



Installation and servicing instructions

MODEL **GENUS 27 BFFI**

Type C

with Sealed Combustion Chamber

G.C. NUMBER

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Produced by Merloni Termo Sanitari<sup>spa</sup> - Italy

**LEAVE THESE INSTRUCTIONS  
ADJACENT TO THE GAS METER**

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*Dear customer,  
Thank you for choosing a ARISTON combination boiler.  
We guarantee that your boiler is a reliable and technically sound product.  
This Owner's manual provides detailed instructions and recommendations for proper installation, use and maintenance.  
Remember to keep this manual in a safe place for future reference i.e. by the gas meter.  
Your local MTS Servicing Centre is at your complete disposal for all your requirements.*

**MTS (GB) LIMITED**



## **GUARANTEE**

The guarantee on this appliance is valid for 12 months from the date of installation.  
Repairs to the electric, hydraulic or gas circuits may be carried out only by your local authorized MTS Servicing Centre.

*Despite every attempt has been made to avoid errors of any kind in this Owner's Manual, the Management invites customers to inform of any inaccuracies which they may find.  
This will help to improve our service.*

## IMPORTANT INSTRUCTIONS

Read the instructions and recommendations in this owner's manual carefully to ensure proper installation, use and maintenance of the appliance.

Keep this owner's manual in a safe place.

You may need it for your own reference while our Servicing Centre technicians or your installer may need to consult it in the future.

## WARNING

This appliance is designed to produce hot water. It must be connected to a central heating system or to hot water mains system suited to its specifications and capacity.

This appliance **MUST BE USED ONLY** for the purpose for which it is designed.

The manufacturer declines all liability for damage caused by improper or negligent use.

**BEFORE CONNECTING** the appliance check that the information shown on the data plate and on the technical data table comply with the electric, water and gas mains of your home.

You will find the data plate on the control panel.

The gas with which this appliance operates is also shown on the label at the bottom of the boiler.

**DO NOT** install this appliance in a damp environment or close to equipment which spray water or other liquids.

**DO NOT PLACE** objects on the appliance.

**DO NOT ALLOW** children or inexperienced people to use the appliance without supervision.

If you smell gas in the room, **DO NOT TURN ON** light switches, use the telephone or any other object which might cause sparks.

Open doors and windows immediately to ventilate the room.

Shut the gas mains tap ( on the gas meter ) or the valve of the gas cylinder and call your Gas Supplier immediately.

If you are going away for a long period of time, remember to shut the mains gas tap or the gas cylinder valve.

**ALWAYS DISCONNECT** the appliance either by unplugging it from the mains or turning off the mains switch before cleaning the appliance or carrying out maintenance.

**IN THE CASE OF FAULTS OR FAILURE**, switch off the appliance and turn off the gas tap. Do not tamper with the appliance.

For repairs, call your local Authorized Servicing Centre and request the use of original spare parts.

For in guarantee repairs contact MTS (GB) LIMITED

**NEVER** block the ventilation outlet of the compartment in which the boiler is installed with rags or paper.

**CHECK** the following at least once a year:

- 1 - Check the seal of water connections, replacing the gaskets if necessary.
- 2 - Check the seal of the gas connections, replacing the gaskets if necessary.
- 3 - Check the general condition of the appliance and of the combustion chamber visually.
- 4 - Visual check of the combustion: clean burners if necessary.
- 5 - With reference to point 3, dismount and clean the combustion chamber if necessary.
- 6 - With reference to point 4, dismount and clean the injectors if necessary.
- 7 - Visual check of the primary heat exchanger:
  - check for overheating of the exchangers fins;
  - clean the fume side of the exchanger if necessary.
- 8 - Regulate the gas pressure, ignition pressure, partial flame, maximum flame.
- 9 - Check proper operation of the heating safety system:
  - maximum safety temperature;
  - maximum safety pressure.
- 10 - Check the proper operation of the gas safety system:
  - gas or flame safety device;
  - gas valve safety device.
- 11 - Check that the electric connections have been made in compliance with the instructions shown in the owner's manual.
- 12 - Check the efficiency of the hot water supply (flow and temperature ).
- 13 - General operating check of the appliance.
- 14 - Check room ventilation.
- 15 - Check the exhaust system for the combustion products.

**FAILURE  
TO FOLLOW THE  
ABOVE INSTRUCTIONS  
MAY COMPROMISE  
THE SAFETY OF THE  
APPLIANCE**

# 1 GENERAL INFORMATION

## 1.1 OVERALL VIEW

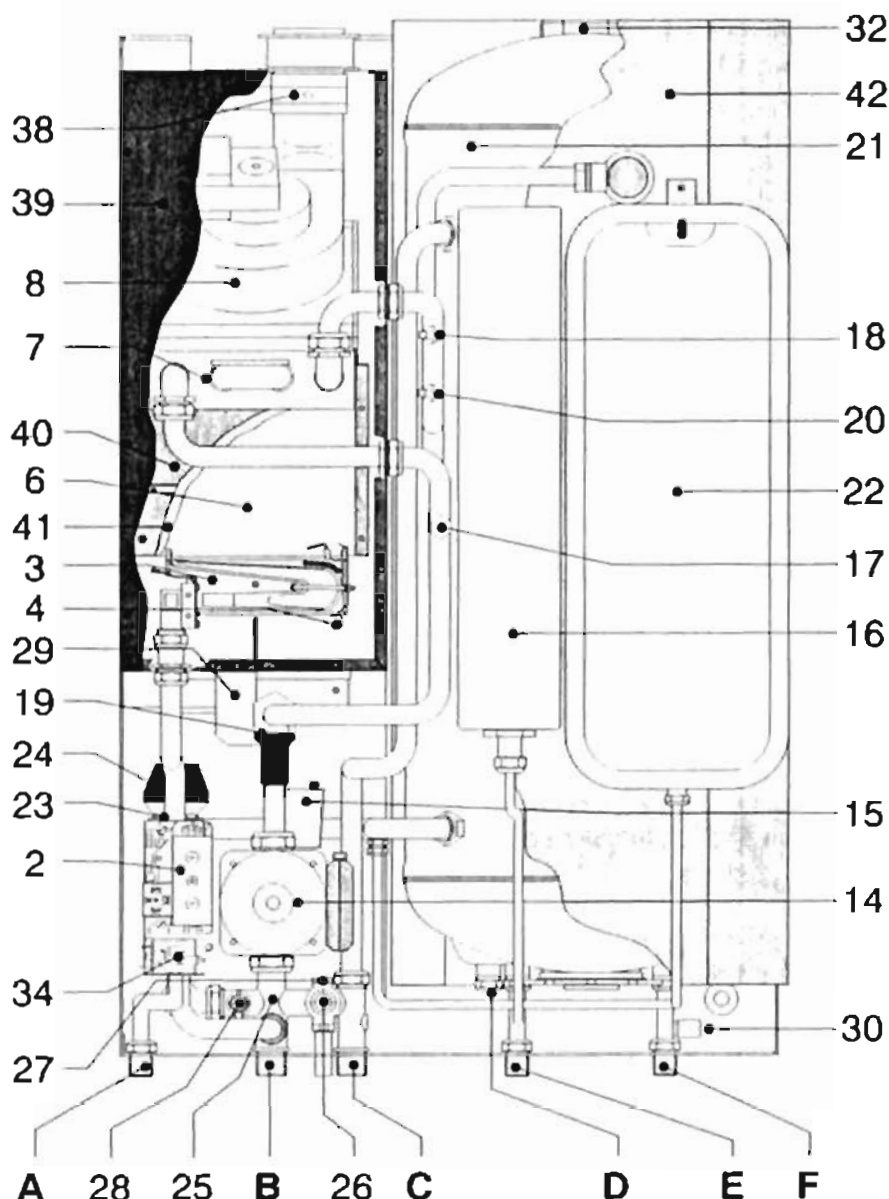
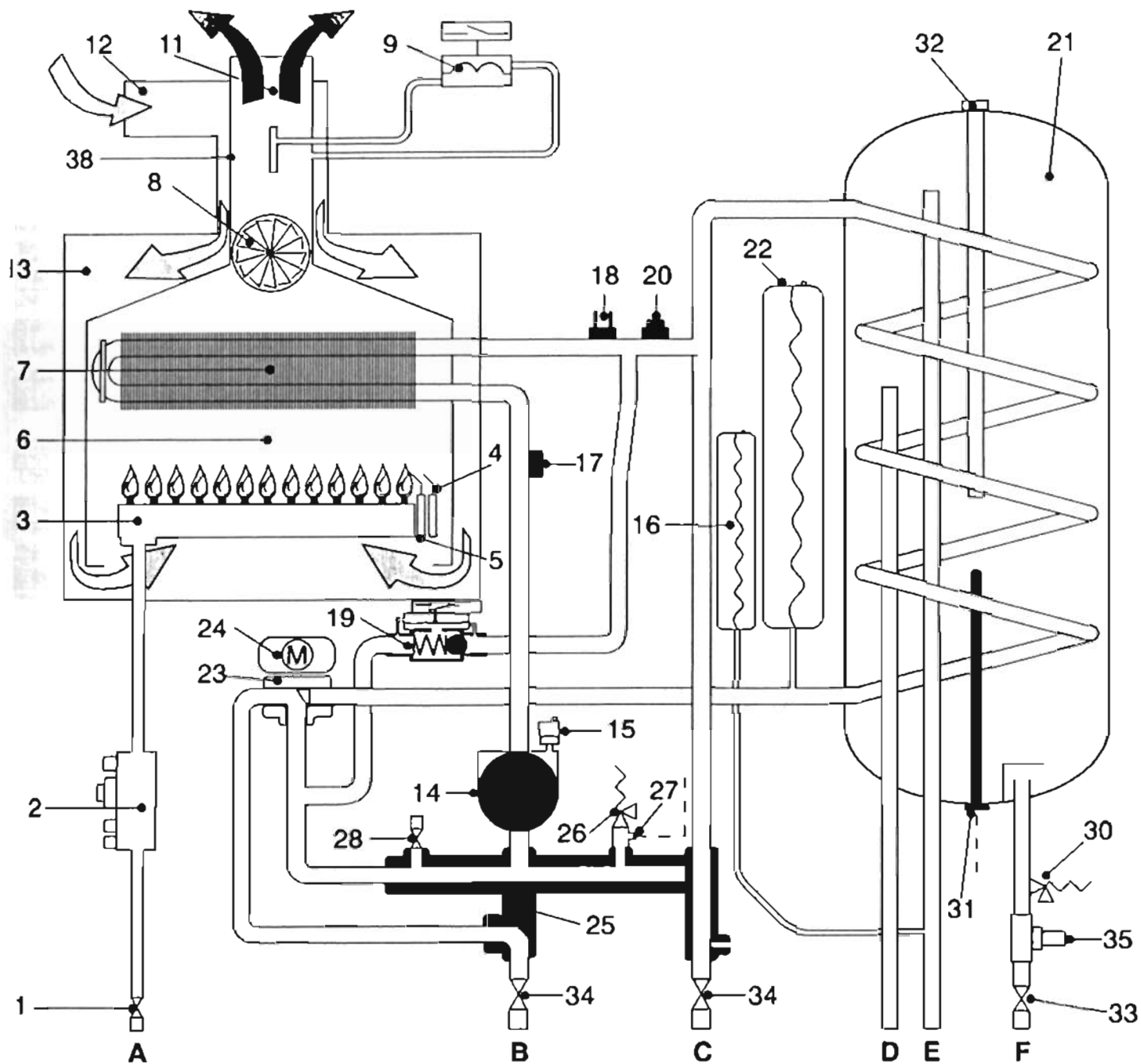


fig. 1.1

- |   |   |
|---|---|
| 1 - Gas cock                                | 22 - C.H. expansion vessel                                    |
| 2 - Gas valve                               | 23 - Three way motorized valve                                |
| 3 - Main burner                             | 24 - Three way valve motor                                    |
| 4 - Ignition electrodes                     | 25 - Multifunctional connector                                |
| 5 - Detection electrode                     | 26 - Safety valve (3 bar)                                     |
| 6 - Combustion chamber                      | 27 - Pressure gauge connection                                |
| 7 - Main exchanger                          | 28 - Manual vent cock   |
| 8 - Fan                                     | 29 - Igniter  |
| 9 - Air pressure switch                     | 30 - D.H.W. safety valve (6 bar)                              |
| 11 - Flue                                   | 31 - Domestic hot water probe                                 |
| 12 - Air intake                             | 32 - Magnesium anode  |
| 13 - Sealed chamber                         | 33 - Domestic water cock                                      |
| 14 - Pump                                   | 34 - C.H.W. cock  |
| 15 - Automatic air release valve            | 35 - Pressure reduction valve with built-in non-return system |
| 16 - D.H.W. expansion vessel                |   |
| 17 - Air intake valve to drain boiler       |   |
| 18 - Overheat thermostat                    |   |
| 19 - Main flow switch with built-in by-pass |   |
| 20 - C.H.W. probe                           |   |
| 21 - Domestic hot water storage             |   |
|   | 38 - Venturi  |
|   | 39 - Sealed chamber from panel                                |
|   | 40 - Combustion chamber front panel                           |
|   | 41 - Insulation panel   |
|   | 42 - Cylinder insulation shell                                |

# General information

## 1.2 C.H.W. & D.H.W. SCHEMATIC



- A: Gas inlet 3/4"
- B: C.H.W. return 3/4"
- C: C.H.W. flow 3/4"
- D: D.H.W. secondary return 1/2"
- E: D.H.W. outlet 1/2"
- F: D.W. inlet 1/2"

fig. 1.2

# General information

## 1.3 TECHNICAL DATA

### Model GENUS 27 BFFI

This boiler is a combined central heating (C.H.) and domestic hot water (D.H.W.) appliance.

It is produced as a room sealed category appliance suitable for wall mounting applications only.

This boiler is suitable only for sealed systems.

Heating input	max	29.8 kW	10111 Btu/h
Heating input	min	12.0 kW	40800 Btu/h
Heating output	max	27.3 kW	92800 Btu/h
Heating output	min	10.1 kW	34500 Btu/h
<b>CENTRAL HEATING</b>			
Operating temperature	max	82°C	
Operating temperature	min	42°C	
Working pressure	max	2.5 bar	36.25 p.s.i.
Water content		2.7 lts.	0.6 gals.
Built-in expansion vessel - Total capacity		7 lts.	1.53 gals.
Built-in expansion vessel - Pre-charge pressure		1 bar	14.5 p.s.i.
Available head at 1000 lts./h (220 gals./h)		2.00 m w.g.	78.73 ins w.g.
Temp. difference for flow and return		20°C	
Flow rate of water through the appliance		1000 lts./h	219.3 gals./h
Max permissible cold water capacity without additional expansion vessel		70 lts./h	15.3 gals./h
<b>DOMESTIC HOT WATER</b>			
Working pressure	max	6 bar	
Stored d.h.w. cylinder capacity	lts.	60	
Stored d.h.w. min/max temp	°C	40/70	
Specific flow rate *	(IN 10° Δt=30°C) lts./min	19.2	
D.h.w. expansion vessel	cap. lts.	3	

\* EN 625

COMPONENT DETAILS				
Gas control valve		SIT 837 TANDEM		
Burner		Atmospheric steel - POLIDORO		
ELECTRICAL DATA				
Electrical supply		230 V		
Frequency		50 Hz		
Power consumption		200 W		
Internal fuse rating		FAST 2 AT		
CONNECTIONS				
Gas connection		15 mm o.d.		
C.h. flow		22 mm o.d.		
C.h. return		22 mm o.d.		
D.c.w. inlet		15 mm o.d.		
D.h.w. outlet		15 mm o.d.		
Safety discharge pipe		15 mm o.d.		
FLUE PIPES SPECIFICATIONS				
Outer diameters		Flue exhaust pipe	60 mm	2.36 ins
Outer diameters		Air intake pipe	100 mm	3.93 ins
Standard length			1000 mm	39.38 ins
Maximum length <sup>(2)</sup>			3000 mm	118.1 ins
OTHER SPECIFICATIONS				
Height			900 mm	35.24 ins
Width			600 mm	18.90 ins
Depth			460 mm	14.17 ins
Dry weight			82 mm	121 lb

GAS REQUIREMENTS		NATURAL GAS (G20)		NATURAL GAS (G30)		NATURAL GAS (G31)	
Gas rate	max	3.0 m³/h	106.0 ft³/h	0.88 m³/h	31.1 ft³/h	1.15 m³/h	40.6 ft³/h
Gas rate	min	1.2 m³/h	42.3 ft³/h	0.35 m³/h	12.3 ft³/h	0.46 m³/h	16.2 ft³/h
Inlet pressure		20 mbar	7.8 in w.g.	28 mbar	10.9 in w.g.	37 mbar	14.4 in w.g.
Burner pressure	max	12.3 mbar	4.8 in w.g.	28 mbar	10.9 in w.g.	37 mbar	14.4 in w.g.
Burner pressure	min	2.0 mbar	0.8 in w.g.	5.1 mbar	2.0 in w.g.	7.0 mbar	2.7 in w.g.
Burner injector		15 x 1.25		15 x 0.72		15 x 0.72	

(1) If required an external expansion vessel can be fitted

(2) Using one or more horizontally elongated flue pipes kits (see sect. 1.4)

## General information

### 1.4 AVAILABLE PUMP HEAD

The curve on the internal end cover shows the water pressure (head) available to the central heating (C.H.) circuit as a function of flow; the load loss of the appliance has already been subtracted.

### 1.5 FLUE PIPE OPTIONAL EXTRAS

For a full report about flue pipe optional extras, please consult the "flue pipe accessories" booklet.

### 1.6 DESIGN PRINCIPLES AND OPERATING SEQUENCE

#### Water system design

The basic purpose of a boiler is to generate heat through the combustion of gas and to direct the heat through a water circuit.

A combination-type appliance allows the heat to be used either for heating the environment or for heating hot water for domestic use.

#### Main water circuit

This is an internal water circuit in the appliance which passes through the main heat exchanger and absorbs heat directly from the combustion of gas. The water in this circuit is the same water that is circulated by the pump and flows through the C.H. system.

The direction of the water in the main water circuit can be changed by a diverter valve. The main water circuit is connected to the C.H. circuit during operation with the C.H. system (see fig. 1.3).

When D.H.W. is required, the main water circuit is directed through the cylinder via the diverter valve (see fig.

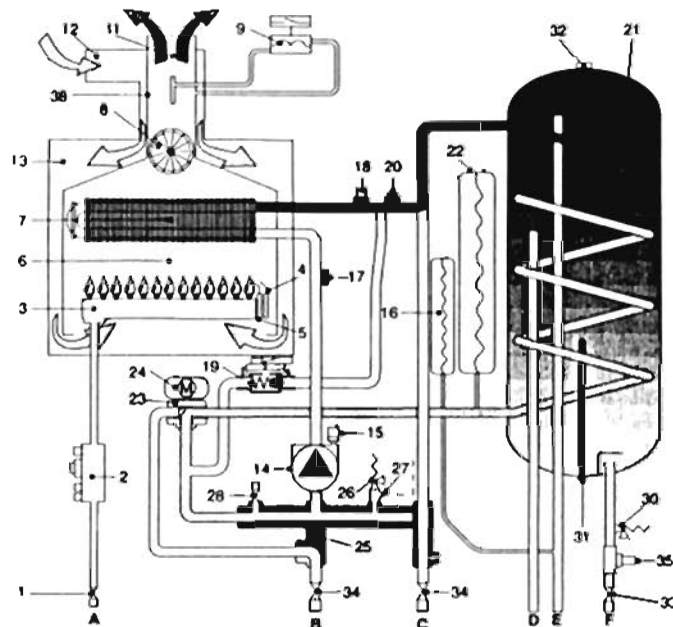


fig. 1.4

### 1.7 SELECTING THE OPERATING MODES

The selector knob (C) on the unit allows you to choose between the various modes:

III' Heating Only Mode

III Domestic Hot Water Only Mode

III' Domestic Hot Water and Heating Mode  
Maintaining the temperature of the water in the tank and use of domestic hot water take precedence over the heating function.

When the selector knob is on this setting, the Flue-Test feature is activated. This feature must only be used by personnel from an Authorized Service Centre for combustion analysis.

#### 1.7.1 ACTIVATING THE HEATING MODE

1. Turn the (K) knob to the - I - setting to supply the boiler with electricity.
2. Turn the selector knob (C) to either the III' or the III' Domestic Hot Water and Heating Mode setting. (On the second setting, domestic hot water is also available).
3. The (H) knob regulates the temperature of the water in the heating circuit. Turning the knob in the clockwise direction increases the temperature, while turning it in the anticlockwise direction decreases the temperature. The temperature range for the water in the heating circuit is 42°C to 82°C. The thermometer (F)

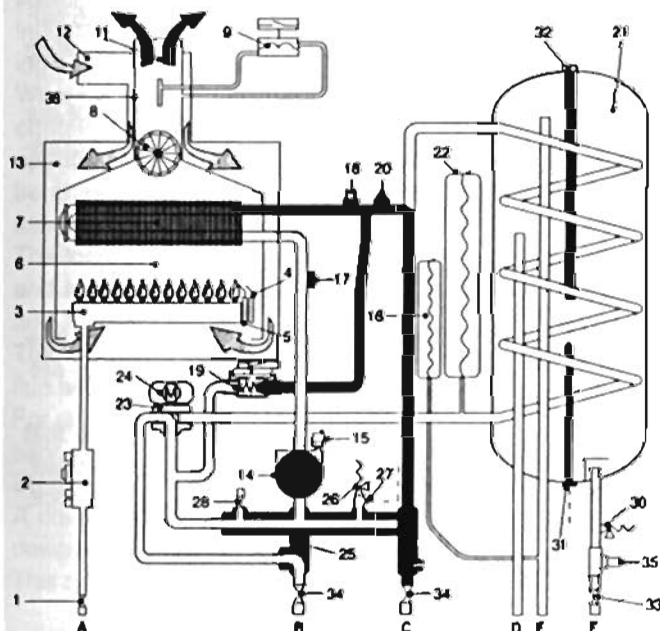


fig. 1.3



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## General information

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indicates the actual temperature. When the LEDs turn on, it indicates that the temperature setting has been reached.

### *Installation without a room Thermostat*


- The ambient temperature is not controlled.
- The water circulation pump runs continuously.


### *Installation with a room Thermostat Connected to the Boiler*

- The ambient temperature is controlled.
- When the temperature setting on the thermostat has been reached, the burner turns off and the pump stops.



## 1.7.2 TURNING OFF THE HEATING MODE

The interruption of the heating mode can be done as follows:

- Turn the selector knob (C) to the  setting.
- If connected, turn the room thermostat on to the "Antifrost" setting.
- Cut off the electrical supply to the unit by turning the switch to the - 0 - setting.

In the first case, the unit will still provide domestic hot water. In the second, domestic hot water will only be available if the selector knob (C) is on the III  setting.


## 1.7.3 ACTIVATING THE DOMESTIC HOT WATER MODE

1. Turn the (K) knob to the "I" setting.
2. Turn the selector knob (C) to either the  or the III  setting. (On the second setting, the heating feature is also on.)

The (E) knob regulates the temperature of the water in the boiler tank. Turning the knob in the clockwise direction increases the temperature, while turning it in the anticlockwise direction decreases the temperature. The temperature range for hot water for domestic purposes is 40°C to 70°C.

## 1.7.4 TURNING OFF THE DOMESTIC HOT WATER MODE

The domestic hot water feature can be turned off in one of the following two ways:

- Turn the selector knob (C) to the III  setting.
- Cut off the supply of electricity to the unit by turning the (K) knob to the - 0 - setting.

In the first case, the heating mode is ON.

## 1.7.5 SAFETY SHUTDOWN OF THE BOILER

The boiler is equipped with safety devices that intervene in certain situations to shutdown the unit.

Some of these situations are signalled by the appliance itself and can be corrected by the user.

### *Shutdown due to lighting failure*

This situation is indicated by the (B) LED turning on.

To restart the appliance, press and then release the (A) button.

This will activate the electronic lighting system, which will try to light the burner again.

Should this problem occur on a regular basis, contact one of our Authorized Service Centres for assistance.

### *Shutdown due to overheating*

This situation is indicated by the (G) LED turning on.

In this case, the safety thermostat shuts down the unit.

To restart the appliance, wait until the thermostat cools down and then press and release the (A) button.

Should the safety thermostat shutdown the unit on a regular basis, contact one of our Authorized Service Centres for assistance.

### *Boiler shutdown due to insufficient water pressure*

This situation is signalled by the (D) LED turning on.

One of the possible causes of this type of shutdown may be an insufficient amount of water in the appliance.

Check the pressure of the system on the pressure gauge (M). If the pressure is below 1 bar, add water to the system until the pressure reaches a median value of 1.5 bar. To reset the system, turn the boiler off and then on using the (K) knob.

In the event that the system will not restart, one of our Authorized Service Centres must be contacted for assistance.

## 1.7.6 TURNING OFF THE BOILER

To turn off the main burner, cut off the supply of electricity to the appliance and turn the (K) switch to the - 0 - setting.

To completely disable the unit, it is recommended that the bipolar switch to which the unit is connected be used.

As a safety precaution, it is best to shut off the gas cock, which is usually located beneath the appliance.

## 2 GENERAL REQUIREMENTS

***This appliance must be installed by a competent installer in accordance with the 1984 Gas Safety (Installation & use) Regulations (as amended).***

### 2.1 RELATED DOCUMENTS

The installation of this appliance must be in accordance with the relevant requirements of the 1984 Gas Safety (Installation & use) Regulations, the Local Building Regulations, the current I.E.E. Wiring Regulations, the by laws of the local water undertaking, and in Scotland, in accordance with the Building Standards (Scotland) Regulation. Health and safety document n° 635 "Electricity at work regs. 1989".

Installation should also comply with the following British Standard Codes of Practice:

Low pressure pipes	BS 6891	1988
Boilers of rated input not exceeding 60 kW	BS 6798	1987
Forced circulation hot water system	BS 5449	1990
Installation of gas hot water supplies for domestic purposes (2 <sup>nd</sup> family gases)	BS 5546	1990
Flues	BS 5540-1	1990
Air supply	BS 5540-2	1989

### 2.2 LOCATION OF APPLIANCE

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

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

The location must permit adequate space for servicing and air circulation around the appliance (see fig. 3.1-a and 3.1-a ).

The location must permit the provision of an adequate flue and termination.

For unusual locations special procedures may be necessary.

BS 6798-1987 gives detailed guidance on this aspect.

A compartment used to enclose the appliance must be designed specifically for this purpose.

This appliance is not suitable for outdoor installation.

### 2.3 FLUE SYSTEM

The provision for satisfactory flue termination must be made as described in BS 5440-1.

The appliance must be installed so that the flue terminal is exposed to outdoor air.

The terminal must not discharge into an another room or space such as an outhouse or lean-to.

It is important that the position of the terminal allows a free passage of air across at all times.

The terminal should be located with due regard for the damage or discoloration that might occur on buildings in the vicinity.

In cold and/or humid weather water vapour may condense on leaving the flue terminal.

The effect of such "steaming" must be considered.

The minimum acceptable spacing from the terminal to obstructions and ventilation openings are specified in fig. 2.1.

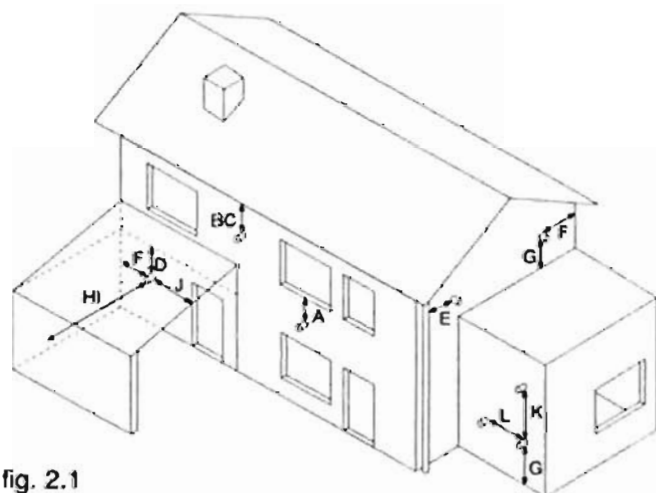


fig. 2.1

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

### 2.4 GAS SUPPLY

The gas meter is connected to the service pipe by the local gas region contractor.

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

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

Installation pipes should be fitted in accordance with BS 6891-1988 and the complete installation should be tested for soundness.

# General requirements

## 2.5 AIR SUPPLY

The room in which the boiler is installed does not require a purpose provided air vent.

If installed in a cupboard or compartement, ventilation is required for cooling.

Recommendations for air supply are detailed in BS 5440-2.

The following notes are for general guidance.

The minimum effective area requirement is:

230.4 cm<sup>2</sup> / 34.9 in<sup>2</sup> at high level

230.4 cm<sup>2</sup> / 34.9 in<sup>2</sup> at low level

The figures quotes relate to the ventilation requirement if the ventilation is into a room. If the ventilation is to the outside then the above sizes can be halved.

## 2.6 WATER CIRCULATION (Central heating)

Detailed recommendations are given in BS 6798-1987 and BS 5449-1 1990; the following notes are given for general guidance.

### Pipework

Copper tubing to BS 2871-1 1977 is recommended for water pipes. Jointing should be either with capillary soldered or compression fittings.

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

The appliance has a built-in automatic air release valve;

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

Except where providing useful heat, pipes should be insulated to prevent heat loss and avoid freezing.

Particular attention should be paid to pipes passing through ventilated spaces in roofs and under floors.

### Installation of by-pass

The installation of a by-pass is not required because an automatic one is incorporated into the main flow switch.

### System design

This boiler is suitable only for sealed systems.

A typical lay-out is illustrated in fig. 2.2.

### Drain cocks

These must be located in accessible positions to permit the draining of the whole system. The taps must be at least 15 mm nominal size and manufactured in accordance with BS 2870-1980.

### Air release points

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

The appliance has an integral sealed expansion vessel to accomodate the increase of water volume when the system is heated.

- A: Gas inlet
- B: C.H.W. return
- C: C.H.W. flow
- D: D.H.W. secondary return
- E: D.H.W. flow
- F: D.H. inlet

- |                              |                             |
|------------------------------|-----------------------------|
| 1 - Gas meter inlet cock     | 10 - Thermostat             |
| 2 - Gas meter                | 11 - Time control clock     |
| 3 - Gas meter outlet cock    | 12 - Radiator control clock |
| 4 - Internal gas cock        | 13 - Holder                 |
| 5 - Appliance gas inlet cock | 14 - Air release valve      |
| 6 - D.W. inlet cock          | 15 - Drain valve            |
| 7 - D.H.W. expansion vessel  | 16 - TMP valve              |
| 8 - cock                     | 17 - Safety valve           |
| 9 - Secondary return pump    | 18 - Tundish                |

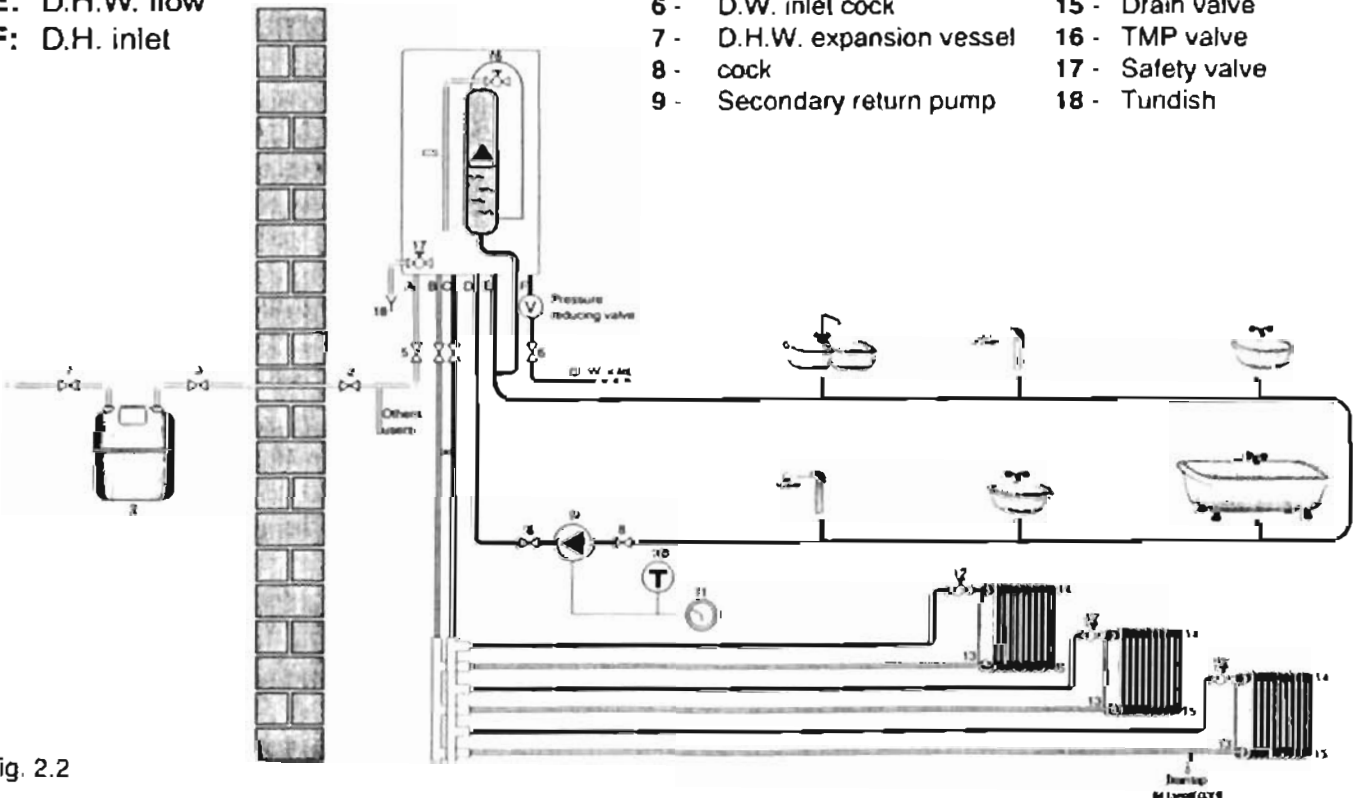


fig. 2.2

## General requirements

It can accept up to 7 lts ( 1,5 gals.) of expansion water.  
If the heating circuit has an unusually high water content, calculate the total expansion and add additional sealed expansion vessel with adequate capacity.

### Mains water feed: central heating

No direct connection to the mains water supply even through a non return valve, may be made without the approval of the Local Water Authority.

### Filling

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

A possible method is shown in fig. 2.3.

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

## 2.7 DOMESTIC WATER

The domestic water must be in accordance with the relevant recommendations of BS 5546. Copper tubing to BS 2871-1 is recommended for water carrying pipework and must be used for pipework carrying drinking water.

## 2.8 ELECTRICAL SUPPLY

**Warning, this appliance must be earthed.**

External wiring to the appliance must be carried out by a qualified technician and be in accordance with the current I.E.E. Regulations and applicable local regulations .

This boiler is supplied for connection to a 230 VAC 50 Hz supply.

The supply must be fused at 3 A.

The method of connection to the electricity supply must facilitate complete electrical isolation of the appliance by the use of a fused double pole isolator having a contact separation of the least 3 mm in all poles or alternatively, by means of a 3 A fused three pin plug and unswitched shuttered socket outlet both complying with BS 1363.

The point of connection to the Electricity supply must be readily accessible and adjacent to the appliance unless the appliance is installed in bathroom when this must be sited outside the bathroom.

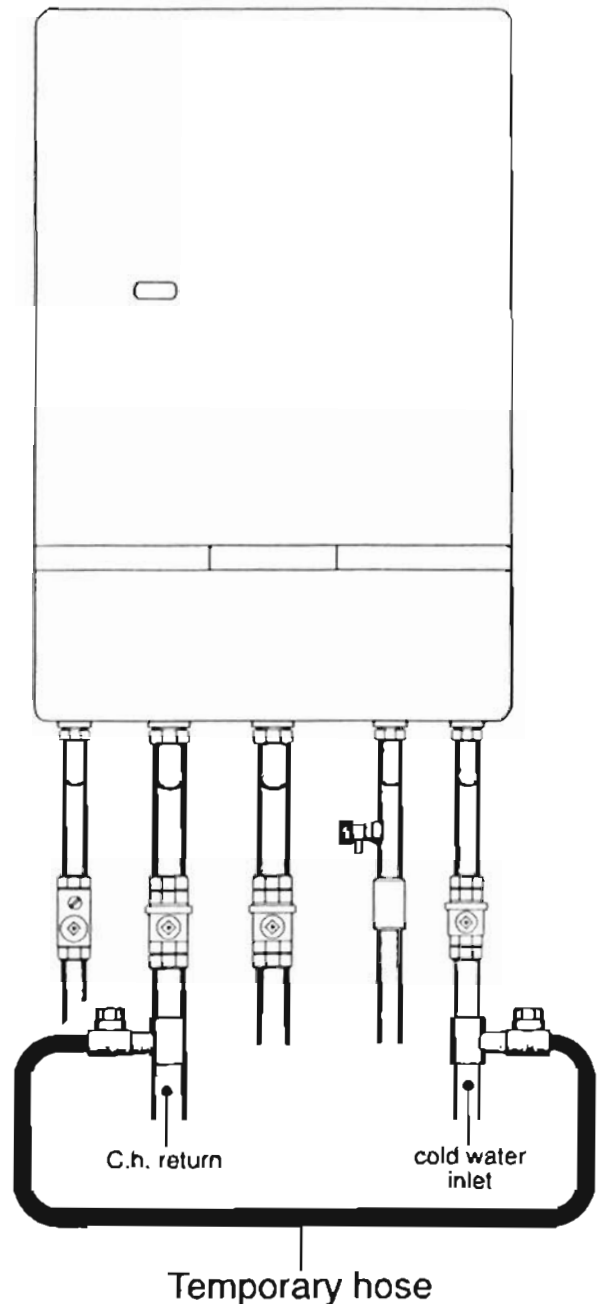


fig. 2.3

## 3 INSTALLATION

### 3.1 DELIVERY

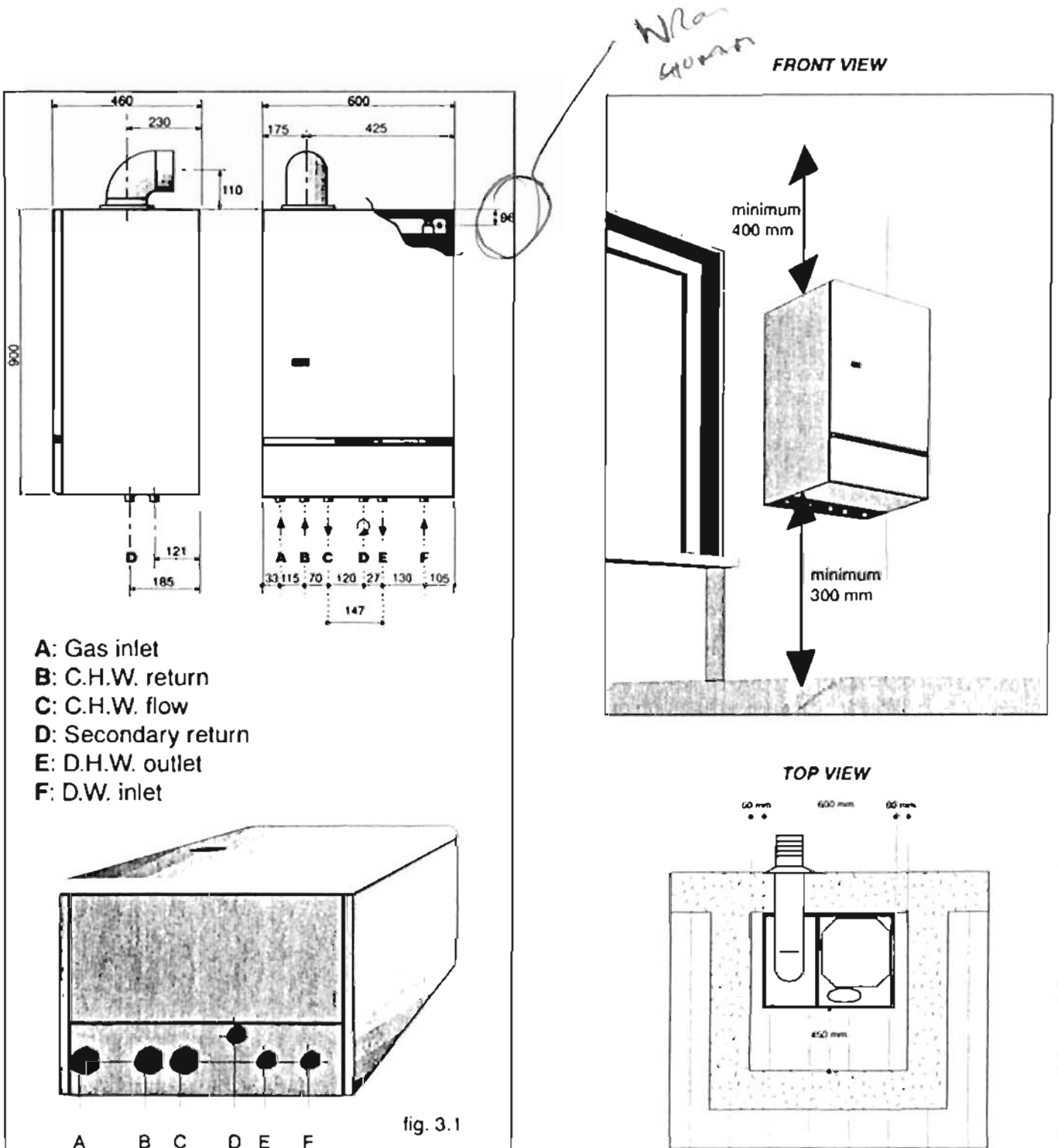
There will be 3 items:

- 1 - The fully assembled boiler;
- 2 - A skin pack containing cocks and pipes;
- 3 - A documentation bag

### 3.2 MEASUREMENTS FOR INSTALLING THE APPLIANCE

#### IMPORTANT!

To allow easy access to the interior of the boiler for maintenance work, keep to the minimum dimensions shown in the drawing.



# Installation

## 3.3 UNPACKING THE BOILER

- A - Remove the plastic strap;
- B - Open the top of the carton and remove again:
  - n.1 - hard-board sheet;
  - n.1 - polystyrene sheet;
  - n.2 - polystyrene strips;
  - n.1 - instruction kit;
  - n.1 - pipework skin-pack;
- C - Pull the carton upwards;
- D - Remove n.4 polystyrene angulars.



### IMPORTANT!

All of the boiler packaging (carton and polystyrene) is fully recyclable.

### IMPORTANT!

All packaging must be properly and thoroughly disposed of, as some components (i.e.: polythene, staples etc.) could prove to be dangerous to young children.

## 3.4 POSITIONING OF THE BOILER

(see fig. 3.3).

- 1 - Drill holes for flue/air intake (consult flue pipe accessories) and for wall metal template (B = 14 mm diam.);

- 2 - Assemble, and loosley secure template on to the wall.

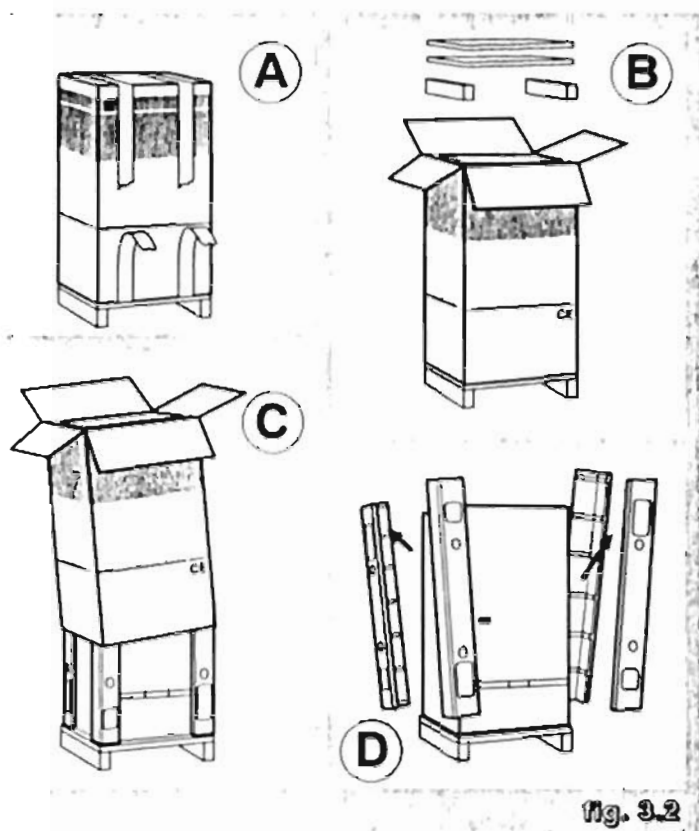


fig. 3.2

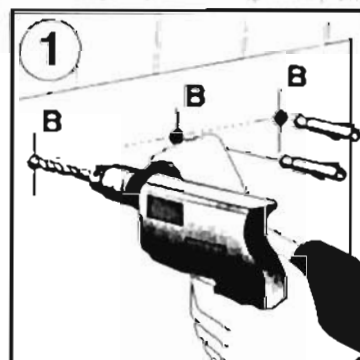
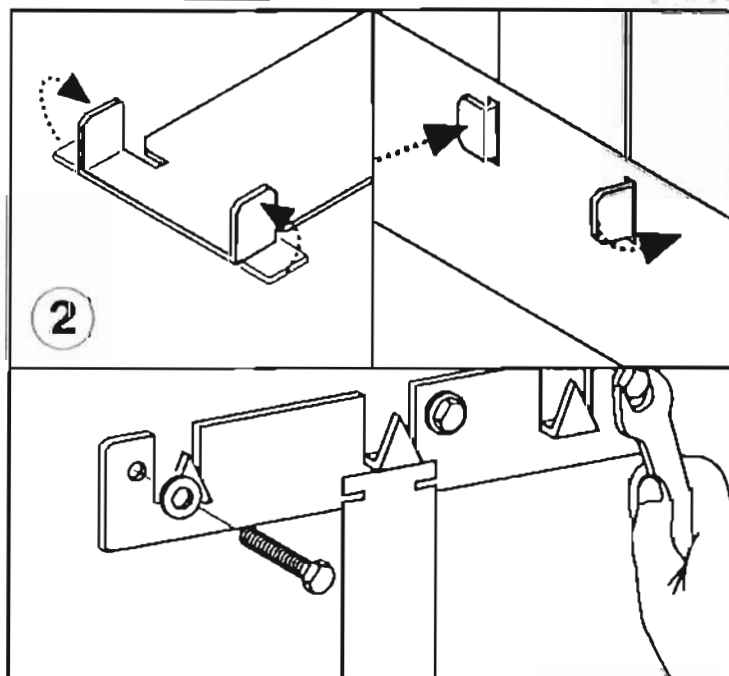


fig. 3.3



## Installation

- 3- Cut plumb service pipes using the lower plate edge, as reference;
- 4 - Remove the middle and bottom part of template and secure firmly the top plate to the wall;
- 5 - Hang the boiler via holes in the boiler frame "F";
- 6 - Assemble the pipework;
- 7 - At the point "K", drill an hole into the wall to secure the boiler by security bolt.

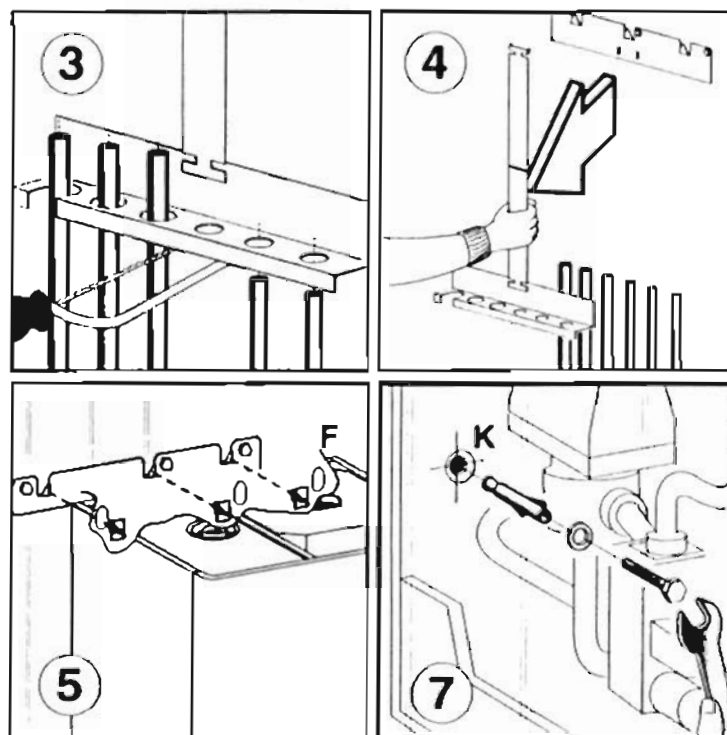


Fig. 3.3

### 3.5 SAFETY VALVE DISCHARGE CONNECTION

The safety discharge pipe from the TMP and safety valves must be connected to a discharge pipe via a tundish as per building regulation G3.

N.B. The discharge pipe from the tundish must be in 22mm pipe for the first 9M then increased by one pipe size for each subsequent 9M (each 90° elbow used reduces the available pipe run by 0,8 m);

### 3.6 MOUNTING THE FLUE EXHAUST PIPES

Please consult the "Flue pipe accessories" booklet.

#### NOTE:

During the drilling of hole for the flue air intake, ensure that its diameter is bigger than the pipe which will be fitted. This, to guarantee the extraction of the pipe if required in the future.

The sealant between the pipe and the wall is assured by an internal and external flange (see the "Flue pipe accessories" booklet).

# Installation

## 3.7 FLUE TERMINAL GUARD

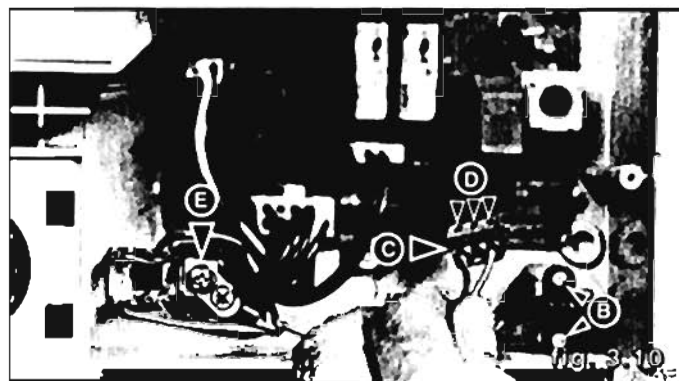
Where the lowest part of the terminal is less than 2 m (6.5 ft) above the level of any ground, balcony, flat roof or place to which any person has access then a suitable terminal guard must be fitted. A suitable guard is available from:

### TOWER FLUE COMPONENTS

Morley Road  
Tonbridge  
Kent TN91RA

When ordering the guard, quote appliance model number.

The guard should be fitted centrally over the terminal.



## 3.8 ELECTRICAL CONNECTIONS

### Connecting to the electricity supply

**WARNING - THIS APPLIANCE MUST BE EARTHED**

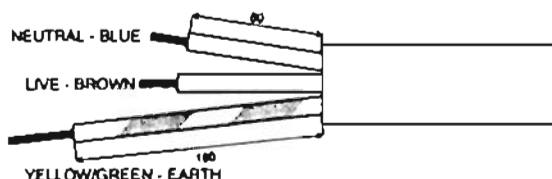
The appliance is delivered with a flexible cable for electrical supply. The cable allows the electrical connection as detailed in sect. 2.8 .

### Replacing the electrical supply cord

- 1 - Ensure electricity is switched off at main isolator;
- 2 - Remove the boiler casing (see sect. 8.2);
- 3 - Lower control panel (see sect. 8.2);
- 4 - Loosen screws "B" to slaken the cable clamber (see fig. 3.10);
- 5 - Remove connector "C": firstly from the PCB by unplugging, secondly from the supply cord by loosening screws "D" (see fig. 3.10);
- 6 - Disconnect the yellow/green wire (earth) by loosening screw "E" (see fig. 3.10);
- 7 - Replace with a same characteristic supply cord: a PVC insulated flexible cable, three core of size 0.75 mm<sup>2</sup> to BS6500 table 16.

### **IMPORTANT:**

On preparing new wiring terminals look up the following figure.

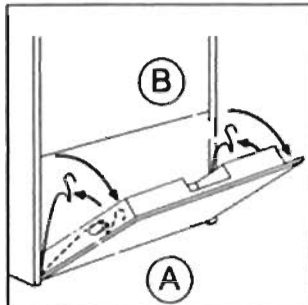




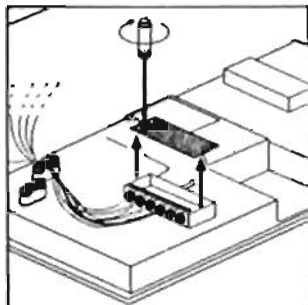
# Installation

## 3.9 ELECTRICAL CONNECTION FOR A ROOM THERMOSTAT

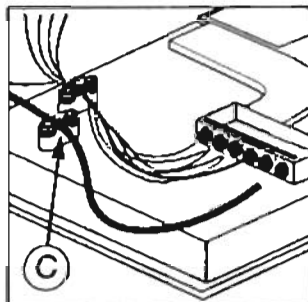
- 1 - Release springs A and B.
- 2 - Lift the control panel.



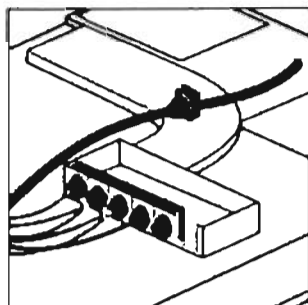
- 3 - Open the cover on the left wire guide box.



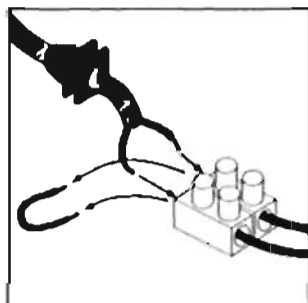
- 4 - Insert the thermostat wire into the wire clamp (C), as indicative in the figure.



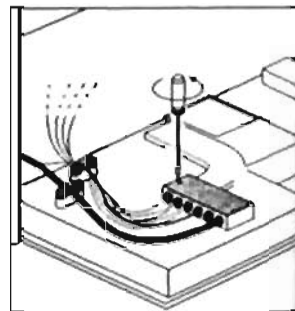
- 5 - Remove the wire guide indicated in the figure, make a hole in it, and pass the thermostat wire through it.



- 6 - Remove one of the two jumpers that are located on the terminal board itself.



- 7 - Return the terminal board and the wire guide to their original positions and close the wire guide box.



### **IMPORTANT:**

The components of the room thermostat which are under tension must be well protected and accessible only through the use of a tool.

## 4 COMMISSIONING

### 4.1 ELECTRICAL INSTALLATION

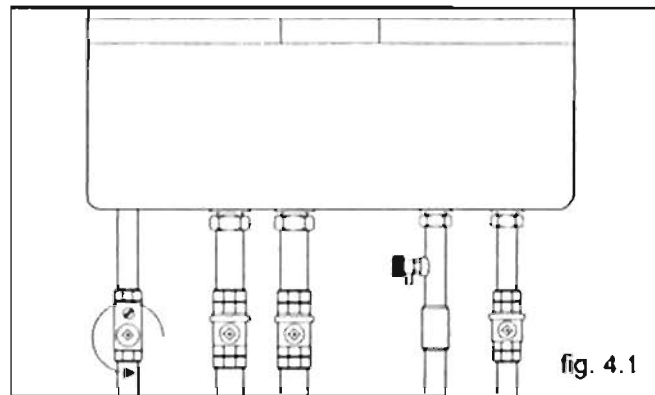
Preliminary electrical system checks to ensure electrical safety must be carried out by a qualified electrician.

i.e. polarity, earth continuity, resistance to earth and short circuit.

If a fault has occurred on the appliance the fault finding procedure should be followed as specified under the servicing section of this document.

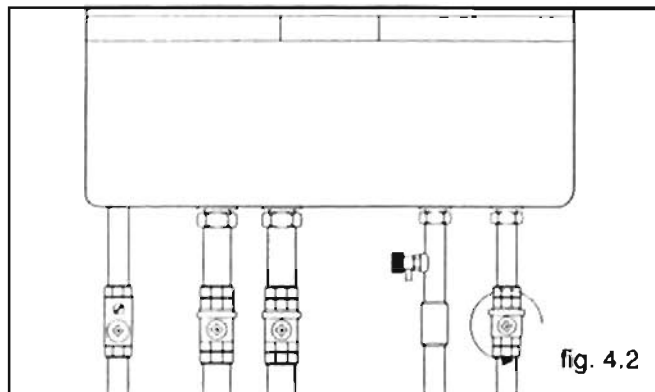
### 4.2 GAS SUPPLY INSTALLATION

- 1 Inspect the entire installation including the gas meter, test for soundness and purge, as described in BS6891;
- 2 Open the gas cock (drawn with the knob in "open" position on the appliance) and check the gas connector on the appliance for leaks (see fig. 4.1.).



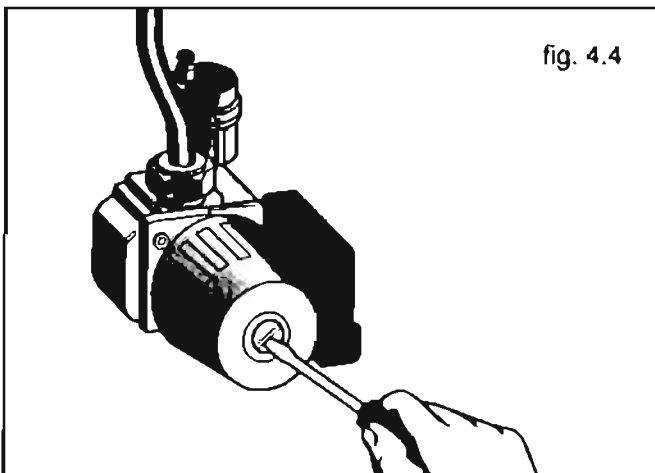
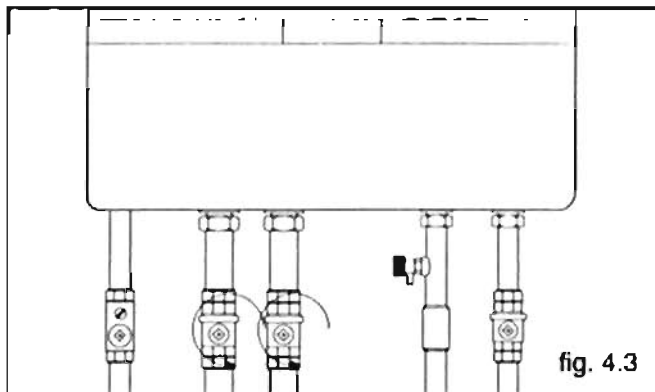
### 4.3 FILLING THE D.H.W. SYSTEM

- 1 Close all hot water draw-off taps;
- 2 Open the cold water inlet cock as indicated in fig. 4.2;
- 3 Slowly open each draw-off tap and close it only when clear water, free of bubbles, is visible.



### 4.4 INITIAL FILLING OF THE SYSTEM

- 1 Open central heating flow and return cocks as indicated in fig. 4.3;
- 2 Unscrew the cap on the automatic air release valve one full turn and leave open permanently;
- 3 Close all air release valves on central heating system;
- 4 Gradually open stopcock at the filling point connection to central heating system until water is heard to flow; do not open fully;
- 5 Open each air release tap starting with the lower point and close it only when clear water, free of bubbles, is visible;
- 6 Remove the front panel of the case and lower the control panel (sect. 8.2);
- 7 Purge the air from the pump by unscrewing the pump plug indicated as indicated in fig. 4.4; release the pump by turning the rotor in the direction indicated by the arrow on the information plate;
- 8 Close the pump plug;
- 9 Continue filling the system until at least 1.5 bar registers on the temperature-pressure gauge;
- 10 Inspect the system for water soundness and remedy any leaks discovered.



# Commissioning

When the installation and filling are completed turn on the central heating system ( sect. 4.5 ) and run it until the temperature has reached the boiler operating temperature. The system must then be immediately flushed through. The flushing procedure must be in line with BS7593:1992 *treatment of Water in Domestic Hot Water Central Heating Systems*.

During this operation, we highly recommend the use of a central heating flushing detergent, whose function is to dissolve any foreign matter which may be in the system i.e. Fernox Superfloc or equivalent.

**Substances different from these, could create serious problems to the pump or others components.**

We also recommend the use of an inhibitor in the system such as Fernox MB1 Universal or equivalent.

## 4.5 SETTING THE SYSTEM PRESSURE

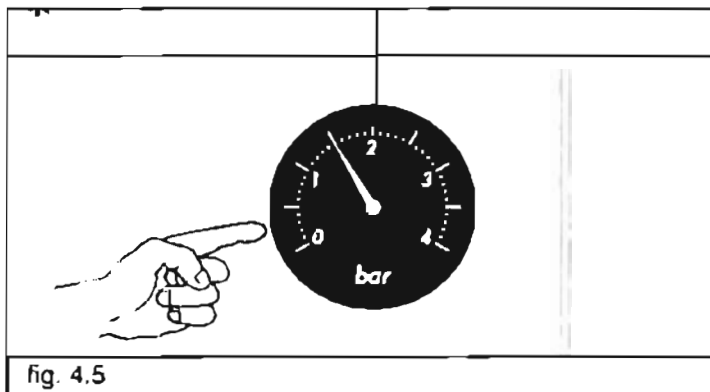


fig. 4.5

The actual reading should ideally be 1.5 bar (see fig. 4.5).

## 4.6 LIGHTING THE BOILER

Set the time clock to manual - if fitted.

If external controls are fitted e.g. Timeclock, room thermostat ensure that they "call for heat".

- 1 Switch on the electricity and turn on the boiler by selecting "I" on the knob K

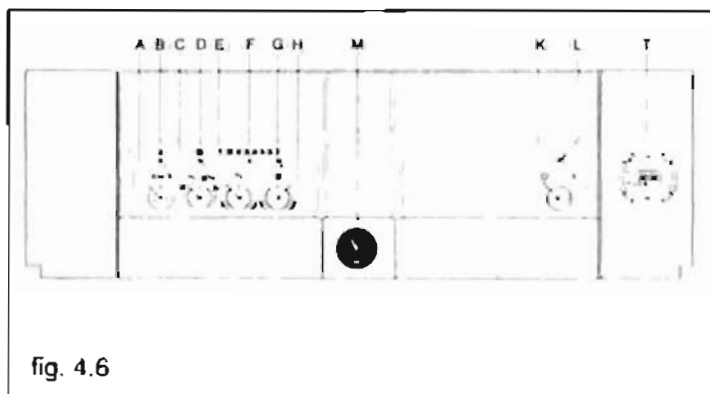


fig. 4.6

- 2 Select heating mode by positioning knob C on III position (see fig. 4.6).

- 3 Check the burner pressures and adjust as necessary as in section 4.

The boiler will now go through an ignition sequence and the burner will light.

## 4.7 CHECKING THE FULL SEQUENCE CONTROL

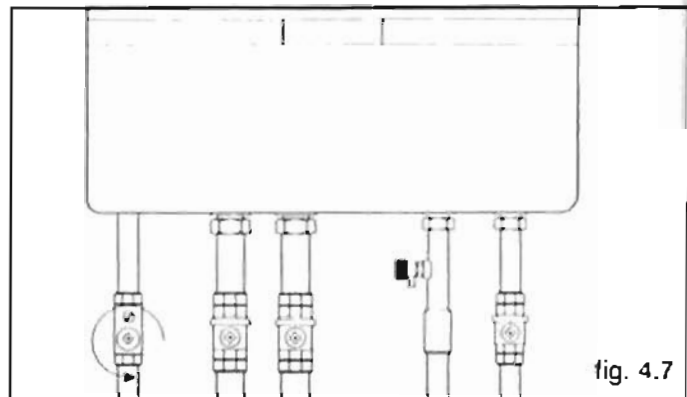



fig. 4.7

With the burner on high flame, close the gas cock (drawn with the knob in "close" position) turning the screw in a clockwise direction (see fig. 4.7);

After several seconds, the shut-down warning light will appear.

To reset the boiler, open gas cock and depress the reset push button "C" marked with the symbol  (see fig. 4.6).

## 5 MAINTENANCE

### 5.1 GENERAL

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

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

The following notes apply to the appliance but it should be remembered that attention must be also paid to the central heating and domestic hot water circuits with special attention to radiator valves; thermostats, clocks, leaking hot water taps etc.

#### WARNING

Before starting any servicing work, switch-off the electrical supply or disconnect the plug at the main isolating switch and socket ( if a switch is used remove the fuse ).

After any service on electrical components carry out a preliminary electrical checks; in particular:

earth continuity;

polarity;

earthing resistance;

short circuit.

### 5.2 RECOMMENDED ROUTINE MAINTENANCE

The following procedures should be carried out at least once a year:

- 1 Verify that the electrical connections, the flue pipe-work and the case are in good condition;
- 2 Inspect ventilation arrangements as explained in section 2.6 to ensure no alterations have been made since installation;
- 3 Switch-off the electrical supply and remove the front panel of the case (section 5.2);
- 4 Switch-on the electrical supply and run the boiler for few minutes in D.H.W. mode;
- 5 Check that the flame covers all the flame ports and is of a light blue colour. Yellow flames and excessive lifting of flames indicate poor combustion.
- 6 Visually check the flue system for soundness.

Check all clamps, gaskets and fixings are secure and tight. To check the exhaust gas, remove the right screw indicated in fig. 5.1 and connect the analyser to the flue gas sampling point.

To check the air inlet temperature, remove the left screw indicated in fig 5.1 and insert the probe of a thermometer.

#### To inspect and clean the appliance

- 7 Switch-off the electrical supply, remove the sealed chamber cover and open the combustion chamber (section 5.2);
- 8 If during initial check any combustion irregularity is suspected, remove the burner and the injectors (section 5.13).  
Clean or replace if necessary;
- 9 Inspect the main heat exchanger for any deposits of soot. If cleaning is necessary place a cloth over the burner to catch debris and clean the main heat exchanger using a soft brush.  
**Do not use brushes with metallic bristles;**
- 10 Inspect the combustion chamber panels.  
Damaged panels should be replaced;
- 11 Examine the fan for any mechanical damage and check to ensure free running of the fan motor;
- 12 Check sealing gaskets and replace if required;
- 13 Replace all parts in reverse order with the exception of the case and the control panel;
- 14 Undertake a complete commissioning check as detailed in section 4;
- 15 Close-up the control panel and the case;
- 16 Clean the case using a soft cloth.

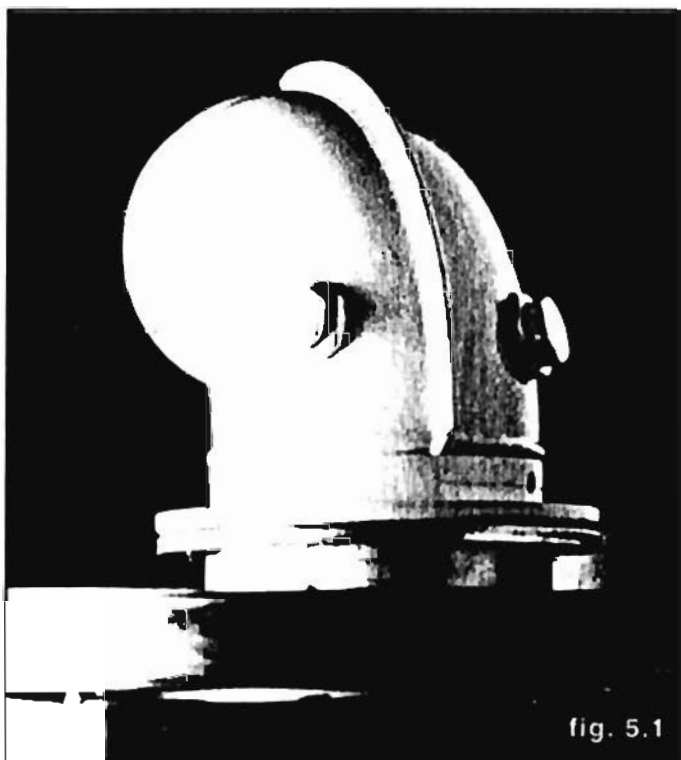


fig. 5.1

## 6 SERVICING INSTRUCTIONS

### 6.1 REPLACEMENT OF PARTS

The life of individual components varies and they will need servicing as and when faults develop.

The fault finding sequence chart in chapter 7 will serve to locate which component is the cause of any malfunction, and instructions for removal, inspection and replacement of the individual parts are given in the following pages.

### 6.2 TO GAIN GENERAL ACCESS

All testing and maintenance operations on the boiler require the control panel to be lowered. These operations also require the removal of the casing.

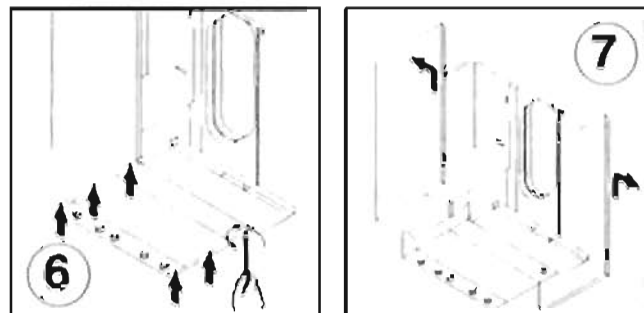
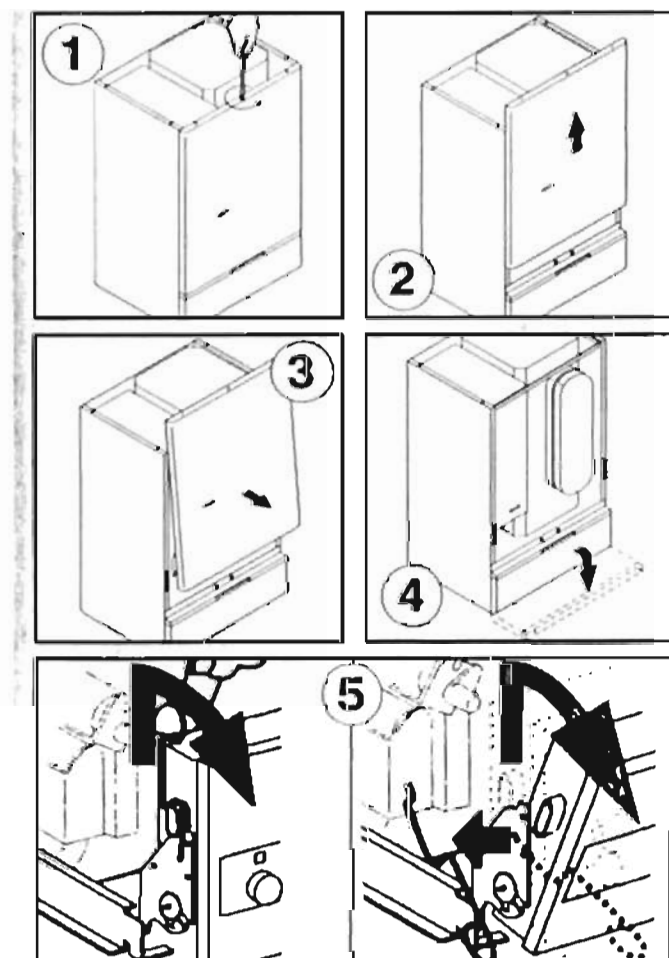


fig. 6.1

The casing is removable as showed on fig. 6.1

- 1 - Remove the screw at the top of the casing front panel.
- 2 - Pull up the casing from panel.
- 3 - Remove it.
- 4 - Open the casing door.
- 5 - To gain access to the control panel remove secure spins.
- 6 - Loosen (not remove) screws at the bottom of side panels.
- 7 - Pull forward one side panel from its bottom edge and push up.



### Removing the sealed chamber cover

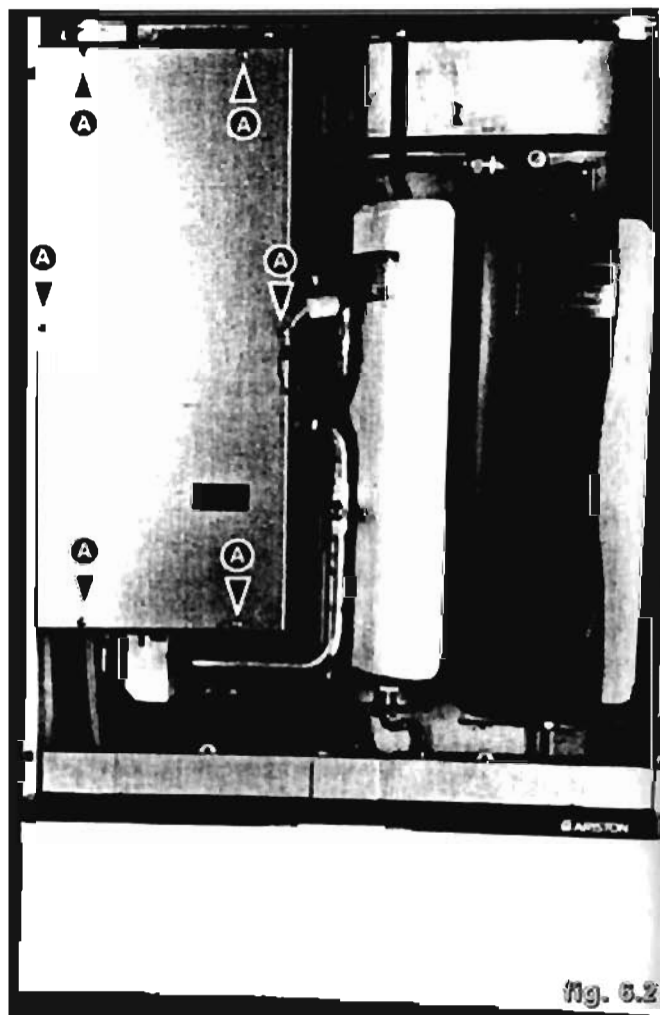
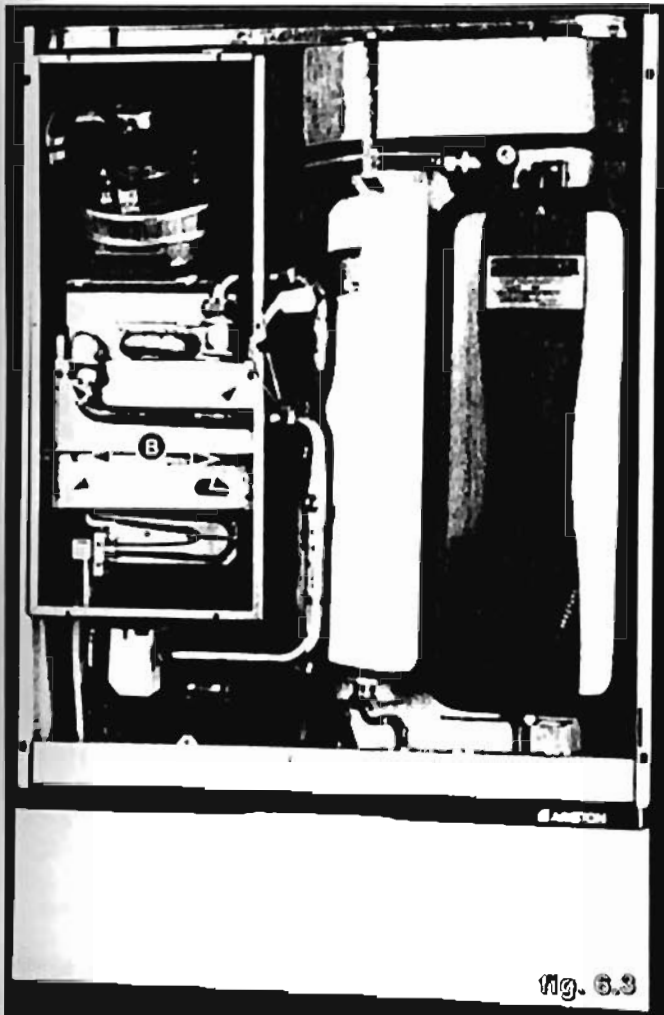


fig. 6.2

To remove the cover, remove screws A (see fig. 6.2). Pull cover forward. When replacing cover ensure that the silicone seal is in good condition. If not, replace the seal.

## General information

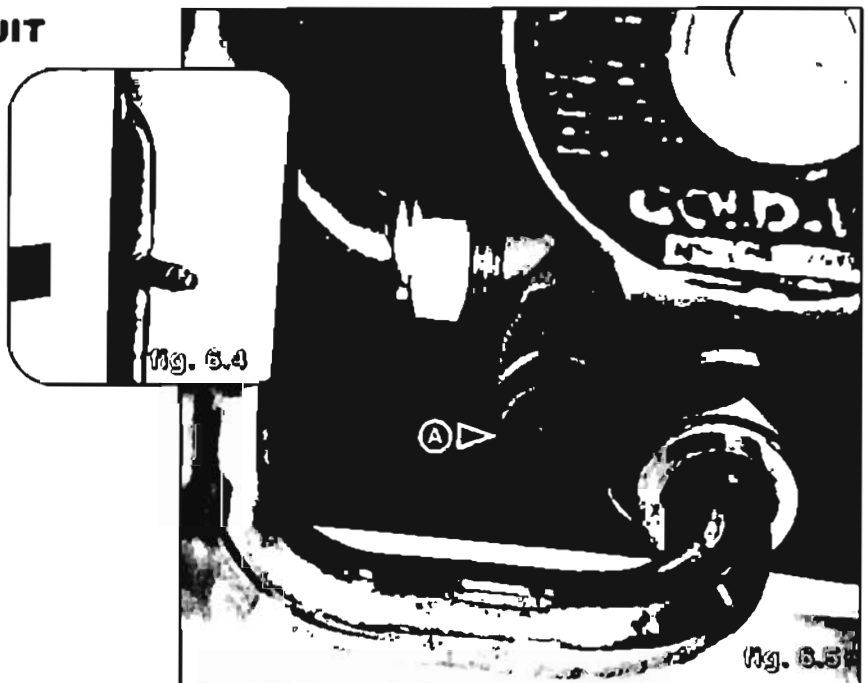
### Opening combustion chamber



- 1 Remove screws B;
- 2 Pull forward and remove.

### 6.3 TO DRAIN THE MAIN CIRCUIT OF THE BOILER

- 1 Close C.H. flow and return cocks;
- 2 Release the manual vent cock (see fig.6.4);
- 3 Attach a small hose to the drainage cock "A" (see fig.6.5);
- 4 Open cock "A" and drain water from boiler.



## General information

### 6.4 TO DRAIN THE D.H.W. CIRCUIT OF THE BOILER

- 1 Close the cold water inlet cock;
- 2 Open the d.h.w. circuit drainage.

### 6.5 SETTING GAS PRESSURE

Inlet gas pressure,  
rated valves           = 180 mm H<sub>2</sub>O (Natural Gas)  
                              = 350 mm H<sub>2</sub>O (LPG)

Maximum inlet  
gas pressure           = 450 mm H<sub>2</sub>O

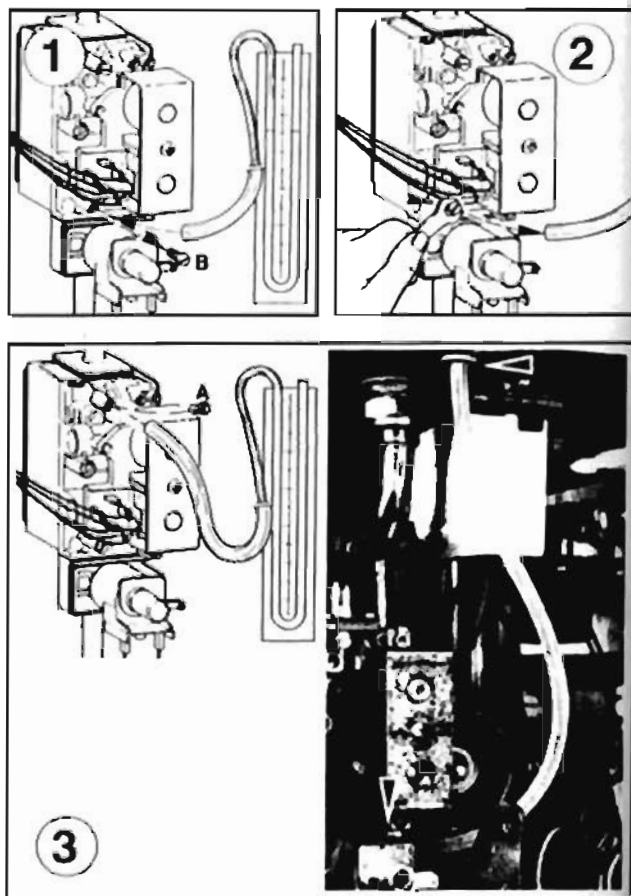
Minimum power of the boiler  
(the same for domestic and heating mode)  
Setting pressures       = 18-20 mm H<sub>2</sub>O (Natural Gas)  
                              = 60-65 mm H<sub>2</sub>O (LPG)

Maximum power of the boiler  
(available on domestic mode always)  
Setting pressures       = 100-115 mm H<sub>2</sub>O (Natural Gas)  
                              = 320-350 mm H<sub>2</sub>O (LPG)

Slow ignition  
Setting pressures       = 50-55 mm H<sub>2</sub>O (Natural Gas)  
                              = 170-180 mm H<sub>2</sub>O (LPG)

#### Setting the minimum and the maximum power of the boiler (see fig. 6.7)

- 1) Check that the supply pressure of gas valve is 20 mbar in the case of natural gas.
- 2) To do this, remove the screw "B". Fit the pipe of the pressure gauge to the pressure connection of the gas valve.  
When you have completed this operation, fit the screw "B" securely into its housing to seal off the gas.
- 3) To check the pressure supplied by the gas valve, remove the screw "A". Fit the pipe of the pressure gauge to the pressure outlet of the gas valve.  
Disconnect the compensation pipe either from the gas valve or from the sealed chamber (see fig. 6.7 a-b)



# Servicing instructions

4) Set the ON/OFF switch to winter position 'I' and the "summer /winter" switch to winter position 'III'. Adjust screw "D" on the solenoid to set the pressure valve (displayed on the pressure gauge) corresponding to the maximum power (see table sect. 1.2).

5) To set the minimum power, disconnect a supply terminal and adjust screw "C". Turn the screw clockwise to increase the pressure and counter-clockwise to decrease the pressure (displayed on the pressure gauge) corresponding to the minimum power (see table sect. 1.2).

6) Re-connect the supply terminal to the solenoid on the gas valve and replace the cap on the screws of the solenoid.

## Setting the maximum heating circuit power (see fig. 6.8)

1) To set the maximum heating circuit power, place the ON/OFF switch to position 'III'. Turn the knob of the heating thermostat clockwise to maximum;

2) Remove the front cover contr. panel and access into the as on sect. 6.8.

Fit a cross-head screw driver into the hole marked "Maximum heating circuit power regulation" through to the potentiometer. Turn clockwise to increase the pressure. Adjust the setting to the required heating pressure valve (displayed on the pressure gauge), as indicated in the diagrams shown on page 57.

3) Turn off the boiler by placing the main switch of the boiler on "OFF".

4) Disconnect the detection electrode cable.

Turn on the boiler by placing the main switch to position "I" and sparks will come on.

Check the gas pressure on the pressure gauge which must be about 50 mm H<sub>2</sub>O.

	NATURAL GAS (G30)	BUTANE GAS (G30)	PROPANE GAS (G31)
Recommended pressure for slow ignition	5 mbar - 1.95 in w.g	18 mbar - 7.0 in w.g	19 mbar - 7.4 in w.g

If it is necessary adjust the slow ignition.

Fit a cross-head screw driver into the hole marked "REGULATION OF SLOW BURNER IGNITION" on the electronic P.C.B., through the potentiometer.

5) Remove the pipe of the pressure gauge and connect screw "A" to the pressure outlet in order to seal off the gas.

6) Carefully check the pressure outlets for gas leaks (valve inlet and outlet).

## IMPORTANT!

Whenever you disassemble and reassemble the gas connections, always check for leaks using a soap water solution.

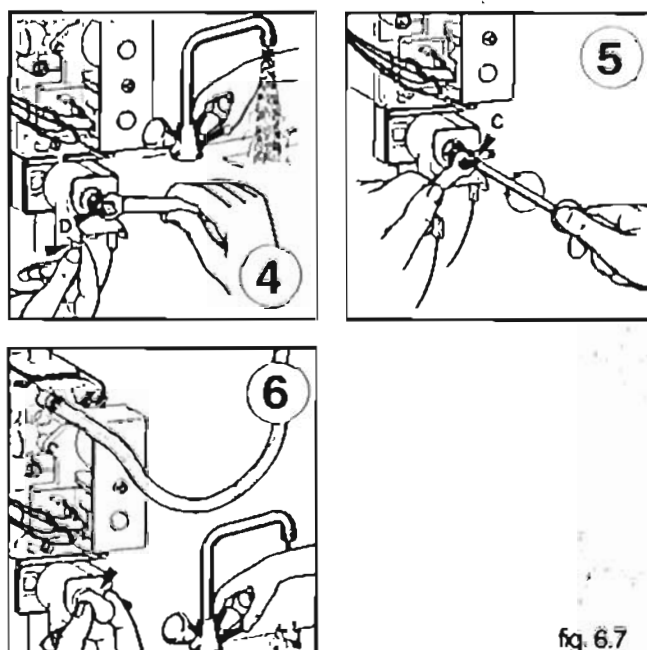


fig. 6.7

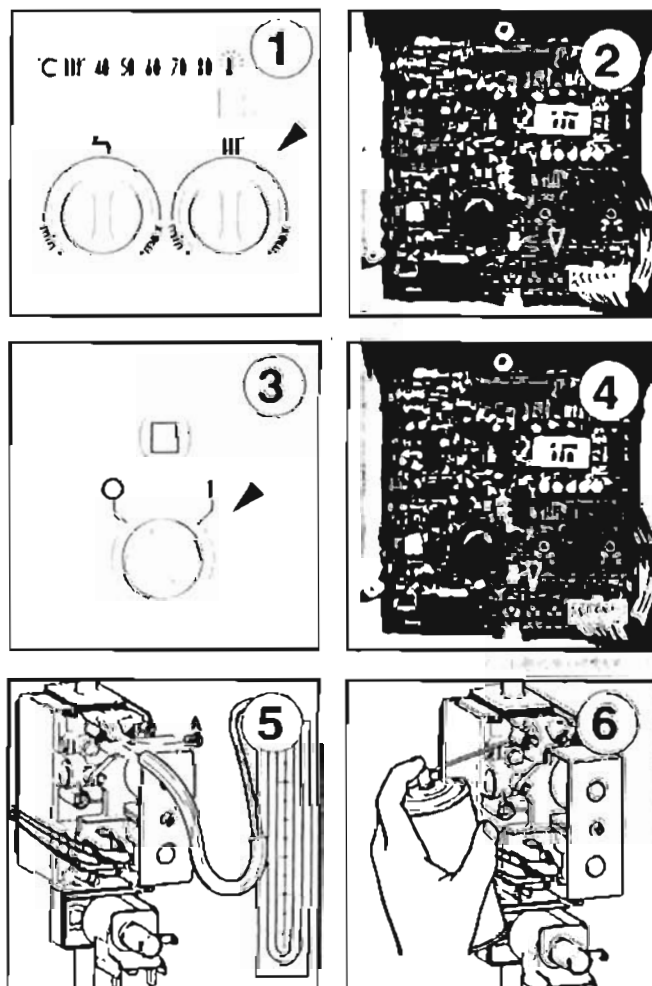


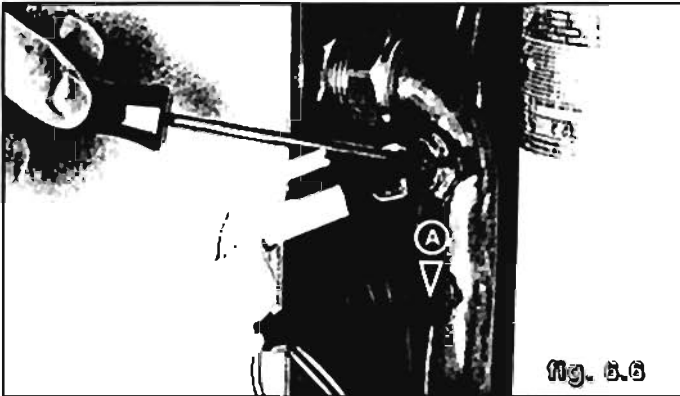
fig. 6.8



# Servicing instructions

## 6.6 OVERHEAT THERMOSTAT

1 Ensure electricity is switched off at main isolator;



2 Remove protection cap;

3 Remove wiring connections and screws "A" (see fig. 6.6);

4 Replace thermostat.

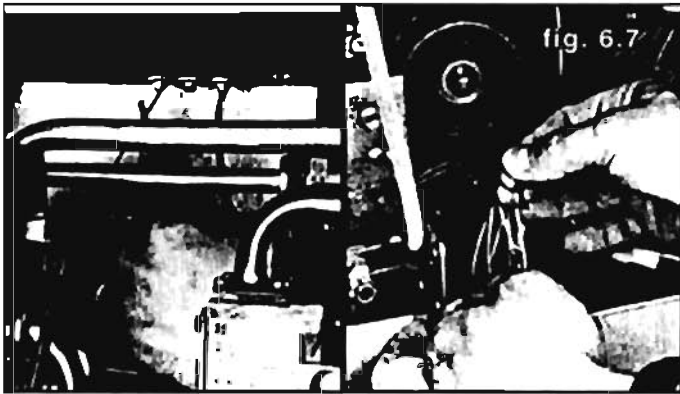
## 6.7 REMOVING ELECTRODES

1 Ensure electricity is switched off at main isolator;

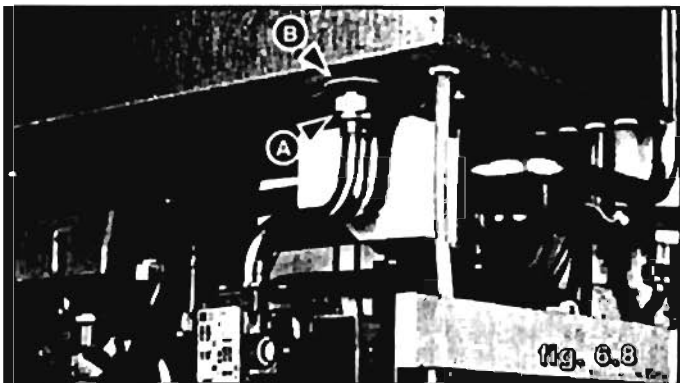
2 Lower control panel (sect. 8.2);

3 Remove sealed chamber cover (sect. 8.2);

4 Remove combustion chamber front panel (sect. 8.2);

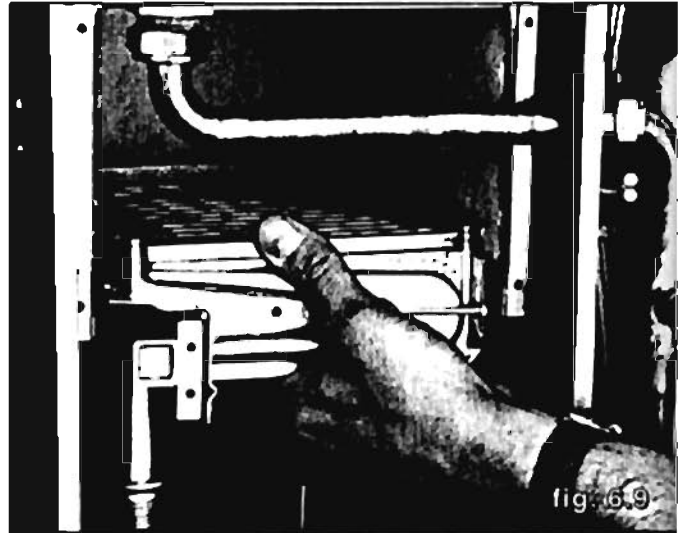


5 Disconnect electrodes (see fig. 6.7);

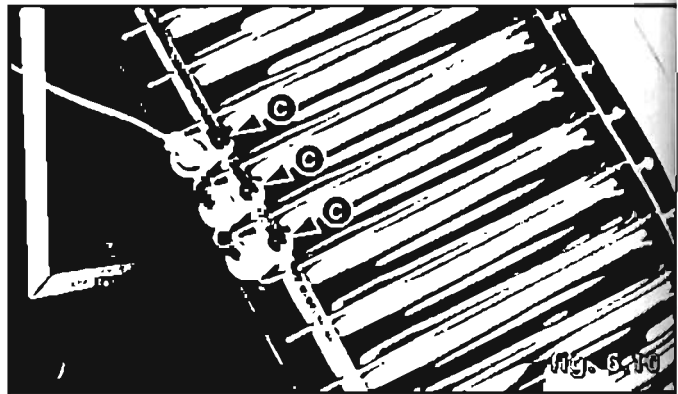


6 AnscREW main gas connection "A" (see fig. 6.8);

7 Remove secure with nut its washer "B" (see fig. 6.8);

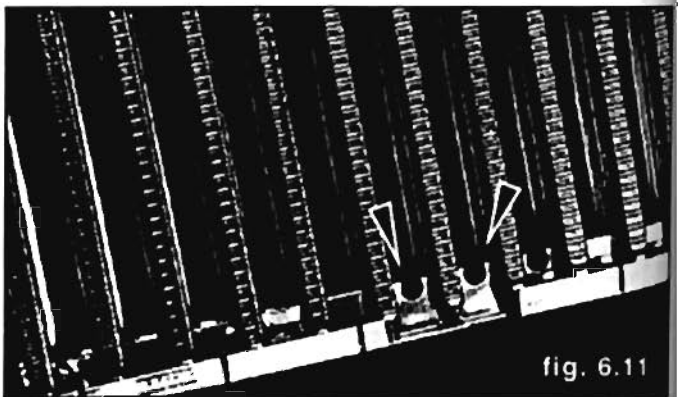


8 Lift up the main burner to free the main gas connection and pull forward very carefully (see fig. 6.9);



9 Remove screws "C" using a Phillips n.2 star tip screw driver (see fig. 6.10);

10 Slide the electrodes gently downwards (see fig. 6.10);



11 To mount, repeat steps in the reverse order, paying particular attention to centre the second support hole which you will find between connections, otherwise the electrode may break (see fig. 6.11).

## Serviceing instructions

### 6.8 TO GAIN ACCESS TO HIGH AND LOW VOLTAGE P.C.B.s

- 1 Ensure electricity is switched off at main isolator;
- 2 Access to control panel following sections 8.2;

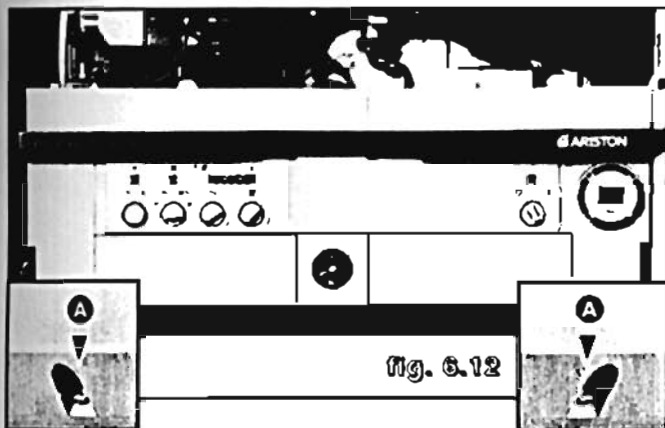


fig. 6.12

- 3 Remove inspection covers by loosening screws A and rotating, as showed on fig. 6.12;

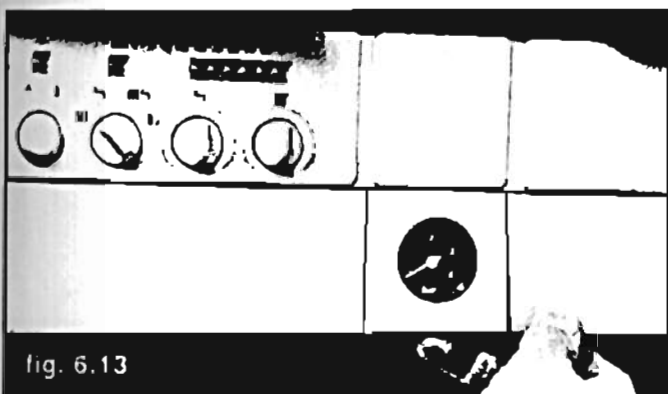


fig. 6.13

- 4 Remove the manometer plastic surround by pulling forward;

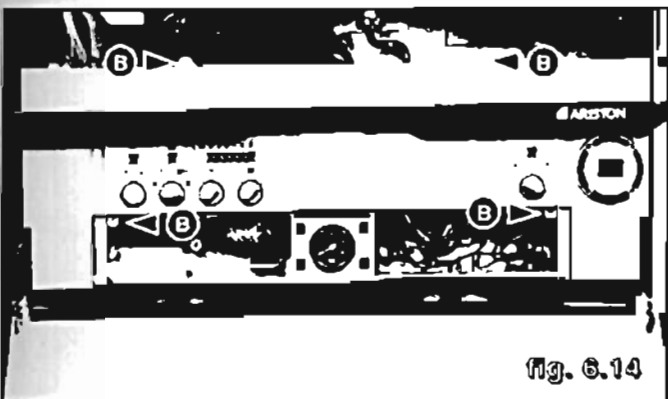


fig. 6.14

- 5 Loosen screws B to remove the plastic front panel (see fig. 6.14);

To replace a P.C.B. it is necessary to loosen screws C (see fig. 6.15);

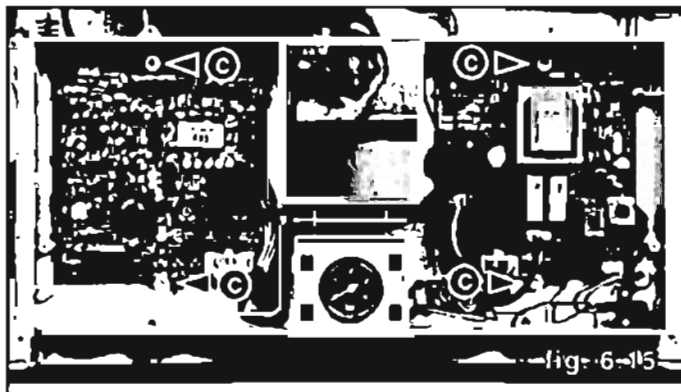


fig. 6.15

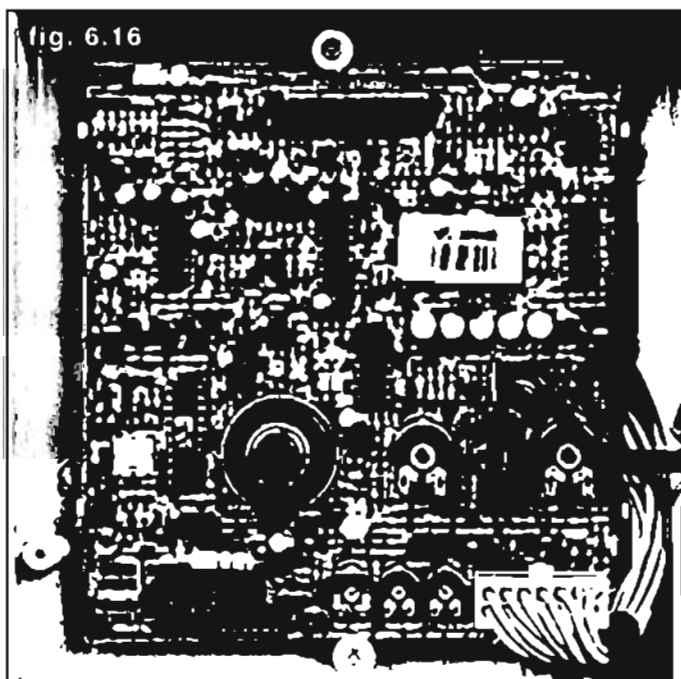


fig. 6.16

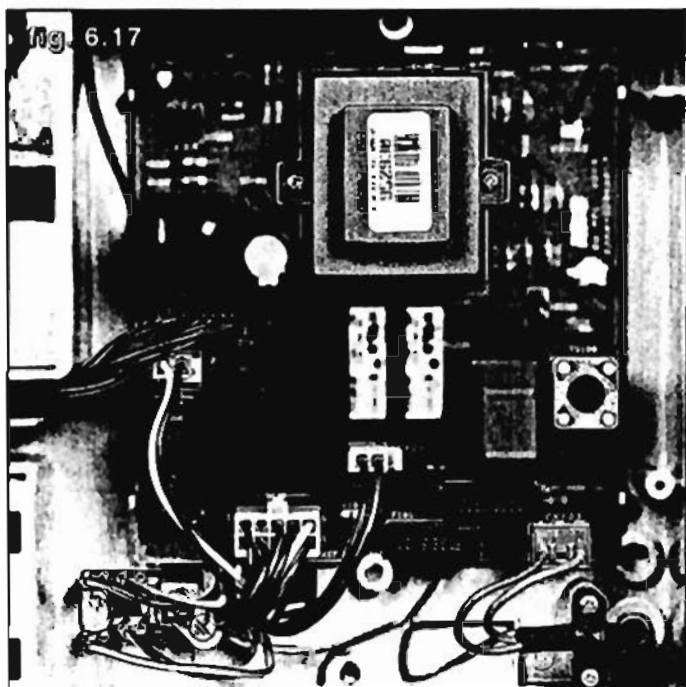
On the low voltage P.C.B. you have access to:

- reset switch
- function switch
- D.H.W. potentiometer
- C.H.W. potentiometer
- P.C.B.s connection wiring
- ignition delay potentiometer
- slow ignition potentiometer
- maximum heating power potentiometer
- TCS connection
- low voltage wiring loom connection

Onto high voltage P.C.B. you have access to:

- transformer
- P.C.B.s connection wiring
- fuses

# Servicing instructions



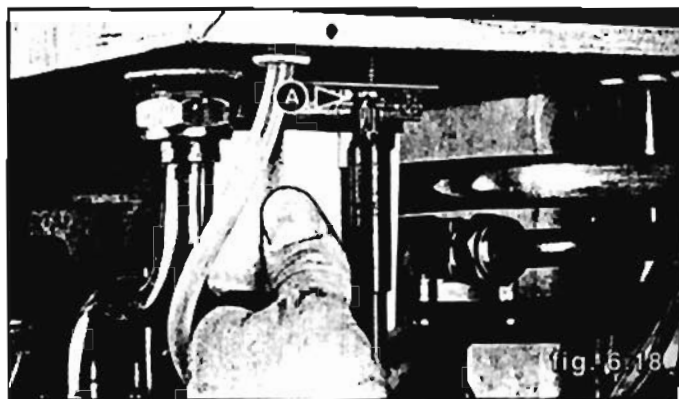
Onto high voltage P.C.B. you have access to:

- transformer
- P.C.B.s connection wiring
- fuses
- main power cord supply connector
- high voltage wiring loom connection
- fan connector
- air pressure switch connector
- on/off switch

## 6.9 TRANSFORMER

1 Ensure electricity is switched of at main isolator;

2 Remove the boiler casing and rotate control panel (sect. 8.2);



3 Remove screw "A" whilst one hand holds the transformer (see fig. 6.18);



4 Remove screws "B" (see fig. 6.19);

5 Disconnect cables by pulling carefully;

6 Remove screws "C" (only one visible see fig. 6.20);

7 Reassemble in the reverse order.

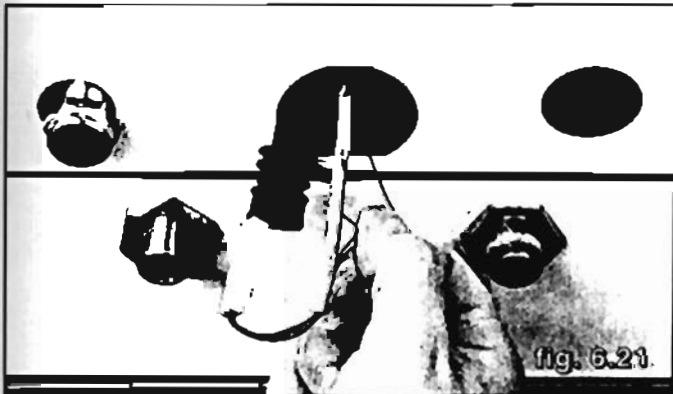


## **Servicing instructions**

### **6.10 REMOVING D.H.W. SENSOR PROBE**

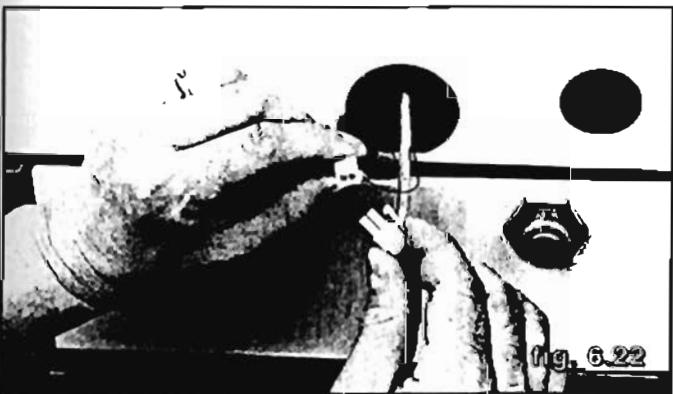
This operation is possible with boiler fully assembled. The D.H.W. probe access, is at the bottom right side of the boiler:

1 Ensure electricity is switched of at main isolator.



2 Hold the D.H.W. probe spring and pull downwards (see fig. 6.21)

3 Remove the spring;



4 Disconnect the probe (see fig. 6.22);

5 Replace with new D.H.W. probe;

6 Mount the spring;

7 Introduce new probe into its housing pushing upwards;

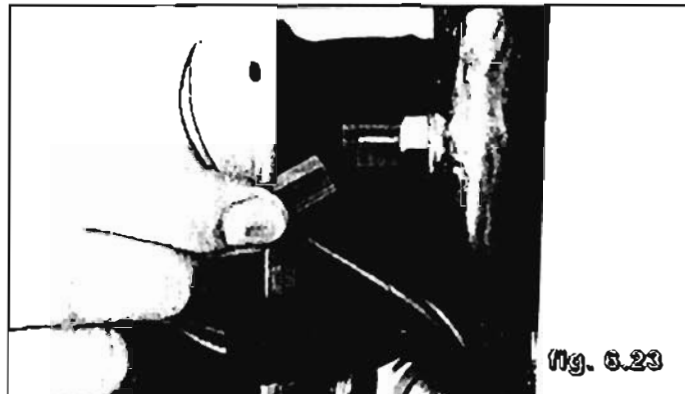
8 Ensure the probe has reached the end of the housing pushing firmly again.

### **6.11 REMOVING C.H.W. SENSOR PROBE**

1 Ensure electricity is switched of at main isolator.

2 Lower control panel (sect. 6.2);

3 Drain boiler (sect. 6.3);



4 Disconnect the electric connector by pulling up (see fig. 6.23);

5 Unscrew the sensor probe using a 15 mm open ended;

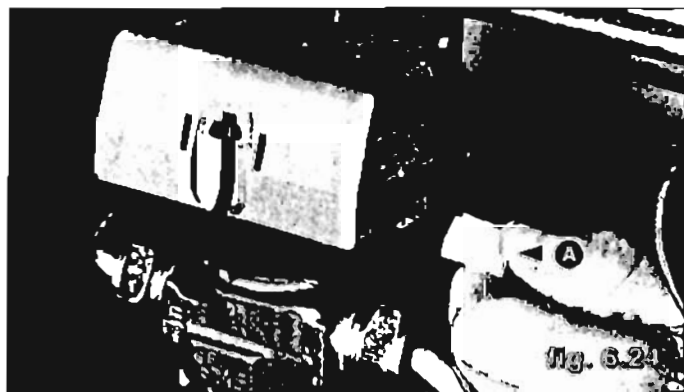
6 Reassemble in reverse order.

### **6.12 DIVERTER VALVE (MOTORIZED)**

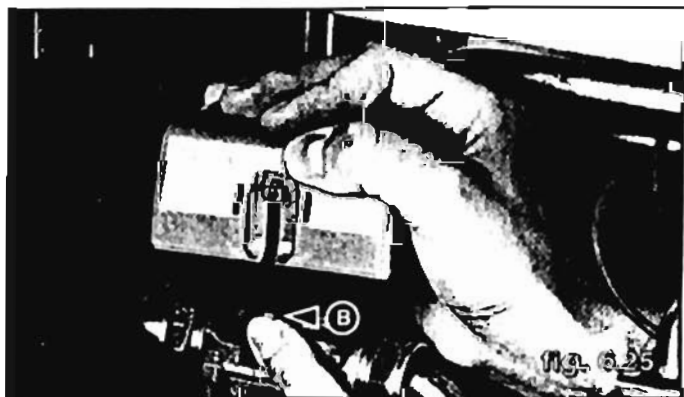
In the case of diverter valve failure it is possible to replace the motor separately. Proceed as follows:

1 Make sure that the power supply has been turned off at the main isolator;

2 Lower the control panel;



3 Unfasten the connector "A" (see fig. 6.24);



4 Press the button "B" indicated in figure 6.25 and turn the motor in the counter-clockwise direction at the same time;

5 To mount the new motor follow the same procedure in the reverse order.

## General information

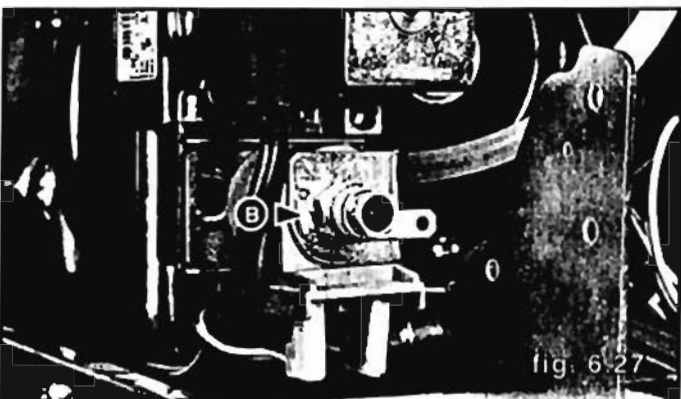
### 6.13 BURNER and INJECTORS

- 1 Ensure electricity is switched off at main isolator;
- 2 Remove main burner following the same steps as on sect. 8.7;
- 3 Remove burner connector;
- 4 Remove injectors using a n. 7 socket spanner;
- 5 Reassemble in the reverse order.

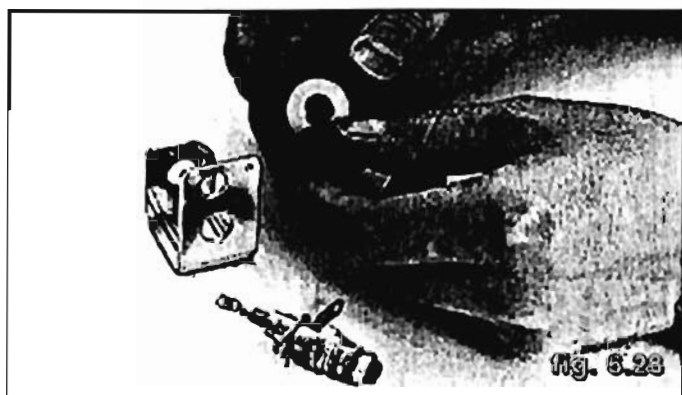
**NOTE:** When you are replacing jets to convert the appliance for use with a different type of gas, remember to replace the existing data plate with the plate supplied in the modification kit.

### 6.14 GAS MODULATOR CARTRIDGE

- 1 Ensure electricity is switched off at main isolator;
- 2 Lower control panel (sect. 8.2);
- 3 Turn the protection cap "A" and remove it from the adjustment control. Use a flat-edge screw driver to help removal (see fig. 6.26);



- 4 With a 14 mm spanner turn the cartridge "B" counter-clockwise (see fig. 6.27);



- 5 Remove the cartridge, but be very careful to not loose the internal components (see fig. 6.28);
- 6 Reassemble in reverse order.

### 6.15 GAS MODULATOR COIL

- 1 Ensure electricity is switched off at main isolator;
- 2 Disconnect the two cables;
- 3 Lower the control panel (sect. 8.2);
- 4 Remove the gas modulator cartridge as explained in sect. 8.14;



- 5 Slide the coil "A" and its housing from the valve (see fig. 6.29);
- 6 Remove the plate "B" (see fig. 6.29);

### 6.16 ON-OFF OPERATOR COILS

- 1 Ensure electricity is switched off at main isolator;
- 2 Lower the control panel (sect. 8.2);

**To remove the TANDEM operator coils**

- 3 Disconnect connector "A" (see fig. 6.32);
- 4 Unscrew the screw "C" and slide the TANDEM coils with its housing from the valve (see fig. 6.32);
- 5 Reassemble in reverse order.

## Servicing instructions

### 6.17 GAS VALVE

- 1 Ensure electricity is switched off at main isolator;
- 2 Remove the casing and lower control panel (sect. 8.2);



- 3 Disconnect each electrical connection "A" (see fig. 6.32);

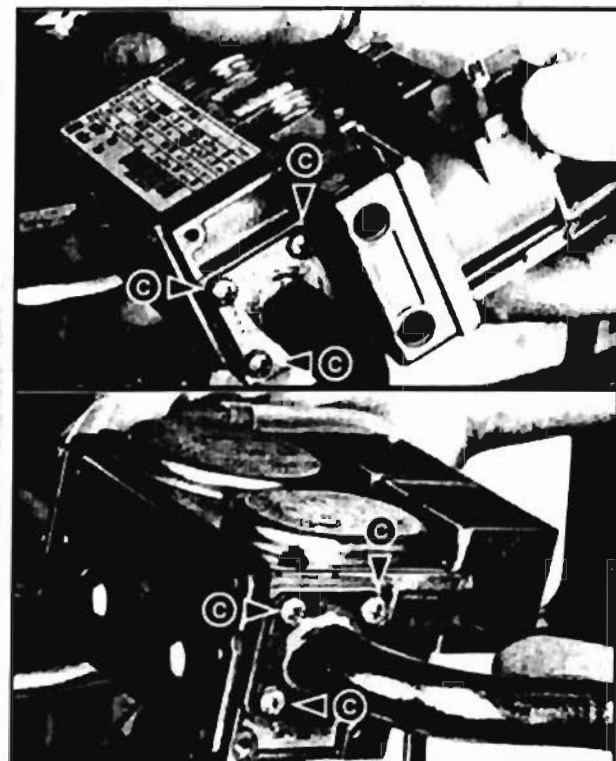


fig. 6.34

- 6 Remove pipes from gas valve by screws "C";
- 7 Reassemble in the reverse order.

### 6.18 REMOVING THE FAN

- 1 Ensure electricity is switched off at main isolator;



fig. 6.33

- 4 Loosen the inlet gas connection with its secure nut, as well (see fig. 6.33);
- 5 Loosen gas connection "B" from main burner (see fig. 6.32).

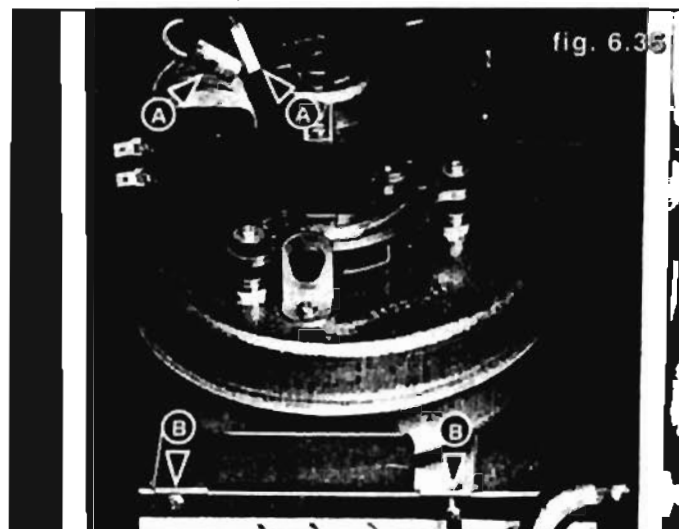
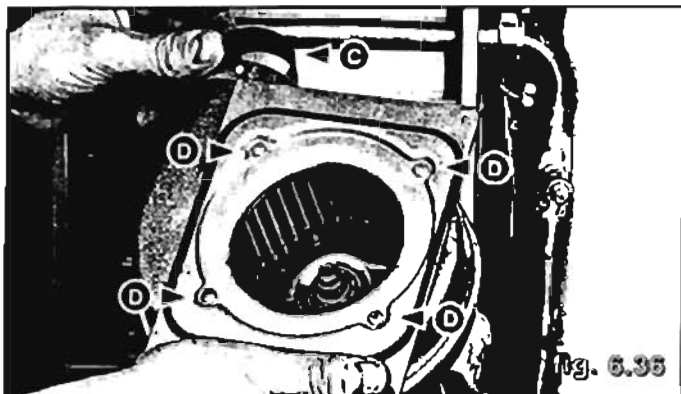


fig. 6.35

- 2 Remove sealed chamber front panel (sect. 6.2);
- 3 Disconnect electrical connections "A";
- 4 Remove screws "B" (see fig. 6.35);
- 5 Pull carefully, to remove the fan assembly;



## Servicing instructions



6 Remove the collar seal "C" (see fig. 6.36), and screws "D" to remove the fan support plate;

7 Reassemble in the reverse order.

### 6.19 AIR PRESSURE SWITCH

1 Ensure electricity is switched off at main isolator;

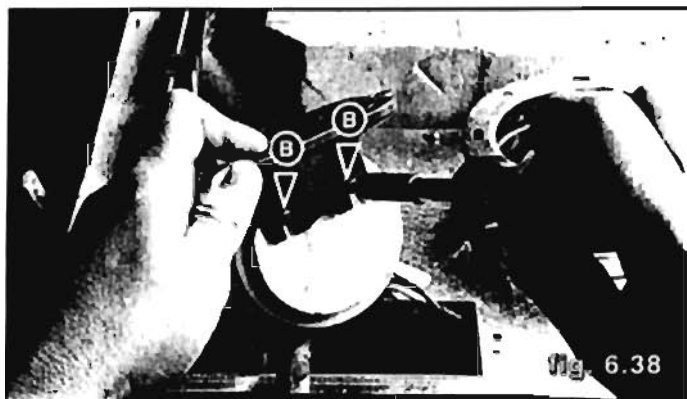


2 Loosen screws A (see fig. 6.37);

3 Pull upwards the plastic support plug;

4 Disconnect electrical wiring;

5 Disconnect silicon pipes;



6 Loosen screws B to remove the air pressure switch;

7 Reassemble in reverse order.

#### **WARNING!**

Each make of A.P. switch has its own screws. If a different make switch has been supplied, use only the screws supplied with it, as others could compromise its operations.

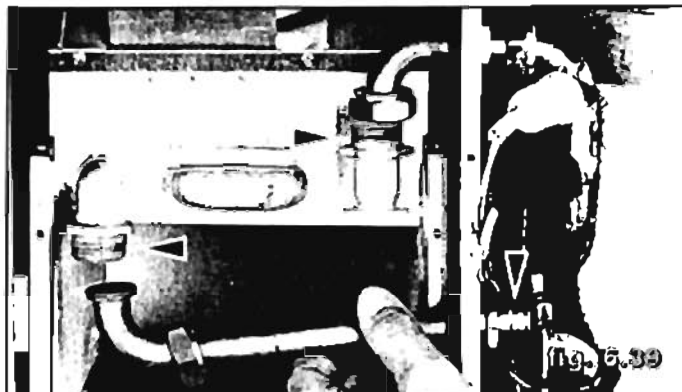
### 6.20 MAIN HEAT EXCHANGER

1 Ensure electricity is switched off at main isolator;

2 Remove the casing from panel and its sealed chamber front panel as well (sect. 8.2);

3 Drain water from main circuit (sect. 8.9);

4 Disconnect each exchanger hydraulic junction;



5 Push down slowly the exchanger frontal side;

6 Pull forward, there are no fixing screws.

7 Reassemble in reverse order.

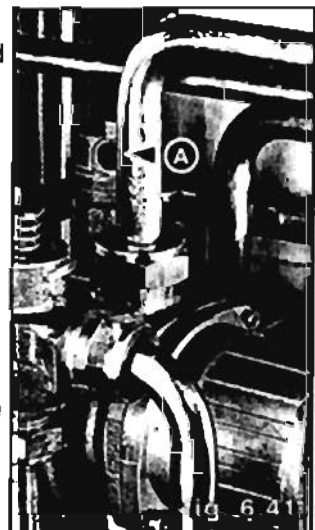
### 6.21 AUTOMATIC AIR RELEASE VALVE

1 Ensure electricity is switched off at main isolator;

2 Drain boiler (sect. 8.9);

3 Unscrew valve "A" (see fig. 6.41);

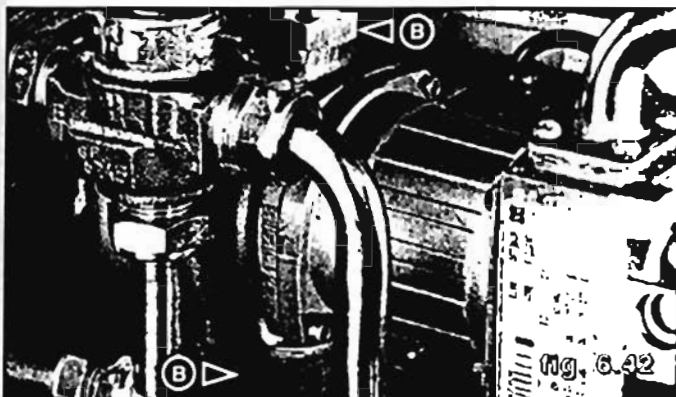
4 Reassemble in reverse order.



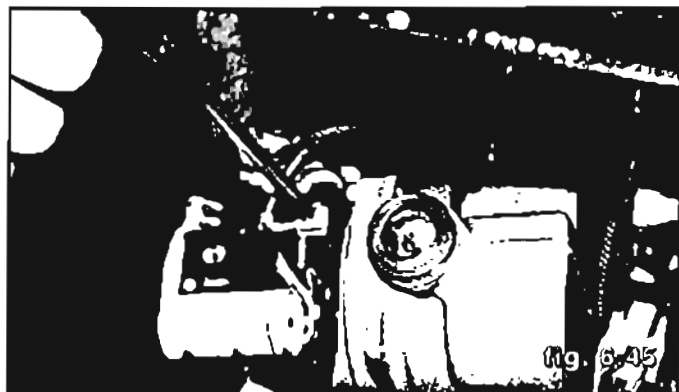
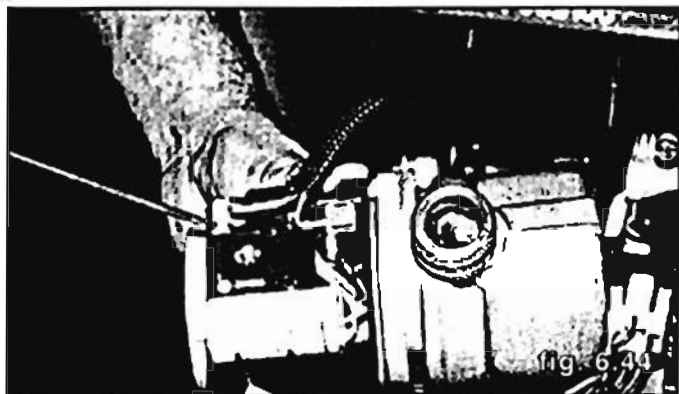
# Servicing instructions

## 6.22 PUMP

- 1 Ensure electricity is switched off at main isolator;
- 2 Drain boiler (sect. 8.3);



- 3 Release nuts "B" using a 36 mm open ended (see fig. 6.42);



- 4 Disconnect electrical connections (see fig. 6.43, 6.44, 6.45);
- 5 Reassemble in reverse order.

## 6.23 MAIN CIRCUIT FLOW SWITCH

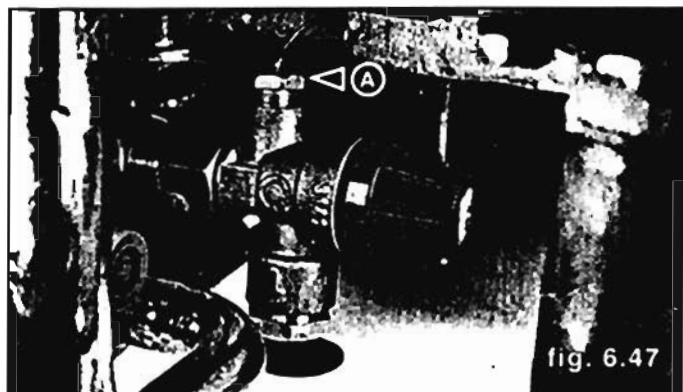
- 1 Ensure electricity is switched off at main isolator;
- 2 Remove the casing and lower control panel (sect. 6.2);
- 3 Drain water from main circuit (sect. 8.3);
- 4 Disconnect electrical connections;
- 5 Release nuts "A" by a 24 mm open ended;



- 6 Reassemble in the reverse order.

## 6.24 MANOMETER

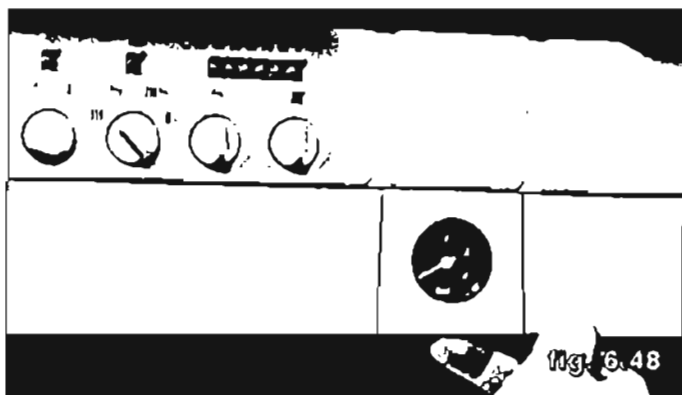
- 1 Ensure electricity is switched off at main isolator;
- 2 Remove the boiler casing front panel and rotate the control panel (sect. 8.2);



- 3 Drain water from main circuit (sect. 8.3);
- 4 Release coupling "A" using a 14 mm open ended (see fig. 6.47);



## Servicing instructions



5 Remove the plastic surround (see fig. 6.48);



6 Push on the manometer from the interior to the exterior (see fig. 6.49);

7 Reassemble in the reverse order.

### 6.25 EXPANSION VESSEL

1 Ensure electricity is switched off at main isolator;

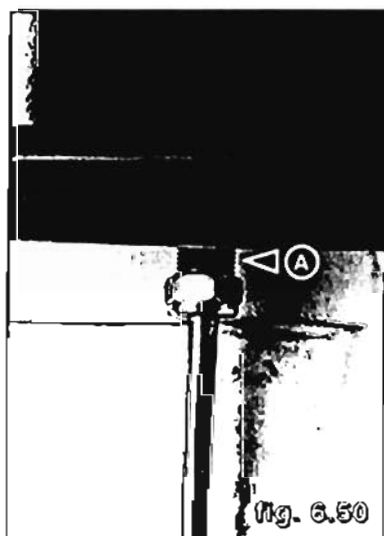
2 Drain boiler (sect. 8.3);

3 Remove nut "A" away from the expansion vessel (see fig.6.50);

4 Remove screw "B" using a POZI-DRIVE No.2 star tip screw-driver (see fig.6.52);

5 Lift expansion vessel up from the boiler;

6 Reassemble in reverse order.

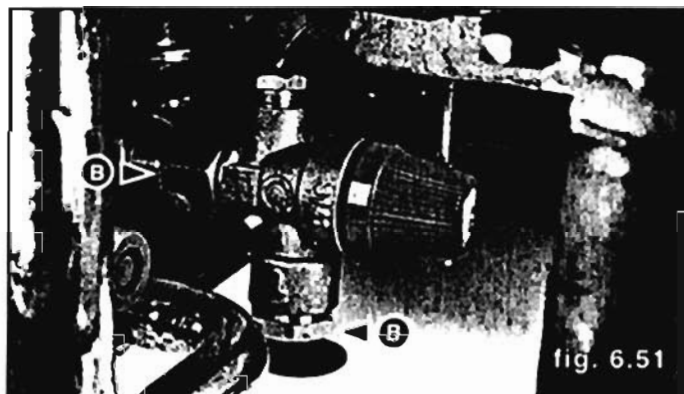


### 6.26 SAFETY VALVE

1 Ensure electricity is switched off at main isolator;

2 Lower control panel (sect. 8.2);

3 Drain boiler (sect. 8.3);



4 Loosen nuts B (see fig.6.51);

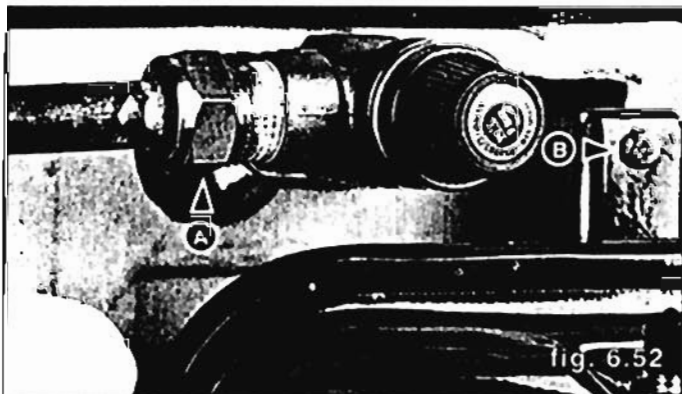
5 Remove valve;

6 Reassemble in reverse order.

### 6.27 TEMPERATURE AND PRESSURE RELIEF VALVE

1 Ensure electricity is switched off at main isolator;

2 Drain domestic water from cylinder;



3 Loosen nut "A" and remove the 1/2" nipple;

4 Remove the valve by unscrewing in an anticlockwise direction.

## 7 FAULT FINDING

### 7.1 TOTAL CHECK SYSTEM ( TCS )

The TOTAL CHECK SYSTEM (which will be referred to as "TCS") is designed to locate faults quickly and easily. (see fig.7.1).



fig. 7.1

This device makes it possible to check the proper functioning of the electronic PCBs and components these control, it is connected to the PCB via the cable which you will see is folded back inside the TCS.

The TCS indicates:

- The actual state of the boiler;
- The eventual fault.

The information given by the TCS are as follows (see fig.7.2):

a) n°2 LEDs EACH SIDE OF THE DISPLAY:

- green LED: the boiler work properly;
- red LED: the boiler has a fault.

b) DISPLAY SHOWING :

- the actual state of the boiler according to the following numbers:

- "0" Boiler off
- "1" Autodiagnostic state
- "2" Spark ignition stage
- "3" Boiler functioning normally
- "4" Lockout
- "5" Boiler thermostat satisfied
- "6" Room thermostat/clock no demand or selector in summer setting

- the actual faults according to the following letters:

- "A" Faulty ventilation system
- "B" Air pressure switch stuck in N.O. position
- "C" Faulty reset switch
- "D" Faulty main circuit flow
- "E" Faulty flame detection
- "F" N.A. for this model
- "G" N.A. for this model

c) n°8 YELLOW LEDs UNDER THE DISPLAY SHOWING THE ACTUAL STATE OF THE MAIN COMPONENTS:

- LED 1 : Pump fed
- LED 2 : Main flow switch closed
- LED 3 : Air pressure switch N.O.
- LED 4 : Flame detected
- LED 5 : Water at required temperature
- LED 6 : Room thermostat/clock no demand or selector in summer setting
- LED 7 : Autodiagnosics faulty
- LED 8 : N.A. for this model

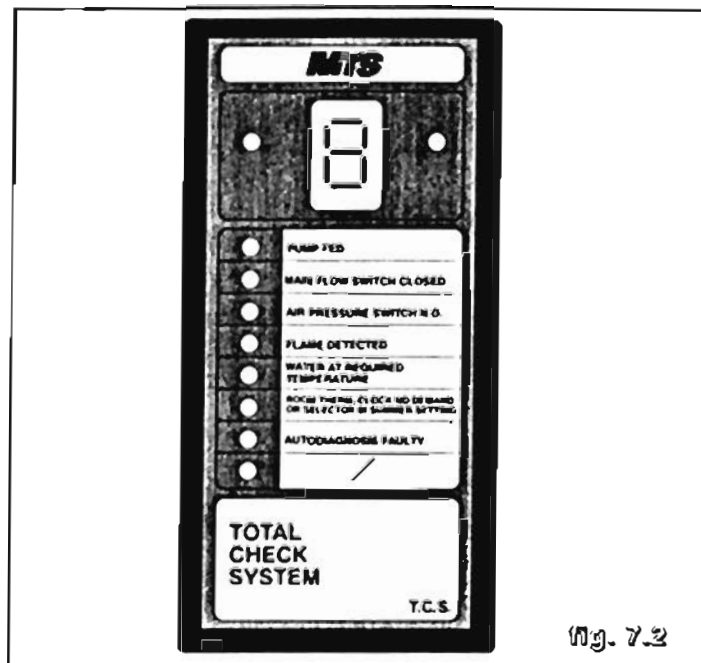


fig. 7.2

**Note:** During the operation of the TCS, faults may be signaled by the red LED and a letter in the display for short periods (one second or less), this is normal and does not signify these faults.

### 7.2 SPECIAL DEFECTS

There are special defects that can not been indicated by the TCS; these defects are treated in the following sections:

- Water leaks;
- Difficulty in lighting gas;
- Incorrect combustion;
- Traces of gas or exhaust gases in the installation area.

#### 7.2.1 WATER LEAKS

##### Leaks from connectors, O-Rings or gaskets

Make sure that the surfaces which come into contact with the gaskets are free from dirt, roughness or deformation. Then substitute the gasket (both O-rings and flat gaskets).

##### Water leaks from safety valve

This may be caused by leaks from the d.h.w. over-pressurizing the heating circuit.

In this case remove the d.h.w. heat exchanger and replace it.

If the leak only occurs when the appliance is operating, empty the main water circuit and check the pressure applied to expansion vessel (1 bar).

#### 7.2.2 DIFFICULTY IN LIGHTING THE BURNER

Make sure that input and output pressures on the gas valve are set to the correct values.

Also, make sure that no pressure variations are being caused by a malfunctioning component (defective pressure reducers or regulator; dirty gas filters; other gas consuming equipment installed on the same gas line, etc.).

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## Fault finding

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Make sure that the ignition electrodes are positioned correctly. Make sure that injectors are clean.

### 7.2.3 INCORRECT COMBUSTION

Make sure that the gas modulator has been set correctly and make sure that the following elements are clean:

- Burner;
- Combustion chamber;
- Flue system.

Make sure that the exhaust flue does not return to the appliance through the air intake duct.

Make sure that the flue terminal on the exhaust system has been installed in the correct position (see sect. 3.4).

If extension flue have been used in the exhaust duct, make sure that these flue have been inserted correctly.

Please ensure that flue length does not exceed the maximum allowed (consult the "FLUE PIPE ACCESSORIES" booklet).

### 7.2.4 TRACES OF GAS OR EXHAUST FUMES

If gas is detected in the installation area, use a soap solution or a specific leak-detection product to make sure that all the gas connectors in the system are perfectly sealed.

Check for leaks when the appliance is shut down and during operation.

If exhaust fumes are detected in the installation area, make sure that the exhaust duct has been built to the exact specifications prescribed. Also, check the exhaust duct for leaks and make sure that it is clean. Make sure that all exhaust duct-work conforms to current technical standards.

## 7.3 INSTALLATION OF THE TCS

- 1 To reach the total check system connector on the PCB, read sect. 8.8.



Fig. 7.3

- 2 On TCS remove the cover at the back in order to release the cable.  
You will see two connectors: a black one and a grey one, use the black.

With the boiler switch set to ON, once you have made the above connections, all the LEDs will light up and the number 8 will flash on the display for one second; this means that the TCS is ready for use.

## 7.4 FAULT FINDING

The TCS give all information if the boiler is faulty or run properly.

According to the signals of the TCS, some verifications must be made and then the faults can be rectified.

Follow the fault flow chart and the relative verifications according to the TCS state.

**If the TCS is not available or is damaged, please follow the sequence as described at sect. 7.5.**

# Fault finding

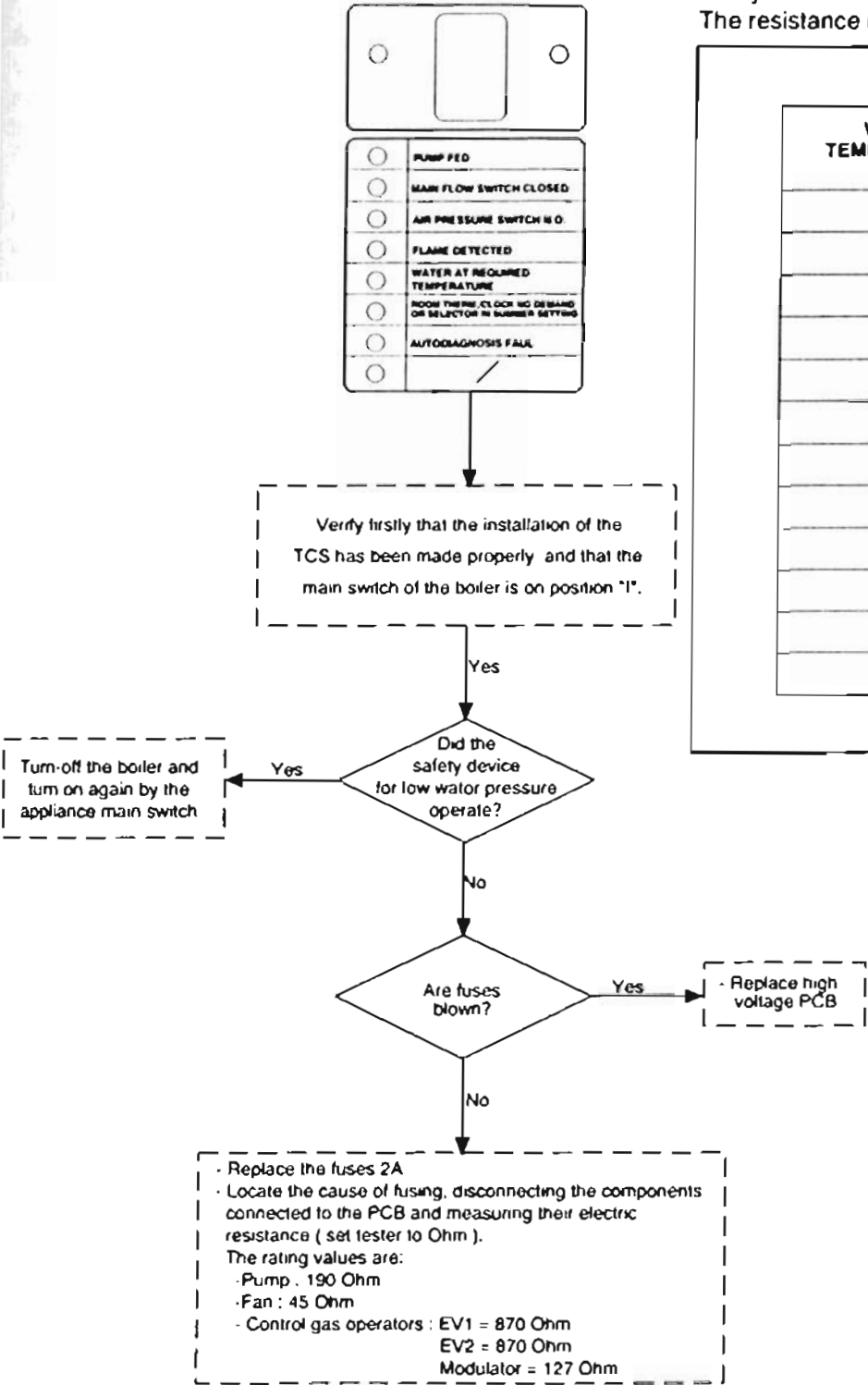
**TCS STATE : All lights in the TCS are off while the main switch is on position "ON"**

**Ref.1**  
Try to reset the overheat thermostat by the proper button, the first from the left side.

**Ref.2**  
Verify the heating probe resistance.  
The resistance must be according to the following table:

WATER TEMPERATURE (°C)	RESISTANCE (Ω)
30	8.170
35	6.750
40	5.750
45	4.750
50	4.240
55	3.470
60	2.950
65	2.600
75	1.900
80	1.665
85	1.442
90	1.202

Ref.2



# Fault finding

## TCS STATE : Ventilation fault

(letter "A" appears at the end of the autodiagnosis if here is ventilation is fault)

### Ref.5

Supply voltage (230 VAC -10% ÷ +15%) should be indicated by terminals of the fan.  
Set the tester to VAC.

### Ref.6

Verify that C and NC connectors of the air pressure switch are closed, measuring the resistance between them that must be zero.  
Set the tester to Ohm.

### Ref.9

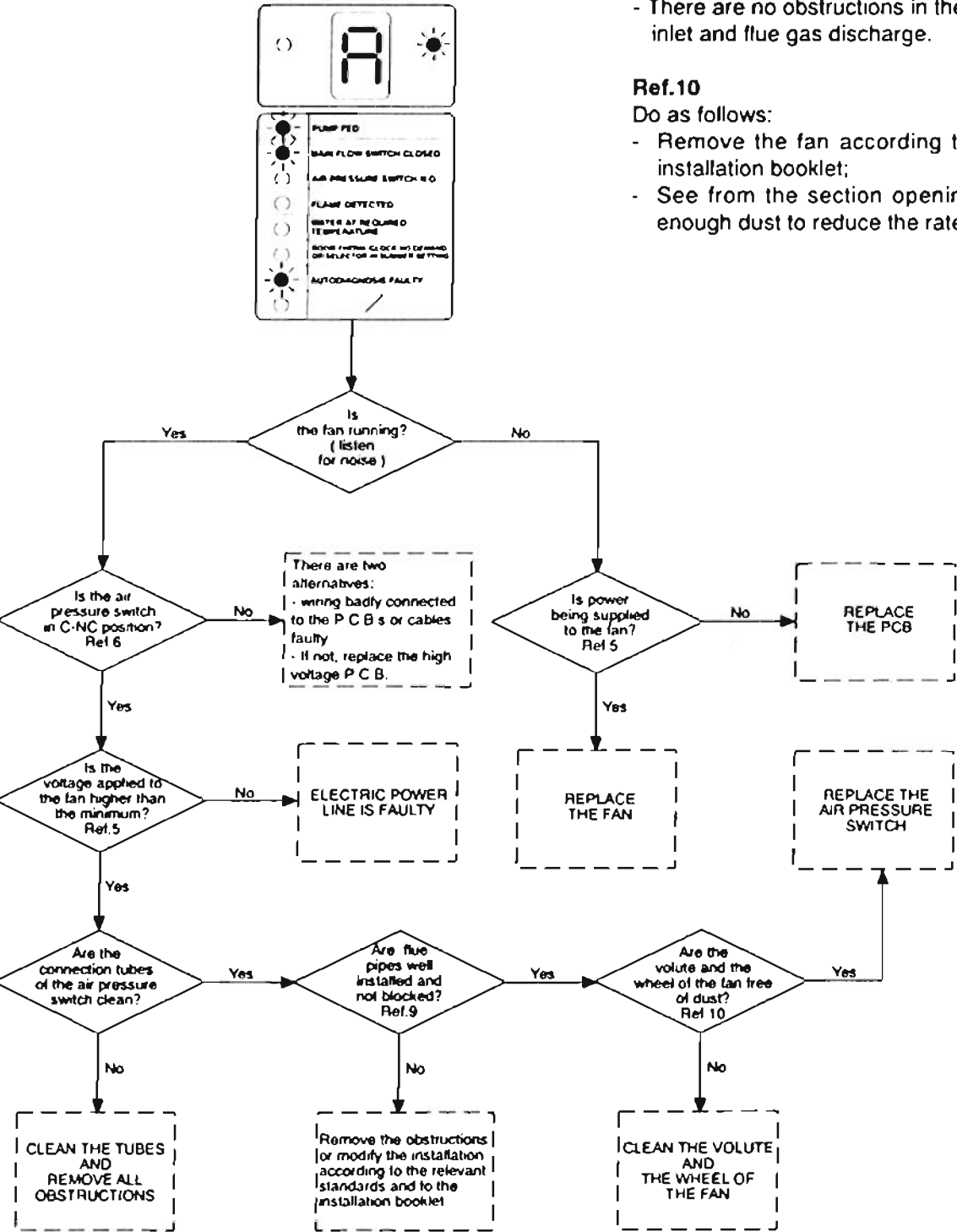
Verify the flue pipes and the terminal as follows:

- They are installed according to the relevant standards;
- The diameter of the flue pipes, the total length and the number of the elbows are according to the installation booklet;
- There are no obstructions inside the flue pipes;
- There are no obstructions in the outside openings air inlet and flue gas discharge.

### Ref.10

Do as follows:

- Remove the fan according to the sect. 6.18 of the installation booklet;
- See from the section opening of the fan if there is enough dust to reduce the rate of flow.



# Fault finding

## TCS STATE : Air pressure switch stuck in C-NO position

( letter "B" appears during the autodiagnosis if the air pressure switch indicates ventilation before the fan is activated )

### Ref.11

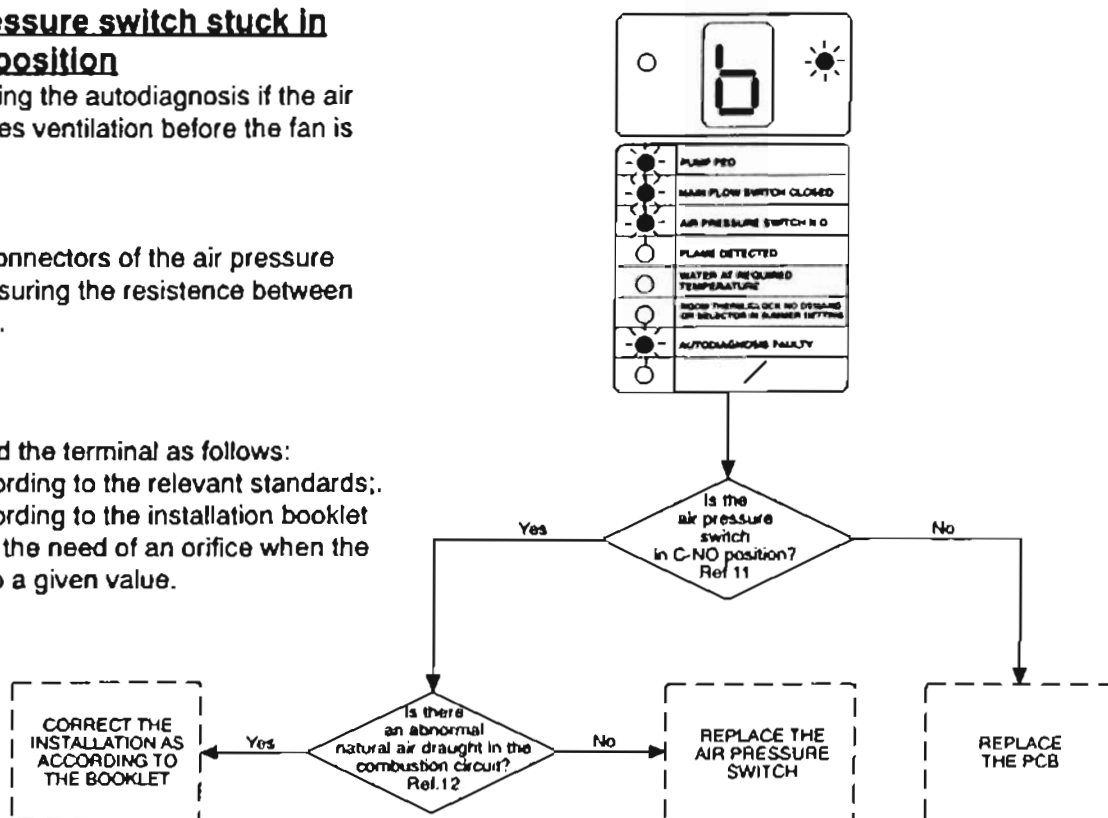
Verify that C and NO connectors of the air pressure switch are closed, measuring the resistance between them that must be zero.

Set the tester to Ohm.

### Ref.12

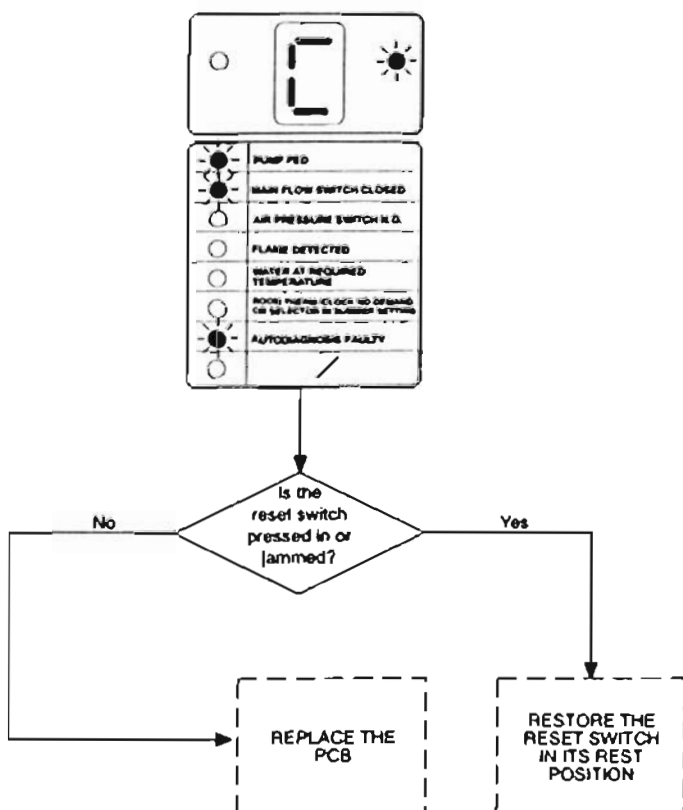
Verify the flue pipes and the terminal as follows:

- they are installed according to the relevant standards;
- they are installed according to the installation booklet mainly as it concerns the need of an orifice when the total length is lower to a given value.



## TCS STATE : Reset switch pressed

( letter "C" appears during the autodiagnosis if the reset switch is pressed or in short circuit )



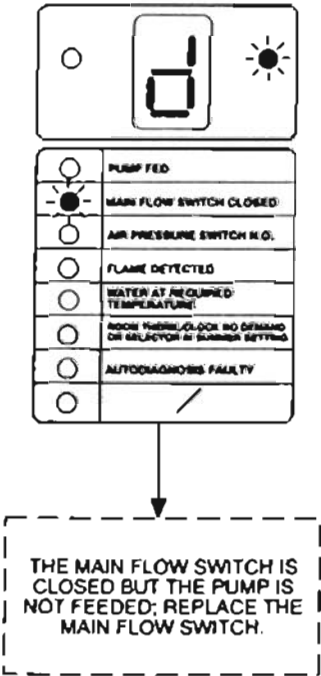
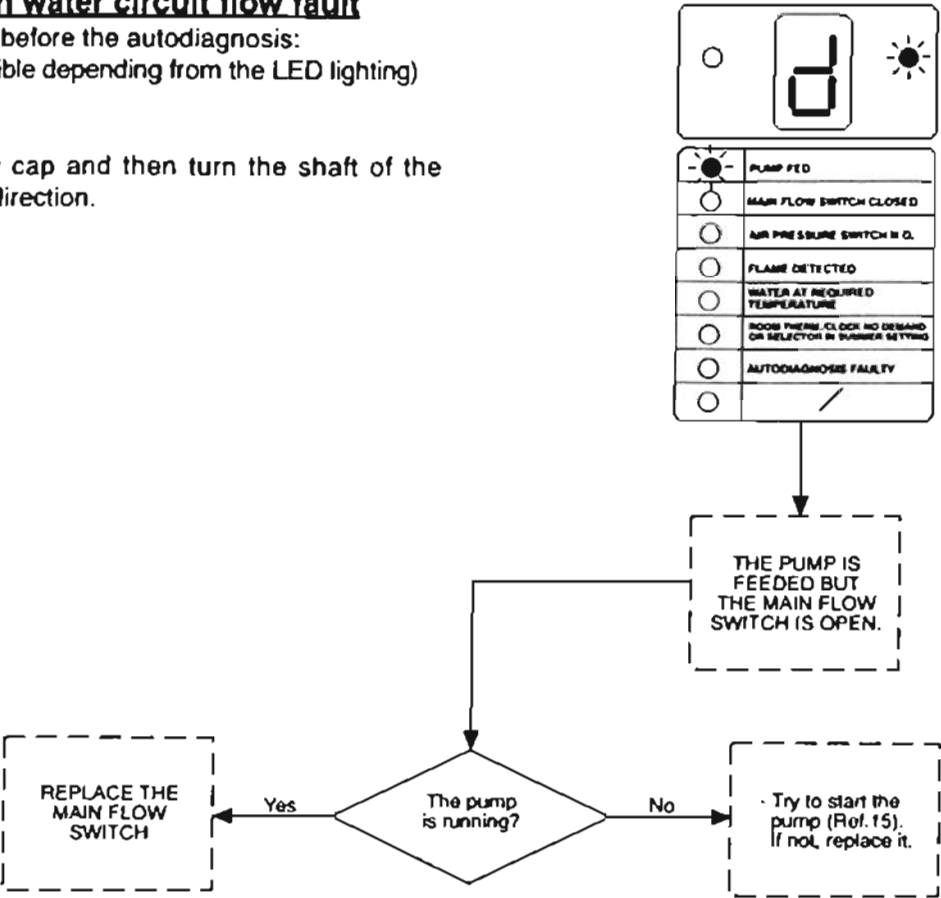
# Fault finding

## TCS STATE : Main water circuit flow fault

( letter "D" appears before the autodiagnosis:  
(two cases are possible depending from the LED lighting)

### Ref.15

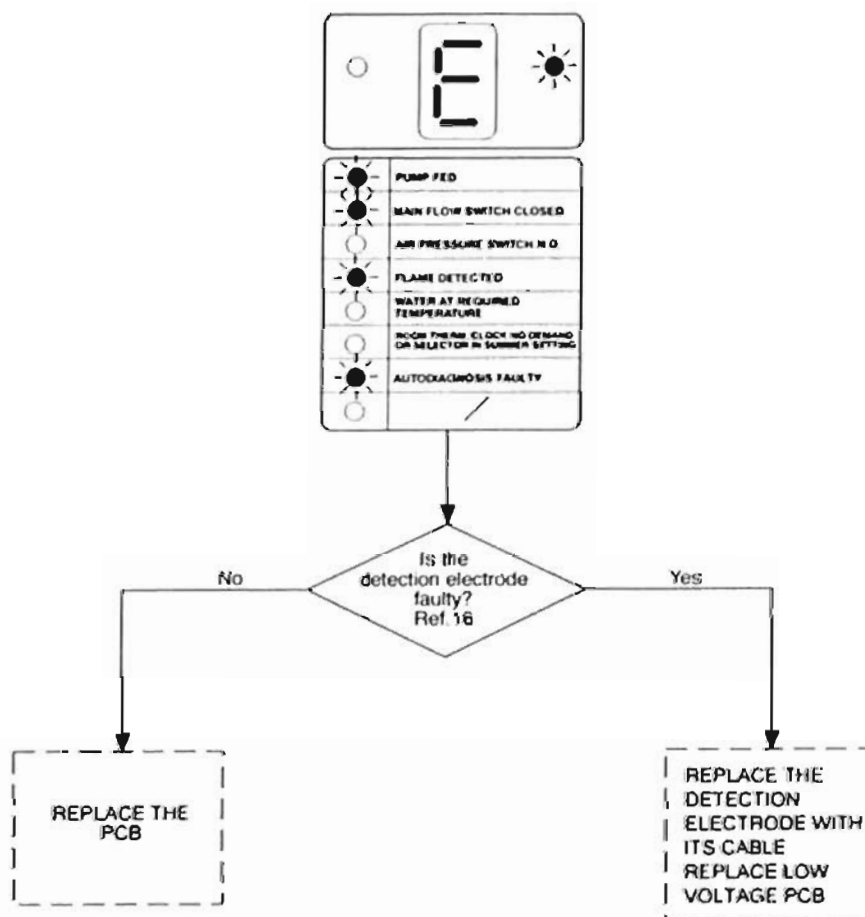
Remove the screw cap and then turn the shaft of the pump in clockwise direction.



## Fault finding

### TCS STATE : Faulty flame supervision device

( letter "E" appears during the autodiagnostic if there is a supervised flame before opening the gas valve )



#### Ref.16

Verify the distance of the terminal of the detection electrode to the burner; it should be about  $5 \pm 7$  mm ( see Fig. Ref.16-a ).

Set the tester to DC ( $\mu A$ ).

The tester should be connected in series with the detection circuit ( see Fig. Ref.16-b ).

The value of detection current without flame must be lower than  $0.5 \mu A$ .





# Fault finding

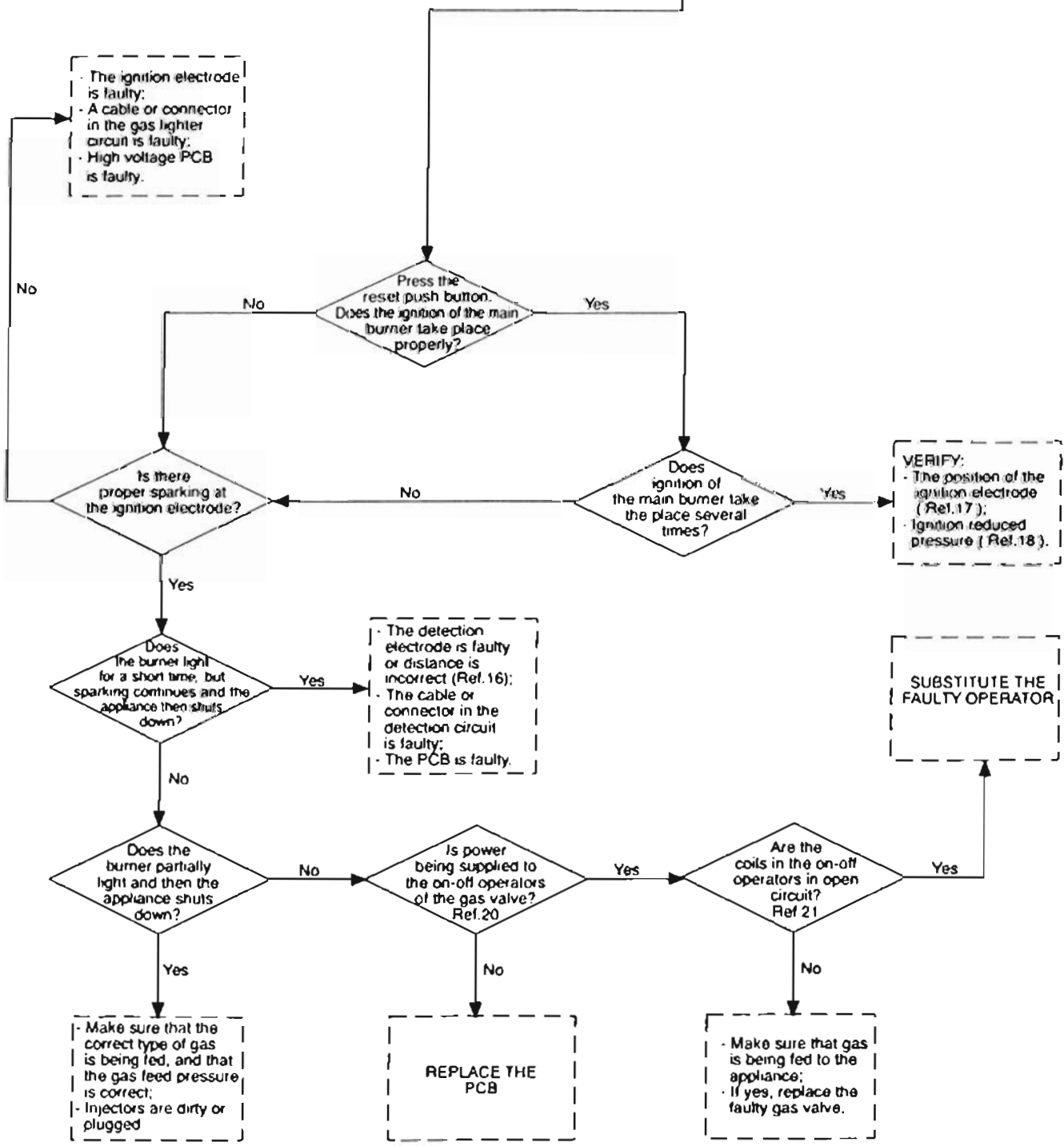
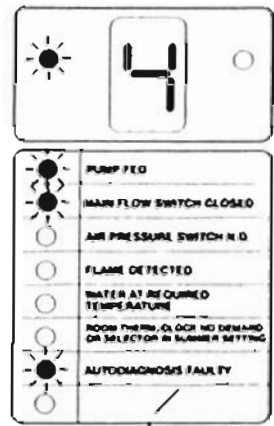
## TCS STATE : Lockout

( number "4" appears if the flame is not detected;

1 - or at the end of a complete ignition sequence;

2 - or when, as a consequence of a disappearance of the flame without the gas supply having been interrupted, the ignition device fault ).

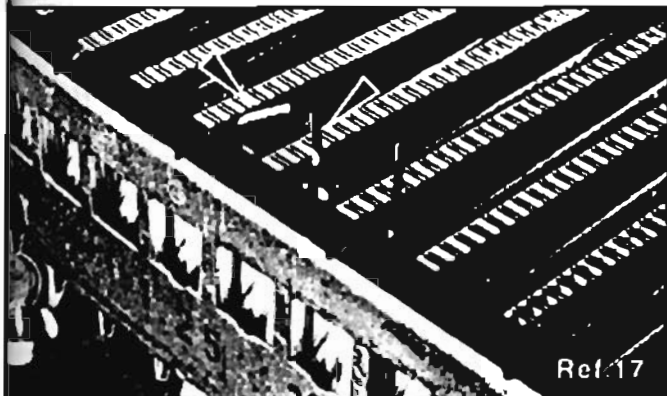
**Note:** A single lockout is a not considered a fault, only repetitive lockouts.



## Fault finding

### Ref.17

Verify that the distance between the terminal of the ignition electrode and the burner is about 5 mm.



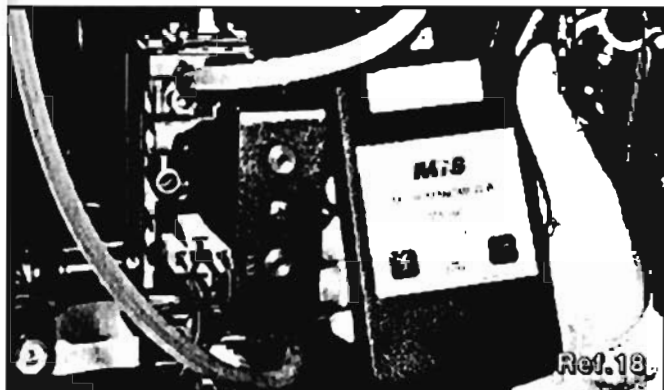
### Ref.18

Install a manometer onto the outlet pressure intake of the gas valve.

Remove the detection electrode and activate an ignition cycle.

During this attempt the ignition, gas pressure can be measured.

Verify that this value is according to the installation booklet.



### Ref.20

Supply voltage should be indicated when power is supplied to the operators.

Make measurements with the device reset from shut-down.

Set the tester to VAC.

### Ref.21

To check the coil in the on-off operators, disconnect the winding from its circuit and measure the resistance, it must be not infinity.

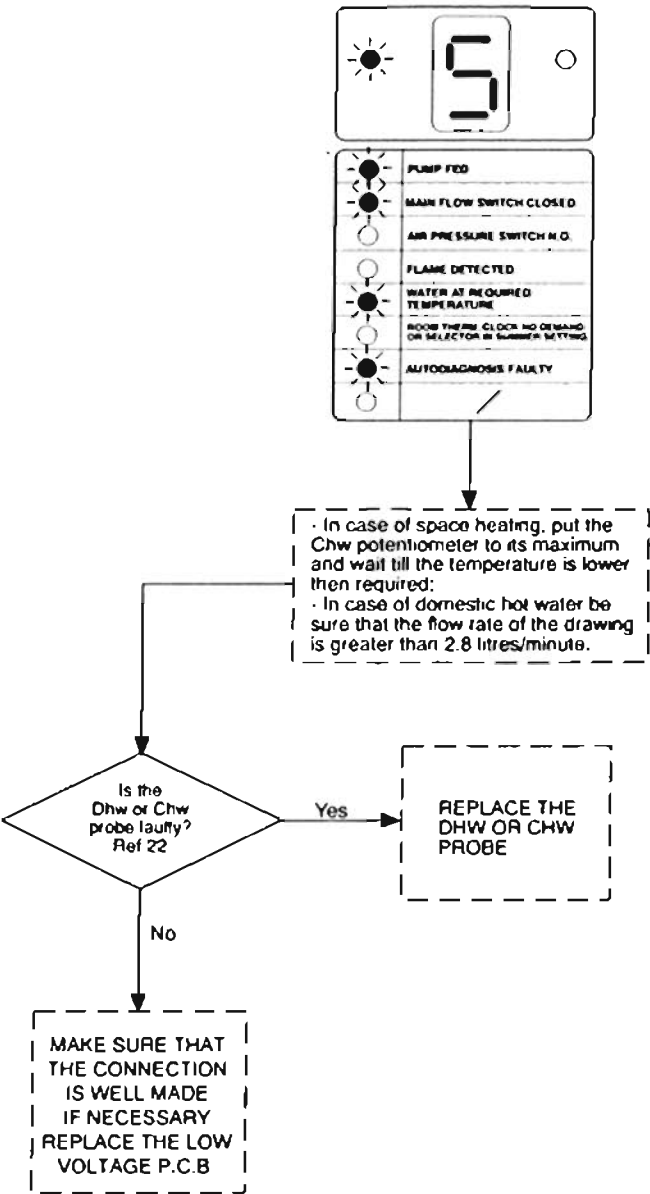
# Fault finding

TCS STATE : There is no demand of heat due to the internal regulations of the boiler

**Note:** This state is faulty only if it remains indefinitely, even when central heating or domestic hot water are expected.

Chw : Central heating water

Dhw : Domestic hot water



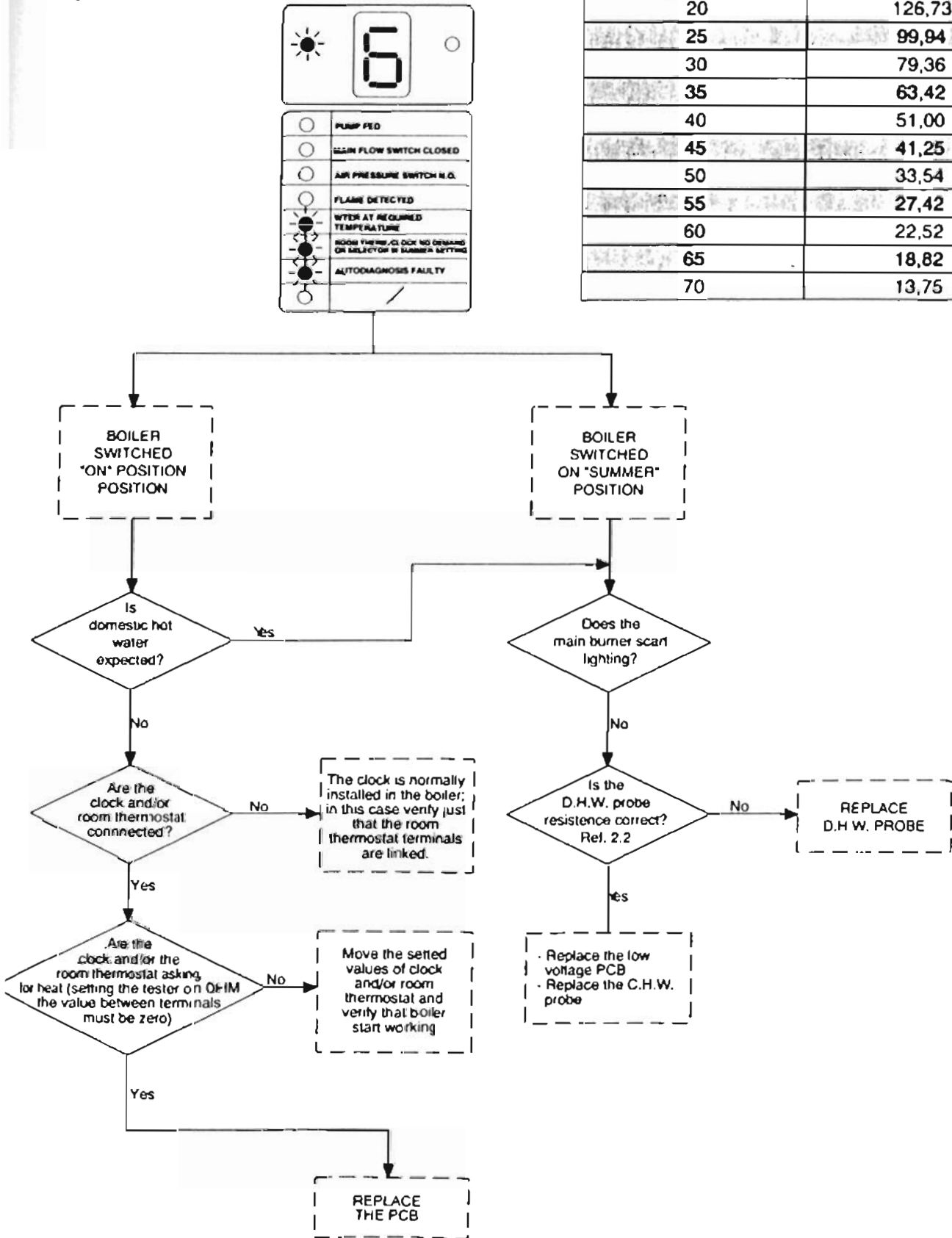
# Fault finding

**TCS STATE :** There is no demand of heat due to the external regulations of the boiler or boiler is switched on "summer" position.

**Note:** This state is faulty only if it remains indefinitely, even when space heating or hot water are expected.

**Ref.22**  
D.H.W. probe resistance table.

WATER TEMPERATURE °C	RESISTANCE KΩ
15	161,84
20	126,73
25	99,94
30	79,36
35	63,42
40	51,00
45	41,25
50	33,54
55	27,42
60	22,52
65	18,82
70	13,75



# Fault finding

## 7.5 FAULT FINDING WITHOUT THE UTILIZATION OF THE TOTAL CHECK SYSTEM

The utilization of TCS is the more efficient way to single out a defect, because it points to a restricted area to be checked.

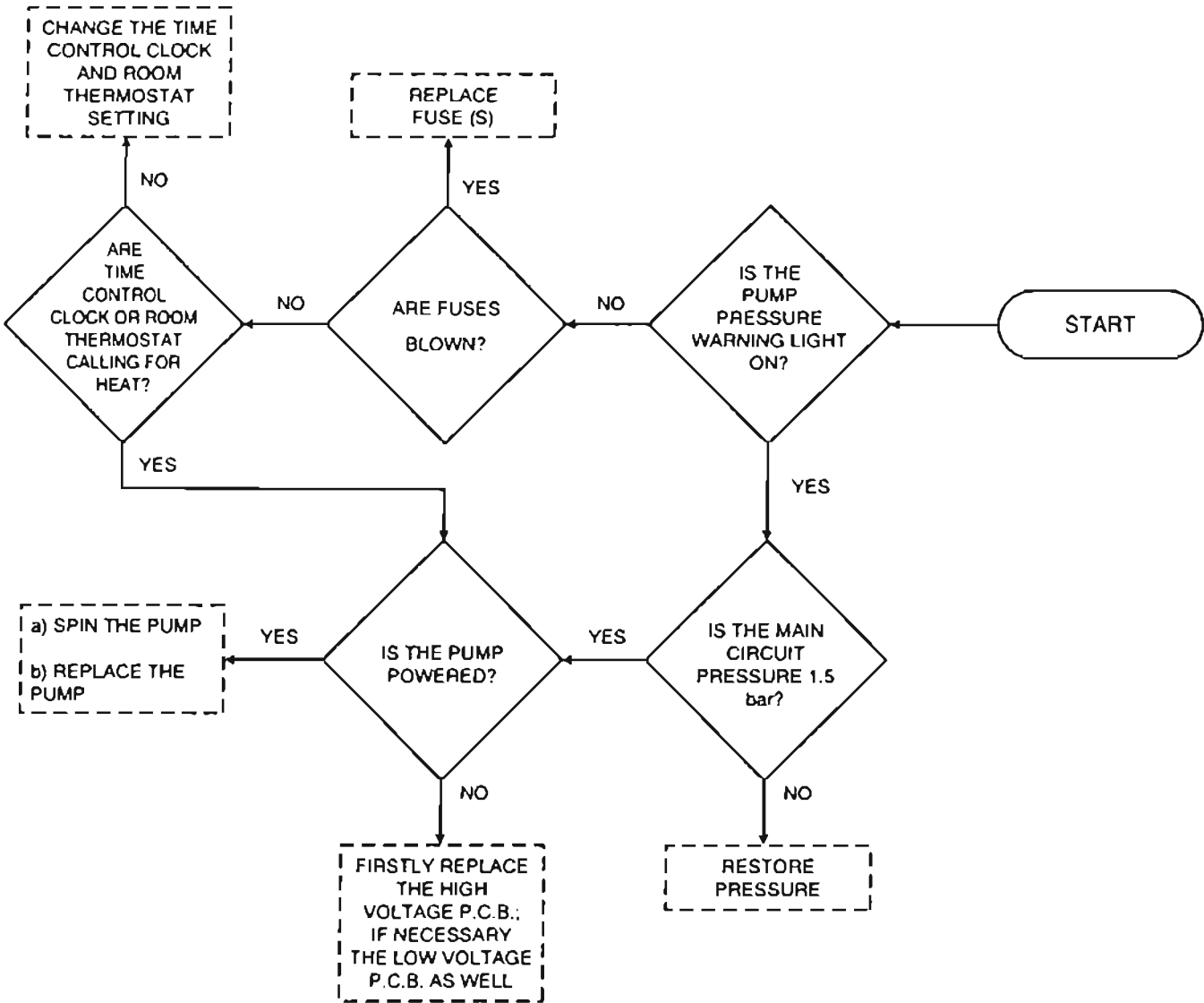
But in the case of TCS being unavailable, it is possible to detect and remove the eventual defect utilizing the standard fault finding diagrams described in this chapter.

The checking modes referred to are the same as with utilization of TCS.

### 7.5.1 APPLIANCE COMPLETELY SHUT DOWN

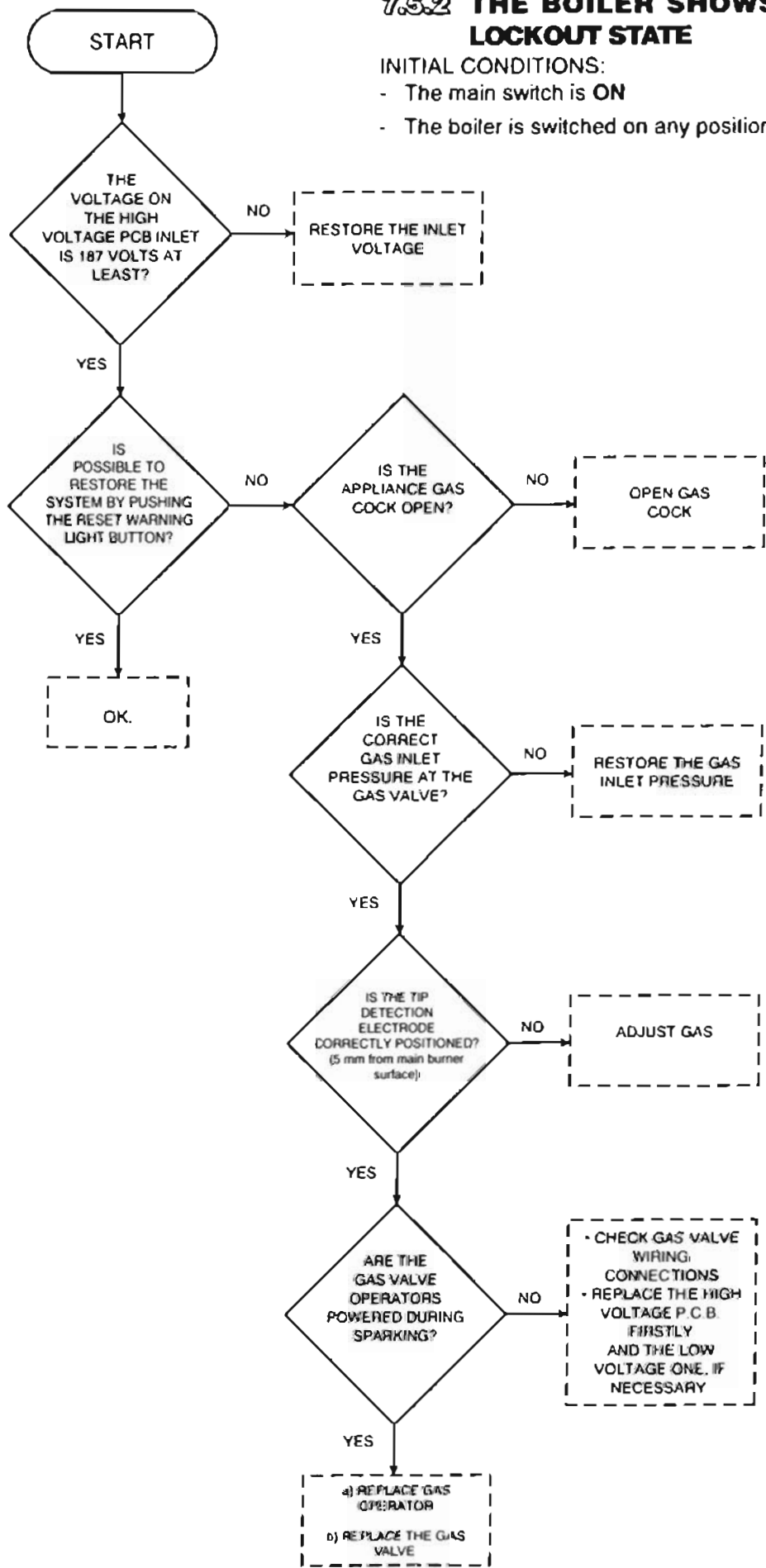
INITIAL CONDITIONS:

- The main switch is ON
- The boiler is switched on any position except for "OFF"



7.5.2 THE BOILER SHOWS THE IGNITION LOCKOUT STATE

- INITIAL CONDITIONS:
- The main switch is ON
  - The boiler is switched on any position except for "1/2".

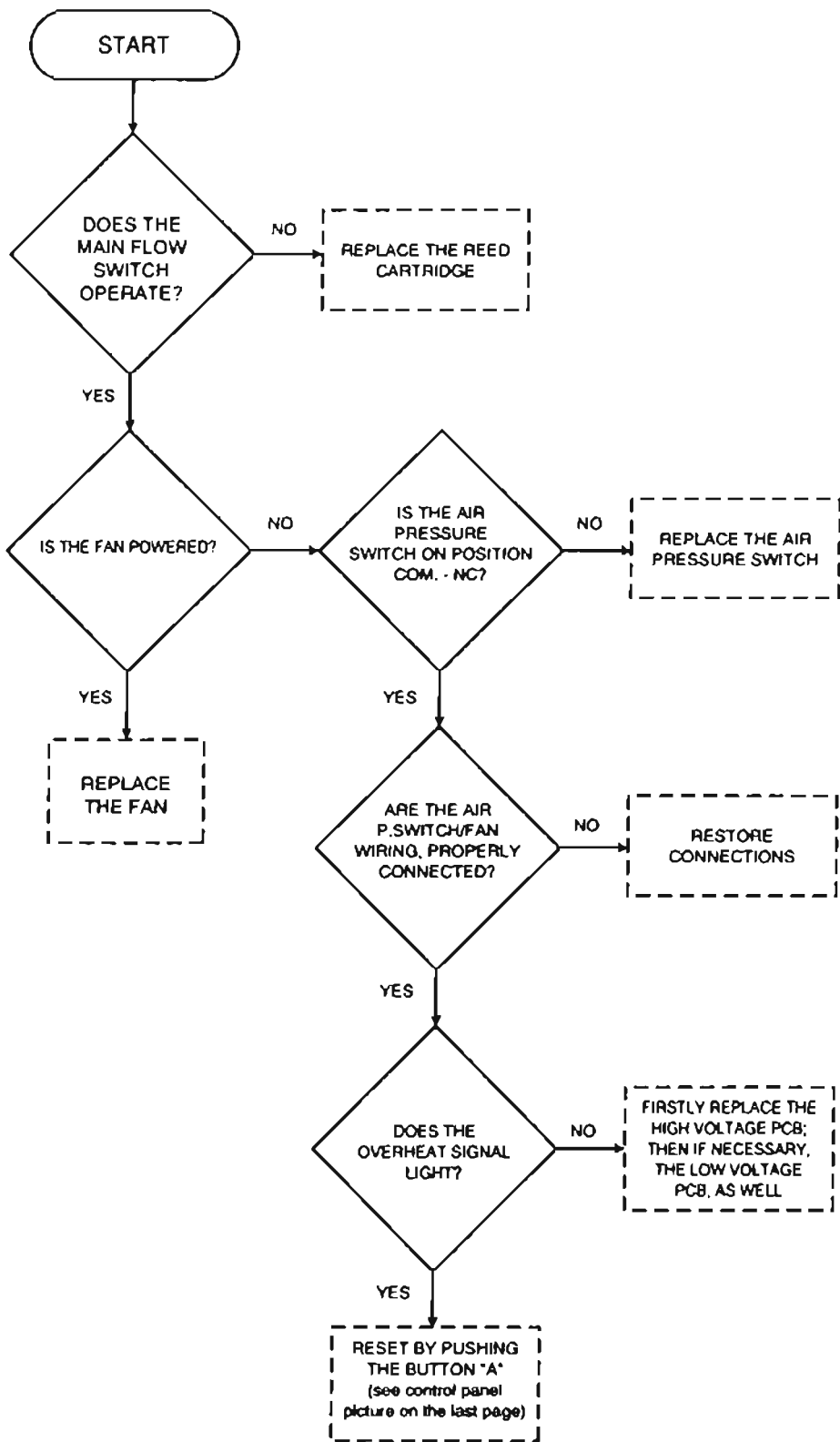


# Fault finding

## 7.5.3 PUMP IS RUNNING BUT THE APPLIANCE DOES NOT OPERATE

INITIAL CONDITIONS:

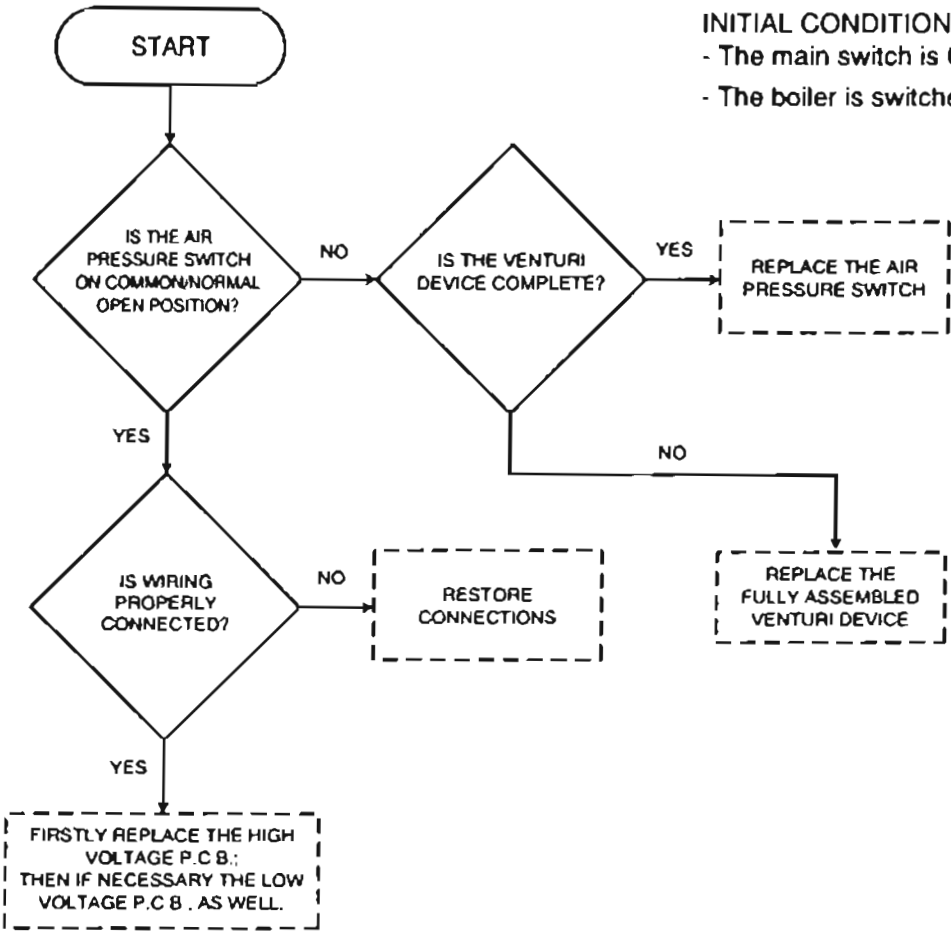
- The main switch is **ON**
- The boiler is switched on any position except for "🔧"



# Fault finding

## 7.5.4 FAN IS RUNNING BUT THE APPLIANCE DOES NOT OPERATE

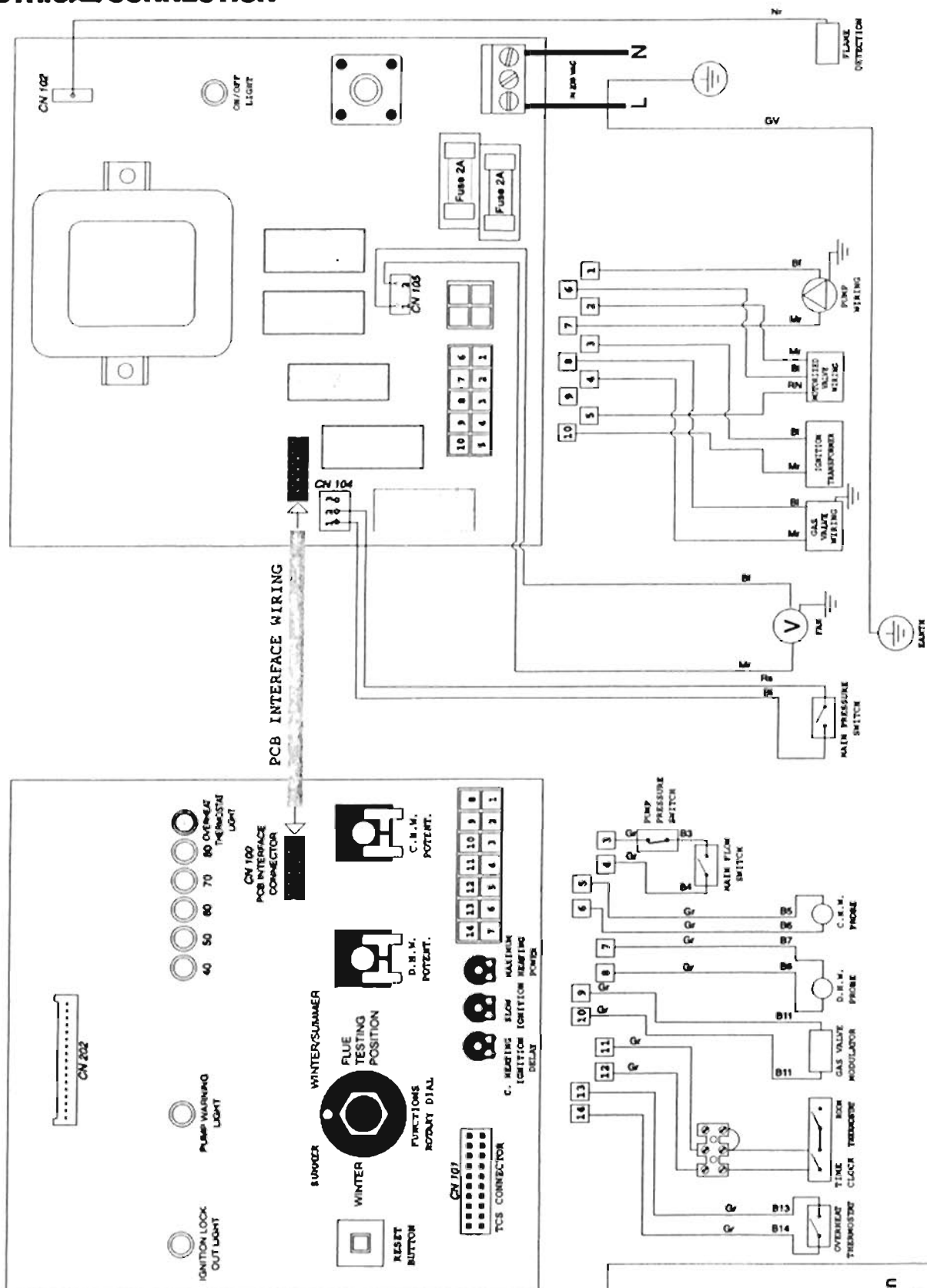
- INITIAL CONDITIONS:
- The main switch is ON
  - The boiler is switched on any position except for "🔥".





# 8 ELECTRIC DIAGRAMS

## 8.1 ELECTRICAL CONNECTION

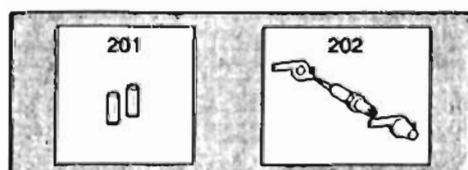
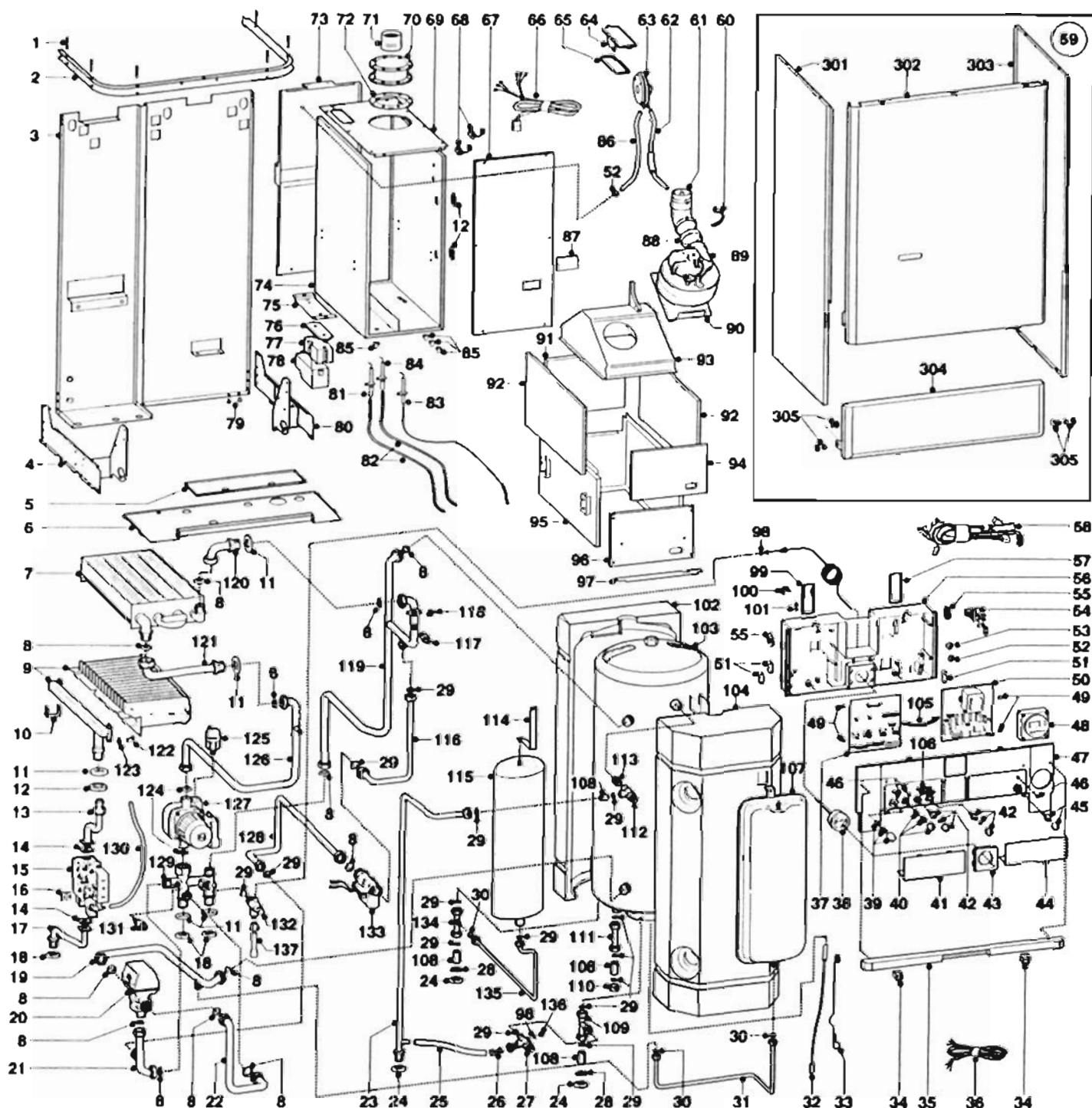


### COLOUR

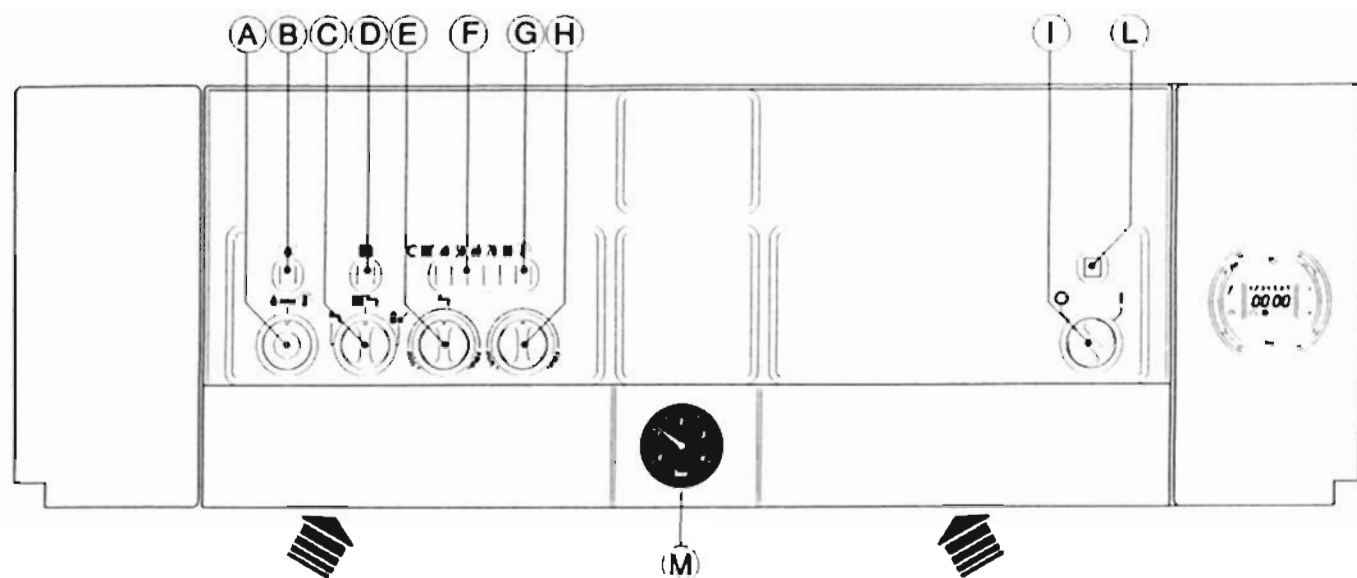
Bl	=Blue
Red	=Red
Brw	=Brown
Blk	=Black
Gry	=Grey
Vio	=Violet
Whi	=White
Pnk	=Pink
Grn	=Green
Org	=Orange
Yll/Gm	=Yellow/Green
Whv/Blk	=White/Black
Whv/Red	=White/Red
Red/Blk	=Red/Black

[illegible]

# Short spare parts list



## CONTROL PANEL



Left service door;  
access to:

- ignition delay potentiometer
- TCS connection
- low voltage wiring loom connection

Right service door;  
access to:

- fuses
- main voltage cord supply connector
- high voltage wiring loom connection
- fan connector
- air flow switch connector

**A** - button for ignition and overheat thermostat reset

**B** - ignition lock out light

**C** - function rotary dial

**D** - Low water pressure warning light

**E** - D.H.W. control knob

**F** - C.H.W. thermometer

**G** - overheat thermostat light

**H** - C.H.W. control knob

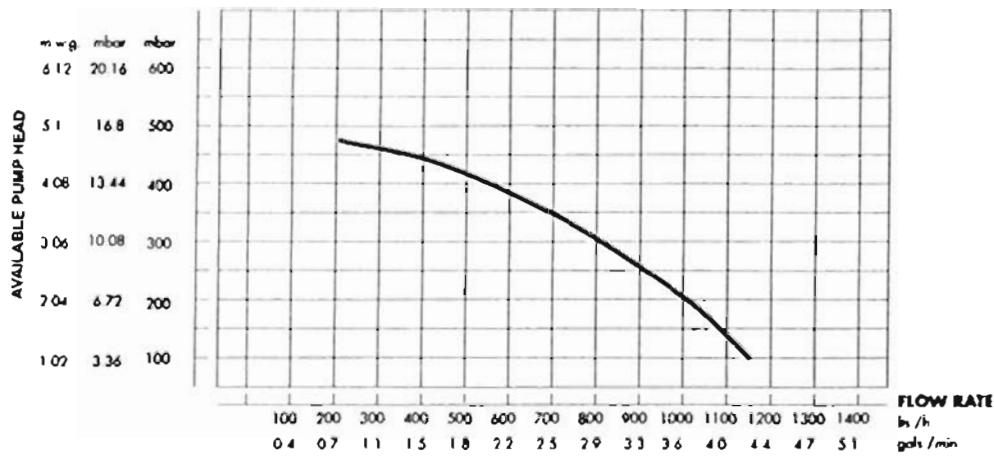
**K** - on/off knob

**L** - on/off light

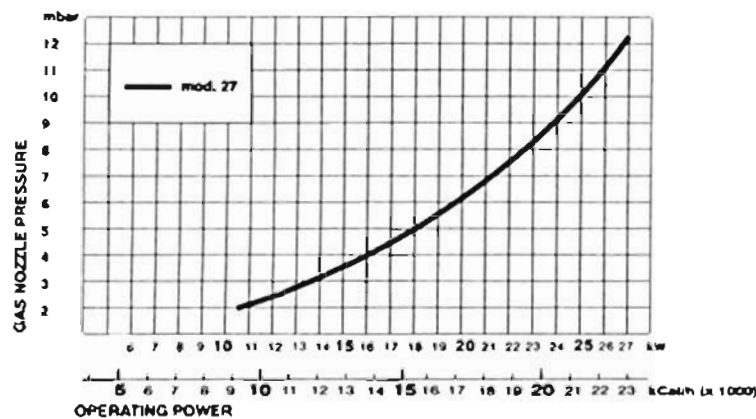
**M** - Manometer for C.H.W. pressure

**T** - C.H. time control clock

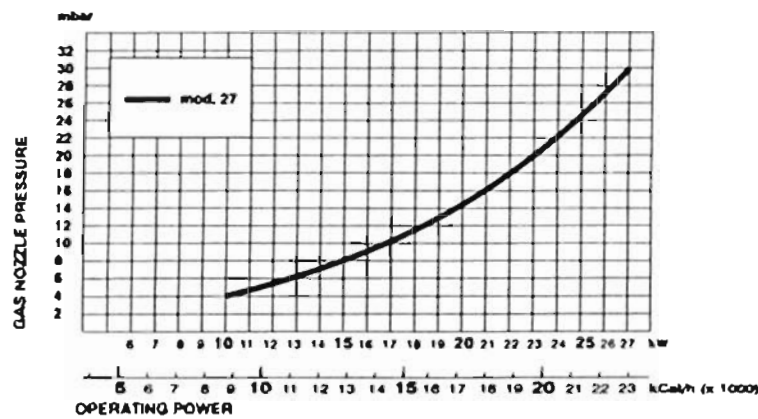
RESIDUAL HEAD OF THE CIRCULATOR



REGULATING HEATING POWER FOR NATURAL GAS (G20)



REGULATING HEATING POWER FOR BUTANE GAS (G30)



REGULATING HEATING POWER FOR PROPANE GAS (G31)

