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Wall hung, fan flue, room sealed, high efficiency gas boiler

# User manual and Installation instructions

## RIVA COMPACT HE

Models

**M96.24SM/C**

**M96.28SM/C**

**M96.28SR/C**



This product has an energy rating B on a scale of A to G  
For more information see [www.boilers.org.uk](http://www.boilers.org.uk)  
This is a certification mark





Congratulations on your choice.

**RIVA COMPACT HE** are condensing high efficiency sealed chamber fan flue gas boilers. They are fully electronically controlled and have electronic ignition.

The materials they are made of and the control systems they are equipped with give you safety, a high level of comfort and energy savings to allow you to get the greatest benefit out of independent heating.

**RIVA COMPACT HE** allow a higher efficiency by reducing the flue gas temperature such that the water vapour formed during the combustion is condensed out.

This allows a gain of useful heat that otherwise would be lost.

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## Remember that...

### ✓ **The manual**

- must be read thoroughly, so that you will be able to use the boiler in a safe and sensible way;
- must be carefully kept. It may be necessary for reference in the future.

✓ **First lighting up** must be carried out by competent and responsible engineer.

### ✓ **The manufacturer**

- disclaim all liability for any translations of the present manual from which incorrect interpretation may occur
- cannot be held responsible for non-observance of instructions contained in this manual or for the consequences of any procedure not specifically described.

## Using the boiler...

✓ **Before lighting the boiler** you are advised to have a professionally qualified person check that the installation of the gas supply

- is gas-tight;
- is of the correct gauge for the flow to the boiler;
- is fitted with all the safety and control devices required by the current Regulations.

### ✓ **Ensure that**

- the installer has connected the pressure relief valve outlet to a drain pipe. The manufacturers are not responsible for damage caused by opening of the pressure relief

valve and consequent escape of water, if not connected correctly to the drain.

- the installer has connected the condensate outlet to a suitable drain pipe.

### ✓ **On detecting the smell of gas**

- don't operate any electrical switches, the telephone or any device that may produce sparks;
- open the windows and doors at once to create a draught of air which will purge the area;
- shut off the gas cocks;
- get the assistance of a qualified person.

✓ **Do not touch the appliance** with parts of the body that are wet or damp and/or bare feet.

✓ **Do not block or modify** the condensate outlet and pipework

✓ **In case of structural work** or maintenance near the exhaust duct and/or fume exhaust devices or their attachments, turn off the appliance. On completion of the work, have a professionally qualified person check their efficiency.

✓ **Repairs** (under guarantee) must be carried out only by an approved engineer, using genuine spare parts. Thus do no more than switching off the boiler yourself (see the instructions).

✓ **Your boiler** allows heating up of water to a temperature less than boiling point;

- must be connected to a central heating system and/or a hot water supply system, compatible with its performance and output;



- can be used only for those purposes for which it has been specially designed;
- must not be touched by children or by those unfamiliar with its operation;
- must not be exposed to weather conditions.

✓ **During the operation** it is quite normal that the boiler produces a white plume of condensation vapour from the flue terminal. This is due to the high efficiency of the appliance and may be particularly evident with low outdoor temperatures.

## Safe handling of substances

Biasi products are manufactured in accordance with ISO 9000 and do not, and will not, contain any hazardous materials or substances such as asbestos, mercury or C.F.C.'s. The appliance packaging does not contain any substances, which may be considered a hazard to health.

### Combustion chamber panels

Material: mineral fibers

**Known hazards** – Some people can suffer reddening and itching of the skin. Fibre entry into the eye will cause foreign body irritation, which can cause severe irritation to people wearing contact lenses. Irritation to respiratory tract.

**Precautions** – Dust goggles will protect eyes. People with a history of skin complaints may be particularly susceptible to irritation. High dust levels are only likely to arise following harsh abrasion. In general, normal handling and use will not present high risk, follow good hygiene practices, wash hands before, touching eyes, consuming food, drinking or using the toilet.

**First aid** – Medical attention must be sought following eye contact or prolonged reddening of the skin.

### Thermostat / Temperature gauge


**Description** – Sealed phial and capillary containing liquid.

**Known hazards** – irritating to skin, eyes and throat. Vapour is harmful. Inflammable – do not extinguish with water.

**Precautions** – Do not incinerate. Avoid contact with broken/leaking phials. Do not purposely puncture.

**First aid** medical attention must be sought following eyes/skin contact, wash with clean water.

**Appliance category** II<sub>2H3+</sub> **Gas** G20 20 mbar, G30 29 mbar, G31 37 mbar  
**Country of destination:** United Kingdom

This appliance conforms with the EEC directive 90/396 and, consequently, it has the right to make use of the  brand name

Moreover, the appliance conforms with the EEC directive 87/308 relative to the prevention and elimination of radio disturbances.

The appliance is built to comply with the regulation now in force regarding gas appliance's safety and the European regulation now in force relative to safety of household and similar electrical appliances.

The manufacturer, in the continuous process to improve his products, reserves the right to modify the data expressed in the present documentation at any time and without prior notice.

The present documentation is an informative support and it cannot be considered as a contract towards third parties.

# Boiler installation and commissioning tips

✓ **The installation** must be carried out by a qualified person who will be responsible for observing the current Regulations.

## Installing the boiler...

✓ Do not forget to remove the transit caps and plugs from the boiler connections these are fitted to every boiler.

✓ Keep the boiler clear of dust during installation and in particular do not allow any dust or debris to enter the top of the boiler where the flue connection is made. It is recommended that you put a dust sheet over the top of the boiler until you are ready to make the flue connection.

✓ Because every boiler is fired and tested live at the factory, a small amount of water remains within the boiler. It is possible for this water to initially cause the pump to seize. It is therefore recommended that the pump rotor be manually turned to free its rotation before turning the boiler on.

✓ Remember to release the auto air purge before filling the boiler. See the instructions to identify the location of this device.

✓ Do not remove the cap of the pressure test points of the air switch (top left side of the boiler).

✓ You are strongly advised to flush out the system both cold and hot in order to remove system and installation debris.

✓ It is also sensible to initially fire and commission the boiler before connecting any external controls such as a room thermostat. By this method if you have a subsequent problem following the addition of an external control you can eliminate the boiler from your fault analysis.

✓ Do not forget to range rate the boiler to suit the system requirements. This procedure is covered in the commissioning section of the installation manual.

✓ If the boiler is fitted with a digital programmer, when setting the times for automatic operation, remember that for every "ON" time there must be an "OFF" time to follow and that on every occasion you enter a time you must also indicate which days that you want the boiler to follow the timed settings.

✓ Some products incorporate an anti cycling time delay. It is normal when first switching the boiler on for the boiler to operate on heating for a few seconds then switch off. After 3–4 minutes has elapsed the boiler will then re ignite and operate perfectly normally. The ignition delay cycle does not prevent normal operation of the boiler to provide d.h.w.

✓ If you are in any doubts as to the installation or operation of the boiler please read the instruction manuals thoroughly and then if necessary contact Biasi UK for advice and assistance.

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MAINTENANCE

Abbreviations used in the manual

C.h. = Central heating

D.h.w. = Domestic hot water

D.c.w. = Domestic cold water

# 1 APPLIANCE DESCRIPTION

## 1.1 Overview

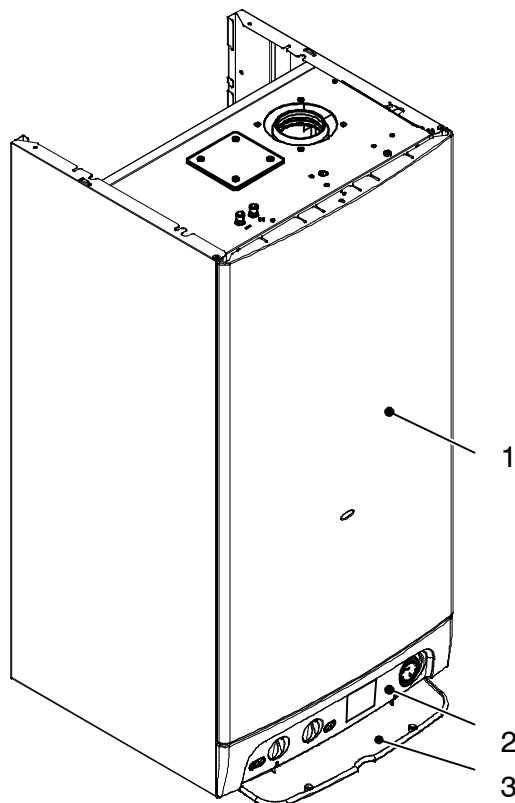


Fig. 1.1

- 1 Case front panel
- 2 Control panel
- 3 Control panel cover

## 1.2 Control panel

- 4 C.h. circuit temperature and pressure gauge
- 5 Time switch (c.h. control) \*
- 6 Lock-out signal lamp
- 7 Lockout reset button
- 8 Function selector and c.h. temp. control knob

M96.24SM/...  
M96.28SM/...

M96.28SR/...

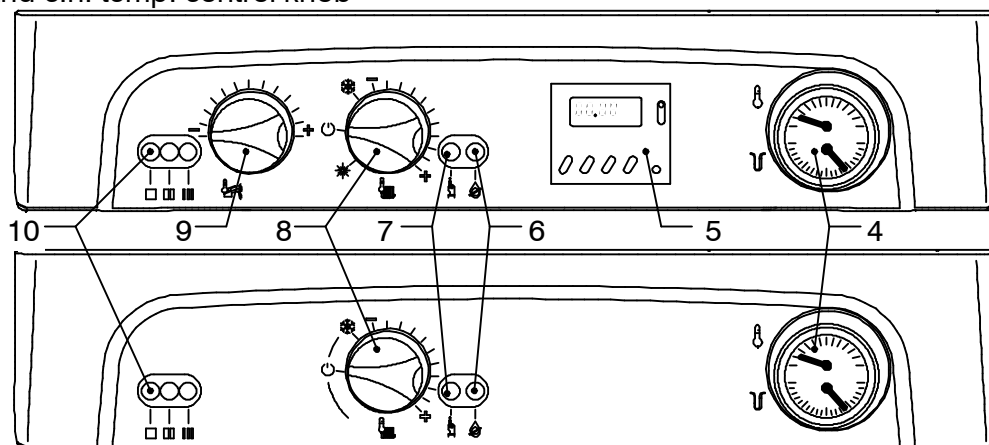


Fig. 1.3

\* not on M96.28SR/... boiler

- 9 D.h.w. temperature control knob \*
- 10 Appliance operation lights

## 1.3 Isolation valves

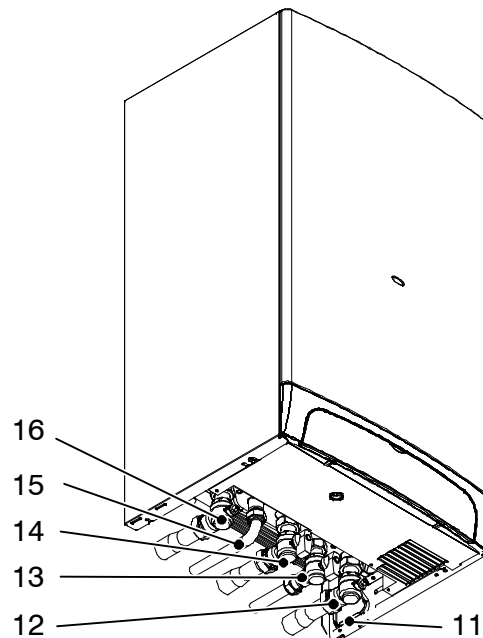


Fig. 1.2 (bottom view of the boiler)

- 11 Condensate drain pipe
- 12 C.h. return valve
- 13 D.c.w. inlet valve \*
- 14 Gas inlet valve
- 15 D.h.w. outlet pipe \*
- 16 C.h. flow valve

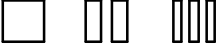




































## 1.4 Technical data





For detailed technical data see section 4.6 or 4.7 of this manual.

1.5 Operation lights

Three lights (10 in Fig. 1.3) give detailed indication regarding the operation of the boiler.

The following table gives the relationship between each of the possible light combinations and their meaning.

	A short pulse every 4 seconds: stand-by condition Function selector in  position. Anti-freeze system active	
  	1 second pulse every 2 seconds: normally operating boiler. Function selector in  or  position	
  	C.h. operation	
  	D.h.w. operation *	
  	Frost protect operation	
  	D.h.w. operation Excessive temperature on primary circuit *	
  	Faulty c.h. temperature probe NTC	
  	Faulty d.h.w temperature probe NTC *	
  	Faulty primary circuit (no water or absence of flow)	
  	Lack of burner ignition (no ignition signal from the full sequence ignition device)	
  	Ignition gas pressure adjustment	
  	Minimum gas pressure adjustment	

-  Lamp OFF
-  Lamp ON
-  Flashing lamp, alone or simultaneously with an other lamp.
-  Flashing lamp, alternate with another lamp.

USE

\* not on M96.28SR/... boiler

## 2 INSTRUCTIONS FOR USE

### 2.1 Warnings

Biasi UK Ltd support the Benchmark initiative. Within the information pack, you will find a Benchmark Log Book. It is very important that this is completed correctly by the installer and/or the commissioning engineer at the time of installation, commissioning and hand over to the user.

All CORGI Registered Installers carry a CORGI ID card, and have a registration number. Both should be recorded in your Benchmark Log Book. You can check your installer is registered by calling CORGI direct on 01256 372300.

In order to guarantee safety and correct operation, it is essential that all the tests are carried out by a competent and responsible service engineer before lighting up the boiler.

The tests are described in the *installation instructions* in section 7 *commissioning*.

Ensure that the c.h. circuit is regularly filled with water (even if the boiler is only used for d.h.w. supply) checking that the pressure indicated on the temperature and pressure gauge 4 is not lower than that shown in Fig. 2.2.

If the pressure reading on the pressure gauge is below that shown in Fig. 2.2, then the system will require topping up. A filling loop is normally provided by the installer for this purpose.

**If you are in any doubt regarding this procedure you are advised to contact your Installer or an Approved Engineer.**

This appliance is provided with a built in anti-freeze system that operates the boiler when the temperature is below 4 °C

Therefore, when the boiler is not lit or used in cold weather, with consequent risk of freezing **do not switch off the boiler at the fused spur isolation switch or close the gas inlet cock.**

When you do not expect to use the boiler for a long period and the boiler is not to be used for frost protection then follow the instructions given in section 2.6 on page 6.

### 2.2 Refilling procedure

- 1 Isolate the boiler from the electrical supply at the fused spur. Reconnect the filling loop as demonstrated in Fig. 2.1.

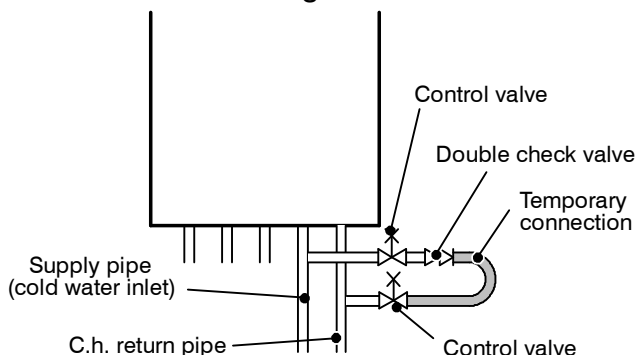


Fig. 2.1

- 2 Open the valves of the filling loop and watch the gauge until it reaches normal filling pressure as shown in Fig. 2.2.

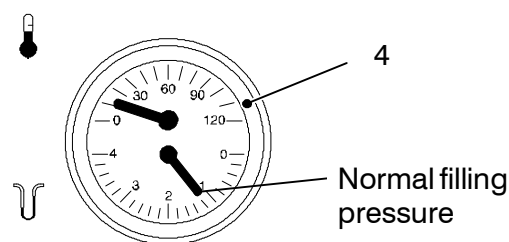


Fig. 2.2

- 3 Close the valves and remove the filling loop.

**If you experience any difficulty with the operation of the boiler, switch off the boiler immediately at the fused spur isolation switch and contact your Installer or an approved Service Engineer**

Air introduced into the boiler during this filling process will vent through the automatic air purger fitted to the boiler. You may also find it necessary to vent air from your radiator circuit using your radiator key, however be aware that excessive venting will cause the pressure in the system to drop.

Always ensure that the pressure gauge is set at the required pressure.



## 2.3 Ignition

- 1 Check that the valves located in the lower part of the boiler are open (Fig. 2.3).

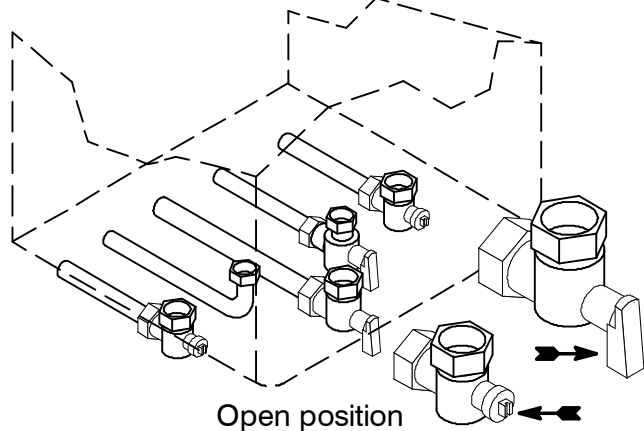


Fig. 2.3

- 2 Turn on the electricity supply to the boiler, switching on the fused spur isolation switch. The appliance operation light 10 (Fig. 2.4) will flash every 4 seconds (stand-by condition).
- 3 If the boiler is to be used for c.h. and d.h.w position the function selector 8 as in Fig. 2.4 (combi) or in Fig. 2.5 (c.h. only). The appliance operation light 10 will flash every 2 seconds (operating boiler).

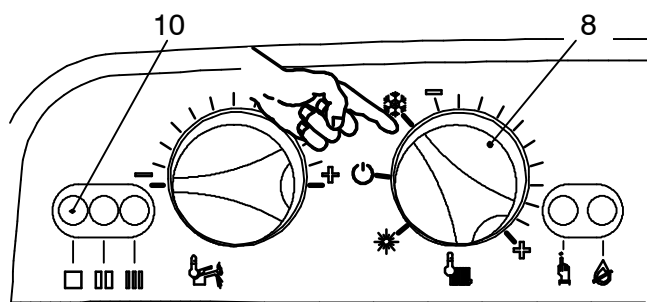


Fig. 2.4

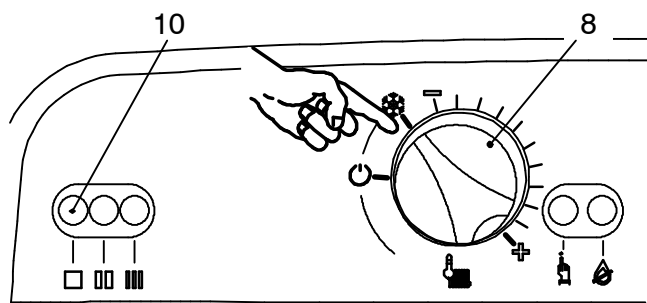


Fig. 2.5

- 4 If d.h.w. supply only is required (combi), position the function selector 8 as in Fig. 2.6. The appliance operation light 10 will flash every 2 seconds (operating boiler).

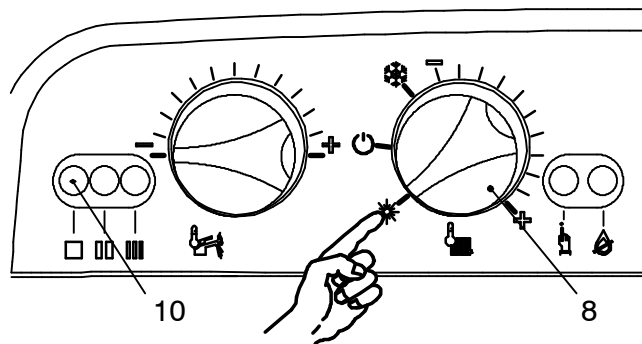


Fig. 2.6

## 2.4 C.h. circuit temperature

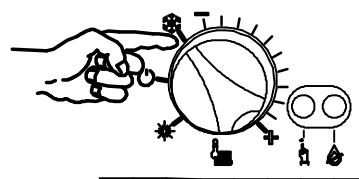
The output temperature of c.h. water is adjustable from a minimum of about 38°C to a maximum of about 85°C (Fig. 2.7), by turning the function selector (8).

Adjustment of c.h. output on the boiler is automatic. The greatest output pre-set in the factory can, however, be reduced in level according to actual system requirements; this does not affect the maximum output in d.h.w. operation.

Such adjustments must be carried out by a qualified person; therefore we advise you to contact your installer or Service Agent.

Adjustment of the boiler temperature alters the gas flow at the burner according to the thermal demand in the system. So it is usual to see the burner lit at the minimum level for more or less long periods.

Minimum



Maximum

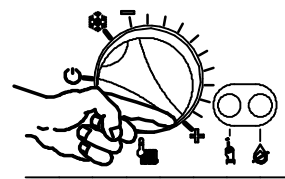


Fig. 2.7

## Instructions for use

USE

### Adjustment

In order to achieve optimal settings for economy and comfort, we recommend adjusting the operating temperature of the c.h. water according to the outside temperature, positioning the knob as follows:

From 5 to 15 °C

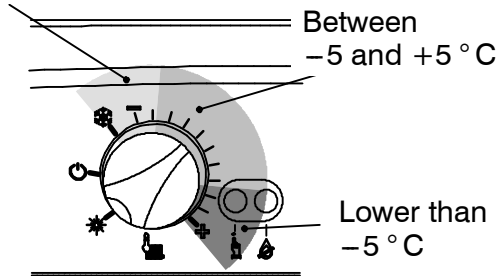


Fig. 2.8

Your qualified installer will be able to recommend the most suitable adjustment for your system.

The temperature and pressure gauge (4, Fig. 1.3 on page 2) will allow you to check that the set temperature is obtained.

### 2.5 D.h.w. temperature (combi)

The temperature of the d.h.w. leaving the boiler can be varied from a minimum of about 35°C to a maximum of about 55°C (Fig. 2.9), by turning the temperature control knob 9.

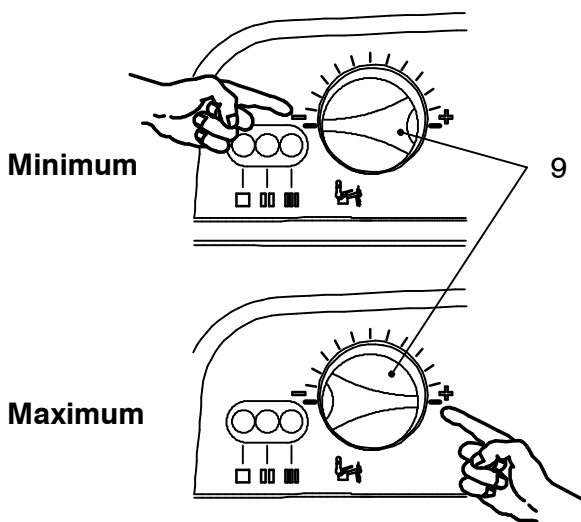


Fig. 2.9

Adjustment of the d.h.w. temperature is completely separate from that of the c.h. circuit.

The adjustment system integrated within the boiler automatically controls the flow of gas to the burner in order to keep the temperature of d.h.w. delivered constant, between the limits of maximum and minimum output.

Where the demand is at a low level or with the temperature set to the minimum, it is normal to see a cycle of lighting and extinguishing of the burner when running.

### Adjustment

It is advisable to adjust the d.h.w. temperature to a level commensurate with the demand, minimising the need to mix with cold water. In this way, the automatic control facilities will be fully exploited.

Moreover, where the amount of limescale present in the water may be particularly great, not exceeding the position in **Fig. 2.10** of the d.h.w. temperature control knob 9 corresponding to about 50°C (Fig. 2.10), minimises annoying incidences of scale deposits and clogging.

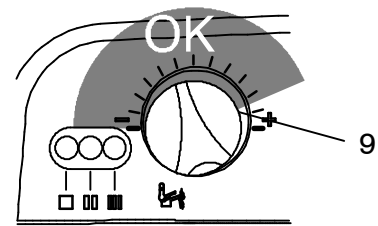


Fig. 2.10

In these cases, however, it is advisable to install a small water treatment device or softener. With such a device you should avoid periodic descaling.

Consequently, the d.h.w. heat exchanger will keep its performance consistent for a longer period of time with resulting gas savings.

If the demand for d.h.w. is so great as to prevent reaching a high enough temperature, have the appropriate output limiting valve installed by your installer or an Authorised Service Engineer.

### 2.6 Extinguishing

To turn the boiler off set the function selector 8 to the position shown in Fig. 2.11 (combi) or Fig. 2.12 (c.h. only).

## Instructions for use

The appliance operation light 10 will flash every 4 seconds.

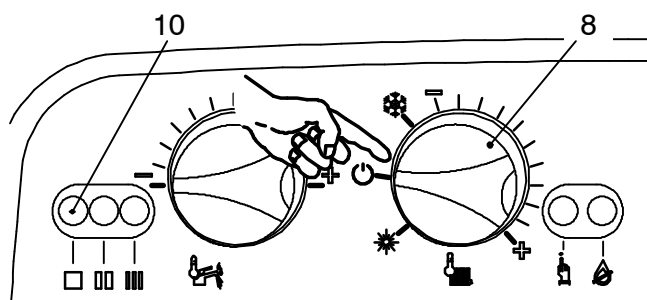


Fig. 2.11

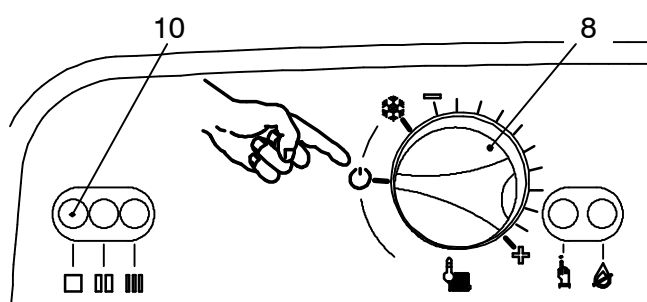


Fig. 2.12

When you do not expect to use the boiler for a long period:

- 1 Switch off the electricity supply to the boiler, by means of the fused spur isolation switch;
- 2 Shut off the gas supply cock 14 and the valves for the water circuits fitted under the boiler (Fig. 2.13).
- 3 Empty the water circuits, if necessary, as shown in the *installation instructions* in the section *maintenance*.

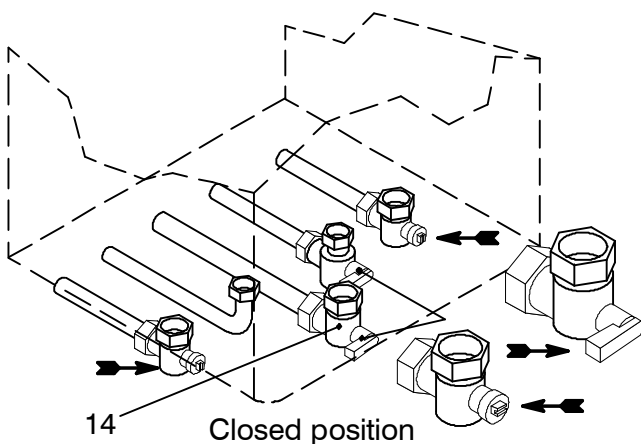


Fig. 2.13

## 2.7 Built in time switch (combi)

The combi boilers are equipped with a built in electronic time switch (5, Fig. 1.3 on page 2) which controls the c.h. operation.

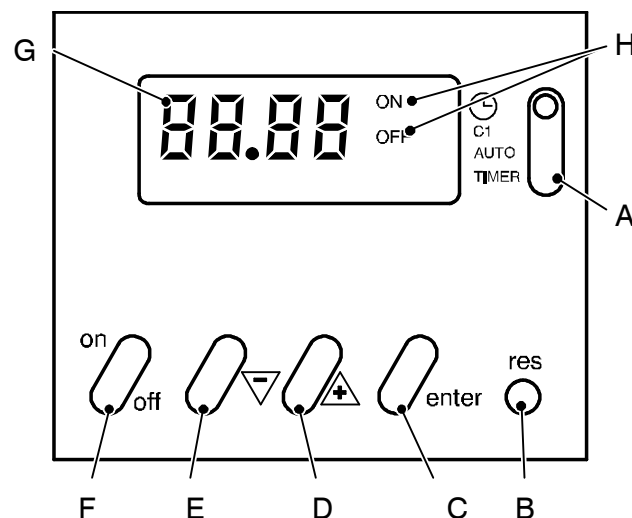




Fig. 2.14

### Display and control panel

- A Mode selector switch
- B Reset button
- C Enter button
- D Increase “+” setting button
- E Decrease “-” setting button
- F On-off button
- G Time display
- H ON-OFF display

### Setting the current time

Note: with a new unit or when the reset button B has been pressed and the selector switch A is to the  position, the time display G is flashing.

Set the mode selector switch A to the  position and press the buttons D or E until the current time appears in the display G.

The clock starts by moving the switch A to the AUTO position.

Setting example shown in Fig. 2.15:  
Current time 16.30.

USE

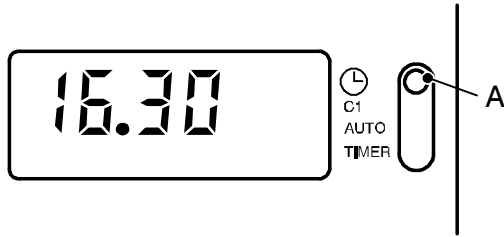


Fig. 2.15

## Setting the switching time

20 memory locations are available, corresponding to 10 on–off sequences.

Set the mode selector switch A to the **C1** position. The symbols shown in Fig. 2.16 appears in the display.

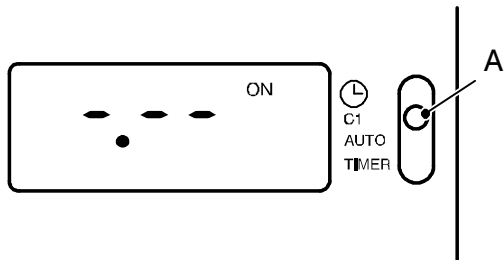


Fig. 2.16

Press the buttons D or E to set the desired ON time.

Press the “enter” button C to confirm the setting and to continue programming the OFF time.

Set the OFF time as explained above for the ON setting and confirm by pressing the “enter” button C. Proceed in the same way for other settings.

Setting example shown in Fig. 2.17:

A – ON time 7.45.

B – OFF time 10.30.

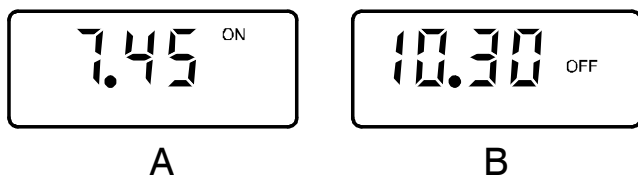


Fig. 2.17

## Activating the timed settings

Set the mode selector switch A to the **AUTO** position shown in Fig. 2.18.

The current time appears in the display. The ON–OFF display H indicates the current state of operation (according to the settings).

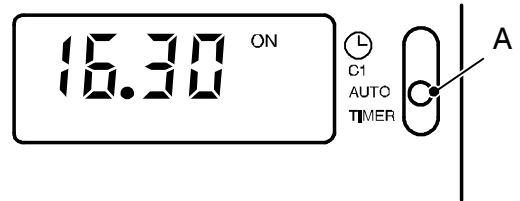


Fig. 2.18

Note: when the mode selector switch A is in the **AUTO** position and the boiler is switched off at the fused spur isolation switch, the display H indicates only the OFF state. The other indications are blanked.

## Reading the timed settings

Set the mode selector switch A to the **C1** position. The symbols shown in Fig. 2.16 appears in the display.

Press the “enter” button C. Each time the button is pressed the display shows the details of the next setting.

## Changing or deleting the timed settings

Set the mode selector switch A to the **C1** position. The symbols shown in Fig. 2.16 appears in the display.

Press the “enter” button C until the display shows the setting to be modified or deleted.

The time setting can be modified now by pressing button D or E and the operation can be switched on or off by pressing the button F.

To delete a time set press the button D or E until the symbols shown in Fig. 2.16 appears in the time display G.

The new settings are memorized by moving the switch A to a different position.

## Manual operation

The operation of the time switch can be forced on or off constantly or for a timed period.

To force **constantly** on or off the timer operation set the mode selector switch A to the **TIMER** position. The symbols shown in Fig. 2.19 appears on the display.

## Instructions for use

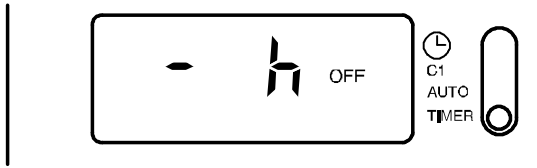


Fig. 2.19

The operation can be switched permanently on or off by pressing the button F and leaving the switch A in the **TIMER** position.

To force a **timed delay** on or off operation, set the mode selector switch A in the **TIMER** position.

Set the time delay by pressing the button D or E and the operation can be forced on or off by pressing the button F.

The time delay can be set within the following ranges:

1 to 23 hours with steps of 1 hour

1 to 27 days with steps of 1 day

The time delay setting is activated by moving the switch A to the **AUTO** position.

The ON – OFF display H flashes indicating that the current state of operation has been forced.

To delete the timed delay setting, set the mode selector switch A in the **TIMER** position, press the button D or E until the symbols shown in Fig. 2.19 appears in the display and then set the mode selector switch A to the **AUTO** position

Setting example shown in Fig. 2.20:  
forced ON state for 4 hours.

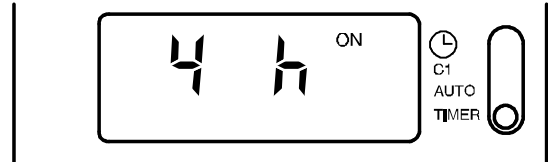


Fig. 2.20

### Resetting

To completely reset the timer, press the reset button with a pointed object (pencil).

**CAUTION:** pushing the reset button will completely erase the settings as well as all the data, including the current time.

## 3 USEFUL ADVICE

### 3.1 Central heating

USE

For reasonably economical service install a room thermostat.

Never shut off the radiator in the area where the room thermostat is installed.

If a radiator (or a convector) does not heat up, check that no air is present in it and that its valve is open.

If the ambient temperature is too high, do not alter the radiator valves. Reduce the central heating temperature instead by means of the room thermostat and the function selector (8 in Fig. 3.1).

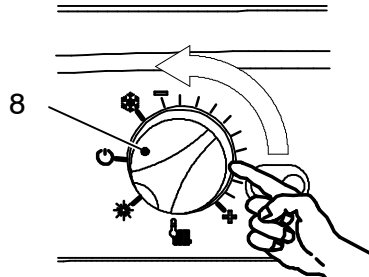


Fig. 3.1

### 3.2 Frost protection

This appliance is provided with a built in anti-freeze system that operates the boiler when the temperature is below 4 °C

Therefore, when the boiler is not lit and used in cold weather, with consequent risk of freezing **do not switch off the boiler at the fused spur isolation switch or close the gas inlet cock.**

### 3.3 Periodic maintenance

For efficient and continuous operation of the boiler, it is advisable to arrange maintenance and cleaning by an Authorised Service Centre Engineer, at least once a year.

During the service, the most important components of the boiler will be inspected and cleaned. This service can be part of a maintenance contract.

In particular, you are advised to have the following checks carried out:

- primary heat exchanger;
- domestic hot water heat exchanger;
- burner;
- exhaust fume duct and flue;
- pressurisation of the expansion tank;
- filling up of the central heating circuit;
- bleeding of air from the central heating system;

- general check of the appliance's operation.

### 3.4 External cleaning

Before carrying out any cleaning, disconnect the appliance from the electrical mains, using the fused spur isolation switch fitted adjacent to the appliance.

To clean the external panels, use a cloth soaked in soapy water. Do not use solvents, abrasive powders or sponges.

Do not carry out cleaning of the appliance and/or its parts with readily flammable substances (for example petrol, alcohols, naphtha, etc.).

### 3.5 Operational faults

#### If the lock-out signal lamp comes on

this indicates that the safety lock-out 6 (Fig. 3.2) has stopped the boiler

To re-start the boiler, it is necessary to press the boiler reset button 7 (Fig. 3.2).

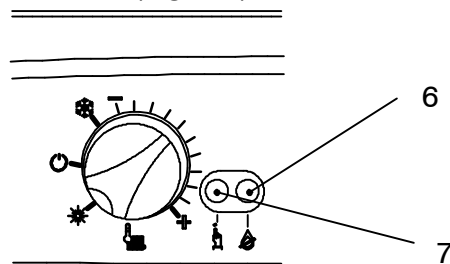


Fig. 3.2

For the first lighting up and following maintenance procedures for the gas supply, it may be necessary to repeat the resetting operation several times so as to remove the air present in the pipework.

Safety lock-out may occur even in case of an blockage of the condensate drainage (e.g. plugged drain pipe).

It is advisable to check the condensate drainage pipe and traps for cleanliness.

In case of persistent lock-out call a competent and responsible service engineer.

#### If noises due to air bubbles are heard during operation...

you should check that the pressure on the temperature and pressure gauge (Fig. 2.2 on page 4) is not below the correct setting.

If required, top up the system correctly, as described in the section 2.2 of this manual.

Bleed any air present in the radiators, if necessary.

## Useful advice

### **If the pressure on the temperature and pressure gauge (4 on page 2) has gone down...**

it is necessary to top up the appliance with water again, so as to raise the pressure to an adequate level as described in the section 2.2 of this manual.

If topping up with water has to be done very frequently, have the system checked for leaks.

### **If water comes out of the pressure relief valve**

Check on the temperature and pressure gauge (4 on page 2) that the pressure in the central heating circuit is not close to 3 bars. In this case, temperature rise in the circuit can cause the pressure relief valve to open.

So that this does not happen and to decrease the pressure to a normal value, it is advisable to vent some of the water in the appliance through the bleed valves present in the radiators.

### **If in time, a reduction in domestic hot water supply is observed...**

The likely causes may be impurities caught in the domestic hot water flow switch filter or limescale deposited in the domestic hot water heat exchanger. It is advisable to have the appliance cleaned out by an Authorised Service Centre Engineer.

### **If water should occasionally leak from the boiler...**

shut off the valves positioned under the boiler (Fig. 2.13 on page 7) and call an Authorised Service Centre Engineer.

### **If the left appliance operation light 10 (Fig. 3.3) flashes very quickly the boiler is detecting a fault.**

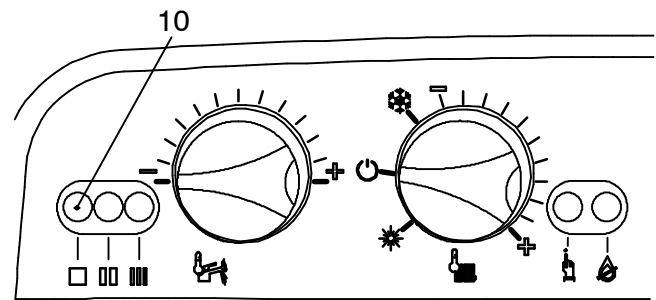


Fig. 3.3

**In this case or in case of problems other than those mentioned here, switch off the boiler, as described in section 2.6 on page 6 and call a competent and responsible service engineer.**

## 4 TECHNICAL INFORMATION

### 4.1 Overview

#### INSTALLATION

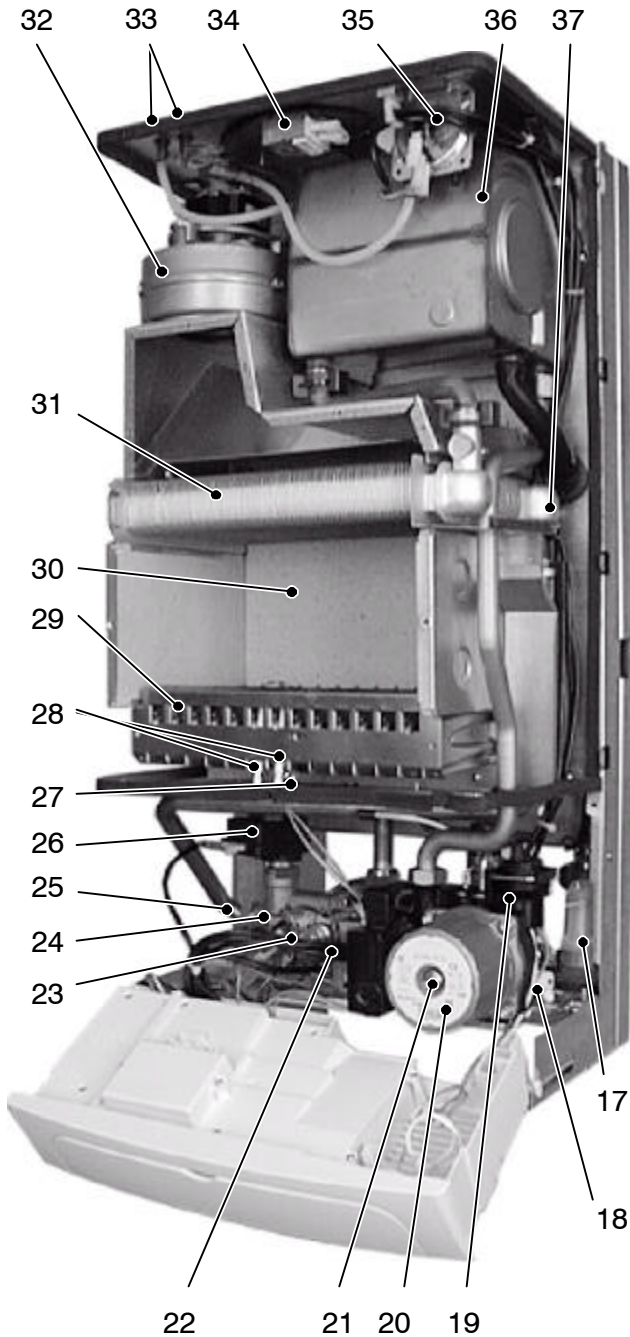


Fig. 4.1

- 11 Condensate drain pipe
- 12 C.h. return valve
- 13 Domestic cold water inlet valve
- 14 Gas inlet valve

- 15 D.h.w. outlet pipe
- 16 C.h. flow valve
- 17 Condensate trap
- 18 Main circuit drain valve
- 19 Automatic air purger valve
- 20 Pump
- 21 Pump vent plug
- 22 Modulation gas valve
- 23 D.h.w. temperature probe NTC
- 24 Primary circuit flow switch
- 25 C.h. temperature probe NTC
- 26 Three-way diverter valve
- 27 Flame-detecting electrode
- 28 Ignition electrodes
- 29 Burner
- 30 Combustion chamber
- 31 Primary heat exchanger
- 32 Fan
- 33 Air switch pressure test points
- 34 Flue thermostat
- 35 Air pressure switch
- 36 Condensing heat exchanger
- 37 Safety thermostat
- 38 D.h.w. flow switch
- 39 C.h. pressure relief valve
- 40 Modulation operator
- 41 Gas valve outlet pressure test point
- 42 Gas valve inlet pressure test point
- 43 D.h.w. heat exchanger
- 44 C.h. expansion tank
- 45 By-pass valve
- 46 Venturi device
- 47 Domestic water circuit filter
- 48 D.h.w. flow limiter
- 49 Flue outlet pipe
- 50 Air intake pipe



## 4.2 Main diagram (combi)

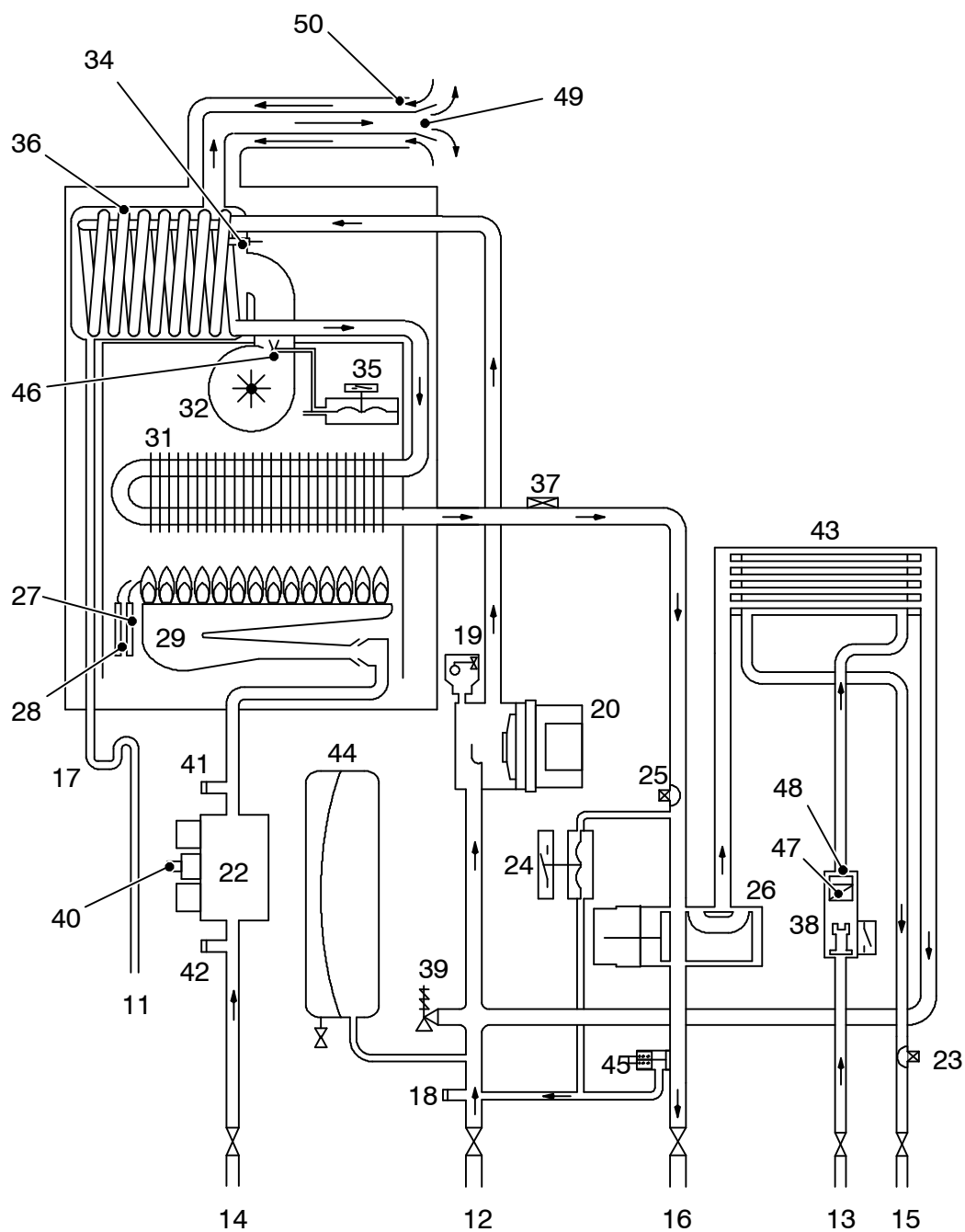


Fig. 4.2

### 4.3 Main diagram (c.h. only)

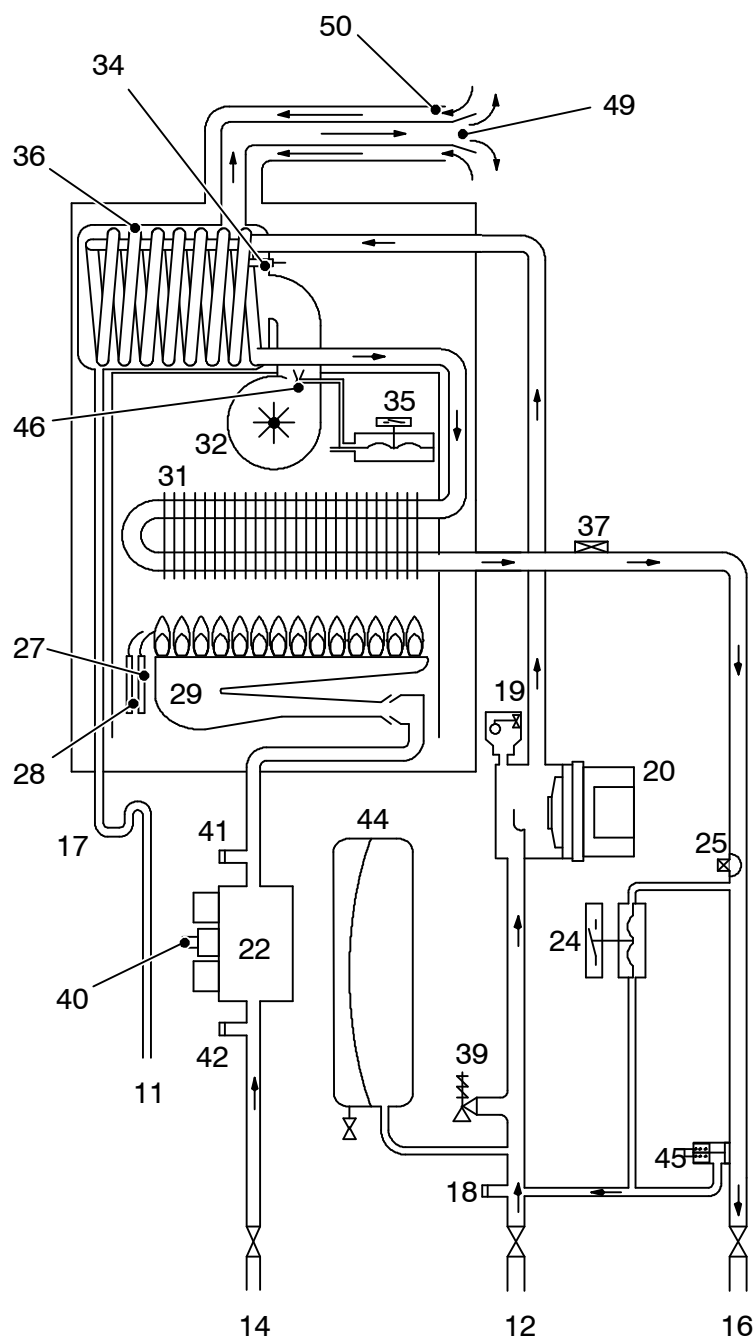


Fig. 4.3

4.4 Hydraulic specifications

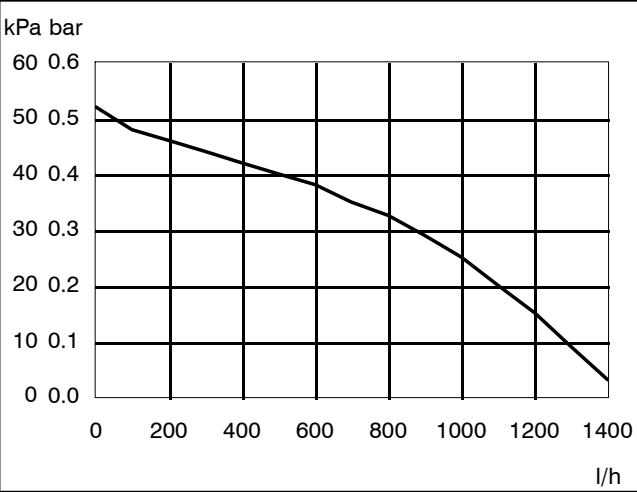


Fig. 4.4

The hydraulic specifications in Fig. 4.4 represent the pressure (available head for the central heating system) as a function of the flow rate.

The load loss due to the boiler has already been subtracted.

Output with thermostat cocks shut off

The boiler is fitted with an automatic by-pass valve (45 on page 12), which protects the primary heat exchanger.

In case of excessive reduction or total blockage of water circulation in the central heating system owing to closure of the thermostatic valves or sys-

tem component cocks, the by-pass valve ensures a minimum flow of water through the primary heat exchanger.

4.5 Expansion vessel

**Note: this boiler is designed for operation only in a sealed central heating system**

The height difference between the pressure relief valve and the highest point in the system may be 7m at most.

For greater differences, increase the pre-load pressure in the expansion vessel (44 on page 12) and the system, when cold, by 0.1 bar for each additional 1m.

Capacity	l	6,0
Pre-load pressure	kPa	100
	bar	1,0
Maximum volume of water in the system *	l	132

Tab. 4.1

\* Where conditions are:

- Average maximum temperature of the system is 80°C
- Initial temperature when filling up the system is 10°C

For systems with volumes greater than 132 l, an additional expansion vessel must be provided.

## 4.6 Technical data mod. M96.24SM/...

Heat input (A)		
Nominal	kW	25,0
	BTU/h	85 295
Minimum	kW	11,0
	BTU/h	37 530

Useful output G20		
Maximum	kW	24,6
	BTU/h	83 973
Minimum	kW	10,2
	BTU/h	34 936
Maximum condensing	kW	26,6
	BTU/h	90 754
Minimum condensing	kW	11,1
	BTU/h	37 871

Useful output G30 G31		
Maximum	kW	23,7
	BTU/h	80 894
Minimum	kW	10,2
	BTU/h	34 936
Maximum condensing	kW	26,6
	BTU/h	90 754
Minimum condensing	kW	10,8
	BTU/h	36 997

Central heating		
Maximum flow temp.	° C	85
Minimum flow temp.	° C	38
Minimum return temp.	° C	30
Maximum pressure	kPa	300
	bar	3
Minimum pressure	kPa	30
	bar	0,3
Available head (in 1000 l/h)	kPa	25
	bar	0,25
Seasonal efficiency G20 (B)	band	B
	%	87,7
Seasonal efficiency G30 G31 (B)	band	B
	%	86,9

Domestic hot water		
Maximum temperature	° C	55
Minimum temperature	° C	35
Maximum pressure	kPa	1 000
	bar	10
Minimum pressure	kPa	30
	bar	0,3
Flow rate		
minimum	l/min	2,5
30° rise (C)	l/min	12,1
35° rise (C)	l/min	10,1
40° rise (C)	l/min	8,7

Gas supply pressures				
Gas		Natural G20	Butane G30	Propane G31
Norm.	Pa	2 000	2 900	3 700
	mbar	20	29	37
Max	Pa	2 500	3 500	4 500
	mbar	25	35	45
Min.	Pa	1 700	2 000	2 500
	mbar	17	20	25
1 mbar approximately equals 10 mm H <sub>2</sub> O				

(A) referred to the net calorific value at 15 ° C and 1013,25 mbar

G 20 = 34,02 MJ/m<sup>3</sup>, G 30 = 45,6 MJ/kg, G 31 = 46,4 MJ/kg

(B) The value is used in the UK Government's Standard Assessment Procedure (SAP) for energy rating of dwellings. The test data from which it has been calculated have been certified by a notified body.

(C) Values subject to tolerance

## Technical information

Gas pressures at the burner				
Gas		Natural G20	Butane G30	Propane G31
Max.	Pa <i>mbar</i>	1080 <i>10,8</i>	2800 <i>28,0</i>	3550 <i>35,5</i>
Min.	Pa <i>mbar</i>	150 <i>1,5</i>	550 <i>5,5</i>	770 <i>7,7</i>
Ignition	Pa <i>mbar</i>	600 <i>6,0</i>	1200 <i>12,0</i>	1300 <i>13,0</i>
1 mbar approximately equals 10 mm H <sub>2</sub> O				

Gas rate				
Gas		Natural G20 m <sup>3</sup> /h	Butane G30 kg/h	Propane G31 kg/h
Max.		2,65	1,97	1,94
Min.		1,16	0,87	0,85

Injectors	
Natural G20	130
Butane G30	75
Propane G31	75

Electrical Data		
Voltage	V~	230
Frequency	Hz	50
Power consumption	W	140
Protection degree		IPX4D
External fuse rating	A	3
Internal fuse rating	A	1,6 T

Flue design		
Flue pipe diameter		
Coaxial	mm	60/100
Twin split pipes	mm	80
Roof	mm	80/125
Nominal heat flow rate (A)(D)	kW	25,0
Exhaust temperature (D)	°C	90
Smoke production (D)	kg/h	68

Flue gas figures		
Nominal heat input (A)(D)	kW	25,0
CO <sub>2</sub> content	%	6,4
O <sub>2</sub> content	%	11,1
CO content	ppm	50
Exhaust temperature (D)	°C	90

Other specifications		
Height	mm	803
Width	mm	400
Depth	mm	350
Weight (dry)	kg	42,5
Water volume in the boiler (up to 1 bar)	l (kg)	2,1

INSTALLATION

(D) Values refer to tests with a 1 m chimney working at the nominal heat input

## 4.7 Technical data mod. M96.28SM/... M96.28SR/...

Heat input (A)		
Nominal	kW	29,0
	BTU/h	98 942
Minimum	kW	13,0
	BTU/h	44 353

Useful output G20		
Maximum	kW	28,3
	BTU/h	96 488
Minimum	kW	12,1
	BTU/h	41 284
Maximum condensing	kW	30,7
	BTU/h	104 602
Minimum condensing	kW	13,2
	BTU/h	44 965

Useful output G30 G31		
Maximum	kW	27,4
	BTU/h	93 599
Minimum	kW	12,1
	BTU/h	41 284
Maximum condensing	kW	30,7
	BTU/h	104 602
Minimum condensing	kW	12,9
	BTU/h	44 016

Central heating		
Maximum flow temp.	° C	85
Minimum flow temp.	° C	38
Minimum return temp.	° C	30
Maximum pressure	kPa	300
	bar	3
Minimum pressure	kPa	30
	bar	0,3
Available head (in 1000 l/h)	kPa	25
	bar	0,25
Seasonal efficiency G20 (B)	band	B
	%	87,5
Seasonal efficiency G30 G31 (B)	band	B
	%	87,0

Domestic hot water (M96.28SM/... only)		
Maximum temperature	° C	55
Minimum temperature	° C	35
Maximum pressure	kPa	1 000
	bar	10
Minimum pressure	kPa	30
	bar	0,3
Flow rate		
minimum	l/min	2,5
30° rise (C)	l/min	14,0
35° rise (C)	l/min	11,7
40° rise (C)	l/min	10,1

Gas supply pressures				
Gas		Natural G20	Butane G30	Propane G31
Norm.	Pa	2 000	2 900	3 700
	mbar	20	29	37
Max	Pa	2 500	3 500	4 500
	mbar	25	35	45
Min.	Pa	1 700	2 000	2 500
	mbar	17	20	25
1 mbar approximately equals 10 mm H <sub>2</sub> O				

(A) referred to the net calorific value at 15 ° C and 1013,25 mbar

G 20 = 34,02 MJ/m<sup>3</sup>, G 30 = 45,6 MJ/kg, G 31 = 46,4 MJ/kg

(B) The value is used in the UK Government's Standard Assessment Procedure (SAP) for energy rating of dwellings. The test data from which it has been calculated have been certified by a notified body.

(C) Values subject to tolerance

## Technical information

Gas pressures at the burner				
Gas		Natural G20	Butane G30	Propane G31
Max.	Pa <i>mbar</i>	1000 <i>10,0</i>	2800 <i>28,0</i>	3600 <i>36,0</i>
Min.	Pa <i>mbar</i>	160 <i>1,6</i>	590 <i>5,9</i>	770 <i>7,7</i>
Ignition	Pa <i>mbar</i>	600 <i>6,0</i>	1200 <i>12,0</i>	1300 <i>13,0</i>
1 mbar approximately equals 10 mm H <sub>2</sub> O				

Gas rate				
Gas		Natural G20 m <sup>3</sup> /h	Butane G30 kg/h	Propane G31 kg/h
Max.		3,07	2,29	2,25
Min.		1,28	1,03	1,01

Injectors	
Natural G20	130
Butane G30	75
Propane G31	75

Electrical Data		
Voltage	V~	230
Frequency	Hz	50
Power consumption	W	160
Protection degree		IPX4D
External fuse rating	A	3
Internal fuse rating	A	1,6 T

Flue design		
Flue pipe diameter		
Coaxial	mm	60/100
Twin split pipes	mm	80
Roof	mm	80/125
Nominal heat flow rate (A)(D)	kW	29,0
Exhaust temperature (D)	°C	90
Smoke production (D)	kg/h	76

Flue gas figures		
Nominal heat input (A)(D)	kW	29,0
CO <sub>2</sub> content	%	6,8
O <sub>2</sub> content	%	10,7
CO content	ppm	75
Exhaust temperature (D)	°C	90

Other specifications		
Height	mm	803
Width	mm	400
Depth	mm	350
Weight (dry)	kg	44,5
Water volume in the boiler (up to 1 bar)	l (kg)	2,2

INSTALLATION

(D) Values refer to tests with a 1 m chimney working at the nominal heat input

## 5 GENERAL REQUIREMENTS

Biasi UK Ltd support the Benchmark initiative. Within the information pack, you will find a **Benchmark Log Book**. It is very important that **this is completed correctly at the time of installation, commissioning and hand over to the user.**

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

### INSTALLATION

#### 5.1 Related documents

The installation of this appliance must be in accordance with the relevant requirements of the current Gas Safety (Installation & Use) Regulations, the Local Building Regulations, the current I.E.E. Wiring Regulations, the Regulations and 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."

It should also be in accordance with the British Standard Codes of Practice:

#### 5.2 Location of appliance

The appliance may be installed in any room or internal space, although particular attention is drawn to the requirements of the current I.E.E. Wiring Regulations, and in Scotland, the electrical provisions of the Building Regulations applicable in Scotland, with respect to the installation of the 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 so situated that it cannot be touched by a person using the bath or shower.**

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

For unusual locations special procedures may be necessary and BS 6798 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 external installation.

#### 5.3 Flue system

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

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

It must not be installed so that the terminal discharges into an other room or space as an out-house 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 to building products 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.

Plumbing may easily occur at the terminal. Where possible, terminal position which could cause a nuisance should be avoided.

The minimum acceptable spacing from the terminal to obstructions and ventilation openings are specified in Fig. 5.1.

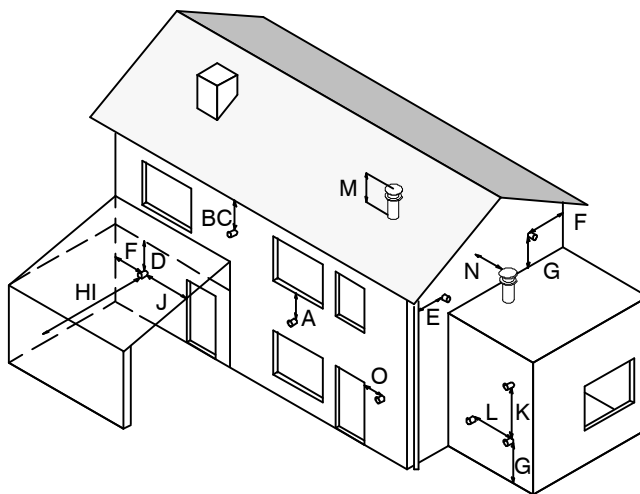


Fig. 5.1

Terminal position

mm

A .	Directly below a window or other opening . . .	300
B .	Below gutters, soil pipes or drain pipes . . . . .	75
C .	Below eaves . . . . .	200
D .	Below balconies or car port roof . . . . .	650
E .	From vertical drain pipes and soil pipes . . . . .	75
F .	From internal or external corners . . . . .	300
G .	Above ground or balcony level . . . . .	300
H .	From a surface facing a terminal . . . . .	600
I . .	From a terminal facing a terminal . . . . .	1 200
J .	From an opening in the car port (e.g. door, window) into dwelling . . . . .	1 200



## General requirements

K .	Vertically from a terminal in the same wall .	1 500
L .	Horizontally from a terminal in the same wall .	300
	<i>Table follows in next page</i>	
M	Above the roof pitch with roof slope less than or equal to 30° . . . . .	600
	Above the roof pitch with roof slope more than 30° . . . . .	1 000
N .	From wall face . . . . .	600
O .	From an opening . . . . .	300

\* specific manufacturer requirements

### 5.4 Gas supply

The Gas meter is connected to the service pipe by the local gas region or a 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 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 and the complete installation should be tested for soundness.

### 5.5 Air supply

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

### 5.6 Ventilation

If installed in a cupboard or compartment, it is not necessary to provide additional ventilation for cooling for this particular product. However consideration must be given to clearance requirements for maintenance (see section 6.2) and under no circumstances must stored articles be allowed to come into contact with the boiler or flue pipe.

### 5.7 Condensate drain

Ensure that the condensate discharge complies with the national or local regulations in force.

The condensate pipe must be fitted in accordance with Building Regulations.

Drainpipe material should be resistant to acid as the condensate is slightly acid with a pH less than 6.5.

The boiler includes a trap (17 on page 12) that prevents the combustion products entering the drain, however an additional trap with a seal of at least 75 mm and an air break between the traps is required (Fig. 5.2).

The length of the condensate pipe should be kept at minimum.

To avoid condensate being trapped:

- the drainpipe should be run with a fall of at least 2.5° (45 mm/m) away from the boiler;
- the number of bends and joints should be kept at minimum;
- the drainpipe should be adequately fixed to prevent pipe sagging.

If a part of the drainpipe runs externally this part should be kept as short as possible and protected to reduce the risk of freezing.

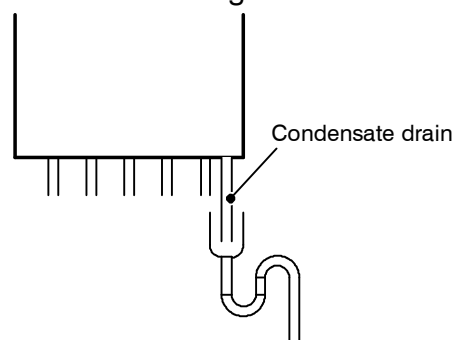


Fig. 5.2

### 5.8 Water circulation (c.h.)

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

#### Pipework

The return temperature must not be lower of 30 °C.

Copper tubing to BS EN 1057 is recommended for water pipes. Jointing should be either with capillary soldered or with compression fittings.

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

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.

## General requirements

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

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

### By-pass

The appliance includes an automatic by-pass valve which protects the main heat exchanger in case of reduced or interrupted water circulation through the heating system due to the closing of thermostatic valves or cock-type valves within the system.

The by-pass is calibrated to assure a minimum flow of 500–600 lts/hr through the main heat exchanger.

If you are installing a system that includes thermostatic radiator valves (TRV) and/or small bore (8–10 mm) it may be necessary to fit an external by-pass to facilitate correct operation of the boiler.

### Air release points

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

### Expansion vessel

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

Refer to Tab. 4.1 on page 15 for its technical data.

If the heating circuit has an unusually high water content, calculate the total expansion and add an additional sealed expansion vessel with adequate capacity.

### Mains water feed: central heating

There must be no direct connection to the mains water supply even through a non return valve, without the approval of the Local Water Authority.

### Mains water feed: hot water supply

The domestic section of the boiler is designed to withstand an internal domestic water pressure of 10 bar. Where it is likely that the mains domestic water pressure may exceed 5 bar, it is possible due to internal “water hammer” effects that the pressure within the domestic system can increase to a level in excess of the 10 bar limit.

In these circumstances it is therefore recommended that a 3 bar pressure reducing valve be fitted to the incoming mains water supply and a

mini expansion vessel installed on the domestic circuit.

These devices will protect the boiler and the domestic system from damage due to excessive domestic water pressure.

### 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.

The correct method is shown in Fig. 5.3.

**The temporary connection must be removed immediately after filling.**

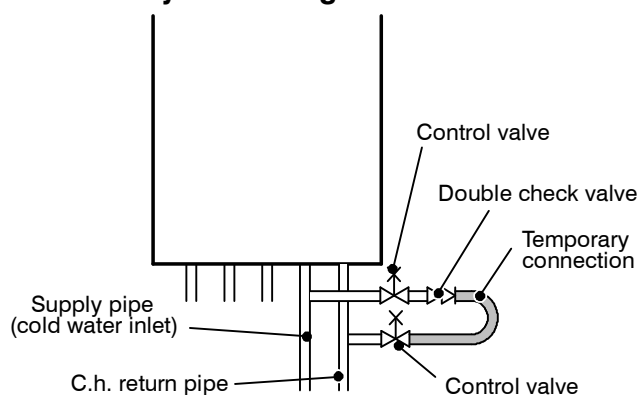


Fig. 5.3

The installer should ensure that no leaks exist either inside the boiler or on the system as frequent filling of the system could cause premature scaling of the heat exchanger.

## 5.9 Domestic water

The domestic water installation must be in accordance with the relevant recommendations of BS 5546. Copper tubing to BS EN 1057 is recommended for water carrying pipework and must be use for pipework carrying potable water.

## 5.10 Water treatment

### Central heating circuit

Where a new boiler is fitted to a new system with either plastic or copper pipes, it is important the system is fully flushed, on completion, to ensure flux residues, swarfs, oils and other installation debris is removed.

Where a new boiler is fitted to an existing system, it is important the debris from the existing system is fully removed in order to ensure the efficiency of the new appliance is maintained.

---

## General requirements

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Details on flushing procedure are given in the section 7.4 of this manual.

### **Domestic hot water circuit (scale protection)**

In areas where the water is 'hard' (i.e. more than 200 ppm total hardness as defined by BS 7593: 1993 Table 2) it is recommended that a proprietary scale-reducing device is fitted into the boiler cold supply, within the requirements of the local water company.

## **5.11 Electrical supply**

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

External wiring to the appliance must be carried out by a competent person and be in accordance

with the current I.E.E. Regulations and any local regulations which apply.

The boiler is supplied for connection to a 230 V~ 50 Hz supply. The supply must be fused at 3A.

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 at least 3 mm between poles or alternatively, by the use of a 3A 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 except where the appliance is installed in a bathroom this must then be sited outside the bathroom.

## 6 INSTALLATION

### 6.1 Warnings

**The use of gas appliances is subject to statutory control; it is essential to observe the current regulations and laws in force (see also chapter 5).**

The appliance must discharge combustion products directly outside or into a suitable exhaust duct designed for this purpose.

Combustion products must be discharged using original flue kits only, since they are integral parts of the boiler.

For LPG, the appliance must also conform with the requirements of the distributors and comply with current Regulations and laws in force.

The safety relief valve and the condensate drain must be connected to a suitable drain, or discharge in a safe manner.

The electrical wiring must conform with current Regulations, in particular:

- the boiler **must** be earthed using the correct bonding clamp.
- a fused spur isolation switch, with a gap of at least 3 mm between the contacts must be installed near to the boiler. Refer to section 6.9 in this chapter for the electrical connections.

**In no circumstances will the manufacturer be held responsible if the warnings and instructions contained in this manual have not been complied with.**

### 6.2 Precautions for installation

For the installation proceed as follows:

- The boiler must be fixed to a strong wall.
- The dimensions for the exhaust fume duct detailed in section 6.7 and the correct procedures for installing the duct, depicted in the instruction leaflet included with the flue kit, must be complied with during installation.
- To allow maintenance procedures it is necessary to leave the minimum gaps indicated in Fig. 6.1.

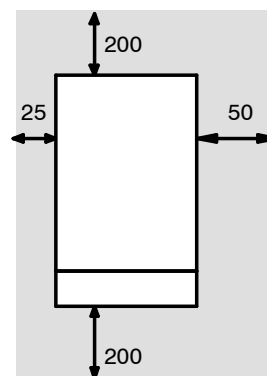


Fig. 6.1 (all dimensions in mm)

- When installing the boiler in a cupboard, cover or alcove allow at least 50mm permanent clearance from the front face of the boiler. Also ensure sufficient clearance to allow free access for servicing and the lowering of the front control panel.
- If the boiler is installed outside, cover the appliance to protect it against the elements and add some special anti-freeze (neutralised) to the c.h. system.
- Before installing the boiler on an existing c.h. system, flush it out thoroughly before fitting the boiler, so as to remove muddy deposits.
- It is advisable to equip the system with a sediment filter, or use a water-treatment product in the circulating water.

The latter option in particular, not only cleans out the system, but also has an anti-corrosive effect by promoting formation of a protective skin on metal surfaces and neutralising gases present in the water.

We recommend the use of a suitable universal inhibitory to protect the c.h. system from corrosion.

### 6.3 Installing the bracket

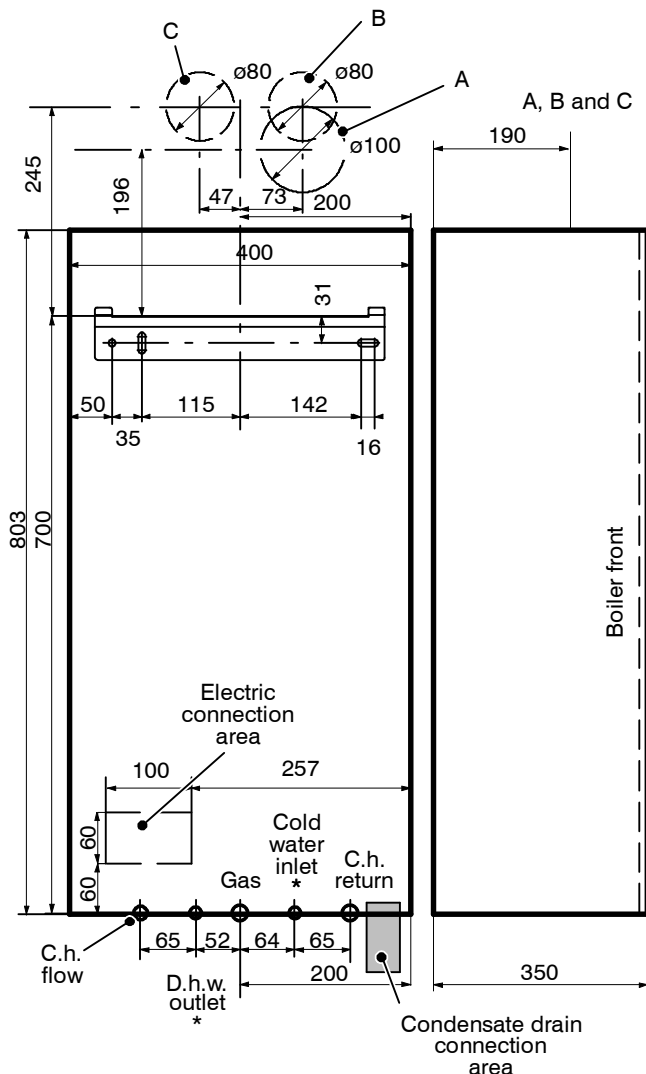
#### Precautions

Before mounting the bracket, check that the dimensions for fitting the exhaust fume duct are complied with (refer to the leaflet included with the flue kit, packed separately).

## Installation

Utilise the paper template supplied with the boiler to determine the fixing position for the bracket and boiler. Securely mount the bracket to the wall using appropriate fixings suitable for the type of wall construction and capable of supporting the total (wet) load. Refer to the weight given in the technical data tables specific for each model.

### 6.4 Overall dimensions



- A – air intake/flue outlet pipe (co-axial)
- B – flue outlet pipe  $\varnothing$  80 mm (twin kit)
- C – air intake pipe  $\varnothing$  80 mm (twin kit)
- \* not present on c.h. only boilers

Fig. 6.2 (all dimensions in mm)

### 6.5 Joints

Functions	Pipe sizes (o.d)
Gas, c.h. return, c.h. flow	$\varnothing$ 22
D.c.w. inlet *	$\varnothing$ 15
D.h.w. outlet *	$\varnothing$ 15
Pressure relief valve	$\varnothing$ 15
Condensate drain	$\varnothing$ 25 (plastic)
* not present on c.h. only boilers	

Tab. 6.1 (sizes in mm o.d.)

### 6.6 Mounting the boiler

- 1 Take the protective caps off the boiler pipe-work.
- 2 Thoroughly clean the connections.
- 3 Mount the boiler on its bracket.
- 4 Fix the c.h. valves A and gas cock B ( $\frac{3}{4}$ " ) to the boiler using the  $\frac{3}{4}$ " gaskets (Fig. 6.3)
- 5 Fix the  $\varnothing$  22 mm pipes C (c.h. circuit) to the c.h. valves A and the  $\varnothing$  22 mm pipe D (gas) to the cock B using the  $\frac{3}{4}$ " gaskets.
- 6 Repeat the above procedure for the d.c.w. inlet utilising the  $\frac{1}{2}$ " cold water inlet valve E, the  $\varnothing$  15 mm copper tail F with its connection nut and two  $\frac{1}{2}$ " gaskets.
- 7 Fix the  $\varnothing$  15 mm copper tail G with the  $\frac{1}{2}$ " connection nut and a  $\frac{1}{2}$ " gasket.

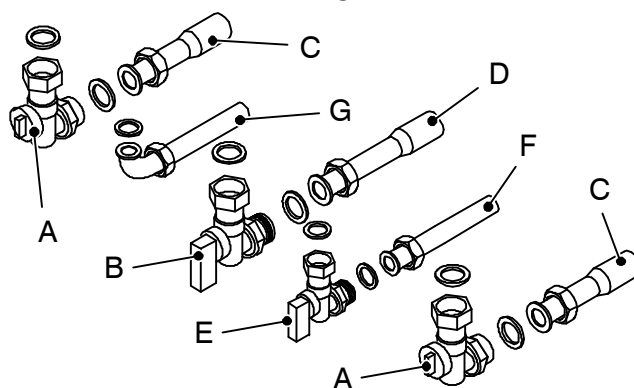


Fig. 6.3

## Installation

- 8 Connect the pipe H (Fig. 6.4) from the pressure relief valve to the safety discharge pipework.
- 9 Fit the condensate drain 11 (Fig. 6.4) in the air brake connected to the drainage pipework. See also section 5.7 in this manual.

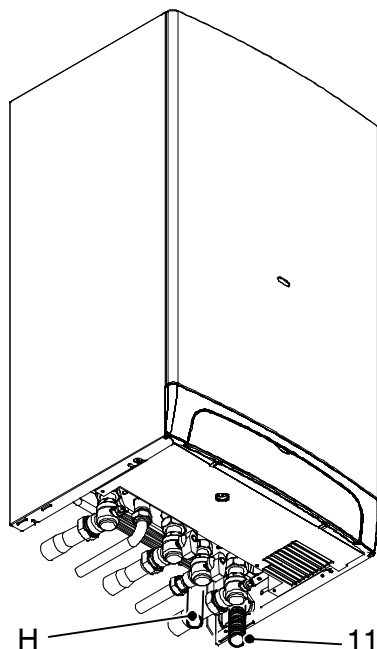


Fig. 6.4

### 6.7 Fitting the flue system

Refer to the assembly instructions contained within the chosen flue kit packaging for the correct assembly and installation.

In general, it has to be taken in consideration that the horizontal sections of the flue pipe must have an horizontal sloping not less than 1.5 deg. (25 mm per metre) towards the boiler.

In the standard horizontal flue kit (Fig. 6.5A) the flue pipe is angled within the air duct therefore the air duct must be horizontally installed.

If one or more extensions have to be used they must be adequately supported so that there is no sag in the flue pipe and a minimum fall of 1,5 deg. (25 mm per metre) over the whole length towards the boiler is ensured.

### 6.8 Choice of flue

The following flue kits are available for connecting to the boiler:

#### Standard horizontal flue kit (Fig. 6.5A)

Co-axial 60/100mm – nominal length 1m

This kit is normally supplied with the boiler and can be fitted to allow discharge to the rear or either side of the boiler via the flanged boiler adapter elbow. Minimum length required is 0.3 m. Maximum equivalent length of 2,7 metres can be achieved utilising extensions. This flue system can only be used to discharge horizontally, it is not designed to enable termination in the vertical plane.

#### Vertical kit with 90° elbow (Fig. 6.5B)

Co-axial 60/100 mm

Supplied with a straight flanged adapter a co-axial elbow and a co-axial pipe with terminal, this kit allows for a vertical rise of 0,5 m from the boiler. In all circumstances the flue terminal must discharge horizontally and the equivalent flue length must not exceed 2,7 metres.

#### Elbows 45° & 90° (Fig. 6.5C)

Co-axial 60/100mm.

Elbow kits enable the standard flue kits to be offset to overcome obstructions or ensure the correct clearances for the flue terminal. Each elbow used in addition to the standard flanged elbow reduces the overall acceptable length of the flue system as follows:

45° reduce length by 0.5 m.

90° reduce length by 1 m.

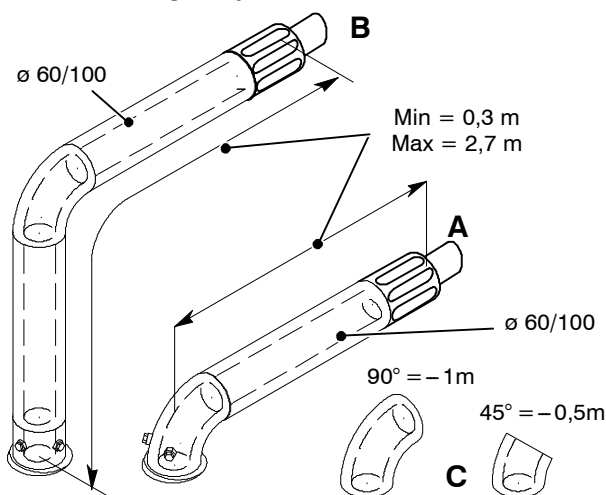


Fig. 6.5

#### Twin pipe kits ø 80 mm (Fig. 6.6)

Various twin (split) pipes kits and optional accessories (elbows) are available to assist in the termination of the flue where the boiler is installed in a location remote to an outside wall.

These kits allow for separation of the air supply pipe from the pipe that discharges the exhaust

## Installation

gasses. Consequently it is possible to extend the flue system to a greater distance than that provided by the standard horizontal co-axial flue.

If either an additional 45° or 90° accessory elbow is used then the maximum permissible length of either pipe must be reduced by 0.90 m or 1.65 m respectively.

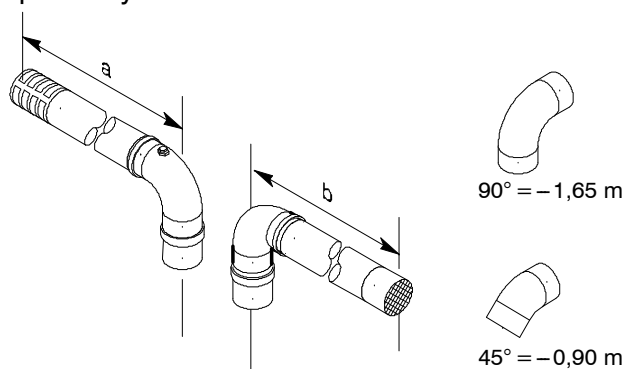


Fig. 6.6

Two restrictors with different size are supplied with the twin pipe kit and have to be installed between the boiler and the air intake adapter (Fig. 6.7).

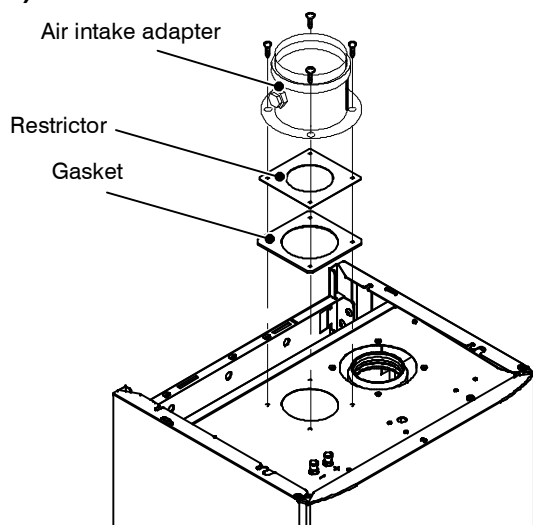


Fig. 6.7

For the correct use of the restrictors **with twin pipes** refer to Tab. 6.2.

Equivalent length (air duct + flue duct)	Restrictor
Between 1 and 15 m	ø 50 mm
More than 15 m up to 30 m	ø 55 mm

Tab. 6.2

### Vertical– roof kit (Fig. 6.8)

This kit allows vertical termination of the flue pipe through the roof. The kit is 1.2 m in length. Extension pieces (Co-axial) are also available which allows the flue system to be extended to a total overall maximum permissible length.

Optional 45° and 90° elbows can be used to offset the flue route.

Each additional elbow reduces the overall acceptable length of the flue system as follows:

45° reduce length by 0.5 m.

90° reduce length by 1 m.

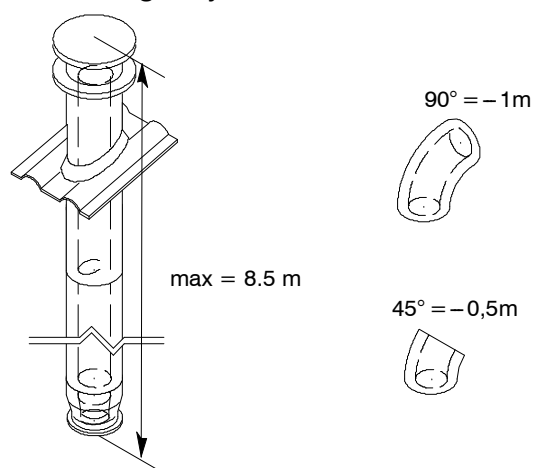


Fig. 6.8

## 6.9 Electrical connections

### Connection to the electricity supply

- 1 Remove the front panel of the case (see the section 9.2 in this manual).
- 2 Remove the screws I and J (Fig. 6.9).
- 3 Loosen the screws K.

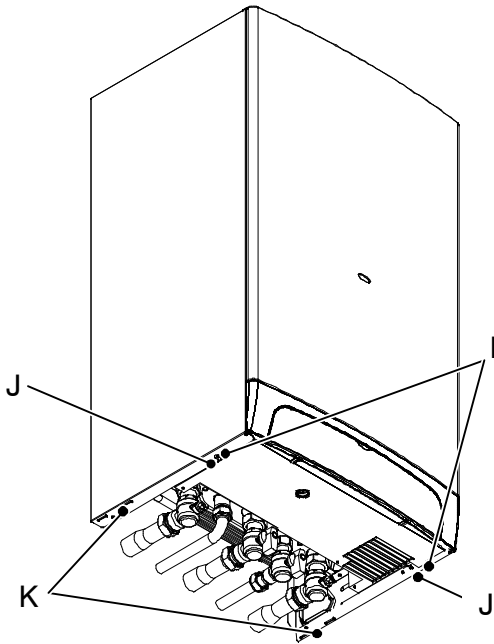


Fig. 6.9

- 4 Remove the side panels or move the lower part of the side panels as indicated in Fig. 6.10 and pull the control panel. When completely pulled out, the panel can rotate 45° downwards to facilitate the operations on the internal parts.

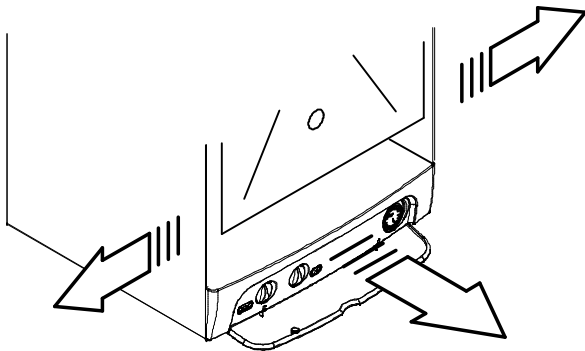


Fig. 6.10

- 5 Loosen the screws L and remove the service panel (Fig. 6.11).

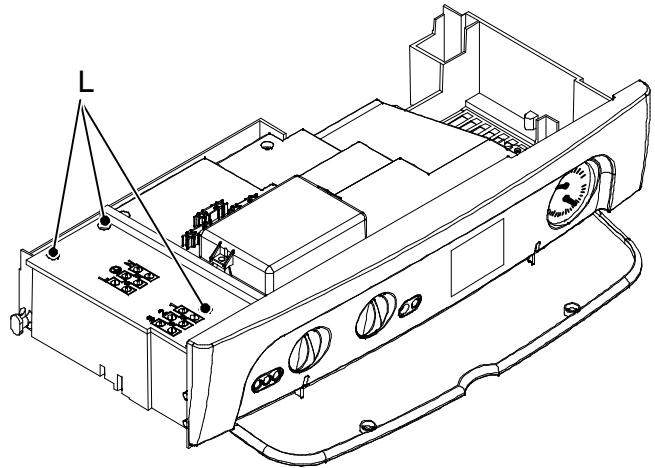


Fig. 6.11

For the electrical connection to the boiler use electric wires which conform to the current regulations, with flexible cord, each core having a cross section area **not less than 0,75 mm<sup>2</sup>**.

- 6 Connect the electrical supply flexible cord coming from the fused spur isolation switch to the power supply terminal block of the boiler (Fig. 6.12) keeping the same connections for the live (brown wire) and the neutral (blue wire). External 3 A fuse or fused plug with same current rating is recommended.

**Do not connect live wires to terminals to which the room thermostat must be connected.**

- 7 **Connect the earth wire (yellow/green).**

## Connection of a room thermostat

The room thermostat must be connected to the terminal block situated next to the control panel.

**When connecting any type of external control, the link M in Fig. 6.12 must be removed.**



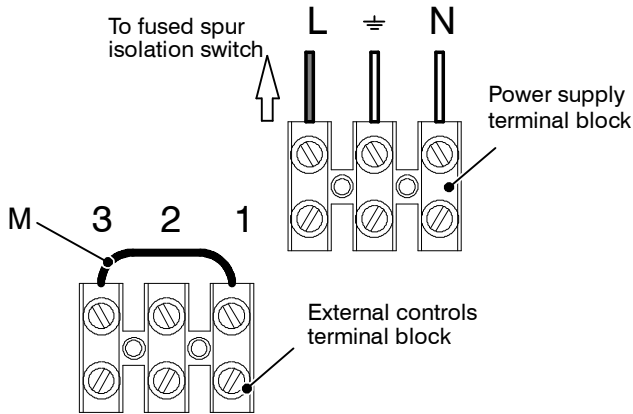


Fig. 6.12

- 8 Connect the room thermostat between terminals 1 and 3 as shown in Fig. 6.13.  
**Do not connect live wires to terminals to which the room thermostat must be connected.**

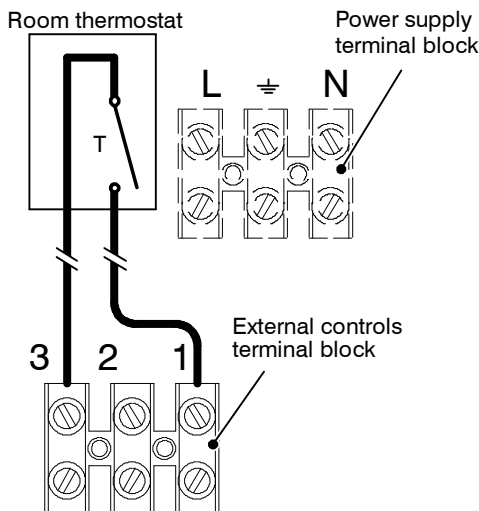


Fig. 6.13

- 9 Route the electrical supply flexible cord and the external control flexible cord as illustrated in Fig. 6.14.  
 Lock the flexible cords in place with the flexible cord clamps

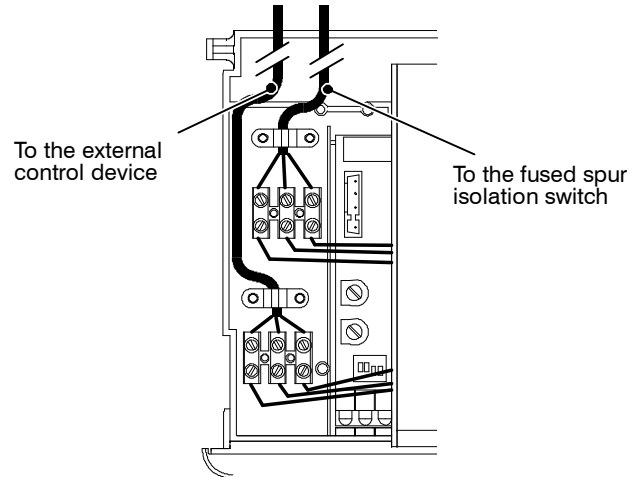


Fig. 6.14

## 6.10 External frost protection

- 10 Connect the frost thermostat between terminals 1 and 2 as shown in Fig. 6.15.  
**Do not connect live wires to terminals to which the room thermostat must be connected.**

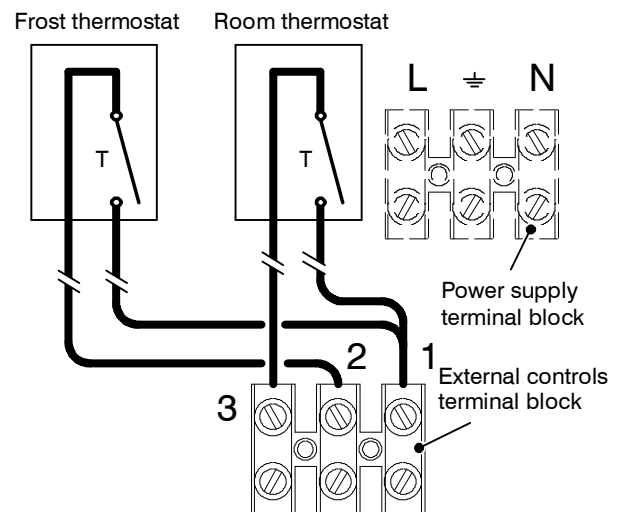


Fig. 6.15

## 6.11 Connecting a M96.28SR/... system boiler to a cylinder

Two schematic wiring diagrams are given in this section showing two possible ways to connect an external programmer to a mid-position diverter valve to provide independent timed and thermostatic control of heating and hot water.

In both diagrams the earth wires are not shown for clarity. Earth wiring **must** be fitted as necessary.

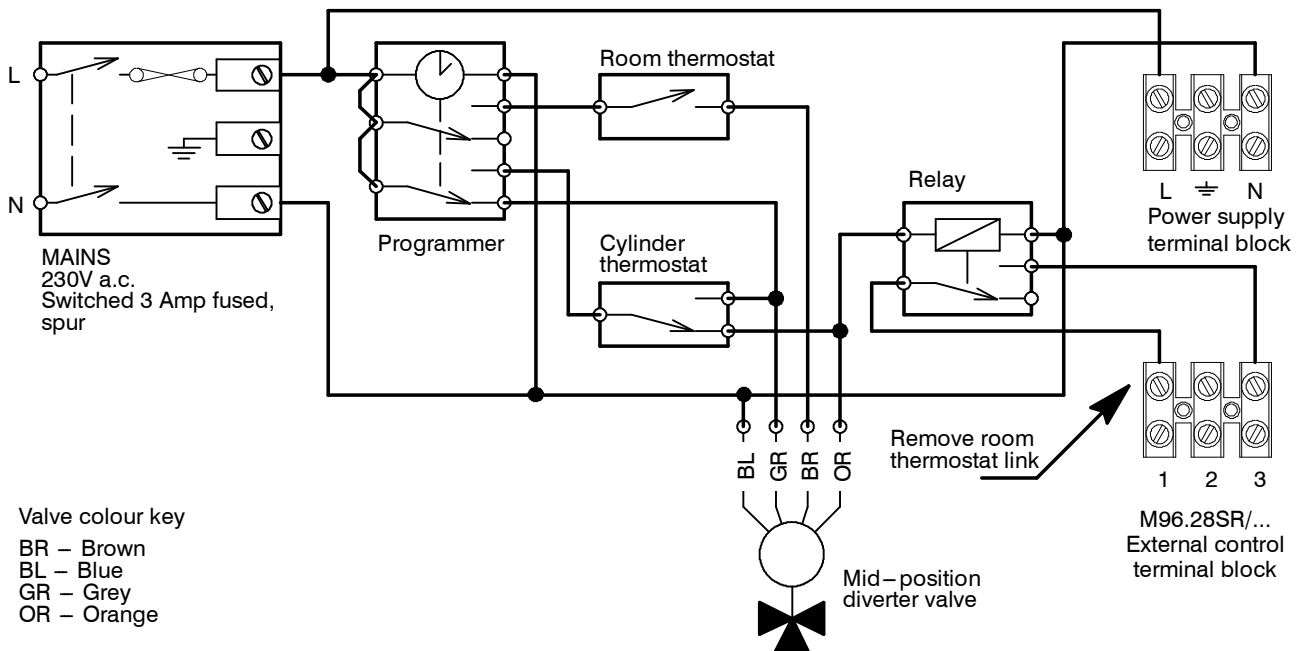


Fig. 6.16 – relay controlled boiler

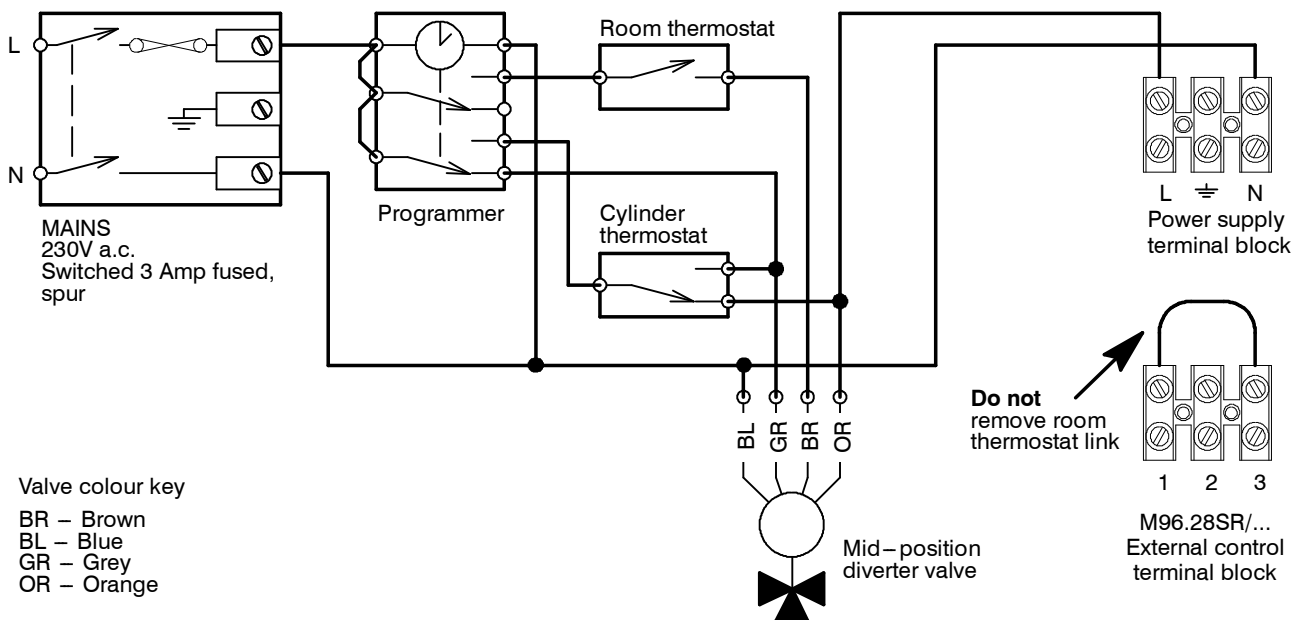


Fig. 6.17 – directly controlled boiler

## 7 COMMISSIONING

Ensure that the Benchmark logbook is satisfactorily completed during the commissioning process.

### 7.1 Electrical installation

Preliminary electrical system checks to ensure electrical safety shall be carried out by a competent person. 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 in the service manual.

### 7.2 Gas supply installation

- 1 Inspect the entire installation including the gas meter, test for soundness and purge, all as described in BS 6891;
- 2 Open the gas cock 14 (Fig. 7.1) on the appliance and check the gas connector on the appliance for leaks.

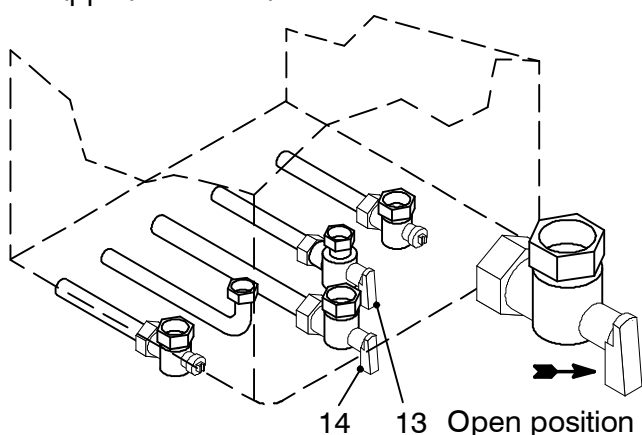


Fig. 7.1

### 7.3 Filling the d.h.w. system

- 1 Close all hot water draw-off taps.
- 2 Open the cold water inlet valve 13 (Fig. 7.1).
- 3 Slowly open each draw-off tap and close it only when clear water, free of bubbles, flows out.

### 7.4 Initial filling of the system

- 1 Open the c.h. flow and return valves.
- 2 Remove the front panel of the case (see the section 9.2 in this manual).
- 3 Unscrew the cap on the automatic air purger-valve 19 (Fig. 7.2) one full turn and leave open permanently.

- 4 Gradually open stopcock at the filling point connection to the c.h. system until water is heard to flow; do not open fully.

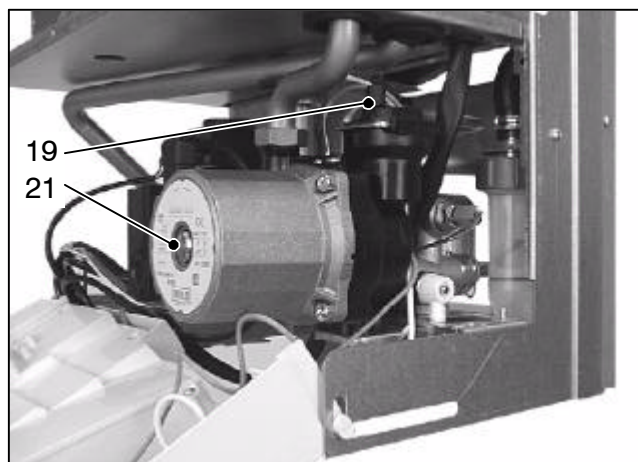


Fig. 7.2

- 5 Open each radiator air vent starting at the lowest point of the system and close it only when clear water, free of bubbles, flows out.
- 6 Purge the air from the pump by unscrewing the pump plug 21 (Fig. 7.2); release the pump shaft by turning in the direction indicated by the arrow on the information plate.
- 7 Replace the pump plug.
- 8 Continue filling the system. The actual reading should ideally be 1,3 bar and not less than 0,3 bar.
- 9 Close all air release valves on the c.h. system.
- 10 Inspect the boiler and the system for water soundness and remedy any leaks discovered.
- 11 Cold flush the system to remove any loose particles and any system debris before starting the boiler for the first time

**The flushing procedure must be in line with BS7593 Treatment of Water in d.h.w. c.h. Systems.**

**When the installation and second filling are completed turn on the c.h. system and run it until the temperature has reached the boiler operating temperature. The system must then be immediately flushed through.**

**This procedure must be repeated twice more.**

**During this operation we highly recommend the use of a c.h. flushing detergent in the quantities as specified by the appropriate manufacturer, whose function it is to dissolve any foreign matter which may be in the system.**

The above operation could save the invalidation of your boilers guarantee and will also prevent problems which you may experience in the future if an inhibitory is not used.

### 7.5 Condensate pipe and traps

The full length of the condensate pipe should be checked for leaks.

The boiler has a built-in condensate trap provided with a ball valve that prevents the escape of combustion products when the trap is empty.

**It is however recommended that any other trap in the drain system is correctly filled with water before to run the boiler.**

### 7.6 Lighting the boiler

Some products incorporate an anti cycling time delay. It is normal when first switching the boiler on for the boiler to operate on heating for a few seconds then switch off. After 3–4 minutes has elapsed the boiler will then re ignite and operate perfectly normally. The ignition delay cycle does not prevent normal operation of the boiler to provide d.h.w..

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

- 1 Turn on the electricity supply to the boiler, switching on the fused spur isolation switch. The appliance operation light 10 will flash every 4 seconds.
- 2 Turn the function selector 8 as in Fig. 7.3 (combi) or Fig. 7.4 (c.h. only). The appliance operation light 10 will flash every 2 seconds.

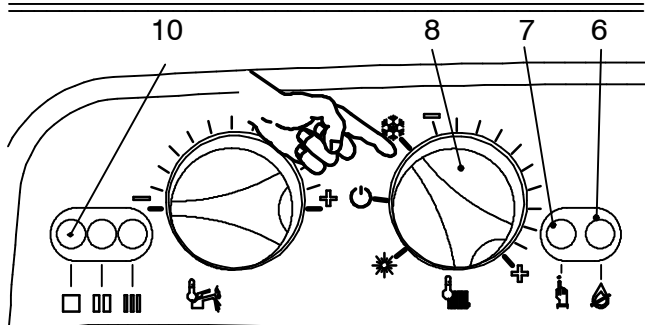


Fig. 7.3

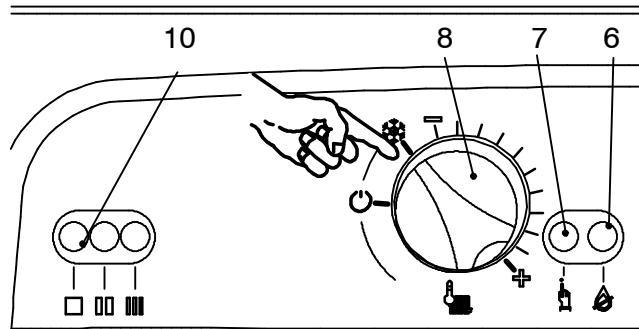


Fig. 7.4

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

If during the ignition attempt period the boiler fails to light, the full sequence control p.c.b. will go to lockout and the lock-out signal lamp 6 will appear.

To reset the boiler press and release the boiler reset button 7 (Fig. 7.3).

### 7.7 Checking the gas pressure at the burner

**This boiler has been tested to the highest quality control standards.**

**The maximum and minimum gas pressures are already set during this quality control process however the checking procedure must be followed to ensure maximum operating efficiency from the boiler.**

- 1 Remove the front panel of the case (see section 9.2 in this manual).
- 2 Loosen the internal screw 41 (Fig. 7.5) on the Outlet Pressure Test Point of the Gas Valve and connect a pressure gauge using a suitable hose.
- 3 Set the d.h.w. and c.h. temperature control knobs to their maximum position.
- 4 Switch on the boiler and open at least one hot water tap fully.
- 5 Check the maximum gas pressure and compare the value on the gauge with the value indicated in the sections 4.6 or 4.7 (gas pressures

## Commissioning

at the burner), accordingly with the model of boiler installed.

- 6 Check the maximum gas flow at the gas meter and compare the value indicated in the sections 4.6 or 4.7 (gas rate), accordingly with the model of boiler installed.
- 7 Switch off the boiler.
- 8 Disconnect the gas modulator coil by removing the electrical connector A (Fig. 7.5).

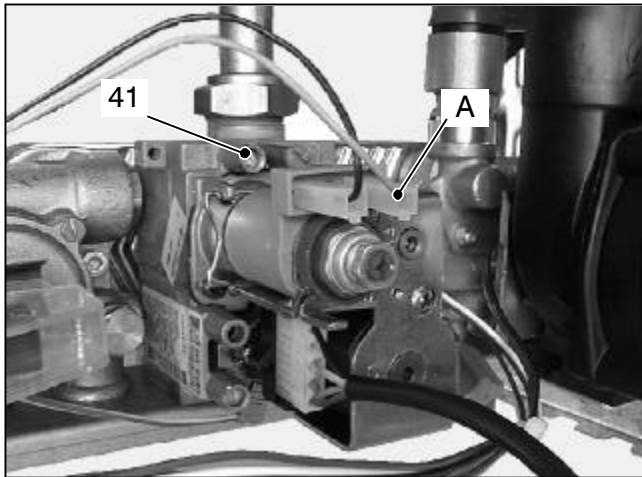


Fig. 7.5

- 9 Switch on the boiler.
- 10 Check the minimum gas pressure and compare the value on the gauge with the value indicated in the sections 4.6 or 4.7 (gas pressures at the burner), accordingly with the model of boiler installed.
- 11 Switch off the boiler and re-connect the electrical connector A to the modulator coil.
- 12 Access the main control panel (see section 6.9, follow steps 2 – 5)
- 13 Switch on the boiler.
- 14 Check the ignition gas pressure by setting dip-switch "3" (Fig. 7.8) to the OFF position. Compare the value on the gauge with the value indicated in the sections 4.6 or 4.7 (gas pressures at the burner), accordingly with the model of boiler installed.  
If the ignition gas pressure is not set correctly see section 7.8 in this manual for the adjustment procedure. If ignition gas pressure is correct switch dip-switch "3" to the ON position.
- 15 Switch off the boiler, turn off the hot water tap(s) and disconnect the pressure gauge.

**If the maximum and minimum gas pressures measured above are not in accordance with the technical data (sections 4.6 or 4.7) then adjustment will be necessary. A full explanation of the**

**gas pressure adjustment procedure is given in the Gas Valve section of the service manual. If maximum and/or minimum gas pressures are adjusted then the ignition gas pressure must be checked and adjusted if necessary.**

**Important: after the gas pressure checks and any adjustment operations, all of the test points and adjustment devices must be sealed.**

### 7.8 Adjusting the burner ignition

- 1 Turn off the boiler by means of the fused spur isolation switch provided adjacent to the appliance.
- 2 Make sure that the function selector 8 is set to the position in Fig. 7.6 and that the timer selector switch and room thermostat, if fitted, is set to "demand heat".

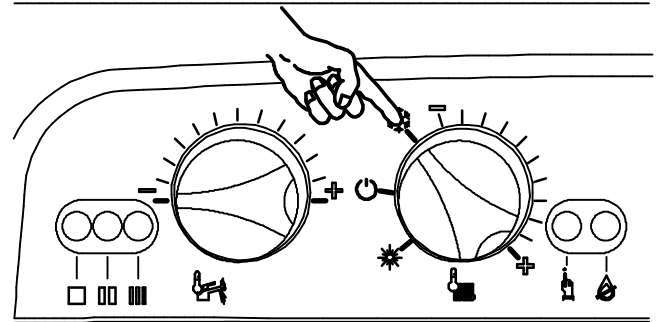


Fig. 7.6

- 3 Unscrew the gas valve's outlet pressure test point 41 (Fig. 7.5) and connect a pressure gauge.
- 4 Loosen the screws B and remove the service panel (Fig. 7.7).

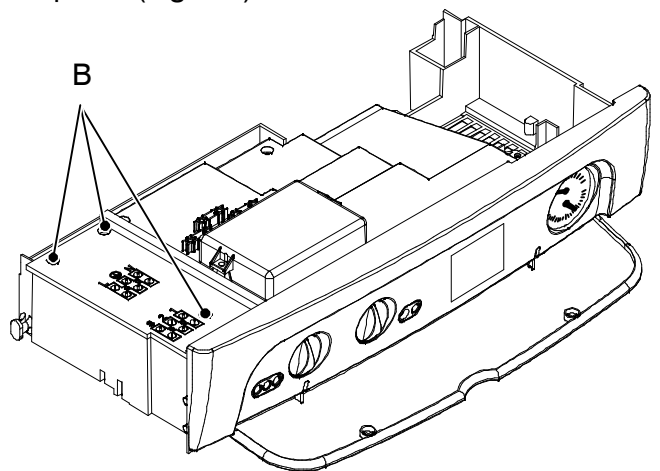


Fig. 7.7

- 5 Turn on the boiler.
- 6 Check that the boiler lights up uniformly and adjust the ignition gas pressure, if necessary.

## Commissioning

To adjust the ignition gas pressure, set dip-switch "3" (Fig. 7.8) to the OFF position and adjust potentiometer marked "ACC" with a screwdriver until correct ignition gas pressure is obtained.

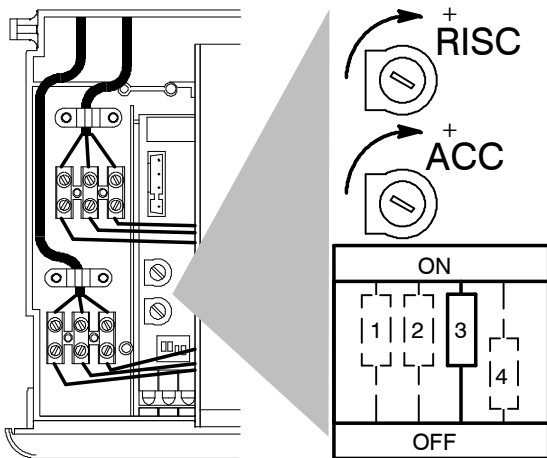


Fig. 7.8

Refer to the table *gas pressures at the burner* in the sections 4.6 or 4.7 for appropriate value.

7 Having finished this procedure, reset dip-switch "3" to the ON position.

### 7.9 Adjustment of useful c.h. output

If the burner function selector (dipswitch number 4 on the main P.C.B.) is set to the 'ON' position it will activate the re-ignition delay period of approximately 4 minutes. When dipswitch number 4 is set to the 'OFF' position there will be approximately 30 seconds re-ignition delay period.

Whilst checking or adjusting the c.h. output, and fault finding on the boiler it may be necessary to switch the re-ignition delay mechanism (dipswitch 4) to the 'OFF' position.

Refer to the diagrams shown in Fig. 7.9, Fig. 7.10 or Fig. 7.11 and select the correct central heating output gas pressure to meet with the central heating system requirements.

With the boiler operating in c.h. mode, use a suitable screwdriver to turn the adjustment potentiometer marked "RISC" (Fig. 7.8).

Rotating the potentiometer anti-clockwise reduces the maximum supply current to the gas modulator device, and thus reduces the gas pressure to the burner.

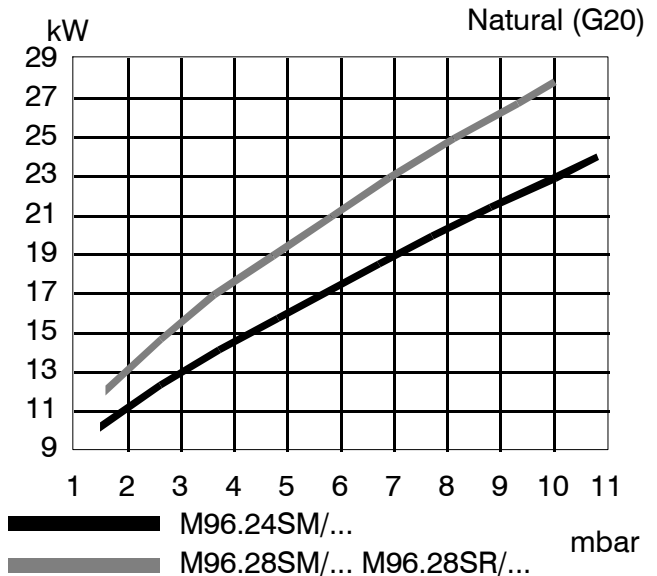


Fig. 7.9

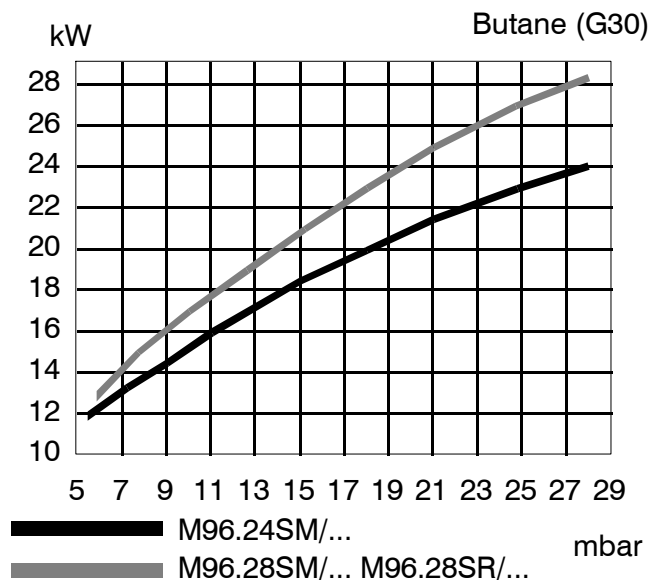


Fig. 7.10

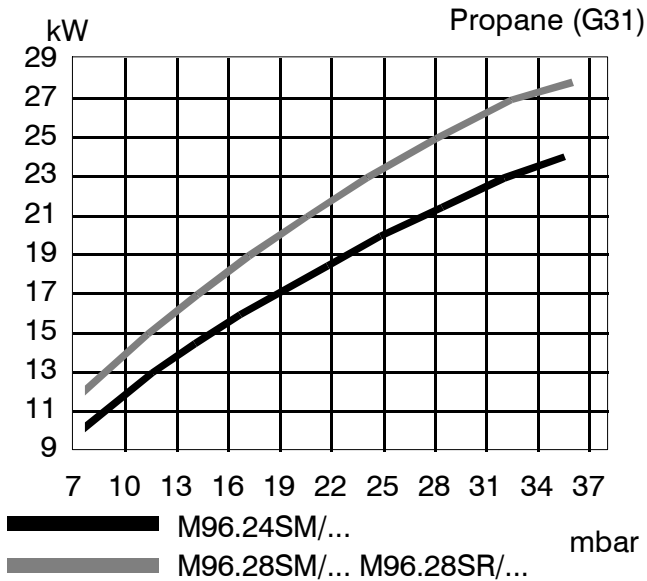


Fig. 7.11

## 7.10 Checking the ignition device

With the burner on high flame close the gas cock. About 10 seconds after, the lock-out signal lamp 6 (Fig. 1.3 on page 2) must appear.

To reset the boiler press and release the boiler reset button 7 (Fig. 1.3 on page 2).

## 7.11 Checking the flue system

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

Ensure that the flue terminal is sited correctly in accordance with the flue fitting instructions and Fig. 5.1 on page 20 of this manual.

To carry out a combustion check refer to the instructions given in the section 9.5 of this manual.

Reference figures are given in the sections 4.6 or 4.7 of this manual (Flue gas figures).

## 7.12 Checking the condensate drain pipe

Check the soundness and integrity of the condensate drain pipe.

Verify the cleanliness and correct filling of the condensate traps.

## 7.13 Instructing the user

Hand over this combined User & Installation manual and the Service manual to the end user and explain how to use the unit in both c.h. and d.h.w. modes.

Take the User step by step through the lighting instructions.

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

Explain the proper use and adjustment of all system controls; this will ensure the greatest possible fuel economy.

Explain the function and use of the function selector.

Explain and demonstrate the function of time and temperature controls (if fitted).

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

Fill in the details required on the Boiler Guarantee Certificate and hand to the User advising them to return the correct section for boiler Guarantee registration.

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

## 8 GAS CONVERSION

### 8.1 Warnings

Procedures to adapt the boiler to the type of gas available **must be carried out** by a competent and responsible person.

Components used to adapt it to the type of gas available must be genuine parts only.

### 8.2 Procedures

- 1 Check that the gas cock (14 in Fig. 9.3) fitted under the boiler is turned off and the appliance is switched off at the mains isolating spur.
- 2 Remove the front and side panels of the case (see the section *General access and emptying hydraulic circuits* in the service manual).
- 3 Take off the lid of the sealed chamber.
- 4 Take the front panel of the combustion chamber off and remove the burner (29 on page 12). See section *Ignition and detection electrodes* in the service manual for detailed instructions.
- 5 Carry out the conversion for the type of gas, replacing the burner injectors correctly.
- 6 Re-assemble the burner, the front panel of the combustion chamber and the lid of the sealed chamber.
- 7 Extract the control panel as explained in the section 6.9 of this manual.
- 8 Loosen the screws C and remove the service panel (Fig. 8.1).

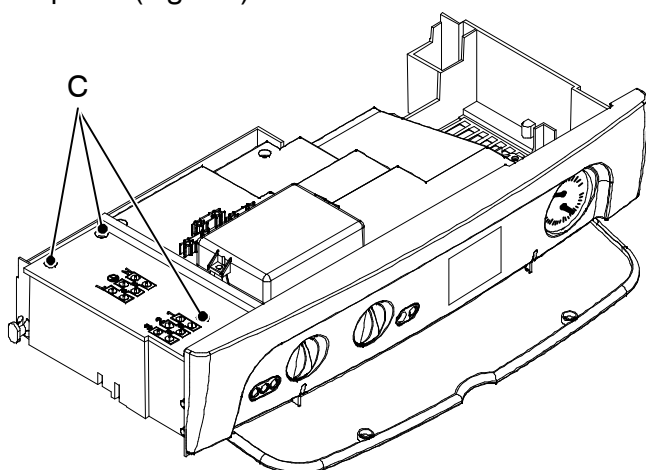


Fig. 8.1

- 9 set correctly the dip-switch "2" to the correct position (Fig. 8.2) in accordance with the following table.

Gas supply	Position of dip-switch 2
Natural gas	On
L.P.G.	Off

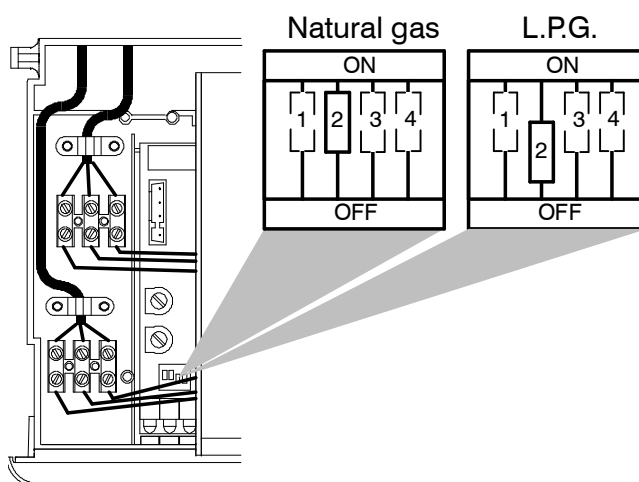


Fig. 8.2

- 10 Calibrate the gas valve according to the instructions given in the service manual, section *Modulating gas valve – Adjustment*.
- 11 Set the correct gas pressure for central heating output required, see section 7.9 in this manual.
- 12 Stick on the inside of the left hand side panel adjacent to the data badge the self-adhesive label (included with the conversion kit) indicating the type of gas, and the gas pressures to which the appliance has been set.
- 13 Replace the service panel, the front and side panels of the case.



## 9 MAINTENANCE

### 9.1 Warnings

The procedures detailed in this chapter **must be carried out only by a professionally qualified person**. Thus you are advised to contact an Authorised Service Agent.

For efficient and continuous operation of the boiler you are advised to have, at least once a year, maintenance and cleaning done by an Approved Service engineer.

**Isolate the appliance from the electricity supply** by turning off the fused spur isolation switch adjacent to the appliance and **turn off the gas cock**, before carrying out any procedures, whatsoever, for cleaning, maintenance, opening or dismantling boiler panels.

### 9.2 Dismantling the external panels

#### Front panel

- 1 Loosen the three screws A (Fig. 9.1).
- 2 Lift and remove the panel.

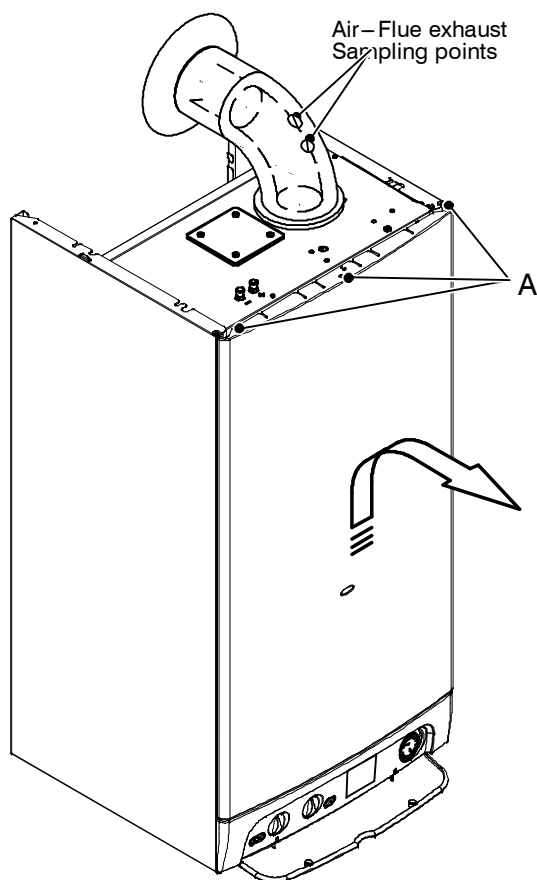


Fig. 9.1

#### Side panels

- 3 Loosen the screws B. Bring the bottom of the panels away from the boiler and lift them, freeing them from the top hooks (Fig. 9.2).

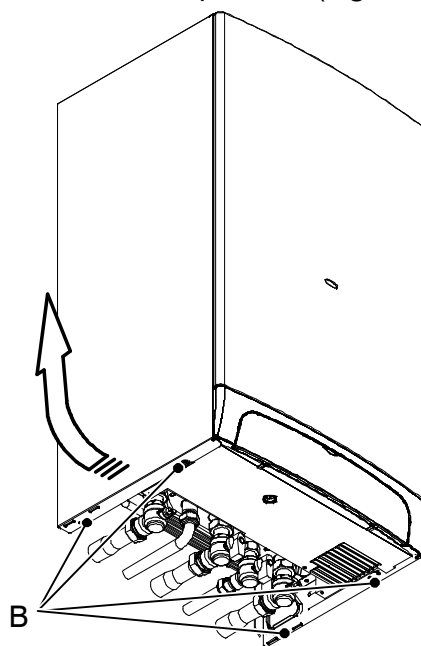


Fig. 9.2

### 9.3 Emptying the d.h.w. system (combi)

- 1 Turn off the d.c.w. inlet isolating valve (13 in Fig. 9.3) and turn on the hot water taps and any drain cocks.

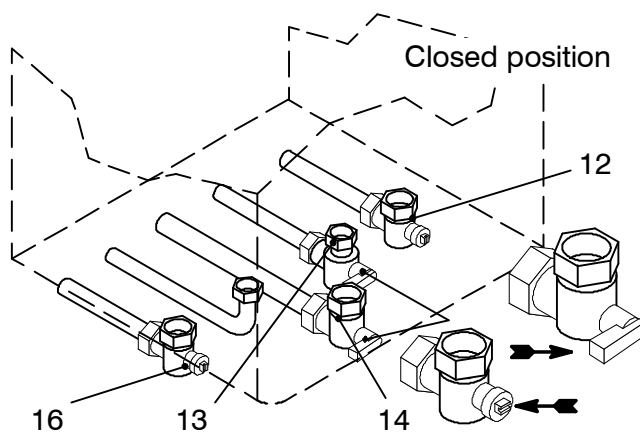


Fig. 9.3

### 9.4 Emptying the c.h. system

- 1 Close the c.h. isolating valves (12 and 16 in Fig. 9.3).
- 2 Open the central heating drain cock (18 in Fig. 9.4).

## Maintenance

- 3 A small quantity of water will remain in the d.h.w. heat exchanger after draining. If the boiler is being drained to prevent freezing, the d.h.w. heat exchanger must be removed and inverted to drain fully or an antifreeze solution added.

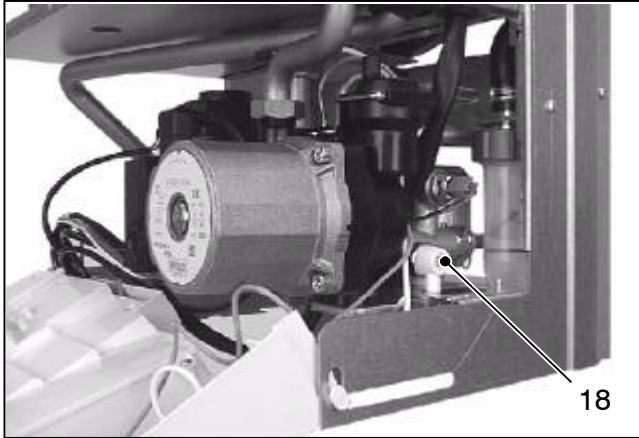


Fig. 9.4

### MAINTENANCE

#### 9.5 Combustion analysis check

If it is necessary to carry out a combustion analysis remove the plugs indicated in Fig. 9.1.

Reference figures are given in the sections 4.6 or 4.7 of this manual (Flue gas figures).

#### 9.6 Cleaning the primary heat exchanger

- 1 Take off the front of the case.
- 2 Take off the removable front of the air-tight chamber and the front panel of the combustion chamber.

If you notice dirt on the fins of the primary heat exchanger (31 on page 12):

- 3 cover the sloping surfaces of the burner (29 on page 12) entirely in a protective layer (sheets of newspaper or similar).
- 4 Brush out the primary heat exchanger (31 on page 12) with a bristle paintbrush.

NOTE – When removing the airtight chamber cover it is not necessary to remove the screws located at the top edge on either side.

#### 9.7 Checking the pressurisation in the expansion vessel

Empty the central heating system as described in section 9.4 of this chapter and check that the pres-

sure in the expansion vessel is not less than 1 bar. See also section 4.5 page 15 of this manual.

If the pressure is lower, take steps to correct the pressure level.

#### 9.8 Cleaning the burner

The sloping and multi-gas type burner (29 on page 12) does not need special maintenance, but it is sufficient to dust it with a bristle paintbrush.

To reach the burner:

- 1 Take off the front of the case.
- 2 Take off the removable front of the air-tight chamber and the front panel of the combustion chamber.
- 3 Brush out the burner with a bristle paintbrush.

NOTE – When removing the airtight chamber cover it is not necessary to remove the screws located at the top edge on either side.

#### 9.9 Checking the flue

Have the integrity of the flue outlet pipe (49 on page 13) air intake pipe (50 on page 13), checked periodically, the venturi device\* (46 on page 13) cleaned and the efficiency of the flue safety circuit checked at least once a year.

\* For details see the section *Fan, venturi device and air pressure switch* in the service manual.

For all the above maintenance operations it is advisable to call an approved Service Engineer.

#### 9.10 Drain pipe inspection

Check the soundness and integrity of the condensate drain pipe.

Verify the cleanliness and correct filling of the condensate traps.

#### 9.11 Visual inspection of appliance

Visually inspect all water joints, seals and connections for any evidence of leakage and retighten, grease or replace them as necessary.

#### 9.12 Gas pressures and soundness

Check appliance for gas soundness. Recheck operational pressures and adjust as necessary as described in section 7.7 page 32 of this manual.





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Willenhall, Wolverhampton WV 13 3XB  
Technical helpline: 01902 304 400  
Web site: [www.biasi.co.uk](http://www.biasi.co.uk)

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Wall hung, fan flue, room sealed, high efficiency gas boiler

# Service manual

## RIVA COMPACT HE

Models:	G.C. Appl. No.
<b>M96.24SM/C</b>	47–970–23
<b>M96.28SM/C</b>	47–970–24
<b>M96.28SR/C</b>	41–970–12

**Leave this manual adjacent to the gas meter**



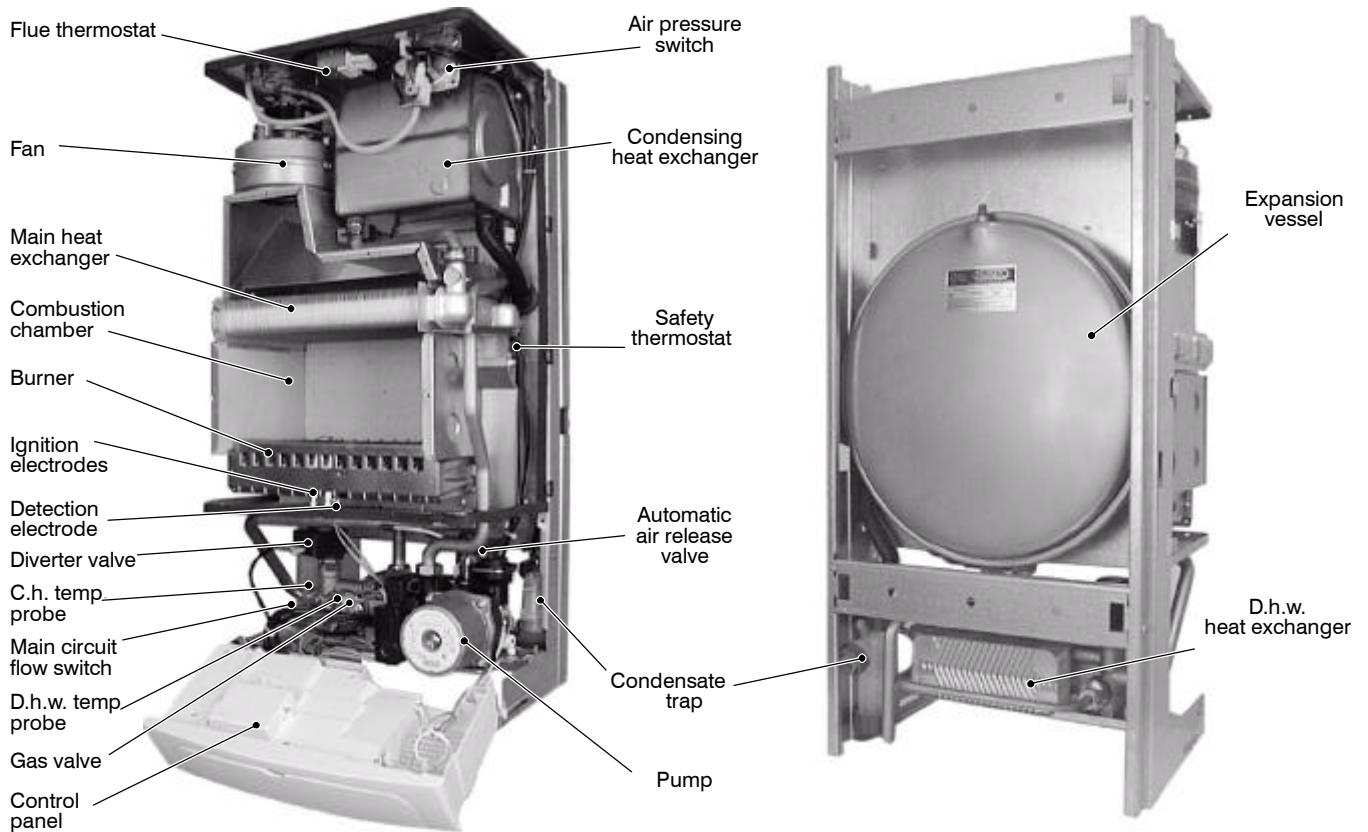
This product has an energy rating B on a scale of A to G  
For more information see [www.boilers.org.uk](http://www.boilers.org.uk)  
This is a certification mark

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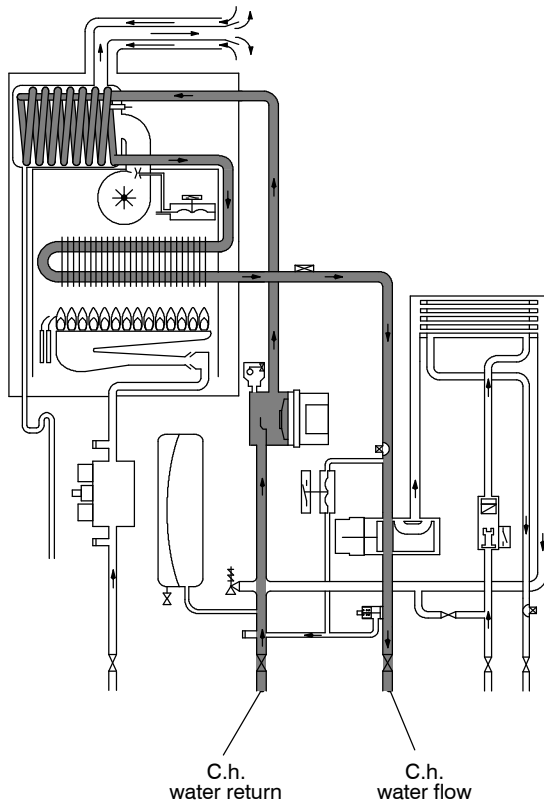
# 1 Overall information

## 1.1 Overall View

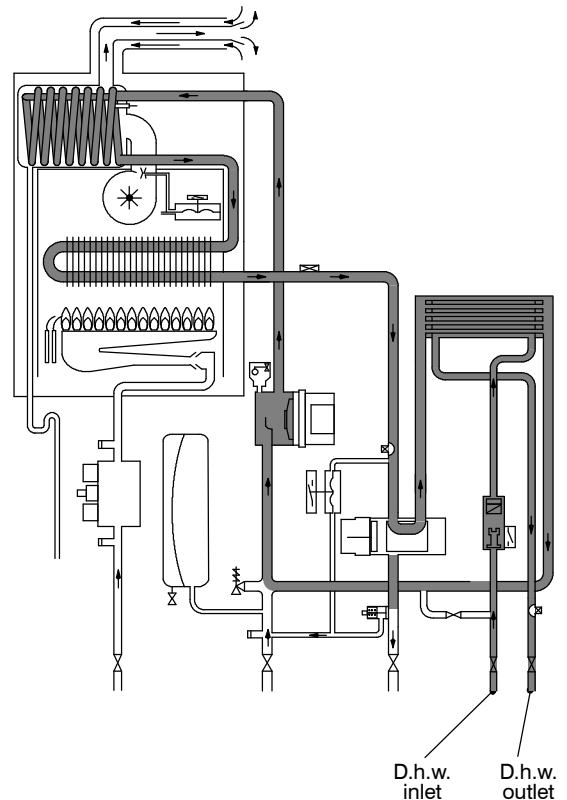


## 1.2 Hydraulic diagram

Central heating (c.h.) operation



Domestic hot water (d.h.w.) operation



## 2 General access and emptying hydraulic circuits

### 2.1 Nomenclature

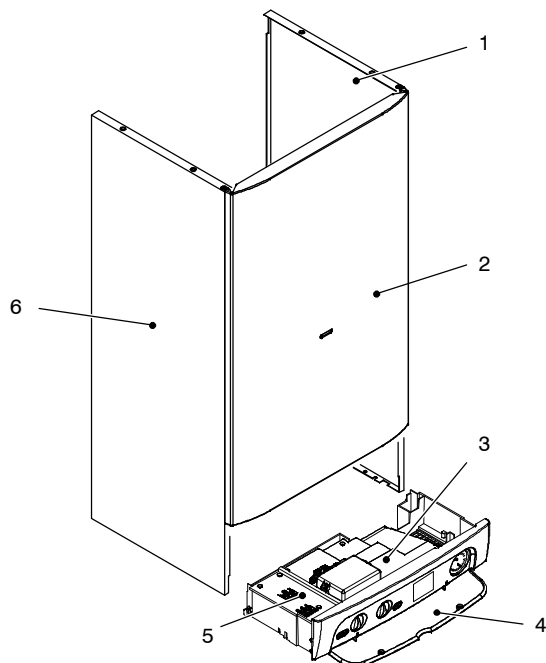


Fig. 1

- 1 Right side panel
- 2 Front panel
- 3 Control panel lid
- 4 Control panel cover
- 5 Service panel
- 6 Left side panel

### 2.2 Body panels

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

For the most part of the check and maintenance operations it is necessary to remove one or more panels of the case.

The side panels can be removed only after the removal of the front panel.

To remove the front panel remove screws A (Fig. 2), lift the panel and remove it.

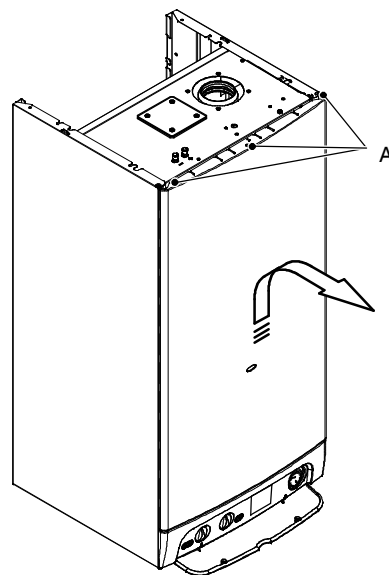


Fig. 2

To remove the side panels loosen the screws B and C (Fig. 3), bring the base of the panels away from the boiler and lift them, freeing them from the top hooks.

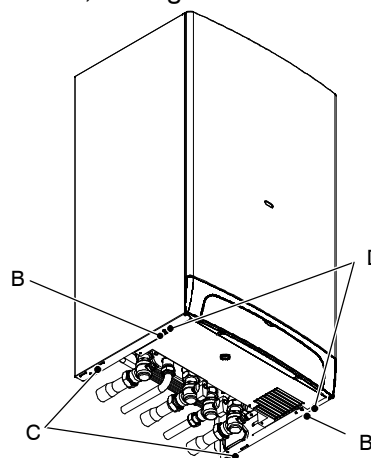


Fig. 3 – bottom view of the boiler

### 2.3 Control panel

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

To gain access to the parts located inside the control panel proceed as follows:

- 1 Remove the front panel of the case
- 2 Loosen the screws B and C (Fig. 3).
- 3 Remove the screws D
- 4 Move the lower part of the side panels as indicated in Fig. 4 and pull the control panel. When completely pulled out, the panel can rotate 45° downwards to facilitate the service operations on the internal parts.



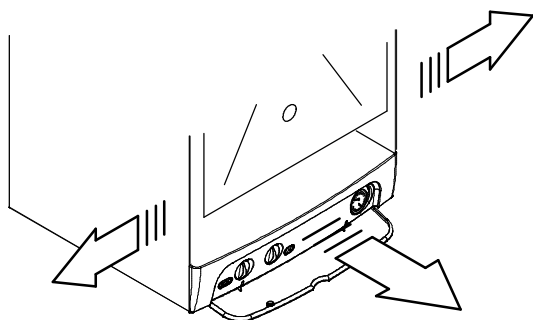


Fig. 4

- 5 Remove the screws *E* and remove the service panel (Fig. 5);
- 6 To gain access to the electronic regulation PCB and the full sequence ignition device remove the screws *F* and remove the control panel lid (Fig. 5);

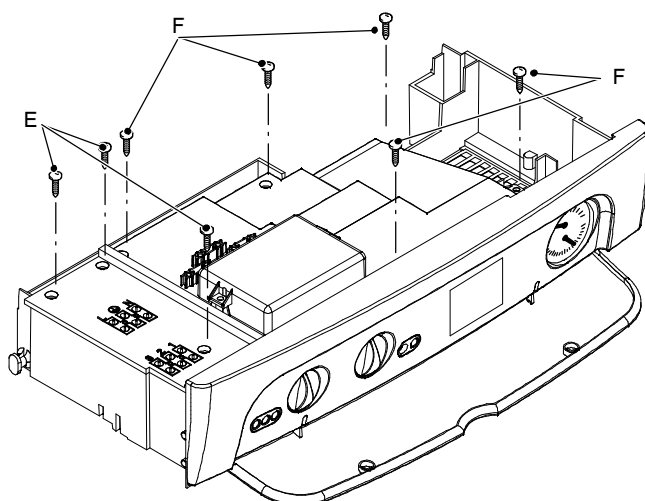


Fig. 5

## 2.4 Access to the sealed chamber

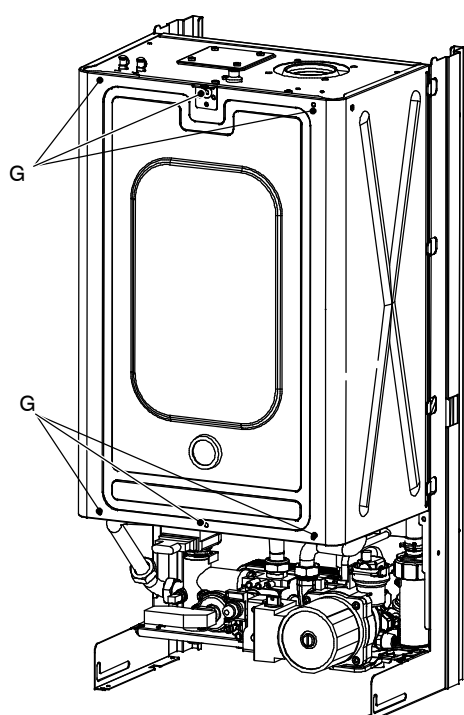


Fig. 6

To gain access to the parts contained in the sealed chamber it is necessary to remove the lid of the sealed chamber.

For this purpose, remove the front and side panels of the case, remove the screws *G* as indicated in Fig. 6 and remove the lid.

## 2.5 Emptying the primary circuit

- 1 Close the c.h. circuit flow and return cocks *H*. (Fig. 7).

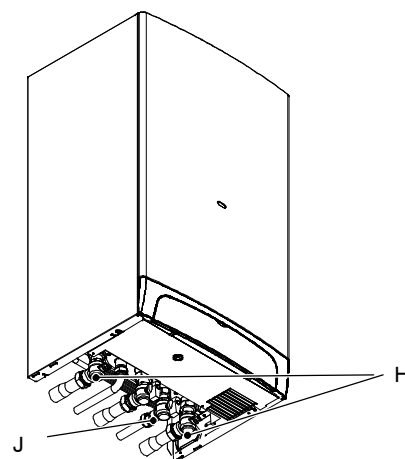


Fig. 7 – bottom view of the boiler

- 2 Remove the front and right panels of the boiler.
- 3 Open the drain tap *I* (Fig. 8) until the boiler is completely emptied.
- 4 Close drain tap again once the emptying has been completed.

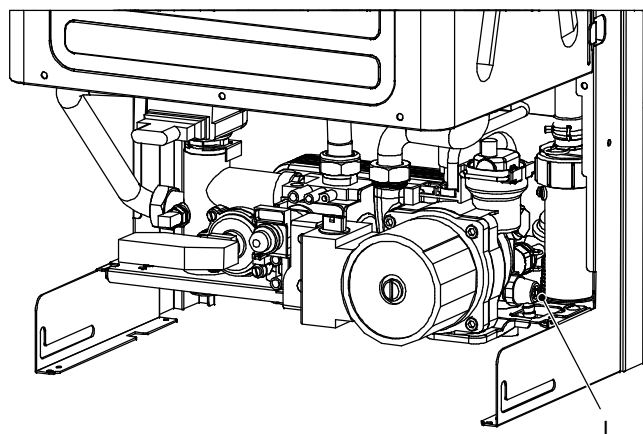


Fig. 8

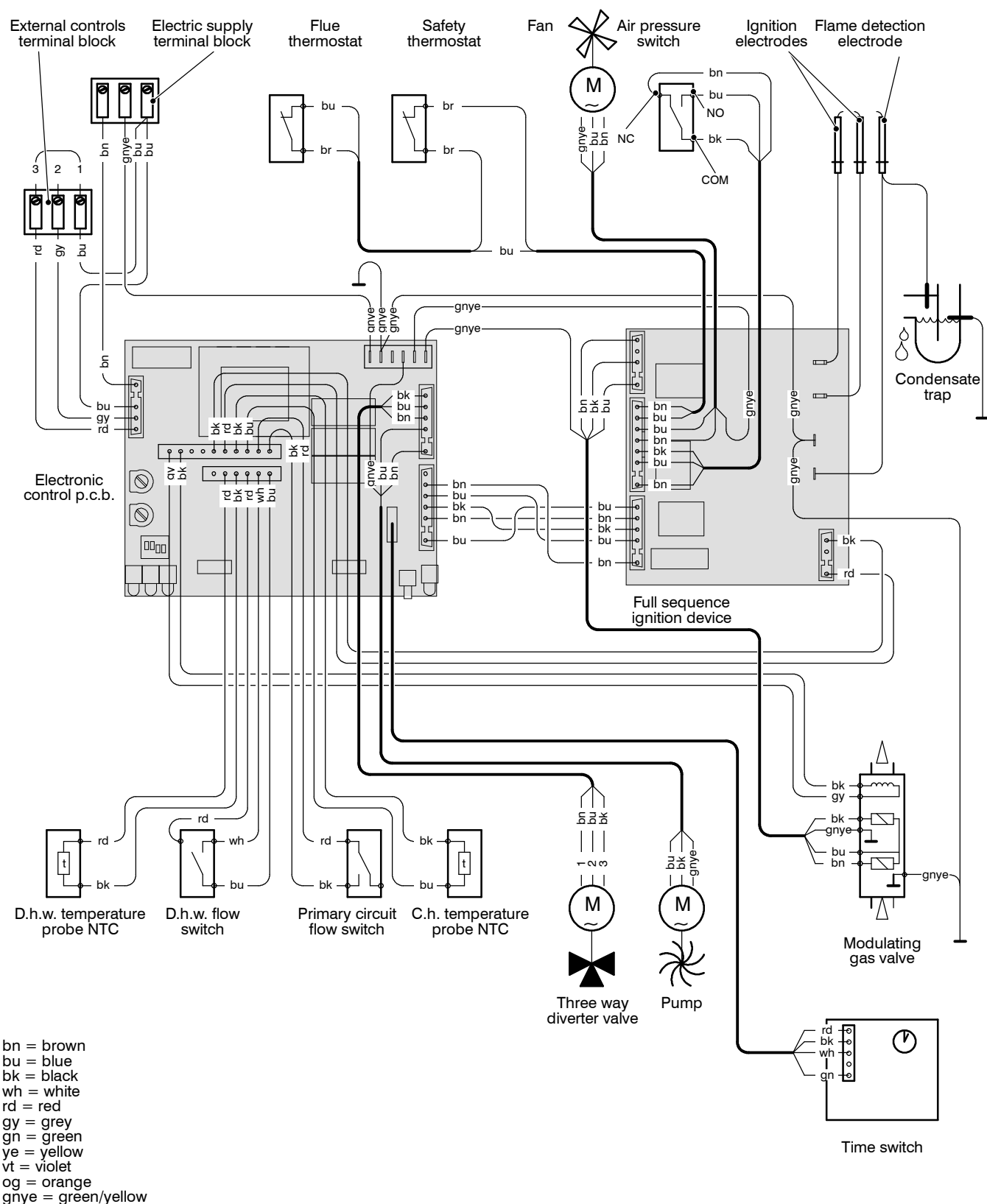
## 2.6 Emptying the d.h.w. circuit

- 5 Close the d.c.w. inlet cock *J* (Fig. 7);
- 6 Open one or more hot water taps until the boiler has been completely emptied.

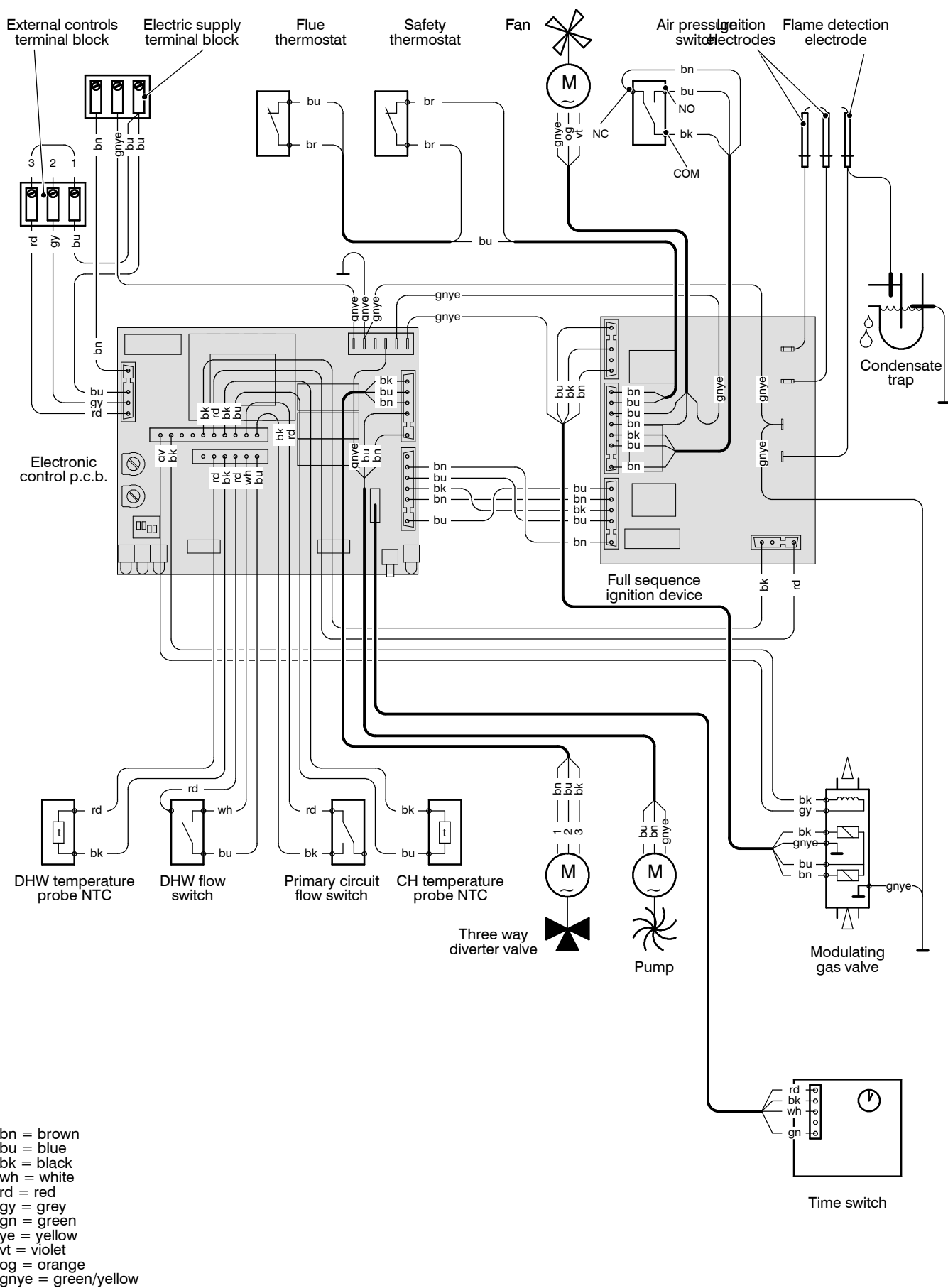
## 3 Diagrams

### 3.1 Wiring diagram M96.24SM/... M96.28SM/...

**Wiring diagram for boiler equipped with full sequence ignition device type: Bertelli & Partners FM30**

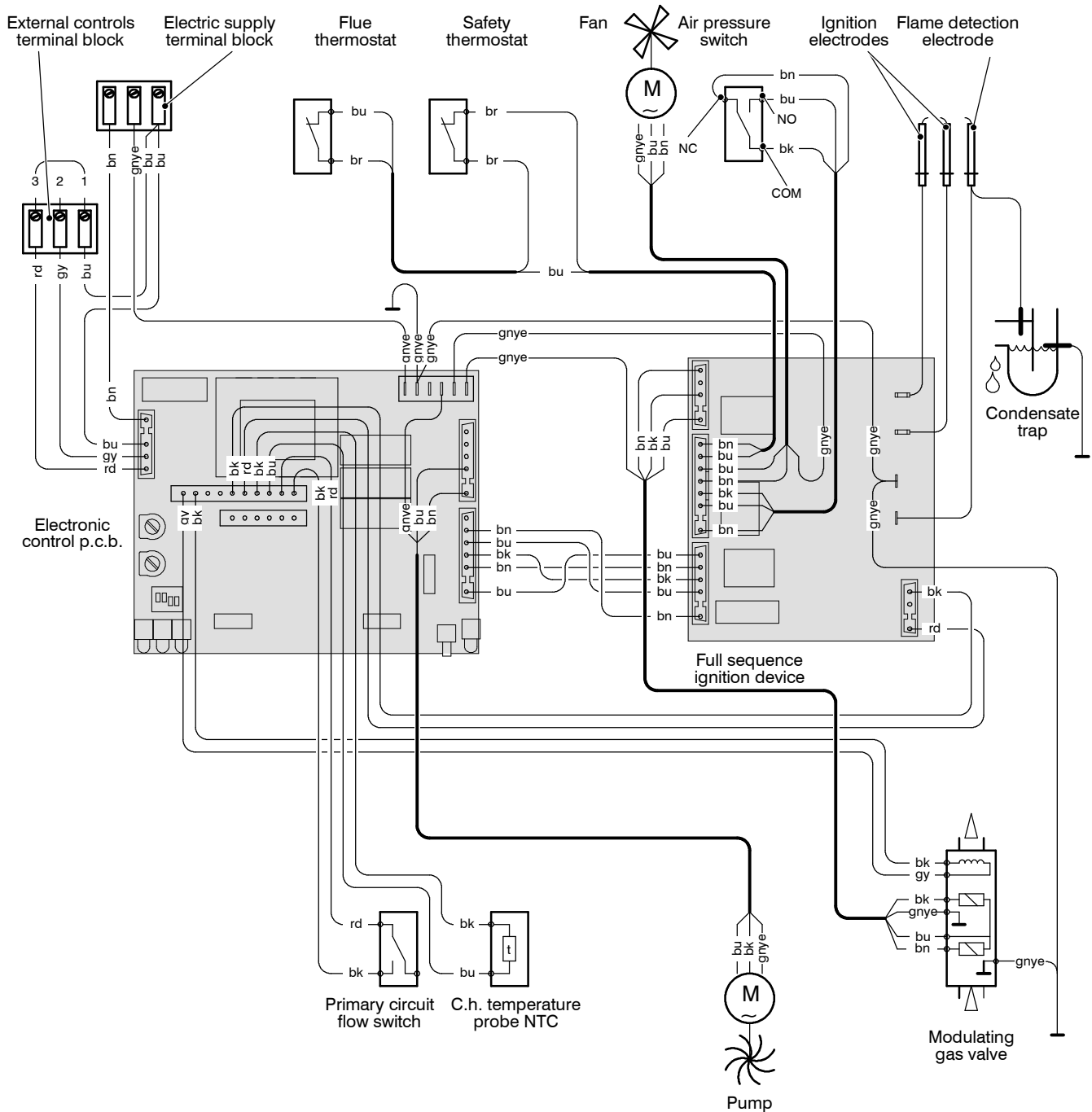


# Wiring diagram for boiler equipped with full sequence ignition device type: Honeywell FPLD



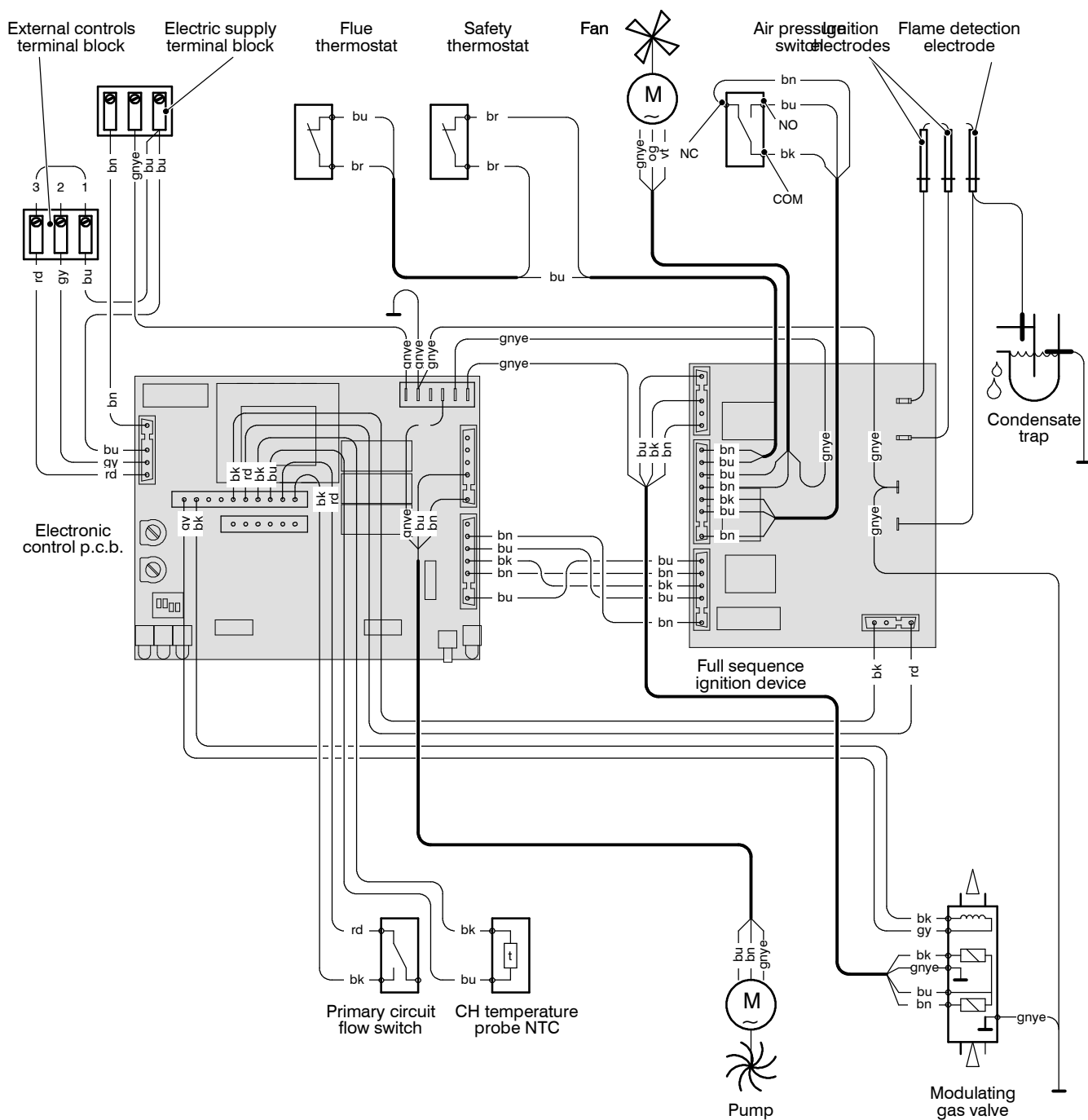
### 3.2 Wiring diagram M96.28SR/...

#### Wiring diagram for boiler equipped with full sequence ignition device type: Bertelli & Partners FM30



bn = brown  
 bu = blue  
 bk = black  
 wh = white  
 rd = red  
 gy = grey  
 gn = green  
 ye = yellow  
 vt = violet  
 og = orange  
 gnye = green/yellow

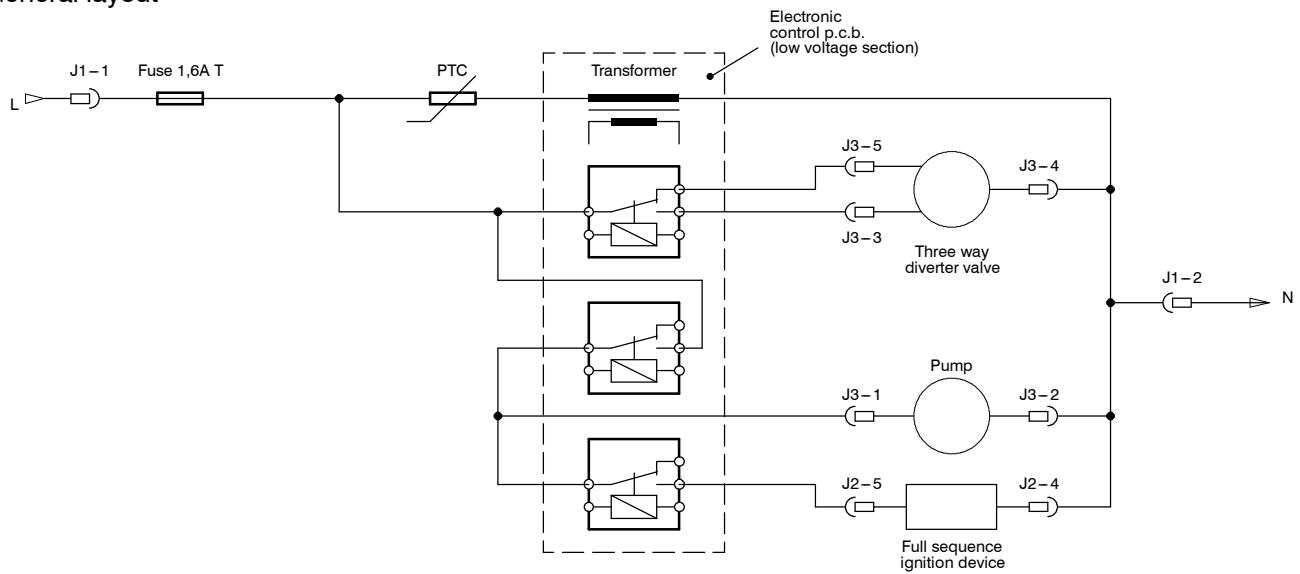
# Wiring diagram for boiler equipped with full sequence ignition device type: Honeywell FPLD



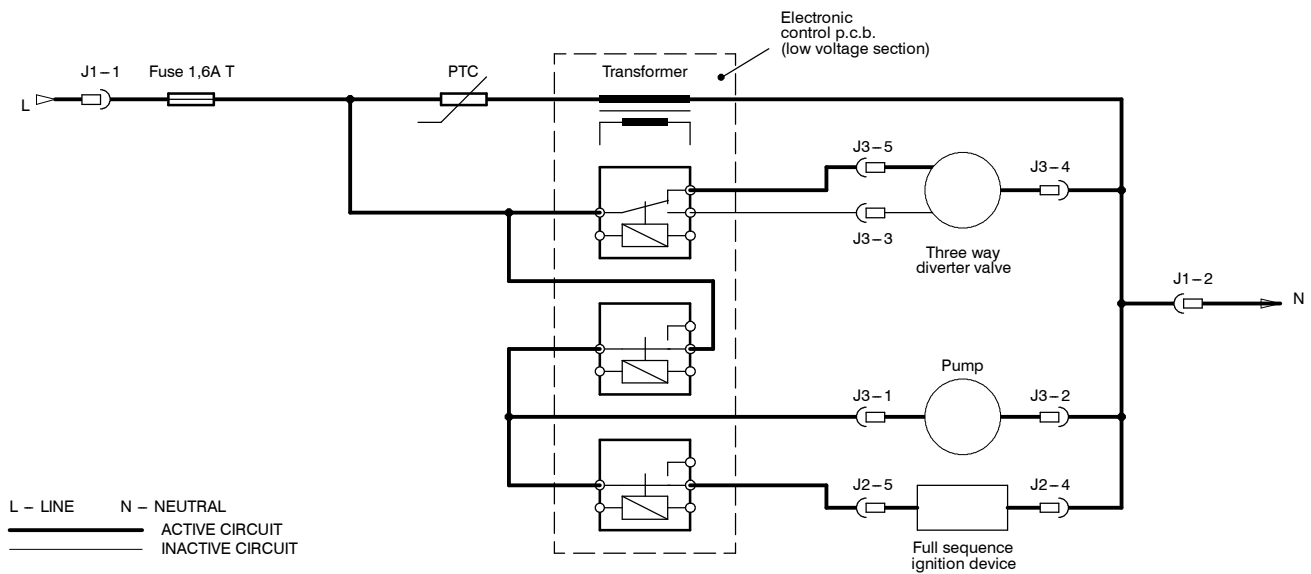
bn = brown  
 bu = blue  
 bk = black  
 wh = white  
 rd = red  
 gy = grey  
 gn = green  
 ye = yellow  
 vt = violet  
 og = orange  
 gnye = green/yellow

### 3.3 Functional flow diagrams

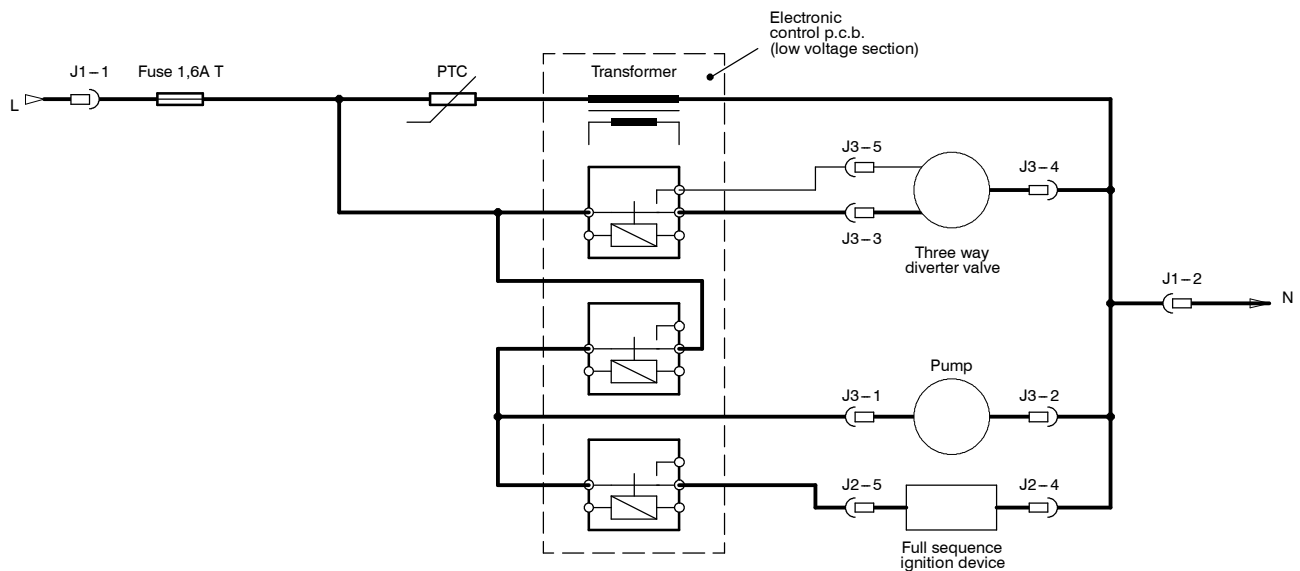
#### General layout



#### Heat request on d.h.w.



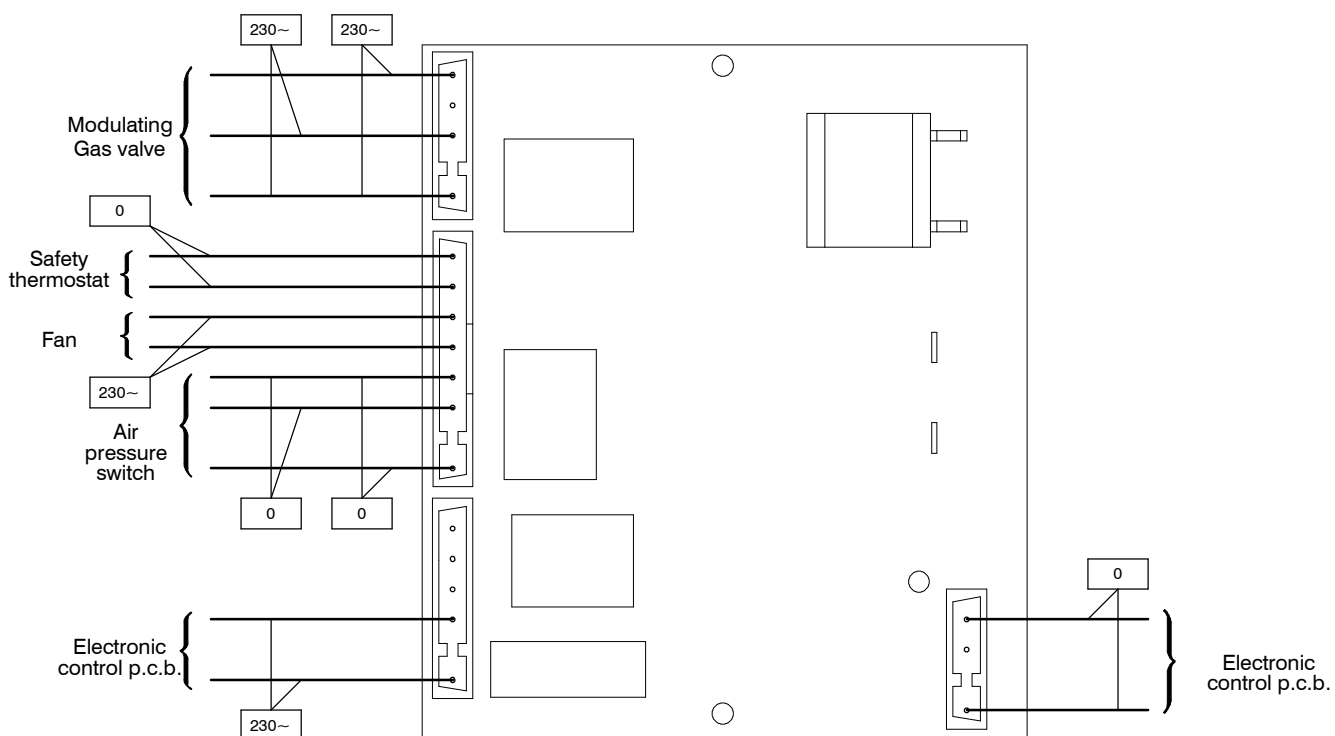
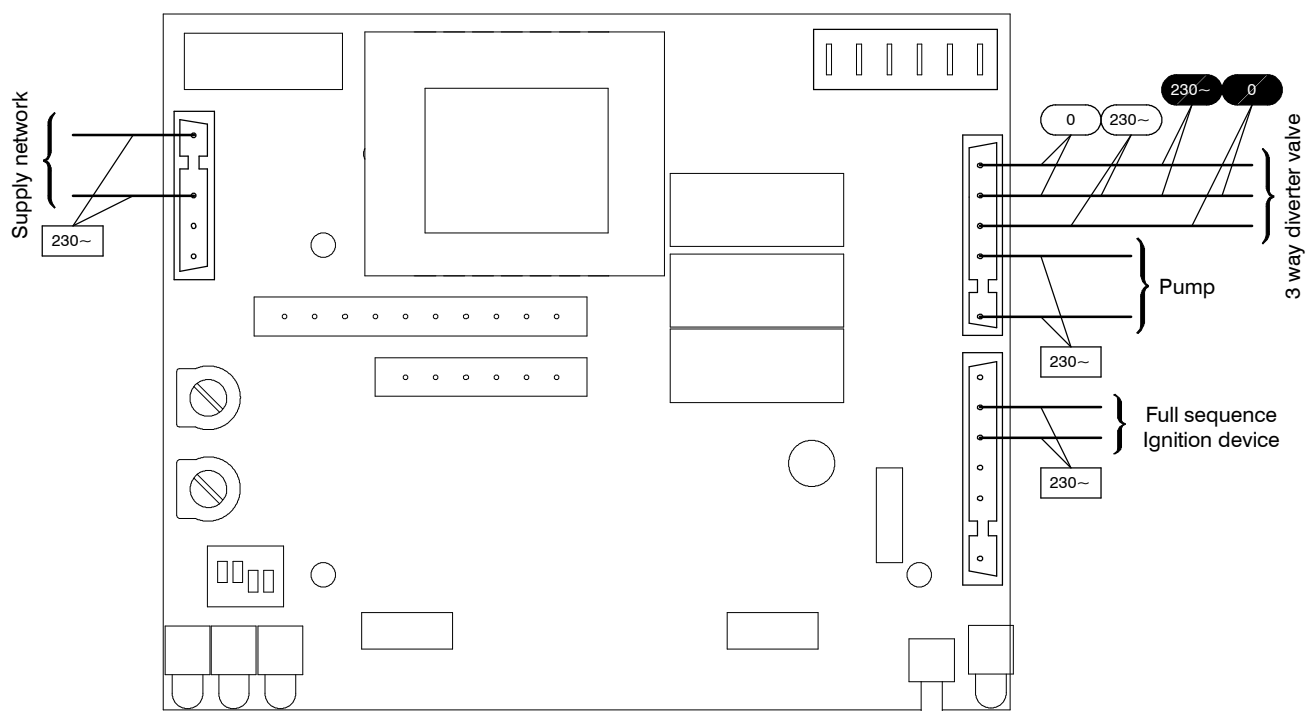
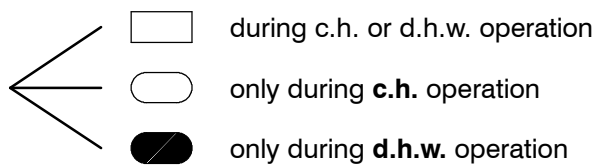
#### Heat request on c.h.



### 3.4 Circuit voltages

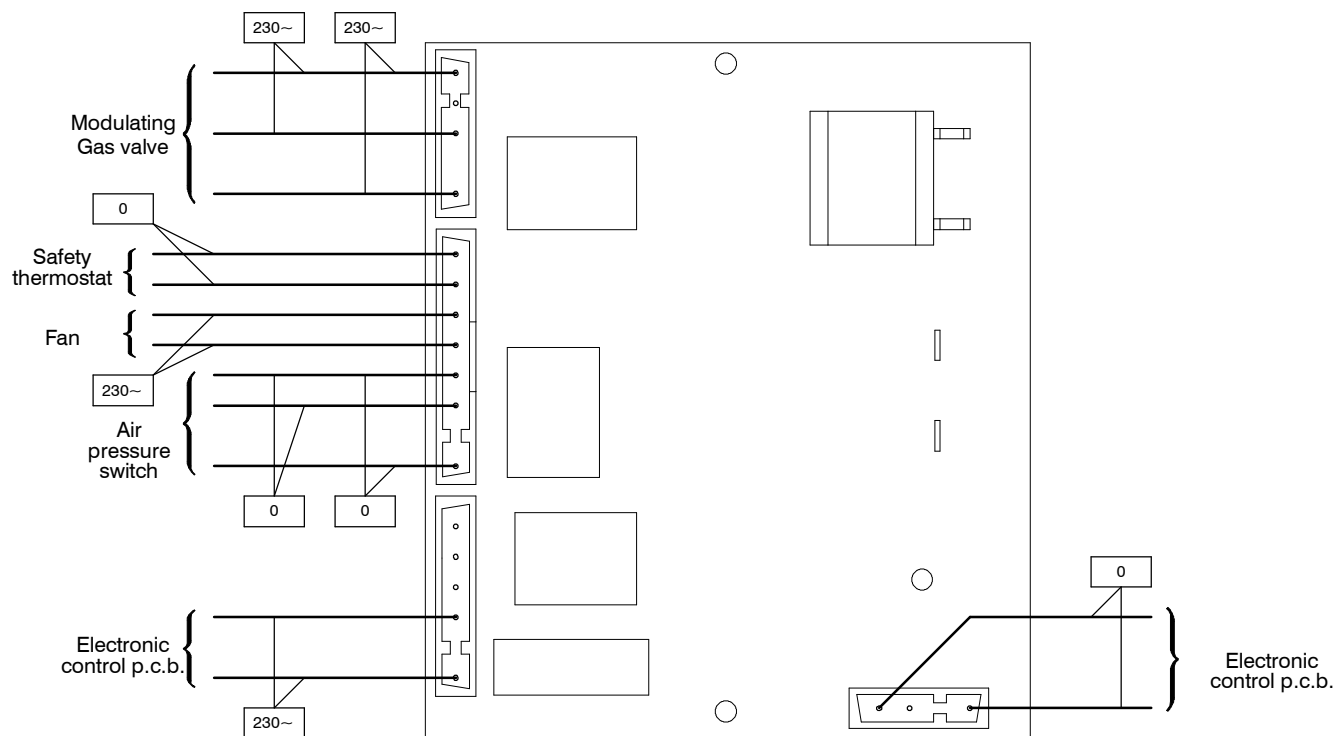
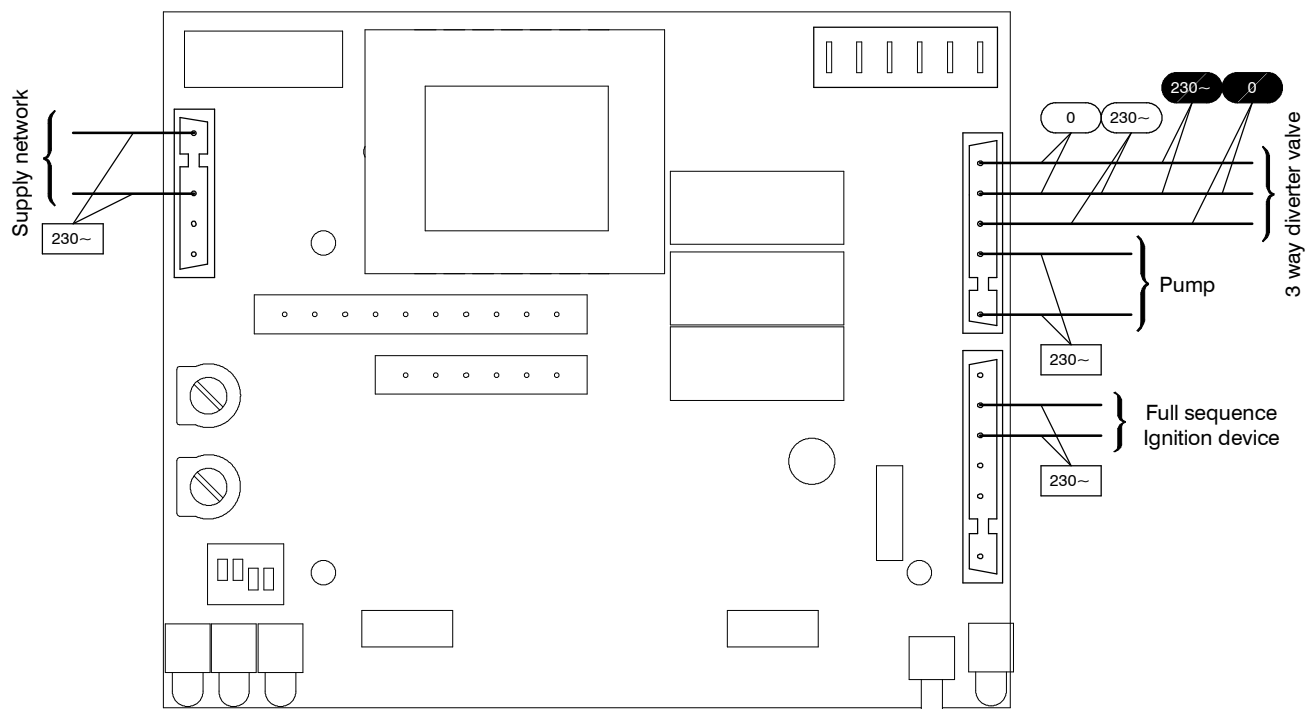
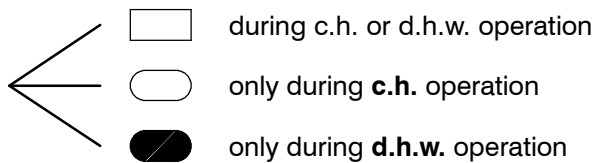
#### Diagrams for boiler equipped with full sequence ignition device type: Bertelli & Partners FM30

Electrical voltages with burner on



**Diagrams for boiler equipped with full sequence ignition device type: Honeywell FPLD**

Electrical voltages with burner on





## 4 Fault finding

		Components to check																																	
		(1)	(2)	(3)	22.1	(4)		7	8.2	9.2		10.8			11.2	12.4		13.2	15.5	16.2		17	18.2		19.2		20.2	21.1	(7)	(8)	-	-			
Defect ↓	Lock – out signal lamp red	Section of the manual → (note ref. in brackets)	Power supply line	Gas supply line	Flue pipes	Condensate drain pipe and trap	C.h. circuit	D.h.w. circuit	D.h.w. heat exchanger	Pump	Diverter valve	D.h.w. flow switch	Fuse (regulation p.c.b.)	Regulation p.c.b.	Function selectors (reg. p.c.b.)	Full sequence device	Gas valve (on – off operators)	Gas valve (modulating operator)	Main circuit flow switch	D.h.w. filter	Main circuit temp. probe	D.h.w. temp. probe	By – pass valve	Fan and venturi device	Air pressure switch	Ignition electrode	Detection electrode	Safety thermostat	Flue thermostat	Injectors	Expansion vessel	Safety valve	Pressure gauge		
																			⑨																
ON																																			
OFF																																			

		Components to check																															
Section of the manual → (note ref. in brackets)	Defect ↓	(1)	(2)	(3)	22.1	- (4)		7	8.2	9.2		10.8			11.2	12.4		13.2	15.5	16.2		17	18.2		19.2	20.2	21.1	(7)	(8)	-			
		Power supply line	Gas supply line	Flue pipes	Condensate drain pipe and trap	C.h. circuit	D.h.w. circuit	D.h.w. heat exchanger	Pump	Diverter valve	D.h.w. flow switch	Fuse (regulation p.c.b.)	Regulation p.c.b.	Function selectors (reg. p.c.b.)	Full sequence device	Gas valve (on – off operators)	Gas valve (modulating operator)	Main circuit flow switch	D.h.w. filter	Main circuit temp. probe	D.h.w. temp. probe	By – pass valve	Fan and venturi device	Air pressure switch	Ignition electrode	Detection electrode	Safety thermostat	Flue thermostat	Injectors	Expansion vessel	Safety valve	Pressure gauge	
OFF	Lock – out signal lamp red	The boiler does not supply d.h.w. (cold water from the tap). Regular operation in c/h mode even during a drawing off d.h.w.								■		■																					
														■																			
														■																			
					■									■																			
														■																			
-	Water leaks from the safety valve during operation on c/h																		■ (9)														
						■																											
1	Water leaks from the safety valve when the boiler is off.																																

## Note

**Useful information can be obtained also from the optical indication given by the appliance operation lights (see section 10.4).**

- 1 Check for 230V~ between line (L) and neutral (N)  
Verify the integrity of supply cable, plug and external fuses.  
Check the polarity of line and neutral connection
- 2 Verify the soundness of the gas supply pipe, the position of stop valves.

5 Check the gas pressure at the inlet test point of the gas valve (see sect. 12.3) with the boiler at rest and during operation and compare it with the values given on the installation booklet.

6 Check for soundness and absence of obstructions. Verify that the flue terminal is correctly installed (see clearances) and ensure that exhaust gas is not sucked back by the boiler.

7 Check for soundness of the circuit and verify its correct filling (see also installation manual).

5 A jammed by – pass could cause the over – heating of the main circuit and the intervention of the safety thermostat.

6 Check the **minimum** gas pressure at the outlet test point of the gas valve (see sect. 12.3) and compare it with the value given on the installation booklet.

7 Verify the cleanness of injectors.

8 Check the pressurization of the expansion vessel. Refer to the installation manual for proper values.

9 d.h.w. pressure too high or flow rate too high. If necessary insert a flow rate limiter (15.6).

## 5 Primary heat exchanger

### 5.1 Function

The primary heat exchanger *A* in Fig. 9 has the function of transferring heat produced from combustion of the gas to the water circulating in it.

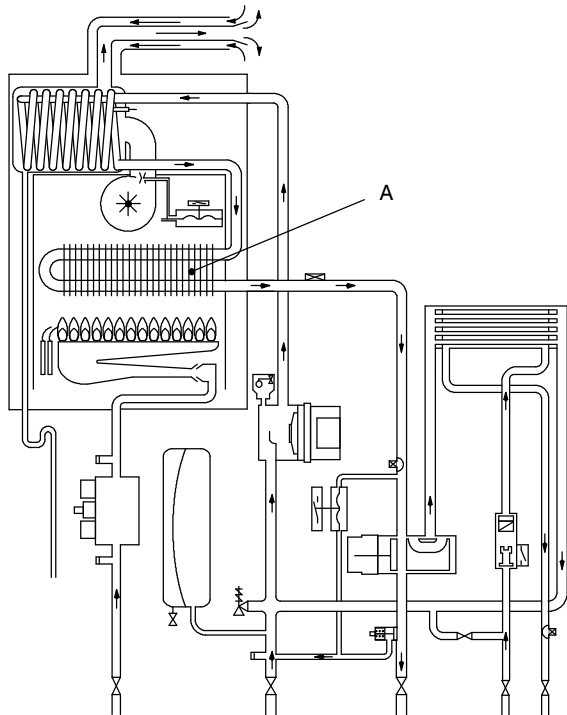


Fig. 9

The hydraulic circuit is composed of 8 elliptical pipes connected in parallel (Fig. 10).

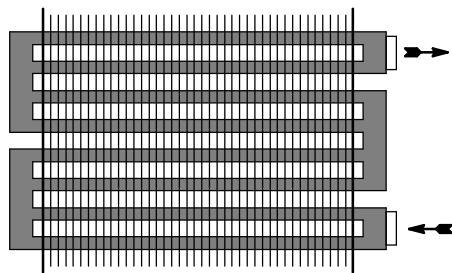


Fig. 10

### 5.2 Removal

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 1 Remove the case panels and the sealed chamber lid (see section 2).
- 2 Empty the primary circuit of the boiler.
- 3 Remove the combustion chamber lid *B* by unscrewing the screws *C* and removing the clamp *D* (Fig. 11).
- 4 Remove the screws *E* and the plate *F*.
- 5 Loosen the connection *G* and slightly move the pipe *H* upwards.
- 6 Remove the clip *I* and the safety thermostat *J*. It is not necessary to disconnect it from the wiring.

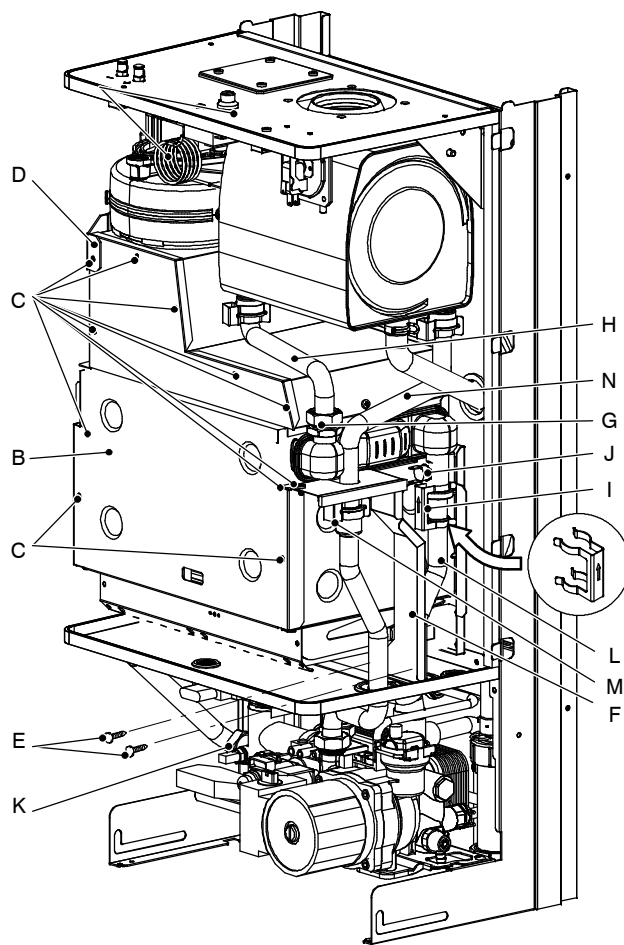


Fig. 11

- 7 Loosen the connection *K* and move the pipe *L* downwards freeing it from the connection of the primary heat exchanger.
- 8 Remove the clip *M*
- 9 Move the pipe *N* upwards freeing it from the connection and rotate towards right.
- 10 Remove the heat exchanger by sliding it forwards.
- 11 Reassemble the boiler carrying out the removal operations in reverse order. **Fit the clip *I* with the arrow pointing upwards as illustrated in Fig. 11.**

**IMPORTANT – do not force the connection *G* when tightening it.**

### 5.3 Cleaning

If there are deposits of soot or dirt between the blades of the heat exchanger, clean with a brush or non-metallic bristle brush.

In any case, avoid any actions that can damage the protective varnish with which the exchanger has been covered.



**Warning:** After cleaning or replacement as detailed above, if it deemed necessary to undertake a combustion analysis, refer to the appropriate chapter *Maintenance of the installation instructions manual*.

## 6 Condensing heat exchanger

### 6.1 Function

The return water flows through the condensing heat exchanger *A* in Fig. 12 and Fig. 13.

By reducing the combustion products temperature, the latent heat of the vapour is transferred to the water circuit, allowing an extra gain of useful heat.

The condensed vapour is then drained through the condensate trap *B* and the draining pipe *C*.

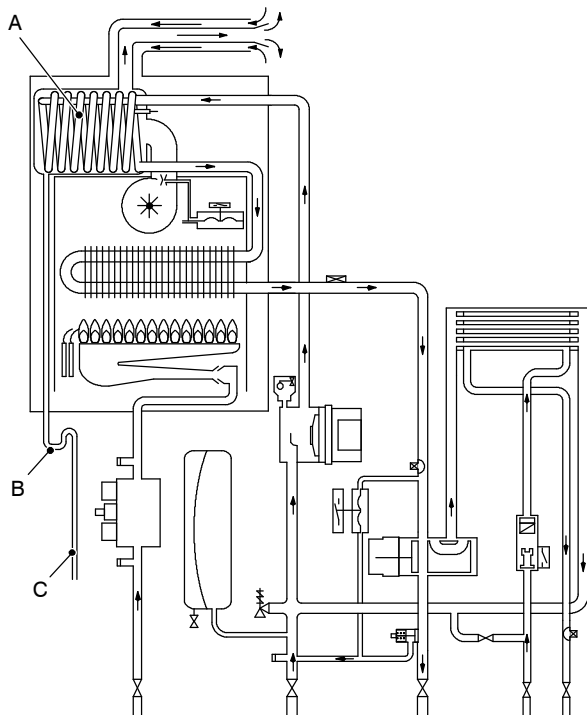


Fig. 12

### 6.2 Removal

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 1 Remove the case panels and the sealed chamber lid (see section 2).
- 2 Empty the primary circuit of the boiler.
- 3 Remove the fan *D* in Fig. 13 (see section 18.3) and the air pressure switch *E* (see section 18.5).
- 4 Remove the flue thermostat *F* (see section 21.3)
- 5 Completely loosen the connection *G* and slightly move the pipe *H* upwards.
- 6 Remove the clip *I* and move the pipe *J* downwards freeing it from the connection, then turn it towards right.

- 7 Using pliers, remove the spring *K* moving it downwards and disconnect the rubber pipe *L*.
- 8 Remove the bracket *M* by unscrewing the screws that hold it on the frame.
- 9 Rotate the exchanger as indicated by the arrow and remove it towards the front of the boiler.
- 10 Remove the clip *N* and the pipe *H*.

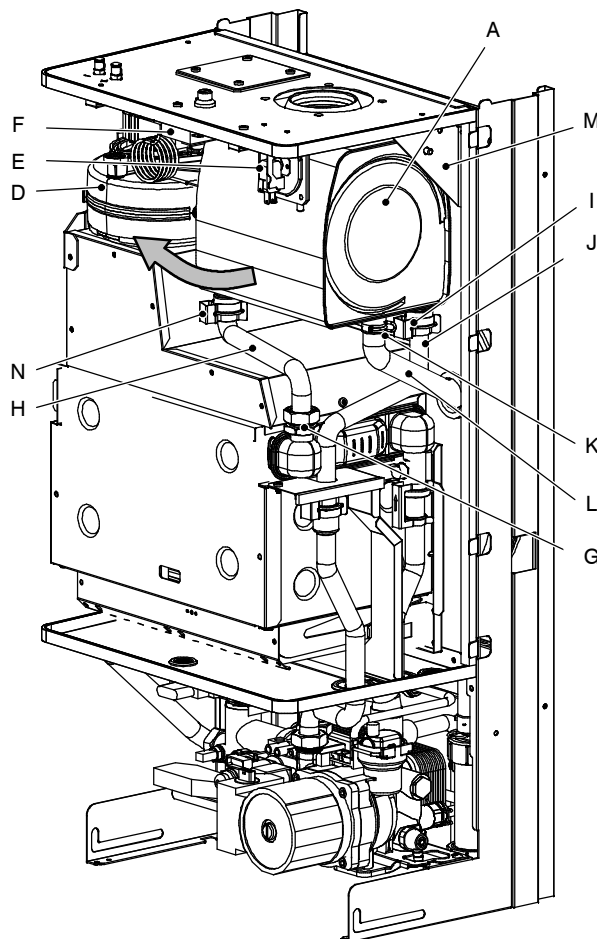


Fig. 13

- 11 Reassemble the exchanger carrying out the removal operations in reverse order.

**After reassembling ensure that the fan-exchanger and exchanger-elbow gaskets are correctly mounted and ensure a good sealing.**



**Warning:** After cleaning or replacement as detailed above, if it deemed necessary to undertake a combustion analysis, refer to the appropriate chapter *Maintenance* of the installation instructions manual.

## 7 D.h.w. heat exchanger

### 7.1 Function

The d.h.w. heat exchanger A in Fig. 14 and Fig. 16 allows the instantaneous transfer of heat from the primary hydraulic circuit to the water destined for d.h.w. use.

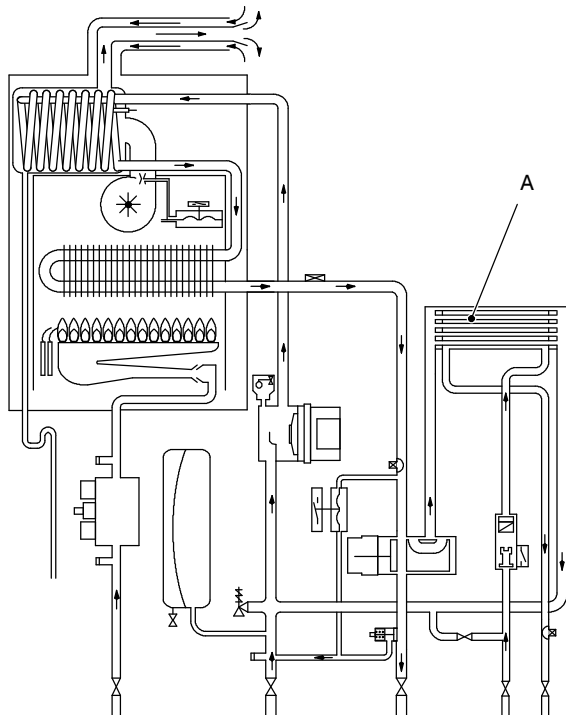
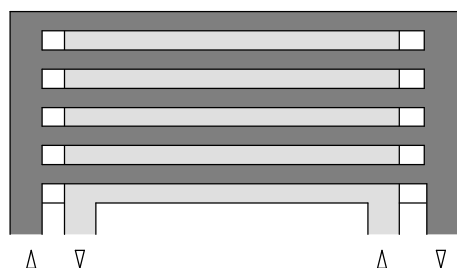


Fig. 14

The schematic structure is shown in Fig. 15.



- Primary hydraulic circuit
- Domestic hot water circuit

Fig. 15

### 7.2 Removal

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 1 Remove the front and right hand side panels of the case.
- 2 Empty the primary circuit and the d.h.w. circuit of the boiler.
- 3 Completely unscrew the two Allen key screws B (Fig. 16) which hold the exchanger to the brass groups.

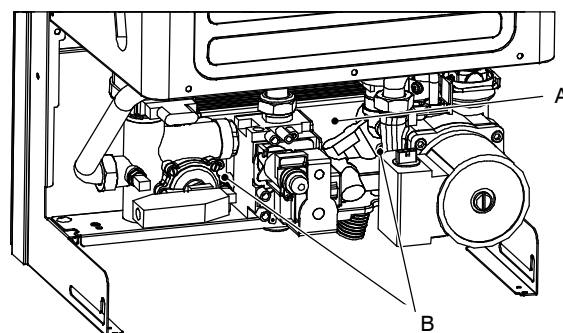


Fig. 16

- 4 Move the exchanger towards the rear of the boiler and extract it.

Reassemble the d.h.w. heat exchanger carrying out the removal operations in the reverse order.

**Attention.** When reassembling the exchanger be sure to put the off center location/securing pin indicated in Fig. 17 towards the left side of the boiler.

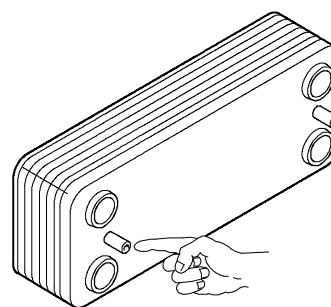


Fig. 17

## 8 Pump

### 8.1 Function

The pump A in Fig. 18 and Fig. 19 has the function of making the water in the main circuit circulate through the main heat exchanger, the condensing heat exchanger and therefore through the c.h. system (during the c.h. function) or through the secondary heat exchanger (during the d.h.w. function).

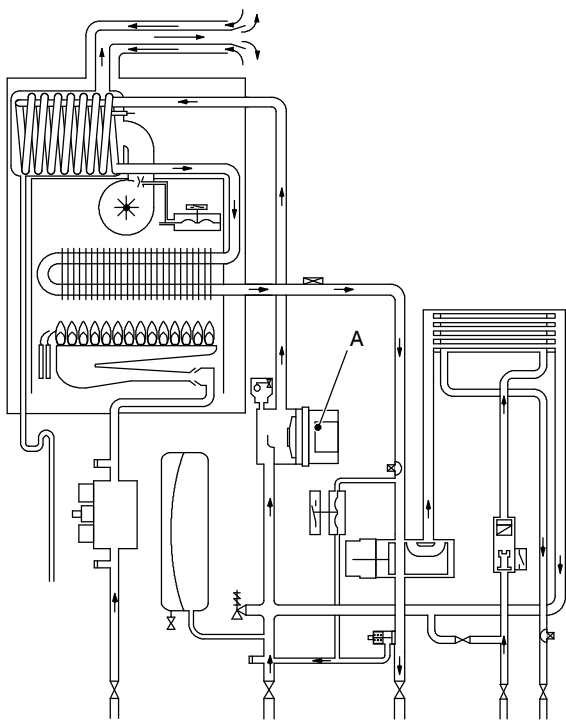


Fig. 18

### 8.2 Checks

**Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

✓ Check that the pump is not seized and that the movement of the rotor is not subject to mechanical impediments.

With the boiler off, remove the front panel. Remove the air release plug of the pump and turn the rotor with a screwdriver.

✓ Check the electrical continuity.

With the boiler off, remove the front panel and disconnect the connector B (Fig. 20).

Measure the electrical resistance between the pump supply connections.

Electrical resistance of the windings (at ambient temperature) must be about 230  $\Omega$

✓ Check the absence of starting defects.

With the boiler off remove the front case panel.

Remove the air release plug from the pump. Start the boiler and with a screwdriver, turn the rotor in the direction of the arrow. If there is a defect in starting, the rotor will begin to turn normally only starting it manually.

✓ Check that the impeller is integral with the rotor.

With the boiler off remove the front and right hand side case panels, lower the control panel and empty the primary circuit.

Remove the pump head by undoing the screws which hold it to the pump body and check that the impeller is firmly joined to the rotor.

### 8.3 Removal

**Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove the front and right hand side case panels
- 2 Empty the primary circuit of the boiler.
- 3 Extract and lower the control panel.
- 4 Disconnect the connector B (Fig. 19).
- 5 Loosen the connection C, remove the fork D and the pipe E.

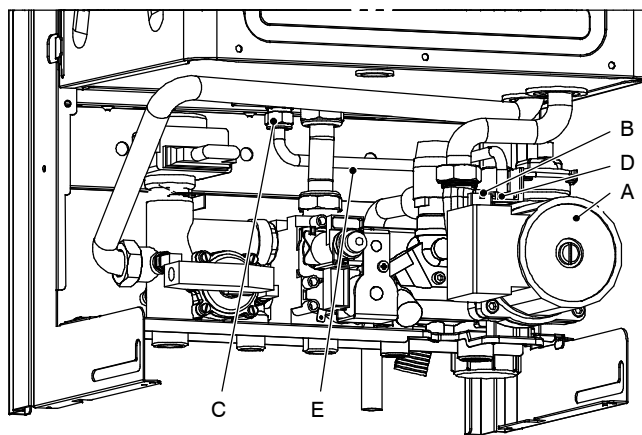


Fig. 19

- 6 Remove the fork F (Fig. 20) and the connection of the capillary pipe of the pressure gauge.
- 7 Remove the locking plate G
- 8 Completely loosen the connection H.
- 9 Unscrew the two screws I that hold the pump on the frame and remove the pump.

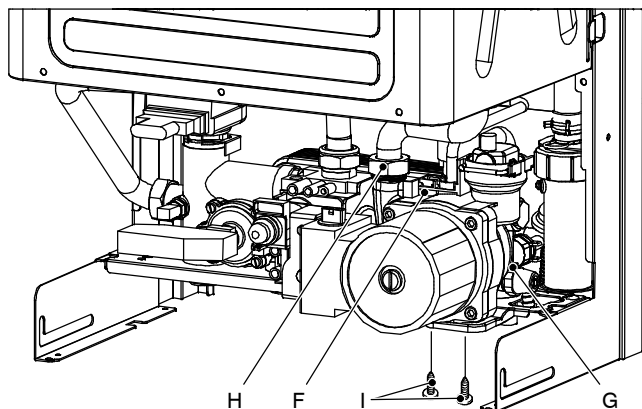


Fig. 20

Reassemble the pump carrying out the removal operations in the reverse order. When reassembling the pump, check the correct location of the O-ring gasket in the inlet port of the pump that seals the connection between the pump and the brass group.

## 9 Three way diverter valve

### 9.1 Function

The diverter valve *A* (Fig. 21) has the function of modifying the hydraulic circuit of the boiler by means of an electric command given by the electronic control p.c.b. in order to send the water that exits the primary heat exchanger towards the c.h. system or towards the d.h.w. heat exchanger.

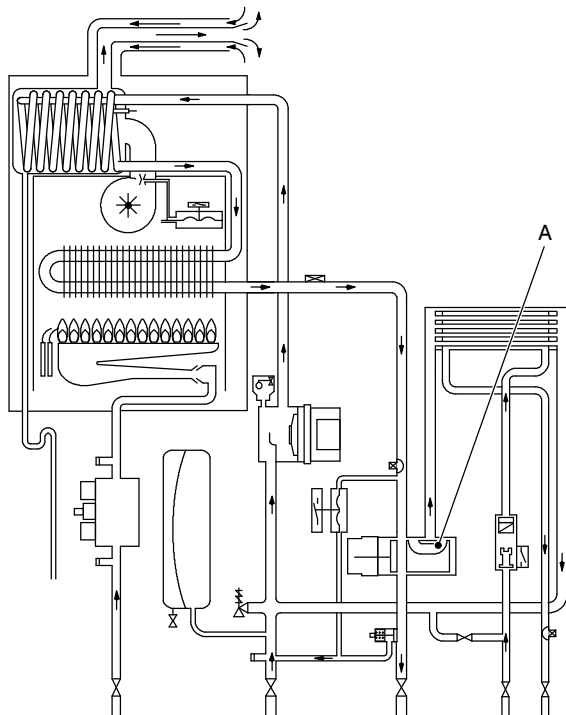


Fig. 21

### 9.2 Checks

✓ Check the electrical continuity

Fig. 22 indicates the relationship between the electric command coming from the electronic control p.c.b. and the position of the actuator *B* (brass spindle) when the boiler operates in **d.h.w. mode**.

Fig. 23 indicates the relationship between the electric command coming from the electronic control p.c.b. and the position of the actuator *B* (brass spindle) when the boiler operates in **c.h. mode**.

In both figures the relationship between the position of the actuator and the resistance of the motor windings (the motor must be disconnected from the wiring) is also given.

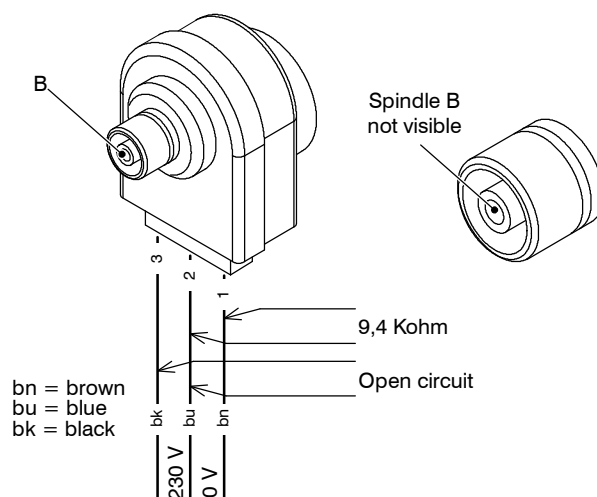


Fig. 22 – D.h.w. mode

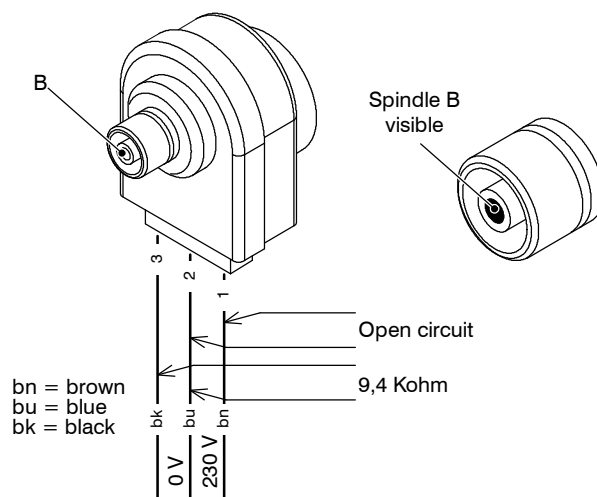


Fig. 23 – C.h. mode

### 9.3 Removal of the electric actuator

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove the front case panel.
  - 2 Disconnect the connectors *C* (Fig. 24).
  - 3 Remove the fixing spring *D* and remove the actuator *E*.
- Reassemble the actuator carrying out the removal operations in the reverse order.  
When reassembling the actuator, refer to Fig. 22 or to the wiring diagram in section NO TAG for the correct wiring connection.

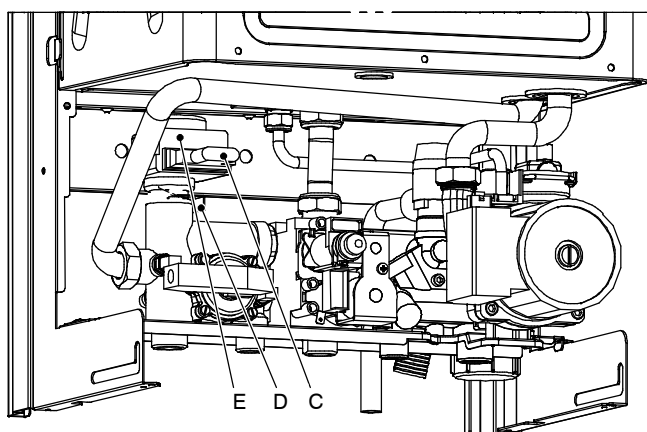


Fig. 24

#### 9.4 Removal of the diverter group and its internal parts

- 1 Remove the front and both side case panels.
- 2 Empty the primary circuit and the d.h.w circuit of the boiler.
- 3 Remove the electric actuator (see section 9.3).
- 4 Remove the fixing spring *F* (Fig. 25) and remove the primary circuit flow switch *G*.
- 5 Disconnect both c.h. and d.h.w. temperature probe, respectively *H* and *I*.
- 6 Unscrew the connector *J*, the c.h. flow connector and the d.h.w. outlet connector.

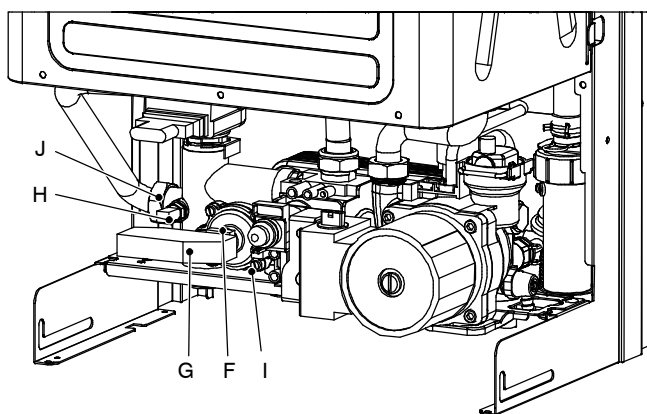


Fig. 25

- 7 Remove the d.h.w. heat exchanger (see section 7.2).
- 8 Remove the fork *K* and move away the pipe *L* (Fig. 26).

- 9 Unscrew the screw *M* and remove the diverter group.

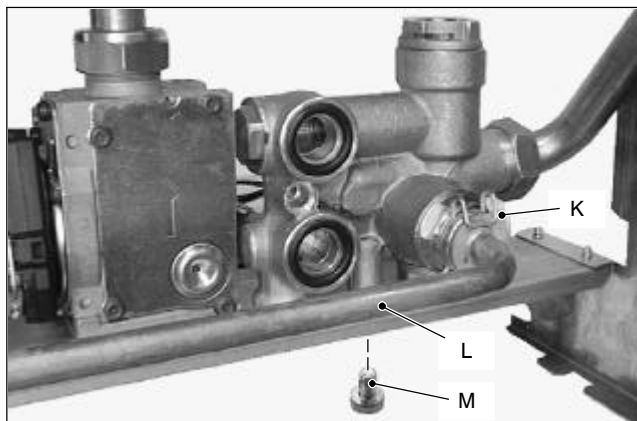


Fig. 26 Rear view of the boiler

- 10 Refer to the exploded view in Fig. 27 to remove the internal parts of the three way diverter valve.



Fig. 27

- 11 Reassemble the diverter group carrying out the removal operations in the reverse order.



## 10 Electronic control p.c.b.

### 10.1 Function

#### Inlet Information

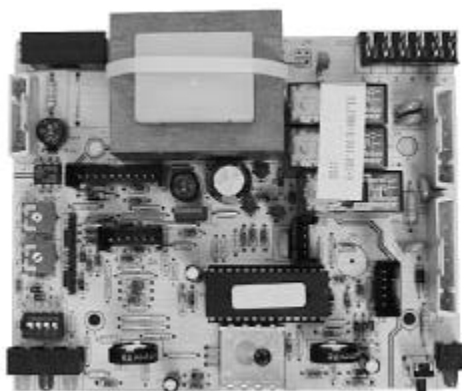
On the Electronic control p.c.b. ....

Function control\*  
C.h. temperature adjustment\*  
D.h.w. temperature adjustment\*  
Function dip-switches  
Ignition gas pressure adjustment  
Boiler reset button\*

\*control panel fascia

From other boiler devices ....

C.h. temperature probe NTC  
D.h.w. temperature probe NTC  
D.h.w. flow switch  
Primary circuit flow switch  
Room thermostat (if fitted)  
Time switch  
Flame presence signal\*  
\*from the full sequence ignition device



#### Outlet command

Pump  
Three way diverter valve  
Full sequence ignition device  
Modulation operator  
Appliance operation lights\*  
Lock-out signal lamp\*  
\*control panel fascia

The fundamental function of the Electronic control p.c.b. is that of controlling the boiler in relation to the external needs (i.e. heating the dwelling or heating the water for d.h.w. use) and operating in order to keep the temperature of the hydraulic circuits constant.

This is obviously possible within the useful power and maximum working temperature limits foreseen.

Generally, the Electronic control p.c.b. receives inlet information coming from the boiler (the sensors) or from the outside (knobs, room thermostat, etc.), processes it and consequently acts with outlet commands on other components of the boiler (Fig. 28).

### 10.2 Selection and adjustment devices

On the Electronic control p.c.b. several selection, adjustment and protection devices are located. (Fig. 29).

Some of these devices are directly accessible by the user (function control, temperature adjustment potentiometers etc.) others are accessible by removing the service panel or the control panel lid.

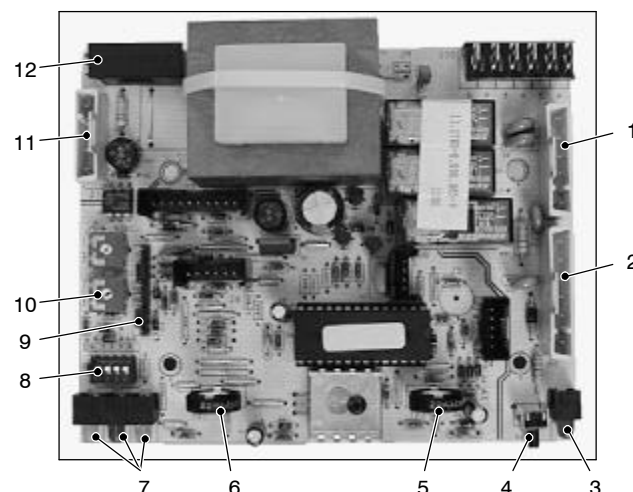


Fig. 29

- 1 J3 connector
- 2 J2 connector
- 3 Lock-out signal lamp
- 4 Boiler reset button
- 5 Function control / C.h. temperature adjustment
- 6 D.h.w. temperature adjustment
- 7 Appliance operation lights
- 8 Dip-switch selectors
- 9 Setting jumpers
- 10 Ignition gas pressure adjustment (ACC.)
- 11 J1 connector
- 12 Fuse 1,6 A T


### 10.3 Checking the temperature

The Electronic control p.c.b. makes it possible to separately adjust the c.h. water flow temperature and d.h.w. outlet temperature.

The temperature of the water is converted into an electric signal by means of temperature probes.

The user, setting the desired temperature with the control panel knobs operates the variable elements (5 and 6 in Fig. 29) of the electronic control p.c.b.

If the power requested is lower than 40% of the maximum power output then control is achieved by switching ON the burner at minimum power, then switching OFF (ON/OFF function). If the power requested is higher, then the burner is switched ON at maximum power and will control by modulating to 40% of the maximum power output.

During the c.h. operation (Fig. 30), the signal coming from the c.h. temperature probe is compared to the signal given by the control panel through the adjustment made by the user (knob ). The result of such a comparison operates the modulation of the gas valve, consequently changing the useful output of the boiler.

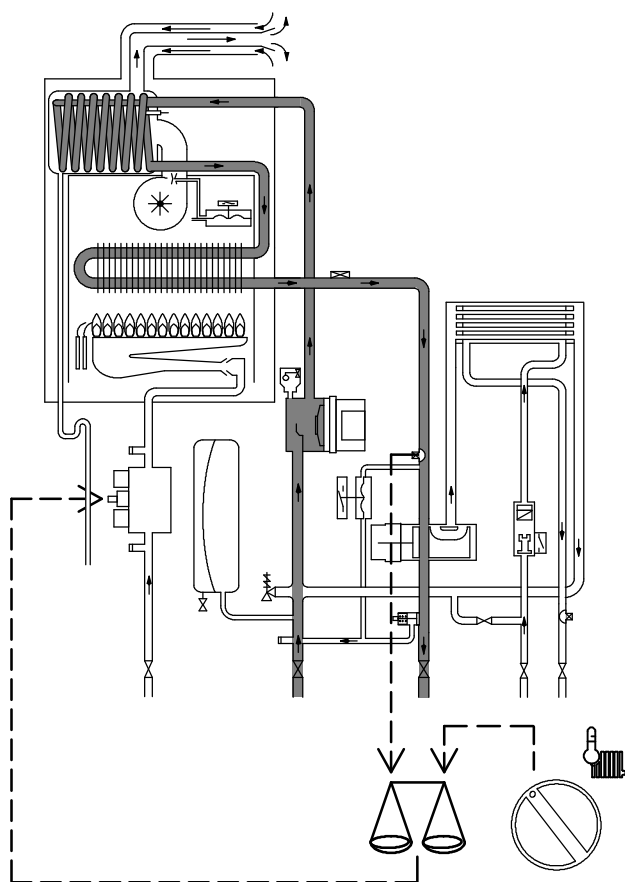



Fig. 30

When the boiler functions in d.h.w. (Fig. 31), the signal coming from the d.h.w. temperature probe is compared with the signal given by the control panel through the adjustment made by the user (knob ).

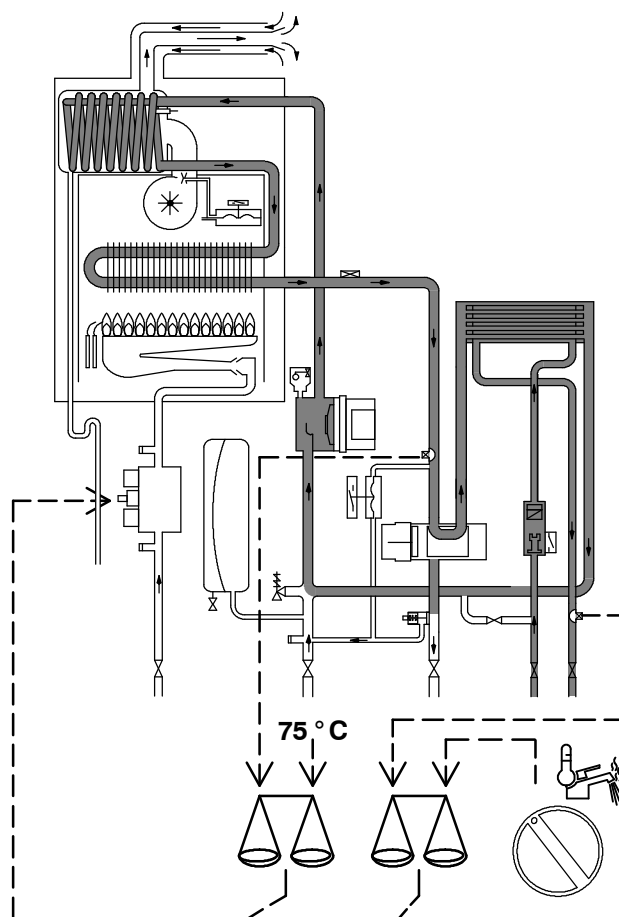


Fig. 31

Normally, the result of the comparison between these two signals directly operates the adjustment elements of the gas valve modulation device, adjusting the useful output generated in order to stabilize the temperature of the exiting water.

If during the d.h.w. mode operation, the temperature of the primary circuit goes over 75°C, the useful output is automatically reduced so that the primary circuit cannot reach excessive temperatures.

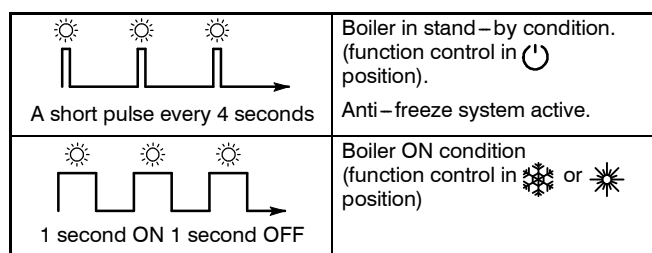
The control sequences in  function and in  function are illustrated in detail in sections 10.10 and 10.11.

#### 10.4 Operation lights

The Electronic control p.c.b. is provided with three lamps (L.E.D. indicators) 7 in Fig. 29 that give optical information during the operation of the boiler.












































The green lamp on the left gives information whether the boiler is in stand-by mode or during the normal operation of the boiler.

The following table gives the relationship between the lamp indication and its meaning.



With the boiler switched ON ( or ) all the lamps (7 in Fig. 29) are activated.

The following table gives the relationship between each of the possible lamp combinations and their meaning.

  	Normally operating boiler (see the previous table for details)		
  	C.h. operation		
  	D.h.w. operation		
  	Frost protect operation		
  	D.h.w. operation Excessive temperature on primary circuit		
  	Faulty c.h. temperature probe NTC		
  	Faulty d.h.w temperature probe NTC		
  	Faulty primary circuit (no water or absence of flow)		
  	Lack of burner ignition (no ignition signal from the full sequence ignition device)		
  	Ignition gas pressure adjustment		
  	Minimum gas pressure adjustment		
  	Lack of power supply or faulty electronic control p.c.b. *		
  	Faulty electronic control p.c.b. *		
 	 		
Lamp OFF	Lamp ON	Flashing lamp, alone or simultaneously with an other lamp.	Flashing lamp, alternate with another lamp.
* These conditions are normal only for a short time when the power supply is applied to the boiler. If permanent they indicate a faulty p.c.b.			

## 10.5 Dip-switch selectors

The function selectors 8 (Fig. 29 and Fig. 32) are micro-switches with which it is possible to select the various boiler control function modes.

In Fig. 32 the selectors are illustrated in the configuration in which the boiler is set in the factory (natural gas boiler).

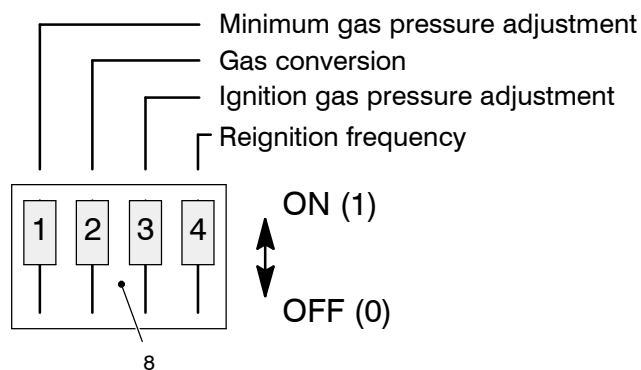


Fig. 32

### ○ Selector 1

This forces the boiler to operate at the minimum gas pressure in order to allow the adjustment of the minimum gas pressure at the burner (on the modulation operator of the gas valve).

After any adjustment operation the selector has to be brought back to the normal position (ON).

### ○ Selector 2

This selects the boiler functions on the basis of the type of gas used.

It allows the selection of the maximum supply current given to the modulator device.

To set selector 2 correctly follow the table in Fig. 33.

Gas supply	Position of selector	Approx. Max current through the modulator device
Natural gas	On	120 mA
L.P.G.	Off	165 mA

Fig. 33

### ○ Selector 3

This forces the functioning of the boiler in order to allow the optimal gas pressure at the burner to be adjusted during the ignition phase.

The adjustment (see section 10.7) is done by means of the potentiometer "10" marked "ACC" (Fig. 29 on page 19).

After the adjustment operations bring the selector back to the normal position (ON).

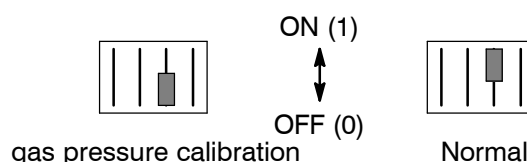


Fig. 34

### ○ Selector 4

This allows you to select the minimum time that must pass between two ignitions of the burner in c.h. function.

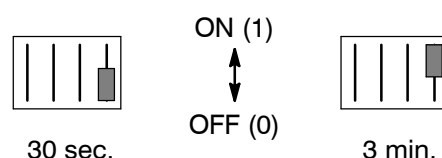


Fig. 35

## 10.6 Settings

Two setting jumpers are fitted on the Electronic control p.c.b.

Refer to Fig. 36 for the position of the jumpers when the Electronic control p.c.b. is fitted on a M96.24SM/... or M96.28SM/... boiler.

Refer to Fig. 37 when the Electronic control p.c.b. is fitted on a M96.28SR/... boiler.

The numbers refer to the marking printed on the circuit board.

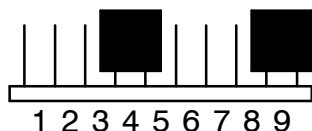


Fig. 36



Fig. 37

The device *N* indicated in Fig. 38 and marked "RISC" on the Electronic control p.c.b. must be set fully counter-clockwise.

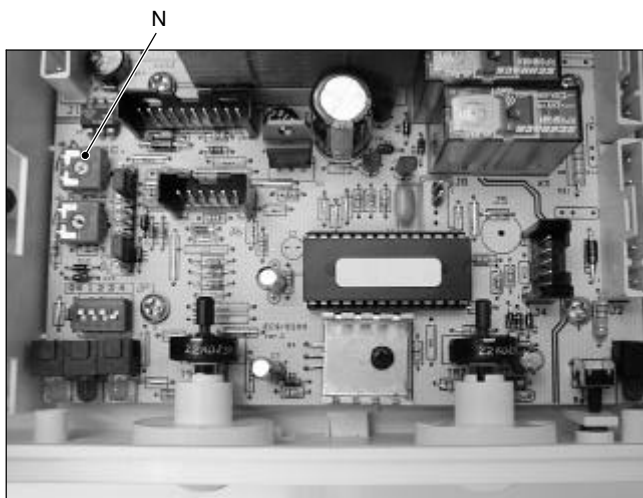


Fig. 38

## 10.7 Ignition gas pressure adjustment

By using the device "10" (Fig. 29) marked "ACC." on the Electronic control p.c.b., it is possible to adjust the gas pressure at the injectors in the ignition phase.

This pressure is maintained at the injectors until ignition occurs (ionization signal from the full sequence ignition device).

To carry out the adjustment move the function selector 3 to the OFF position (Fig. 34) and use the adjustment device "10" (ACC).

Adjust the gas pressure at the injectors to the value indicated in the tables of the User/Installation manual (*Technical information* section, *Gas pressures at the burner* table).

By rotating the device clockwise the pressure increases.

Check the regular ignition of the burner by turning the boiler on and off repeatedly.

After the adjustment operations bring the selector 3 back to the normal position (ON).

## 10.8 Checks

✓ Check that the fuse is complete

If the Electronic control p.c.b. does not supply any device (pump, fan, etc.) check that the fuse 12 (Fig. 29) is complete.

If the fuse has blown replace it with one that has the same characteristics after having identified the reason for failure.

✓ Check the setting jumpers position

Two setting jumpers must be fitted on the Electronic control p.c.b. as shown in Fig. 36.

## 10.9 Removal of the electronic control p.c.b

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Gain access to the parts located inside the control panel as explained in the section 2.3 of this manual.
- 2 Remove all the wiring connected to the Electronic control p.c.b..  
To disconnect the connectors J1, J2 and J3 (11, 2 and 1 in Fig. 29) delicately flex the hook present on one side of each socket.
- 3 Remove the spindles of the c.h. and d.h.w. temperature adjustment knobs by delicately pulling them with pliers in the direction shown by the arrow in Fig. 39.

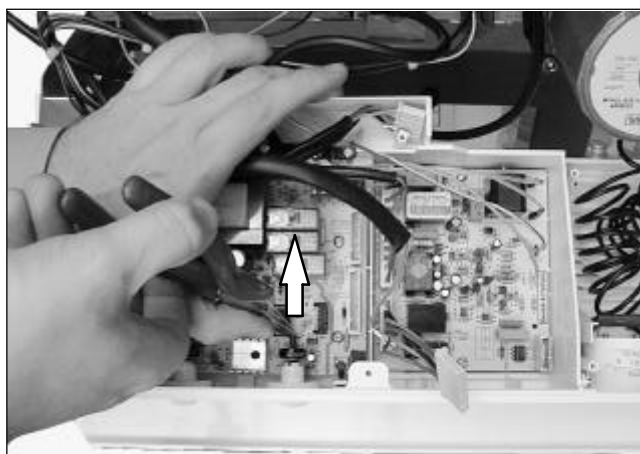


Fig. 39

- 4 Unscrew the four screws that hold the Electronic control p.c.b. on to the control panel.
- 5 Remove it by lifting its rear edge and freeing it from any of the wiring.
- 6 Re-assemble the Electronic control p.c.b. following the removal procedures in the reverse order.

## Important

When re-assembling the Electronic control p.c.b.:

- 7 Fit the p.c.b. into the control panel by first inserting the front lower edge under the control knob shafts. Lower the rear edge and ensure that no wiring is trapped beneath.
- 8 Insert the spindles in the control panel knobs until the notch A (Fig. 40) reaches the potentiometer edge. It is not necessary to force them in the knob.
- 9 While tightening the screws that fix the Electronic control p.c.b. on the control panel, keep the p.c.b. towards the control panel fascia making sure of the contact between the boiler reset button B and the tab C (Fig. 40).

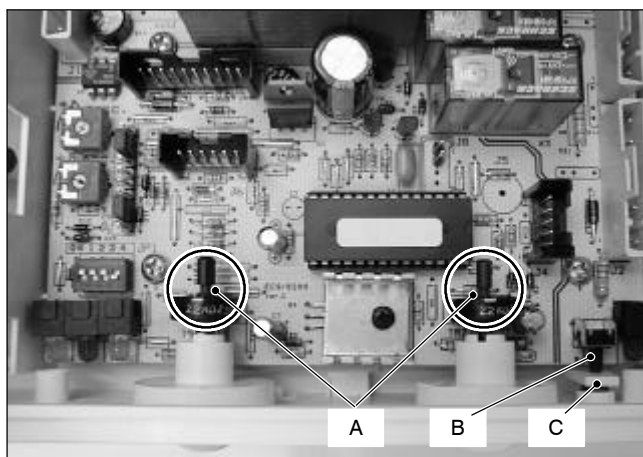


Fig. 40

### Attention

After installing the Electronic control p.c.b. :

- 10 Make sure the c.h. (🔥) and d.h.w. (🚰) temperature adjustment knobs can move freely for the complete range.  
If not, remove the spindle again as described at step 3, turn the knob half a turn and re-insert the spindle.
- 11 Make sure that the settings comply with the indications given in section 10.6.
- 12 Operate the boiler and close the gas inlet cock so that the boiler goes into the safety lock-out state. Verify the correct operation of the boiler reset button by pressing and releasing it.



**Warning:** After cleaning or replacement as detailed above, if it deemed necessary to undertake a combustion analysis, refer to the appropriate chapter *Maintenance* of the installation instructions manual.

## 10.10 Thermal control in the "❄️" mode

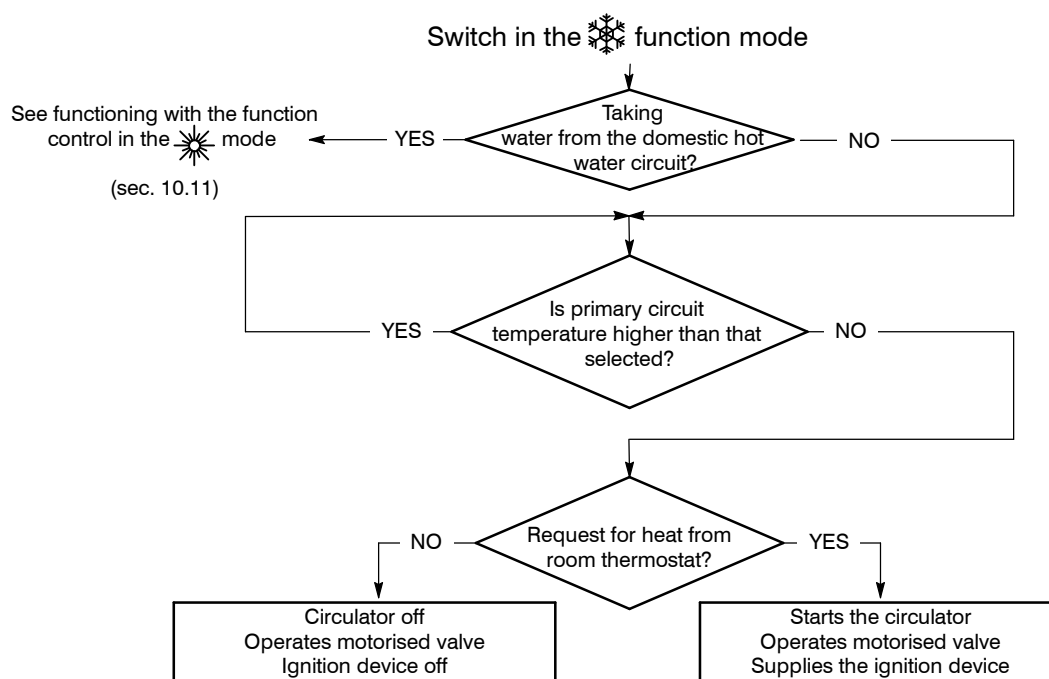


Fig. 41

## 10.11 Thermal control in the "☀️" mode

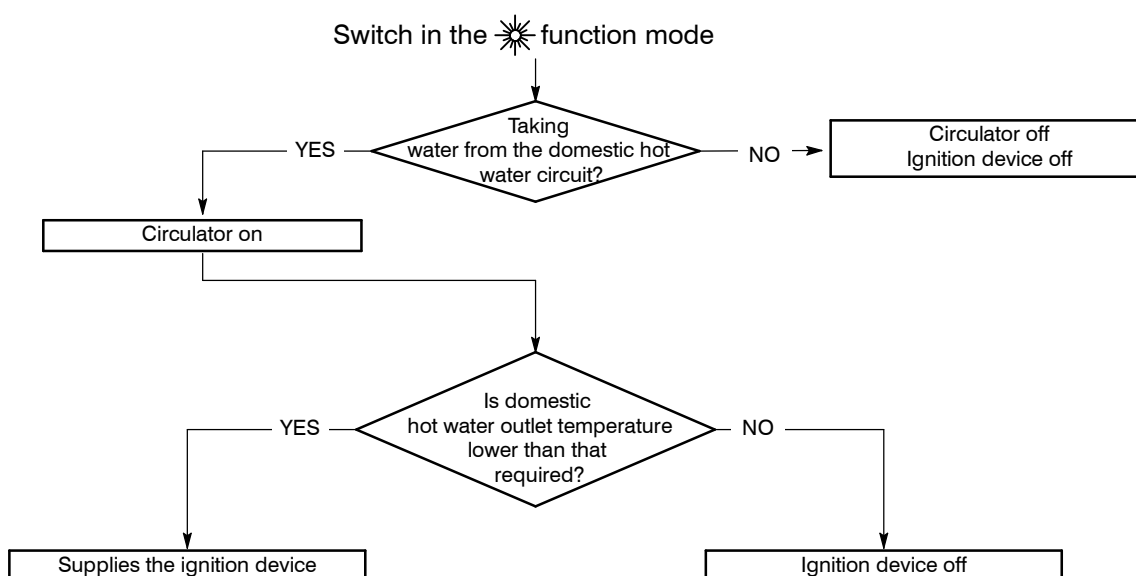


Fig. 42

## 11 Full sequence ignition device

### 11.1 Function

The Full sequence ignition device used on the boiler carries out the following fundamental functions:

- does a sequence of operations (ignition cycle) which lead to the ignition of the gas at the burner
- checks the presence of the flame during the entire period in which it is activated
- supplies the fan and checks its functioning by means of the signal coming from the air pressure switch.

The Full sequence ignition device is supplied by the electronic control p.c.b. when the ignition of the burner is requested.

The Full sequence ignition device has a **safety function** and any incorrect interventions or tampering can result in conditions of dangerous functioning of the boiler.

The Full sequence ignition device can lock the functioning of the boiler (lock state) and stop its functioning up to the resetting intervention. The lock is signalled by the lighting of the lock – out signal lamp and the device can be reset only by using the boiler reset button placed on the control panel fascia.

Some components which are connected to the device can activate the lock state. The causes of a lock state could be:

- The intervention of the safety thermostat (over-heat of the primary circuit).
- A fault on gas supply
- Faulty ignition (faulty ignition electrodes, their wiring or connection).
- Faulty flame detection (faulty detection electrode, its wiring or connection).
- Gas injectors blocked
- Faulty modulation gas valve (faulty on – off operators or not electrically supplied).
- Faulty Full sequence ignition device.

Other components like the air pressure switch can temporarily stop the ignition of the burner but allow its ignition when the cause of the intervention has stopped.

Fig. 44 shows the sequence of the operations that are carried out at the start of every ignition cycle and during normal functioning.

### 11.2 Checks

- ✓ Lock sequence

Start the boiler until the burner is ignited.

With the burner firing, interrupt the gas supply. The Full sequence ignition device must carry out a complete ignition cycle and then stop.

By turning the boiler on and off by means of the function switch the device must not unlock and the burner must not turn on.

- ✓ Fan functioning device

With the boiler operating and the burner on, open the negative pressure test point of the Venturi device. At the moment of opening the burner must turn off.

### 11.3 Removal

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Gain access to the parts located inside the control panel as explained in the section 2.3 of this manual.
- 2 Remove all the wiring connected to the Full sequence ignition device.  
To disconnect the connectors A, delicately flex the hook present on one side of each socket (Fig. 43).
- 3 Unscrew the two screws B that hold the Full sequence ignition device on the panel and remove the component.

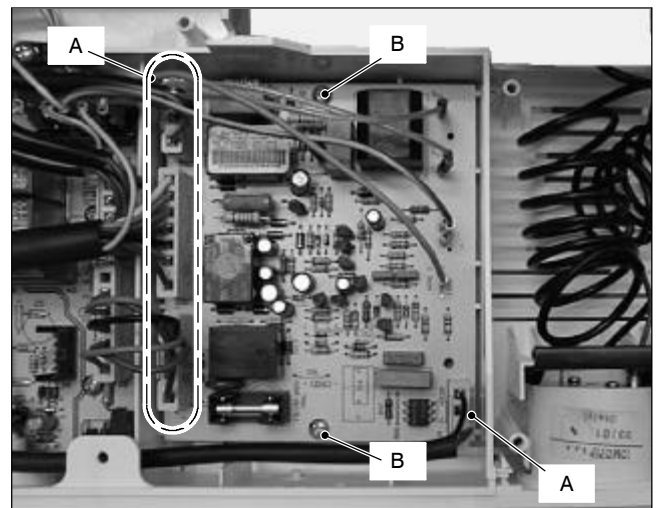


Fig. 43

- 4 Re-assemble the Full sequence ignition device following the removal procedures in the reverse order.

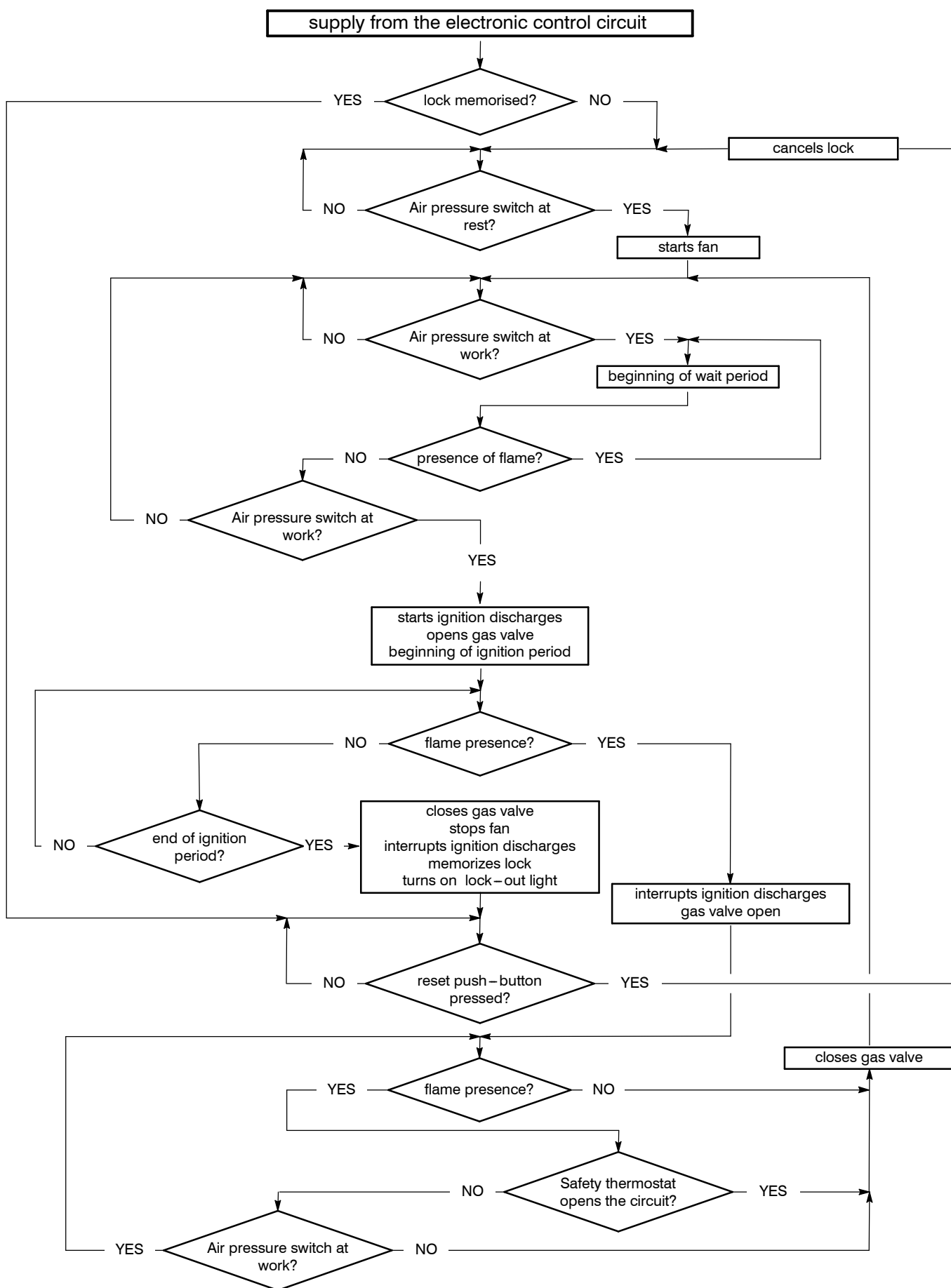
**11.4** Ignition and control sequence

Fig. 44



## 12 Modulating gas valve

### 12.1 Function

The Modulating gas valve A in Fig. 45 controls the gas inflow to the boiler burner.

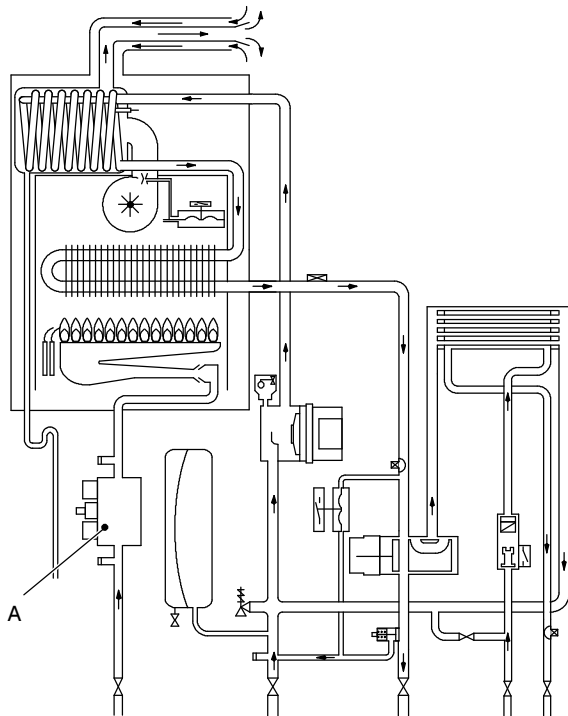


Fig. 45

By means of an electric command given to the on–off operators the passage of the gas through the Modulating gas valve can be opened or closed.

By means of an electric command given to the modulation operator the pressure can be varied and therefore the gas flow rate to the burner (modulation). The modulation operator has mechanical components which allow the adjustment of the minimum and maximum pressure exiting the valve.

### 12.2 Nomenclature of the parts (Fig. 46)

- 1 Modulation operator's electric connectors
- 2 Minimum gas pressure adjustment
- 3 On–off operators
- 4 Maximum gas pressure adjustment
- 5 On–off operators electric connector
- 6 Gas valve inlet pressure test point
- 7 Modulation operator
- 8 Gas valve outlet pressure test point

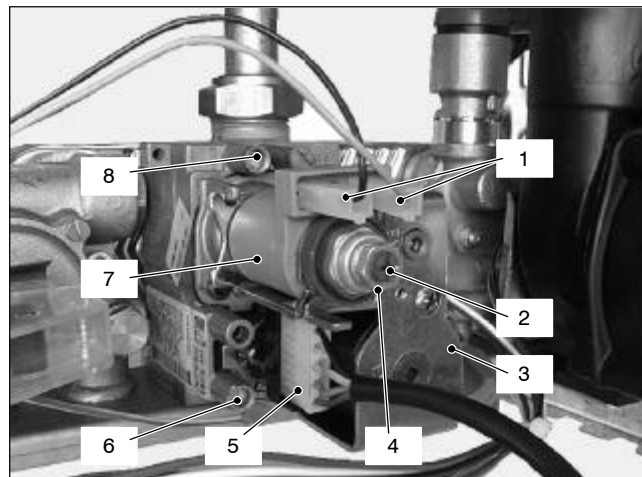


Fig. 46

### 12.3 Adjustment

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 1 Remove the front panel of the case.
- 2 Open the gas valve inlet pressure test point (6 in Fig. 46) at the valve input, connect a suitable pressure gauge and check the gas pressure of the supply network.
- 3 Remove the gauge and close the pressure test point 6.
- 4 Open the gas valve outlet pressure test point (8 in Fig. 46) and connect the gauge;
- 5 Remove the protection cap from the mechanical pressure adjustment components;
- 6 Start the boiler at its maximum power. Operate the boiler in d.h.w. mode or ensure that the boiler is not range rated if the test is carried out in c.h. mode.
- 7 Rotate the maximum gas pressure adjustment (4 in Fig. 46) until you obtain the required pressure (by rotating clockwise the pressure increases).
- 8 Disconnect one of the two connectors (1 in Fig. 46) or, alternatively, remove the service panel as explained in the section 2.3 of this manual and set the dip–switch selector 1 (see section 10.5) to the OFF position.
- 9 Rotate the minimum gas pressure adjustment (2 in Fig. 46) until you obtain the required pressure (by rotating clockwise the pressure increases).
- 10 Turn the boiler off and re–connect the wire to the modulating operator (or set the dip–switch selector 1 back to the ON position).
- 11 Start the boiler and check again the maximum gas pressure setting.
- 12 Turn the boiler off and disconnect the gauge.

**Important:** after the gas pressure checks and any adjustment operations, all of the test points must be sealed.

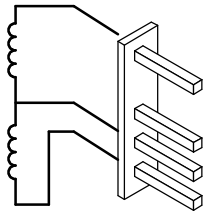
## 12.4 Checks

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- ✓ Check the modulation operator coil
  - 1 Remove the front panel of the case.
  - 2 Disconnect the connectors *B* (Fig. 49) from the modulating operator and measure the electrical resistance of the coil. Its electrical resistance value must be approx.  $80 \Omega^*$ .
- ✓ Check the on-off operators coils
  - 1 Remove the front panel of the case.
  - 2 Disconnect the electrical connector *C* (Fig. 49).
  - 3 Measure the electrical resistance between the connector pins of the on-off operators as illustrated in Fig. 47.

Upper on-off operator  
approx.  $6\ 400 \Omega^*$

Lower on-off operator  
approx.  $920 \Omega^*$



\* at ambient temperature.

Fig. 47

## 12.5 Removal of the on-off operators coils

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 1 Remove the front panel of the case as explained in the section 2.3 of this manual.
- 2 Disconnect the connector *D* (Fig. 48).
- 3 Unscrew the screw *E* and remove on-off operator coils.
- 4 Reassemble the coils carrying out the removal operations in reverse order.

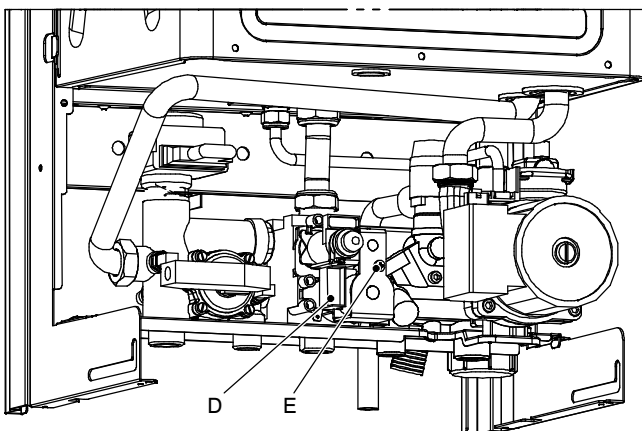


Fig. 48

## 12.6 Removal of the gas valve

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 1 Remove the front panel of the case as explained in the section 2.3 of this manual.
- 2 Disconnect the connectors *B* and *C* (Fig. 49).
- 3 Turn off the gas supply and disconnect the gas isolation cock connector from the inlet port of the gas valve.
- 4 Unscrew the connectors *F* and remove the pipe *G*.
- 5 Unscrew the screws *H* and remove the valve.
- 6 Reassemble the valve carrying out the removal operations in reverse order.

**After any service operation on the components of the gas circuit check all the connections for gas leaks.**



**Warning:** After cleaning or replacement as detailed above, if it deemed necessary to undertake a combustion analysis, refer to the appropriate chapter *Maintenance* of the installation instructions manual.

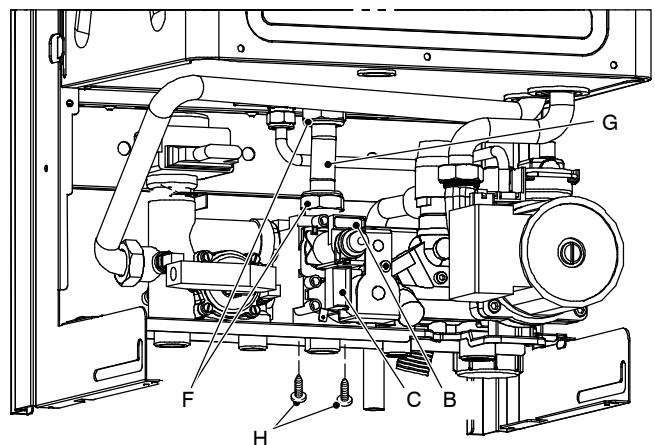


Fig. 49

## 13 Primary circuit flow switch

### 13.1 Function

The Primary circuit flow switch (A in Fig. 50) function is to detect water flowrate through the primary hydraulic circuit of the boiler.

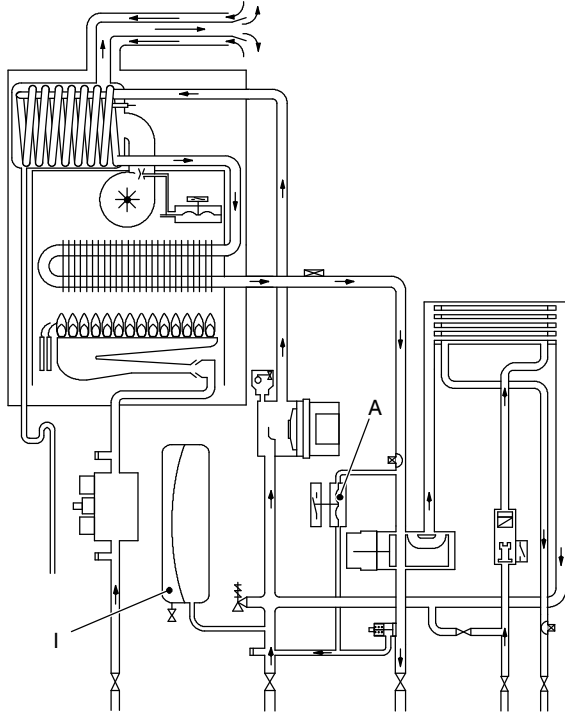


Fig. 50

This hydraulic/membrane operated electrical micro-switch device will control the functioning of the ignition control circuit, providing there is an adequate quantity and flow of water in the primary circuit. Any failure of the pump or obstructions in the primary circuit, whilst in either c.h. or d.h.w. modes, will not allow the device to operate.

This device is connected to the electronic control p.c.b. and if, after the pump operates, it does not activate within 20 seconds the control board will indicate that a fault condition (see section 10.4 of this manual) has occurred.

### 13.2 Checks

**Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

#### ✓ Mechanical function

- 1 Remove the front panel of the case.
- 2 Start and stop the boiler either in d.h.w. or c.h. mode.
- 3 Looking through the switch box verify the position of the shaft B referring to Fig. 51.

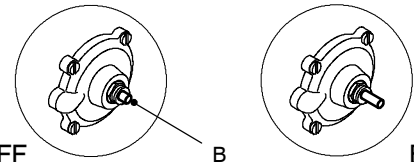


Fig. 51

#### ✓ Electrical check

It is possible to verify the general operation of the switch by measuring the electric resistance between the contacts C. and N.O. of the switch.

- 1 Remove the switch as explained in section 13.3.
- 2 Measure the electrical resistance between the tabs marked C. and N.O. (Fig. 52). The contact must be normally open.
- 3 Operate the switch by hand and verify that the contact is now closed.

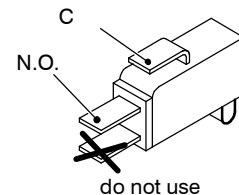


Fig. 52

### 13.3 Removal

**Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

#### ✓ Removal of the switch

- 1 Remove the front panel of the case.
- 2 Remove the fork C (Fig. 53).
- 3 Open the box and disconnect the switch.
- 4 Re-assemble the parts in reverse order of removal. Refer to Fig. 52 for the correct wiring connectors on the switch

#### ✓ Removal of the membrane

- 1 Remove the front and right hand side panels of the case, turn off the flow and return isolation valves and empty the primary circuit.
- 2 Remove the fork C that holds the micro-switch housing D (Fig. 53).

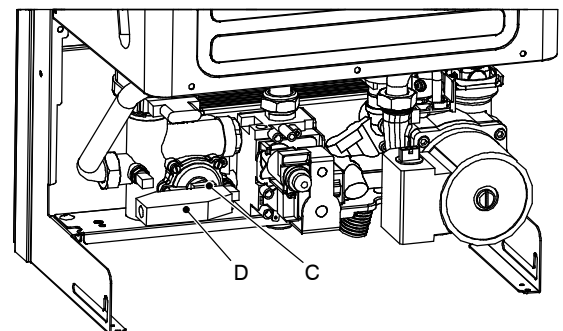


Fig. 53

- 3 Unscrew the four screws E (see Fig. 54) open the hydraulic operator and remove the membrane F.

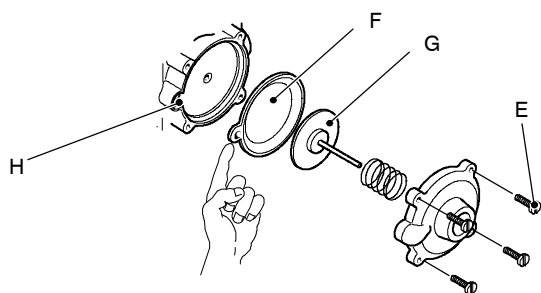


Fig. 54

- 4 Reassemble the parts in reverse order of removal.

**When assembling the membrane, ensure that its concave side faces towards the actuator plate G and the reference indicated aligns with the seat H (see Fig. 54).**

## 14 Expansion vessel and temperature–pressure gauge

### 14.1 Function

The Expansion vessel (I in Fig. 50) function is to allow for the volume expansion of the c.h. circuit water due to the temperature rise.

### 14.2 Checks

- 1 Turn off the flow and return isolation valves and empty the primary circuit of the boiler.
- 2 Remove the protective cap J (Fig. 55) from the valve on the top of the expansion vessel and connect a suitable air pressure gauge.

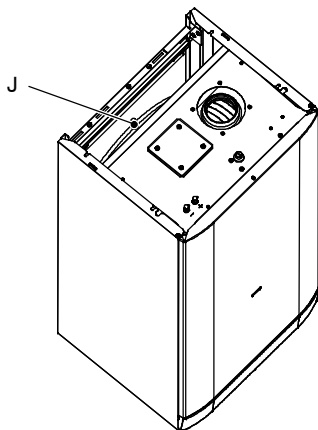


Fig. 55

- 3 Check the pre-load pressure and refer to the section *Expansion vessel* in the *User manual and installation instructions* for the correct value.

### 14.3 Removal of the expansion vessel

If there is at least 400 mm clearance above the boiler and the rear exit flue can be easily removed, the expansion vessel can be changed without removing the boiler.

**Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove the front and left hand side panels of the case, turn off the flow and return isolation valves and empty the primary circuit.
- 2 Completely unscrew the connection K, the lock-nut L (Fig. 56) and remove the expansion vessel from the top of the boiler.

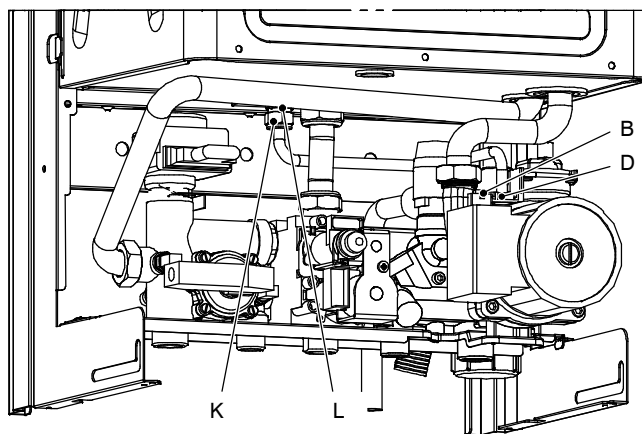


Fig. 56

- 3 Re-assemble the parts in reverse order of removal.

### 14.4 Removal of the temperature–pressure gauge

- 1 Remove the front and right hand side panels of the case, turn off the flow and return isolation valves and empty the primary circuit.
- 2 Remove the fork M and the probe holder spring N (Fig. 57).
- 3 Squeeze the tabs O to release the temperature–pressure gauge P and remove it.
- 4 Re-assemble the parts in reverse order of removal.

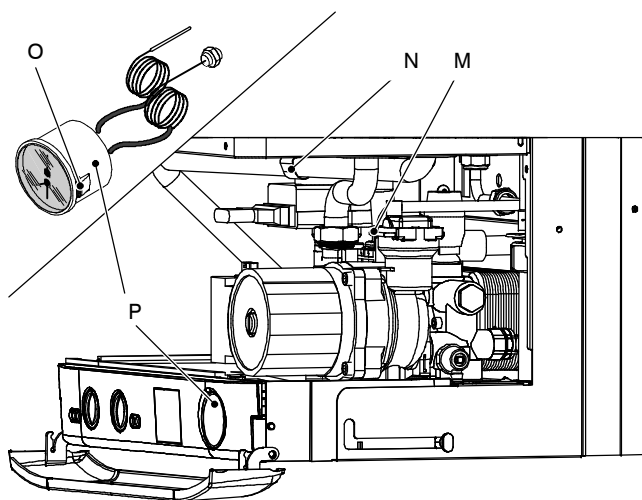


Fig. 57

## 15 D.h.w. flow switch, filter and flow limiter

### 15.1 Function

The d.h.w. flow switch *A* in Fig. 58 is a device that generates an electrical signal when hot water is drawn.

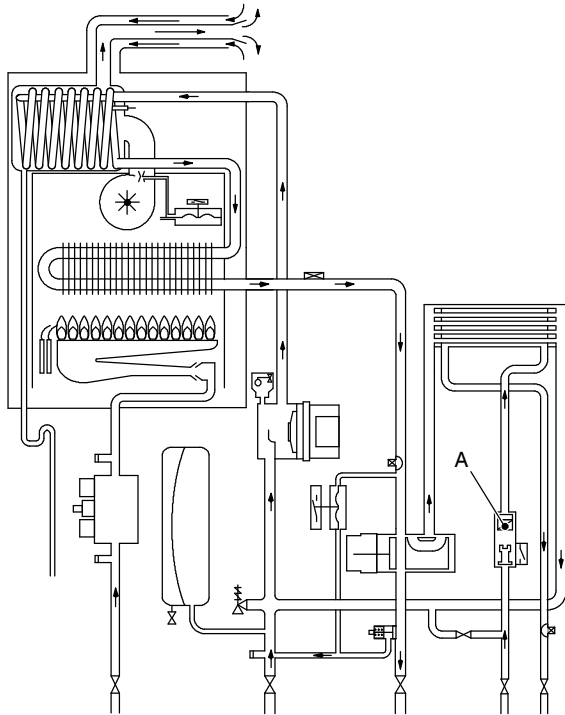


Fig. 58

When the flow rate through the d.h.w. circuit reaches about 2,5 litres/min', the float 4 (Fig. 60) is drawn towards the right. The resulting magnetic field of ring 3 increases and reaches the flow switch sensor 1. The sensor generates an electrical signal that switches the boiler d.h.w. operation ON.

The state of the sensor is also indicated by means of the lamp *B* placed on the sensor body.

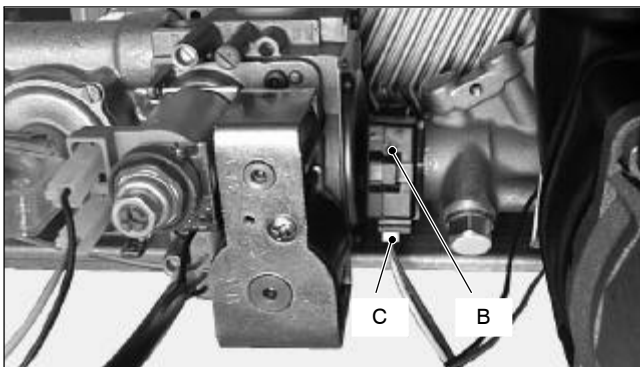


Fig. 59

### 15.2 Nomenclature and location of parts (Fig. 60)

- 1 Flow switch sensor
- 2 Plug
- 3 Magnetic ring
- 4 Float
- 5 Spring
- 6 Filter
- 7 Body
- 8 Spring seat
- 9 Flow limiter (M96.28SM/... optional accessory)
- 10 Threaded ring

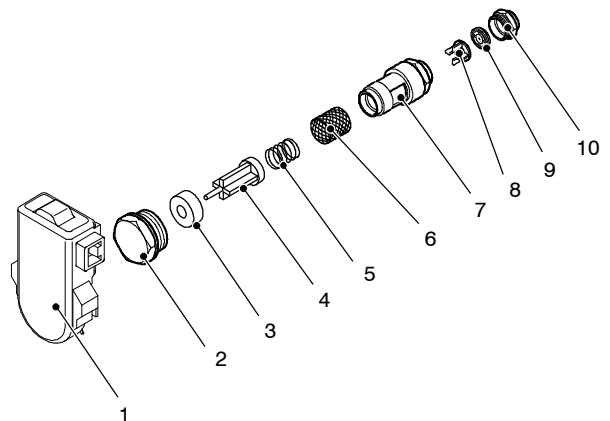


Fig. 60

### 15.3 Checks

**Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

✓ Flow switch sensor operation

- 1 Remove the front panel of the case.
- 2 Switch on the boiler and open a d.h.w. tap. The lamp *B* (Fig. 59) placed on the sensor body is switched on when the flow rate reaches about 2,5 litres/min'.

### 15.4 Removal of the flow switch sensor

**Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove the front panel of the case.
- 2 Disconnect the connector *C* (Fig. 59) and remove the sensor by pulling it towards the front of the boiler (the sensor is held in place by means of a spring).

### 15.5 Removal of the flow switch group and d.h.w. circuit filter

**Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove the front panel of the case and empty the d.h.w. circuit.

- 2 Remove the flow switch sensor (see section 15.4).
- 3 Remove the gas valve (see section 12.6).
- 4 Unscrew the plug 2 (Fig. 60) and extract the flow switch group.
- 5 To remove the filter from the flow switch group separate the body 7 from the plug 2 (Fig. 60) by unscrewing it.
- 6 Reassemble the parts following the removing sequence in reverse order.

**Attention: the ring 3 (Fig. 60) has a magnetic polarity and must be correctly coupled with the spindle of the float 4.**

To determine the correct orientation of the ring proceed as follows:

- 1 Set the function selector of the boiler in stand – by mode (Fig. 61).

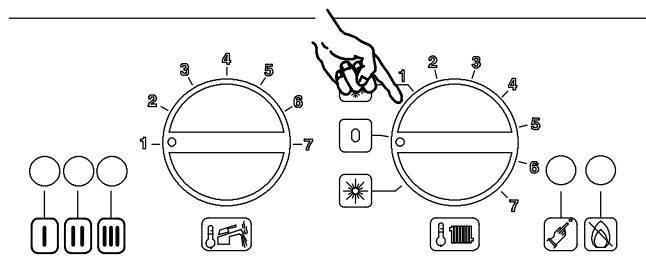


Fig. 61

- 2 Restore the mains electricity supply to the boiler. **Warning – ensure that all the electric parts and wirings are dry and do not touch other not mentioned electric parts during the following operations.**
- 3 Hold the flow switch sensor 1 and bring the ring in touch with the sensor as illustrated in Fig. 62.
- 4 Observe the lamp B placed on the sensor body that should light. If not reverse the ring and repeat the previous operation.

- 5 Fit the ring on the spindle of the float in the way that lights the lamp B.
- 6 Isolate the boiler from the mains electricity supply and reassemble the parts following the removing sequence in reverse order.

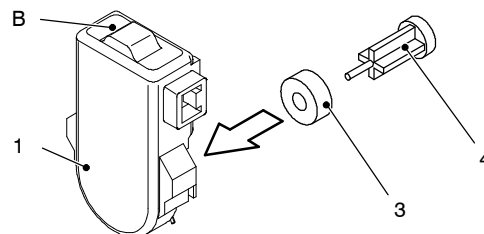


Fig. 62

## 15.6 Flow limiter

The M96.24SM/... model is factory fitted with a 10 litre/min. flow limiter.

If on the M96.28SM/... model the flow rate of the d.h.w. circuit is too high, it is possible to limit it by installing a flow limiter. The following sizes are available:

Nominal flow rate (litres/min)	Colour
10	Yellow
12	Brown

To install the flow limiter:

- 1 Remove the flow switch group as explained in the section 15.5.
- 2 Unscrew the threaded ring 10 (Fig. 60) and remove it from the body 7.
- 3 Install the flow limiter 9 putting its smaller diameter side towards the threaded ring.
- 4 Reassemble the group following the above sequence in reverse order.

## 16 Temperature probe

### 16.1 Function

The Temperature probe has the function of converting the temperature of the water in the hydraulic circuit where it is installed into an electrical signal (resistance). The relation between temperature and electrical resistance is stated in Fig. 63.

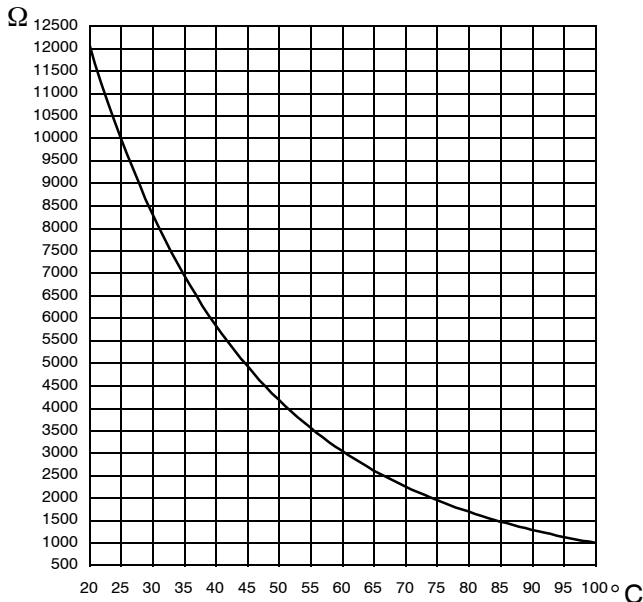


Fig. 63

On the boiler there are two Temperature probes. One on the output of the primary heat exchanger (c.h. Temperature probe) A in Fig. 64 and Fig. 65; one on the output of the d.h.w. heat exchanger (d.h.w. Temperature probe) B in Fig. 64 and Fig. 65.

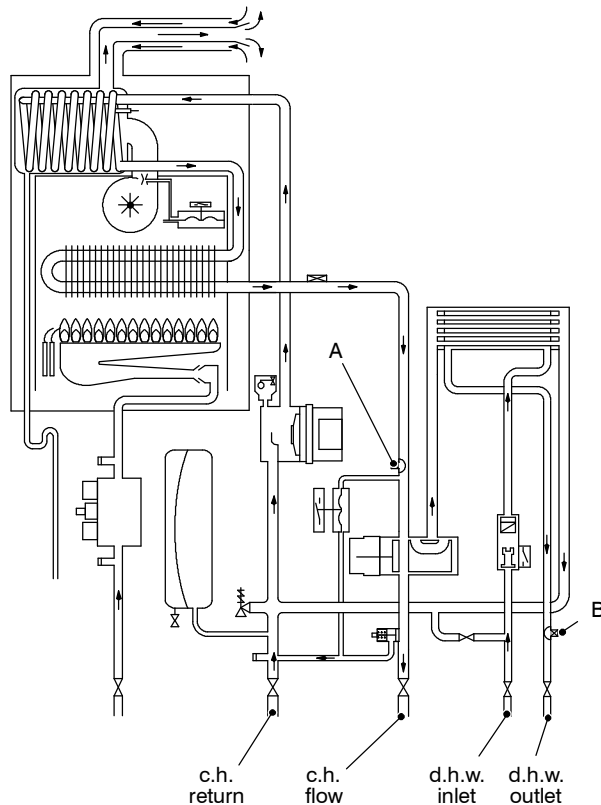


Fig. 64

### 16.2 Checks

✓ Temperature – resistance relationship

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

Disconnect the cable from the Temperature probe.

Measure the temperature of the brass group where the Temperature probe is located and check the electrical resistance according to the graph in Fig. 63.

### 16.3 Removal

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 To remove the Temperature probes remove the front panel of the case.
- 2 To remove the c.h. Temperature probe empty the primary circuit of the boiler.  
To remove the d.h.w. Temperature probe empty the d.h.w. circuit of the boiler.
- 3 Remove the electric connector of the Temperature probe and unscrew it.
- 4 Reassemble the Temperature probe carrying out the removal operations in reverse order.

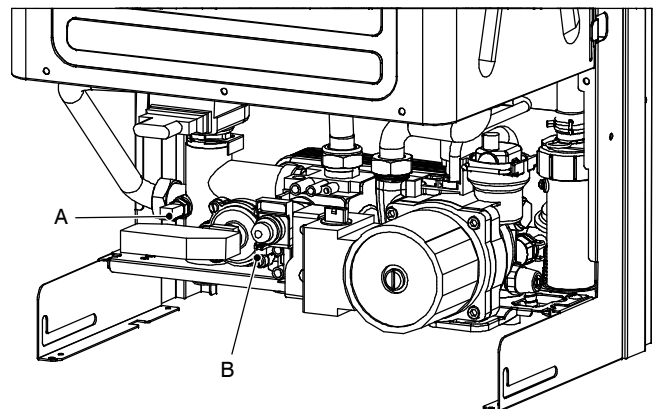


Fig. 65

## 17 By-pass valve

### 17.1 Function

The By-pass valve A in Fig. 66 is located between the c.h. water flow and return and its function is that of guaranteeing a minimum flow across the primary heat exchanger if the circulation across the c.h. system is completely closed.

The By-pass valve is fitted on the rear side of the diverter group.

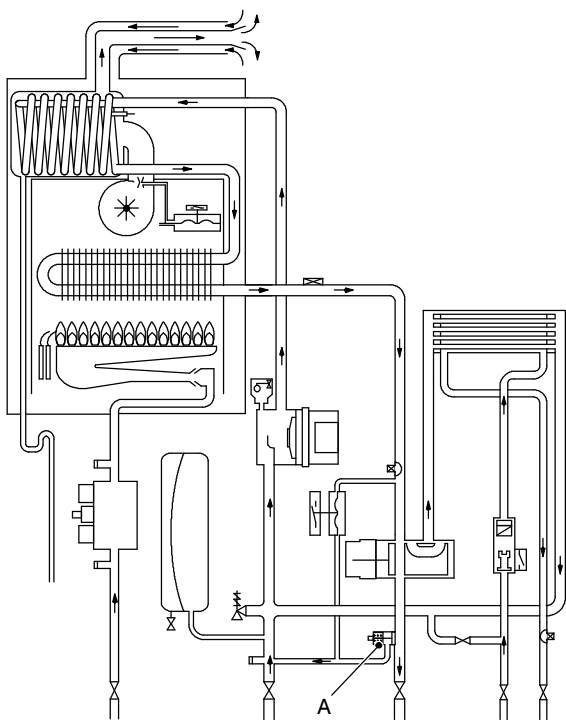


Fig. 66

### 17.2 Removal

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 1 Remove all the case panels.
- 2 Empty the primary circuit of the boiler.
- 3 Remove the diverter group as described in the section 9.4 of this manual.
- 4 Unscrew the connector B and remove the by-pass valve C (Fig. 67).

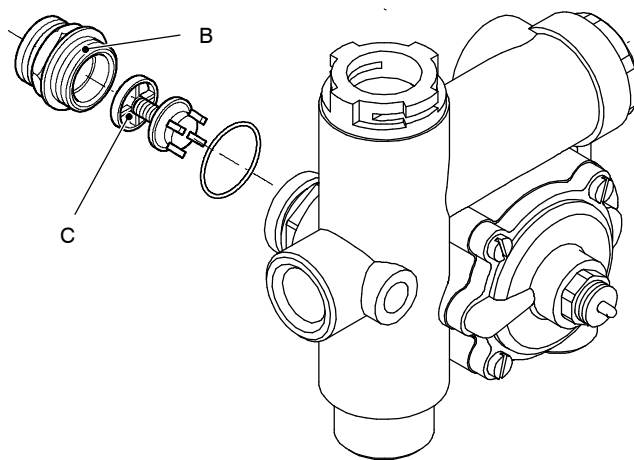


Fig. 67

- 5 Reassemble the by-pass valve as illustrated in Fig. 67 reversing the order of removal.



## 18 Fan, venturi device and Air pressure switch

### 18.1 Function

The function of the Fan A (Fig. 68 and Fig. 69) is to force the products of combustion through the condensing heat exchanger to the outside air via the flue system.

The Fan is supplied by the full sequence ignition device at the beginning of the ignition cycle.

Its correct functioning is controlled by means of a system incorporating a built in venturi device (B in Fig. 74) and an Air pressure switch C (Fig. 68 and Fig. 69).

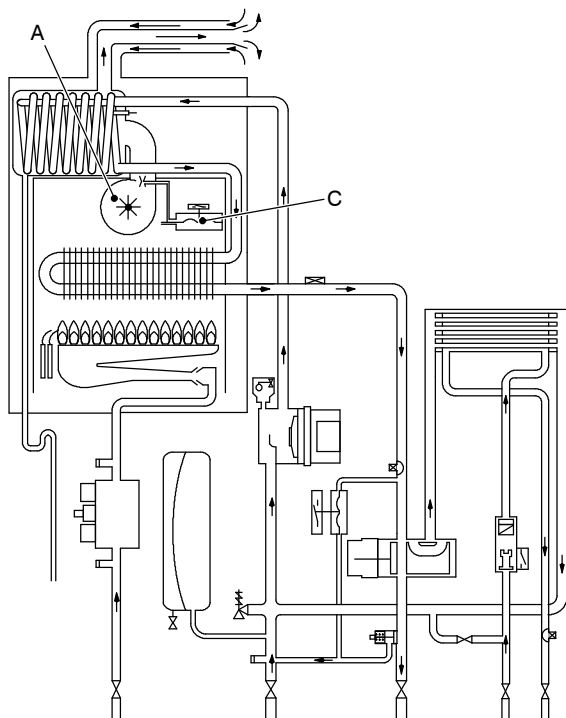


Fig. 68

### 18.2 Checks

✓ Check of the fan

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove all the case panels and the sealed chamber lid.
- 2 Disconnect the connectors D (Fig. 69) and measure the electrical resistance of the motor that has to be about:  
43  $\Omega$  – M96.24SM/...  
25  $\Omega$  – M96.28SM/... M96.28SR/...  
(at ambient temperature).

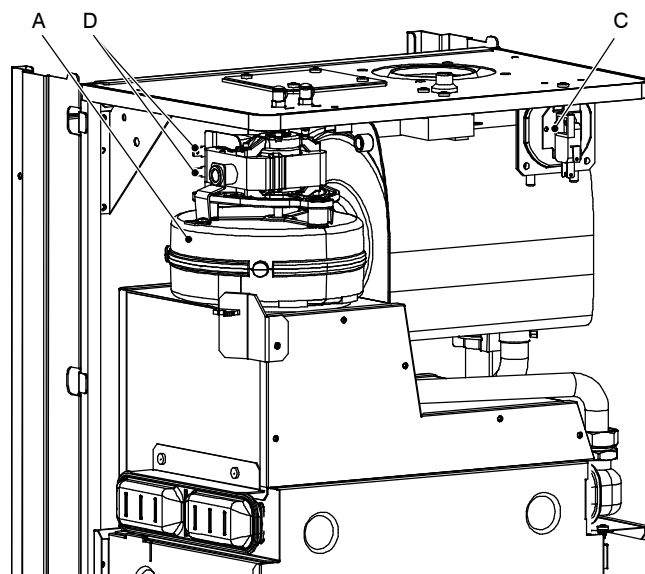


Fig. 69

✓ Check of the Air pressure switch operation

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove all the case panels and the sealed chamber lid.
- 2 Disconnect the wires and check the electrical resistance between the connections of the Air pressure switch.  
Refer to the Fig. 70a or b in accordance with the type of air pressure switch used.

**Between COM or 3 and N.O. or 2 the contact must be open.**

**Between COM or 3 and N.C. or 1 the contact must be closed (electrical resistance zero).**

- 3 Connect the black wire (COM or 3) and the brown wire (N.C. or 1).
- 4 Run the boiler (the Fan must run) and check the the electric resistance between COM or 3 and N.O. or 2. Between COM or 3 and N.O. or "2 the contact must be closed (electrical resistance zero).

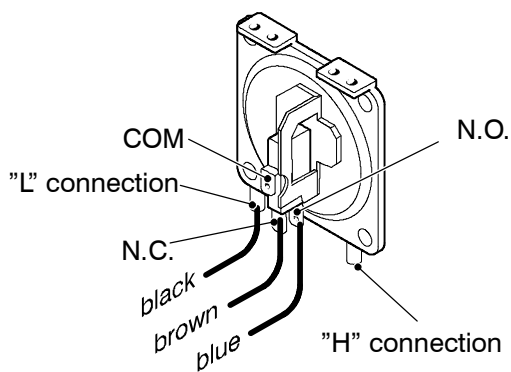


Fig. 70a

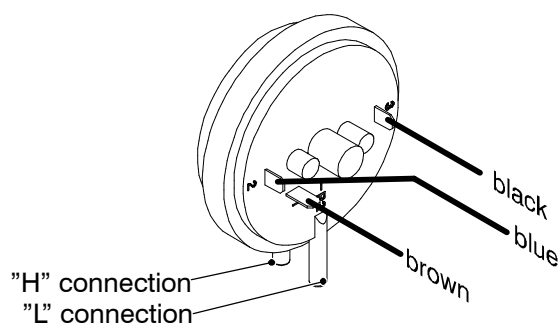


Fig. 70b

#### ✓ Check of the venturi device

**This test must be carried out with the sealed chamber closed**

- 1 Remove the caps of the pressure test points located on the top of the boiler and connect a differential pressure gauge (Fig. 71).
- 2 Switch on the boiler.

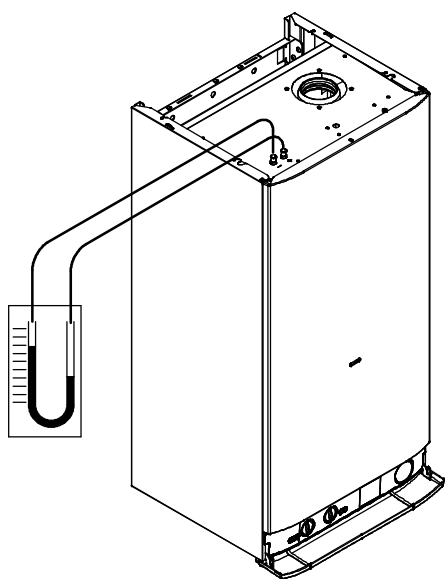


Fig. 71

- 3 Compare the value on the gauge with the following minimum values:  
80 Pa (0,8 mbar) – M96.24SM/...  
110 Pa (1,1 mbar) – M96.28SM/... M96.28SR/...

## 18.3 Removal of the Fan

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 1 Remove all the case panels, the sealed chamber lid and the combustion chamber lid.
- 2 Disconnect the connectors *D* and the earth connection *E* (Fig. 69).
- 3 Disconnect the pipe which connect the venturi device to the Air pressure switch.
- 4 Unscrew the screw *F* and remove the bracket *G* (Fig. 72).

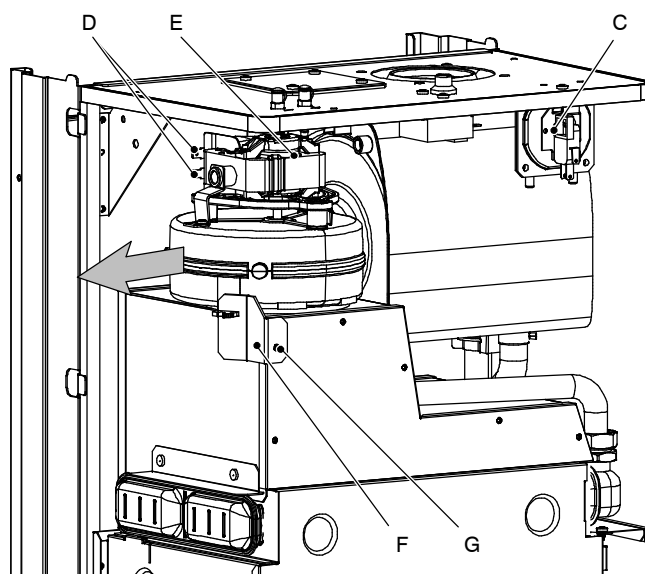


Fig. 72

- 5 Remove the Fan by sliding it towards left (se the arrow in Fig. 72).
- 6 Assemble the fan carrying out the removal operations in reverse sequence.

**Warning:** Re-assembling the fan ensure that the hooks around the inlet port of the fan hung correctly on the flue hood.

**Warning:** to correctly connect the venturi device to the Air pressure switch, refer to Fig. 73.

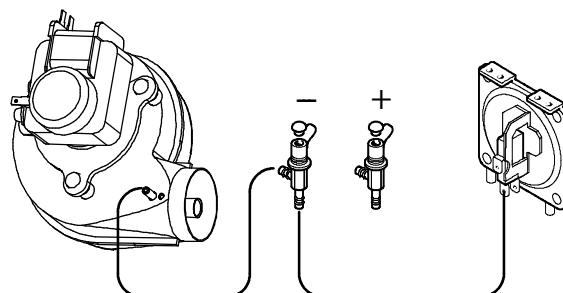


Fig. 73

**Warning:** After cleaning or replacement as detailed above, if it deemed necessary to undertake a combustion analysis, refer to the appropriate chapter *Maintenance* of the installation instructions manual.

**18.4** Inspection and removal of the venturi device

⚡ **Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 1 Remove the fan (section 18.3).
- 2 Remove the venturi device by unscrewing the screw *H*.
- 3 Inspect the venturi device *B* and the connection pipe *I*. Ensure they are clean.
- 4 Re-assemble the parts in reverse order of removal.

⚠ **Warning:** After cleaning or replacement as detailed above, if it deemed necessary to undertake a combustion analysis, refer to the appropriate chapter *Maintenance* of the installation instructions manual.

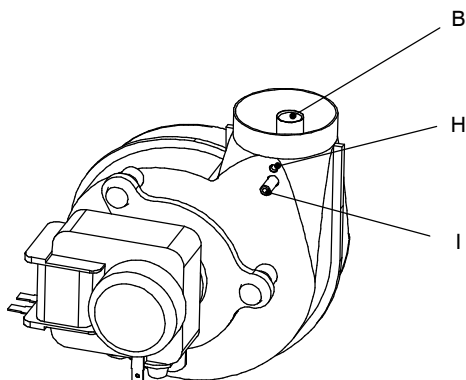


Fig. 74

**18.5** Removal of the Air pressure switch

⚡ **Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 1 Remove all the case panels and the sealed chamber lid.
- 2 Disconnect the wires from the Air pressure switch.
- 3 Remove the pipe from the Air pressure switch.
- 4 Unscrew the screws which hold the Air pressure switch to the frame.
- 5 Assemble the Air pressure switch carrying out the removal operations in reverse sequence.

**Warning:** to correctly connect the Air pressure switch, refer to Fig. 73 and Fig. 70a or Fig. 70b for the correct wiring.

⚠ **Warning:** After cleaning or replacement as detailed above, if it deemed necessary to undertake a combustion analysis, refer to the appropriate chapter *Maintenance* of the installation instructions manual.

## 19 Ignition and detection electrodes

### 19.1 Function

Three electrodes are fitted on the burner. Two of them are the ignition electrodes and are fitted near the front part of the burner. The ignition sparks take place between their metallic edges over the central ramp of the burner during the ignition sequence.

The third electrode is the detection electrode and it detects the presence of the flame.

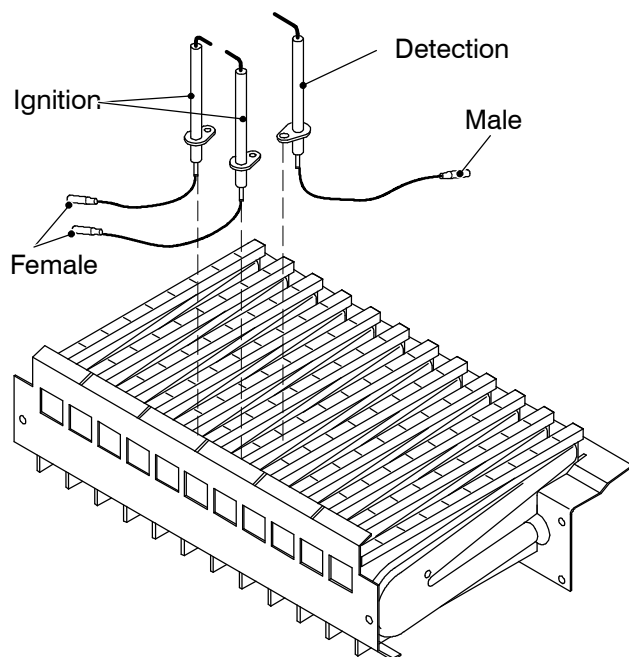


Fig. 75

### 19.2 Checks

✓ Check the position of the electrode edges

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove all the case panels, the sealed chamber lid and the combustion chamber lid.
- 2 Check for the correct distance between the metallic edges of the ignition electrodes (see Fig. 76).

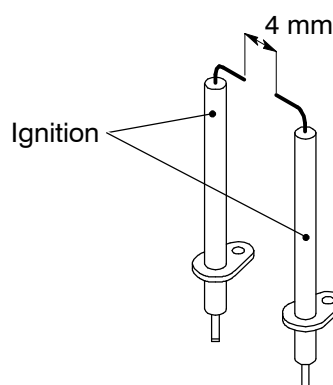


Fig. 76

- 3 Check the integrity of the detection electrode and ensure that its metallic edge is correctly placed over the ramp of the burner.

✓ Check the connection wires.

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove all the case panels, the sealed chamber lid and the combustion chamber lid.
- 2 Check for the integrity of the insulation of wires which connect the electrodes to the ignition device.

### 19.3 Removal

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove all the case panels, the sealed chamber lid and the combustion chamber lid.
- 2 Disconnect the electrode wires from the full sequence ignition device.
- 3 Remove the plate C (see Fig. 79 on page 39).
- 4 Remove the burner by unscrewing the four screws placed at the right and left sides of the burner.
- 5 Unscrew the screws A (Fig. 77) which hold the electrodes to the burner.

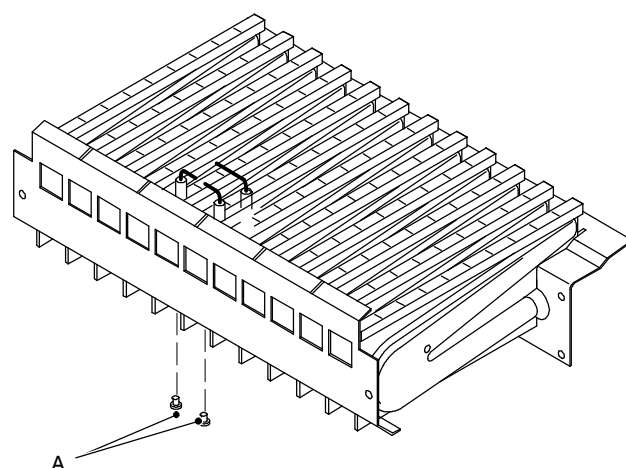


Fig. 77

- 6 Extract the electrodes from the burner.
- 7 Assemble the electrodes carrying out the removal operation in reverse order. Refer to Fig. 75 in order to recognise the electrodes and to correctly connect the wiring.

**Note: the metallic edge of the detection electrode is longer than the one of the ignition electrodes.**

⚠ **Warning: After cleaning or replacement as detailed above, if it deemed necessary to undertake a combustion analysis, refer to the appropriate chapter *Maintenance* of the installation instructions manual.**

## 20 Safety thermostat

### 20.1 Function

The safety thermostat *A* in Fig. 78 and Fig. 79 is a device that senses the temperature of the primary circuit water which flows in the outlet pipe of the primary heat exchanger.

If the temperature control system of the boiler fails and the temperature of the primary circuit reaches a dangerous temperature, the safety thermostat opens the electric circuit that supplies the on – off operators of the gas valve.

Consequently, the full sequence ignition device attempts to light the burner and, at the end, locks the boiler and lights the lock – out signal lamp.

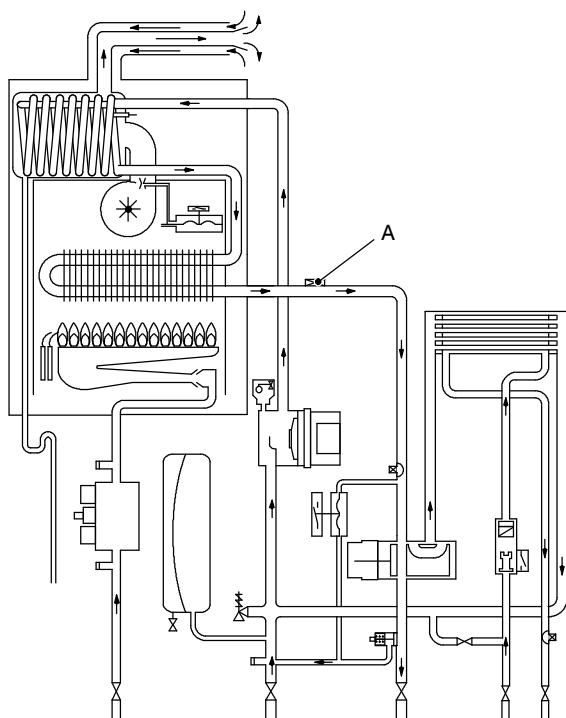


Fig. 78

### 20.2 Checks

#### ✓ Overheat temperature value

- 1 Set the temperature control knobs to their max. position and run the boiler in d.h.w. and c.h.
- 2 Allow the boiler to reach its maximum operating temperature (monitor the temperature gauge on the instrument panel). The boiler should maintain a temperature below that of the safety thermostat and no overheat intervention should occur.

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

#### ✓ Electrical function

- 1 Remove all the case panels and the lid of the sealed chamber.
- 2 Remove the screws *B* and the plate *C* (Fig. 79).
- 3 Disconnect the safety thermostat and check its electrical function. Normally (no intervention) the

contact must be closed (electrical resistance zero  $\Omega$ ).

### 20.3 Removal

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove all the case panels and the lid of the sealed chamber.
- 2 Remove the screw *B* and the plate *C* (Fig. 79).

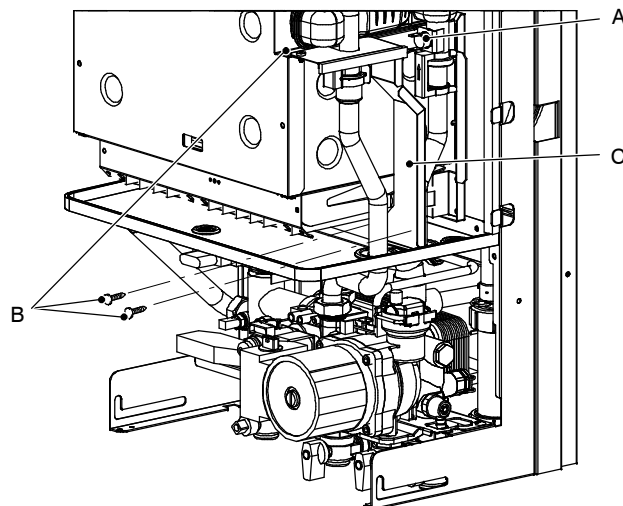


Fig. 79

- 3 Disconnect the wiring *D* (detail in Fig. 80).
- 4 Remove the spring *E* which holds the overheat thermostat on the pipe of the primary heat exchanger and remove it.

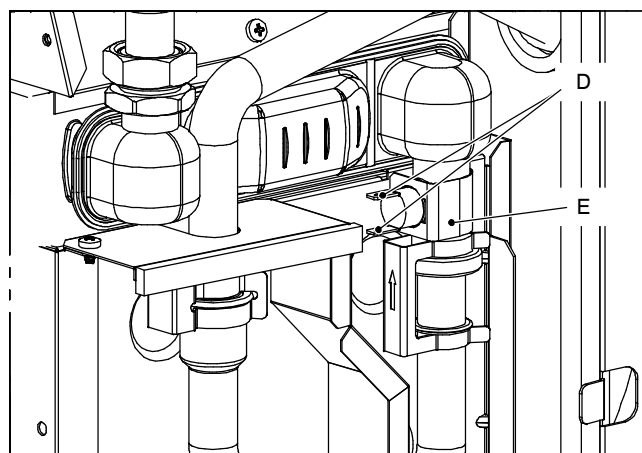


Fig. 80

- 5 Reassemble the overheat thermostat carrying out the operations in reverse order.
- 6 Apply an adequate quantity of heat conducting compound between the pipe and the thermostat.

⚠ **Warning: After cleaning or replacement as detailed above, if it deemed necessary to undertake a combustion analysis, refer to the appropriate chapter *Maintenance of the installation instructions manual*.**

## 21 Flue thermostat

### 21.1 Function

The Flue thermostat A in Fig. 81 and Fig. 82 senses the temperature of the combustion products that flow through the condensing heat exchanger.

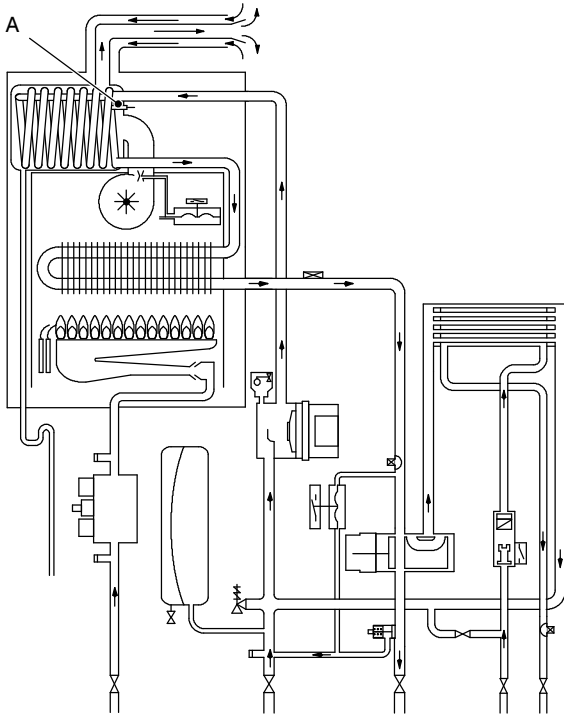


Fig. 81

In the case that the temperature of the combustion products reaches a potentially dangerous value, it stops the boiler operation. It is therefore allowed the use of plastic materials for the flue outlet pipes and bends\*

**The use of kits different from the original isn't however allowed, since the flue pipes are integral parts of the boiler.**

If the temperature of the combustion products circuit reaches the limit temperature, the Flue thermostat opens the electric circuit that supplies the on-off operators of the gas valve.

Consequently, the full sequence ignition device attempts to light the burner and, at the end, locks the boiler and lights the lock-out signal lamp.

The Flue thermostat is a push-button reset type. This allows to recognise if the lock-out has been due to its intervention or to another different cause (flame failure, main circuit overheating etc.).

The reset push-button is located on the top of the boiler under a protective cap B in Fig. 82 and can be reached by unscrewing the cap.

**The intervention of the Flue thermostat may be caused by a defective operation of the device but more probably is due to a poor heat exchange and therefore to a low efficiency of the boiler. In this case the cleanliness of main and condensing heat exchangers is recommended.**

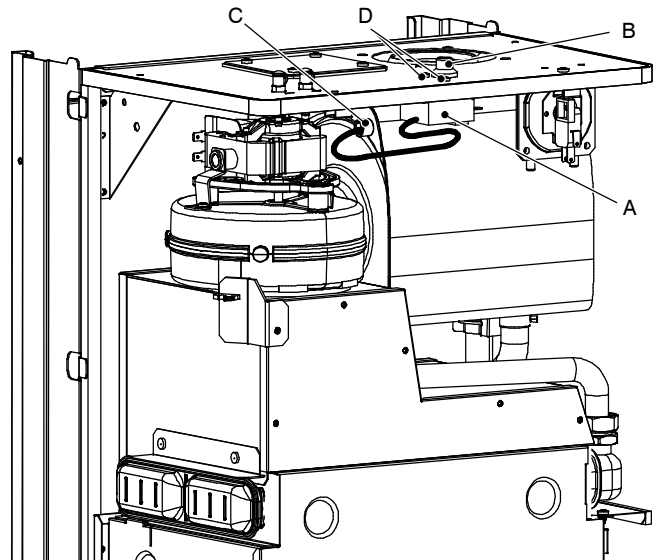


Fig. 82

### 21.2 Checks

- ✓ Overheat temperature value
- 1 Set the temperature control knobs to their max. position and run the boiler in d.h.w. and c.h.
- 2 Allow the boiler to reach its maximum operating temperature (monitor the temperature gauge on the instrument panel). The boiler should maintain a temperature below that of the Flue thermostat and no overheat intervention should occur.

### 21.3 Removal

⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**

- 1 Remove all the case panels and the sealed chamber lid.
- 2 Disconnect the wires from the Flue thermostat.
- 3 Unscrew and remove the thermostat probe C (Fig. 82) from the condensing heat exchanger.
- 4 Unscrew the screws D which hold the Flue thermostat to the frame.
- 5 Assemble the Flue thermostat carrying out the removal operations in reverse sequence.

**Warning: to correctly connect the Flue thermostat, refer to Fig. 83 and Fig. 70a or Fig. 70b for the correct wiring.**

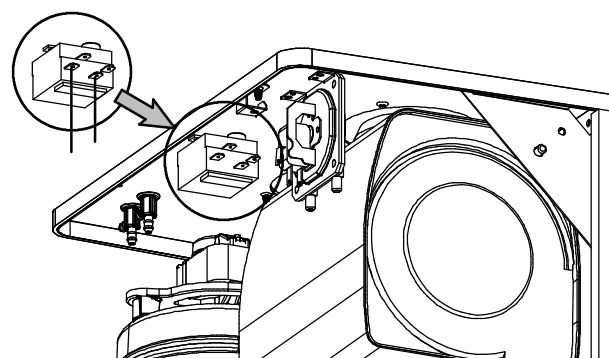


Fig. 83

## 22 Condensate trap

### 22.1 Function

The condensate trap *A* in Fig. 84 and Fig. 86 allows the discharge of the condensate via the condensate drain pipe avoiding in the mean time the escape of combustion products.

A plastic ball closes the trap outlet in case that the trap is empty.

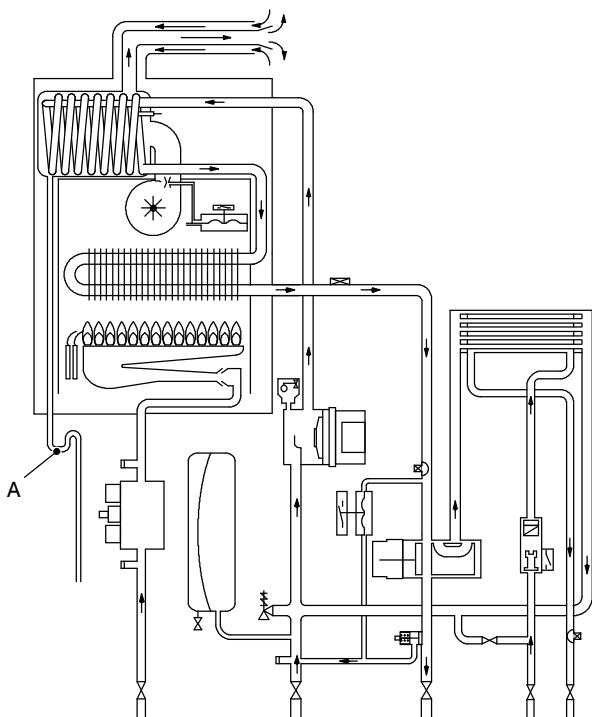


Fig. 84

The condensate trap is provided with two electrodes. The electrode *B* is connected to the ground circuit; the electrode *C* is connected to the flame detecting electrode (Fig. 85).

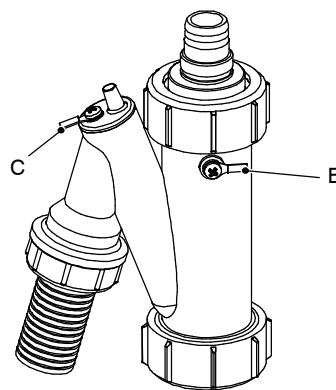


Fig. 85

If the drain pipe is plugged or in any case in which the condensate isn't correctly evacuated, the condensate level in the trap rises putting in contact the electrodes thus causing the boiler lock-out.

### 22.2 Removal

**Warning:** isolate the boiler from the mains electricity supply before removing any covering or component.

- 6 Remove the front and right case panels.
- 7 Disconnect the trap from the draining pipe.
- 8 Using pliers, remove the spring *D* moving it upwards.
- 9 Remove the spring *E* and lower the trap.
- 10 Disconnect the wirings from the trap.
- 11 Reassemble carrying out the removal operations in reverse order.

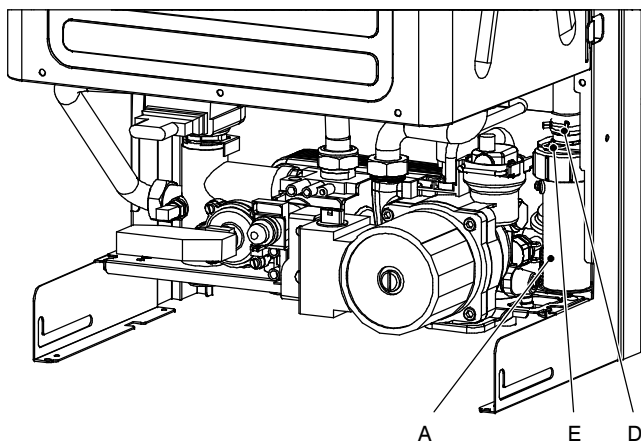
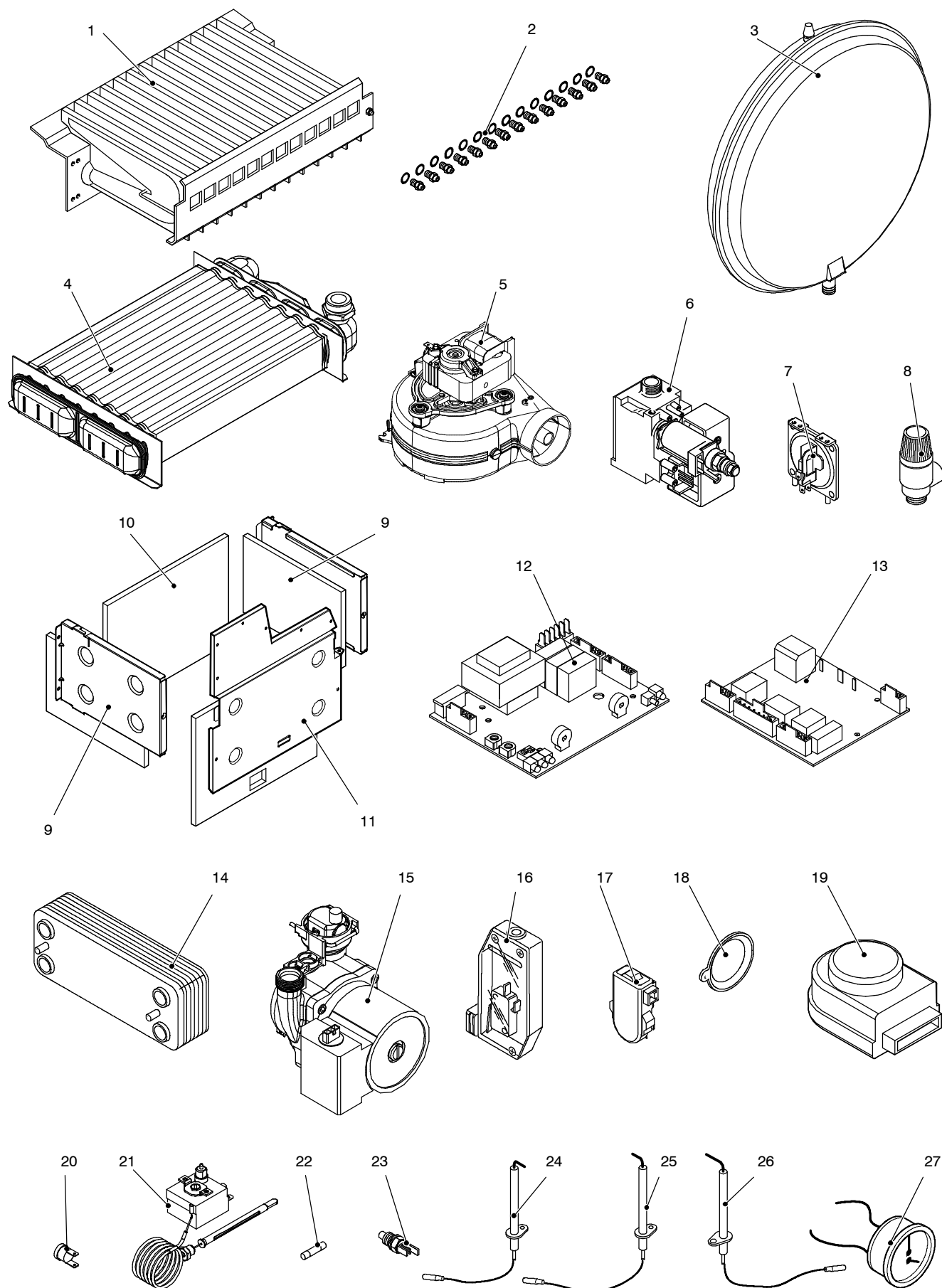


Fig. 86

## 23 Short spare parts list

Key	G.C. part no.	Description	Q.ty	Manufac- turer part no.	Manufacturer's reference
1	173 – 148	Burner (mod. M96.24SM/...,)	1	KI1004 102	Polidoro
	173 – 149	Burner (mod. M96.28SM/...,)	1	KI1004 147	
2	169 – 069	Injectors for natural gas (mod. M96.24SM/..., )	12	KI1064 505	Polidoro
		Injectors for natural gas (mod. M96.28SM/... M96.28SR/...)	14		
	E01 – 156	Injectors for LPG (mod. M96.24SM/...)	12	BI1003 509	
		Injectors for LPG (mod. M96.28SM/... M96.28SR/...)	14		
3	E83 – 121	Expansion vessel	1	BI1172 103	CIMM 6 litres
4		Main heat exchanger (mod. M96.24SM/...)	1	BI1262 101	
		Main heat exchanger (mod. M96.28SM/... M96.28SR/...)	1	BI1262 102	
5		Fan (mod. M96.24SM/...)	1	BI1406 100	
		Fan (mod. M96.28SM/... M96.28SR/...)	1	BI1406 101	
6	E83 – 129	Gas valve	1	BI1193 105	SIT 845 Sigma
7	169 127	Air pressure switch 0,88 – 0,74 mbar (mod. M96.24SM/...)	1	KI1267 103	Yamatake – Honeywell C6065 SIT 380 (alternative)
		Air pressure switch 1,38 – 1,25 mbar (mod. M96.28SM/..., M96.28SR/...)	1	BI1376 104	Yamatake – Honeywell C6065 SIT 380 (alternative)
8	E83 – 013	Safety valve	1	BI1131 100	Watts Orkly (alternative)
9	E83 – 178	Combustion chamber side panels	2	BI1326 100	
10	E83 – 180	Combustion chamber rear panel (mod. M96.24SM/...)	1	BI1326 107	
	E83 – 181	Combustion chamber rear panel (mod. M96.28SM/... M96.28SR/...)	1	BI1326 108	
11	E83 – 196	Combustion chamber front panel (mod. M96.24SM/...)	1	BI1406 103	
	E83 – 197	Combustion chamber front panel (mod. M96.28SM/... M96.28SR/...)	1	BI1406 104	
12		Electronic regulation p.c.b.	1	BI1605 100	
13	E83 – 142	Full sequence ignition device	1	BI1305 101	Bertelli & Partners FM30 Honeywell FPLD (alternative)
14	E01 – 204	D.h.w. heat exchanger (M96.24SM/...)	1	BI1001 101	
	E01 – 205	D.h.w. heat exchanger (M96.28SM/...)	1	BI1001 102	
15		Pump	1	BI1262 103	
16	E00 – 684	Primary circuit flow switch	1	BI1011 505	
17	E83 – 082	D.h.w. flow switch	1	BI1091 104	
18	E00 – 688	Main. flow switch membrane	1	BI1011 103	
19	E83 – 086	Three way diverter valve (electric actuator)	1	BI1101 102	Elbi
20	E83 – 101	Overheat thermostat	1	BI1172 105	ELTH – type 261
21		Flue thermostat	1	BI1262 104	
22	169 – 083	Fuse 1,6 A T	1	BI1005 105	
23	164 – 026	Temperature probe (main or d.h.w. circuit)	1	BI1001 117	
24	E83 – 127	Ignition electrode (left)	1	BI1123 101	
25	E83 – 126	Ignition electrode (right)	1	BI1123 103	
26	E83 – 122	Detection electrode	1	BI1123 102	
27	E83 – 145	Temperature – pressure gauge	1	BI1475 108	IMIT











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# Spare Parts List

## M96.24SM/C

## M96.28SM/C

## M96.28SR/C

### Issue 08/2004

Table description	Issue	n. of pages
Overall view	08/2004	1
C.h. return group and d.h.w. heat exchanger	08/2004	1
C.h. flow group and three way diverter valve	08/2004	1
C.h. flow and return groups	08/2004	1
Pump and main circuit assembly M96.24SM/C M96.28SM/C	08/2004	1
Pump and main circuit assembly M96.28SR/C	08/2004	1
Gas assembly	08/2004	1
Valves and connection pipes	08/2004	1
Control panel and ignition device	08/2004	1
Wiring	08/2004	1
Fan, combustion chamber and case panels	08/2004	1
List of parts M96.24SM/C M96.28SM/C	08/2004	8
List of parts M96.28SR/C	08/2004	7

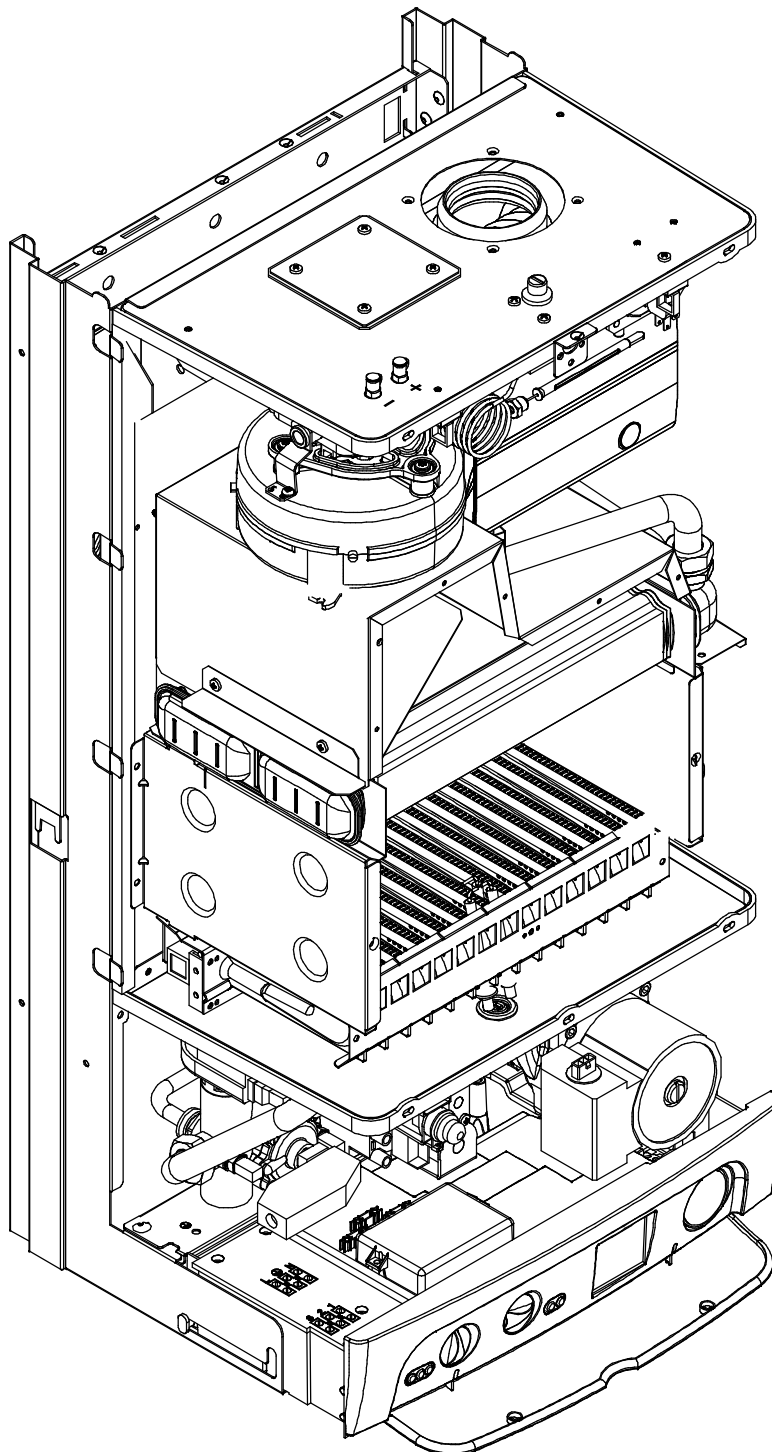


M96.24SM/C  
M96.28SM/C  
M96.28SR/C

47-970-23  
47-970-24  
41-970-12

### Overall view

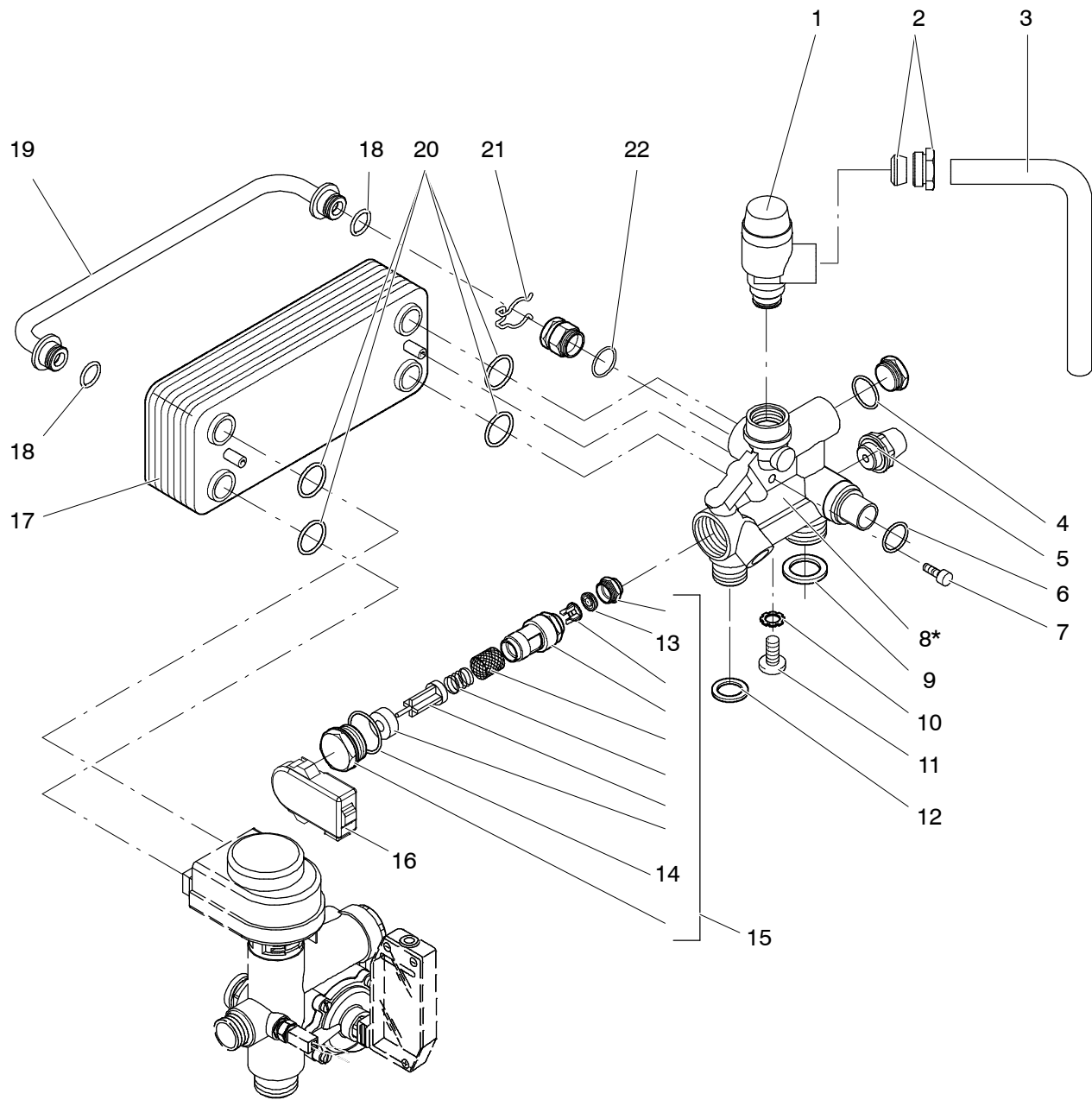
DATA BADGE: inner side of left case panel



M96.24SM/C  
M96.28SM/C

47-970-23  
47-970-24

C.h. return group and d.h.w. heat exchanger



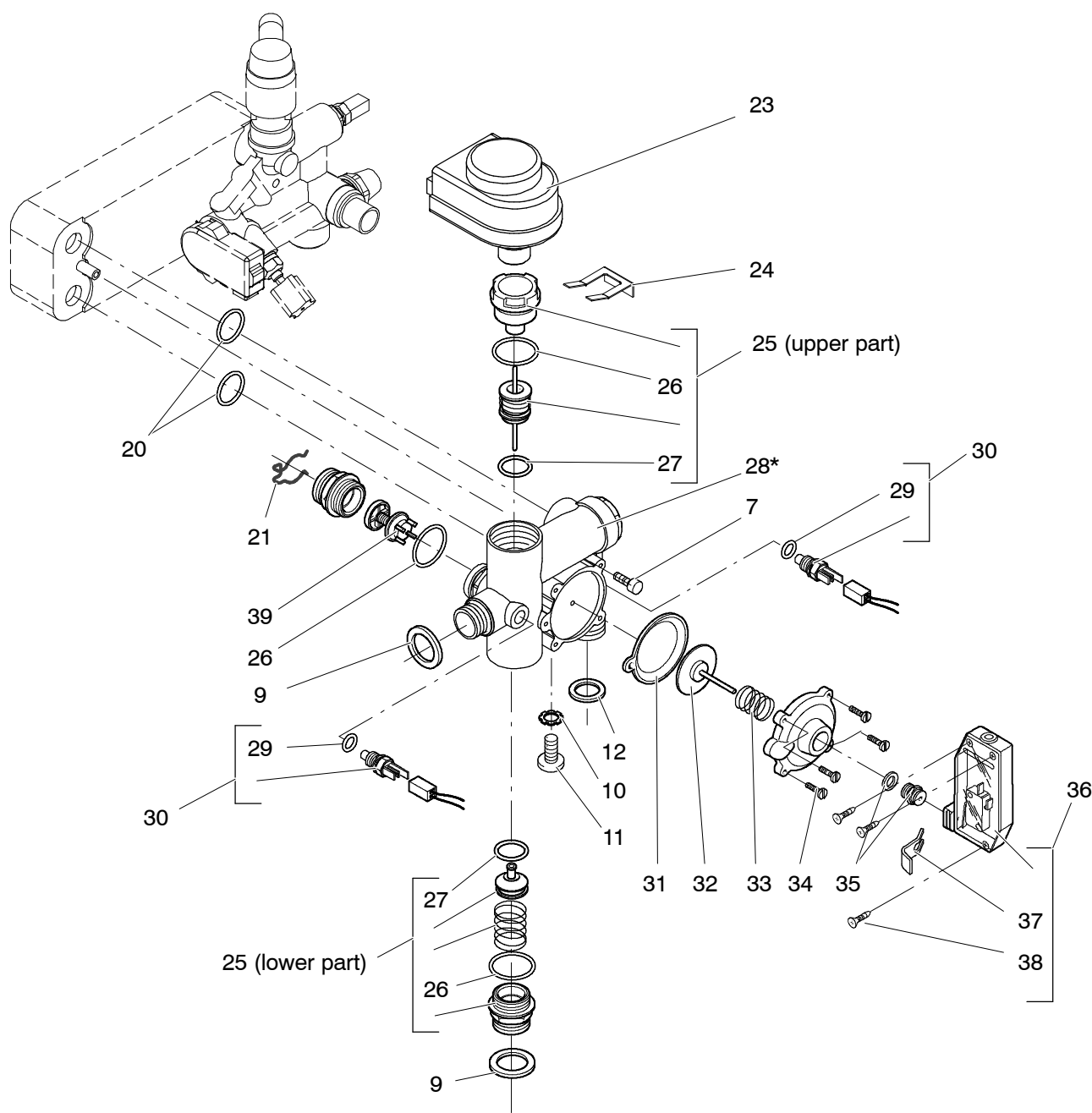
\* Includes items 4, 15, 22



M96.24SM/C  
M96.28SM/C

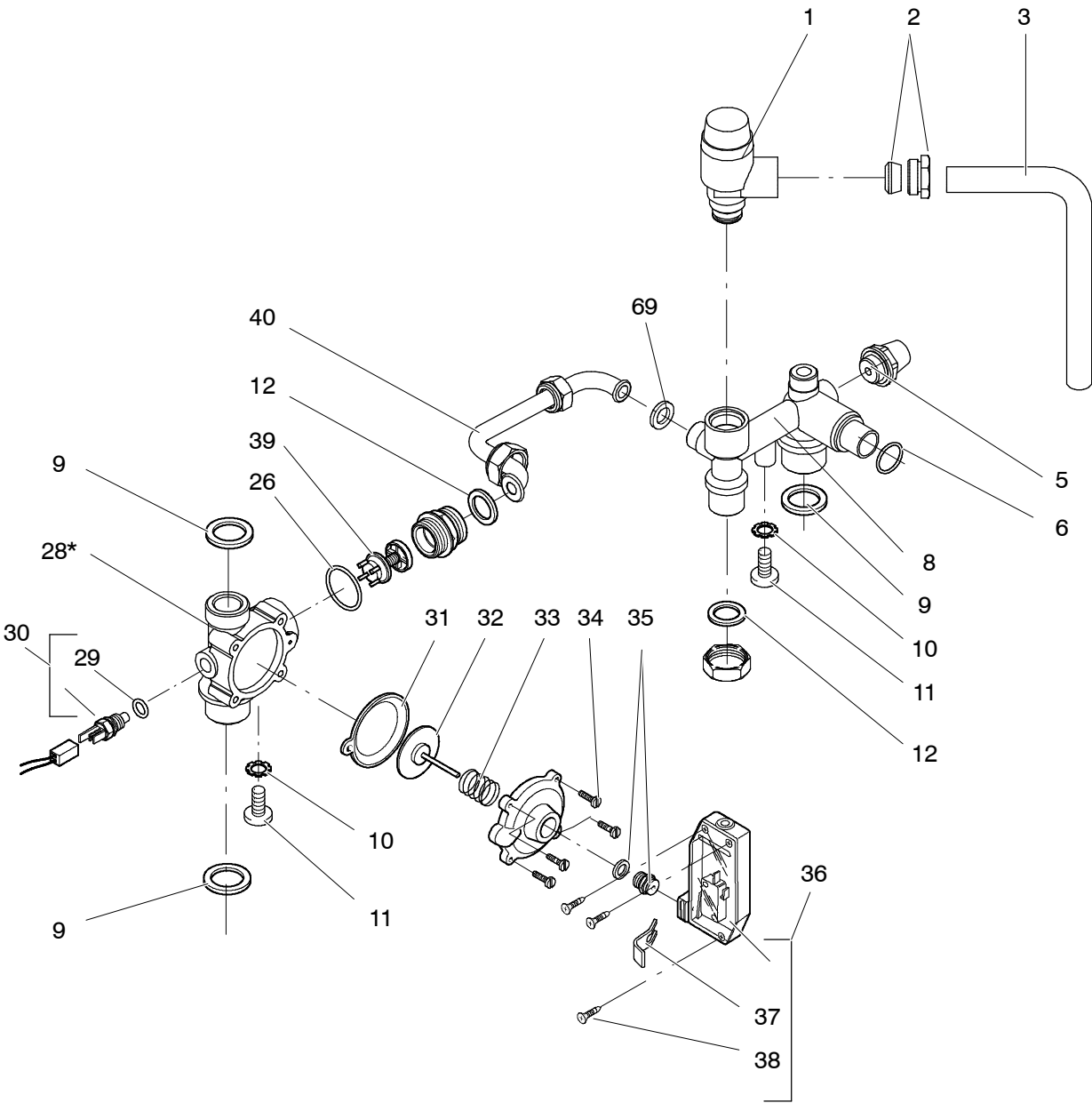
47-970-23  
47-970-24

C.h. flow group and three way diverter valve



\* Includes items 25, 31, 32, 33, 34, 35, 26, 39

C.h. flow and return groups

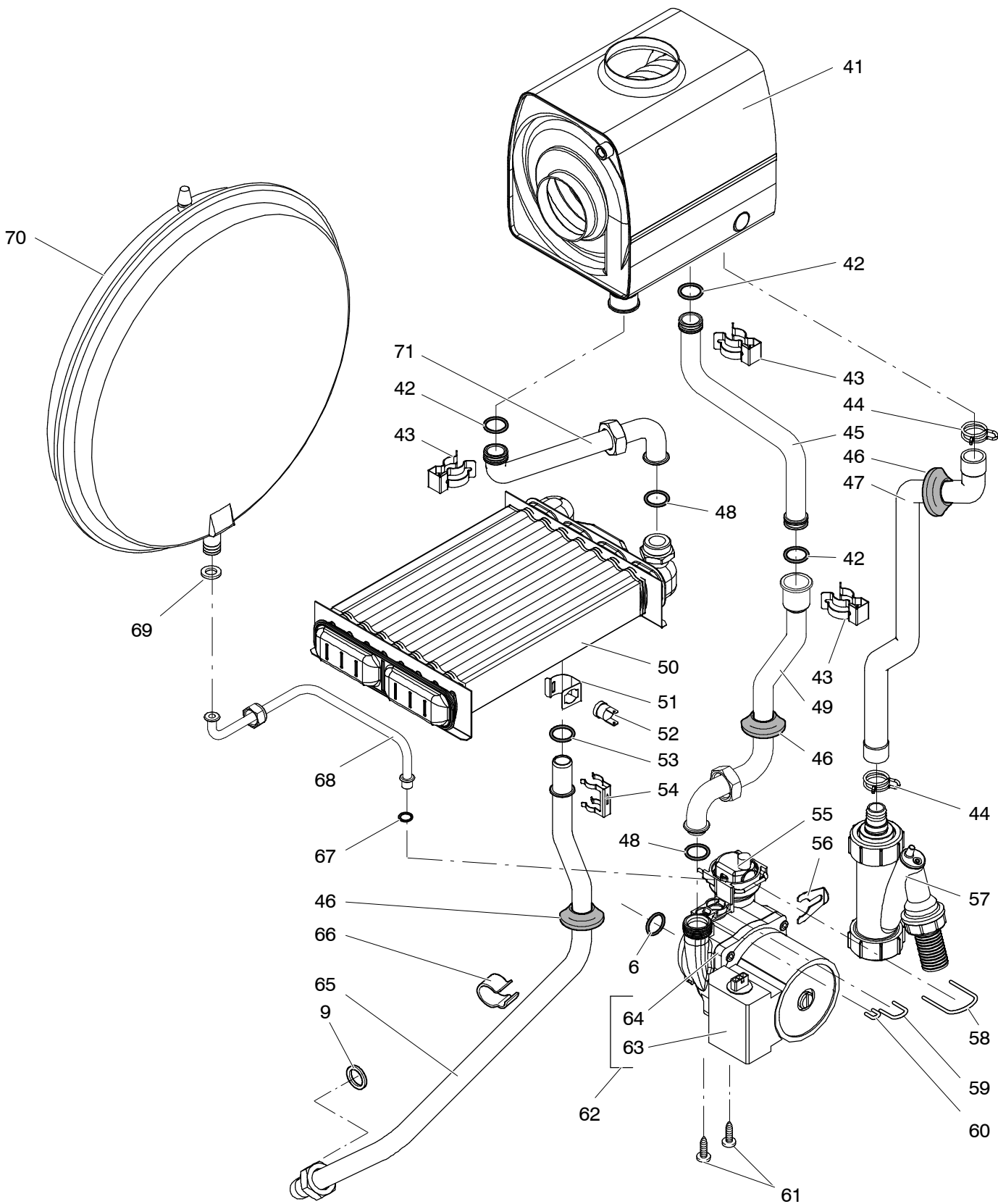


\* Includes items 26, 31, 32, 33, 34, 35, 39

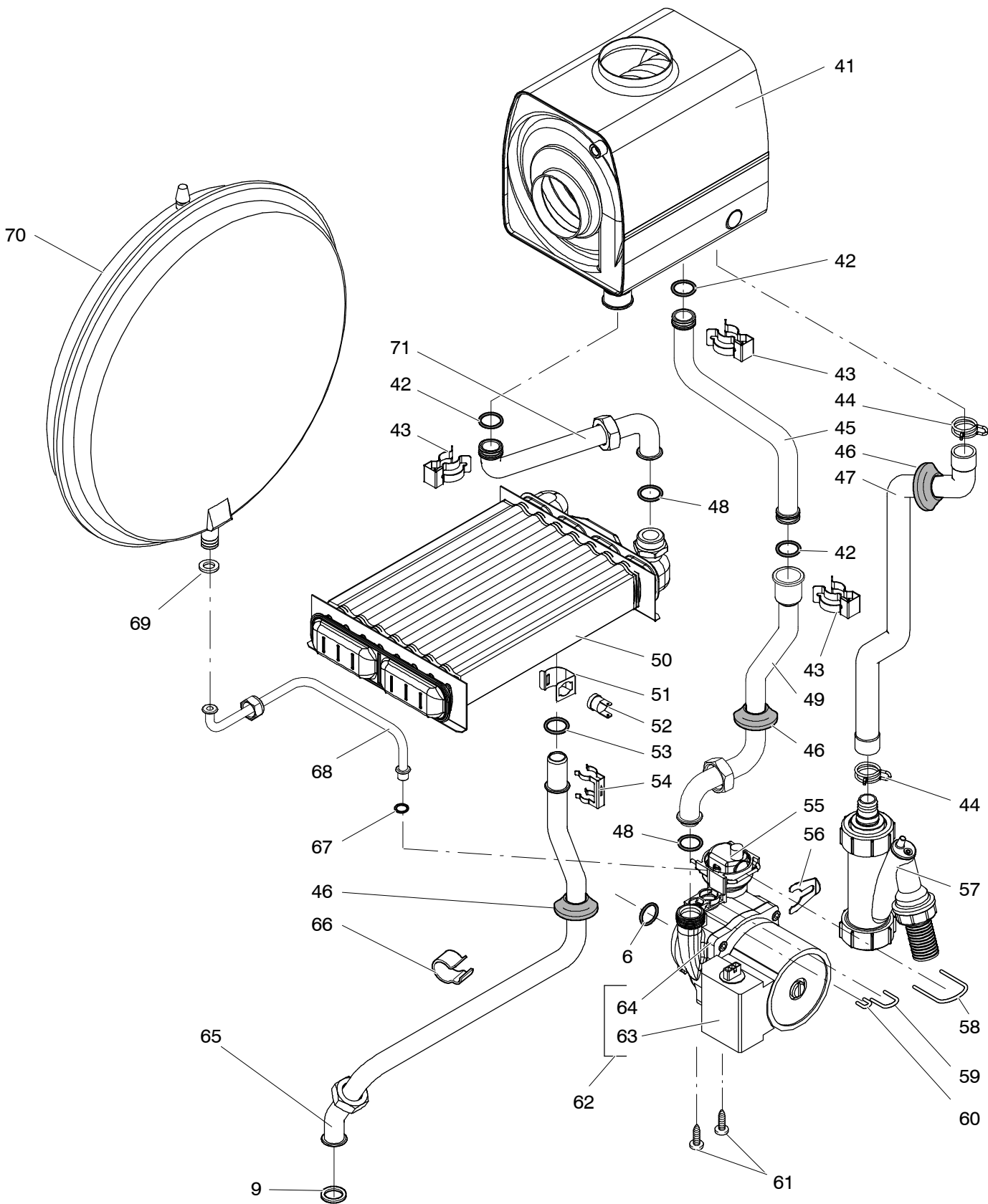
M96.24SM/C  
M96.28SM/C

47-970-23  
47-970-24

Pump and main circuit assembly



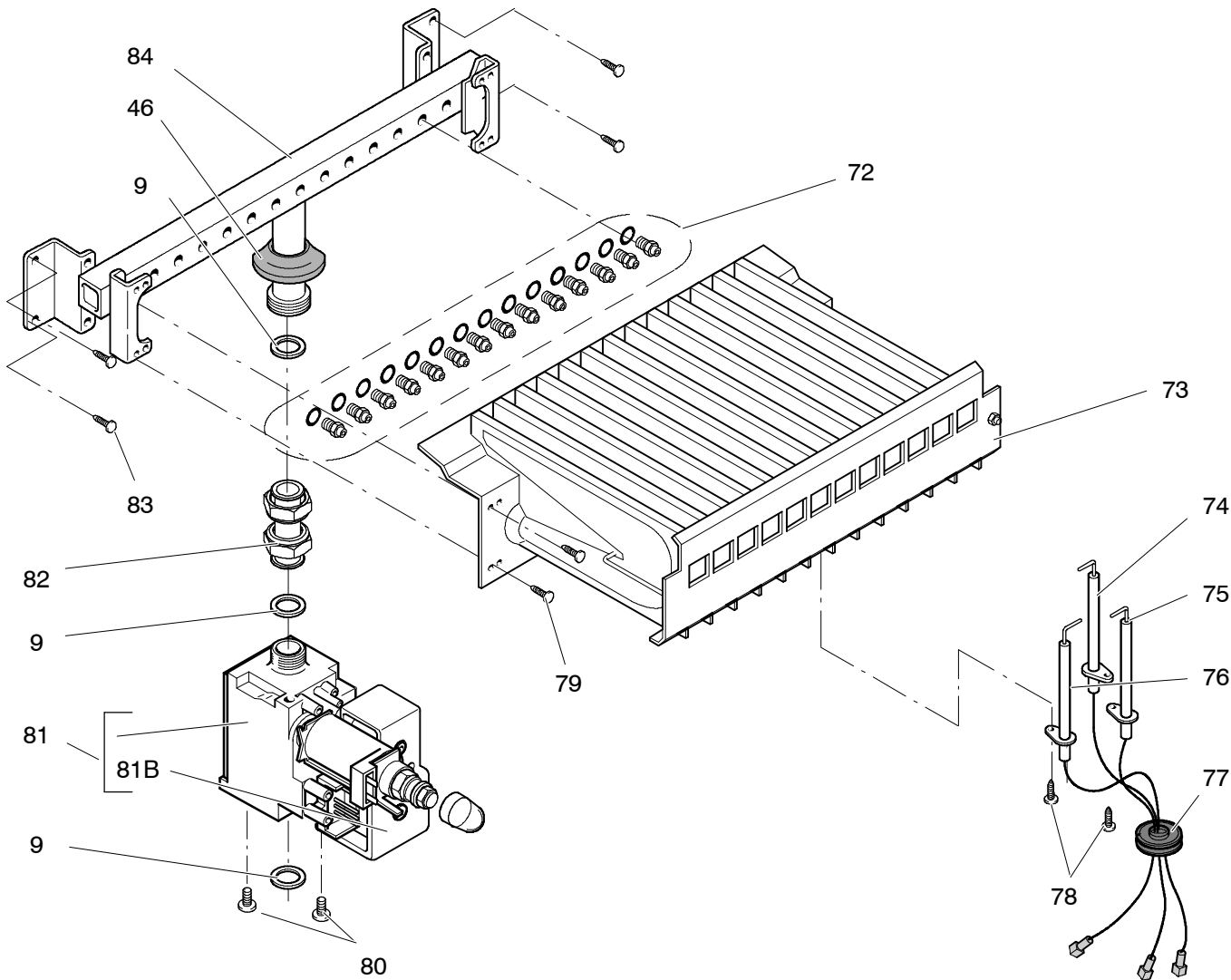
Pump and main circuit assembly



M96.24SM/C  
M96.28SM/C  
M96.28SR/C

47-970-23  
47-970-24  
41-970-12

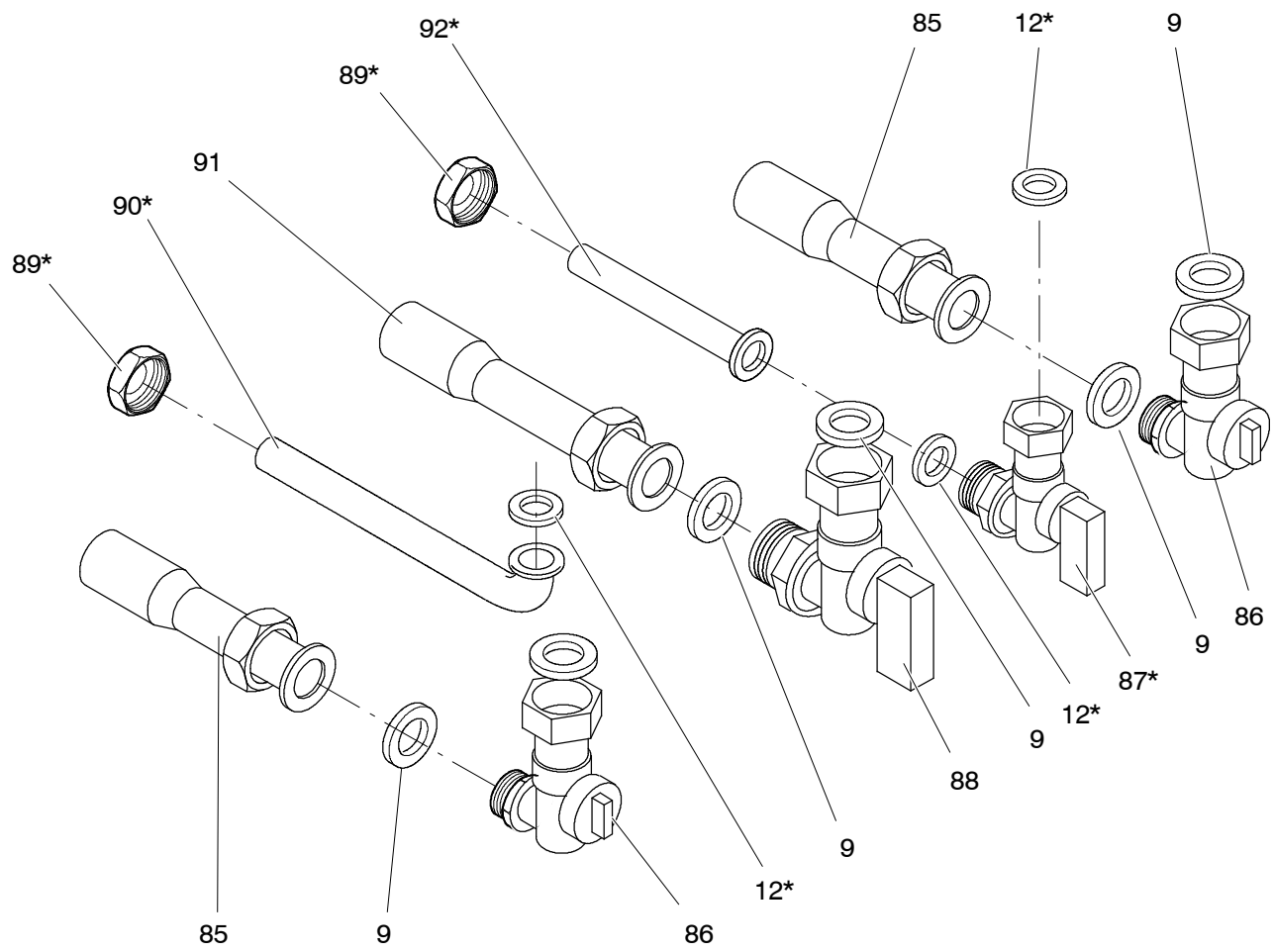
Gas assembly



M96.24SM/C  
M96.28SM/C  
M96.28SR/C

47-970-23  
47-970-24  
41-970-12

Valves and connection pipes

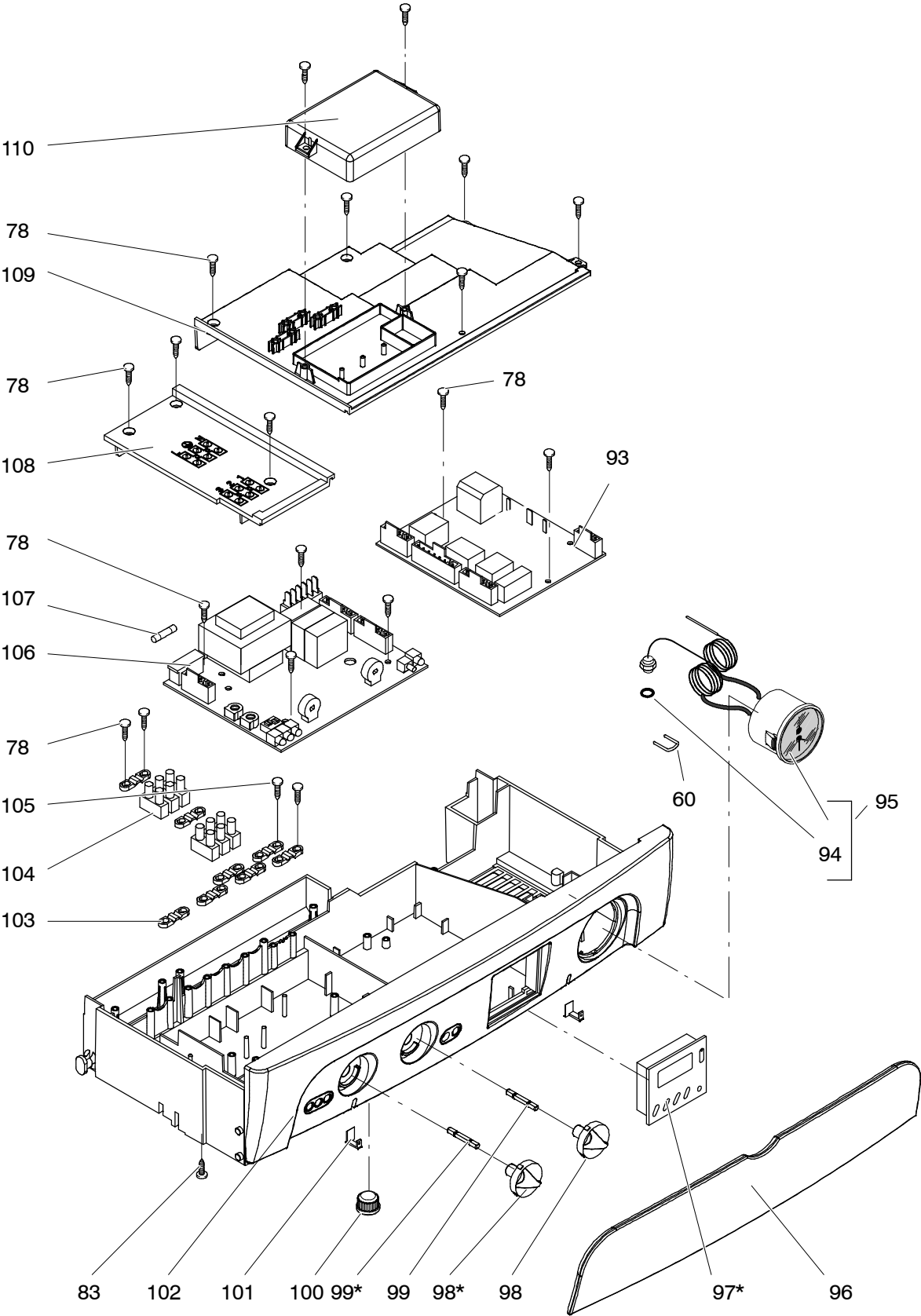


\* Not for model M96.28SR/C

M96.24SM/C  
M96.28SM/C  
M96.28SR/C

47-970-23  
47-970-24  
41-970-12

Control panel and ignition device

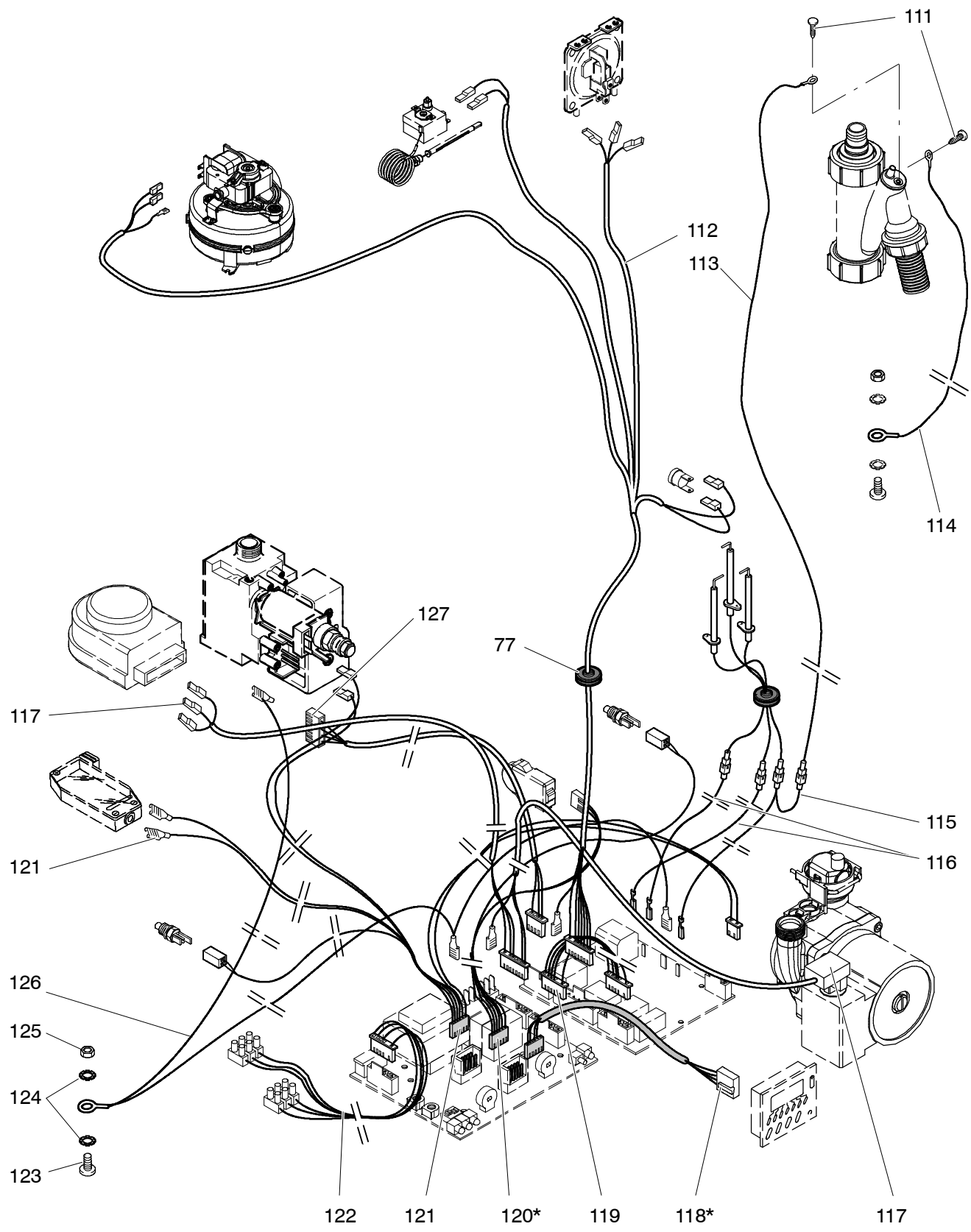


\* Not for model M96.28SR/C

M96.24SM/C  
M96.28SM/C  
M96.28SR/C

47-970-23  
47-970-24  
41-970-12

Wiring



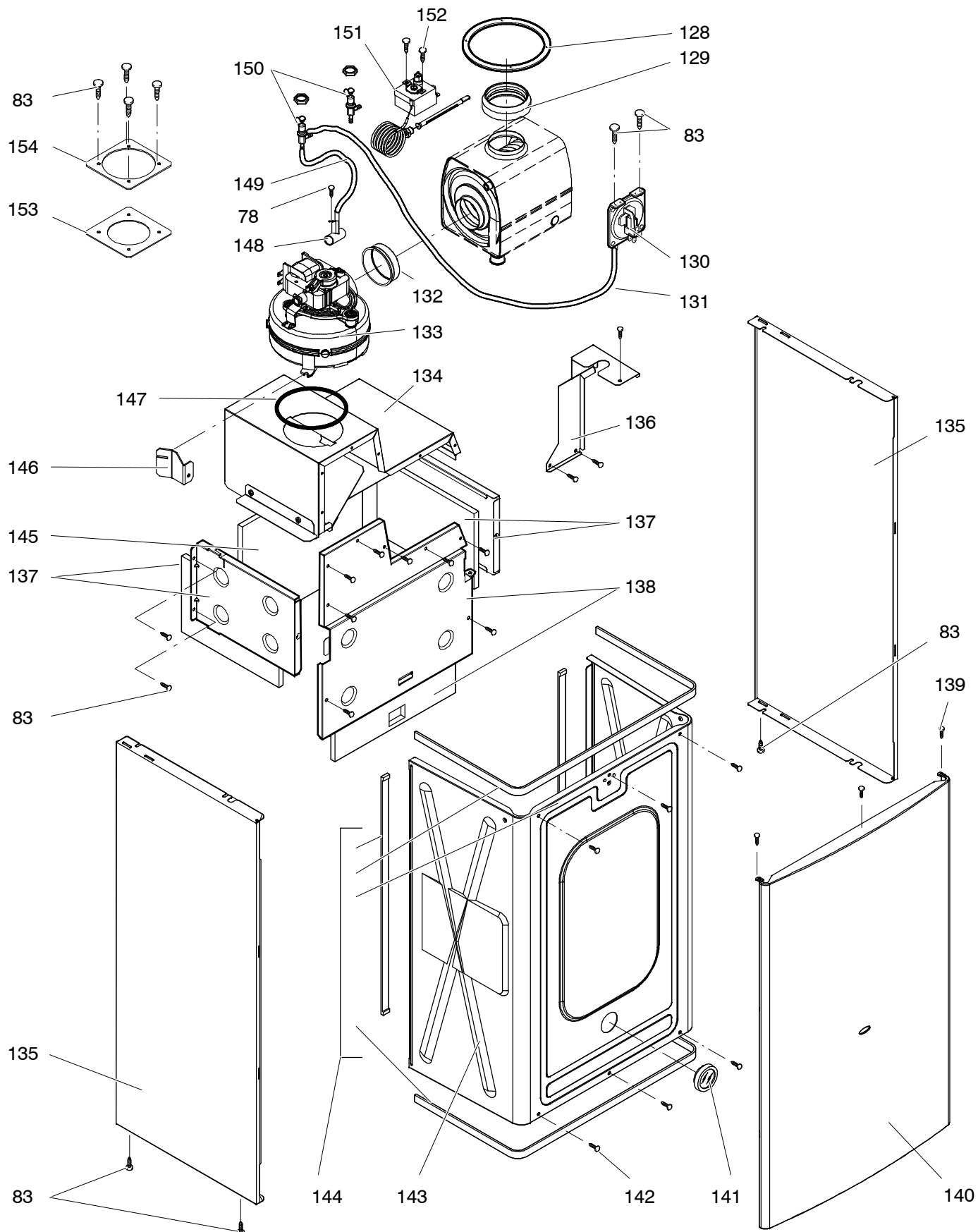
\* Not for model M96.28SR/C



M96.24SM/C  
M96.28SM/C  
M96.28SR/C

47-970-23  
47-970-24  
41-970-12

### Fan, combustion chamber and case panels



# DRAFT BRITISH GAS PART LIST

Date \_\_\_\_\_

Sheet 1 of 8

Manufacturer Biasi SpA – Italy

Appliance(s) M96.24SM/C, M96.28SM/C

GC Appliance Number(s) 47–970–23, 47–970–24, 41–970–12

Contract Name \_\_\_\_\_

Telephone Number \_\_\_\_\_

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
		Position of data badge: inner side of left case panel								
		Instructions booklets set	1			BI1913 501	M			
1	E83–013	Safety valve 3 bar	1	BI1131 100			B	Watts Interme – Caldaro Italy	3 bar	
								Orkli (alternative)	3 bar	
2	E23–759	Safety valve connection	1	BI1001 127			M			
3	H05–158	Safety valve connection pipe	1	BI1131 106			M			
4	E00–679	O–ring gasket 1,78x15,6	1	BI1001 131			M			
5	E00–669	Drainage valve	1	BI1011 104			B	Watts Interme – Caldaro Italy	RSR8 1/4"	
6	H20–945	O–ring gasket 17,04x4,00	5	BI1212 112			M			
7	E00–671	Screw M5x16 – Hexagon socket cap	2	BI1001 125			F			
8	H20–948	Return group kit M96.24SM/C, M96.28SM/C	1	BI1131 503			M			
9	169–033	Flat gasket 3/4"	9	BI1001 108			M			
10	E23–757	Toothed lock washer external 6,4 mm	2	BI1001 124			F			
11	E00–670	Screw M6x8 – BZP RPH	2	BI1001 123			F			
12	169–141	Gasket 1/2"	3	BI1001 106			M			
13	E83–018	Flow limiter 10 Litres/min	1	BI1091 102			B	Acqua Flow		
13 A	E83–019	Flow limiter 12 Litres/min	1	BI1091 103			B	Acqua Flow		
14	E00–678	O–ring gasket 2,62x20,63	1	BI1001 130			M			
15	E83–081	Magnetic flow switch and filter kit	1	BI1091 502			M			
16	E83–082	D.h.w. flow switch	1	BI1091 104			M			
17	E01–204	Exchanger DHW – M96.24SM/C	1	BI1001 101			M			
17 A	E01–205	Exchanger DHW – M96.28SM/C	1	BI1001 102			M			
18	E00–668	O–ring gasket 1,78x12,42 by–pass pipe	2	BI1001 115			M			
19	E83–083	By–pass pipe	1	BI1131 101			M			
20	169–060	O–ring gasket 18,64x3,53	4	KI1043 144			M			

# CONTINUATION SHEET

Sheet 2 of 8

Appliance number(s) 47-970-23, 47-970-24,

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
21	E00-672	By-pass pipe fixing fork	2	Bl1001 111			M			
22	E00-676	O-ring gasket 1,78x14	1	Bl1001 129			M			
23	E83-086	Diverter valve actuator	1	Bl1101 102			B	Elbi International SpA Collegno italy	1650/6/0	
24	E83-090	Diverter valve actuator fixing spring	1	Bl1101 101			M			
25	E83-091	Diverter valve kit	1	Bl1141 501			M			
26	E00-680	O-ring gasket 2,62x23,47	3	Bl1011 107			M			
27	E83-092	O-ring gasket 2,7x13,6	2	Bl1011 117			M			
28	H20-960	Flow group kit M96.24SM/C, M96.28SM/C	1	Bl1141 504			M			
29	164-025	O-ring gasket 9,25x1,78 (NTC)	2	Kl1001 128			M			
30	164-026	Temperature probe (special)	2	Bl1001 117			M			
31	E00-688	Central heating pressure switch membrane	1	Bl1011 103			M			
32	E00-687	Central heating pressure switch disk	1	Bl1011 111			M			
33	E00-686	Central heating pressure switch spring	1	Bl1011 110			M			
34	E00-685	Screw M4x12 mm Stainless steel SCH	4	Bl1011 109			F			
35	E00-681	Microswitch guide bush	1	Bl1011 502			M			
36	E00-684	Microswitch kit	1	Bl1011 505			M			
37	E00-683	Microswitch box fixing clip	1	Bl1011 105			M			
38	E00-682	Screw 2,9x13 mm AB self tapping BZP - RCH	3	Bl1011 108			F			
39	H20-966	By-pass kit	1	Bl1141 505			M			
41	H20-969	Condensing heat exchanger	1	Bl1262 111			M			
42	H20-970	O-ring gasket 2,62x17.86	3	Bl1262 112			M			
43	E83-108	Condensing heat exchanger connection clip	3	Bl1172 101			M			
44	H20-972	Connection spring	2	Bl1262 117			F			
45	H20-977	Condensing heat exchanger inlet pipe - upper	1	Bl1262 109						
46	169-104	Grommet	4	Bl1002 113			M			

# CONTINUATION SHEET

Sheet 3 of 8

Appliance number(s) 47-970-23, 47-970-24,

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
47	H20-980	Condensate discharge pipe	1	BI1262 110			M			
48	H20-981	O-ring gasket 1,9X16	2	BI1262 114			M			
49	H20-982	Condensing heat exchanger inlet pipe - lower	1	BI1262 108			M			
50	H20-984	Main exchanger M96.24SM/C,	1	BI1262 101			M			
50 A	H20-985	Main exchanger M96.28SM/C, M96.28SR/C	1	BI1262 102			M			
51	E94-723	Overheat thermostat fixing clip	1	BI1182 100			M			
52	E83-101	Overheat thermostat	1	BI1172 105			B	Elth	261 105° C	
53	169-025	O-ring gasket 17,04x3,53	1	KI1043 114			M			
54	E94-737	Main exchanger connection clip	1	BI1182 106			M			
55	H20-986	Automatic air purger valve	1	BI1212 107			M			
56	H20-987	Pump connection fork	1	BI1262 116			M			
57	H20-989	Condensate trap	1	BI1262 118			M			
58	H20-990	Fork	1	BI1262 120			M			
59	169-015	Fork	1	KI1042 101			M			
60	169-040	Fork	1	KI1042 115			M			
61	H20-992	Screw 5X16	2	BI1262 115			F			
62	H20-993	Pump (complete)	1	BI1262 103			M	Wilo	NFSL12/6-1 HE CRF9-S 82W	
63	H20-994	Pump (motor)	1	BI1262 119			B			
64	E83-114	Pump gasket	1	BI1172 113			M			
65	H20-995	Main exchanger outlet pipe M96.24SM/C, M96.28SM/C	1	BI1262 106			M			
66	169-045	Probe holder	1	BI1105 108			M			
67	H20-996	O-ring gasket 2,62X9,92	1	BI1262 113			M			
68	H20-997	Expansion vessel connection pipe	1	BI1262 105			M			
69	H03-727	Flat gasket 3/8" O.D 15 mm, i.d. 8.5 mm	2	BI1202 105			M			

# CONTINUATION SHEET

Sheet 4 of 8

Appliance number(s) 47-970-23, 47-970-24,

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
70	E83-121	Expansion vessel	1	BI1172 103			B	CIMM Srl - Castello di Godego Italy	CP387 6L	
								Zilmet - Italy (alternative)	13C0000600	
71	H27-566	Condensing heat exchanger outlet pipe	1	BI1262 107			M			
72	169-069	Injectors with gaskets 130 - NG	14	KI1064 505			B	Polidoro		
72 A	E01-156	Injectors with gaskets 75 - LPG	14	BI1003 509			B	Polidoro		
73	173-148	Burner M96.24SM/C	1	KI1004 102			B	Polidoro		
73 A	173-149	Burner M96.28SM/C, M96.28SR/C	1	KI1004 147			B	Polidoro		
74	E83-122	Detection electrode	1	BI1123 102			M			
75	E83-126	Ignition electrode - right	1	BI1123 103			M			
76	E83-127	Ignition electrode - left	1	BI1123 101			M			
77	169-125	Grommet	1	BI1002 115			M			
78	409-736	Tapping screw 3,5x9,5 recessed pan head	24	BI1013 115			F			
79	409-531	Taptite screw M4x8 Recessed pan head Hardened steel	4	BI1013 111			F			
		Bright Zinc Plated BS3382 Clear passivated and lanolin								
		Dipped								
80	402-124	Machine Screw M4x8 mm Recessed pan head Mild steel	2	BI1013 114			F			
		BS4183 Bright zinc plate BS3382 Clear passiv.								
81 A	H03-746	Gas valve	1	BI1193105			B	Sit	845 Sigma	
81 B	H21-018	Gas valve on-off operator coils		BI1093 107			B	Sit	0.967.158	
82	H21-019	Gas pipe to the manifold	1	BI1213 100			M			
83	409-722	Tapping Screw ISO No8 B 4,2x9,5 Recessed Pan Head	34	BI1013 110			F			
		Hardened Steel BS4174 Bright Zinc plate BS1706 Clear								
		Passivated								
84	E83-131	Gas manifold with injectors NG M96.24SM/C	1	BI1183 103			B	Polidoro		
84 A	H21-021	Gas manifold with injectors LPG M96.24SM/C	1	BI1213 101			B	Polidoro		

# CONTINUATION SHEET

Sheet 5 of 8

Appliance number(s) 47-970-23, 47-970-24,

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
84	B E83-133	Gas manifold with injectors NG M96.28SM/C, M96.28SR/C	1	BI1183 105			B	Polidoro		
84	C H21-023	Gas manifold with injectors LPG M96.28SM/C,	1	BI1213 102			B	Polidoro		
		M96.28SR/C								
85	H21-025	C.h. connection pipe	2	BI1124 100			M			
86	E83-136	Tap 3/4" - c.h.	2	BI1084 105			B			
87	E83-137	Tap 1/2" - d.h.w.	1	BI1084 101			B			
88	E83-138	Tap 3/4" - gas	1	BI1084 100			B			
89	E01-226	Nut 1/2"	2	BI1004 101			M			
90	H21-027	Pipe 15 mm dia (bent) d.h.w.	1	BI1124 102			M			
91	H21-029	Pipe 22 mm dia gas	1	BI1124 101			M			
92	H21-030	Pipe 15 mm dia (straight) d.h.w.	1	BI1124 103			M			
93	E83-142	Full sequence control device	1	BI1305 101			B	Bertelli & Partners	FM30	
94	E83-144	O-ring gasket 1,78 x 6,75	1	BI1475 119			M			
95	E83-145	Temperature-pressure gauge	1	BI1475 108			M			
96		Cover panel	1			BI1605 108	M			
97	E94-738	Time switch	1	BI1525 101			B	Flash	Monotron 200 23011	
98	H27-577	Knob	2	BI1605 106			M			
99	E83-149	Shaft	2	BI1475 105			M			
100	E83-150	Control panel plug	1	BI1475 110			M			
101	H27-578	Hinge plugs (couple)	1	BI1605 107			M			
102	H27-580	Control panel box M96.24SM/C, M96.28SM/C	1	BI1605 104			M			
103	E83-152	Cable holder	8	KI1066 208			B	Fastpoint S.r.l.	1207.BB01 XS	
		Replacement for discontinued KI1066 102								
104	E83-153	Terminal block	2	BI1475 109			B	Elettrogibi	PA27	
								Odoardo Korner (alternative)	OK-433-FV	

# CONTINUATION SHEET

Sheet 6 of 8

Appliance number(s) 47-970-23, 47-970-24,

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
105	409-727	Screw 3,5x16 mm self tap RPH	4	BI1165 101			F			
106	H21-037	Electronic control p.c.b.	1	BI1605 100			M			
107	169-083	Fuse 1.6A	1	BI1005 105			B			
108	E83-155	Service panel cover	1	BI1475 111			M			
109	H21-038	Control panel cover	1	BI1605 101			M			
110	H21-039	External controls cover	1	BI1605 102			M			
111	409-902	Screw 3,5X9,5 mm self tap RPH stainless steel	2	BI1615 104			F			
112	H21-041	Fan cable	1	BI1615 100			M			
113	H21-042	Detection to trap wiring	1	BI1615 101			M			
114	H21-043	Trap to earth wiring	1	BI1615 102			M			
115	H21-044	Flame detection electrode cable	1	BI1615 103			M			
116	E83-160	Ignition electrode cable	2	BI1485 101			M			
117	E83-162	Pump-diverter valve cable	1	BI1485 103			M			
118	E83-163	Time switch cable	1	BI1485 111			M			
119	E83-164	Electronic control p.c.b.-ignition device connection cable	1	BI1485 104			M			
120	E83-165	D.h.w. flow switch and temp. probe cable	1	BI1485 105			M			
121	E83-166	C.h. flow switch, temp. probe cable and modulator cable	1	BI1485 106			M			
122	E83-168	Power supply and external control cable	1	BI1485 107			M			
123	402-225	Machine Screw M5x10 Recessed Pan Head Mild steel	1	BI1035 109			F			
		BS4183 Bright zinc plate BS3382 Clear Passivated								
124	164-133	Toothed lock washer external 5,3x10 mm stainless	2	BI1035 110			F			
125	404-609	Full nut M5 Hexagon Steel grade 8 BS3692 Bright zinc	1	BI1035 111			F			
		plate BS3382 clear passivated								
126	E83-169	Earth wiring	1	BI1485 108			M			
127	E83-170	Gas valve cable	1	BI1485 109			M			

# CONTINUATION SHEET

Sheet 7 of 8

Appliance number(s) 47-970-23, 47-970-24,

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
128	169-110	Flue pipe gasket	1	BI1016 104			M			
129	H21-045	Flue outlet gasket	1	BI1406 112			M			
130	169-127	Air pressure switch M96.24SM/C	1	KI1267 103			B	Yamatake-Honeywell	C6065 0,88 mbar	
130 A	H27-582	Air pressure switch M96.28SM/C, M96.28SR/C	1	BI1376 104			B	Yamatake-Honeywell	C6065 1,38 mbar	
131	E83-188	Venturi device tube	1	BI1256 101			M			
132	H21-047	Fan outlet gasket	1	BI1406 113			M			
133	H21-048	Fan M96.24SM/C	1	BI1406 100			B	FIME	GR 02445 47W	
133 A	H21-049	Fan M96.28SM/C, M96.28SR/C	1	BI1406 101			B	FIME	GR 02440 60W	
134	H21-050	Flue hood M96.24SM/C	1	BI1406 108			M			
134 A	H21-051	Flue hood M96.28SM/C, M96.28SR/C	1	BI1406 109			M			
135	H21-052	Side case panel	2	BI1406 106			M			
136	H21-054	Air deflector - right	1	BI1406 114			M			
137	E83-178	Combustion chamber side panel	2	BI1326 100			M			
138	H21-055	Combustion chamber front panel M96.24SM/C	1	BI1406 103			M			
138 A	H21-056	Combustion chamber front panel M96.28SM/C,	1	BI1406 104			M			
		M96.28SR/C								
139	409-702	Screw 4,2x13 mm AB self tapping RPH BZP	2	BI1336 115			F			
140	H21-057	Front case panel	1	BI1406 107			M			
141	E69-243	Window (glass + rubber frame)	1	BI1206 118			M			
142	409-747	Screw 4,8x13 mm AB self tapping RPH BZP	4	BI1336 114			F			
143	H21-059	Sealed chamber lid	1	BI1406 105			M			
144	H21-060	Sealed chamber gaskets kit	1	BI1406 500			M			
145	E83-180	Combustion chamber rear panel M96.24SM/C	1	BI1326 107			M			
145 A	E83-181	Combustion chamber rear panel M96.28SM/C,	1	BI1326 108			M			
		M96.28SR/C								



## CONTINUATION SHEET

Sheet 8 of 8

Appliance number(s) 47-970-23, 47-970-24,

[illegible]

# DRAFT BRITISH GAS PART LIST

Date \_\_\_\_\_

Sheet 1 of 7

Manufacturer Biasi SpA – Italy

Appliance(s) , M96.28SR/C

GC Appliance Number(s) , , 41–970–12

Contract Name \_\_\_\_\_

Telephone Number \_\_\_\_\_

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
		Position of data badge: inner side of left case panel								
		Instructions booklets set	1			BI1913 501	M			
1	E83–013	Safety valve 3 bar	1	BI1131 100			B	Watts Interme – Caldaro Italy	3 bar	
								Orkli (alternative)	3 bar	
2	E23–759	Safety valve connection	1	BI1001 127			M			
3	H05–158	Safety valve connection pipe	1	BI1131 106			M			
4	E00–679	O–ring gasket 1,78x15,6	1	BI1001 131			M			
5	E00–669	Drainage valve	1	BI1011 104			B	Watts Interme – Caldaro Italy	RSR8 1/4"	
6	H20–945	O–ring gasket 17,04x4,00	5	BI1212 112			M			
8	H06–023	Return group kit M96.28SR/C	1	BI1171 100			M			
9	169–033	Flat gasket 3/4"	9	BI1001 108			M			
10	E23–757	Toothed lock washer external 6,4 mm	2	BI1001 124			F			
11	E00–670	Screw M6x8 – BZP RPH	2	BI1001 123			F			
18	E00–668	O–ring gasket 1,78x12,42 by–pass pipe	2	BI1001 115			M			
19	E83–083	By–pass pipe	1	BI1131 101			M			
20	169–060	O–ring gasket 18,64x3,53	4	KI1043 144			M			
21	E00–672	By–pass pipe fixing fork	2	BI1001 111			M			
22	E00–676	O–ring gasket 1,78x14	1	BI1001 129			M			
26	E00–680	O–ring gasket 2,62x23,47	3	BI1011 107			M			
28	H27–556	Flow group kit M96.28SR/C	1	BI1171 103			M			
29	164–025	O–ring gasket 9,25x1,78 (NTC)	1	KI1001 128			M			
30	164–026	Temperature probe (special)	1	BI1001 117			M			
31	E00–688	Central heating pressure switch membrane	1	BI1011 103			M			
32	E00–687	Central heating pressure switch disk	1	BI1011 111			M			
33	E00–686	Central heating pressure switch spring	1	BI1011 110			M			

# CONTINUATION SHEET

Sheet 2 of 7

Appliance number(s) , , 41-970-12

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
34	E00-685	Screw M4x12 mm Stainless steel SCH	4	Bl1011 109			F			
35	E00-681	Microswitch guide bush	1	Bl1011 502			M			
36	E00-684	Microswitch kit	1	Bl1011 505			M			
37	E00-683	Microswitch box fixing clip	1	Bl1011 105			M			
38	E00-682	Screw 2,9x13 mm AB self tapping BZP - RCH	3	Bl1011 108			F			
39	H20-966	By-pass kit	1	Bl1141 505			M			
40	H06-027	By-pass pipe	1	Bl1171 102			M			
41	H20-969	Condensing heat exchanger	1	Bl1262 111			M			
42	H20-970	O-ring gasket 2,62x17.86	3	Bl1262 112			M			
43	E83-108	Condensing heat exchanger connection clip	3	Bl1172 101			M			
44	H20-972	Connection spring	2	Bl1262 117			F			
45	H20-977	Condensing heat exchanger inlet pipe - upper	1	Bl1262 109						
46	169-104	Grommet	4	Bl1002 113			M			
47	H20-980	Condensate discharge pipe	1	Bl1262 110			M			
48	H20-981	O-ring gasket 1,9X16	2	Bl1262 114			M			
49	H20-982	Condensing heat exchanger inlet pipe - lower	1	Bl1262 108			M			
50	H20-984	Main exchanger M96.24SM/C,	1	Bl1262 101			M			
50 A	H20-985	Main exchanger M96.28SM/C, M96.28SR/C	1	Bl1262 102			M			
51	E94-723	Overheat thermostat fixing clip	1	Bl1182 100			M			
52	E83-101	Overheat thermostat	1	Bl1172 105			B	Elth	261 105° C	
53	169-025	O-ring gasket 17,04x3,53	1	Kl1043 114			M			
54	E94-737	Main exchanger connection clip	1	Bl1182 106			M			
55	H20-986	Automatic air purger valve	1	Bl1212 107			M			
56	H20-987	Pump connection fork	1	Bl1262 116			M			
57	H20-989	Condensate trap	1	Bl1262 118			M			

# CONTINUATION SHEET

Sheet 3 of 7

Appliance number(s) , , 41-970-12

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
58	H20-990	Fork	1	Bl1262 120			M			
59	169-015	Fork	1	Kl1042 101			M			
60	169-040	Fork	1	Kl1042 115			M			
61	H20-992	Screw 5X16	2	Bl1262 115			F			
62	H20-993	Pump (complete)	1	Bl1262 103			M	Wilo	NFSL12/6-1 HE CRF9-S 82W	
63	H20-994	Pump (motor)	1	Bl1262 119			B			
64	E83-114	Pump gasket	1	Bl1172 113			M			
65	H27-563	Main exchanger outlet pipe M96.28SR/C	1	Bl1262 121			M			
66	169-045	Probe holder	1	Bl1105 108			M			
67	H20-996	O-ring gasket 2,62X9,92	1	Bl1262 113			M			
68	H20-997	Expansion vessel connection pipe	1	Bl1262 105			M			
69	H03-727	Flat gasket 3/8" O.D 15 mm, i.d. 8.5 mm	2	Bl1202 105			M			
70	E83-121	Expansion vessel	1	Bl1172 103			B	CIMM Srl - Castello di Godego Italy	CP387 6L	
								Zilmet - Italy (alternative)	13C0000600	
71	H27-566	Condensing heat exchanger outlet pipe	1	Bl1262 107			M			
72	169-069	Injectors with gaskets 130 - NG	14	Kl1064 505			B	Polidoro		
72 A	E01-156	Injectors with gaskets 75 - LPG	14	Bl1003 509			B	Polidoro		
73	173-148	Burner M96.24SM/C	1	Kl1004 102			B	Polidoro		
73 A	173-149	Burner M96.28SM/C, M96.28SR/C	1	Kl1004 147			B	Polidoro		
74	E83-122	Detection electrode	1	Bl1123 102			M			
75	E83-126	Ignition electrode - right	1	Bl1123 103			M			
76	E83-127	Ignition electrode - left	1	Bl1123 101			M			
77	169-125	Grommet	1	Bl1002 115			M			
78	409-736	Tapping screw 3,5x9,5 recessed pan head	24	Bl1013 115			F			

# CONTINUATION SHEET

Sheet 4 of 7

Appliance number(s) , , 41-970-12

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
79	409-531	Taptite screw M4x8 Recessed pan head Hardened steel	4	BI1013 111			F			
		Bright Zinc Plated BS3382 Clear passivated and lanolin								
		Dipped								
80	402-124	Machine Screw M4x8 mm Recessed pan head Mild steel	2	BI1013 114			F			
		BS4183 Bright zinc plate BS3382 Clear passiv.								
81 A	H03-746	Gas valve	1	BI1193105			B	Sit	845 Sigma	
81 B	H21-018	Gas valve on-off operator coils		BI1093 107			B	Sit	0.967.158	
82	H21-019	Gas pipe to the manifold	1	BI1213 100			M			
83	409-722	Tapping Screw ISO No8 B 4,2x9,5 Recessed Pan Head	34	BI1013 110			F			
		Hardened Steel BS4174 Bright Zinc plate BS1706 Clear								
		Passivated								
84	E83-131	Gas manifold with injectors NG M96.24SM/C	1	BI1183 103			B	Polidoro		
84 A	H21-021	Gas manifold with injectors LPG M96.24SM/C	1	BI1213 101			B	Polidoro		
84 B	E83-133	Gas manifold with injectors NG M96.28SM/C, M96.28SR/C	1	BI1183 105			B	Polidoro		
84 C	H21-023	Gas manifold with injectors LPG M96.28SM/C,	1	BI1213 102			B	Polidoro		
		M96.28SR/C								
85	H21-025	C.h. connection pipe	2	BI1124 100			M			
86	E83-136	Tap 3/4" - c.h.	2	BI1084 105			B			
88	E83-138	Tap 3/4" - gas	1	BI1084 100			B			
91	H21-029	Pipe 22 mm dia gas	1	BI1124 101			M			
93	E83-142	Full sequence control device	1	BI1305 101			B	Bertelli & Partners	FM30	
94	E83-144	O-ring gasket 1,78 x 6,75	1	BI1475 119			M			
95	E83-145	Temperature-pressure gauge	1	BI1475 108			M			
96		Cover panel	1			BI1605 108	M			
98	H27-577	Knob	1	BI1605 106			M			

# CONTINUATION SHEET

Sheet 5 of 7

Appliance number(s) , , 41-970-12

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
99	E83-149	Shaft	1	BI1475 105			M			
100	E83-150	Control panel plug	1	BI1475 110			M			
101	H27-578	Hinge plugs (couple)	1	BI1605 107			M			
102	H27-581	Control panel box M96.28SR/C	1	BI1605 105			M			
103	E83-152	Cable holder	8	KI1066 208			B	Fastpoint S.r.l.	1207.BB01 XS	
		Replacement for discontinued KI1066 102								
104	E83-153	Terminal block	2	BI1475 109			B	Elettrogibi	PA27	
								Odoardo Korner (alternative)	OK-433-FV	
105	409-727	Screw 3,5x16 mm self tap RPH	4	BI1165 101			F			
106	H21-037	Electronic control p.c.b.	1	BI1605 100			M			
107	169-083	Fuse 1.6A	1	BI1005 105			B			
108	E83-155	Service panel cover	1	BI1475 111			M			
109	H21-038	Control panel cover	1	BI1605 101			M			
110	H21-039	External controls cover	1	BI1605 102			M			
111	409-902	Screw 3,5X9,5 mm self tap RPH stainless steel	2	BI1615 104			F			
112	H21-041	Fan cable	1	BI1615 100			M			
113	H21-042	Detection to trap wiring	1	BI1615 101			M			
114	H21-043	Trap to earth wiring	1	BI1615 102			M			
115	H21-044	Flame detection electrode cable	1	BI1615 103			M			
116	E83-160	Ignition electrode cable	2	BI1485 101			M			
117	E83-200	Pump cable	1	BI1485 114			M			
119	E83-164	Electronic control p.c.b. - ignition device connection cable	1	BI1485 104			M			
121	E83-166	C.h. flow switch, temp. probe cable and modulator cable	1	BI1485 106			M			
122	E83-168	Power supply and external control cable	1	BI1485 107			M			

# CONTINUATION SHEET

Sheet 6 of 7

Appliance number(s) , , 41-970-12

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
123	402-225	Machine Screw M5x10 Recessed Pan Head Mild steel	1	BI1035 109			F			
		BS4183 Bright zinc plate BS3382 Clear Passivated								
124	164-133	Toothed lock washer external 5,3x10 mm stainless	2	BI1035 110			F			
125	404-609	Full nut M5 Hexagon Steel grade 8 BS3692 Bright zinc	1	BI1035 111			F			
		plate BS3382 clear passivated								
126	E83-169	Earth wiring	1	BI1485 108			M			
127	E83-170	Gas valve cable	1	BI1485 109			M			
128	169-110	Flue pipe gasket	1	BI1016 104			M			
129	H21-045	Flue outlet gasket	1	BI1406 112			M			
130	169-127	Air pressure switch M96.24SM/C	1	KI1267 103			B	Yamatake-Honeywell	C6065 0,88 mbar	
130 A	H27-582	Air pressure switch M96.28SM/C, M96.28SR/C	1	BI1376 104			B	Yamatake-Honeywell	C6065 1,38 mbar	
131	E83-188	Venturi device tube	1	BI1256 101			M			
132	H21-047	Fan outlet gasket	1	BI1406 113			M			
133	H21-048	Fan M96.24SM/C	1	BI1406 100			B	FIME	GR 02445 47W	
133 A	H21-049	Fan M96.28SM/C, M96.28SR/C	1	BI1406 101			B	FIME	GR 02440 60W	
134	H21-050	Flue hood M96.24SM/C	1	BI1406 108			M			
134 A	H21-051	Flue hood M96.28SM/C, M96.28SR/C	1	BI1406 109			M			
135	H21-052	Side case panel	2	BI1406 106			M			
136	H21-054	Air deflector - right	1	BI1406 114			M			
137	E83-178	Combustion chamber side panel	2	BI1326 100			M			
138	H21-055	Combustion chamber front panel M96.24SM/C	1	BI1406 103			M			
138 A	H21-056	Combustion chamber front panel M96.28SM/C,	1	BI1406 104			M			
		M96.28SR/C								
139	409-702	Screw 4,2x13 mm AB self tapping RPH BZP	2	BI1336 115			F			
140	H21-057	Front case panel	1	BI1406 107			M			

# CONTINUATION SHEET

Sheet 7 of 7

Appliance number(s) , , 41-970-12

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Key no.	GC Part Number	Description	No. Off	Makers part number which have a CG number	Maker's old part number which have since been changed	Maker's new part number which DO NOT have a GC number	M B F	Original Supplier	Original Supplier part number	Retail price excl. VAT
141	E69-243	Window (glass + rubber frame)	1	BI1206 118			M			
142	409-747	Screw 4,8x13 mm AB self tapping RPH BZP	4	BI1336 114			F			
143	H21-059	Sealed chamber lid	1	BI1406 105			M			
144	H21-060	Sealed chamber gaskets kit	1	BI1406 500			M			
145	E83-180	Combustion chamber rear panel M96.24SM/C	1	BI1326 107			M			
145 A	E83-181	Combustion chamber rear panel M96.28SM/C,	1	BI1326 108			M			
		M96.28SR/C								
146	H21-062	Fan holder bracket	1	BI1406 110			M			
147	H21-063	Fan inlet gasket	1	BI1406 111			M			
148	H03-695	Venturi	1	BI1366 100			M			
149	E01-187	Flue pressure switch tube	1	BI1016 107			M			
150	E05-424	Air switch pressure test point	2	BI1036 101			M			
151	H21-064	Flue thermostat	1	BI1262 104			M	IMIT	542080 120° C	
152	402-123	Screw M4x6 - BZP RPH	2	BI1406 117			F			
153	H21-070	Air restrictor d. 50	1	BI1406 115			M			
153 A	H21-071	Air restrictor d. 55	1	BI1406 116			M			
154	E01-184	Gasket - Air intake twin kit	1	BI1016 101			M			