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

User manual and Installation instructions

GARDA PLUS HE

Models

M110.24SM/E

M110.32SM/E





Congratulations on your choice.

GARDA PLUS 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.

GARDA PLUS 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.

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 fibres

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 I_{2H} Gas G20 20 mbar

Country of destination: United Kingdom (GB) Ireland (IE)

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.

✓ This boiler allows to control the flow temperature of the central heating system at very low levels.

In case of underfloor heating system a temperature limiting device (e.g. a safety thermostat) is recommended to stop the boiler in case that the water temperature exceeds the design temperature.

✓ 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.

✓ 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

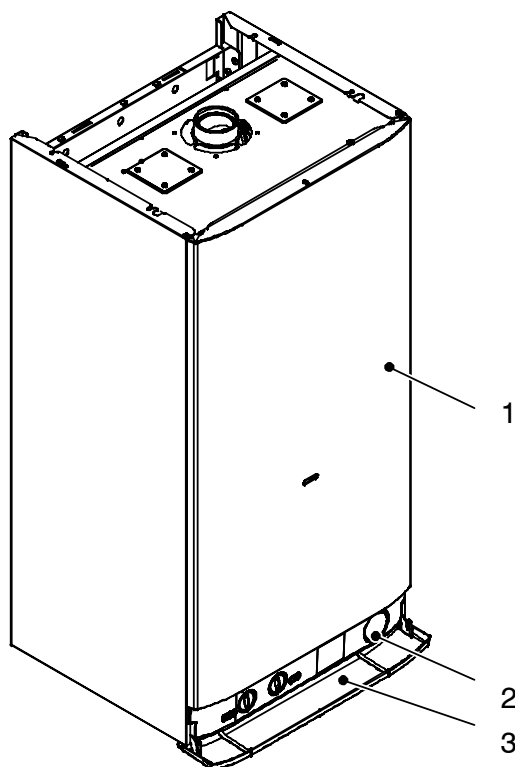


Fig. 1.1

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

1.3 Isolation valves

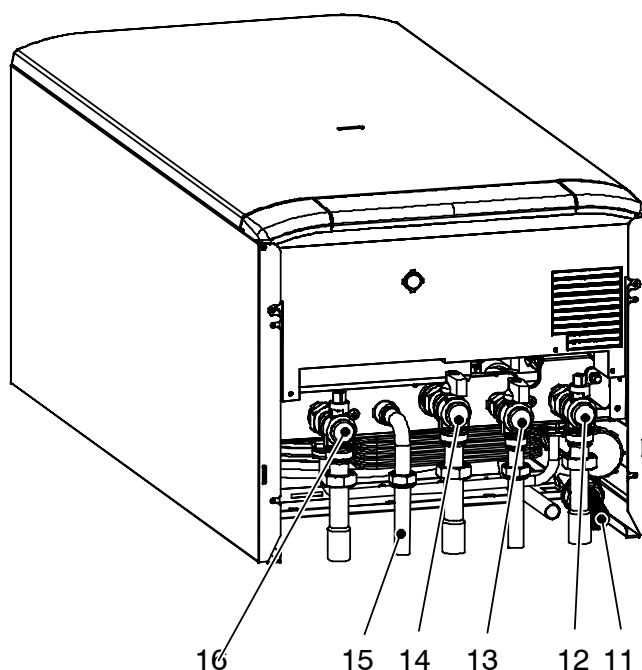


Fig. 1.2 (bottom view of the boiler)

- 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 4.3 or 4.4 of this manual.

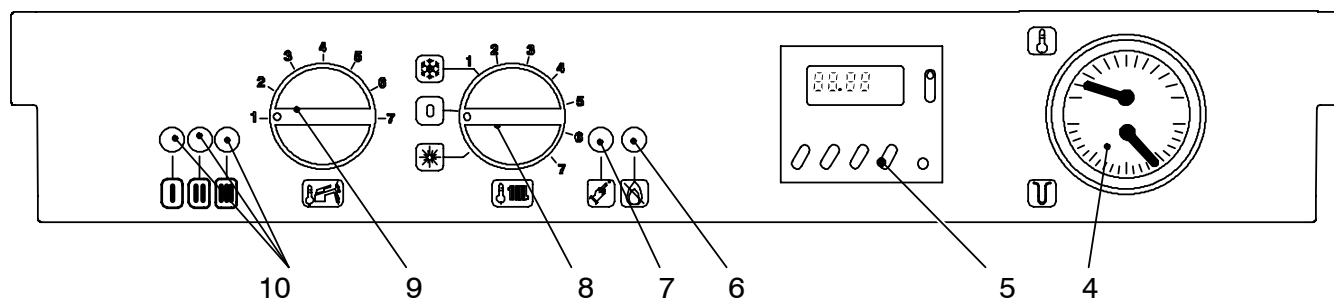





















Fig. 1.3

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 during the normal operation of the boiler.





































  	
  	A short pulse every 4 seconds: stand-by condition Function selector in  position. Anti-freeze system active
  	C.h. operation
  	D.h.w. operation
  	Frost protect operation
  	D.h.w. operation Excessive temperature on primary circuit

If the lights combination observed is not included in the above table a fault may be indicated.

Reference should be made to the following table.

In this case switch off the boiler, as described in section 2.6 on page 7 and call a competent and responsible service engineer.





  	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
  	Safety thermostat lock out
  	Faulty fan control system
  	Flue temperature probe NTC lock out
  	Open flue temperature probe NTC
  	Faulty external temp. probe (if fitted)
  	Flame detection error
  	Other faults
  	Lack of power supply or faulty electronic control p.c.b.

Meaning of symbols

 Lamp OFF

 Lamp ON

 Flashing lamp, alone or simultaneously with an other lamp.

 Flashing lamp, alternate with another lamp.

2 Instructions for use

2.1 Warnings

Biasi UK Ltd support the Benchmark initiative. The Benchmark Log Book is located at the back of this manual and should be completed by the Installing/Commissioning Engineer and handed over to the User for future reference by other visiting Engineers. Also included is the Service Interval Record card that should be completed by the Service Engineer following the annual service maintenance of the boiler and system.

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 5 °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 7.

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.

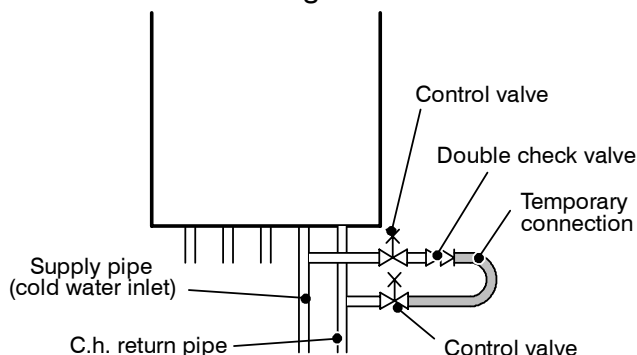


Fig. 2.1

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

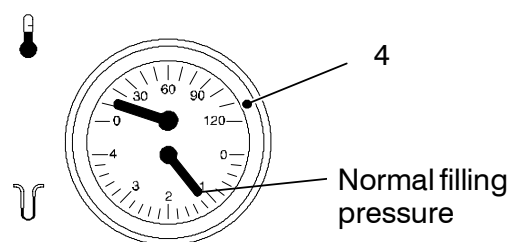


Fig. 2.2

- 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).

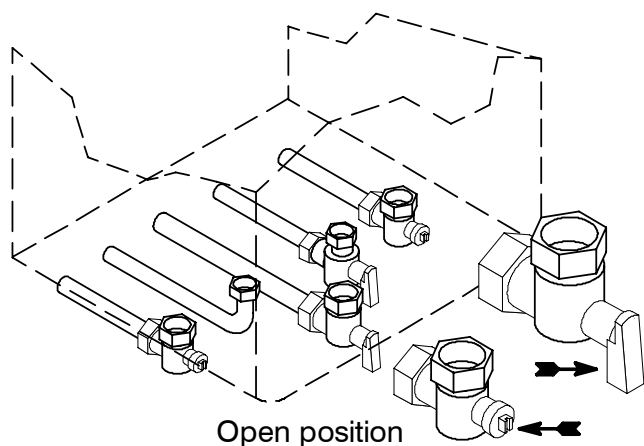


Fig. 2.3

- 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. The appliance operation light 10 will flash every 2 seconds (operating boiler).

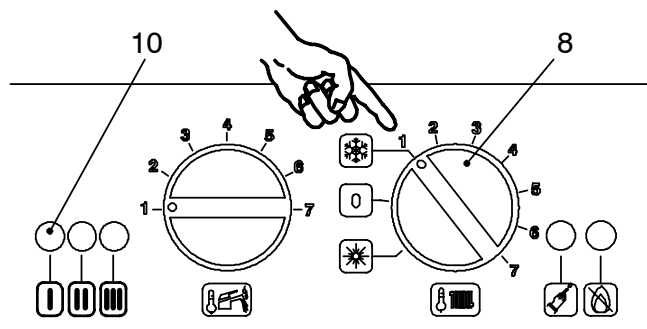


Fig. 2.4

- 4 If d.h.w. supply only is required, position the function selector 8 as in Fig. 2.5. The appliance operation light 10 will flash every 2 seconds (operating boiler).

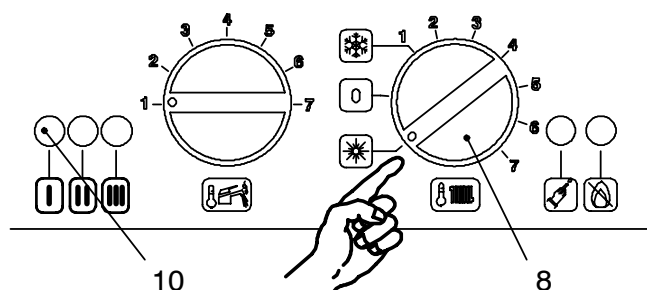


Fig. 2.5

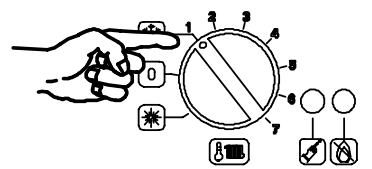
2.4 C.h. circuit temperature

The output temperature of c.h. water is adjustable from a minimum of about 25°C to a maximum of about 85°C (Fig. 2.6), by turning the knob (8).

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.

It is possible to fit to this boiler an optional outside temperature sensor which helps to manage and control the boiler and system efficiency. The following instructions indicate how to set the output temperature of the c.h. water depending on whether the optional outside sensor has been fitted.

Minimum



Maximum

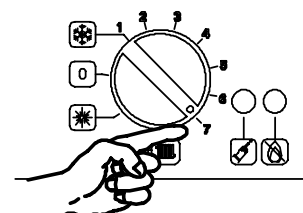


Fig. 2.6

Adjustment WITHOUT the external temperature probe (optional) fitted

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:

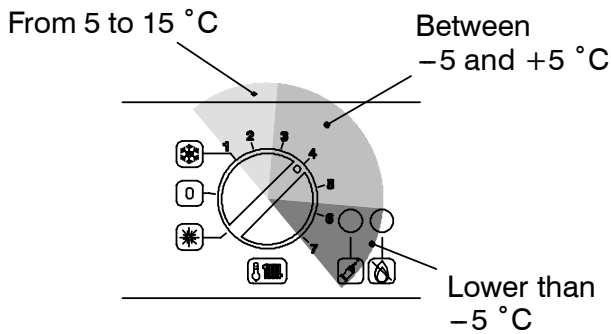


Fig. 2.7

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.

Adjustment WITH the external temperature probe (optional)

When the boiler is connected to the external temperature probe (optional), the temperature of the c.h. flow is automatically adjusted with reference to the external temperature.

In this case the boiler must be properly set by the installer (as described in section 7.9 of this manual) and the c.h. flow temperature control knob must be positioned as illustrated in Fig. 2.8.

To satisfy temporary changes or different room temperatures, the c.h. water temperature can also be manually increased or decreased within a range of ± 15 °C by turning the knob 8 (Fig. 2.8). More details are given in section 7.9 of this manual.

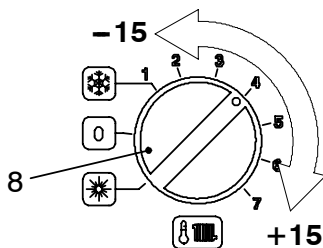
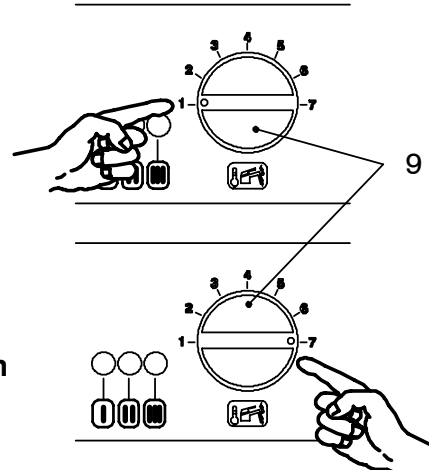


Fig. 2.8

2.5 D.h.w. temperature

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.

Minimum



Maximum

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.

Where lime scale is present in the water supply (hard water areas) it is also advisable not to exceed the setting position of the d.h.w. temperature control knob (9) as indicated in Fig. 2.10. This will help to minimise the incidences of scale deposits clogging the domestic hot water heat exchanger of the boiler.

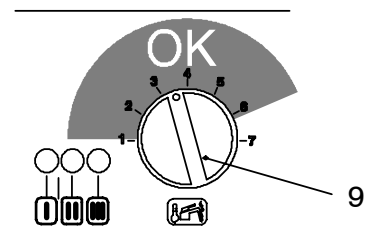


Fig. 2.10

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.

The appliance operation light 10 will flash every 4 seconds.

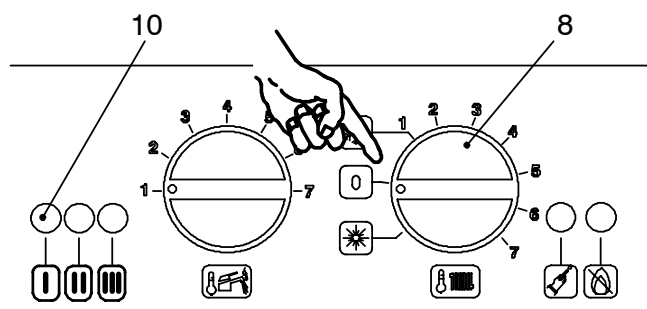


Fig. 2.11

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. 2.12).
- 3 Empty the water circuits, if necessary, as shown in the *installation instructions* in the section *maintenance*.

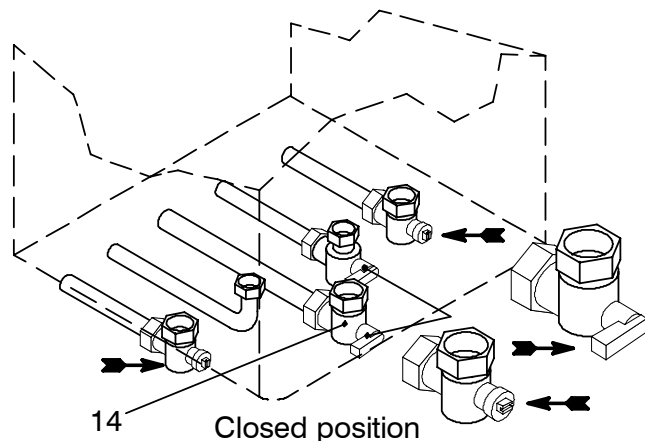


Fig. 2.12

2.7 Built in time switch

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.

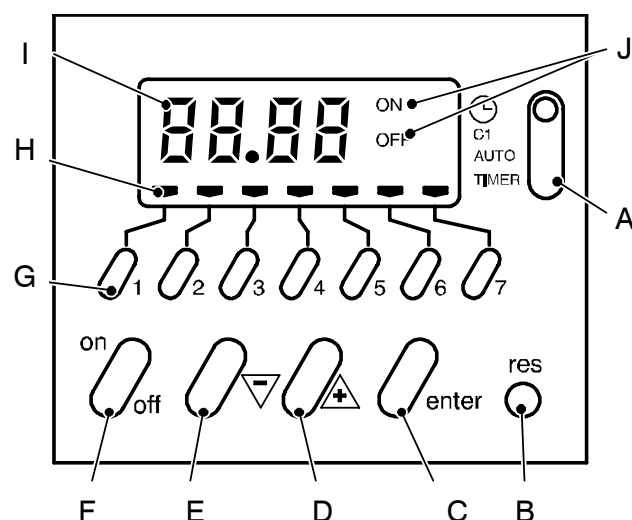


Fig. 2.13

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 Day selection buttons
- H Day display
- I Time display
- J ON-OFF display

Instructions for use

USE

Setting the current time and weekday

Note: with a new unit or when the reset button B has been pressed, the first day indicator H on the left and the time display I are 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 I.

Press the day selection button corresponding to the current day, considering that button 1=Monday, button 2=Tuesday and so on.

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

Setting example shown in Fig. 2.14:
Current time 16.30, day Thursday.

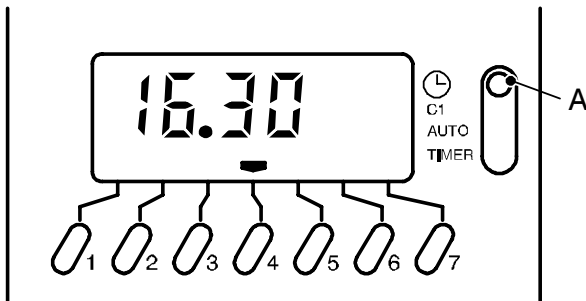


Fig. 2.14

Setting the switching time and day (or days)

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. 2.15 appears in the display.

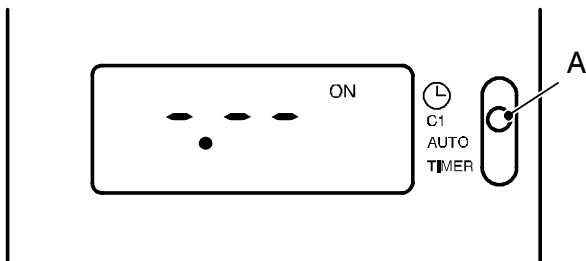


Fig. 2.15

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

Press the buttons G to set the desired day or days of operation.

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. 2.16:

A – ON time 7.45, day Monday to Friday.

B – OFF time 10.30, day Monday to Friday.

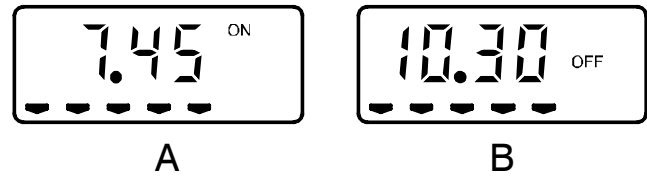


Fig. 2.16

Activating the timed settings

Set the mode selector switch A to the **AUTO** position shown in Fig. 2.17.

The current time and day appears in the display. The ON-OFF display J indicates the current state of operation (according to the settings).

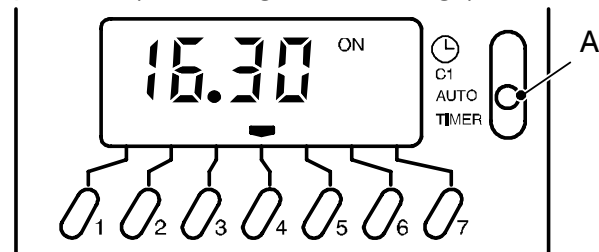


Fig. 2.17

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 J 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. 2.15 appears in the display.

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

The day display H gives a flashing indication of the active day or group of days.

Changing or deleting the timed settings

Set the mode selector switch A to the **C1** position. The symbols shown in Fig. 2.15 appears in the display.

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

The day display H gives a flashing indication of the active day or group of days.

Press the button (or the buttons) G corresponding to the day (or days) for which it is intended to apply the modification. The corresponding day display stops flashing and a new switching time can be set 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. 2.15 appears in the time display I.

The new settings are memorised 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. 2.18 appears on the display.

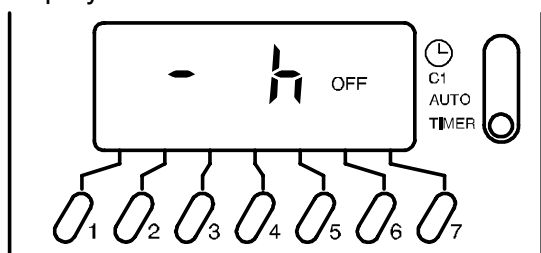


Fig. 2.18

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 J 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. 2.18 appears in the display and then set the mode selector switch A to the **AUTO** position

Setting example shown in Fig. 2.19: forced ON state for 4 hours.

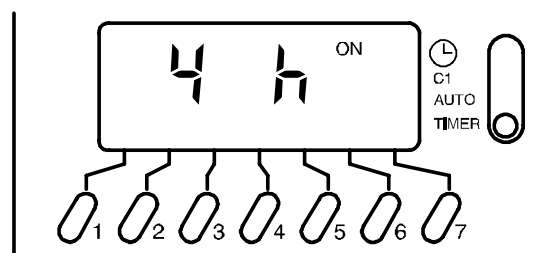


Fig. 2.19

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 and day.

3 Useful advice

3.1 Central heating

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).

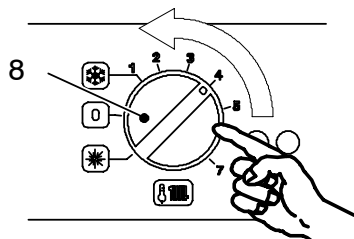


Fig. 3.1

3.2 Frost protection

This appliance is provided with a built in anti-freeze system that operates the boiler when the temperature is below 5 °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:

- domestic hot water heat exchanger;
- condensing 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 (6 in Fig. 3.2) comes on

this indicates that the safety lock – out has stopped the boiler.

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

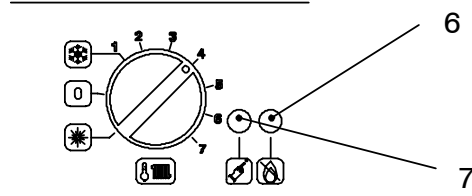


Fig. 3.2

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.

After five consecutive resetting attempts the reset button is inhibited. To restore its function it is necessary to switch the boiler off and on from the electrical mains, using the fused spur isolation switch fitted adjacent to the appliance.

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 cleanness.

In this case and 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.

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. 2.12 on page 7) and call an Authorised Service Centre Engineer.

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 7 and call a competent and responsible service engineer.

4 Technical information

4.1 Overview

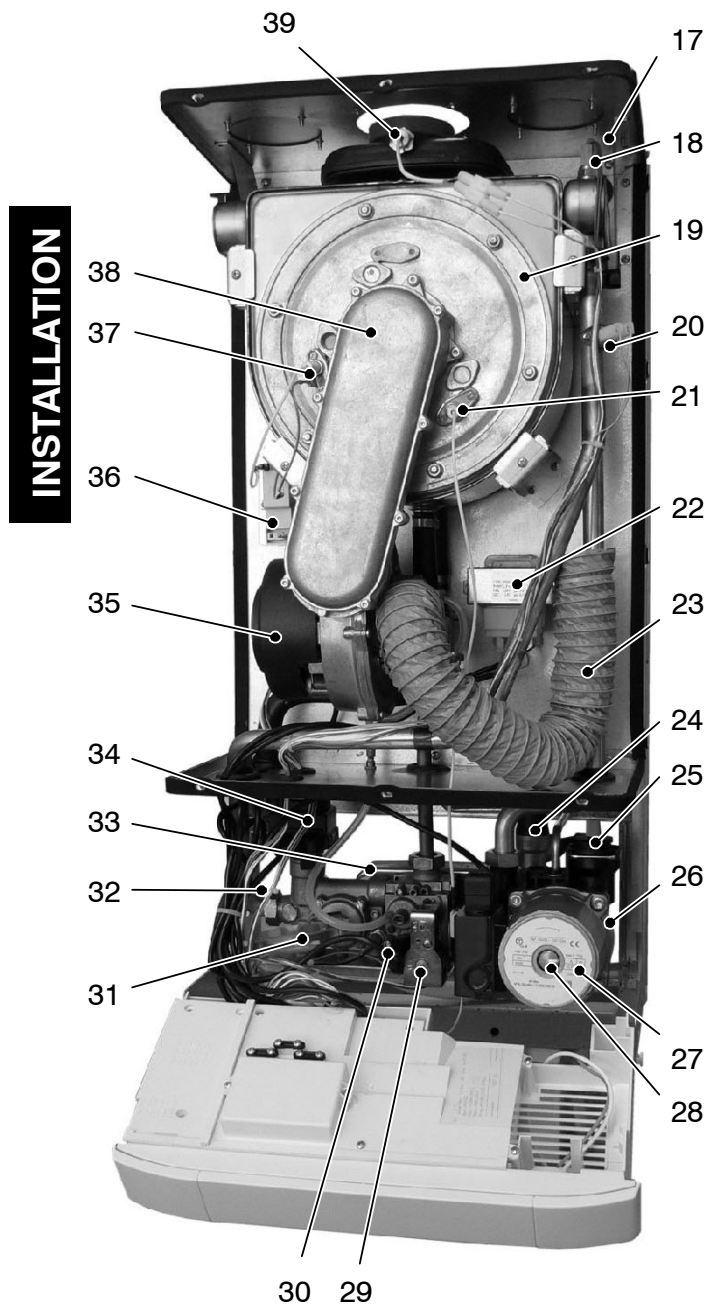
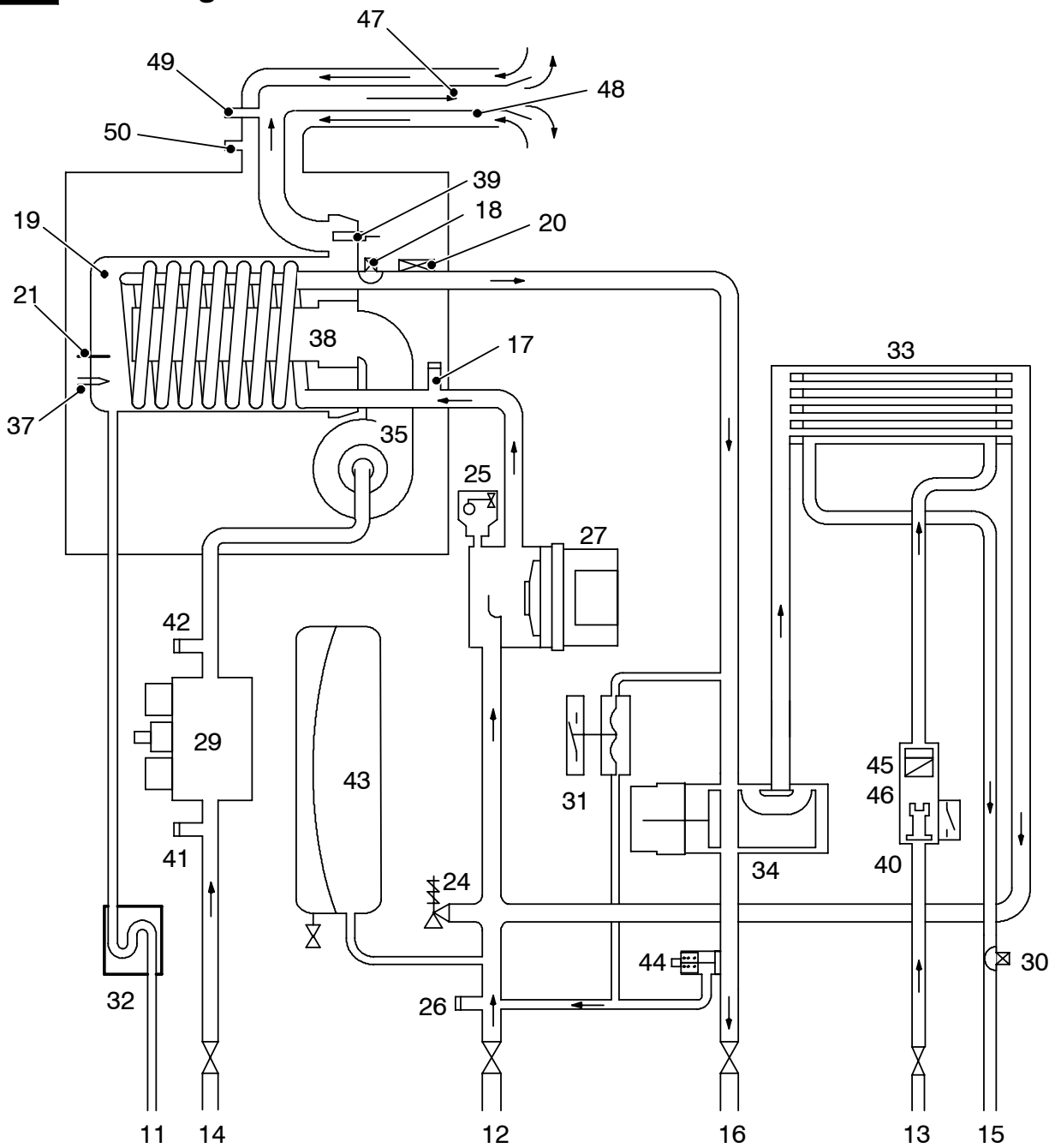


Fig. 4.1

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

4.2 Main diagram



INSTALLATION

Fig. 4.2

4.3 Technical data mod. M110.24SM/...

Heat input			
Nominal	net (A)	kW	25,0
		BTU/h	85 295
	gross (B)	kW	27,8
		BTU/h	94 848
Minimum	net (A)	kW	6,0
		BTU/h	20 470
	gross (B)	kW	6,6
		BTU/h	22 518

Useful output			
Maximum			
	kW	24,4	
	BTU/h	83 248	
Minimum			
	kW	5,8	
	BTU/h	19 788	
Maximum condensing			
	kW	26,3	
	BTU/h	89 730	
Minimum condensing			
	kW	6,3	
	BTU/h	21 494	

Central heating			
Maximum flow temp.	°C	85	
Minimum flow temp.	°C	25	
Maximum pressure	kPa	300	
	bar	3	
Minimum pressure	kPa	30	
	bar	0,3	
Available head (in 1000 l/h)	kPa	23	
	bar	0,23	
Seasonal efficiency (C)	band	A	
	%	90,0	

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 (D)	l/min	12,4	
35° rise (D)	l/min	10,4	
40° rise (D)	l/min	9,1	

Gas supply pressure G20			
Norm.	Pa	2 000	
	mbar	20	
Max	Pa	2 500	
	mbar	25	
Min.	Pa	1 700	
	mbar	17	
1 mbar approximately equals 10 mm H ₂ O			

Gas rate			
Max.	m ³ /h	2,65	
Min.	m ³ /h	0,63	

Restrictors references			
Gas		5,65	
Air		Fuchsia	

(A) referred to the net calorific value at 15 °C and 1013,25 mbar: G 20 = 34,02 MJ/m³

(B) referred to the gross calorific value at 15 °C and 1013,25 mbar: G 20 = 37,78 MJ/m³

(C) 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.

(D) Values subject to tolerance

Electrical Data		
Voltage	V~	230
Frequency	Hz	50
Power consumption	W	108
Protection degree		IPX4D
External fuse rating	A	3
Internal fuse rating	A	3,15 AF

Flue design		
Flue pipe diameter		
Coaxial	mm	60/100
Twin split pipes	mm	80
Roof	mm	80/125
Nominal heat flow rate (A)(E)	kW	25,0
Exhaust temperature (E)	°C	85
Smoke production (E)	kg/h	42

CO ₂ contents		
CO ₂ content (range min – max)	%	8,3–9,3
At nominal heat input of 25,0 kW (A)(E)		
CO ₂ content (range min – max)	%	8,8–9,0
At minimum heat input of 6,0 kW (A)(E)		

Other flue gas figures		
At nominal heat input – non condensing		
O ₂ content	%	4,8
CO content	ppm	150
Exhaust temperature	°C	85

Other specifications		
Height	mm	803
Width	mm	400
Depth	mm	350
Weight (dry)	kg	45
Water volume in the boiler (up to 1 bar)	l (kg)	2

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

4.4 Technical data mod. M110.32SM/...

Heat input			
Nominal	net (A)	kW	33,5
		BTU/h	114 295
	gross (B)	kW	37,2
		BTU/h	126 920
Minimum	net (A)	kW	11,0
		BTU/h	37 530
	gross (B)	kW	12,2
		BTU/h	41 624

Useful output			
Maximum		kW	32,7
		BTU/h	111 566
Minimum		kW	10,6
		BTU/h	36 165
Maximum condensing		kW	35,1
		BTU/h	119 754
Minimum condensing		kW	11,6
		BTU/h	39 577

Central heating			
Maximum flow temp.	°C		85
Minimum flow temp.	°C		25
Maximum pressure	kPa		300
	bar		3
Minimum pressure	kPa		30
	bar		0,3
Available head (in 1000 l/h)	kPa		23
	bar		0,23
Seasonal efficiency (C)	band		A
	%		90,0

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 (D)	l/min		16,5
35° rise (D)	l/min		14,0
40° rise (D)	l/min		12,1

Gas supply pressure G20			
Norm.	Pa		2 000
	mbar		20
Max	Pa		2 500
	mbar		25
Min.	Pa		1 700
	mbar		17
1 mbar approximately equals 10 mm H ₂ O			

Gas rate			
Max.	m ³ /h		3,54
Min.	m ³ /h		1,16

Restrictors references			
Gas			6,90
Air			Blue

(A) referred to the net calorific value at 15 °C and 1013,25 mbar : G 20 = 34,02 MJ/m³

(B) referred to the gross calorific value at 15 °C and 1013,25 mbar: G 20 = 37,78 MJ/m³

(C) 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.

(D) Values subject to tolerance

Electrical Data		
Voltage	V~	230
Frequency	Hz	50
Power consumption	W	125
Protection degree		IPX4D
External fuse rating	A	3
Internal fuse rating	A	3,15 AF

Flue design		
Flue pipe diameter		
Coaxial	mm	60/100
Twin split pipes	mm	80
Roof	mm	80/125
Nominal heat flow rate (A)(E)	kW	33,5
Exhaust temperature (E)	°C	80
Smoke production (E)	kg/h	58

CO ₂ contents		
CO ₂ content (range min – max)	%	8,3–9,3
At nominal heat input of 33,5 kW (A)(E)		
CO ₂ content (range min – max)	%	8,8–9,0
At minimum heat input of 11,0 kW (A)(E)		

Other flue gas figures		
At nominal heat input – non condensing		
O ₂ content	%	5,2
CO content	ppm	120
Exhaust temperature	°C	80

Other specifications		
Height	mm	803
Width	mm	400
Depth	mm	350
Weight (dry)	kg	46
Water volume in the boiler (up to 1 bar)	l (kg)	2,2

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

4.5 Hydraulic specifications

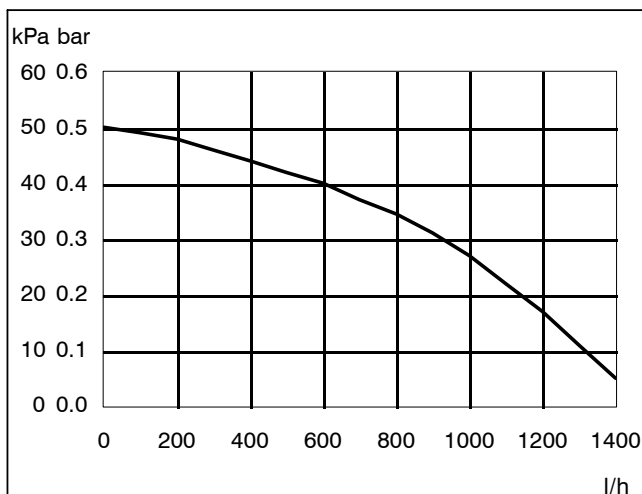


Fig. 4.3 model M110.24SM/...

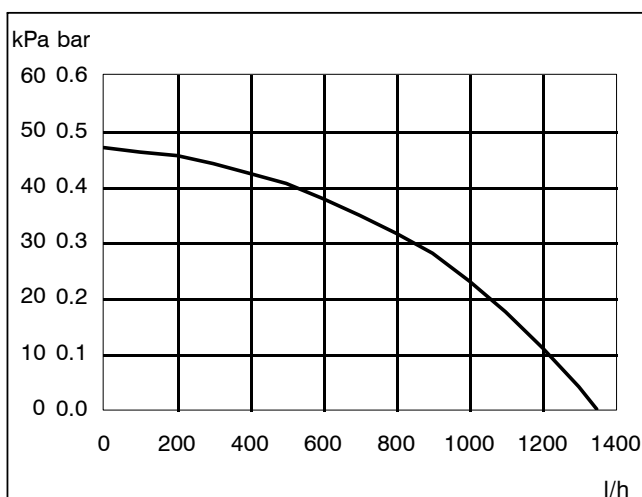


Fig. 4.4 model M110.32SM/...

The hydraulic specifications in Fig. 4.3 and 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.

Operation of integral By-pass valve

The boiler is fitted with an automatic by-pass valve (44 on page 12), which protects the primary heat exchanger.

The integral automatic by-pass will ensure a minimum flow through the primary heat exchanger of the boiler in the event that the flow around the central heating circuit is restricted due to closure of thermostatic or system control valves.

4.6 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 (43 on page 12) and the system, when cold, by 0.1 bar for each additional 1m.

Capacity	l	7,0
Pre-load pressure	kPa bar	100 1,0
Maximum volume of water in the system *	l	154

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 154l, an additional expansion vessel must be provided.

5 General requirements

Biasi UK Ltd support the Benchmark initiative. The Benchmark Log Book is located at the back of this manual and should be completed by the Installing/Commissioning Engineer and handed over to the User for future reference by other visiting Engineers. Also included is the Service Interval Record card that should be completed by the Service Engineer following the annual service maintenance of the boiler and system.

For Ireland (IE), it is necessary to complete a "Declaration of Conformity" to indicate compliance to I.S.813.2002.

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

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:

In Ireland (IE). The installation must be carried out by a Competent Person and installed in accordance with the current edition of I.S.813.2002 "Domestic Gas Installations" the current Building Regulations and reference should be made to the current ETCI rules for electrical installations.

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.

For Ireland (IE), reference should be made to the current edition of I.S.813.2002 and the current ETCI rules for electrical installations.

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.

For Ireland (IE), refer to I.S.813.2002.

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 plumbing must be considered.

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

General requirements

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

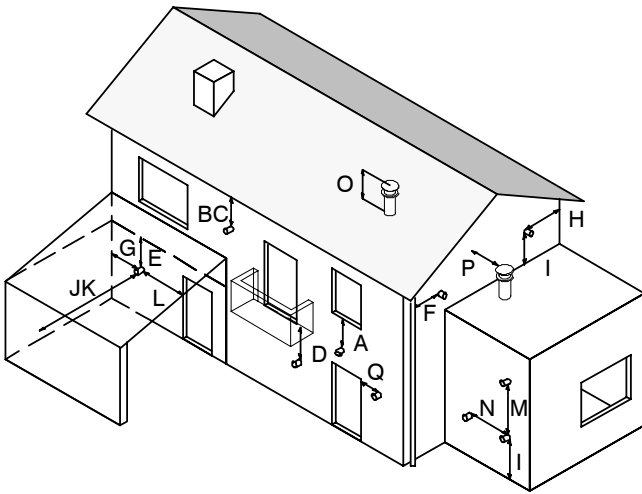


Fig. 5.1

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*	600
E . Below car port roof	NO
F . From vertical drain pipes and soil pipes	150
G . From internal corners**	450
H . From external corners	300
I . . Above ground or balcony level	300
J . From a surface facing a terminal	600
K . From a terminal facing a terminal	1 200
L . From an opening in the car port (e.g. door, window) into dwelling	NO
M . Vertically from a terminal in the same wall . .	1 500
N . Horizontally from a terminal in the same wall .	300
O . Above the roof pitch with roof slope less than or equal to 30°	350
Above the roof pitch with roof slope more than 30°	600
P . From wall face	600
Q . From, above or to side of an opening	300

*Wherever practicable to do so, the flue should be extended beyond the perimeter of the balcony

** Consideration should be given to adding protection against condensate to the adjacent structure

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.

For Ireland (IE), refer to I.S.813.2002.

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 (32 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.

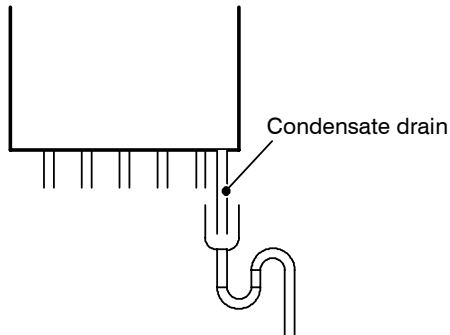


Fig. 5.2

5.8 Water circulation (c.h.)

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

For Ireland (IE), refer to I.S.813.2002.

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.

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.

The fitting of an external bypass helps to prevent and limit system noise.

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 18 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

General requirements

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.

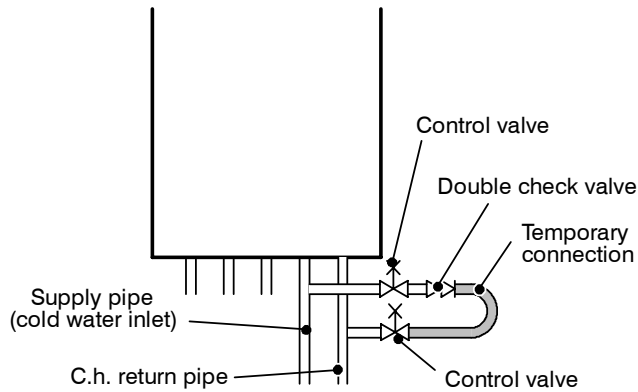


Fig. 5.3

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 used for pipework carrying potable water.

For Ireland (IE), refer to I.S.813.2002.

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.

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.

Reference should be made to the current ETCI rules for electrical installations.

For Ireland (IE), refer to I.S.813.2002.

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.

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.

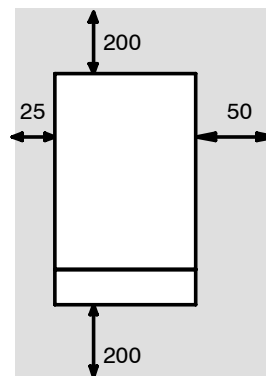


Fig. 6.1 (all dimensions in mm)

- 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).

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

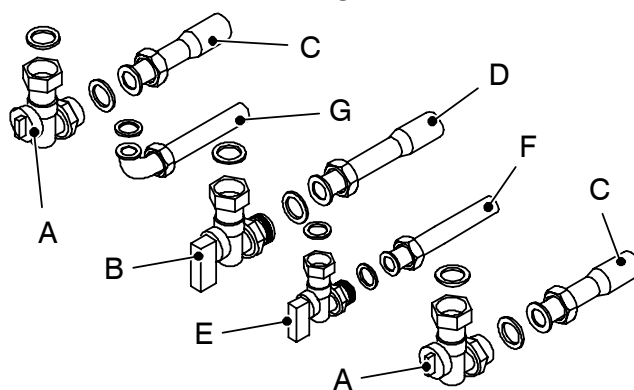
6.4 Overall dimensions



Functions	Pipe sizes (o.d)
Gas, c.h. return, c.h. flow	ø 22
D.c.w. inlet	ø 15
D.h.w. outlet	ø 15
Pressure relief valve	ø 15
Condensate drain	ø 25 (plastic)

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

- 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.



- 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.

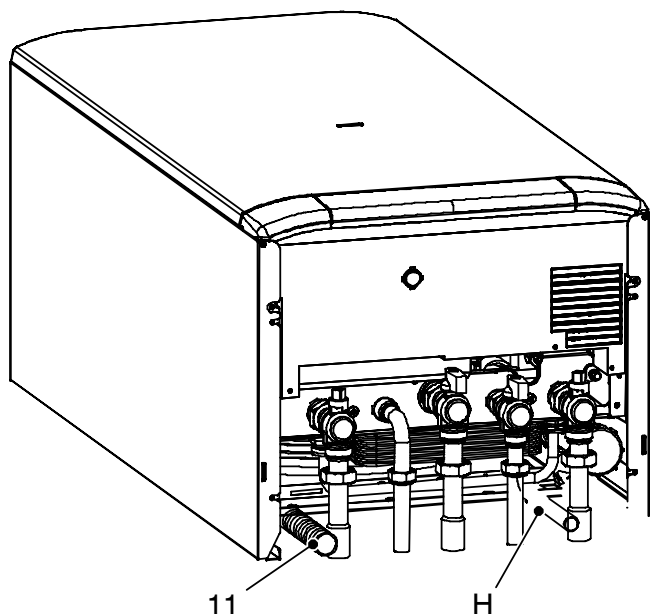


Fig. 6.4

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 10 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 10 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.

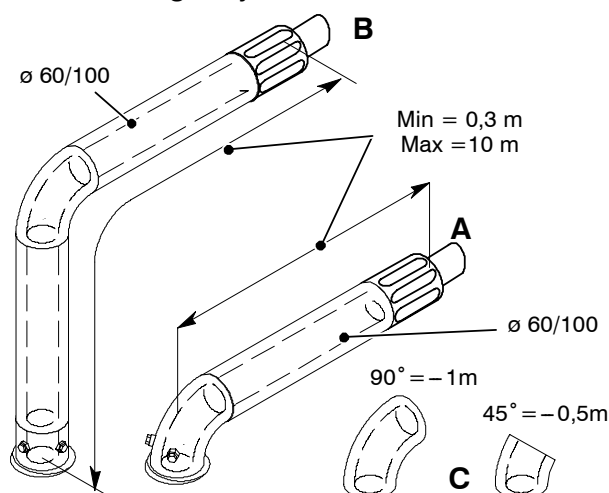


Fig. 6.5

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 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.

Referring to Fig. 6.6, the minimum length required for pipes a and b is 0.3 m.

Installation

Maximum equivalent length "a+b" of 40 metres can be achieved utilising extensions.

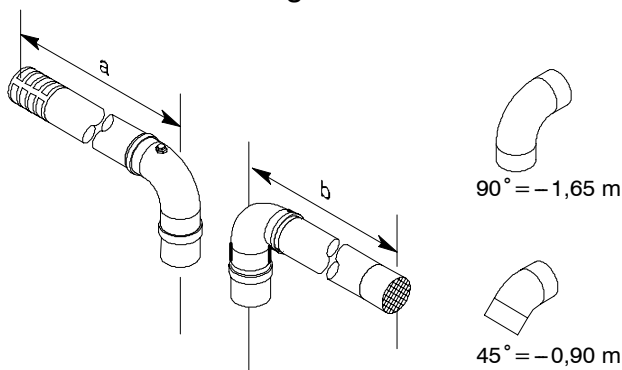


Fig. 6.6

Vertical – roof kit (Fig. 6.7)

Co-axial 80/125 mm

This kit allows vertical termination of the flue pipe through the roof. The kit is 1.2 min length. Extension pieces (Co-axial) are also available which allows the flue system to be extended to a total overall maximum permissible length of 10 m. 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.

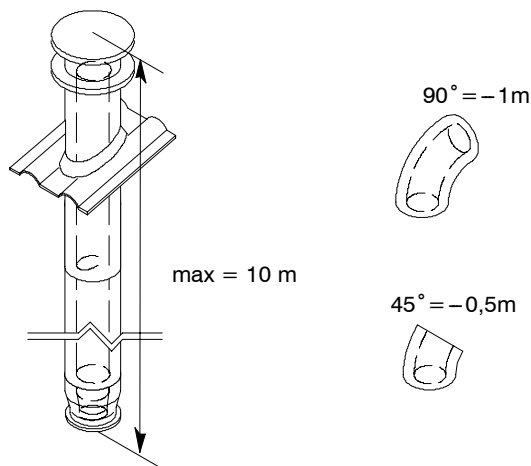


Fig. 6.7

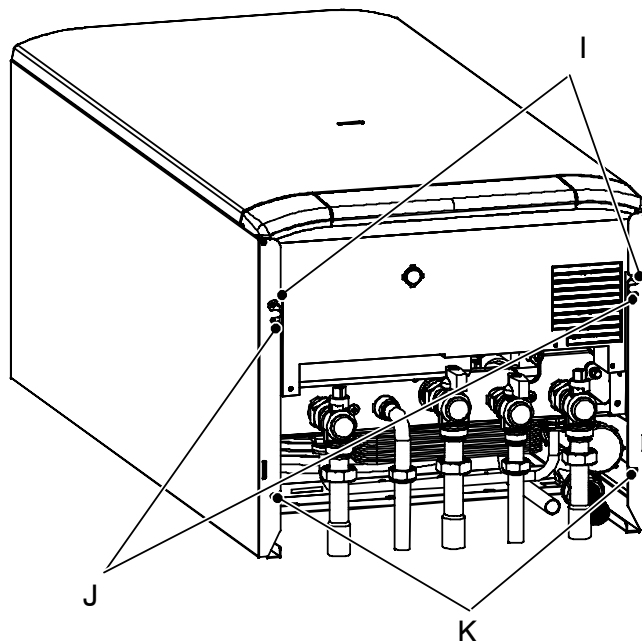


Fig. 6.8

- 4 Remove the side panels or move the lower part of the side panels as indicated in Fig. 6.9 and pull the control panel.

When completely pulled out, the panel can rotate 45° downwards to facilitate the operations on the internal parts.

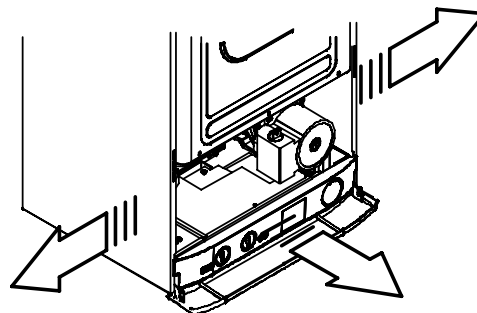


Fig. 6.9

- 5 Loosen the screws L and remove the service panel (Fig. 6.10).

6.9 Electrical connections

Connection to the electricity supply

- 1 Remove the front panel of the case (see the section 8.2 in this manual).
- 2 Remove the screws I and J (Fig. 6.8).
- 3 Loosen the screws K.

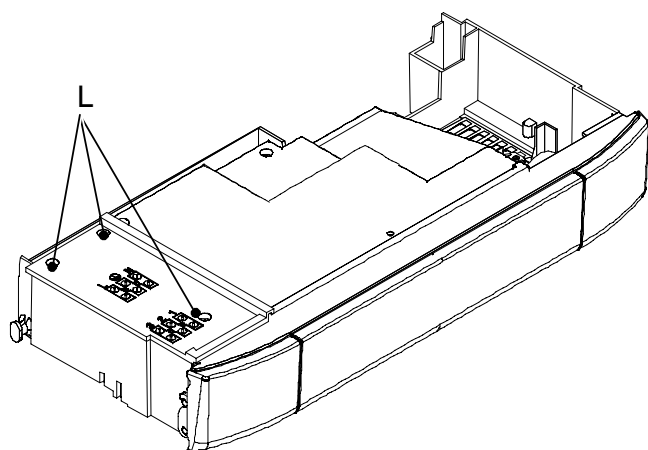


Fig. 6.10

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 mm²**.

- 6 Connect the electrical supply flexible cord coming from the fused spur isolation switch to the power supply terminal block of the boiler (Fig. 6.11) 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.

Any external controls and connection lines must be rated at 230 V but under no circumstances should external live voltage be connected to the room thermostat link on the boiler.

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

When connecting any type of external control, the link M in Fig. 6.11 must be removed.

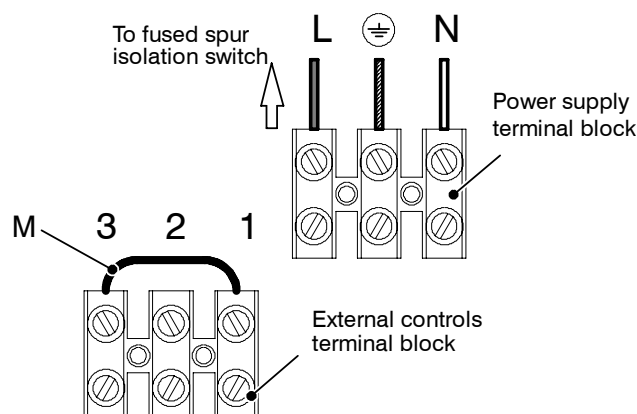


Fig. 6.11

- 8 Connect the room thermostat between terminals 1 and 3 as shown in Fig. 6.12 or Fig. 6.13.

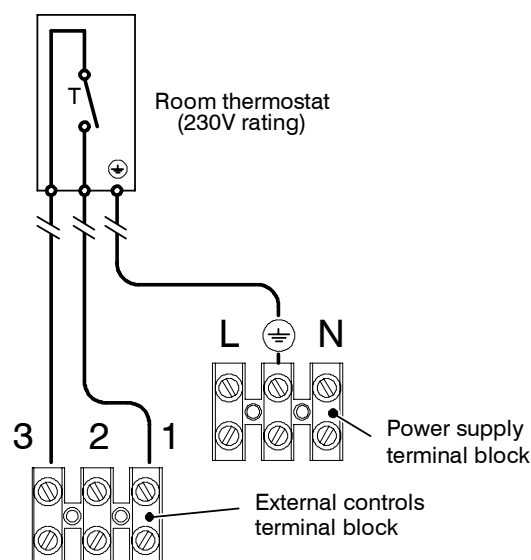


Fig. 6.12

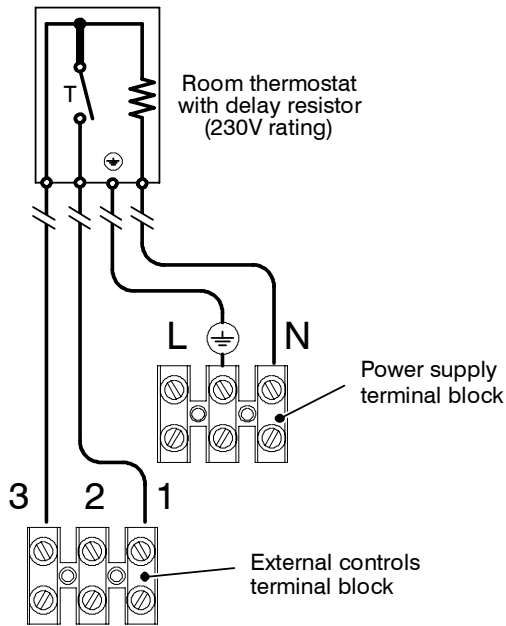


Fig. 6.13

- 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

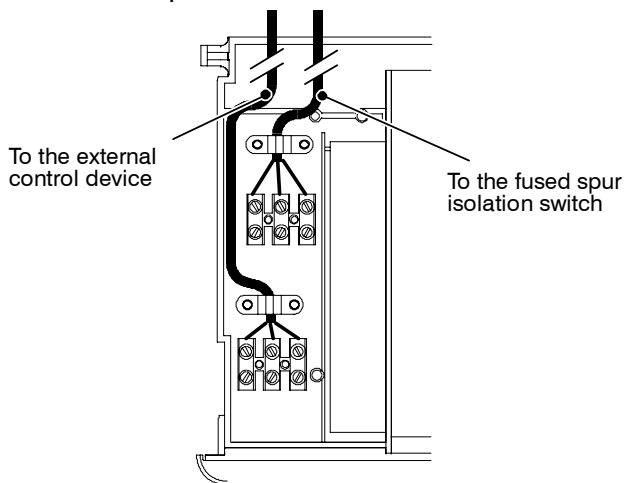


Fig. 6.14

6.10 External frost protection

- 10 Connect the frost thermostat between terminals 1 and 2 as shown in Fig. 6.15 or Fig. 6.16. **Do not connect live wires to terminals to which the frost thermostat must be connected.**

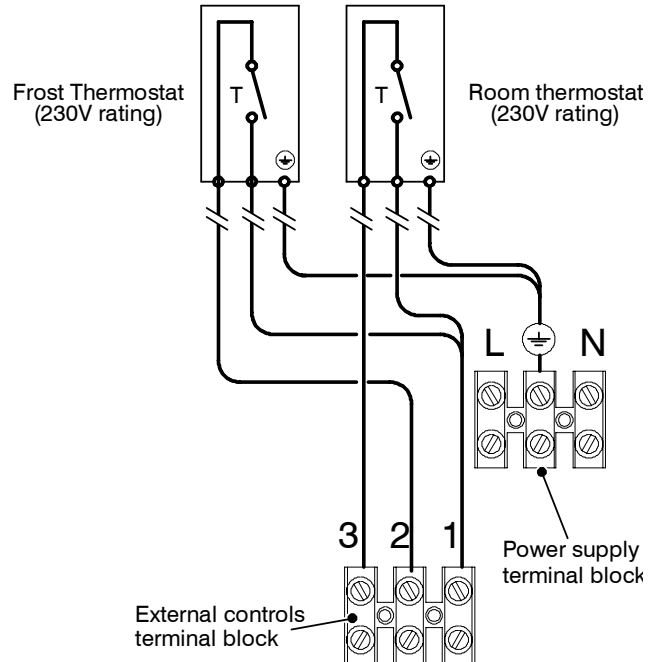


Fig. 6.15

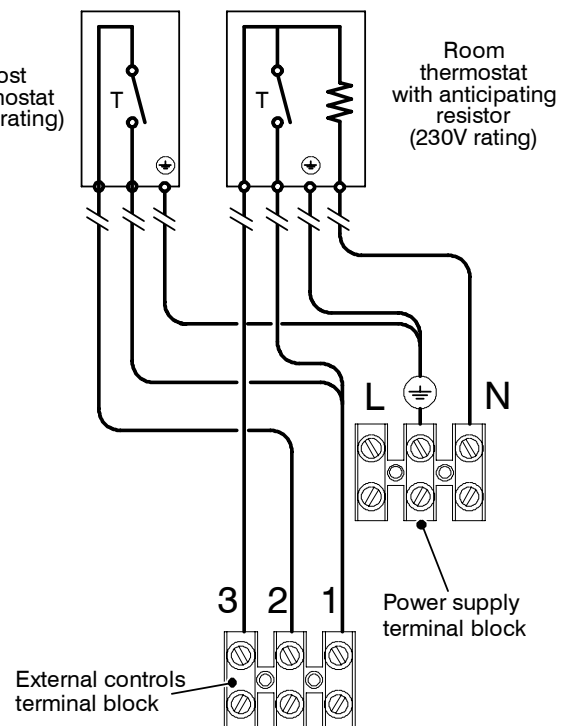


Fig. 6.16

6.11 External temperature probe (optional)

Location

The external temperature probe must be installed on an external wall of the building avoiding:

- the possibility of direct exposure to the sun's rays,
- places subject to humidity or mould,
- the proximity of fans, ventilation openings or flue terminals.

Connection

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 0,50 mm²**.

The connection wiring of the external temperature probe is part of a safety extra – low voltage circuit therefore it has to be routed through a duct separated from the mains voltage wirings.

The maximum allowable length of the wiring is 20 m.

For details concerning the connection of the probe to the boiler refer to the instructions given with the external temperature probe kit.

7 Commissioning

WARNING

The commissioning of this boiler and system must only be undertaken by a professionally qualified person in accordance with the requirements of the Gas Safety Installation and Use Regulations and be approved by C.O.R.G.I.

Ensure that the Benchmark Log Book is satisfactorily completed during the commissioning process. The Log Book is located at the end of this manual. This manual should be handed to the User following completion of the installation and commissioning process. Failure to comply with these requirements may invalidate the manufacturers guarantee.

For Ireland (IE), it is necessary to complete a "Declaration of Conformity" to indicate compliance to I.S.813.2002.

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;

For Ireland (IE), refer to I.S.813.2002.

- 2 Open the gas cock 14 (Fig. 7.1) on the appliance and check the gas connector on the appliance for leaks.

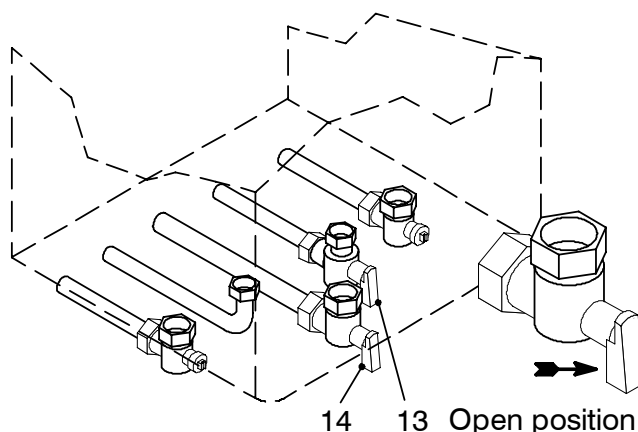


Fig. 7.1

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 and side panels of the case (see the section 8.2 in this manual) and the sealed chamber lid.
- 3 Unscrew the condensing heat exchanger air purger valve 17 (Fig. 7.2).

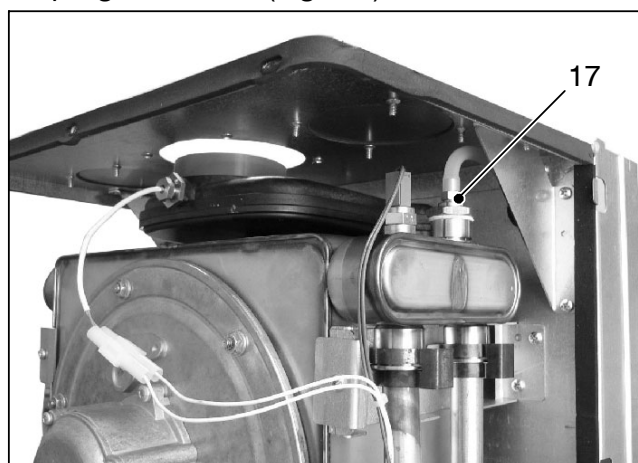


Fig. 7.2

- 4 Unscrew the cap on the automatic air purger valve 25 (Fig. 7.3) one full turn and leave open permanently.

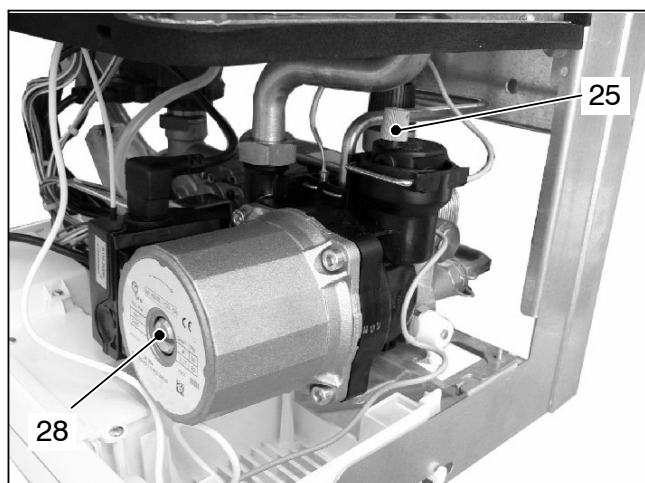


Fig. 7.3

- 5 Gradually open stopcock at the filling point connection to the c.h. system until water is heard to flow; do not open fully.
- 6 Close the condensing heat exchanger air purger valve 17 (Fig. 7.2) when water begins to flow out.
- 7 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.
- 8 Purge the air from the pump by unscrewing the pump plug 28 (Fig. 7.3); release the pump shaft by turning in the direction indicated by the arrow on the information plate.
- 9 Replace the pump plug.
- 10 Continue filling the system. The actual reading should ideally be 1,3 bar and not less than 0,3 bar.
- 11 Close all air release valves on the c.h. system.
- 12 Inspect the boiler and the system for water soundness and remedy any leaks discovered.
- 13 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 quan-

ties as specified by the appropriate manufacturer, whose function it is to dissolve any foreign matter which may be in the system.

INHIBITION (Primary Heating Circuit)

On the final refilling of the heating system it is important to ensure the system water is treated with a suitable scale and corrosion inhibitor in accordance with the manufacturers instructions.

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. 7.4. The appliance operation light 10 will flash every 2 seconds.

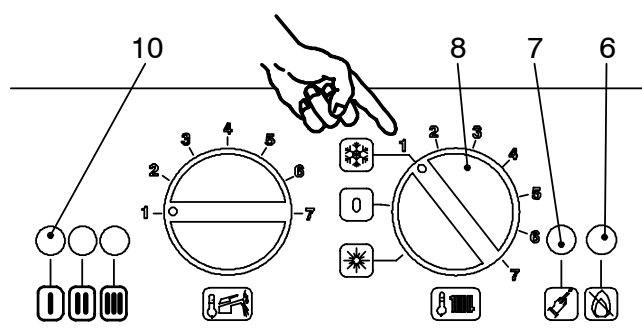


Fig. 7.4

Commissioning

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

If after four ignition attempts (about four minutes) the boiler fails to light, the boiler 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.

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.

After five consecutive resetting attempts the reset button is inhibited. To restore its function it is necessary to switch the boiler off and on from the electrical mains, using the fused spur isolation switch fitted adjacent to the appliance.

7.7 Checking the gas supply pressure

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 and the appliance does not need any particular adjustment.

However if there is variation to the gas supply pressure it is possible that a harmonic noise could resonate through the boiler during operation. In these circumstances it may be necessary to reset the gas valve in accordance with the section 11 Gas Valve of the Service Manual. It should be noted that a flue gas analyser is required for this procedure.

Checking the inlet pressure

- 1 Remove the front panel of the case (see section 8.2) and lower the control panel (see section 6.9).
- 2 Loosen the internal screw on the Inlet Pressure Test Point 41 (Fig. 7.5) of the Gas Valve and connect a pressure gauge using a suitable hose.

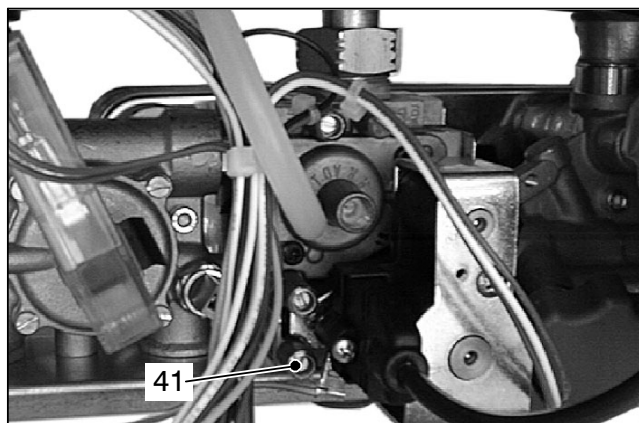


Fig. 7.5

- 3 Open the gas inlet valve (14 on page 2).
- 4 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.
- 5 Set the function knob 8 as illustrated in Fig. 7.6.

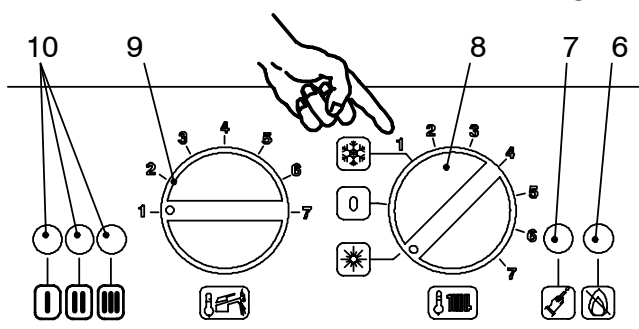


Fig. 7.6

- 6 Open at least one hot water tap fully.
- 7 Read the inlet pressure value and ensure that it is within the limits given in the table *Gas supply pressures*, sections 4.3 and 4.4 of this manual. If it does not comply with the required pressure check the gas supply line and governor for faults and/or correct adjustment.
- 8 Switch off the boiler **close the gas inlet valve** and close the water tap.
- 9 Disconnect the pressure gauge and close the Inlet Pressure Test Point 41 (Fig. 7.5).

Important: after the checks all of the test points must be sealed.

7.8 Maximum output in c.h. mode

The maximum useful output in c.h. mode of model can be varied and on model M110.32SM/... is factory set to 24 kW.

To change the maximum useful output value in c.h. mode refer to the *electronic control/ignition pcb* section of the service manual

7.9 External temperature probe setting (optional)

The external temperature probe (if fitted) allows to adjust automatically the temperature of the c.h. flow with reference to the external temperature.

The curves given in the chart of Fig. 7.7 represent the c.h. flow temperature setting as a function of the external temperature measured by the external temp. probe.

The relationship between the external temperature and the c.h. flow temperature is represented by the coefficient K (Fig. 7.7) that can be set between 0 and 6 as hereafter explained.

E.g. to obtain a flow temperature setting of 60 °C when the external temperature is -5 °C, K must be set to 1,5 (dashed line in Fig. 7.7).

C.h. flow temperature °C

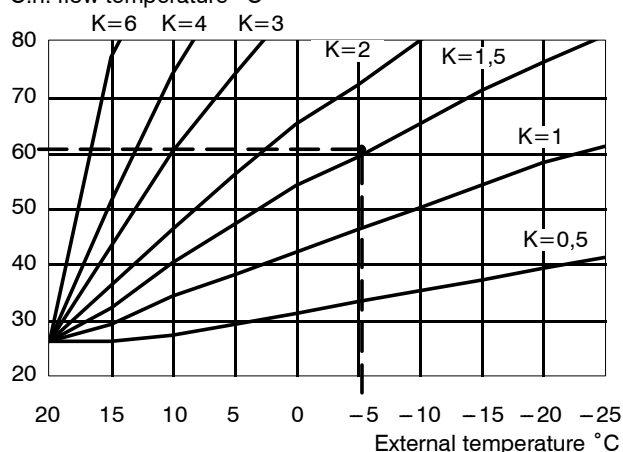


Fig. 7.7

The appropriate value of the coefficient K depends on the design temperatures of the c.h. system as the minimum external temperature and the corresponding c.h. flow temperature.

The coefficient K is factory set to 0 that is the setting for the operation with no external temperature probe fitted.

To set the coefficient K:

- 1 Turn on the electricity supply to the boiler, switching on the fused spur isolation switch.
- 2 Set the function knob 8 as illustrated in Fig. 7.8.

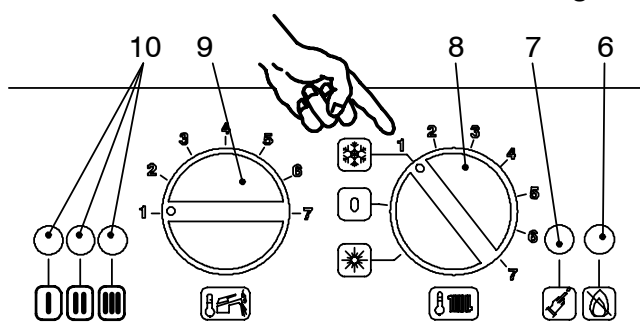


Fig. 7.8

- 3 Keep pressed the reset button 7 for about 10 seconds until the lock-out signal lamp 6 blinks.
- 4 The lamps should give the indication as in Fig. 7.9 (coefficient K setting). If not, press the reset button repeatedly to obtain it.

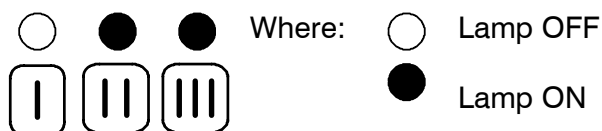


Fig. 7.9

- 5 To change the setting turn the knob 9 on a position corresponding to the desired coefficient K. By turning the knob 9, the lock-out signal lamp 6 blinks quickly (2 per seconds) indicating that the setting has changed and must be memorised.

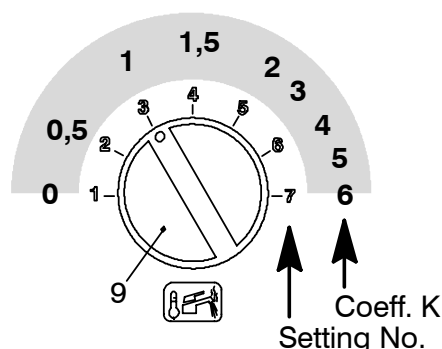


Fig. 7.10

- 6 To memorize the setting keep pressed the reset button 7 for about 5 seconds until the lights 10 briefly blinks simultaneously.
- 7 To reset the boiler to the normal operation turn it OFF and ON by the function selector knob 8.

Commissioning

In any case, the boiler automatically resets to its normal operation after 10 minutes.

After setting the coefficient K, position the knob 8 as shown in Fig. 7.11 in order to obtain the c.h. flow temperature accordingly with the chart of Fig. 7.7.

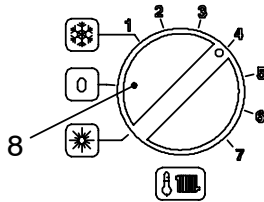


Fig. 7.11

However, the setting point of the c.h. flow temperature can be manually increased or decreased within a range of $\pm 15^\circ\text{C}$ by turning the knob 8.

The effect of the knob 8 for a coefficient K set to 1,5 is illustrated in Fig. 7.12.

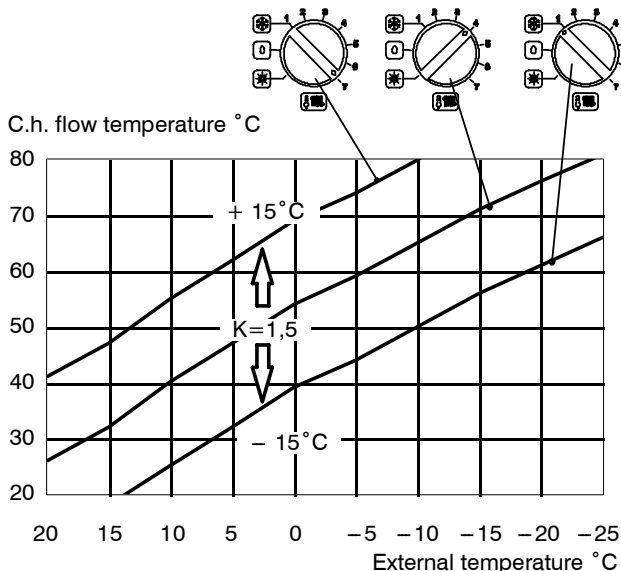


Fig. 7.12

7.10 Checking the ignition device

With the burner on high flame close the gas cock. After four ignition attempts (within about four minutes), 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 fixing 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 8.5 of this manual.

Reference figures are given in the sections 4.3 or 4.4 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 cleanness 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 Maintenance

8.1 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 Ireland (IE), the servicing work must be carried out by a competent Person

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.

8.2 Dismantling the external panels

Front panel

- 1 Loosen the three screws A (Fig. 8.1).
- 2 Lift and remove the panel B.

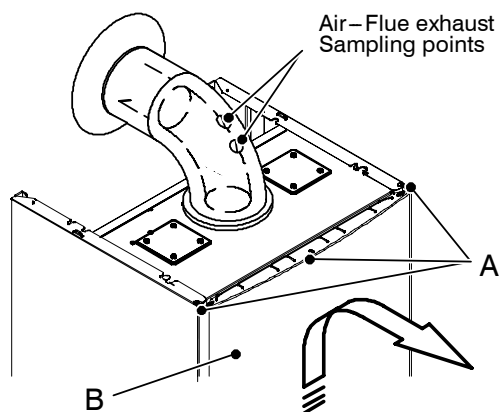


Fig. 8.1

Side panels

- 3 Loosen the screws C. Bring the bottom of the panels away from the boiler and lift them, freeing them from the top hooks (Fig. 8.2).

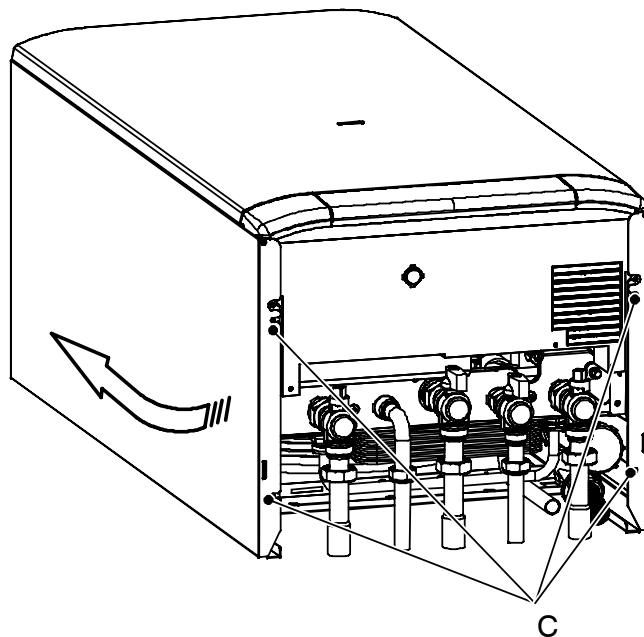


Fig. 8.2

8.3 Emptying the d.h.w. system

- 1 Turn off the d.c.w. inlet isolating valve (13 in Fig. 8.3) and turn on the hot water taps and any drain cocks.

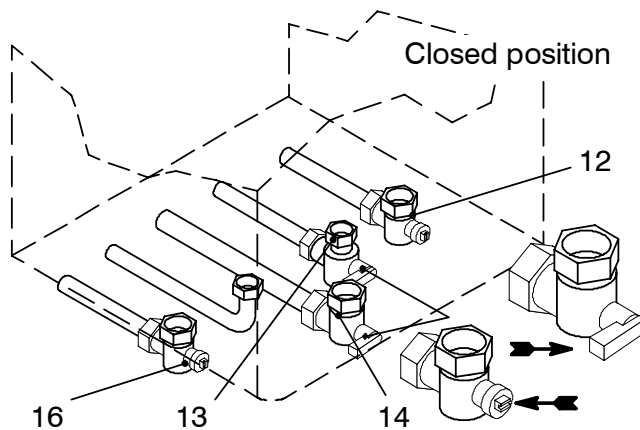


Fig. 8.3

8.4 Emptying the c.h. system

- 1 Close the c.h. isolating valves (12 and 16 in Fig. 8.3).
- 2 Open the central heating drain cock (26 in Fig. 8.4).

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.

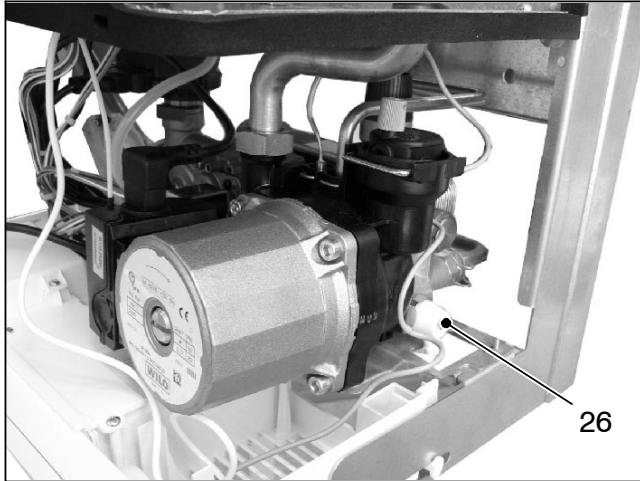


Fig. 8.4

MAINTENANCE

8.5 Combustion analysis check

If it is necessary to carry out a combustion analysis remove the plugs indicated in Fig. 8.1.

Reference figures are given in the sections 4.3 or 4.4 of this manual.

8.6 Cleaning the condensing heat exchanger and burner

To remove the burner–fan group D (Fig. 8.5):

- 1 Take off the front and side panels of the case.
- 2 Remove the sealed chamber lid.
- 3 Disconnect the connectors of the ignition electrodes E and detection electrode F (Fig. 8.5).
- 4 Disconnect the rubber pipe G (Fig. 8.6).
- 5 Unscrew the gas connector H.
- 6 Loosen (do not remove) the screw I.
- 7 Remove the screws J and the air box K. Leave the air box with the air hose clamped to the water pipe.
- 8 Remove the nuts L (Fig. 8.5) and the burner–fan group D.

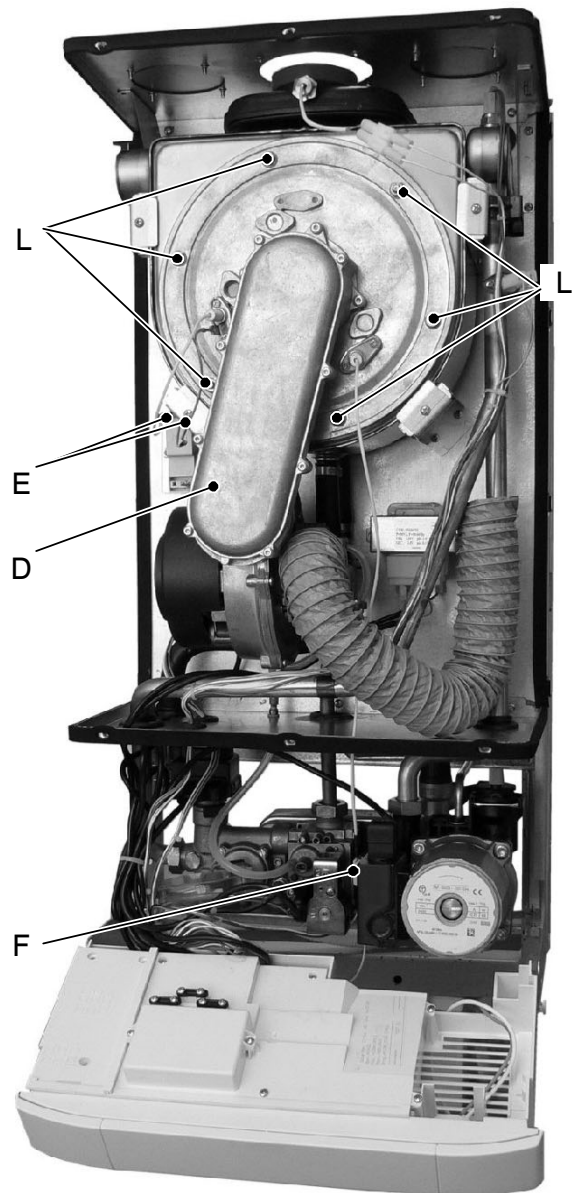


Fig. 8.5

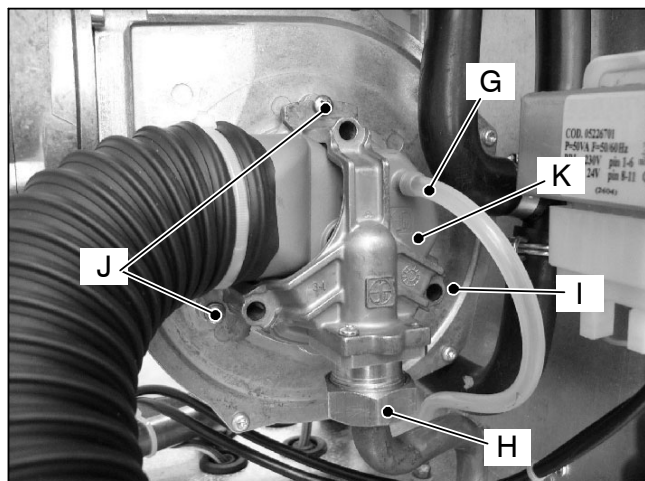


Fig. 8.6 (right side of the fan)

- 9 Disconnect the connector of the fan M by pressing the plastic hook N placed on the rear side of the connector (Fig. 8.7).

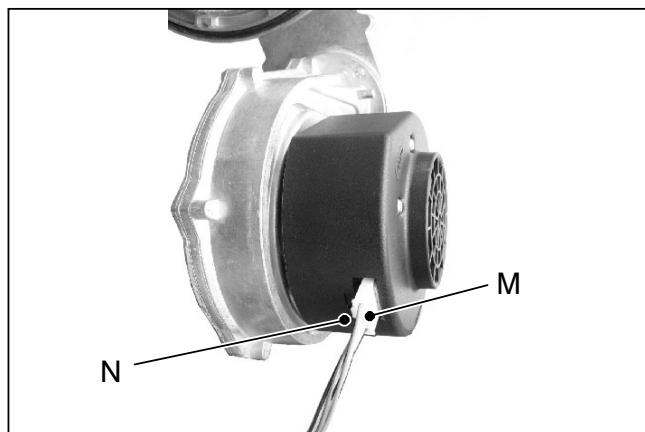


Fig. 8.7 (rear view of the fan)

If you notice dirt on the coil of the condensing heat exchanger (19 on page 12) brush out it with a bristle paintbrush and remove the dust with a Hoover.

Reassemble the parts carrying out the removal operations in reverse order.

8.7 Checking the pressurisation in the expansion vessel

Empty the central heating system as described in section 8.4 of this chapter and check that the pressure in the expansion vessel is not less than 1 bar. See also section 4.6 page 18 of this manual.

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

8.8 Cleaning the burner

The burner (38 on page 12) does not need special maintenance, but it is sufficient to dust it with a bristle paintbrush.

To reach the burner do the operations described in the section 8.6 of this manual

8.9 Checking the flue

Have the integrity of the flue outlet pipe (47 on page 13) air intake pipe (48 on page 13), checked periodically, at least once a year.

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

8.10 Drain pipe inspection

Check the soundness and integrity of the condensate drain pipe.

Verify the cleanness and correct filling of the condensate traps.

8.11 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.

8.12 Gas pressures and soundness

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

8.13 Water inhibitor concentration

Where chemical products are used the level of water treatment should be checked on an annual basis and re treated after full or partial drain down. A conductivity meter can be used to check the correct concentration of inhibitor in the heating water.



BENCHMARK No. | | | | | |

GAS BOILER COMMISSIONING CHECKLIST

BOILER SERIAL No. _____ NOTIFICATION No. _____

CONTROLS To comply with the Building Regulations, each section must have a tick in one or other of the boxes

TIME & TEMPERATURE CONTROL TO HEATING	ROOM T/STAT & PROGRAMMER/TIMER <input type="checkbox"/>	PROGRAMMABLE ROOMSTAT <input type="checkbox"/>
TIME & TEMPERATURE CONTROL TO HOT WATER	CYLINDER T/STAT & PROGRAMMER/TIMER <input type="checkbox"/>	COMBI BOILER <input type="checkbox"/>
HEATING ZONE VALVES	FITTED <input type="checkbox"/>	NOT REQUIRED <input type="checkbox"/>
HOT WATER ZONE VALVES	FITTED <input type="checkbox"/>	NOT REQUIRED <input type="checkbox"/>
THERMOSTATIC RADIATOR VALVES	FITTED <input type="checkbox"/>	
AUTOMATIC BYPASS TO SYSTEM	FITTED <input type="checkbox"/>	NOT REQUIRED <input type="checkbox"/>

FOR ALL BOILERS CONFIRM THE FOLLOWING

THE SYSTEM HAS BEEN FLUSHED IN ACCORDANCE WITH THE BOILER MANUFACTURER'S INSTRUCTIONS? ☐

THE SYSTEM CLEANER USED _____

THE INHIBITOR USED _____

FOR THE CENTRAL HEATING MODE, MEASURE & RECORD

GAS RATE _____ m³/hr _____ ft³/hr

BURNER OPERATING PRESSURE (IF APPLICABLE) ☐ N/A _____ mbar

CENTRAL HEATING FLOW TEMPERATURE _____ °C

CENTRAL HEATING RETURN TEMPERATURE _____ °C

FOR COMBINATION BOILERS ONLY

HAS A WATER SCALE REDUCER BEEN FITTED? YES ☐ NO ☐

WHAT TYPE OF SCALE REDUCER HAS BEEN FITTED? _____

FOR THE DOMESTIC HOT WATER MODE, MEASURE & RECORD

GAS RATE _____ m³/hr _____ ft³/hr

MAXIMUM BURNER OPERATING PRESSURE (IF APPLICABLE) ☐ N/A _____ mbar

COLD WATER INLET TEMPERATURE _____ °C

HOT WATER OUTLET TEMPERATURE _____ °C

WATER FLOW RATE _____ lts/min

FOR CONDENSING BOILERS ONLY CONFIRM THE FOLLOWING

THE CONDENSATE DRAIN HAS BEEN INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS? YES ☐

FOR ALL INSTALLATIONS CONFIRM THE FOLLOWING

THE HEATING AND HOT WATER SYSTEM COMPLIES WITH CURRENT BUILDING REGULATIONS ☐

THE APPLIANCE AND ASSOCIATED EQUIPMENT HAS BEEN INSTALLED AND COMMISSIONED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS ☐

IF REQUIRED BY THE MANUFACTURER, HAVE YOU RECORDED A CO/CO₂ RATIO READING? N/A ☐ YES ☐ CO/CO₂ RATIO _____

THE OPERATION OF THE APPLIANCE AND SYSTEM CONTROLS HAVE BEEN DEMONSTRATED TO THE CUSTOMER ☐

THE MANUFACTURER'S LITERATURE HAS BEEN LEFT WITH THE CUSTOMER ☐

COMMISSIONING ENG'S NAME PRINT _____ CORGI ID No. _____

SIGN _____ DATE _____

SERVICE INTERVAL RECORD

It is recommended that your heating system is serviced regularly
and that you complete the appropriate Service Interval Record Below.

Service Provider. Before completing the appropriate Service Interval Record below, please ensure you have carried out the service as described in the boiler manufacturer's instructions. Always use the manufacturer's specified spare part when replacing all controls

SERVICE 1 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 2 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 3 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 4 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 5 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 6 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 7 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 8 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 9 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 10 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE



17962.1251.0 1406 44A5 UK

Biasi U.K. Ltd
Unit 31/33, Planetary Road
Industrial Estate, Neachells Lane
Willenhall, Wolverhampton WV 13 3XB
Technical helpline: 01902 304 400
Web site: www.biasi.co.uk

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

Service manual

GARDA PLUS HE

Models:

G.C. Appl. No.

M110.24SM/E

47-970-31

M110.32SM/E

47-970-32

Leave this manual adjacent to the gas meter

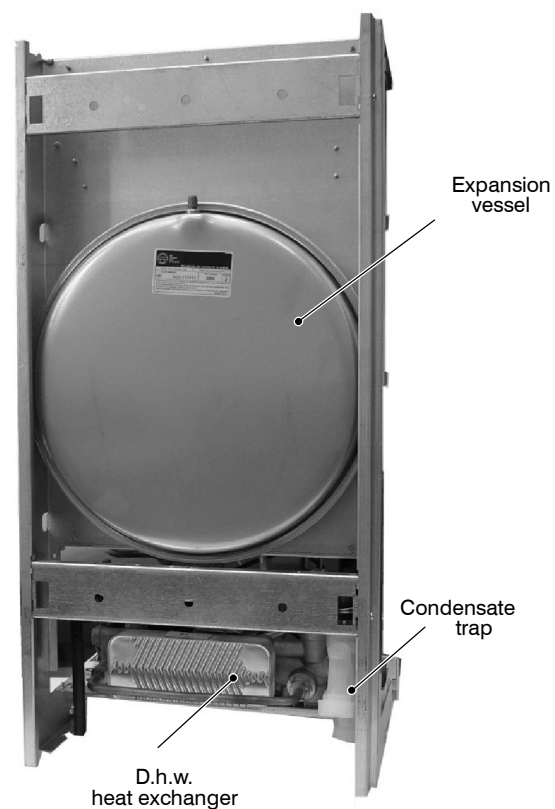
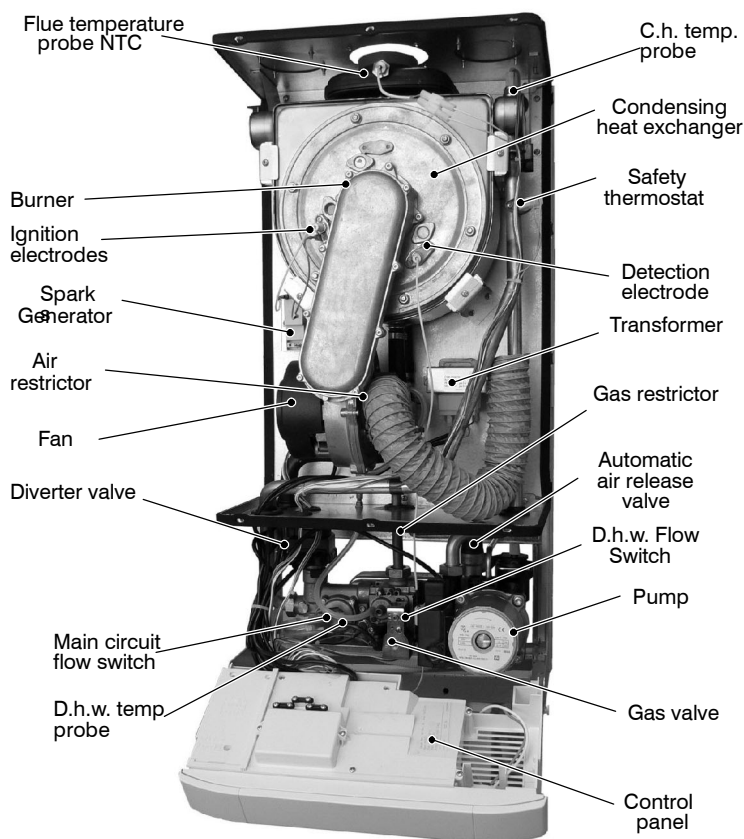


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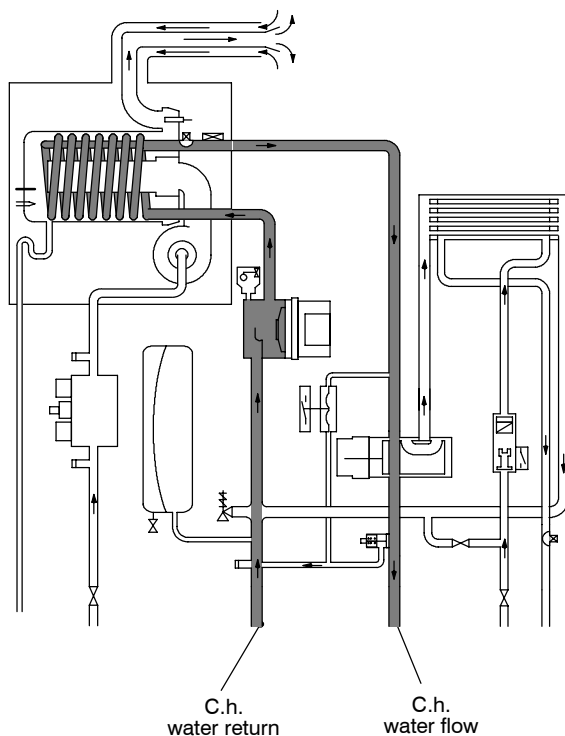
1 Overall information

1.1 Overall View

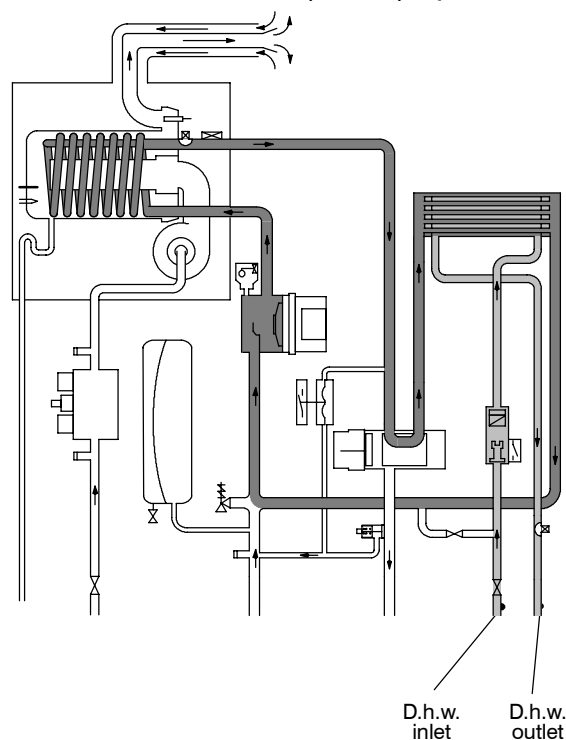


1.2 Hydraulic diagram

Central heating (c.h.) operation



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



2 General access and emptying hydraulic circuits

2.1 Nomenclature

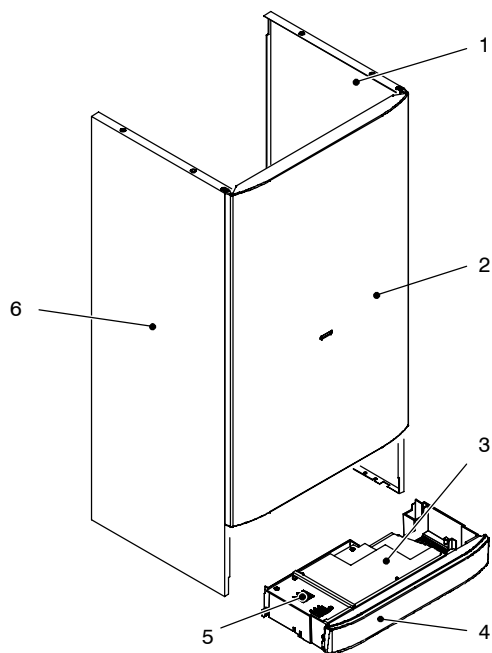


Fig. 2.1

- 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. 2.2), lift the panel and remove it.

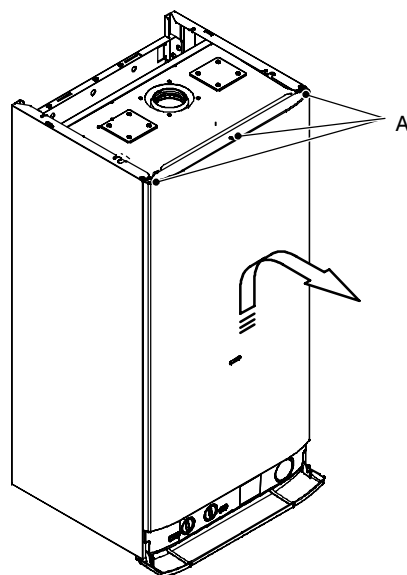


Fig. 2.2

To remove the side panels loosen the screws B and C (Fig. 2.3), bring the base of the panels away from the boiler and lift them, freeing them from the top hooks.

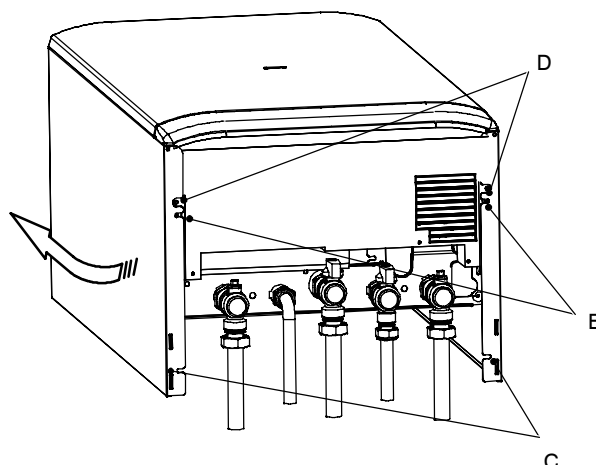


Fig. 2.3 – bottom view of the boiler

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. 2.3).
- 3 Remove the screws D
- 4 Move the lower part of the side panels as indicated in Fig. 2.4 and pull the control panel. When completely pulled out, the panel can rotate 45° downwards to facilitate the service operations on the internal parts.

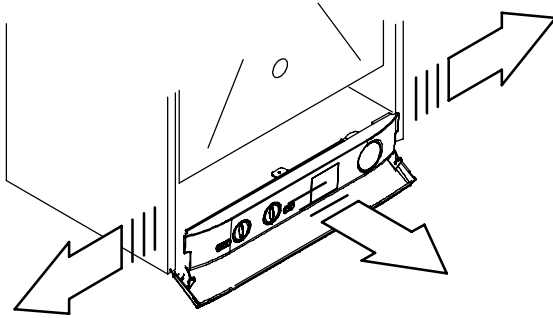


Fig. 2.4

- 5 Remove the screws *E* and remove the service panel (Fig. 2.5);

If the external temperature probe (optional) is fitted follow the steps 6 to 9.

- 6 Remove the screws *F* and remove external temperature probe lid.

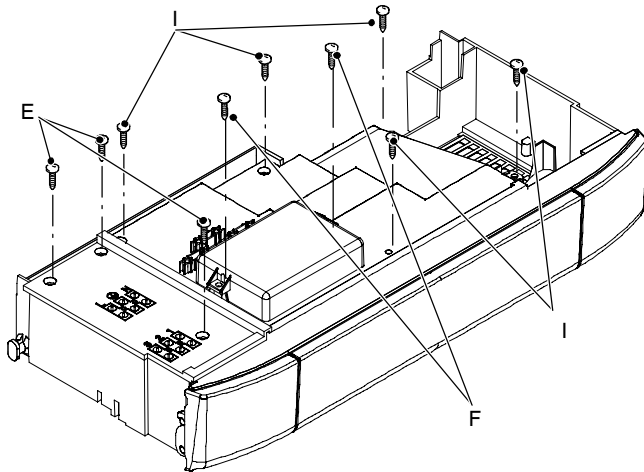


Fig. 2.5

- 7 With the help of a screwdriver disconnect the terminal block *G* (Fig. 2.6).

- 8 Remove the clamp *H* that holds the cable.

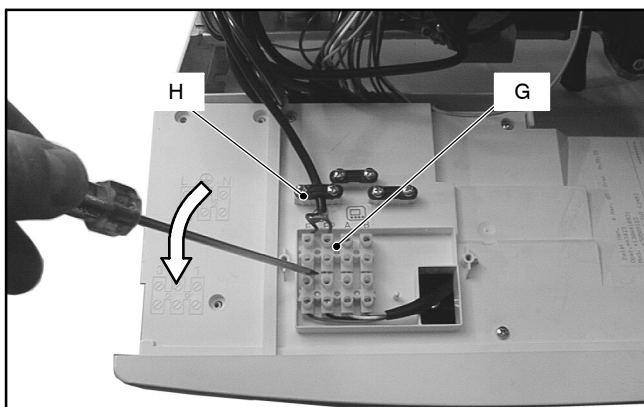


Fig. 2.6

- 9 Pass the terminal block connected to the boiler through the hole of the control panel lid (Fig. 2.7).

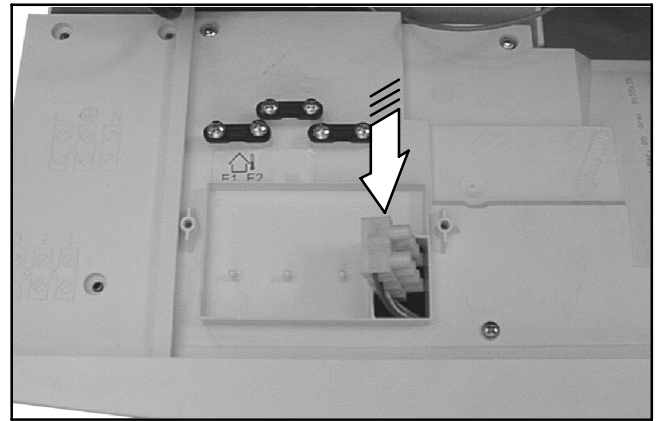


Fig. 2.7

- 10 Remove the screws *I* and remove the control panel lid (Fig. 2.5);

2.4 Access to the sealed chamber

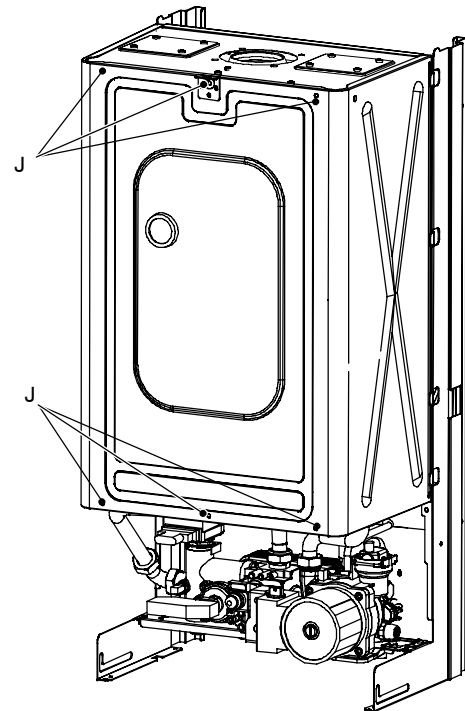


Fig. 2.8

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 *J* as indicated in Fig. 2.8 and remove the lid.

2.5 Emptying the primary circuit

- 1 Close the c.h. circuit flow and return cocks *K*. (Fig. 2.9).

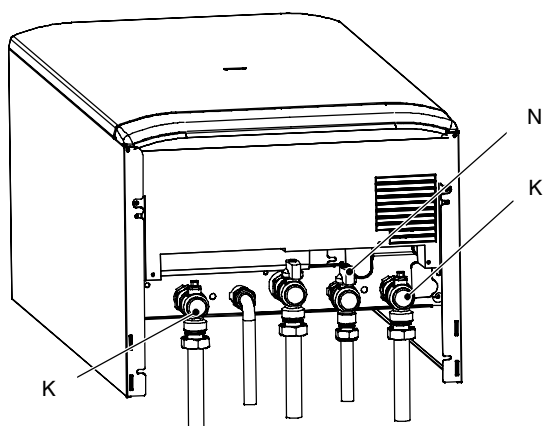


Fig. 2.9 – bottom view of the boiler

- 2 Remove the front and right panels of the boiler.
- 3 Open the drain tap *L* (Fig. 2.11) until the boiler is completely emptied.
- 4 To help the draining of the primary circuit loose the condensing heat exchanger air purger valve *M*

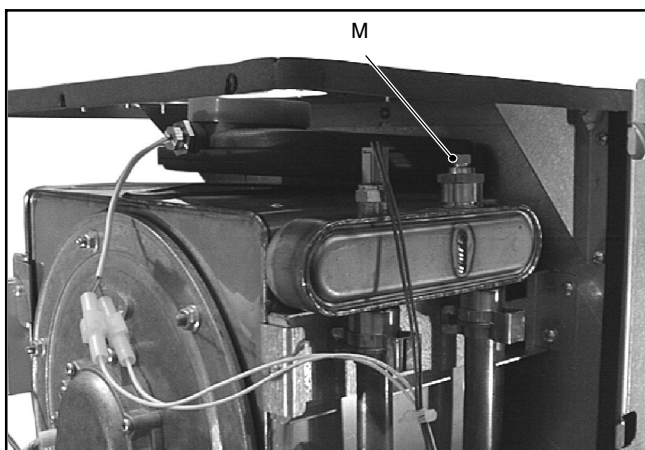


Fig. 2.10

Attention: some water could remain in the condensing heat exchanger.

- 5 Close drain tap once the emptying has been completed.

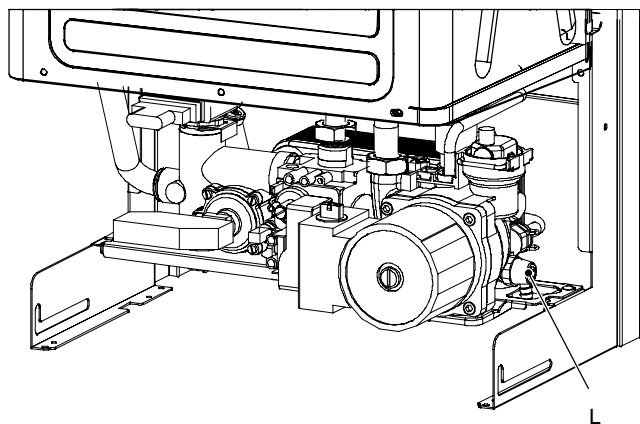


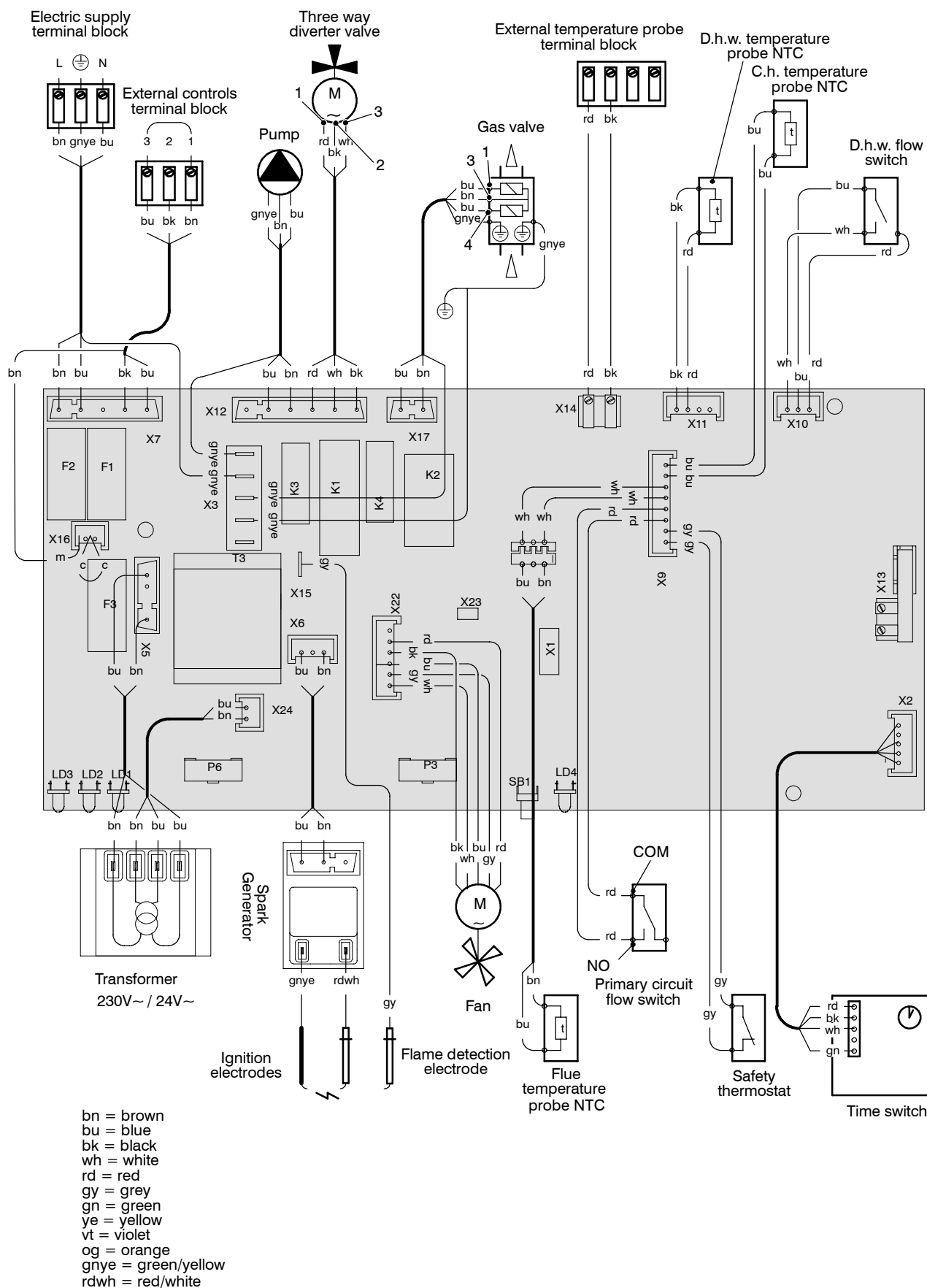
Fig. 2.11

2.6 Emptying the d.h.w. circuit

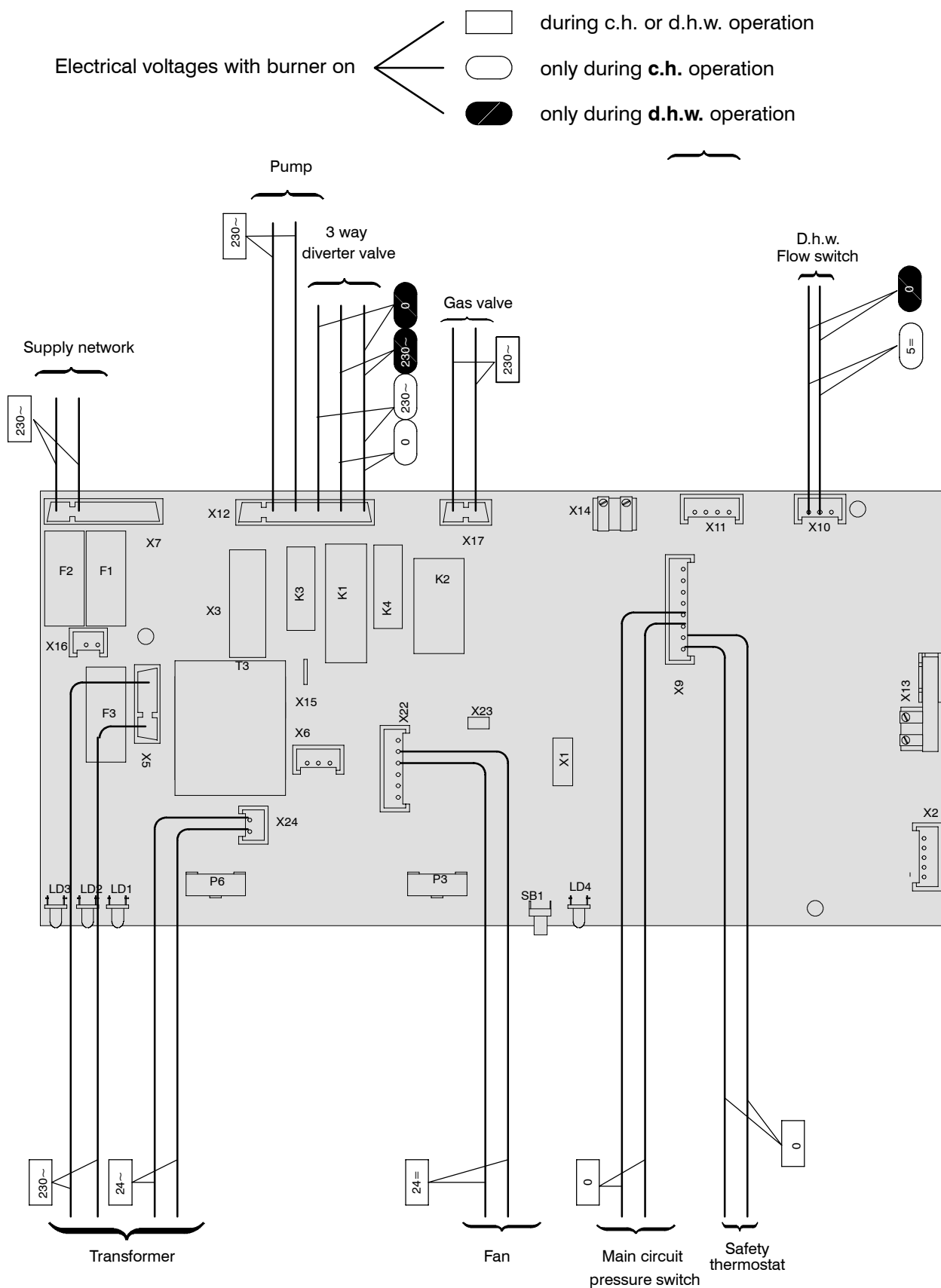
- 6 Close the d.c.w. inlet cock *N* (Fig. 2.9);
- 7 Open one or more hot water taps until the boiler has been completely emptied.

3 Diagrams

3.1 Wiring diagram M110.24SM/...M110.32SM/...



3.2 Circuit voltages



4 Fault finding

		Components to check																												
Section of the manual → (note ref. in brackets)	10	(1)	(2)	(3)	21.1	(4)		6	7.2	8.2		9.8			11.4	12.2	14.5	15.2		16	17	18.8	18.8		19.2	19.2	20.1	(7)	-	
		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	Fuses (Electronic p.c.b.)	Electronic p.c.b.	Boiler settings	Gas valve	Main circuit flow switch	D.h.w. filter	Main circuit temp. probe	D.h.w. temp. probe	By – pass valve	Fan air restrictor	Spark generator	Ignition electrode	Detection electrode	Safety thermostat	Gas restrictor	Flue temperature probe NTC	Expansion vessel	Safety valve	Pressure gauge
Lock – out signal lamp red ↓ Defect			■	■										■							■		■	■	■	■	■	■		
	By pressing the reset push – button the boiler turns on and operates correctly.		■	■	■									■							■		■	■	■	■	■	■		
ON												■									■									
	By pressing the reset push – button the boiler starts the ignition cycle. The burner doesn't light on and the boiler locks again.											■									■									
OFF																														
	The boiler does not start either in c/h or d.h.w. mode. All the operation lights OFF Fan still.	■										■																		
	The burner doesn't light either in c.h. or d.h.w. mode. Fan turns.												■								■									
	The burner doesn't light either in c.h. or d.h.w. mode. Fan doesn't turn.								■							■				■										
OFF																														
	The boiler doesn't control the d.h.w. temperature. Turning the d.h.w. temp. adjustment knob hasn't effect on the modulation of the flame. The boiler operates correctly on c.h.																													

		Components to check																													
	10	(1)	(2)	(3)	21.1	(4)	6	7.2	8.2	9.8			11.4	12.2	14.5	15.2		16	17	18.8	18.8	18.8	19.2	19.2	20.1	(7)	-	-			
	Transformer	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	Fuses (Electronic p.c.b.)	Electronic p.c.b.	Boiler settings	Gas valve	Main circuit flow switch	D.h.w. filter	Main circuit temp. probe	D.h.w. temp. probe	By-pass valve	Fan air restrictor	Spark generator	Ignition electrode	Detection electrode	Safety thermostat	Gas restrictor	Flue temperature probe NTC	Expansion vessel	Safety valve	Pressure gauge	
OFF										■	■		■																		
										■			■		■																
			■	■					■				■		■												■				
			■	■				■		■							■		■												
								■																							
I						■		■									■										■	■	■		
																													■	■	

Note

2 Verify the soundness of the gas supply pipe, the position of stop valves.

Useful information can be obtained also from the optical indication given by the appliance operation lights (see section 9.4).

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

6 Using the flue analyzer, check the CO₂ value of the flue gases. This reading is a reference value for the gas valve setting.

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

8 d.h.w. pressure too high or flow rate too high. If necessary insert a flow rate limiter (14.6).

9 The boiler doesn't reach the nominal heat input.

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

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

3 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.

5 Condensing heat exchanger

5.1 Function

The Condensing heat exchanger *A* in Fig. 5.1 has the function of transferring heat produced from combustion of the gas and from the flue exhausted gas to the water circulating in it.

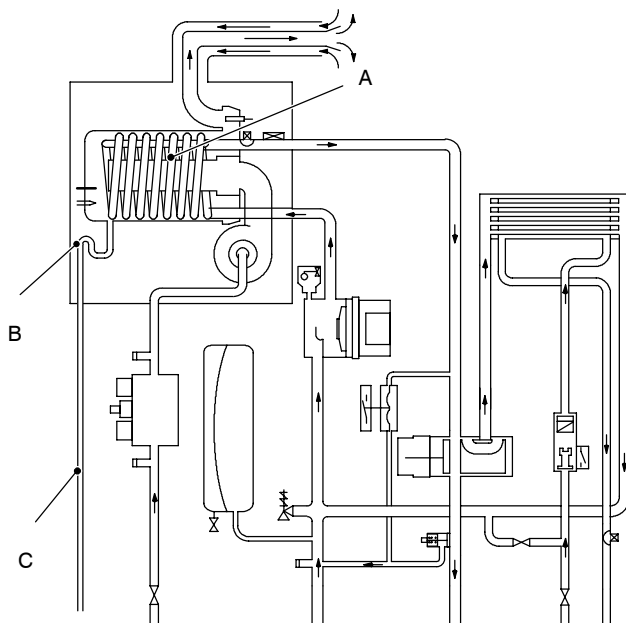


Fig. 5.1

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*.

5.2 Removal

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

- 1 Disconnect the flue system from the boiler.
- 2 Remove the air box following the instructions from 1 to 6 in section 17.2
- 3 Disconnect the detection electrode connector *D*, the ignition electrodes connector *E* and the earth wire *F*.
- 4 Disconnect the fan connector *G* by pressing the plastic hook placed on the rear side of the connector (Fig. 5.3).
- 5 Unscrew the nuts *H* (Fig. 5.2).
- 6 Remove the fan-burner group *I*.
- 7 Empty the primary circuit of the boiler.

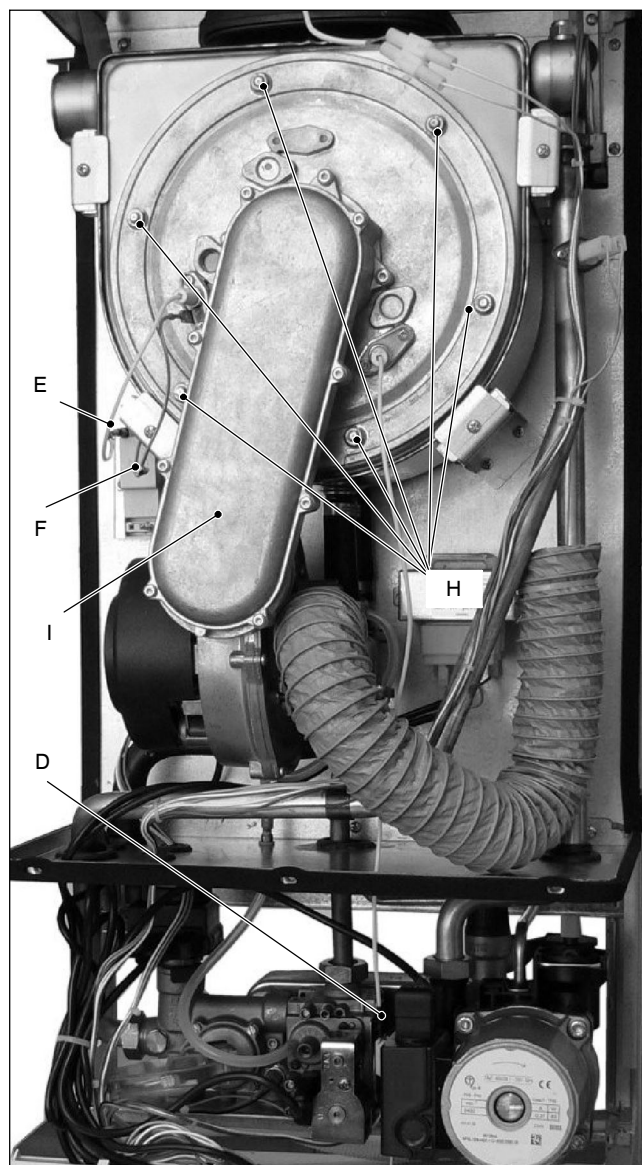


Fig. 5.2

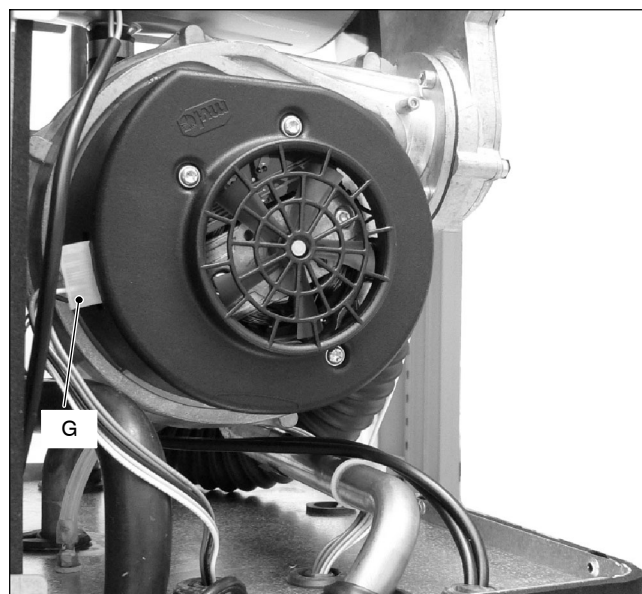


Fig. 5.3

- 8 Disconnect the C.h. temperature probe *J* and the flue temperature probe connector *K* (Fig. 5.4).

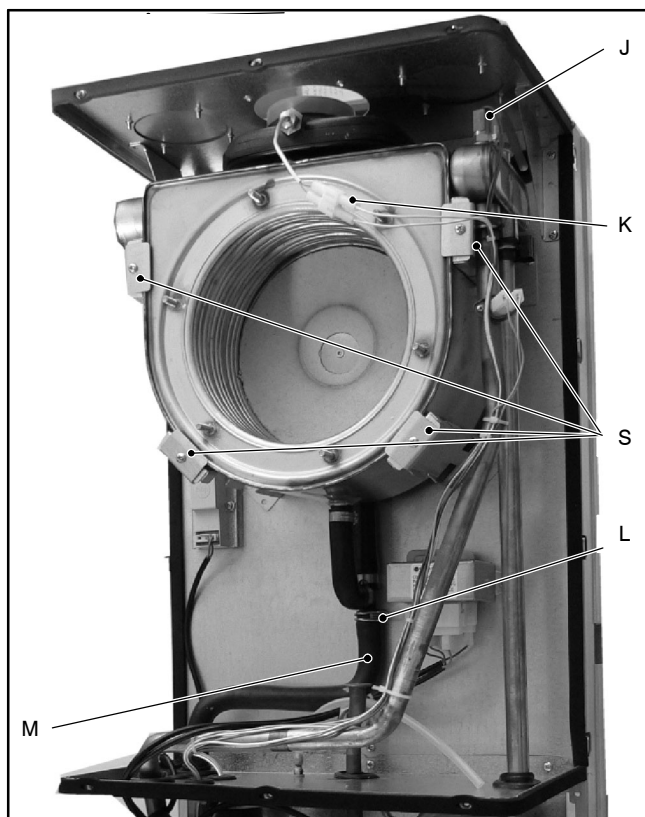


Fig. 5.4

- 9 Using pliers, remove the spring *L* moving it downwards and disconnect the rubber pipe *M* (Fig. 5.4).
- 10 Remove the clips *N* (Fig. 5.6).
- 11 Completely loosen the connection *O* and slightly move the pipe *P* upwards, then turn it towards right (Fig. 5.5)
- 12 Completely loosen the connection *Q* and move the pipe *R* downwards (Fig. 5.5).

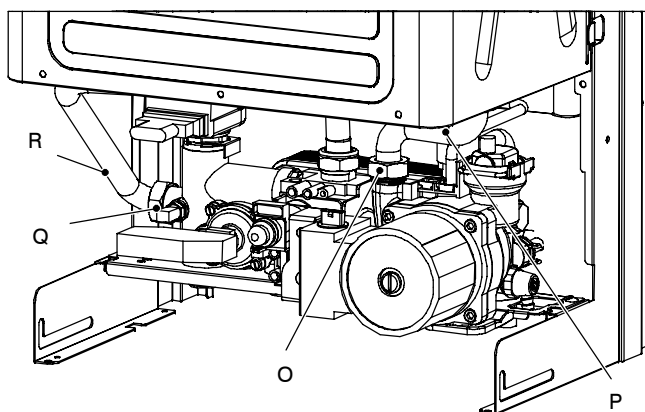


Fig. 5.5

- 13 Free the pipes *R* and *P* from the connection of the Condensing heat exchanger (Fig. 5.6).

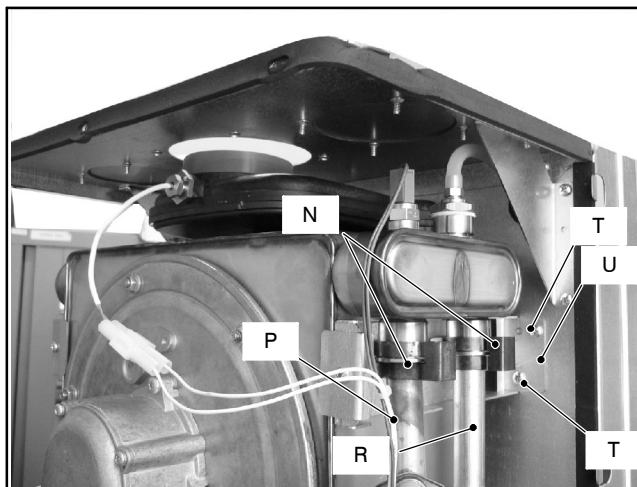


Fig. 5.6

- 14 Unscrew the screws *S* and remove the clamps (Fig. 5.4).
- 15 Unscrew the screws *T* and remove the support *U* (Fig. 5.6).
- 16 Remove the Condensing heat exchanger by levering it and sliding it forwards.
- 17 Reassemble the Condensing heat exchanger carrying out the removal operations in reverse order.

5.3 Cleaning

If there are deposits of dirt on the coil of the Condensing heat exchanger, clean with a bristle paintbrush and remove the dust with a Hoover.



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 D.h.w. heat exchanger

6.1 Function

The d.h.w. heat exchanger A in Fig. 6.1 and Fig. 6.3 allows the instantaneous transfer of heat from the primary hydraulic circuit to the water destined for d.h.w. use.

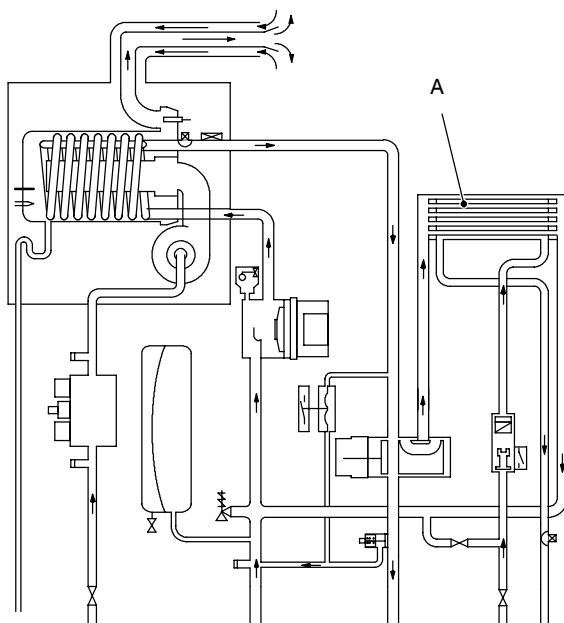


Fig. 6.1

The schematic structure is shown in Fig. 6.2.

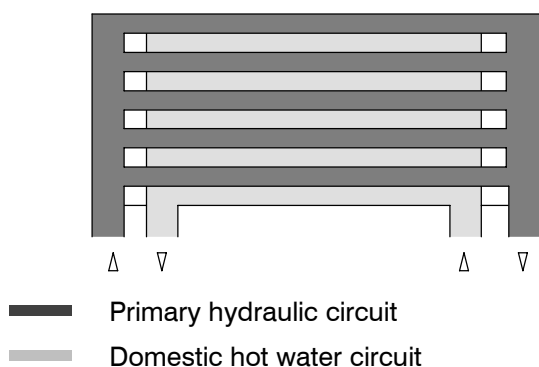


Fig. 6.2

6.2 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. 6.3) which hold the exchanger to the brass groups.

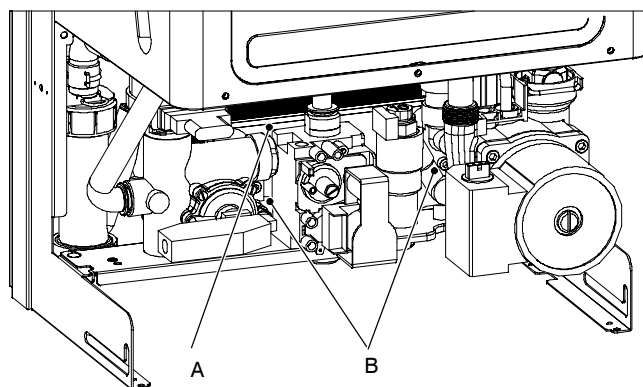


Fig. 6.3

- 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 centre location/securing pin indicated in Fig. 6.4 towards the left side of the boiler.

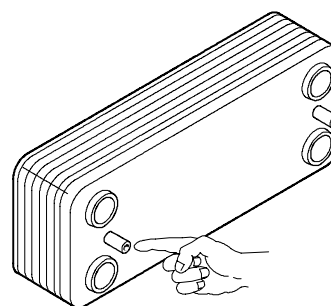


Fig. 6.4

7 Pump

7.1 Function

The pump A in Fig. 7.1 and Fig. 7.2 has the function of making the water in the main circuit circulate through the main 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).

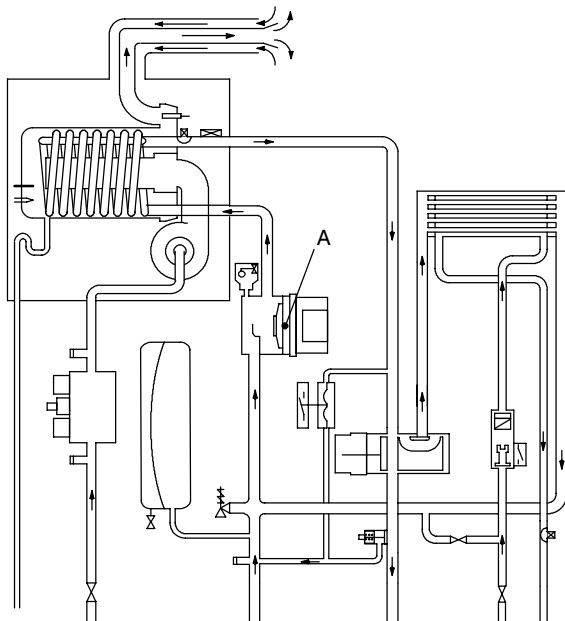


Fig. 7.1

7.2 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. 7.3).

Measure the electrical resistance between the pump supply connections.

Electrical resistance of the windings (at ambient temperature) must be about 230 Ω

✓ 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.

7.3 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. 7.2).
- 5 Loosen the connection C, remove the fork D and the pipe E.

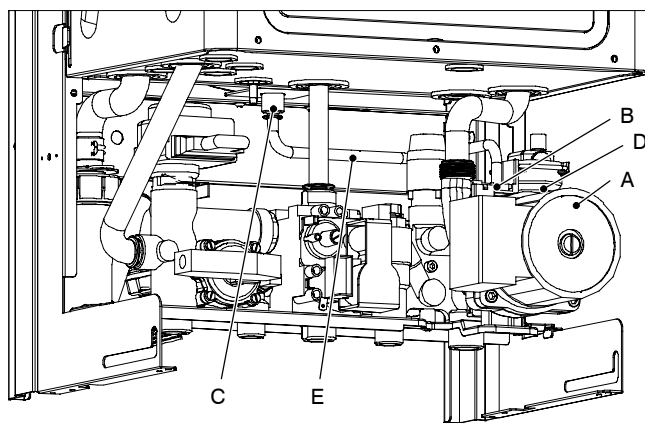


Fig. 7.2

- 6 Remove the fork F (Fig. 7.3) 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.

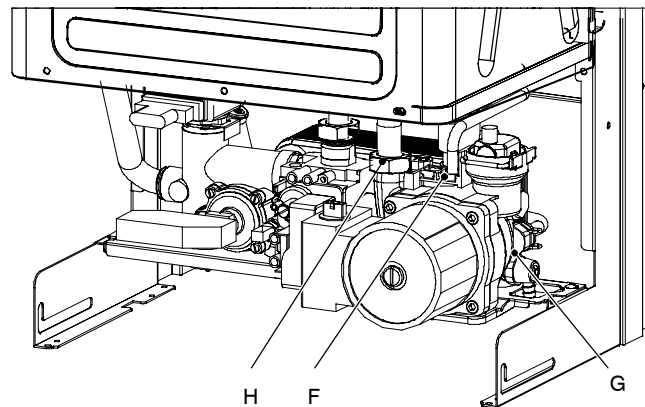


Fig. 7.3

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.

8 Three way diverter valve

8.1 Function

The diverter valve A (Fig. 8.1) 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.

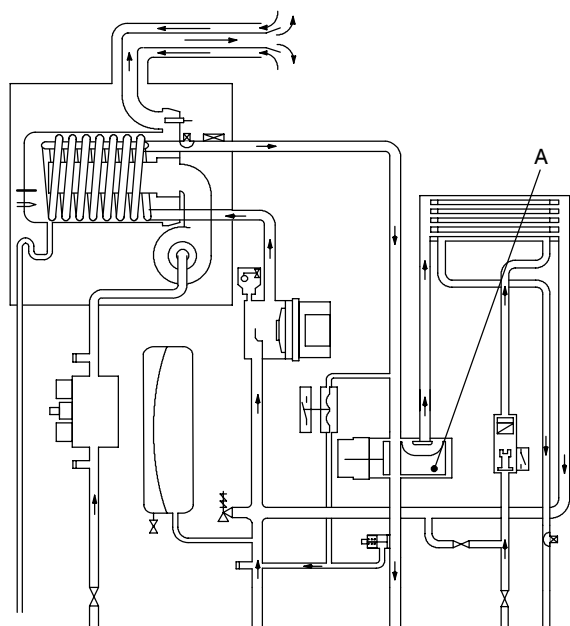


Fig. 8.1

8.2 Checks

✓ Check the electrical continuity

Fig. 8.2 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. 8.3 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.

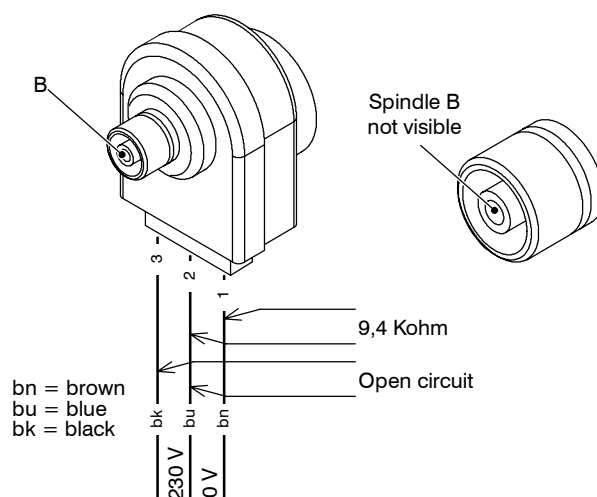


Fig. 8.2 – D.h.w. mode

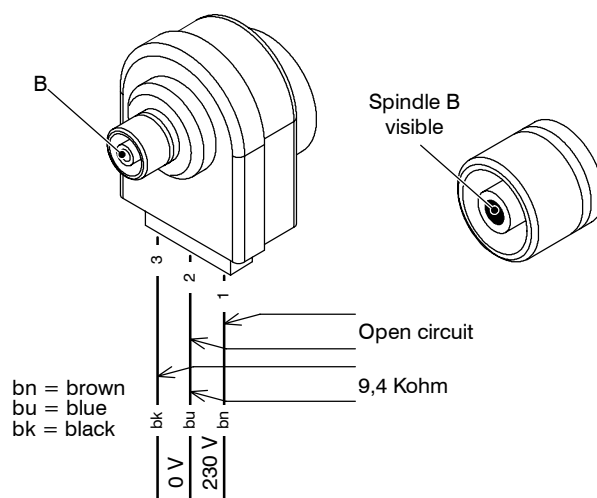


Fig. 8.3 – C.h. mode

8.3 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. 8.4).
 - 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. 8.2 or to the wiring diagram in section NO TAG for the correct wiring connection.

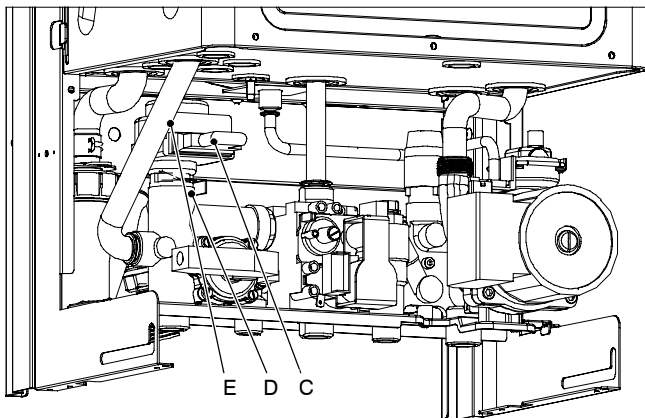


Fig. 8.4

8.4 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 8.3).
- 4 Remove the fixing spring *F* (Fig. 8.5) and remove the primary circuit flow switch *G*.
- 5 Disconnect d.h.w. temperature probe *H*.
- 6 Unscrew the connector *I*, the c.h. flow connector and the d.h.w. outlet connector.

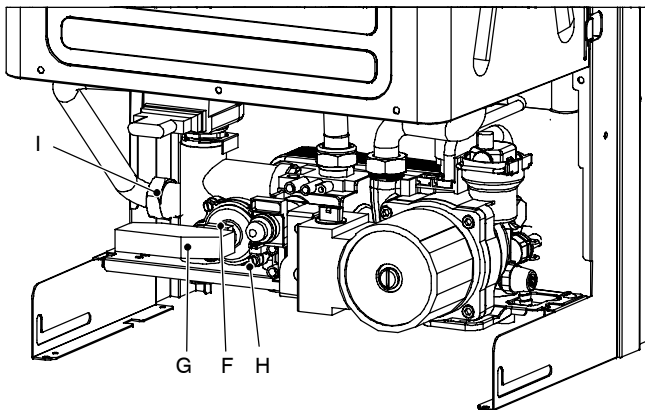


Fig. 8.5

- 7 Remove the d.h.w. heat exchanger (see section 6.2).
- 8 Remove the fork *J* and move away the pipe *K* (Fig. 8.6).

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

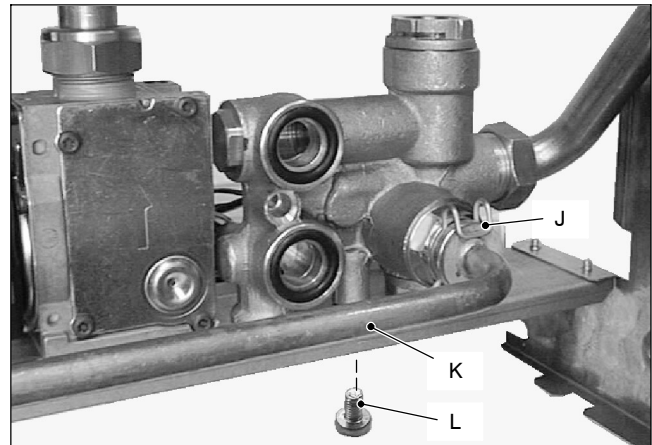


Fig. 8.6 Rear view of the boiler

- 10 Refer to the exploded view in Fig. 8.7 to remove the internal parts of the three way diverter valve.



Fig. 8.7

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

9 Electronic control/ignition p.c.b.

9.1 Function

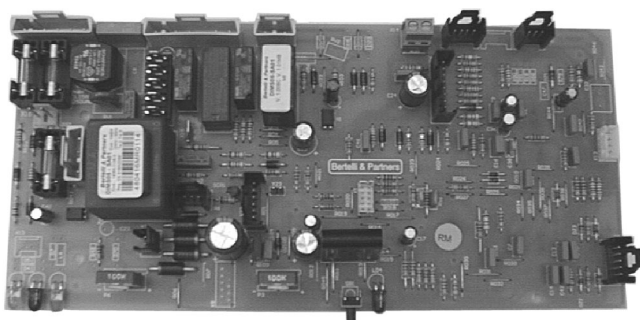
Inlet Information

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

Function control
C.h. temperature adjustment
D.h.w. temperature 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
Flue temperature probe NTC
Safety thermostat
Flame detection electrode
Room thermostat (if fitted)
External temperature probe (if fitted)
Time switch



Outlet command

Pump
Three way diverter valve
Gas valve
Fan
Ignition electrodes
Appliance operation lights*
Lock-out signal lamp*

*control panel fascia

The fundamental function of the Electronic control/ignition 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/ignition 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. 9.1).

The Electronic control/ignition p.c.b. is also a full sequence ignition device and does a sequence of operations (ignition cycle) which lead to the ignition of the gas at the burner

It checks the presence of the flame during the entire period in which it is activated and supplies the fan regulating its speed.

The Electronic control/ignition p.c.b. has a **safety function** and any incorrect interventions or tampering can result in conditions of dangerous functioning of the boiler.

The Electronic control/ignition p.c.b. 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 (overheat of the primary circuit).
- The intervention of the flue temperature probe (overheat of the combustion products).
- A fault on gas supply.
- Faulty ignition (faulty ignition electrodes, their wiring or connection).
- Faulty flame detection (faulty detection electrode, its wiring or connection).
- Faulty condensate drainage.
- Faulty gas valve (faulty on-off operators or not electrically supplied).
- Faulty Electronic control/ignition p.c.b..

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

Fig. 9.13 and Fig. 9.14 show the sequence of the operations that are carried out at the start of every ignition cycle and during normal functioning.

9.2 Selection and adjustment devices

On the Electronic control/ignition p.c.b. several selection, adjustment and protection devices are located. (Fig. 9.2).

Some of these devices are directly accessible by the user (function control, temperature adjustment poten-

Fig. 9.1

tiometers etc.) others, like the fuses, are accessible by removing the service panel.

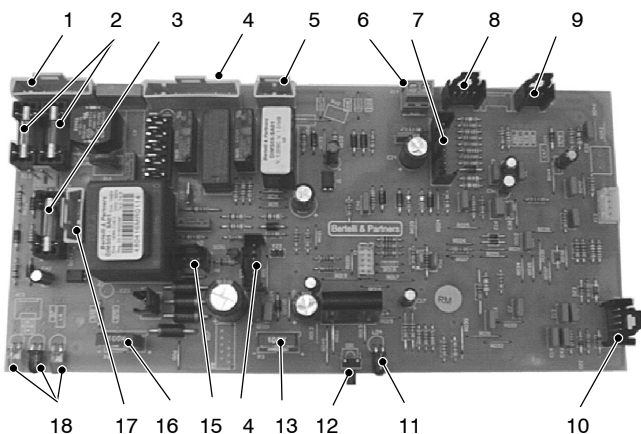


Fig. 9.2

- 1 x7 connector – electric supply terminal block and external controls terminal block.
- 2 Fuse F1, F2 3,15 A F
- 3 Fuse F3, 400 mA T
- 4 x12 connector – pump and 3way diverter valve
- 5 x17 connector – gas valve
- 6 x14 connector – external temperature probe (optional)
- 7 x9 connector – safety thermostat, flue temperature probe NTC, c.h. temperature probe NTC
- 8 x11 connector – d.h.w. temperature probe
- 9 x10 connector – d.h.w. flow switch
- 10 x2 connector – timer
- 11 Lock-out signal lamp
- 12 Boiler reset button
- 13 Function control / C.h. temperature adjustment
- 14 x22 connector – fan
- 15 x24 connector – transformer
- 16 D.h.w. temperature adjustment
- 17 x5 connector – transformer
- 18 Appliance operation lights


9.3 Checking the temperature

The Electronic control/ignition 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 (13 and 16 in Fig. 9.2) 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. 9.3), 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 fan speed thus regulating the gas flow rate and consequently changing the useful output of the boiler.

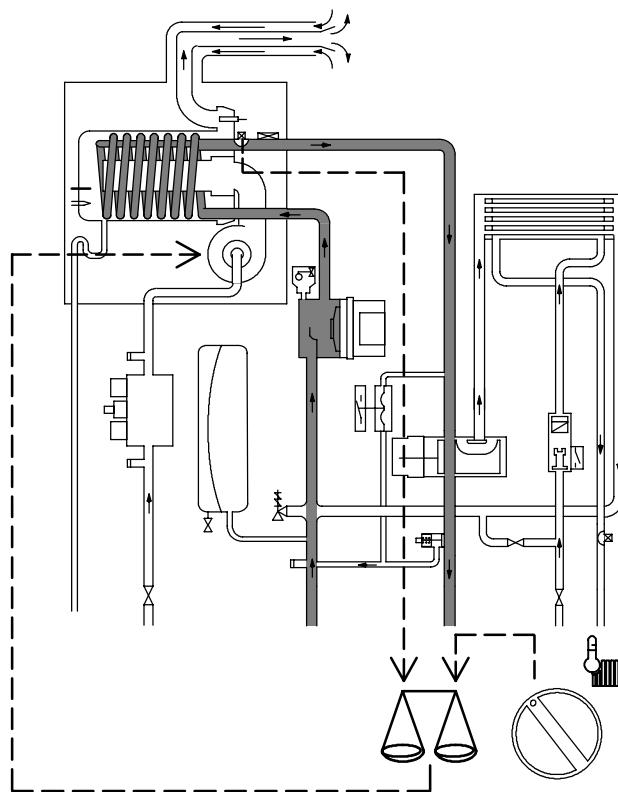



Fig. 9.3

When the boiler functions in d.h.w. (Fig. 9.4), 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 ).

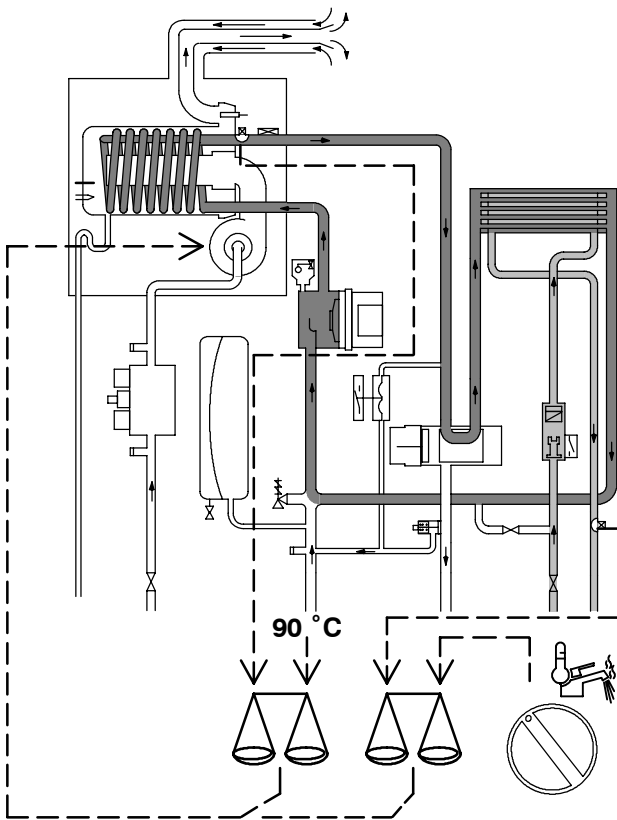


Fig. 9.4

Normally, the result of the comparison between these two signals directly operates the fan speed 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 90°C, the useful output is automatically reduced so that the primary circuit cannot reach excessive temperatures.

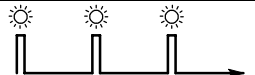

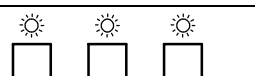


The control sequences in  function and in  function are illustrated in detail in sections 9.10 and 9.11.



9.4 Operation lights

The Electronic control/ignition p.c.b. is provided with three lamps (L.E.D. indicators) 18 in Fig. 9.2 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 lamps indication and their meaning.

 A short pulse every 4 seconds	Boiler in stand-by condition. (function control in  position). Anti-freeze system active.
 1 second ON 1 second OFF	Boiler ON condition (function control in  or  position)

With the boiler switched ON ( or ) all the lamps (18 in Fig. 9.2) 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 flue temperature probe NTC
			Faulty external temperature probe NTC
			Faulty primary circuit (no water or absence of flow)
			Lack of burner ignition
			Safety thermostat lock out
			Faulty fan control system
			Flue temperature probe NTC lock out
			Flame detection error
			Lack of power supply or faulty electronic control p.c.b.
			Faulty Electronic control/ignition p.c.b.. *
			Lamp OFF
			Lamp ON
			Flashing lamp, alone or simultaneously with another 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.

9.5 Setting the boiler control function modes

It is possible to select the various boiler control function modes by using the function selector knob A and the D.h.w. temperature control knob B (Fig. 9.5).

During the function modes setting, the boiler does not operate.

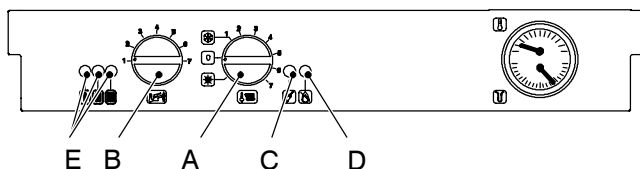


Fig. 9.5

9.6 Adjustment of maximum useful output in c.h. mode

The following procedure allows the output of the boiler for c.h. to be limited to meet the system requirement. Adjusting the maximum useful output in c.h. mode does not prevent the boiler firing at maximum rate for d.h.w. production.

- 1 Turn the boiler ON positioning the function selector knob A as indicated in Fig. 9.6.

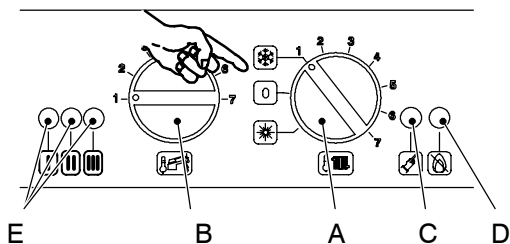


Fig. 9.6

- 2 Keep pressed the reset button C for about 10 seconds until the lock-out signal lamp D blinks.
- 3 The lamps E should give the indication as in Fig. 9.7 (maximum c.h. useful output adjustment). If not, press the reset button repeatedly to obtain it.

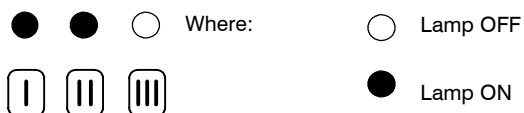


Fig. 9.7

At this step it is possible to visualize the current setting by keeping the reset button C pressed for more than 5 seconds. The lamps will flash a number of times corresponding to the setting (Tab. 9.1).

- 4 To change the setting turn the knob B on a position corresponding to the desired maximum useful output (Tab. 9.1). By turning the knob B, the lock-out signal lamp D blinks quickly (2 per seconds) indicating that the setting has changed and must be memorised.

Knob position	Maximum useful output in c.h. mode non condensing kW (BTU/h)	
	M110.24SM/...	M110.32SM/...
1	5,8 (19 788)	10,6 (36 165)
2	10,3 (35 142)	13,2 (45 036)
3	13,8 (47 083)	16,3 (55 612)
4	16,7 (56 977)	21,0 (71 648)
5	19,9 (67 895)	24,9 (84 954)
6	22,6 (77 107)	29,2 (99 625)
7	24,4 (83 248)	32,7 (111 566)

Tab. 9.1

- 5 To memorize the setting keep pressed the reset button C for about 5 seconds until the lights E briefly blinks simultaneously.
- 6 To reset the boiler to the normal operation turn it OFF and ON by the function selector knob A. In any case, the boiler automatically resets to its normal operation after 10 minutes.

9.7 Reignition frequency setting

It is possible to select the minimum time that must pass between two ignitions of the burner in c.h. function mode.

- 1 Turn the boiler ON positioning the function selector knob A as indicated in Fig. 9.8.

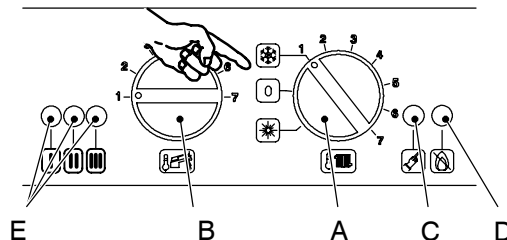


Fig. 9.8

- 2 Keep pressed the reset button C for about 10 seconds until the lock-out signal lamp D blinks.
- 3 The lamps E should give the indication as in Fig. 9.9 (reignition frequency). If not, press the reset button repeatedly to obtain it.

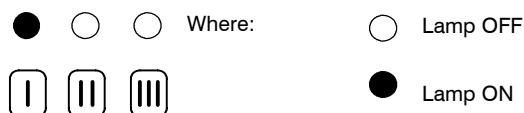


Fig. 9.9

At this step it is possible to visualize the current setting by keeping the reset button C pressed for more than 5 seconds. The lamps will flash a number of times corresponding to the setting (Fig. 9.10).

- 4 To change the setting turn the knob B on a position corresponding to the desired delay. By turning the knob B, the lock-out signal lamp D blinks quickly (2 per seconds) indicating that the setting has changed and must be memorised.

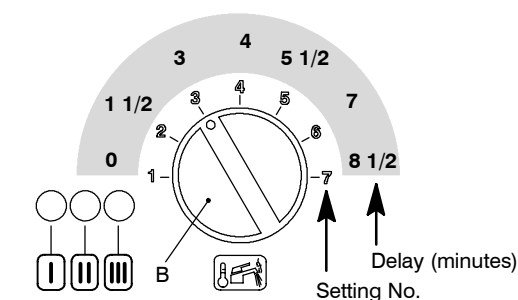


Fig. 9.10

- 5 To memorize the setting keep pressed the reset button C for about 5 seconds until the lights E briefly blinks simultaneously.
- 6 To reset the boiler to the normal operation turn it OFF and ON by the function selector knob A. In any case, the boiler automatically resets to its normal operation after 10 minutes.

Factory setting = 3 minutes

9.8 Checks

- ✓ Check that the fuses are complete

If the Electronic control/ignition p.c.b. does not supply any device (pump, fan, etc.) check that the fuses 2 and 3 (Fig. 9.2) are complete.

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

- ✓ Lock sequence

Start the boiler until the burner is ignited.

With the burner firing, interrupt the gas supply. The Electronic control/ignition p.c.b. must carry out four complete ignition cycles and then, after about 4 minutes, goes to lock-out state.

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.

9.9 Removal of the electronic control p.c.b

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

When replacing the Electronic control/ignition p.c.b. it is advisable to go through the setting modes of the boiler here described in sections 9.5 to 9.7.

If an external temperature probe (optional) is fitted, the coefficient K has also to be set as described in the Commissioning chapter of the installation manual.

- 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/ignition p.c.b.
To disconnect the connectors 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. 9.11.

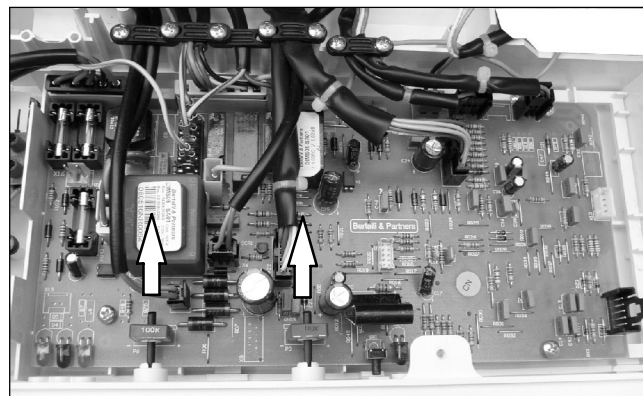


Fig. 9.11

- 4 Unscrew the four screws that hold the Electronic control/ignition 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/ignition p.c.b. following the removal procedures in the reverse order.

Important

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

- 7 It is not necessary to utilise static protections but it is advisable to ensure that the pcb is handled with care and held at the edges and with clean dry hands.
- 8 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.
- 9 Insert the spindles in the control panel knobs until the notch A (Fig. 9.12) reaches the potentiometer edge. It is not necessary to force them in the knob.
- 10 While tightening the screws that fix the Electronic control/ignition 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. 9.12).

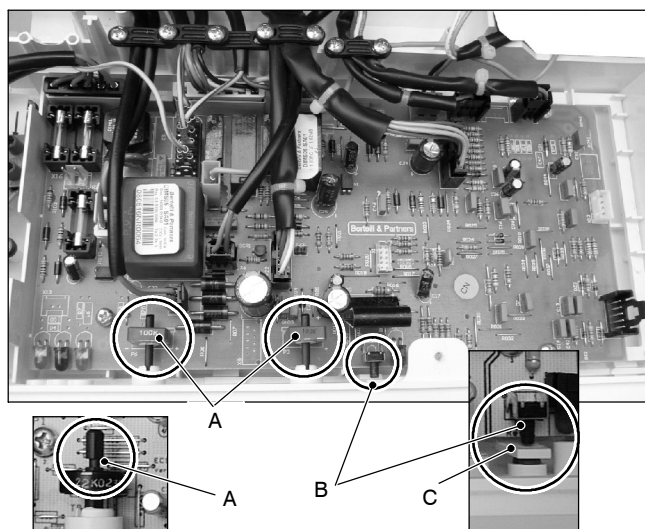


Fig. 9.12

Attention

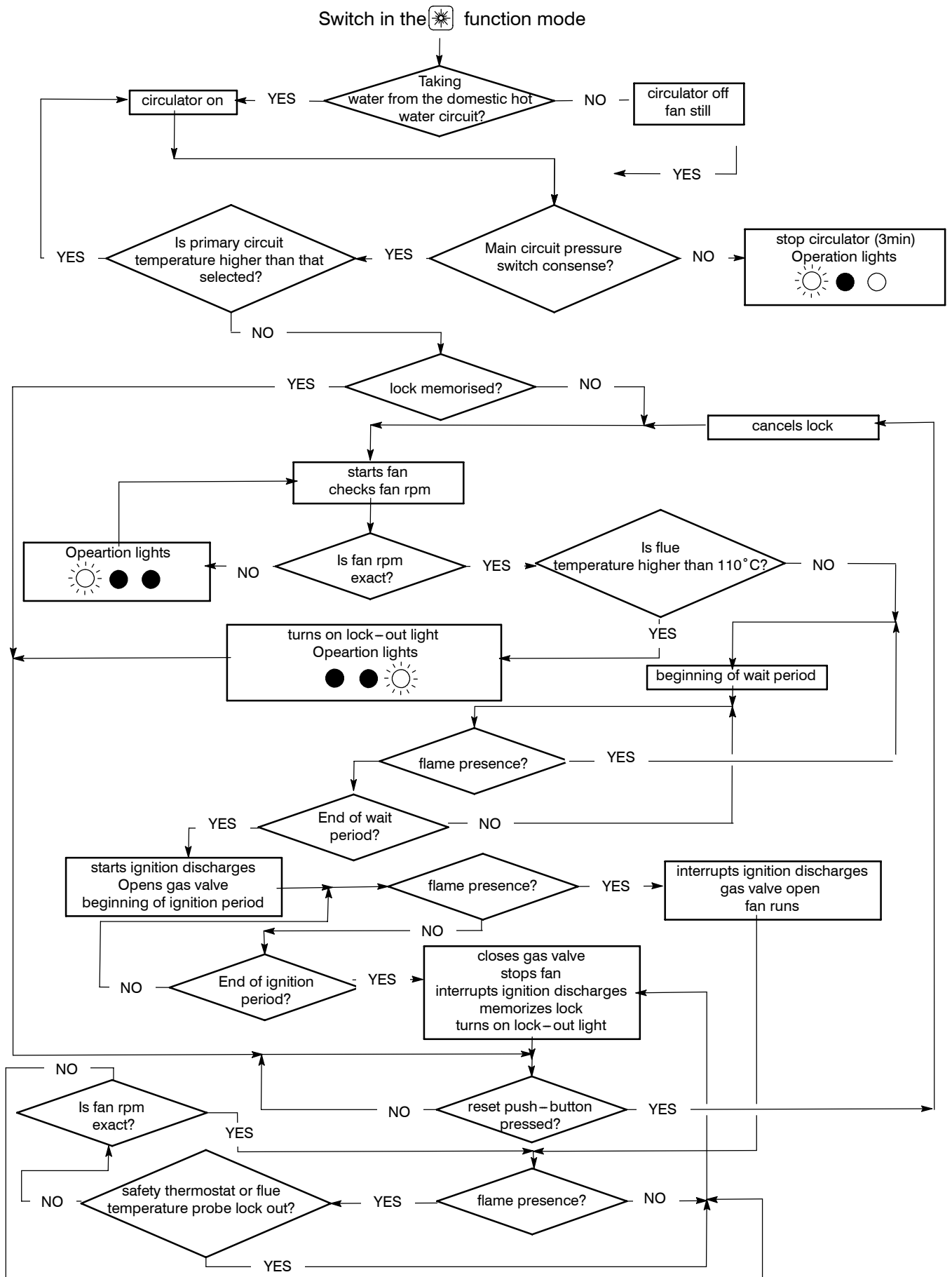
After installing the Electronic control/ignition p.c.b. :

- 11 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.
- 12 Make sure that the settings comply with the indications given in section 9.5.
- 13 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.

Fig. 9.13



9.11 Thermal control in the "❄️" mode

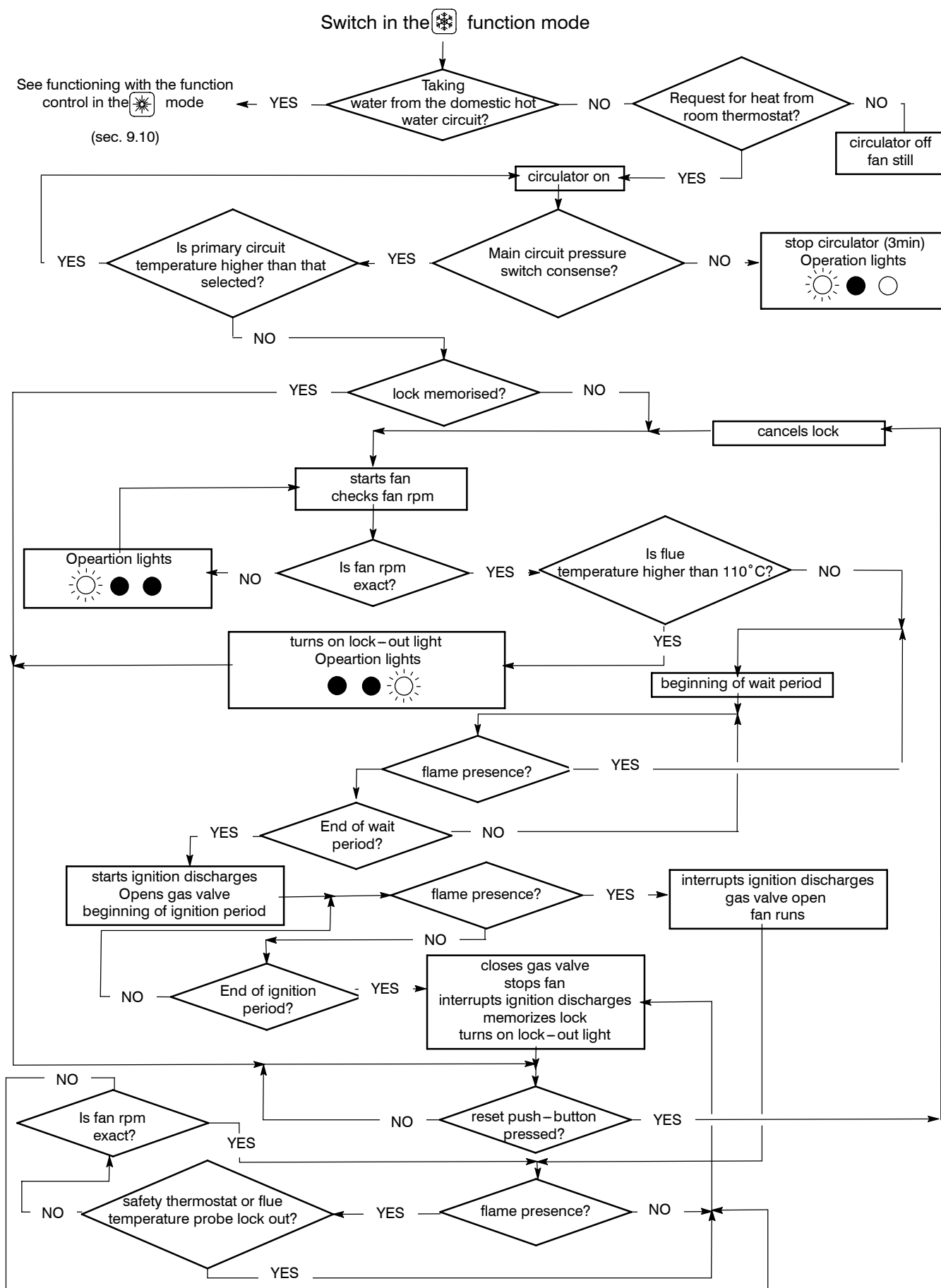


Fig. 9.14

10 Transformer

10.1 Removal

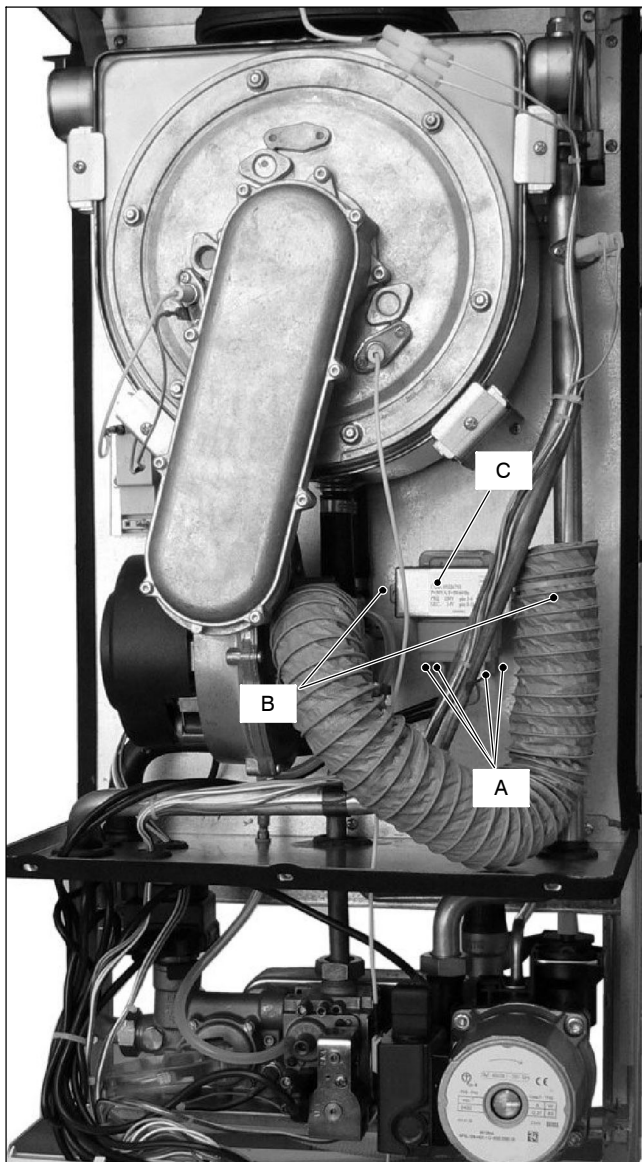


Fig. 10.1

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 (see section 2).
- 2 Disconnect the four connectors A.
- 3 Unscrew the screws B and remove the Transformer C by sliding it forward.
- 4 Reassemble the Transformer carrying out the removal operations in the reverse order.

After reassembling ensure the wires are correctly connected (see Fig. 10.2)

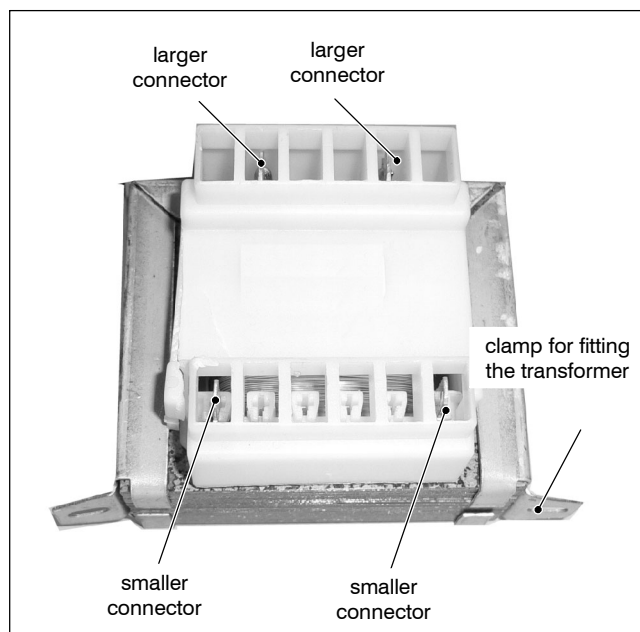


Fig. 10.2

10.2 Check the transformer

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

- 1 Remove the Transformer (see section 10.1)
- 2 Measure the electrical resistance of the primary and secondary windings. The primary should have a resistance approx. 35 ohm and the secondary approx. 1,4 ohm.

11 Gas valve

11.1 Function

The Gas valve A in Fig. 11.1 controls the gas inflow to the boiler burner.

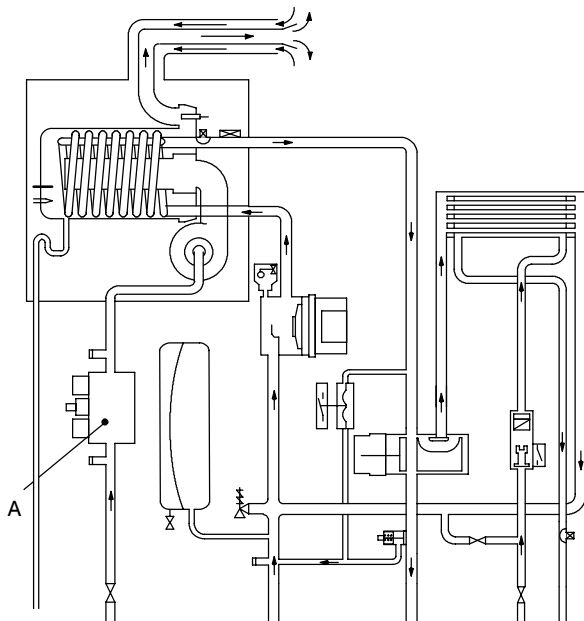


Fig. 11.1

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

11.2 Description of the parts (Fig. 11.2)

- 1 Minimum gas pressure adjustment
- 2 On–off operators
- 3 On–off operators electric connector
- 4 Gas valve inlet pressure test point

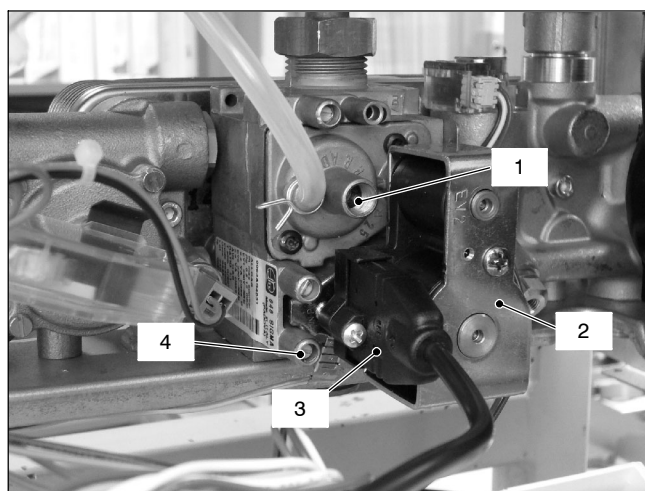


Fig. 11.2

11.3 Adjustment

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

Check the supply pressure before making any adjustment to the gas valve.

- 1 Close the gas inlet valve.
- 2 Remove the front panel of the case and lower the control panel (see sections 2.2 and 2.3).
- 3 Loosen the internal screw on the Inlet Pressure Test Point 4 (Fig. 11.2) of the Gas valve and connect a pressure gauge using a suitable hose.
- 4 Open the gas inlet valve.
- 5 Turn on the electricity supply to the boiler, switching on the fused spur isolation switch. The appliance operation light on the left will flash every 4 seconds.
- 6 Set the function knobs as illustrated in Fig. 11.4.
- 7 Open at least one hot water tap fully.
- 8 Read the inlet pressure value and ensure that it is within the limits given in the table *Gas supply pressures*, of the user/installation manual. If it does not comply with the required pressure check the gas supply line and governor for faults and/or correct adjustment.
- 9 Switch off the boiler **close the gas inlet valve** and close the water tap.
- 10 Disconnect the pressure gauge and close the Inlet Pressure Test Point 4 (Fig. 11.2).

Gas valve adjustment

- 11 Fit the probe of the flue analyser in the flue exhaust sampling point located on the exhaust pipes of the boiler (Fig. 11.3)

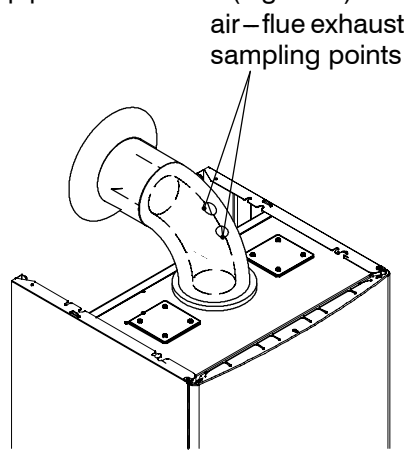


Fig. 11.3

- 12 Turn on the boiler, switching on the fused spur isolation switch.
- 13 Open the gas inlet valve.
- 14 Set the function knob B as indicated in Fig. 11.4. The appliance operation light on the left will flash every 4 seconds.

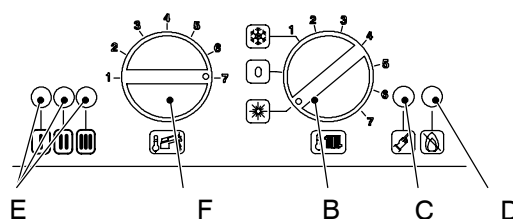


Fig. 11.4

- 15 Keep pressed the reset button *C* for about 10 seconds (Fig. 11.4) until the lock-out signal lamp *D* blinks.
- 16 The lamps *E* should give the indication as in Fig. 11.5.

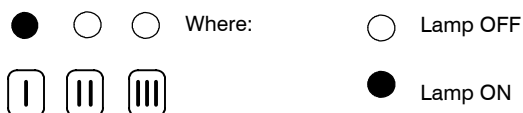


Fig. 11.5

- 17 Release and keep the reset button *C* pressed for more than 5 seconds until the lock-out signal lamp *D* is switched off. The boiler will now go through an ignition sequence and the burner will light.
- 18 Open at least one hot water tap fully.

Adjusting minimum gas valve setting

- 19 Set the knob *F* to the minimum position as illustrated in Fig. 11.6

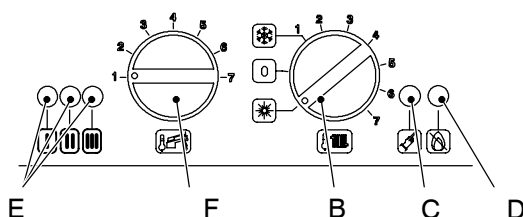


Fig. 11.6

- 20 Allow the analyser to give a stable reading.
- 21 Read the CO₂ % value. It should be between 8,8 and 9,0 %. To adjust the CO₂ % value remove the brass plug by unscrewing it and rotate the plastic screw 1 (Fig. 11.2) (by rotating it clockwise the CO₂ % increases).

Checking the maximum gas valve setting

- 22 Set the knob *F* to the maximum position as illustrated in Fig. 11.7

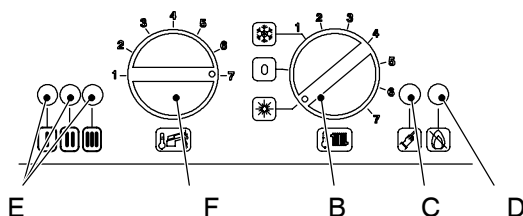


Fig. 11.7

- 23 Allow the analyser to give a stable reading.
- 24 Read the CO₂ % value. It should be between 8,3 and 9,3 %.
- 25 Switch off the boiler and turn off the hot water tap(s).
- 26 Close the air-flue sampling points.
- 27 After adjustment fit the protective brass plug (1, Fig. 11.2).

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

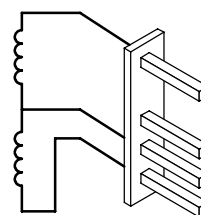
11.4 Checks

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

- ✓ Check the on-off operators coils
- 1 Remove the front panel of the case.
- 2 Disconnect the electrical connector 3 (Fig. 11.2).
- 3 Measure the electrical resistance between the connector pins of the on-off operators as illustrated in Fig. 11.8.

ON-OFF Operator
approx. 6 400 Ω*

ON-OFF Operator
approx. 920 Ω*



* at ambient temperature.

Fig. 11.8

11.5 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 Remove the screw *G* and disconnect the connector *H* (Fig. 11.9).

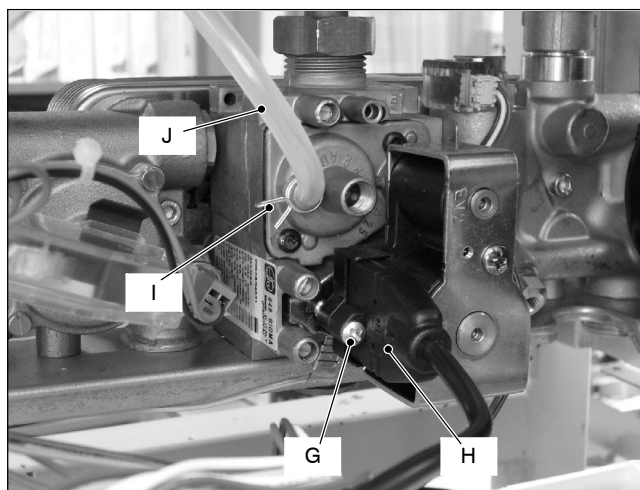


Fig. 11.9

- 3 Turn off the gas supply and disconnect the gas isolation cock connector from the inlet port of the gas valve.
- 4 Using pliers, remove the spring *I* and the rubber pipe *J*.
- 5 Unscrew the connectors *K* and remove the pipe *L* (Fig. 11.10).
- 6 Unscrew the screws *M* and remove the valve.

- 7 Reassemble the valve carrying out the removal operations in reverse order.

Before to fit a new valve it is advisable to pre-set it as hereafter explained.

- 8 Remove the brass plug and turn the plastic screw 1 (Fig. 11.2) fully clockwise until it stops. Do not overtight.
- 9 Turn it counter-clockwise 2 and 3/4 turns.
- 10 Adjust the gas valve using the flue analyser as described in section 11.3.

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, it is deemed necessary to

undertake a combustion analysis as detailed in chapter 11.3 section 11.

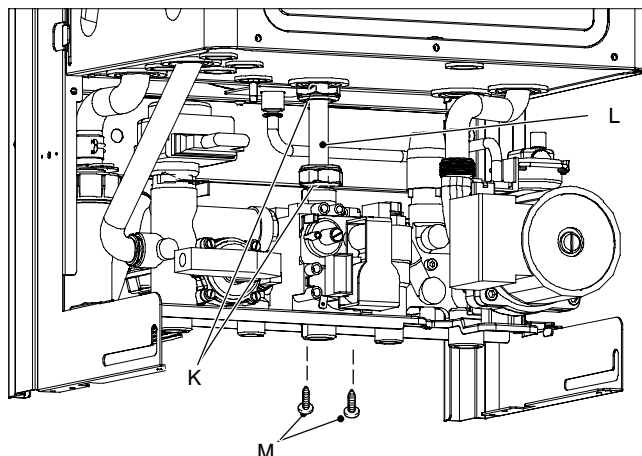


Fig. 11.10

12 Primary circuit flow switch

12.1 Function

The Primary circuit flow switch (A in Fig. 12.1) function is to detect water flow rate through the primary hydraulic circuit of the boiler.

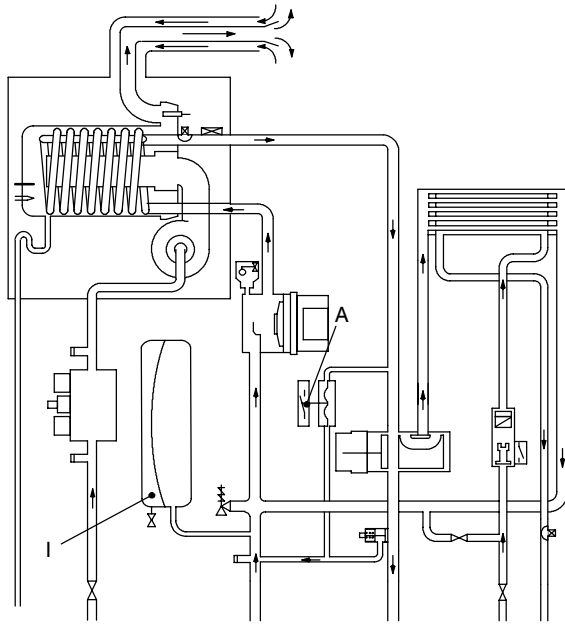


Fig. 12.1

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 9.4 of this manual) has occurred.

12.2 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. 12.2.

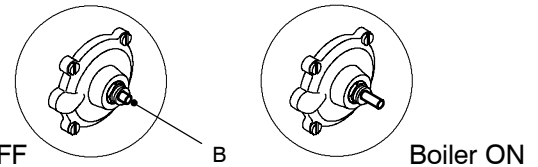


Fig. 12.2

✓ 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 12.3.
- 2 Measure the electrical resistance between the tabs marked C. and N.O. (Fig. 12.3). The contact must be normally open.
- 3 Operate the switch by hand and verify that the contact is now closed.

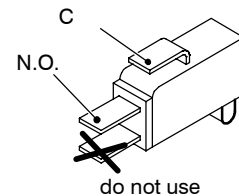


Fig. 12.3

12.3 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. 12.4).
- 3 Open the box and disconnect the switch.
- 4 Re-assemble the parts in reverse order of removal. Refer to Fig. 12.3 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. 12.4).

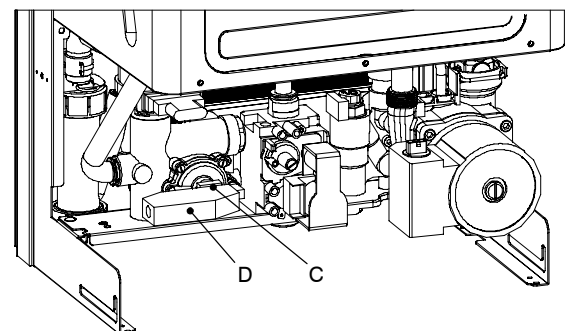


Fig. 12.4

- 3 Unscrew the four screws *E* (see Fig. 12.5) open the hydraulic operator and remove the membrane *F*.

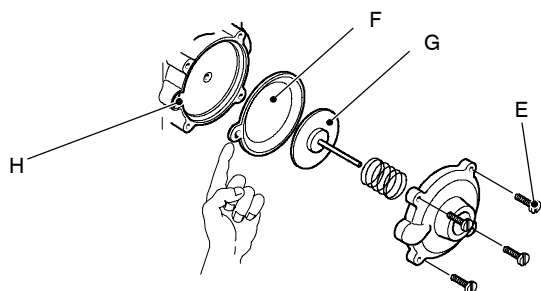


Fig. 12.5

- 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. 12.5).

13 Expansion vessel and temperature–pressure gauge

13.1 Function

The Expansion vessel (*I* in Fig. 12.1) function is to allow for the volume expansion of the c.h. circuit water due to the temperature rise.

13.2 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. 13.1) from the valve on the top of the expansion vessel and connect a suitable air pressure gauge.

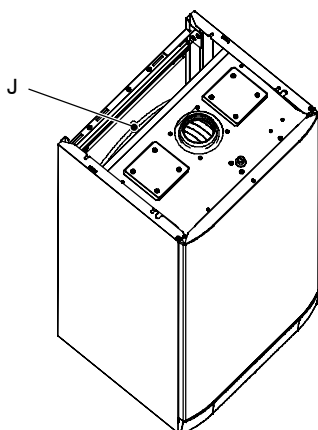


Fig. 13.1

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

13.3 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 expan-

sion 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. 13.2) and remove the expansion vessel from the top of the boiler.

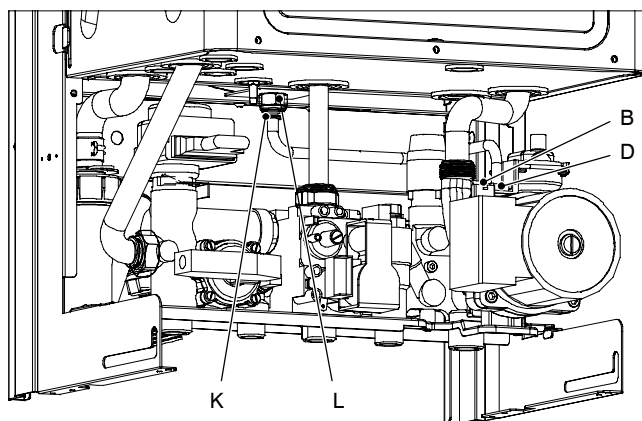


Fig. 13.2

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

13.4 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. 13.3).
- 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.

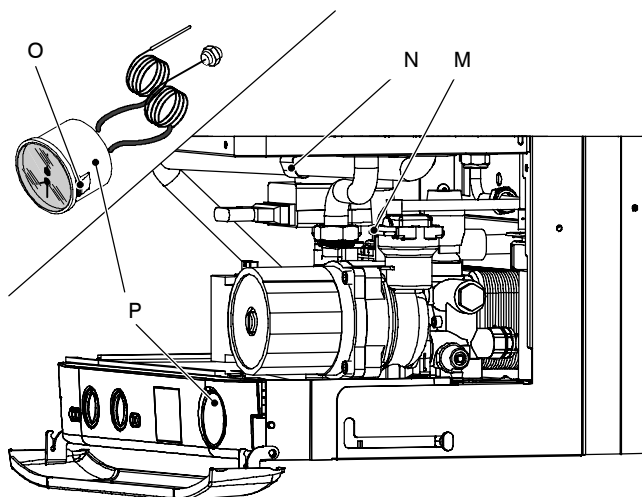


Fig. 13.3

14 D.h.w. flow switch, filter and flow limiter

14.1 Function

The d.h.w. flow switch *A* in Fig. 14.1 is a device that generates an electrical signal when hot water is drawn.

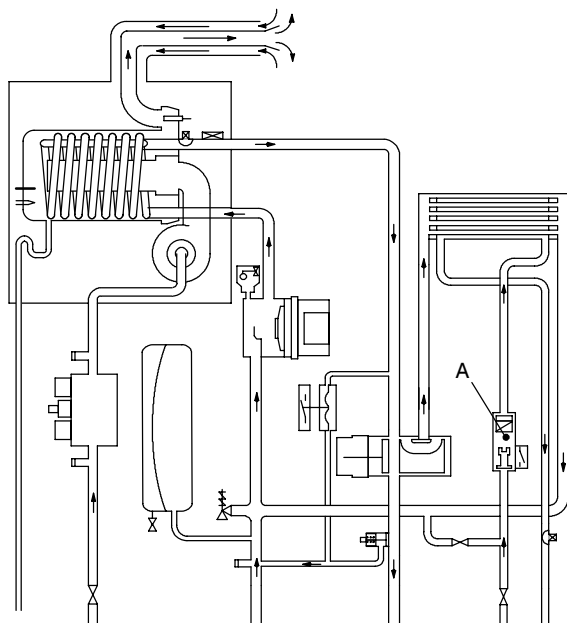


Fig. 14.1

When the flow rate through the d.h.w. circuit reaches about 2,5 litres/min', the float 6 (Fig. 14.3) is drawn towards the right.

The resulting magnetic field of ring 5 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.

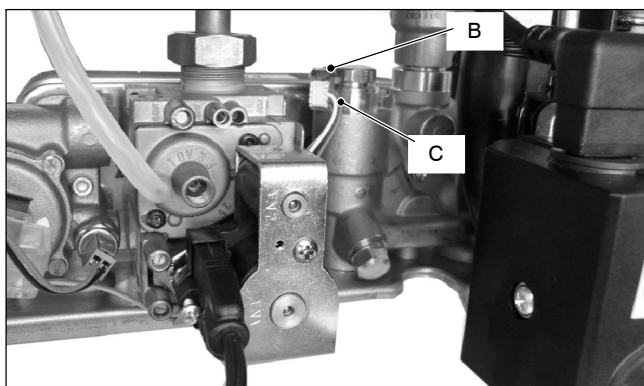


Fig. 14.2

14.2 Description and location of parts (Fig. 14.3)

- 1 Flow switch sensor
- 2 Body
- 3 O-ring
- 4 Spring
- 5 Magnetic ring

- 6 Float
- 7 Threaded ring
- 8 Flow limiter (M110.28SM/... optional accessory)
- 9 Filter
- 10 Spring seat

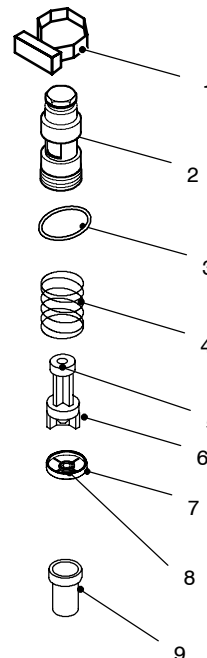


Fig. 14.3

14.3 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. 14.2) placed on the sensor body is switched on when the flow rate reaches about 2,5 litres/min'.

14.4 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. 14.2) and remove the sensor by delicately levering downwards with a screwdriver.

14.5 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 14.4).

- 3 Unscrew the body 2 (Fig. 14.3) and extract the flow switch group.
- 4 To remove the filter from the flow switch group separate the filter 9 from the threaded ring (Fig. 14.3) by levering it.
- 5 Reassemble the parts following the removing sequence in reverse order.

14.6 Flow limiter

The M110.24SM/... model is factory fitted with a 10 litre/min. flow limiter.

If on the M110.32SM/... 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 threaded ring with the flow limiter:

- 1 Remove the flow switch group as explained in the section 14.5.
- 2 Remove the filter from the flow switch group.
- 3 Unscrew the threaded ring 7 (Fig. 14.3) and remove it from the body 2.
- 4 Reassemble the group following the above sequence in reverse order.

15 Temperature probe

15.1 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. 15.1.

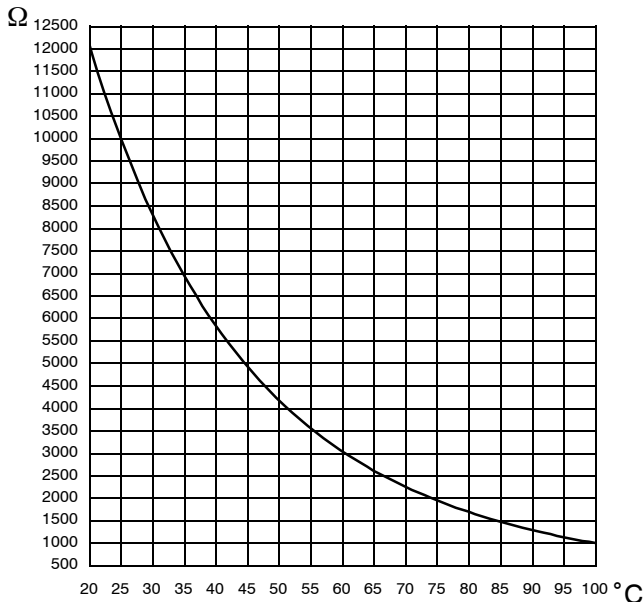


Fig. 15.1

On the boiler there are two Temperature probes. One on the output of the primary condensing heat exchanger (c.h. Temperature probe) A in Fig. 15.2 and Fig. 15.4; one on the output of the d.h.w. heat exchanger (d.h.w. Temperature probe) B in Fig. 15.2 and Fig. 15.4.

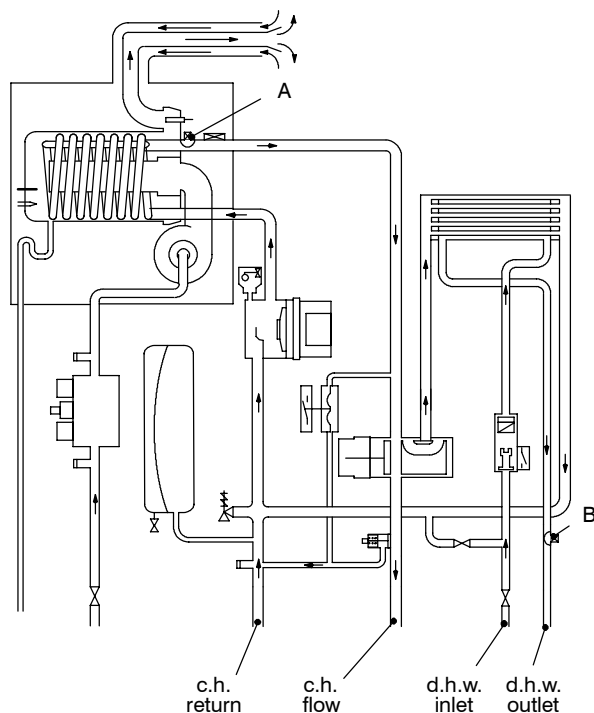


Fig. 15.2

15.2 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. 15.1.

15.3 Removal of the c.h. Temperature probe

⚡ **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 Empty the primary circuit of the boiler.
- 3 Remove the electric connector and unscrew the c.h. Temperature probe (Fig. 15.3).
- 4 Reassemble the c.h. Temperature probe carrying out the removal operations in reverse order.

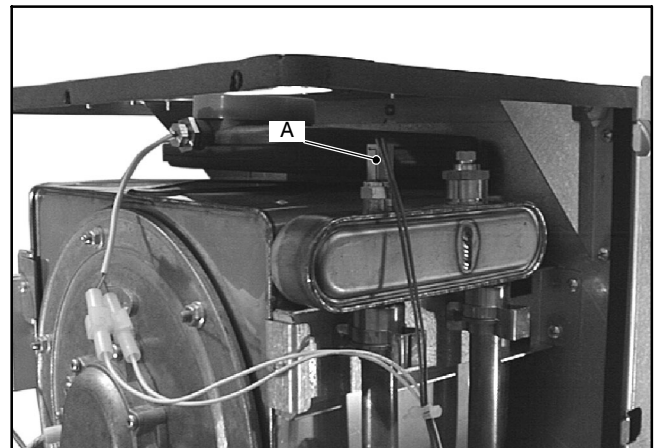


Fig. 15.3

15.4 Removal of the d.h.w. Temperature probe

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

- 1 Remove the front panel of the case.
- 2 Empty the d.h.w. circuit of the boiler.
- 3 Remove the electric connector and unscrew the d.h.w. Temperature probe (Fig. 15.4).
- 4 Reassemble the d.h.w. Temperature probe carrying out the removal operations in reverse order.

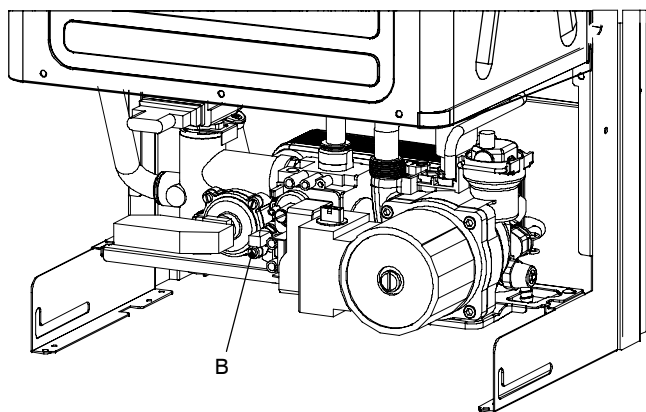


Fig. 15.4

16 By-pass valve

16.1 Function

The By-pass valve A in Fig. 16.1 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.

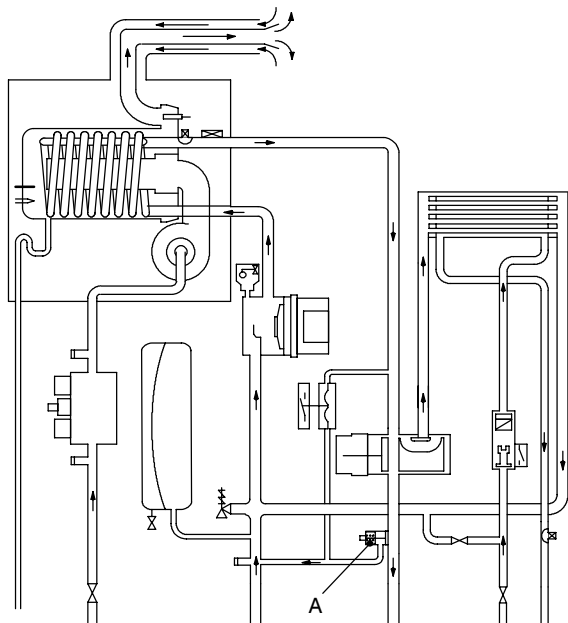


Fig. 16.1

16.2 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 8.4 of this manual.
- 4 Unscrew the connector B and remove the by-pass valve C (Fig. 16.2).

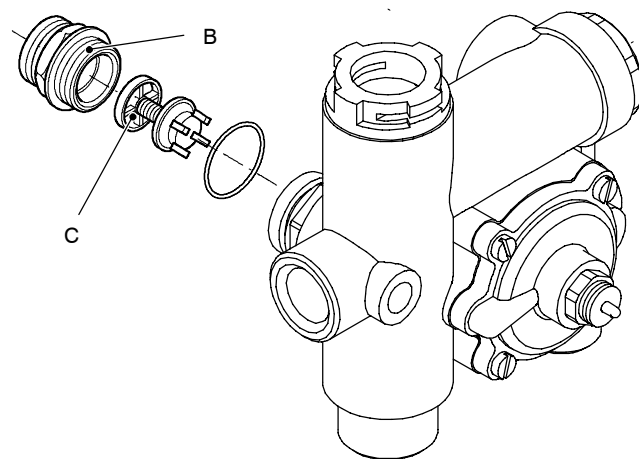


Fig. 16.2

- 5 Reassemble the by-pass valve as illustrated in Fig. 16.2 reversing the order of removal.

17 Fan and Air box

17.1 Function

The function of the Fan A (Fig. 17.1) is to force the mixture of air and gas into the burner.

The function of the Air box B is to mix the gas and the air in the right proportion.

The flow rate of the air – gas mixture and consequently the input power of the boiler is proportional to the speed of the fan that is controlled by the electronic control p.c.b.

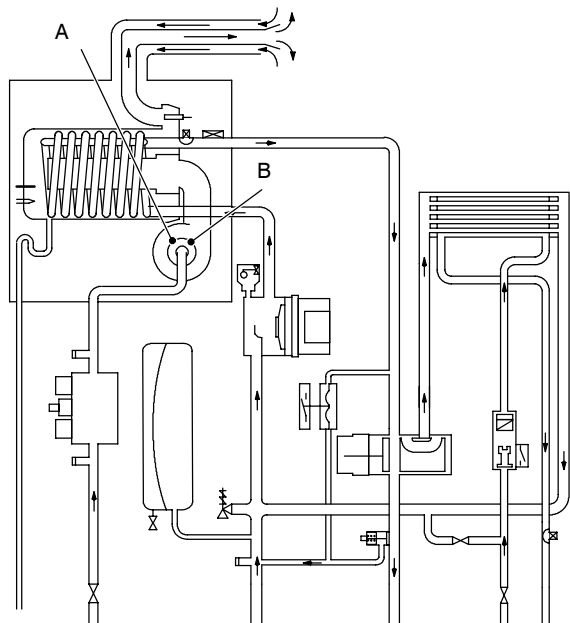


Fig. 17.1

17.2 Removal of the fan group

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

- 1 Turn off the gas supply.
- 2 Remove all the case panels and the sealed chamber lid (see section 2).

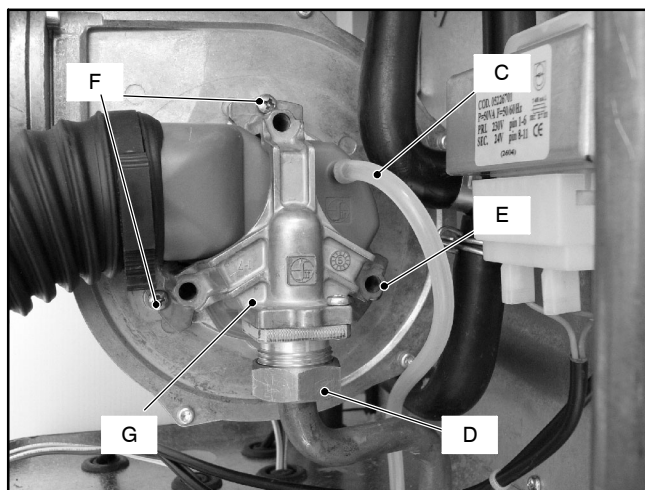


Fig. 17.2

- 3 Disconnect the rubber pipe C (Fig. 17.2).

- 4 Completely loosen the gas connection D (Fig. 17.2).
- 5 Loosen without removing the screw E.
- 6 Remove the screws F and the air box G. Leave the air box with the air hose clamped to the water pipe.
- 7 Disconnect the fan connector H by pressing the plastic hook placed on the rear side of the connector (Fig. 17.3).
- 8 Unscrew the screws I (Fig. 17.4) .

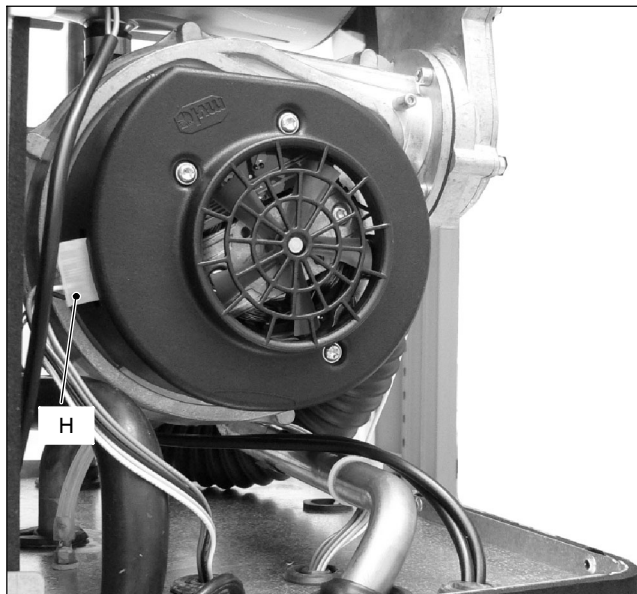


Fig. 17.3

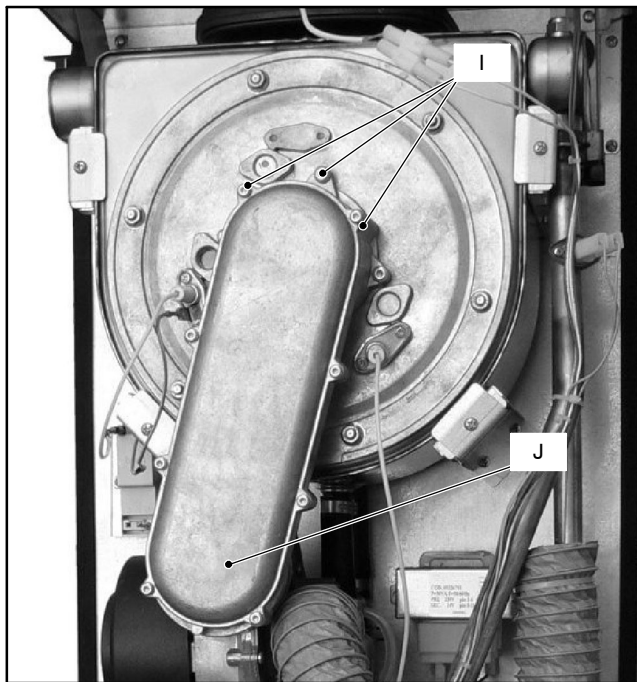


Fig. 17.4

- 9 Remove the fan group J by sliding it forwards.
- 10 Assemble the fan group carrying out the removal operations in reverse sequence.



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.

17.3 Removal of the Air box

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

- 1 Carry out the operations 1 to 6 of section 17.2.
- 2 Unscrew the screws *K* and remove the gas connection *L* (Fig. 17.5).
- 3 Open the strip *M* by sliding the edges with the help of a screwdriver and remove the Air box *G*.
- 4 Assemble the Air box carrying out the removal operations in reverse sequence.

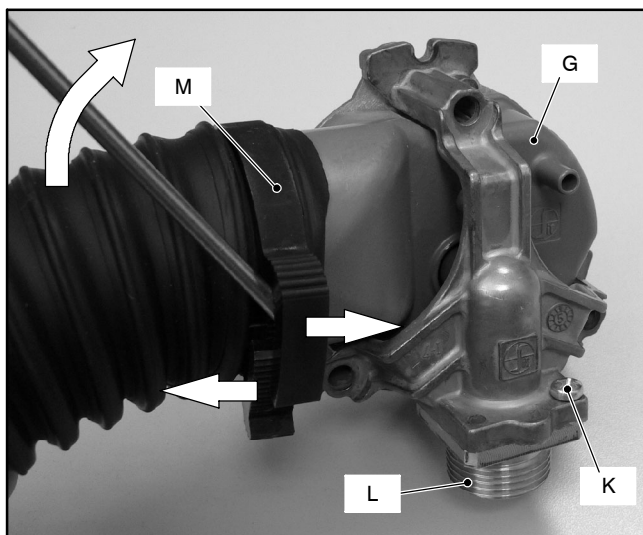


Fig. 17.5

⚠ **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.

17.4 Removal of the Fan

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

- 1 Remove the fan group (see section 17.2).
- 2 Unscrew the screws *N* (Fig. 17.6).
- 3 Assemble the Fan carrying out the removal operations in reverse sequence.

Before reassembling ensure the fan gasket is correctly mounted.

⚠ **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.

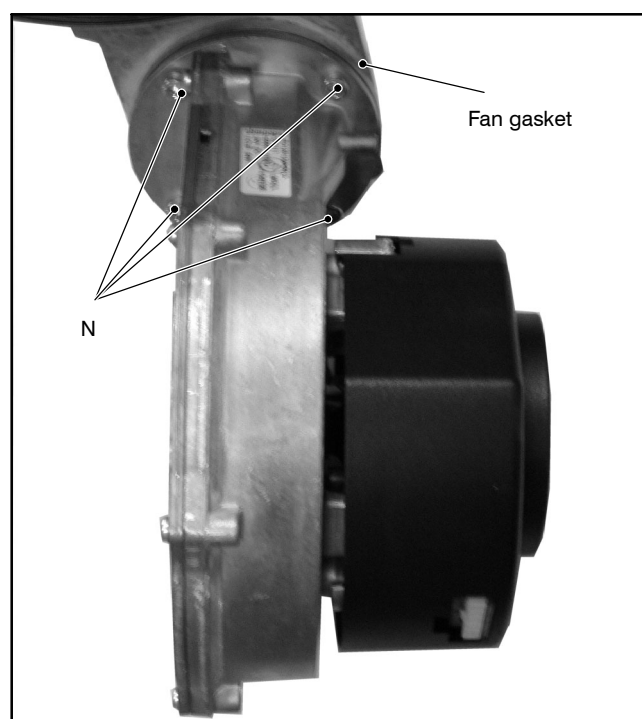


Fig. 17.6

18 Ignition and detection electrodes, burner and spark generator

18.1 Function

Three electrodes are fitted on the fan–burner group. Two of them, fitted on the left side of the fan–burner group *A*, are the ignition electrodes *B* and are connected to the spark generator *C*.

On the right side is the detection electrode *D* and it detects the presence of the flame.

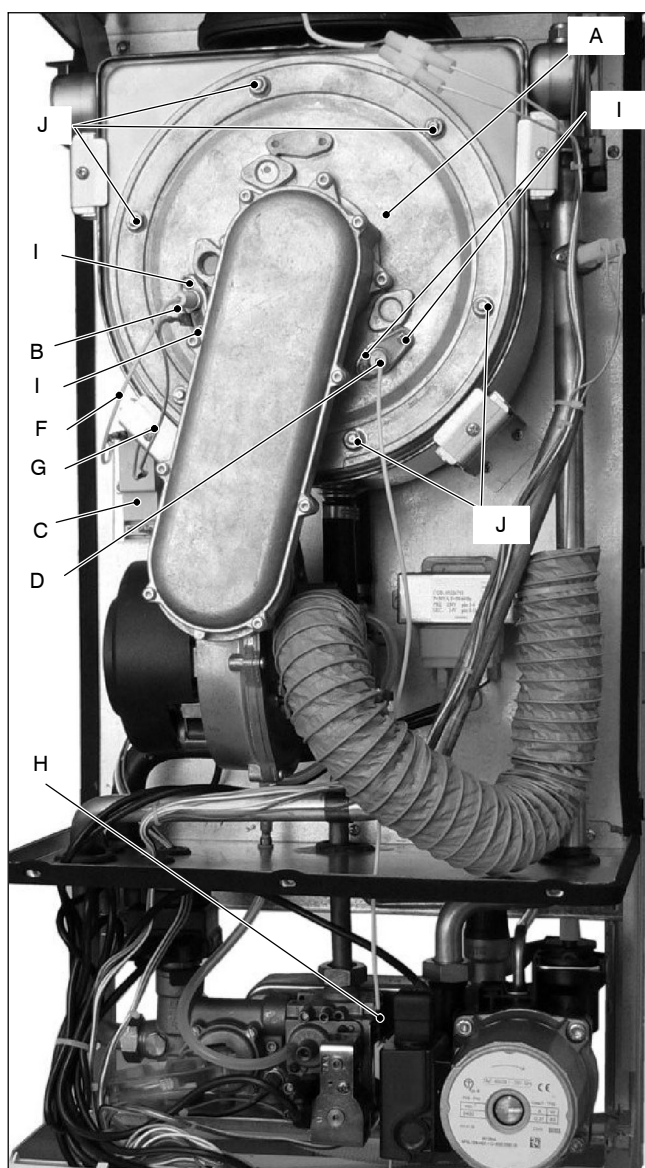


Fig. 18.1

The burner *E* is fitted on the rear of the fan–burner group *A*.

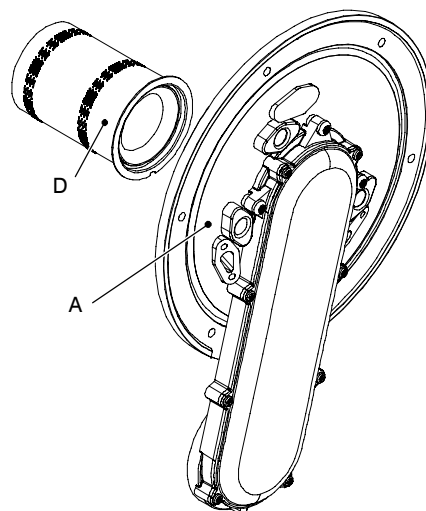


Fig. 18.2

18.2 Removal of the Ignition and detection electrodes

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 (see section 2) .
- 2 Disconnect the ignition electrodes connector *F* and the earth wire *G* from the spark generator (Fig. 18.1) and disconnect the detection electrode connector *H*.
- 3 Unscrew the screws *I* and remove the ignition electrodes *B* and the detection electrode *D* (Fig. 18.1).
- 4 Assemble the Ignition and detection electrodes carrying out the removal operation in reverse order.

When reassembling the ignition electrodes be sure to connect correctly the wires to the spark generator (see Fig. 18.3)

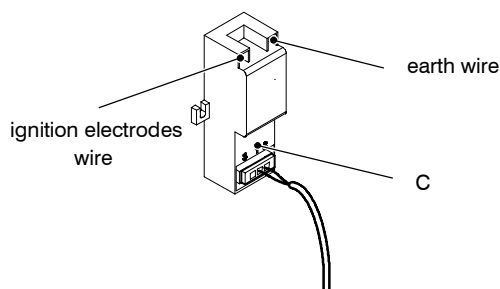


Fig. 18.3

18.3 Removal of the burner

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

- 1 Remove the fan group (see section 17.2)
- 2 Remove the burner by sliding it forward.

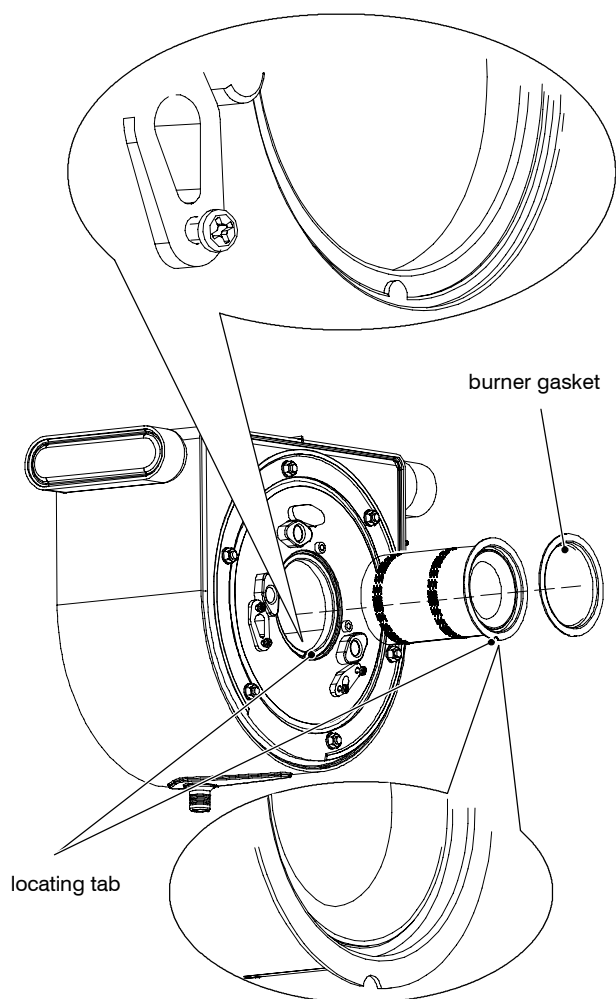


Fig. 18.4

- 3 Assemble the burner carrying out the removal operation in reverse order. Ensure the burner is correctly located by lining up the locating tab (Fig. 18.4).

Before reassembling ensure the burner gasket is correctly located.



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 Removal of the front insulation panel

See warning note at the end of this chapter before to remove this part.

- 1 Remove the Ignition and detection electrodes (see section 18.2).
- 2 Do the operations of section 17.2 from step 1 to step 7.
- 3 Unscrew the nuts *J* (Fig. 18.1)and remove the cover of the combustion chamber.
- 4 Remove the front insulation panel (Fig. 18.5).

- 5 Assemble the new front insulation carrying out the removal operation in reverse order. When fitting the new panel ensure that the electrodes holes coincide with the holes of the combustion chamber.

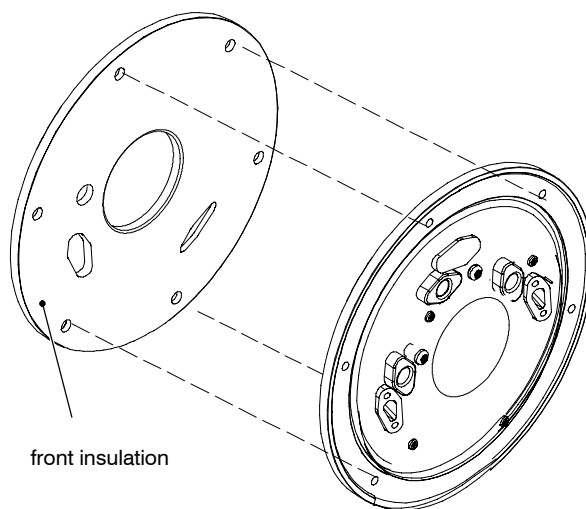


Fig. 18.5

18.5 Removal of the rear insulation

See warning note at the end of this chapter before to remove this part.

Attention: Cover the inner of the condensing heat exchanger to avoid that dirt and debris fall in the coil.

- 1 Disconnect the Ignition and detection electrodes.
- 2 Do the operations of section 17.2 from step 1 to step 7.
- 3 Unscrew the nuts *K* (Fig. 18.1)and remove the cover of the combustion chamber.
- 4 Unscrew the screw *L*, remove the washer *M* and the rear insulation *N* (Fig. 18.6).

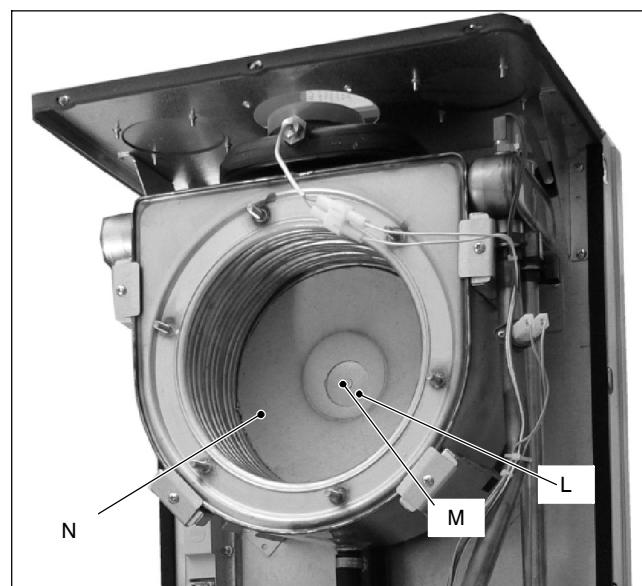


Fig. 18.6

- 5 Assemble the new rear insulation carrying out the removal operation in reverse order.

18.6 Removal of the flue hood

- 1 Remove the condensing heat exchanger (see section 5.2).

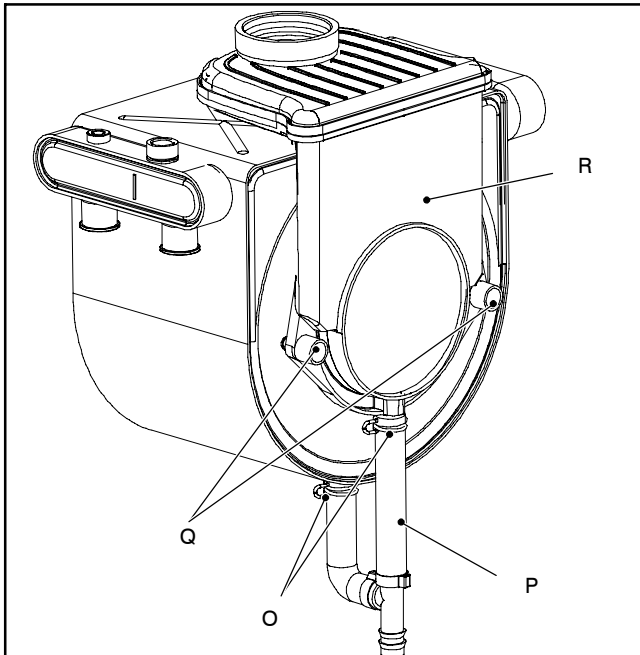


Fig. 18.7

- 2 Using pliers, remove the spring *O* moving it downwards and disconnect the rubber pipe *P* (Fig. 18.7).
- 3 Remove the screws *Q* and remove the flue hood *R*.
- 4 Assemble the flue hood carrying out the removal operation in reverse order.

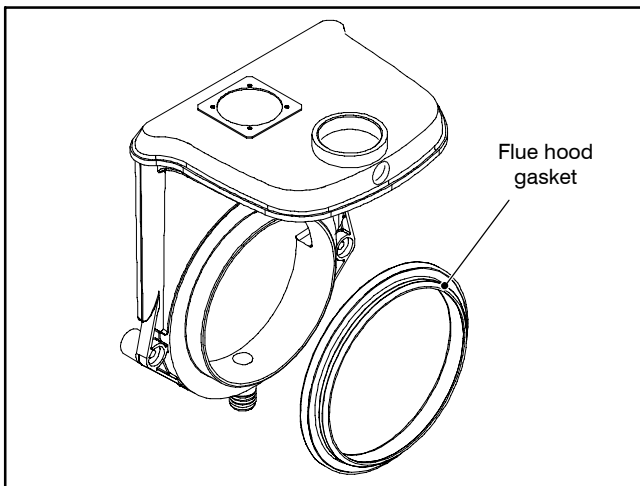


Fig. 18.8

Before reassembling ensure that the flue hood gasket is correctly mounted (Fig. 18.8).

18.7 Removal of the spark generator

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 spark generator connector coming from the control p.c.b, the electrodes wire and the earth wire coming from the ignition electrodes (Fig. 18.9).

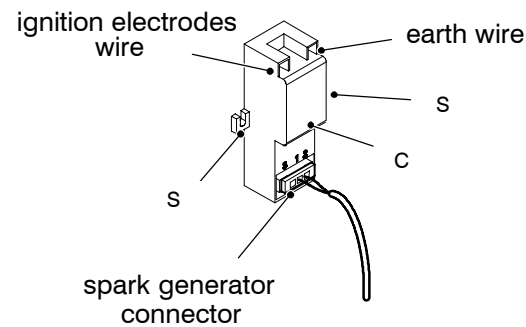


Fig. 18.9

- 3 Unscrew the screws *S* and remove the spark generator.
- 4 Assemble the spark generator carrying out the removal operation in reverse order.

When reassembling the spark generator be sure to connect correctly the wires.

18.8 Checks

- ✓ Check of the spark generator

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

There is not a significant way to verify the integrity of the spark generator.

When the fan turns but the burner does not light a possible cause is a faulty spark generator and it is advisable to replace it to locate the fault.

- ✓ Check the position of the electrode edges

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

- 1 Remove the ignition electrodes (see section 18.2)
- 2 Check for the correct distance between the metallic edges of the ignition electrode (see Fig. 18.10).

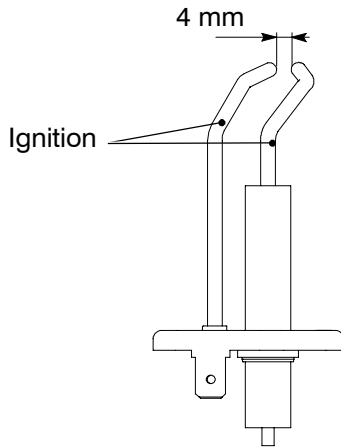


Fig. 18.10

✓ 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 and the sealed chamber lid.

2 Check for the integrity of the insulation of wires which connect the electrodes to the spark generator and to the control/ignition p.c.b.

Warning – Insulation panels material handling care

Mineral fibres are used in this appliance for the insulation panels of the combustion chamber

Excessive exposure to these materials may cause temporary irritation to eyes, skin and respiratory tract.

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.

19 Safety thermostat

19.1 Function

The safety thermostat A in Fig. 19.1 is a device that senses the temperature of the primary circuit water which flows in the outlet pipe of the condensing 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.

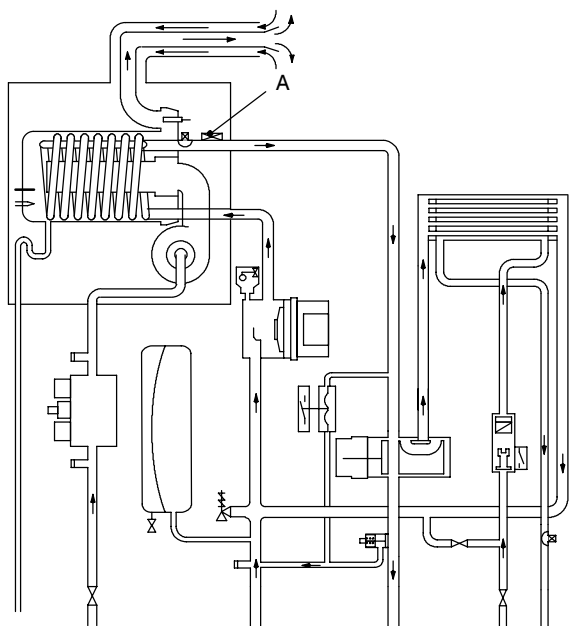


Fig. 19.1

19.2 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 Disconnect the safety thermostat and check its electrical function. Normally (no intervention) the contact must be closed (electrical resistance zero Ω).

19.3 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 Disconnect the wiring B (detail in Fig. 19.2).
- 3 Unscrew the screws C which hold the overheat thermostat on the pipe of the condensing heat exchanger and remove it.

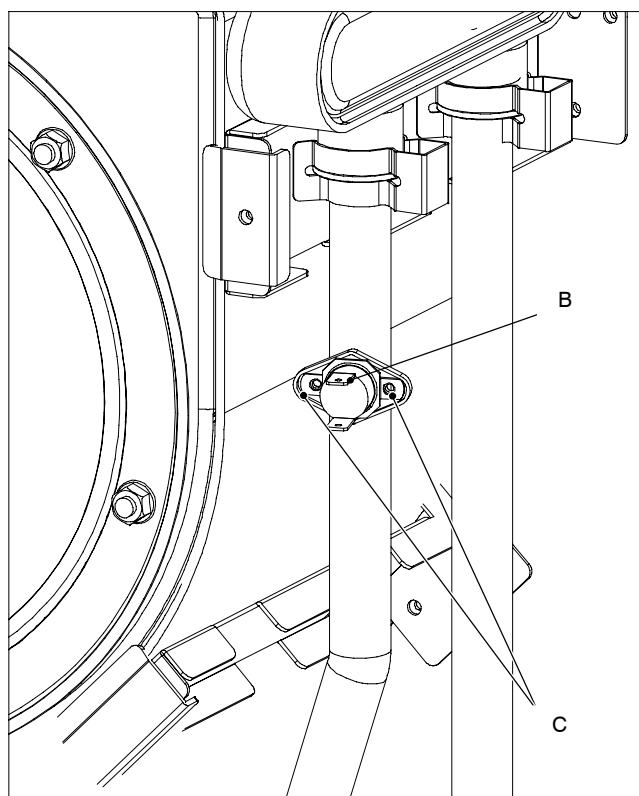


Fig. 19.2

- 4 Reassemble the overheat thermostat carrying out the operations in reverse order.
- 5 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.**

20 Flue temperature probe NTC

20.1 Function

The Flue temperature probe NTC A in Fig. 20.1 and Fig. 20.2 senses the temperature of the combustion products that flow through the condensing heat exchanger.

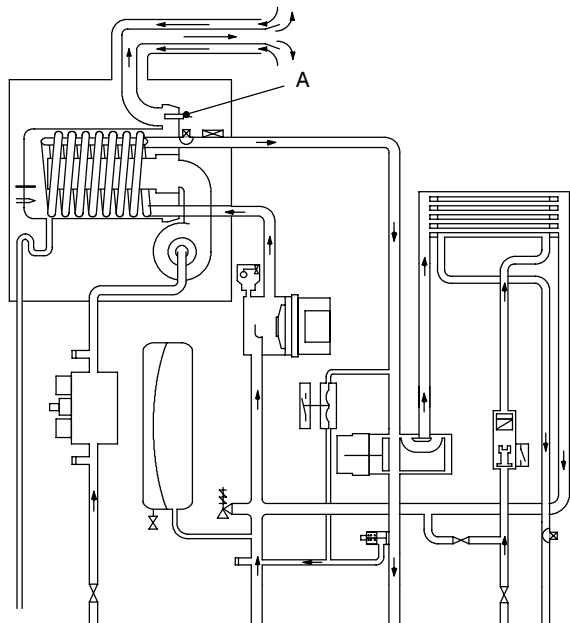


Fig. 20.1

If the temperature of the combustion products circuit reaches the limit temperature, the Flue temperature probe NTC reduces the gas flow rate to the burner. The temperature of the combustion products should decrease to a safe value temperature.

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 not, the electronic control/ignition p.c.b. attempts to light the burner and, at the end, locks the boiler and lights the lock-out signal lamp.

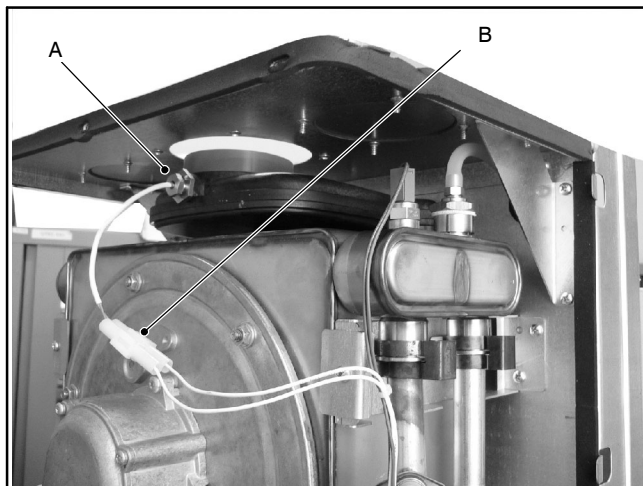


Fig. 20.2

20.2 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 B from the Flue temperature probe NTC.
- 3 Unscrew and remove the flue temperature probe A (Fig. 20.2) from the condensing heat exchanger.
- 4 Assemble the Flue temperature probe NTC carrying out the removal operations in reverse sequence.

20.3 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 temperature probe NTC and no overheat intervention should occur.
- ✓ Temperature-resistance relationship
- 1 Remove the Flue temperature probe NTC (see section 20.2).
 - 2 Measure the Flue temperature probe NTC electrical resistance at the ambient temperature and check it according to the graph in Fig. 20.3

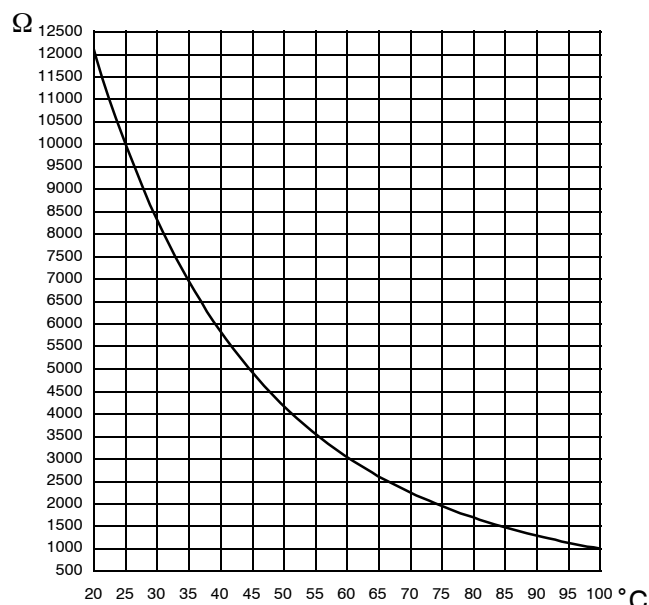


Fig. 20.3

21 Condensate trap

21.1 Function

The condensate trap **A** in Fig. 21.1 and Fig. 21.2 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.

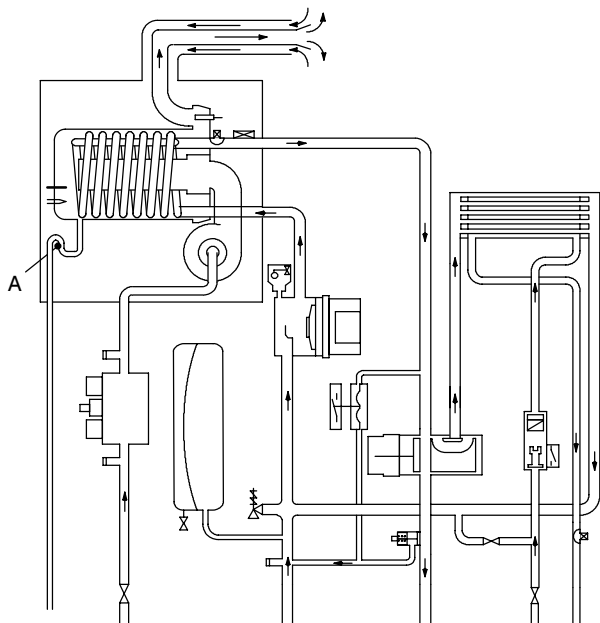


Fig. 21.1

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 till it reaches thus causing the boiler lock-out.

21.2 Removal

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

- 1 Remove the front and right case panels.
- 2 Remove the motor of three way diverter valve (see section 8.4).
- 3 Disconnect the trap from the draining pipe.
- 4 Using pliers, remove the spring **B** moving it upwards.
- 5 Unscrew the lock-nut **C** and lower the trap.
- 6 Reassemble carrying out the removal operations in reverse order.

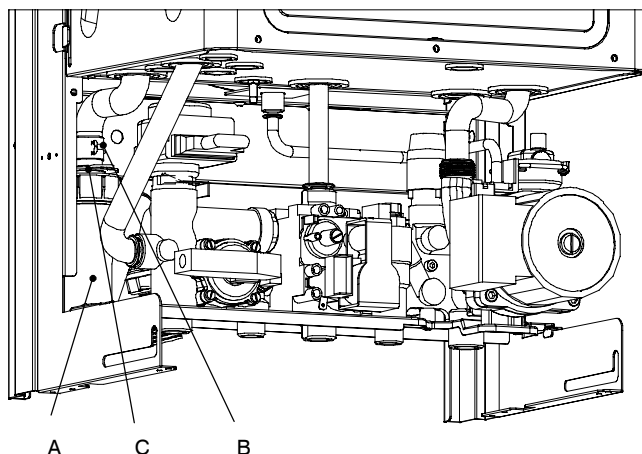


Fig. 21.2

22 External temperature probe (optional)

22.1 Function

The External temperature probe if fitted, allows to adjust automatically the temperature of the c.h. flow with reference to the external temperature.

The relationship between the external temperature and the c.h. flow temperature is represented by the coefficient K (Fig. 22.1) that can be set between 0 and 6.

More details concerning the coefficient K and the setting procedure are given in the *Commissioning* section of the installation manual.

The coefficient K is factory set to 0 that is the setting for the operation with no external temperature probe fitted.

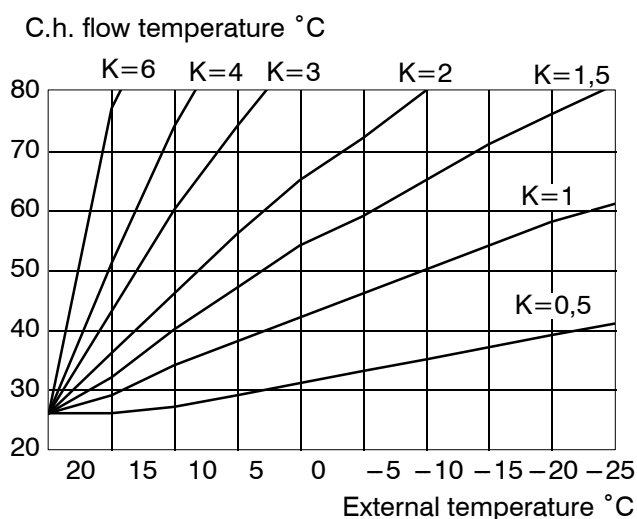


Fig. 22.1

22.2 Checks

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

Disconnect the cable from the External temperature probe.

Measure the external temperature where the External temperature probe is located and check the electrical resistance according to the graph in Fig. 22.2.

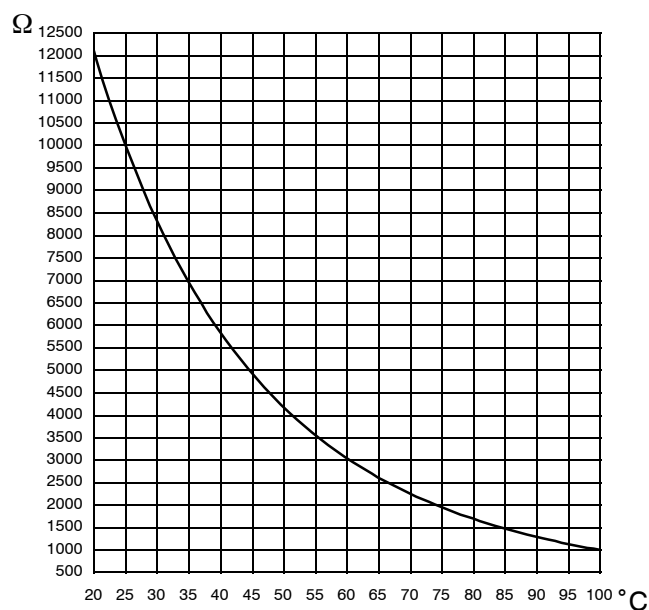
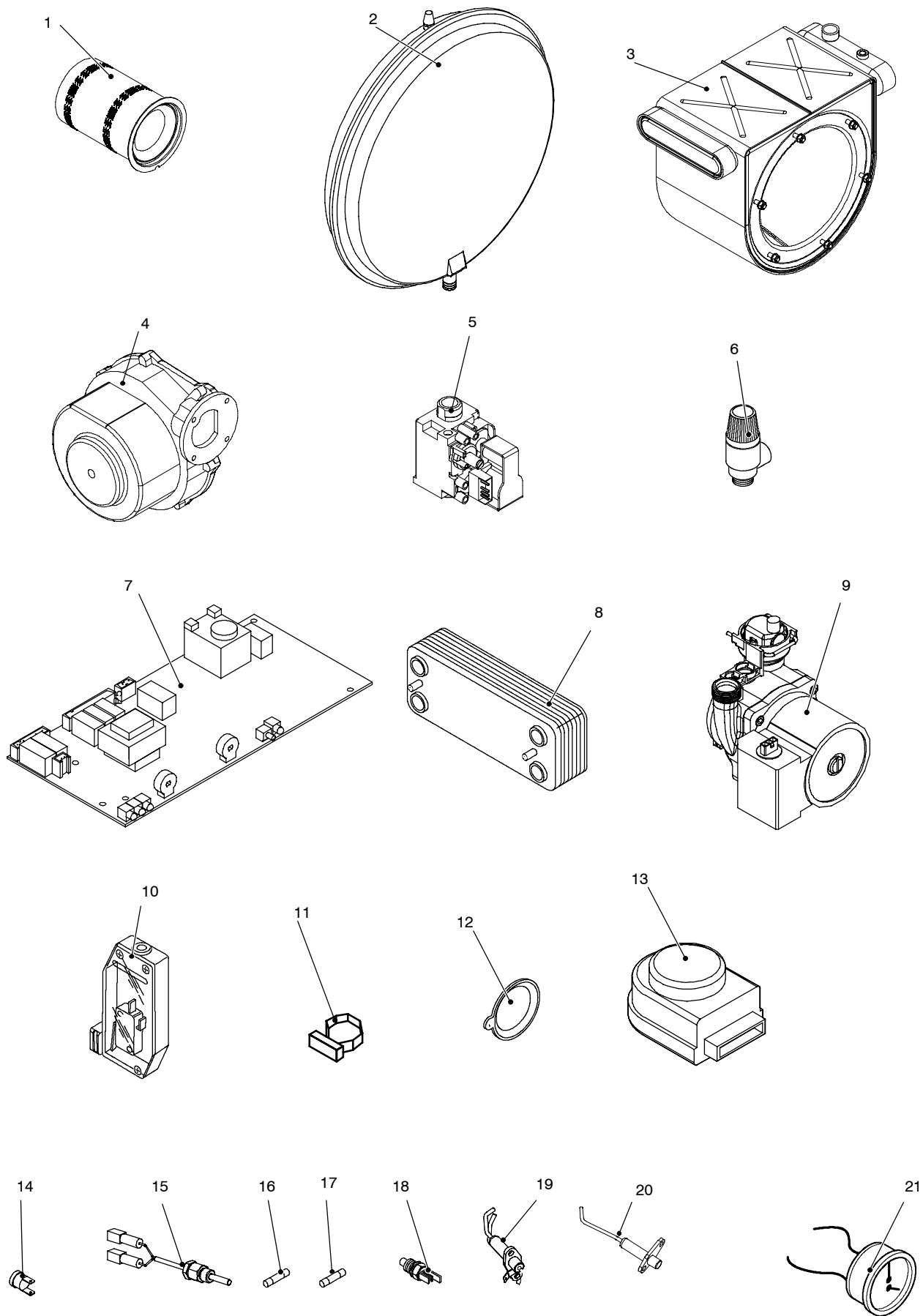


Fig. 22.2

23 Short spare parts list

Key	G.C. part no.	Description	Q.ty	Manufac- turer part no.	Manufacturer's reference
1		Burner (mod. M110.24SM/...)	1	BI1223 101	
		Burner (mod. M110.32SM/...)	1	BI1223 102	
2		Expansion vessel	1	BI1182 105	CIMM 7 litres
3		Condensing heat exchanger (mod. M110.24SM/...)	1	BI1282 101	
		Condensing heat exchanger (mod. M110.32SM/...)	1	BI1282 102	
4		Fan	1	BI1223 113	EBM RG128 24V 54W
5		Gas valve	1	BI1223 111	SIT 848 Sigma
6		Safety valve	1	BI1131 100	Watts Orkly (alternative)
7		Electronic regulation p.c.b. (mod. M110.24SM/...)	1	BI1805 103	Bertelli & Partners
		Electronic regulation p.c.b. (mod. M110.32SM/...)	1	BI1805 101	
8	E01 – 204	D.h.w. heat exchanger (M110.24SM/...)	1	BI1001 101	
	E01 – 205	D.h.w. heat exchanger (M110.32SM/...)	1	BI1161 100	
9	H20 – 993	Pump	1	BI1262 103	
10		Primary circuit flow switch	1	BI1251 501	
11		D.h.w. flow switch	1	BI1271 101	
12	E00 – 688	Main. flow switch membrane	1	BI1011 103	
13	E83 – 086	Three way diverter valve (electric actuator)	1	BI1101 102	Elbi
14	E83 – 101	Overheat thermostat	1	BI1172 105	ELTH – type 261
15		Flue temperature probe NTC	1		
16		Fuse 3,15 AF	2	BI1295 108	
17		Fuse 400 mA T	1	BI1665 104	
18	164 – 026	Temperature probe (main or D.h.w. circuit)	2	BI1001 117	
19		Ignition electrode	1		
20		Detection electrode	1	BI1233 104	
21	E83 – 145	Temperature – pressure gauge	1	BI1475 108	IMIT





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Industrial Estate, Neachells Lane
Willenhall, Wolverhampton WV 13 3XB
Technical helpline: 01902 304 400
Web site: www.biasi.co.uk



Spare Parts List

M110.24SM/E

M110.32SM/E

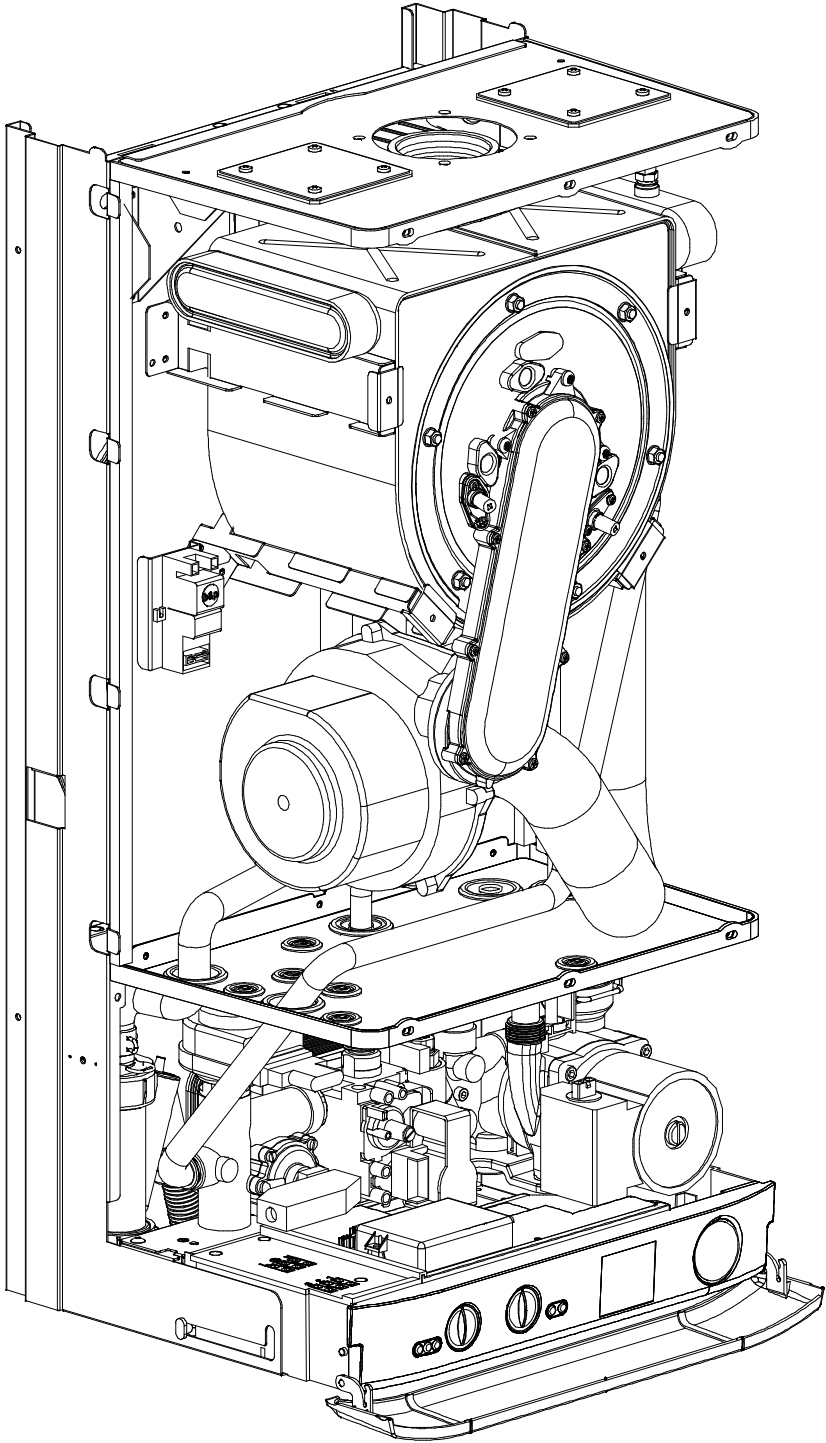
Issue 10/2005

Table description	Issue	n. of pages
Overall view	10/2005	1
C.h. return group and d.h.w. heat exchanger	10/2005	1
C.h. flow group and three way diverter valve	10/2005	1
C.h. flow and return groups	10/2005	1
Pump and main circuit assembly	10/2005	1
Gas assembly	10/2005	1
Valves and connection pipes	10/2005	1
Control panel and ignition device	10/2005	1
Wiring	10/2005	1
Fan, combustion chamber and case panels	10/2005	1
List of parts	10/2005	8

M110.24SM/E
M110.32SM/E

47-970-31
47-970-32

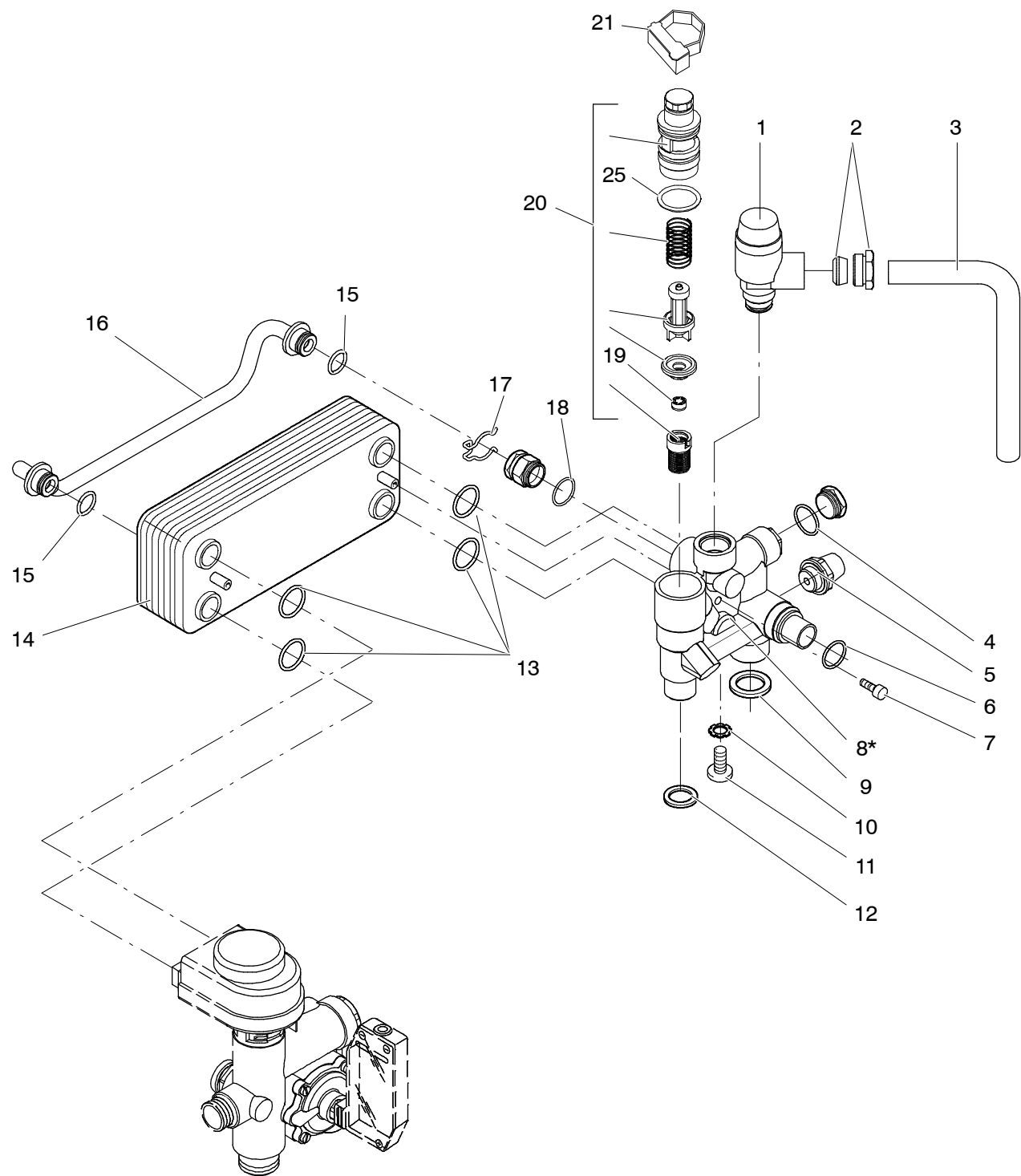
Overall view
DATA BADGE: inner side of left case panel



M110.24SM/E
M110.32SM/E

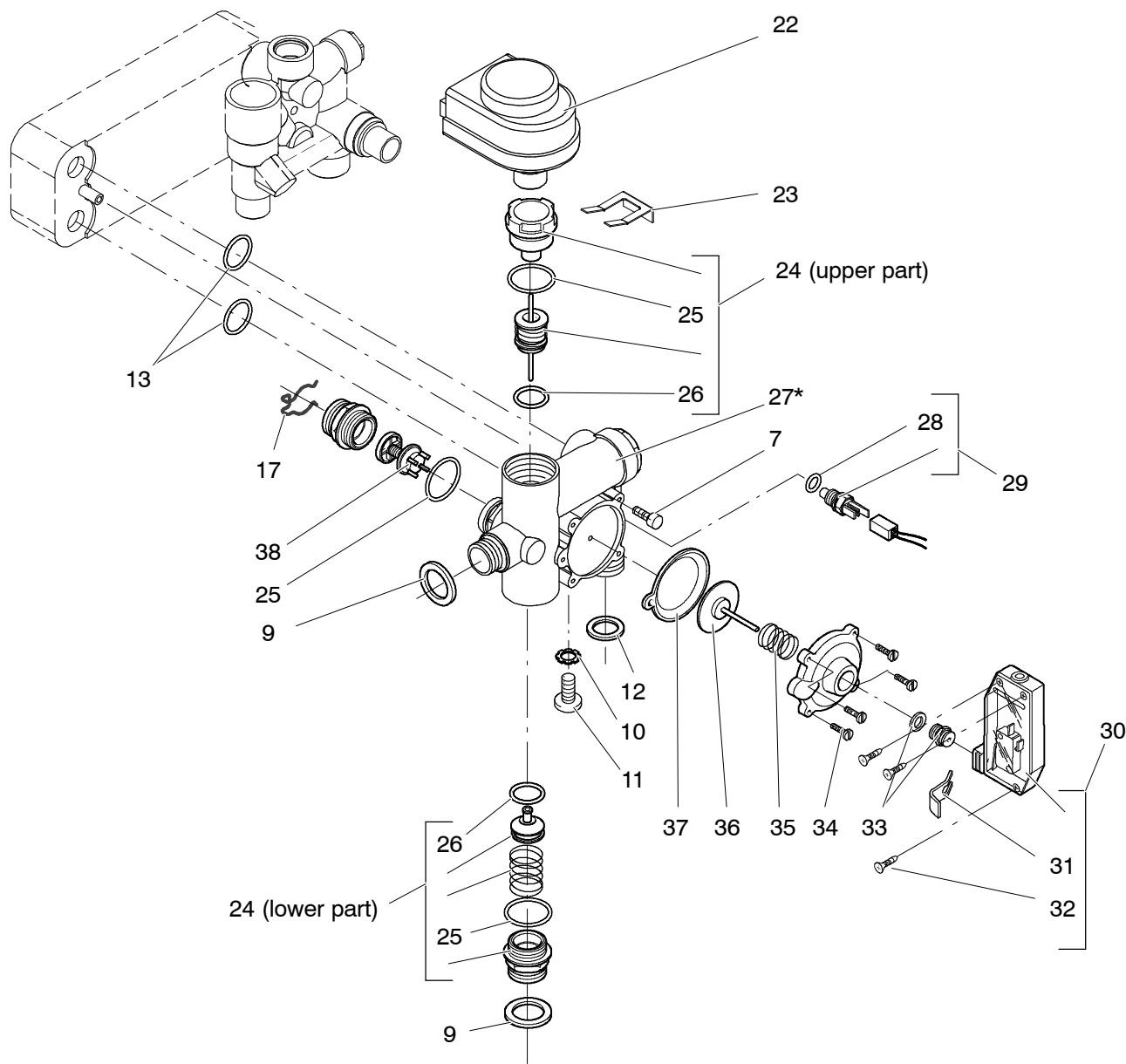
47-970-31
47-970-32

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



* Includes items 4, 18, 20

C.h. flow group and three way diverter valve

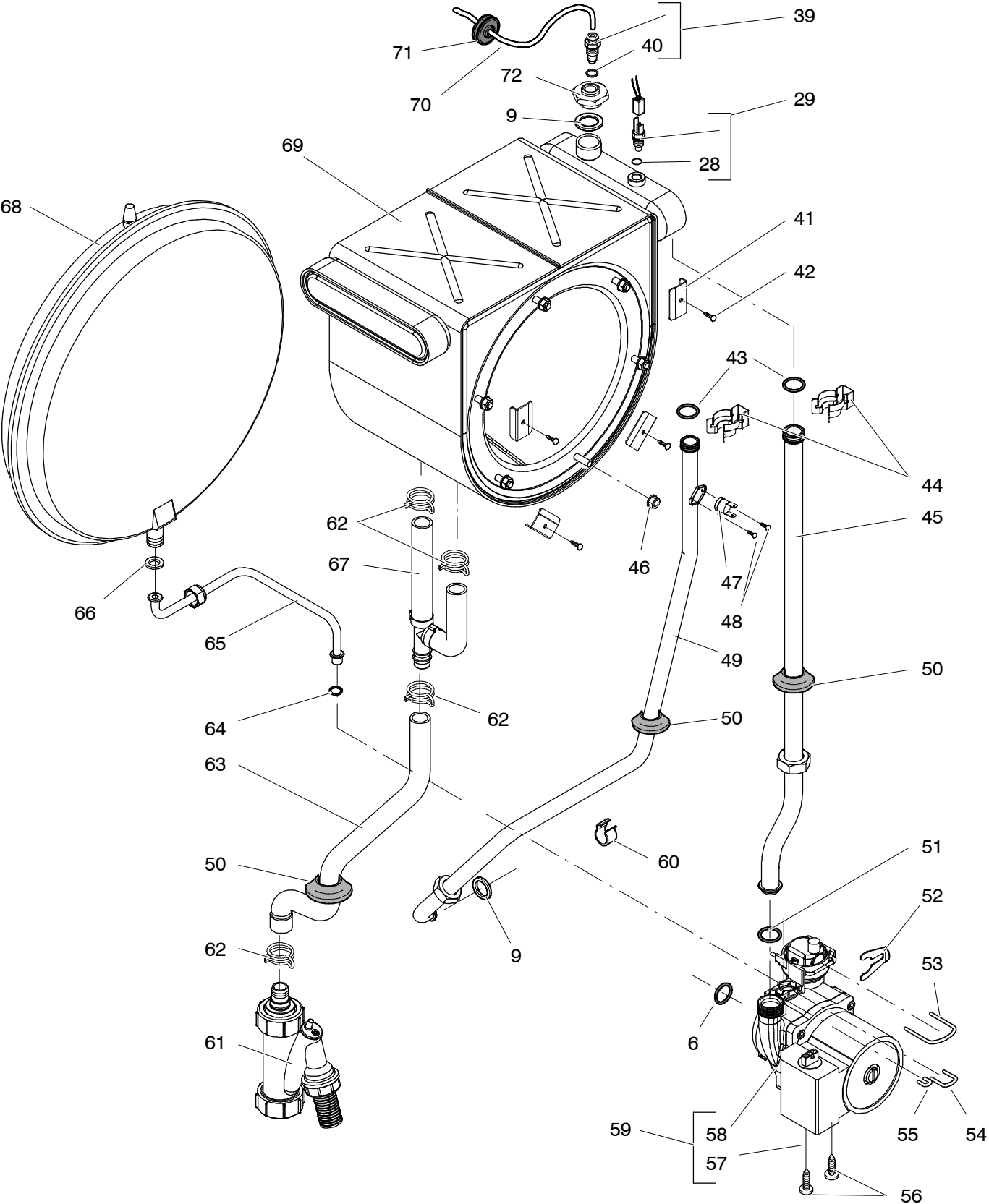


* Includes items 24, 25, 26, 33, 34, 35, 36, 37, 38

M110.24SM/E
M110.32SM/E

47-970-31
47-970-32

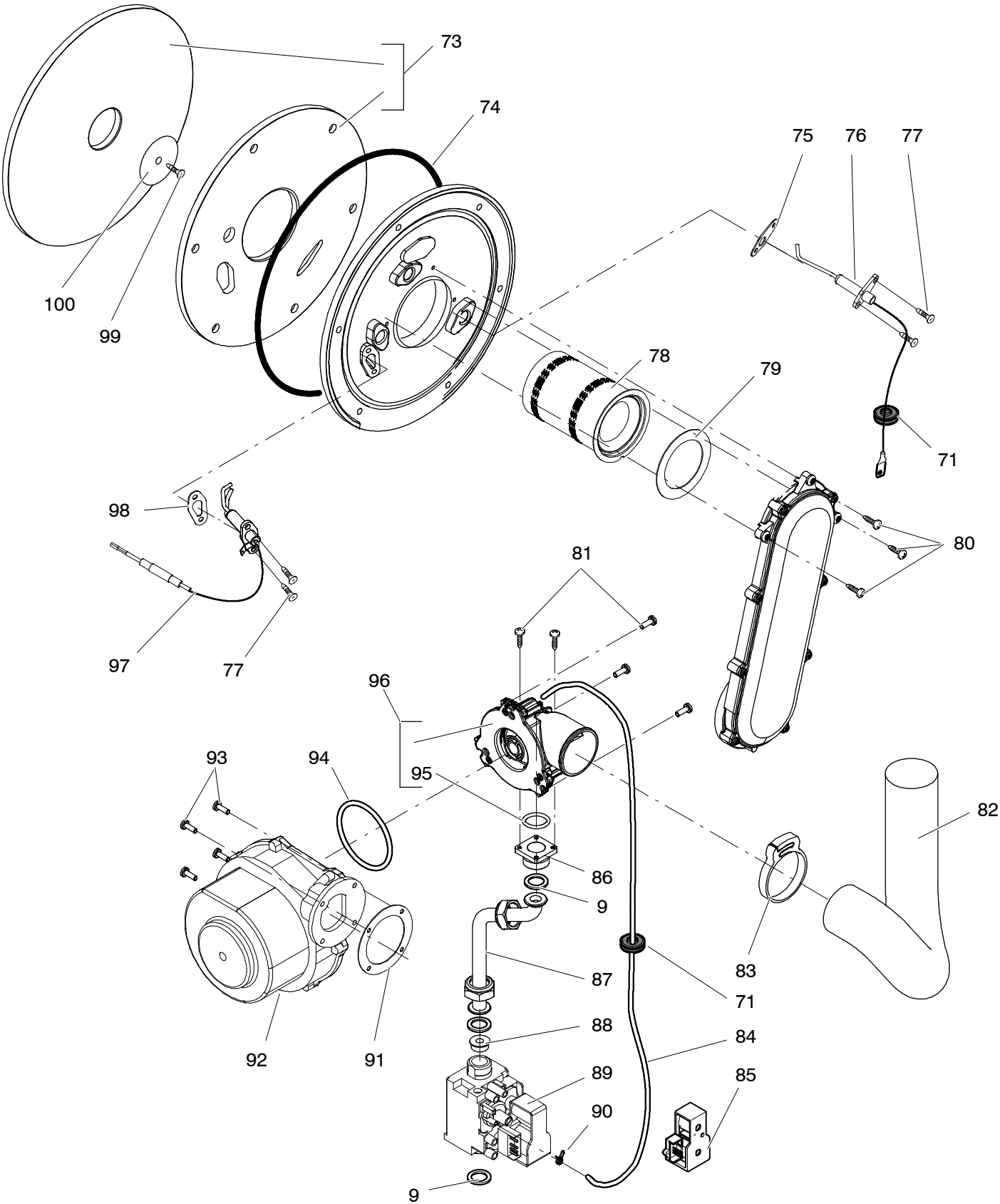
Pump and main circuit assembly



M110.24SM/E
M110.32SM/E

47-970-31
47-970-32

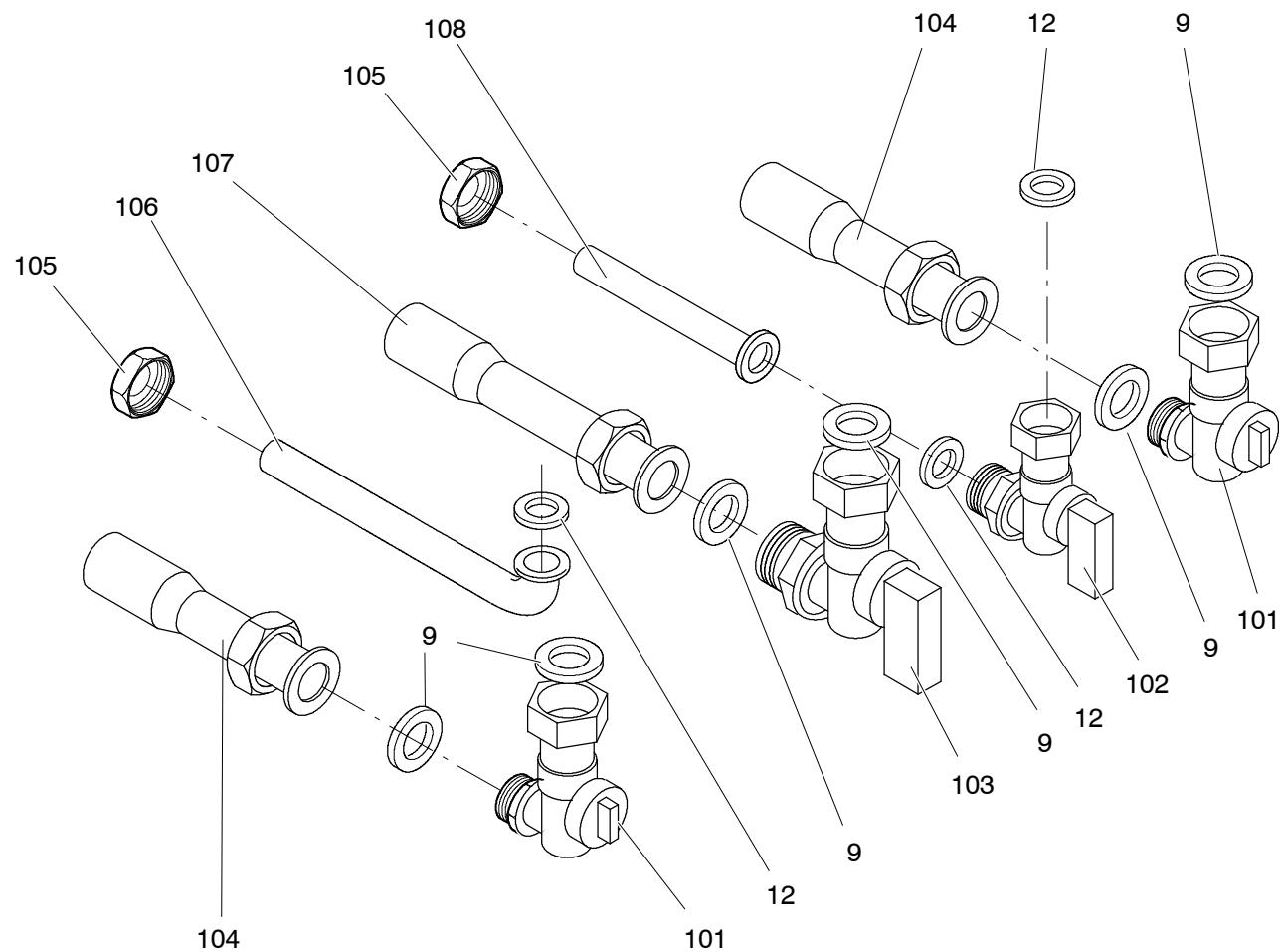
Gas assembly



M110.24SM/E
M110.32SM/E

47-970-31
47-970-32

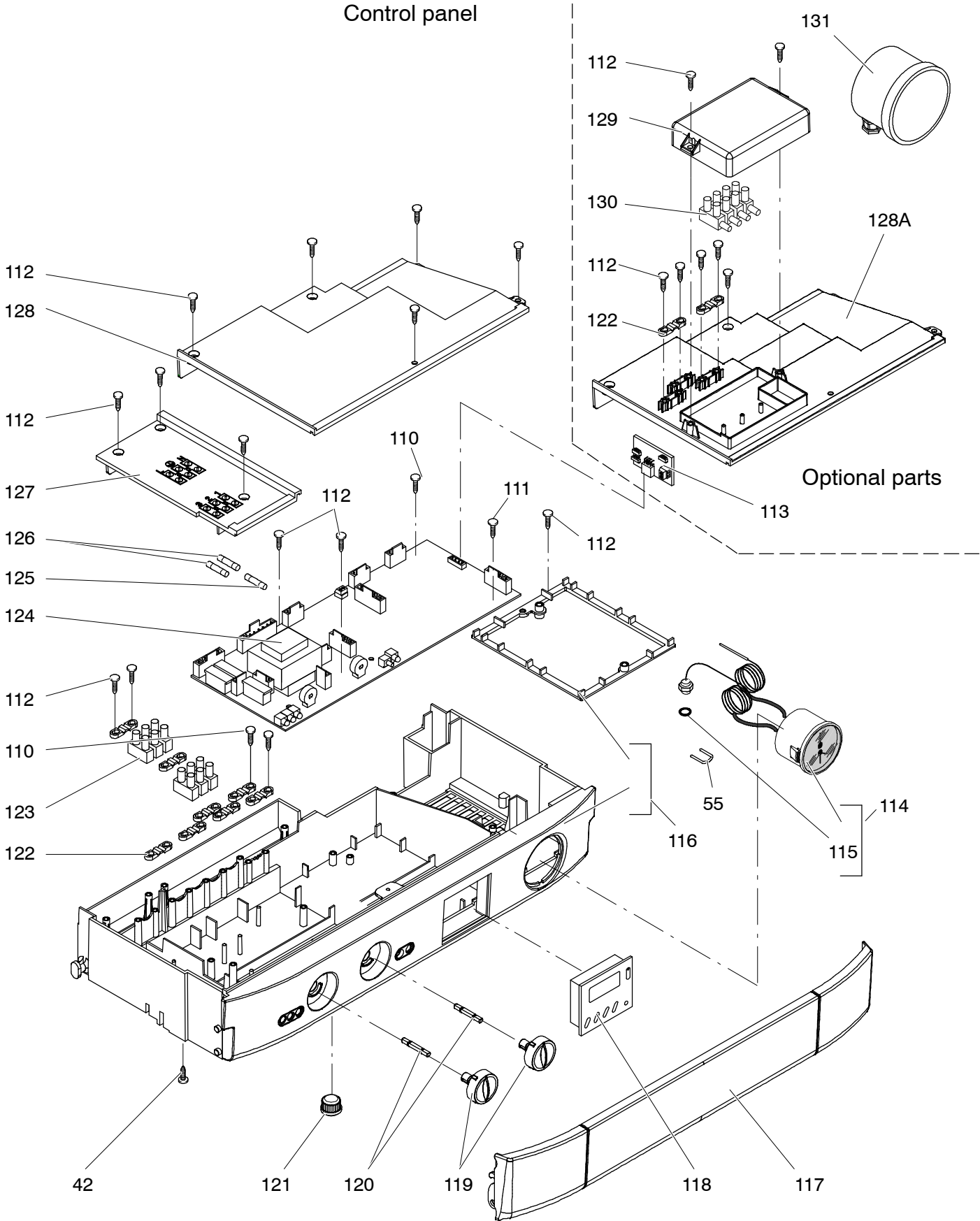
Valves and connection pipes



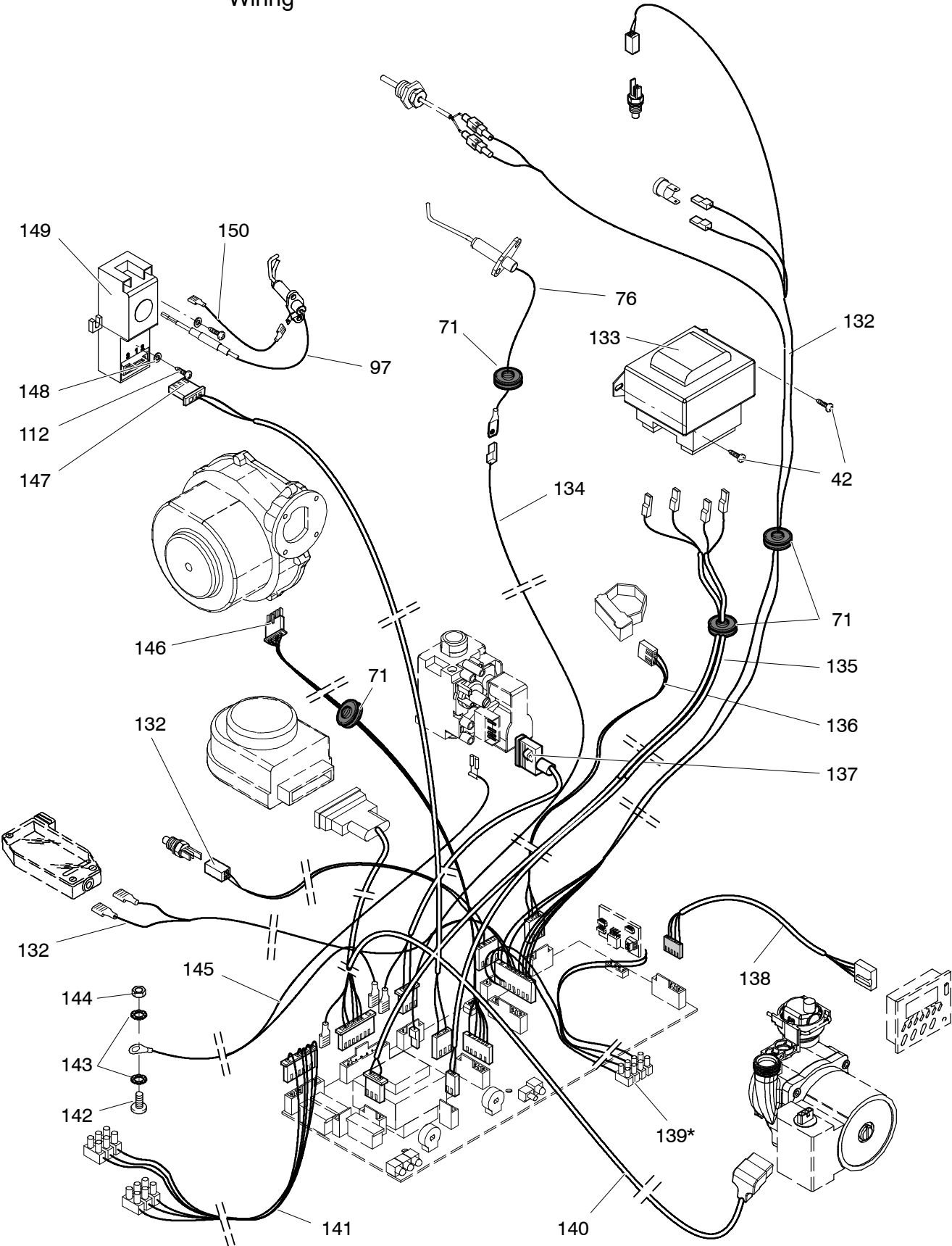
M110.24SM/E
M110.32SM/E

47-970-31
47-970-32

Control panel



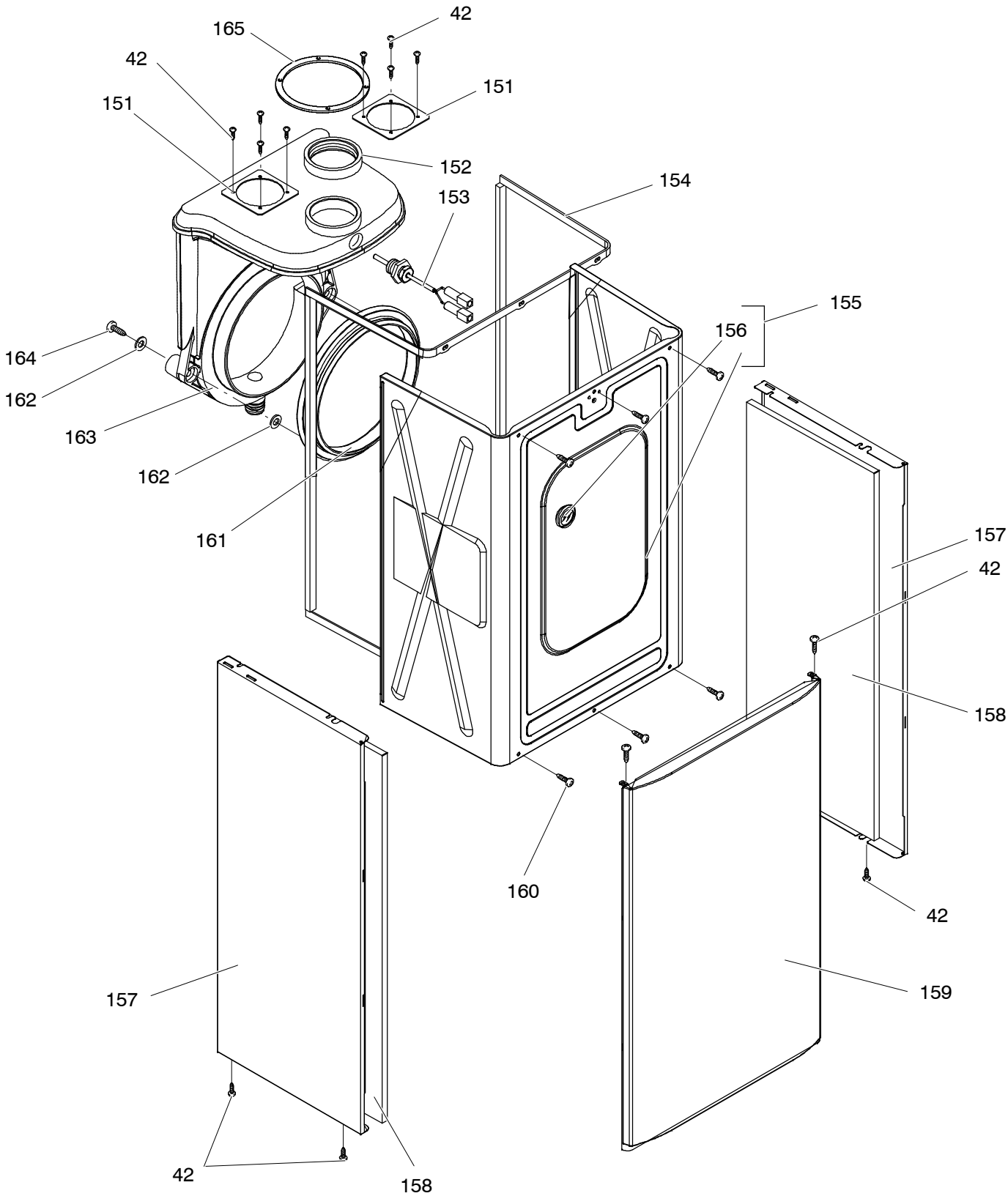
Wiring



M110.24SM/E
M110.32SM/E

47-970-31
47-970-32

Sealed chamber, exhaust gas manifold and case panels



DRAFT BRITISH GAS PART LIST

Date _____
 Sheet 1 of 8
 Manufacturer Biasi SpA – Italy
 Appliance(s) M110.24SM/E, M110.32SM/E
 GC Appliance Number(s) 47–970–31, 47–970–32
 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 506	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	1	BI1212 112			M			
7		Screw M5x25 – Hexagon socket cap	2			BI1131 107	F			
8		Return group kit	1			BI1271 502	M			
9	169–033	Flat gasket 3/4"	10	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	169–060	O–ring gasket 18,64x3,53	4	KI1043 144			M			
14	E01–205	Exchanger DHW – M110.24SM/E	1	BI1001 102			M			
14 A	H05–161	Exchanger DHW – M110.32SM/E	1	BI1161 100			M			
15	E00–668	O–ring gasket 1,78x12,42 by–pass pipe	2	BI1001 115			M			
16	E83–083	By–pass pipe	1	BI1271 100			M			
17	E00–672	By–pass pipe fixing fork	2	BI1001 111			M			
18	E00–676	O–ring gasket 1,78x14	1	BI1001 129			M			
19	E83–018	Flow limiter 10 Litres/min	1	BI1091 102			B	Acqua Flow		
19 A	E83–019	Flow limiter 12 Litres/min	1	BI1091 103			B	Acqua Flow		
20		Magnetic flow switch and filter kit	1			BI1271 501	M			

CONTINUATION SHEET

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Appliance number(s) 47-970-31, 47-970-32

(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		D.h.w. flow switch	1			BI1271 101	M			
22	E83-086	Diverter valve actuator	1	BI1101 102			B	Elbi International SpA Collegno italy	1650/6/0	
23	E83-090	Diverter valve actuator fixing spring	1	BI1101 101			M			
24	E83-091	Diverter valve kit	1	BI1141 501			M			
25	E00-680	O-ring gasket 2,62x23,47	4	BI1011 107			M			
26	E83-092	O-ring gasket 2,7x13,6	2	BI1011 117			M			
27		Flow group kit	1			BI1251 502	M			
28	H23-733	O-ring gasket 9,25x1,78 (NTC)	2	KI1001 128			M			
29	164-026	Temperature probe (special)	2	BI1001 117			M			
30	E00-684	Microswitch kit	1	BI1011 505			M			
31	E00-683	Microswitch box fixing clip	1	BI1011 105			M			
32	E00-682	Screw 2,9x13 mm AB self tapping BZP - RCH	3	BI1011 108			F			
33	E00-681	Microswitch guide bush	1	BI1011 502			M			
34	E00-685	Screw M4x12 mm Stainless steel SCH	4	BI1011 109			F			
35	E00-686	Central heating pressure switch spring	1	BI1011 110			M			
36	E00-687	Central heating pressure switch disk	1	BI1011 111			M			
37	E00-688	Central heating pressure switch membrane	1	BI1011 103			M			
38	H20-966	By-pass kit	1	BI1141 505			M			
39	169-049	Manual bleed valve (incl. key no. 40)	1	KI1031 501			M			
40	169-050	O-ring 2,90x1,78	1	KI1043 145			M			
41		Condensing heat exchanger fixing clamps	4			BI1282 108	M			
42	409-722	Tapping Screw ISO No8 B 4,2x9,5 Recessed Pan Head	20	BI1013 110			F			
		Hardened Steel BS4174 Bright Zinc plate BS1706 Clear								
		Passivated								
43	H20-970	O-ring gasket 2,62x17,86	2	BI1262 112			M			

CONTINUATION SHEET

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Appliance number(s) 47-970-31, 47-970-32

(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
44	E83-108	Condensing heat exchanger connection clip	3	BI1172 101			M			
45		Condensing heat exchanger inlet pipe	1			BI1282 106	M			
46		Flanged nut M6 stainless steel	6			BI1282 109	F			
47	E83-101	Overheat thermostat	1	BI1172 105			B	Elth	261 105° C	
48		Screw 2,9x4,5 Recessed Pan Head Hardened Steel	2			BI1002 127	F			
		BS4174 Bright Zinc plate BS1706 Clear Passivated								
49		Condensing heat exchanger outlet pipe	1			BI1282 105	M			
50	169-104	Grommet	4	BI1002 113			M			
51	H20-981	O-ring gasket 1,9X16	1	BI1262 114			M			
52	H20-987	Pump connection fork	1	BI1262 116			M			
53	H20-990	Fork	1	BI1262 120			M			
54	169-015	Fork	1	KI1042 101			M			
55	169-040	Fork	1	KI1042 115			M			
56	H20-992	Screw 5X16	2	BI1262 115			F			
57	H20-994	Pump (motor)	1	BI1262 119			B			
58	E83-114	Pump gasket	1	BI1172 113			M			
59	H20-993	Pump (complete)	1	BI1262 103			M	Wilo	NFSL12/6-1 HE CRF9-S 82W	
60	169-045	Probe holder	1	BI1105 108			M			
61	H20-989	Condensate trap	1	BI1262 118			M			
62	H20-972	Connection spring	4	BI1262 117			F			
63		Condensate discharge pipe - lower	1			BI1282 107	M			
64	H20-996	O-ring gasket 2,62X9,92	1	BI1262 113			M			
65	H20-997	Expansion vessel connection pipe	1	BI1262 105			M			
66	H03-727	Flat gasket 3/8" O.D 15 mm, i.d. 8.5 mm	2	BI1202 105			M			
67		Condensate discharge pipe - upper	1			BI1282 103	M			

CONTINUATION SHEET

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Appliance number(s) 47-970-31, 47-970-32

(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
68	E94-576	Expansion vessel	1	BI1182 105			B	Zilmet	13C0000700	
69		Condensing heat exchanger M110.24SM/E	1			BI1282 101	M			
69 A		Condensing heat exchanger M110.32SM/E	1			BI1282 102	M			
70	E01-187	Flue pressure switch tube	1	BI1016 107			M			
71	169-125	Grommet	7	BI1002 115			M			
72		Manual bleed valve connection	1			BI1282 100	M			
73		Combustion chamber insulating panels	1			BI1223 100	M			
74		Combustion chamber gasket	1			BI1253 100	B			
75		Detection electrode gasket	1			BI1223 103	M			
76		Detection electrode	1			BI1223 104	M			
77	402-124	Machine Screw M4x8 mm Recessed pan head Mild steel	4	BI1013 114			F			
		BS4183 Bright zinc plate BS3382 Clear passiv.								
78		Burner M110.24SM/E	1			BI1223 101	M			
78 A		Burner M110.32SM/E	1			BI1223 102	M			
79		Air-gas gasket	1			BI1253 102	M			
80		Screw 5X14 WN 1552 Torx T25	3			BI1253 103	F			
81	402-126	Screw M4x12 recessed pan head BZP clear passivated	5	KI1093 119			F			
82		Air hose	1			BI1253 104	M			
83		Air hose clamp	1			BI1253 115	B			
84		Siliconic rubber pipe	1			BI1253 109	M			
85	H08-602	Gas valve on-off operator coils	1	BI1093 107			B	Sit	0.967.158	
86		Gas connection	1			BI1253 106	M			
87		Gas pipe	1			BI1253 107	M			
88		Gas restrictor M110.24SM/E	1			BI1223 109	M			
88 A		Gas restrictor M110.32SM/E	1			BI1253 108	M			

CONTINUATION SHEET

Sheet 5 of 8

Appliance number(s) 47-970-31, 47-970-32

(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
89		Gas valve	1			BI1223 111	B	SIT	848 Sigma	
90		Connection spring	1			BI1253 116	F			
91		Fan gasket	1			BI1223 112	B			
92		Fan	1			BI1223 113	B	EBM Papst	RG128 24V 54W	
93		Screw M5x10 Hexagon Socket Cap Bright Zinc Pl.	4			BI1253 110	F			
94		O-ring gasket 3,53x61,91 NBR	1			BI1253 114	B			
95		O-ring gasket 2,62x22,22 NBR	1			BI1253 105	M			
96		Air-box assembly M110.24SM/E	1			BI1253 111	M			
96 A		Air-box assembly M110.32SM/E	1			BI1253 112	M			
97		Ignition electrodes	1			BI1223 116	M			
98		Ignition electrodes gasket	1			BI1223 115	M			
99		Screw M4x8 Hexagon Socket Countersunk Stainless Steel	1			BI1253 113	F			
100		Insulating panel holder	1			BI1253 101	M			
101	E83-136	Tap 3/4" - c.h.	2	BI1084 105			B			
102	E83-137	Tap 1/2" - d.h.w.	1	BI1084 101			B			
103	E83-138	Tap 3/4" - gas	1	BI1084 100			B			
104	H21-025	C.h. connection pipe	2	BI1124 100			M			
105	E01-226	Nut 1/2"	2	BI1004 101			M			
106	H21-027	Pipe 15 mm dia (bent) d.h.w.	1	BI1124 102			M			
107	E05-387	Pipe 22 mm dia gas	1	BI1014 112			M			
108	H21-030	Pipe 15 mm dia (straight) d.h.w.	1	BI1124 103			M			
110	409-727	Screw 3,5x16 mm self tap RPH	9	BI1165 101			F			
111	410-068	Screw self tapping 3,5x19 mm RPH BZP	1	KI1008 203			F			
112	409-736	Tapping screw 3,5x9,5 recessed pan head	17	BI1013 115			F			
113		Remote control p.c.b.	1			BI1665 103	M			

CONTINUATION SHEET

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Appliance number(s) 47-970-31, 47-970-32

(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
114	E83-145	Temperature-pressure gauge	1	BI1475 108			M			
115	E83-144	O-ring gasket 1,78 x 6,75	1	BI1475 119			M			
116		Control panel box	1			BI1715 101	M			
117	E94-886	Cover panel	1	BI1535 100			M			
118	E83-147	Time switch	1	BI1475 118			B	Flash	Monotron 200	
119	E94-887	Knob	2	BI1535 101			M			
120	E83-149	Shaft	2	BI1475 105			M			
121	E83-150	Control panel plug	1	BI1475 110			M			
122	E83-152	Cable holder	8	KI1066 208			B	Fastpoint S.r.l.	1207.BB01 XS	
123	E83-153	Terminal block	2	BI1475 109			B	Elettrogibi	PA27	
								Odoardo Korner (alternative)	OK-433-FV	
124		Electronic control - ignition p.c.b. M110.24SM/E	1			BI1805 103	M			
124 A		Electronic control - ignition p.c.b. M110.32SM/E	1			BI1805 101	M			
125		Fuse 400 mA T	1			BI1665 104	B			
126		Fuse 3,15A F	2			BI1295 108	B			
127	E83-155	Service panel cover	1	BI1475 111			M			
128	E83-156	Control panel cover	1	BI1475 112			M			
128 A	H21-038	Control panel cover	1	BI1605 101			M			
129	H21-039	External controls cover	1	BI1605 102			M			
130		Remote controls terminal connection block	1			BI1665 102	B	Odoardo Korner	OK-403-NY-SP-LP	
131		External temperature probe	1			BI1665 107	M			
132		Temperature probes / safety thermostat cable	1			BI1675 100	M			
133		Transformer	1			BI1665 100	M			
134		Detection electrode cable	1			BI1675 111	M			
135		Transformer cable	1			BI1675 101	M			

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Appliance number(s) 47-970-31, 47-970-32

(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
136		D.h.w. flow switch cable	1			BI1815 100	M			
137		Gas valve cable	1			BI1675 103	M			
138	E83-163	Time switch cable	1	BI1485 111			M			
139		Remote contrls wiring	1			BI1675 104	M			
140		Pump – diverter valve cable	1			BI1675 105	M			
141		Power supply and external control cable	1			BI1675 106	M			
142	402-225	Machine Screw M5x10 Recessed Pan Head Mild steel	1	BI1035 109			F			
		BS4183 Bright zinc plate BS3382 Clear Passivated								
143	164-133	Toothed lock washer external 5,3x10 mm stainless	2	BI1035 110			F			
144	404-609	Full nut M5 Hexagon Steel grade 8 BS3692 Bright zinc	1	BI1035 111			F			
		plate BS3382 clear passivated								
145		Earth cable	1			BI1675 107	M			
146		Fan cable	1			BI1675 109	M			
147		Spark generator cable	1			BI1675 110	M			
148	405-122	Washer 4,3x9 mm zinc plated	2	KI1093 118			F			
149		Spark Generator	1			BI1805 102	B			
150		Ignition electrode earth cable	1			BI1223 114	M			
151	E01-184	Gasket – Air intake twin kit	2	BI1016 101			M			
152		Flue outlet gasket	1			BI1416 104	M			
153		Flue temperature probe NTC	1			BI1416 105	M			
154	H21-060	Sealed chamber gaskets kit	1	BI1406 500			M			
155		Sealed chamber incl. window	1			BI1416 106	M			
156	E69-243	Window (glass + rubber frame)	1	BI1206 118			M			
157		Side case panel	2			BI1406 106	M			
158		Case insulating panel	2			BI1426 109	M			

CONTINUATION SHEET

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Appliance number(s) 47-970-31, 47-970-32

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