
Wall hung, fan flue, room sealed gas boiler

SERVICE MANUAL

RIVA COMPACT

Models: G.C. Appl. No.

M90E.24S 47-970-17

M90E.28S 47-970-18

M90E.32S 47-970-21

Leave this manual adjacent to the gas meter

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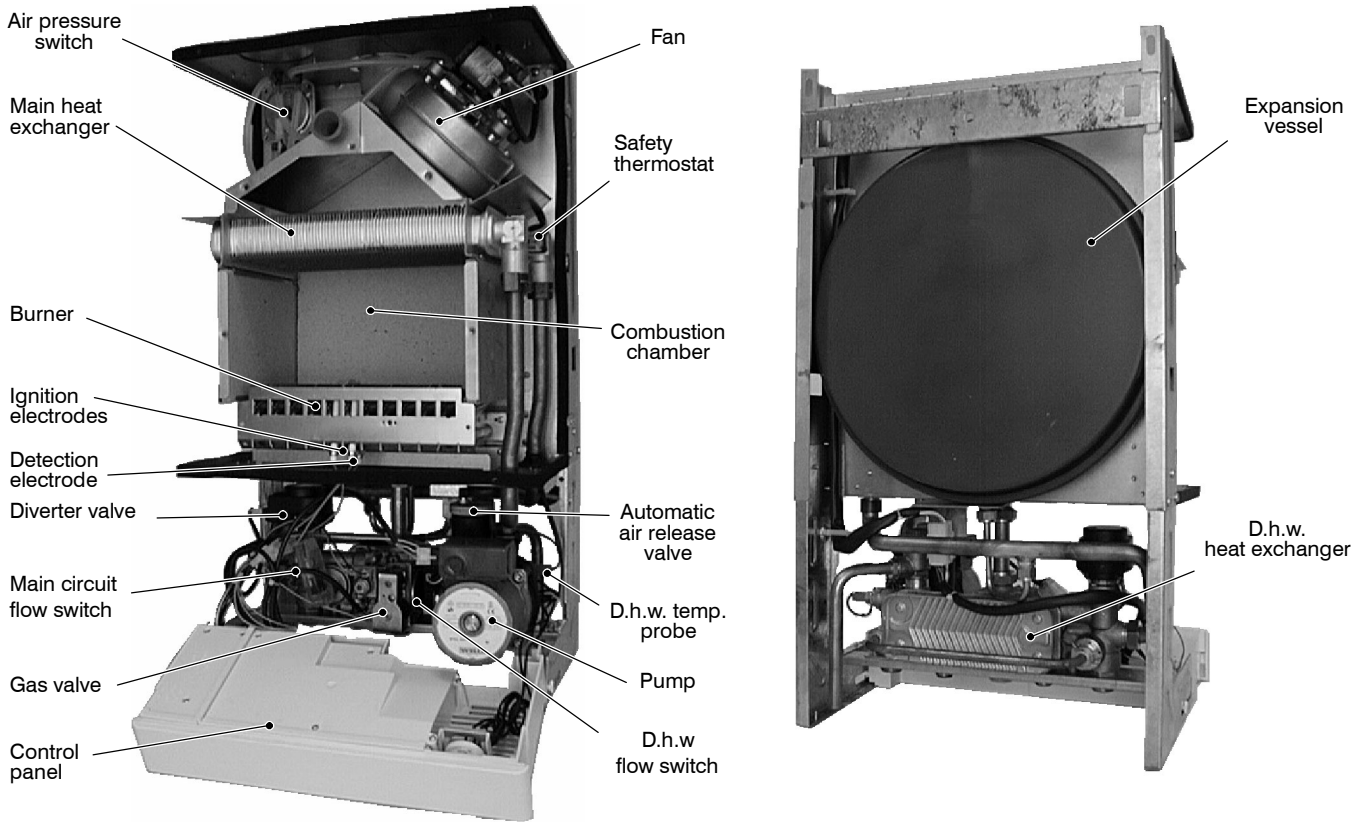


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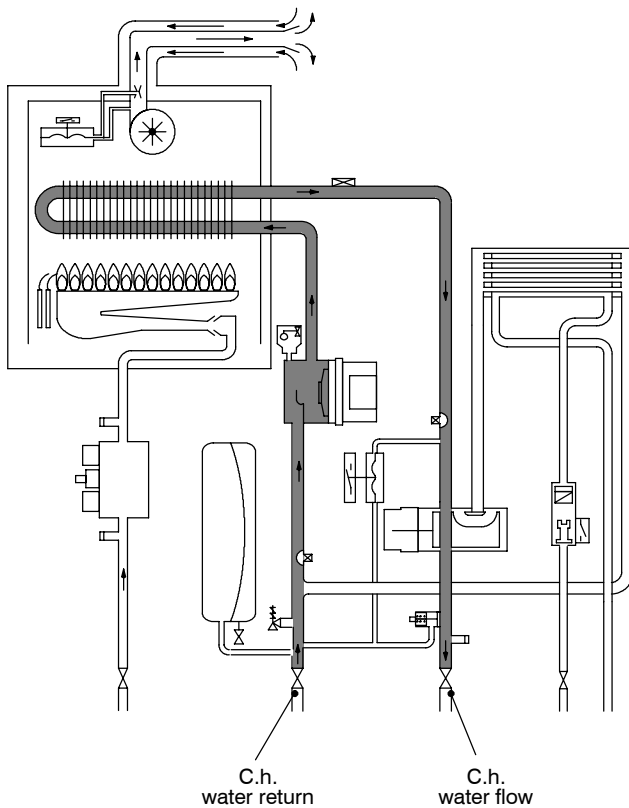
1 Overall information

1.1 Overall View

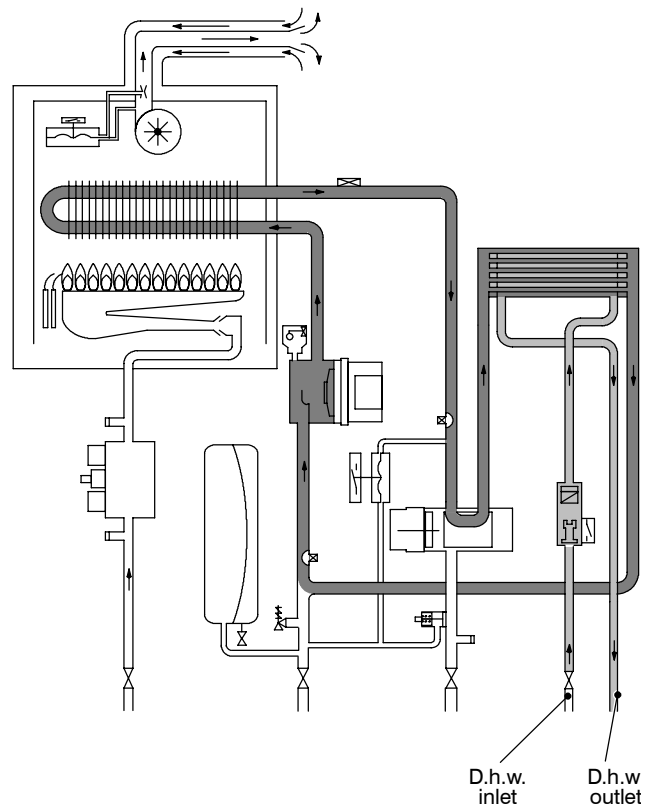


1.2 Hydraulic diagram

Central heating (c.h.) operation



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



2 General access and emptying hydraulic circuits

2.1 Nomenclature

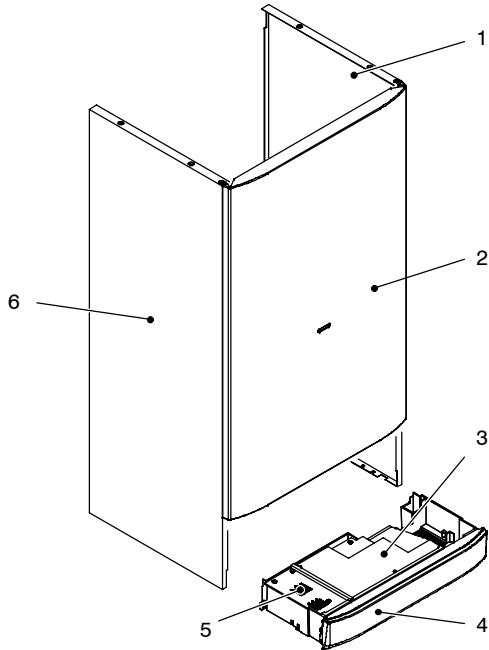


Fig. 1

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

2.2 Body panels

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

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

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

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

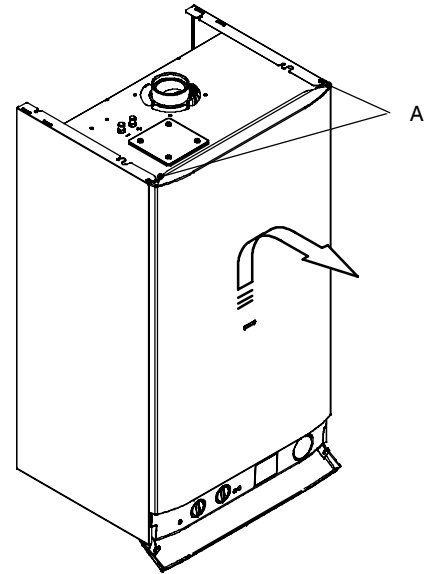


Fig. 2

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

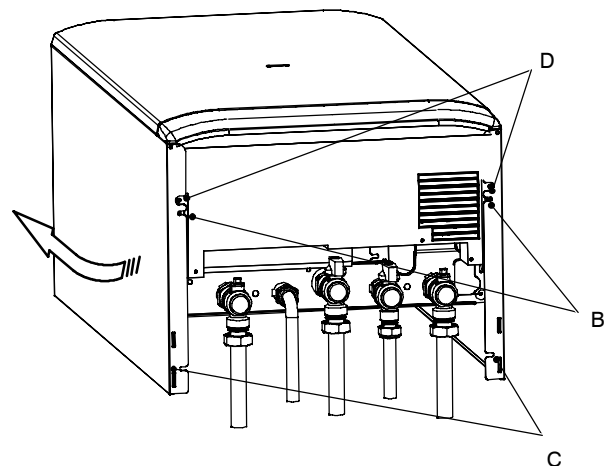


Fig. 3 – bottom view of the boiler

2.3 Control panel

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

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

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

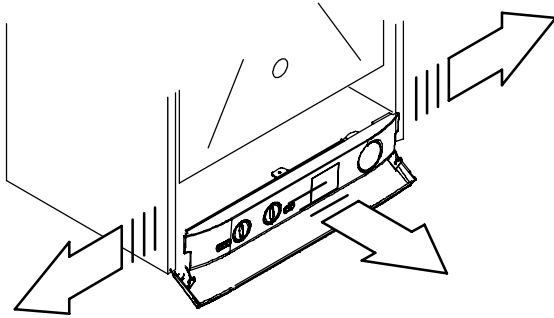


Fig. 4

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

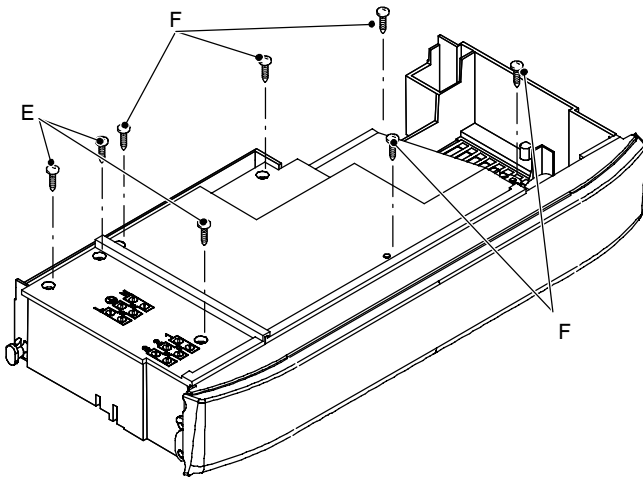


Fig. 5

2.4 Access to the sealed chamber

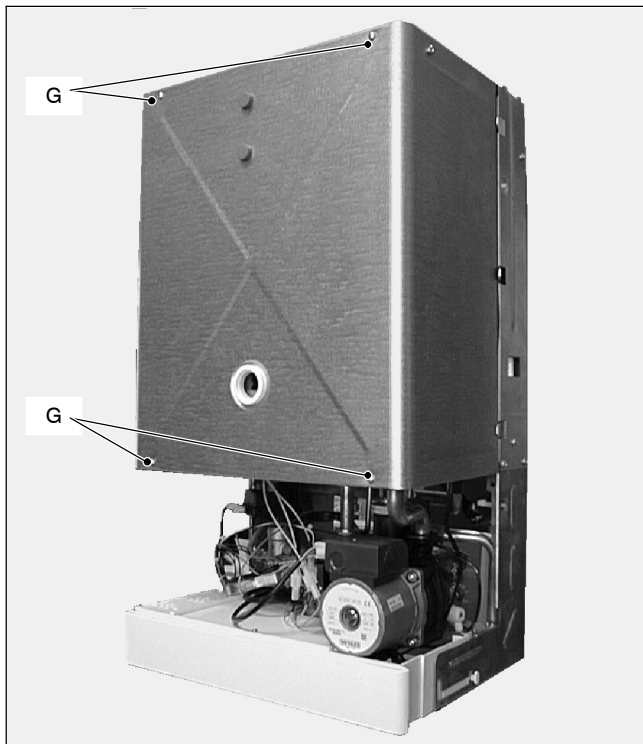


Fig. 6

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

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

2.5 Emptying the primary circuit

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

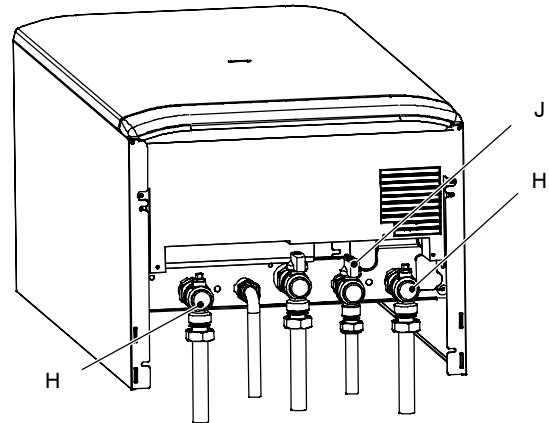


Fig. 7 – bottom view of the boiler

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

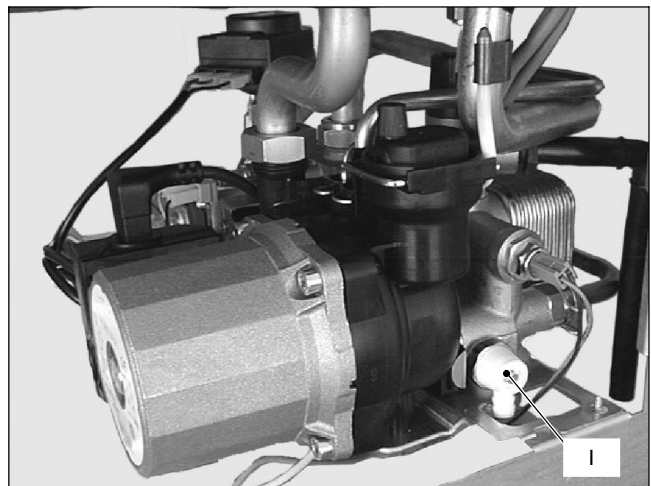


Fig. 8

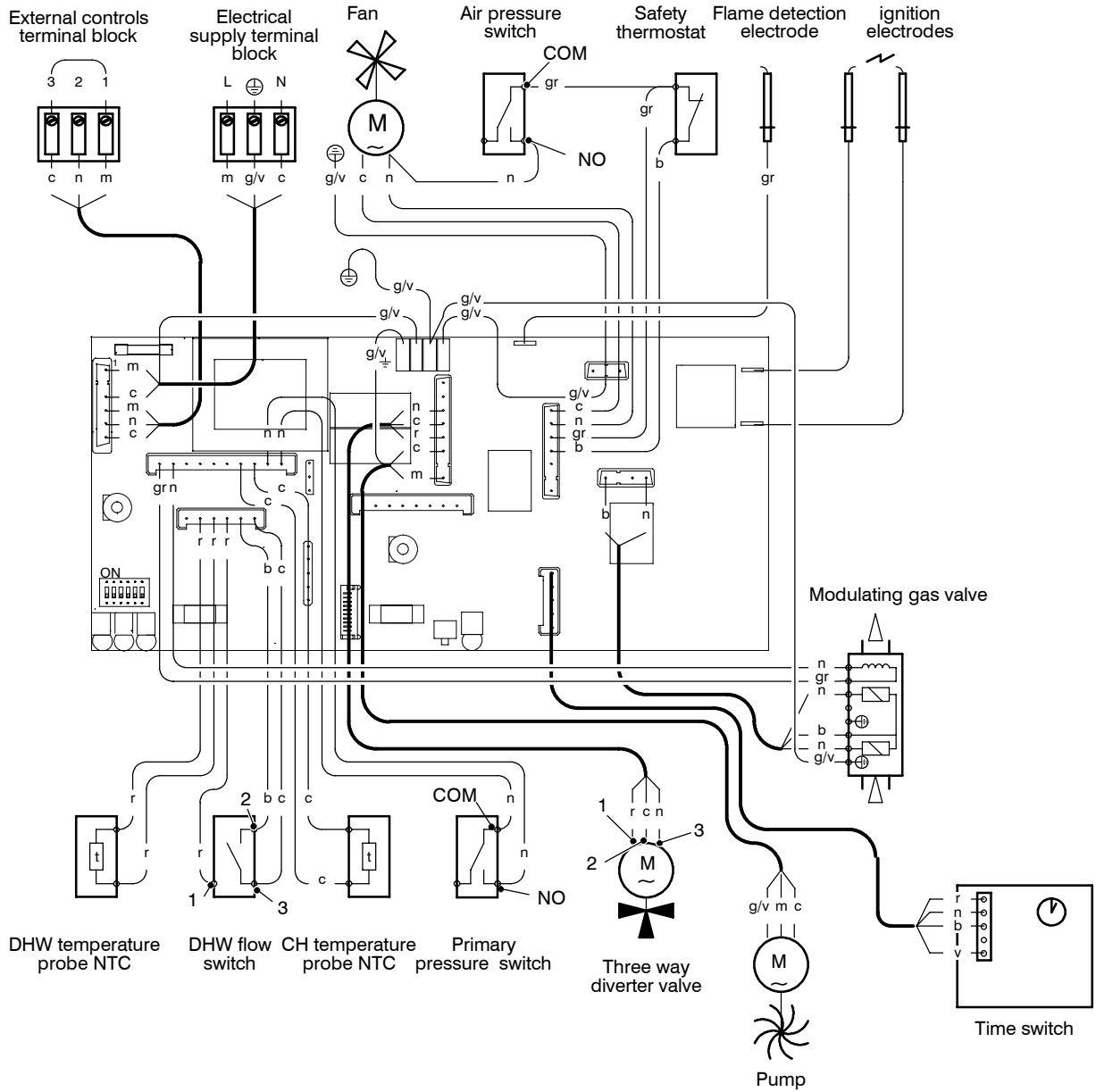
2.6 Emptying the d.h.w. circuit

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

3 Diagrams

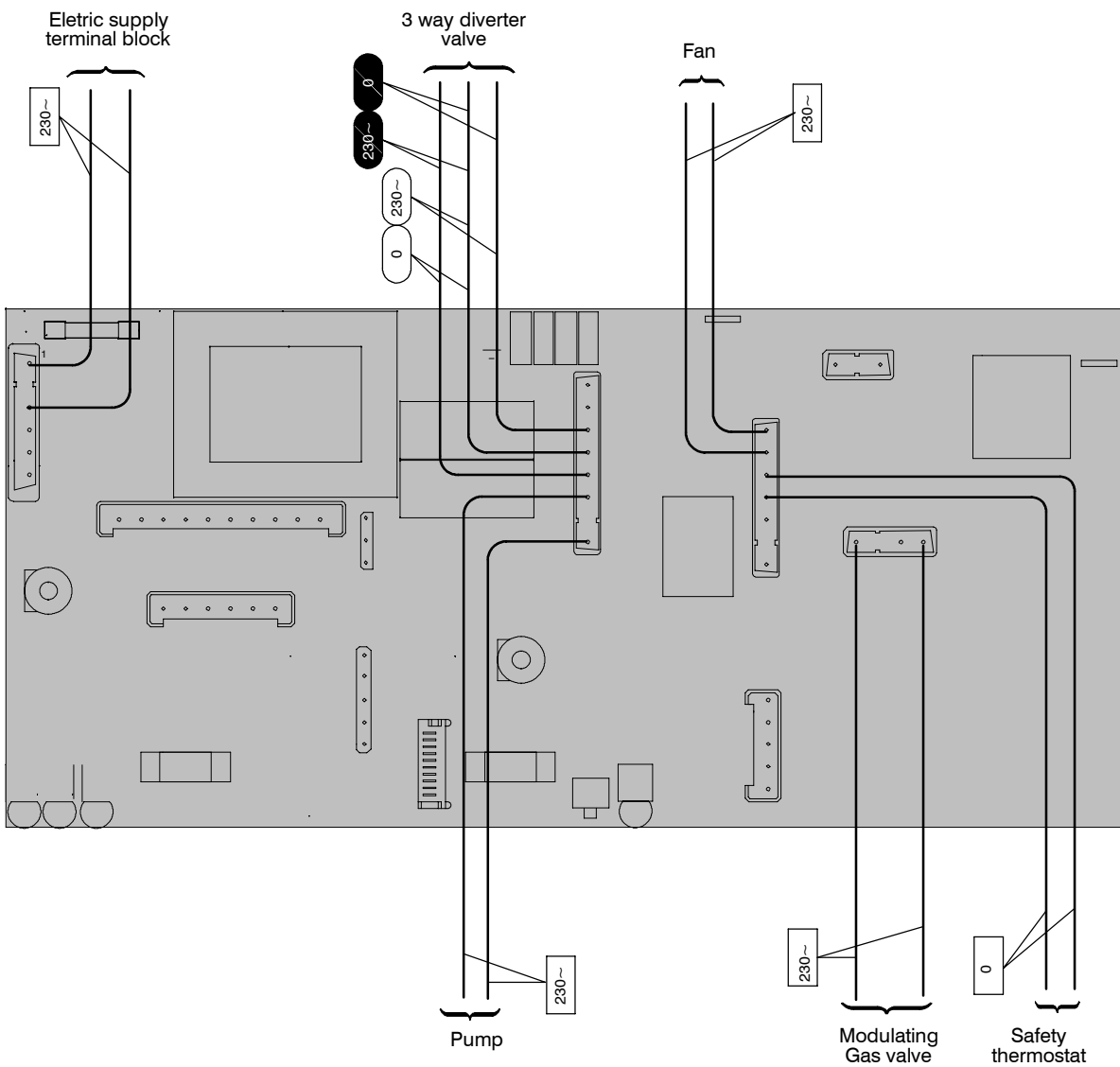
3.1 Wiring diagram

Wiring diagram for boiler equipped with full sequence ignition device type: ceza






- | | | |
|-----------|-----------|--------------------|
| m – brown | b – white | a – orange |
| c – blue | r – red | g – yellow |
| n – black | gr – grey | g/v – yellow/green |
| | | v – green |

3.2 Circuit voltages



Electrical voltages with burner on

-  during c.h. or d.h.w. operation
-  only during c.h. operation
-  only during d.h.w. operation

4 Fault finding

			Components to check																									
Appliance operation lamp green (1)	Section of the manual → (note ref. in brackets)	Defect ↓	(2)	(3)	(4)	(5)	6	7.2	8.2	9.10		10.4		11.2	13.5	14.2		15	16.2		17.2	18.2	(6)	(9)	I	I		
			Power supply line	Gas supply line	Flue pipes	C.h. circuit	D.h.w. circuit	D.h.w. heat exchanger	Pump	Diverter valve	D.h.w. flow switch	Fuse (regulation p.c.b.)	regulation ignition p.c.b	Function selectors (reg. p.c.b)	Gas valve (on – off operators)	Gas valve (modulating operator)	Main circuit flow switch	D.h.w. filter	Main circuit temp. probe	D.h.w. temp. probe	By – pass valve	Fan and venturi device	Air pressure switch	Ignition electrode	Detection electrode	Safety thermostat	Injectors	Expansion vessel
OFF	Appliance operation lamp green (1)	Lock – out signal lamp red	■								■																	
ON – fast pulses		ON	■	■	■						■		■ (7)									■	■		■			
ON – fast pulses		OFF									■																	

		Components to check																			
Section of the manual → (note ref. in brackets)		(2)	(3)	(4)	(5)	6	7.2	8.2	9.10	10.4	11.2	13.5	14.2	15	16.2	17.2	18.2	(8)	(9)	-	
Appliance operation lamp green (1)	Lock-out signal lamp red																				
	Defect ↑																				
ON - normal pulses																					

Note

- For details see section 9.4 of this manual.
Further useful information can be obtained by switching the electronic control p.c.b. in the service operation mode (see section 9.4 of this manual).
- 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
- Verify the soundness of the gas supply pipe, the position of stop valves.
Check the gas pressure at the inlet test point of the gas valve (see sect. 10.3) with the boiler at rest and during operation and compare it with the values given on the installation booklet.
- 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.
- Check for soundness of the circuit and verify its correct filling (see also installation manual).
- A jammed by-pass could cause the over-heating of the main circuit and the intervention of the safety thermostat.
- Check the **minimum** gas pressure at the outlet test point of the gas valve (see sect. 10.3) and compare it with the value given on the installation booklet.
- Verify the cleanness of injectors.
- Check the pressurization of the expansion vessel. Refer to the installation manual for proper values.
- d.h.w. pressure too high or flow rate too high. If necessary insert a flow rate limiter (13.6).

5 Primary heat exchanger

5.1 Characteristics

The primary heat exchanger *A* in Fig. 1 has the function of transferring heat produced from combustion of the gas to the water circulating in it.

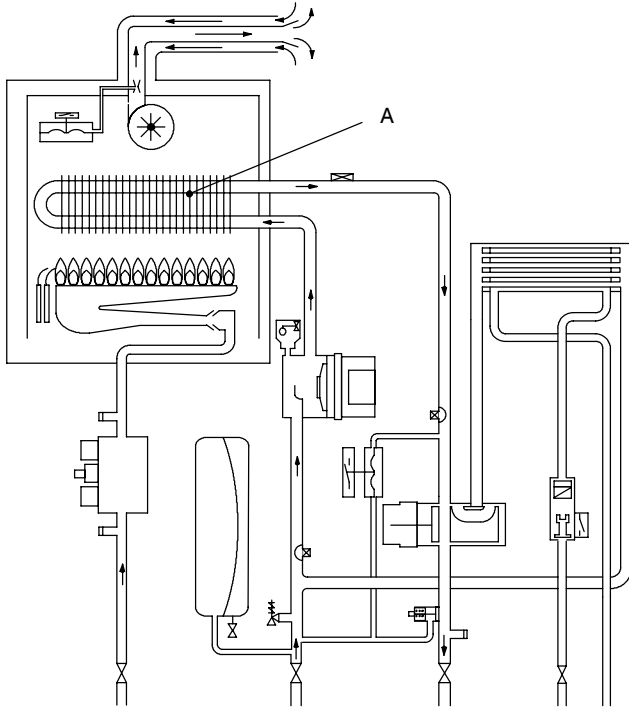


Fig. 1

The hydraulic circuit is composed of 8 elliptical pipes connected in parallel (Fig. 2).

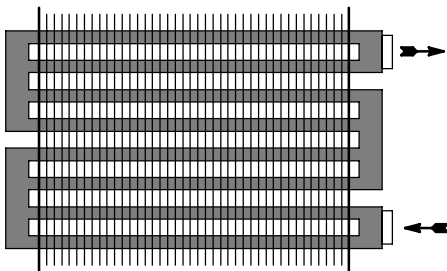


Fig. 2

5.2 Removal

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

- 1 Empty the primary circuit of the boiler.
- 2 Remove the case panels and the sealed chamber lid (see section 2).
- 3 Remove the combustion chamber lid *B* by unscrewing the screws *C* (Fig. 3).
- 3b For model M90E.28S and M90E.32S only, remove the screw *D* and the plate *E*.
- 4 Remove the clips *F* and the safety thermostat *G*. It is not necessary to disconnect it from the wiring.

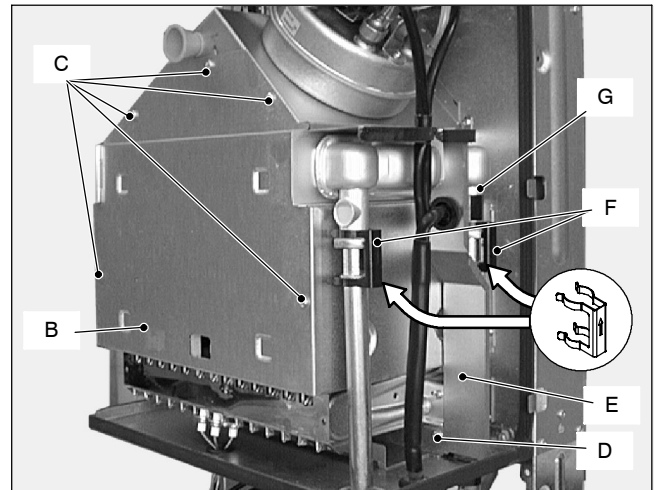


Fig. 3

- 5 Unscrew the connection *H* (Fig. 4), lift the pipe *I* and rotate it right then move it downwards freeing it from the heat exchanger connection.
- 6 Remove the motor of the three way diverter valve (see section 8.3).
- 7 Completely unscrew the connection *J* and rotate the pipe *K* downwards freeing it from the heat exchanger connection.
- 8 Remove the heat exchanger by sliding it forwards.
- 9 Reassemble the boiler carrying out the removal operations in reverse order. **Fit the clips *F* with the arrow pointing upwards as illustrated in Fig. 3.**



Fig. 4

5.3 Cleaning

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

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



Warning: After cleaning or replacement as detailed above refer to section *Combustion analysis check* in the 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. 1 allows the instantaneous transfer of heat from the primary hydraulic circuit to the water destined for d.h.w. use.

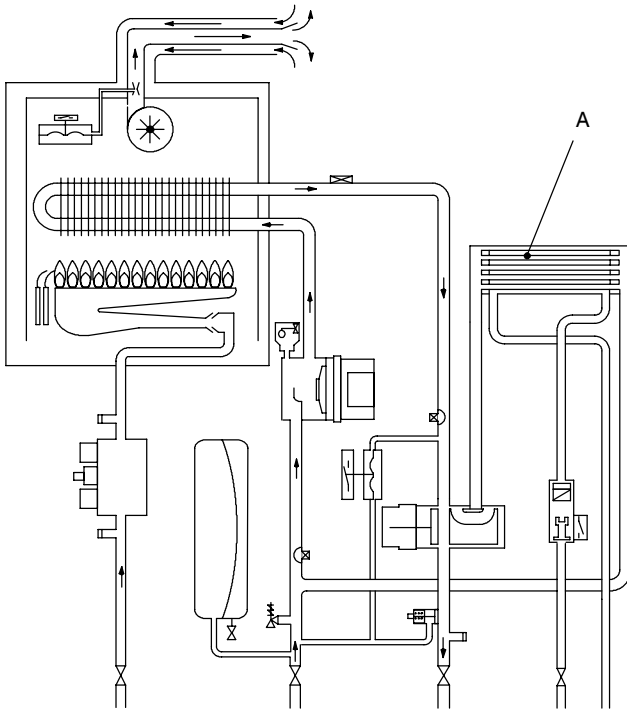
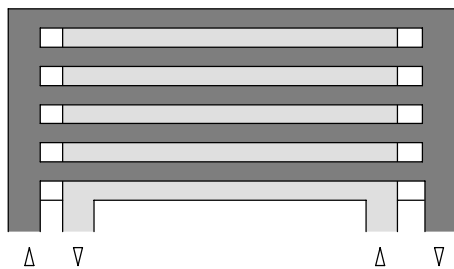


Fig. 1

The schematic structure is shown in Fig. 2.



- Primary hydraulic circuit
- Domestic hot water circuit

Fig. 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 Remove the motor of the three way diverter valve (see section 8.3).
- 4 Completely unscrew the two Allen key screws *B* (Fig. 3) which hold the exchanger to the brass groups.

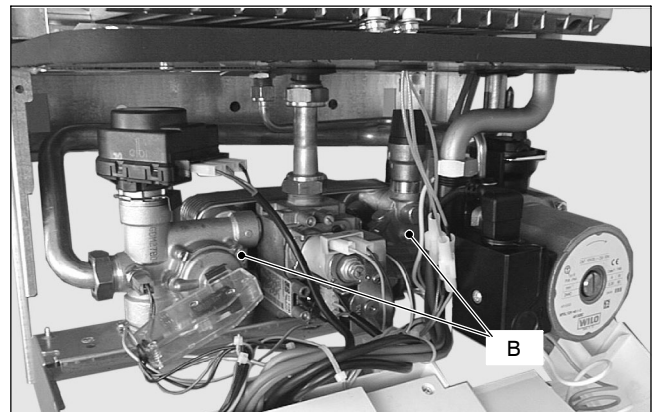


Fig. 3

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

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

Attention. When reassembling the exchanger be sure to put the off center location/securing pin indicated in Fig. 4 towards the left side of the boiler.

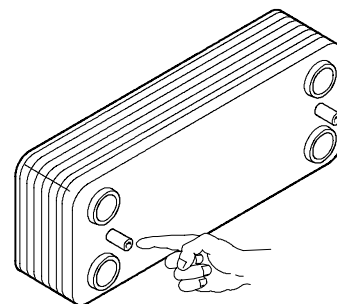


Fig. 4

7 Pump

7.1 Function

The pump *A* in Fig. 1 has the function of making the water in the main circuit circulate through the main 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).

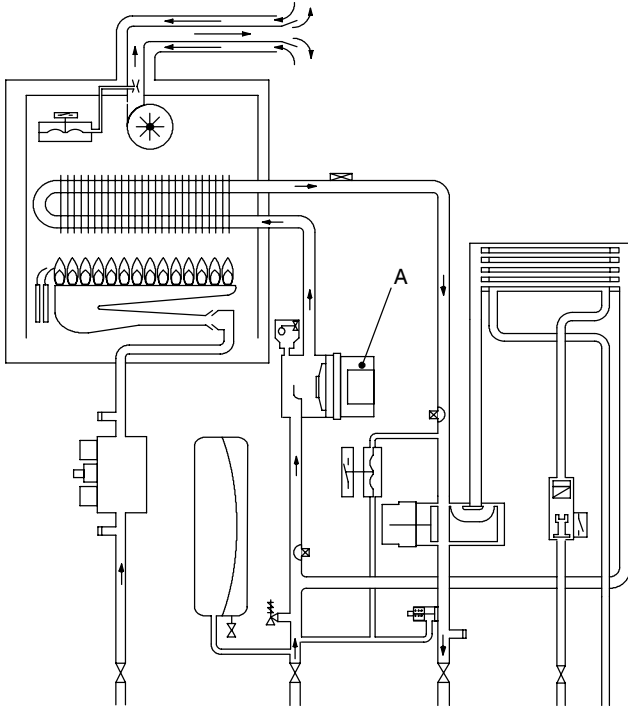


Fig. 1

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. 2).

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. 2).
- 5 Unscrew the connection *C* and move the pipe upwards freeing it from the outlet port of the pump.
- 6 Remove the fork *D* and the capillary pipe
- 7 Remove the locking plate *E* right (Fig. 2).

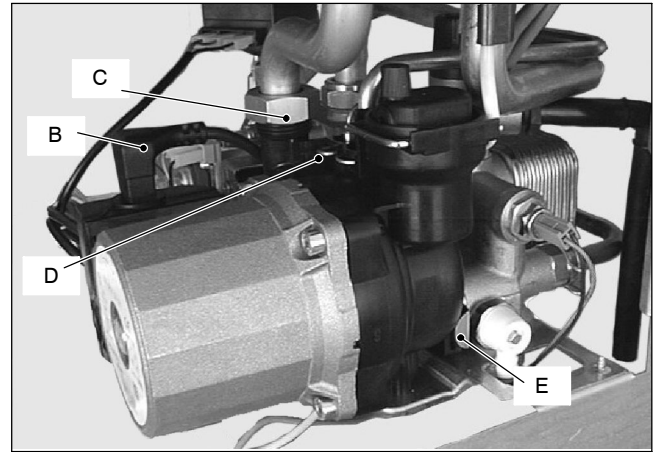


Fig. 2

- 8 Loosen the connection *F*, remove the fork *G* and the pipe *H*.
- 9 Unscrew the two screws *I* that hold the pump on the frame (Fig. 3) and remove the pump towards the front of the boiler.

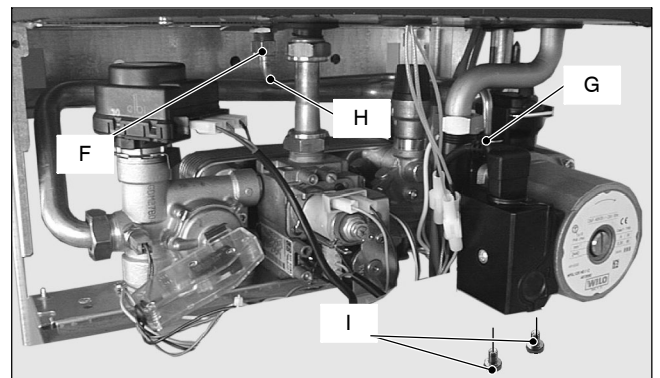


Fig. 3

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. 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.

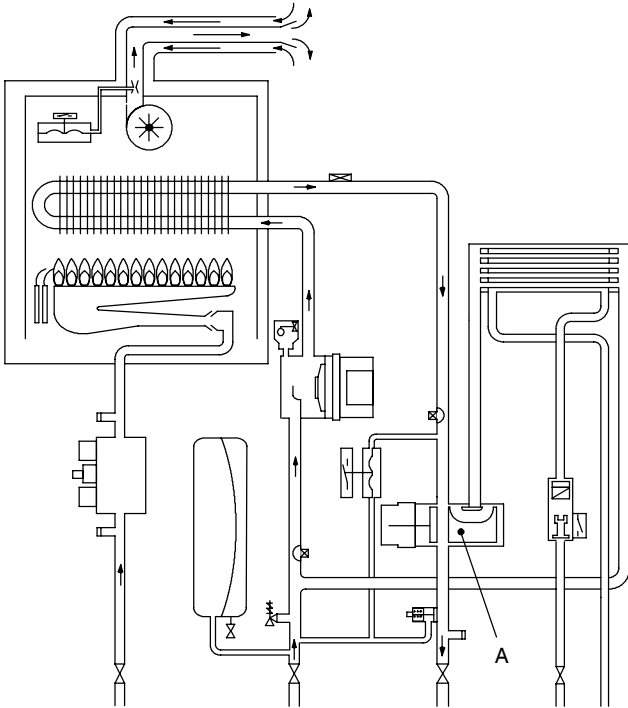


Fig. 1

8.2 Checks

✓ Check the electrical continuity

Fig. 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. 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.

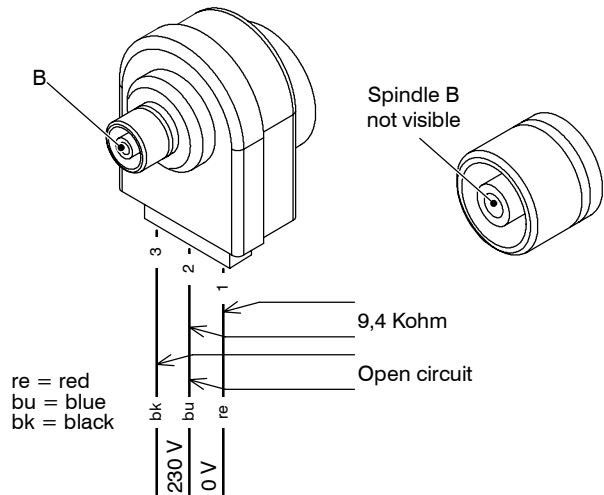


Fig. 2 – D.h.w. mode

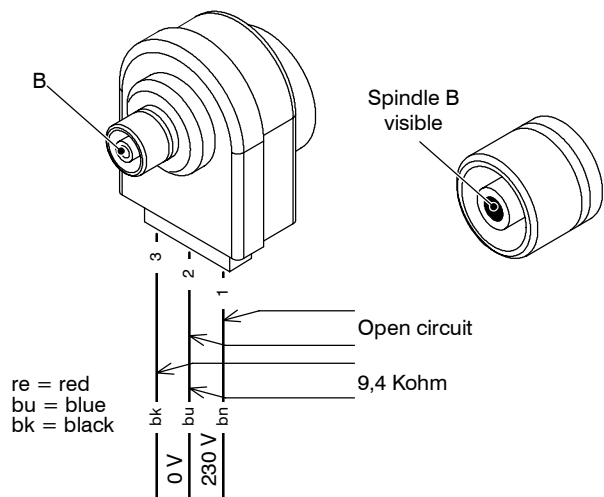


Fig. 3 – C.h. mode

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. 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. 2 or to the wiring diagram in section 3.1 for the correct wiring connection.

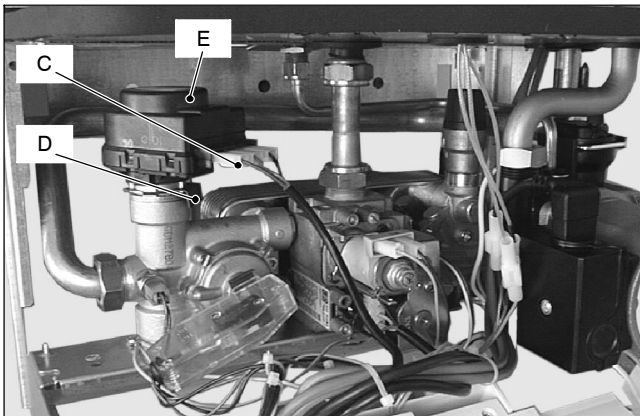


Fig. 4

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. 5) and remove the primary circuit flow switch *G*.
- 5 Disconnect the c.h. temperature probe *H*.
- 6 Unscrew the connector *I*, the c.h. flow connector and the d.h.w. outlet connector.

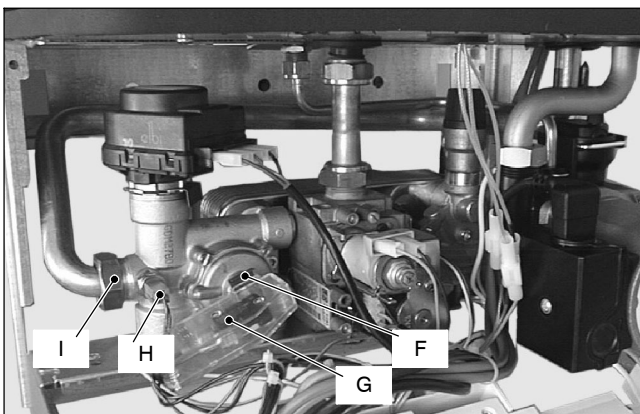


Fig. 5

- 7 Remove the d.h.w. heat exchanger (see section 6.2).
- 8 Remove the fork *J* and move away the pipe *K* (Fig. 6).

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

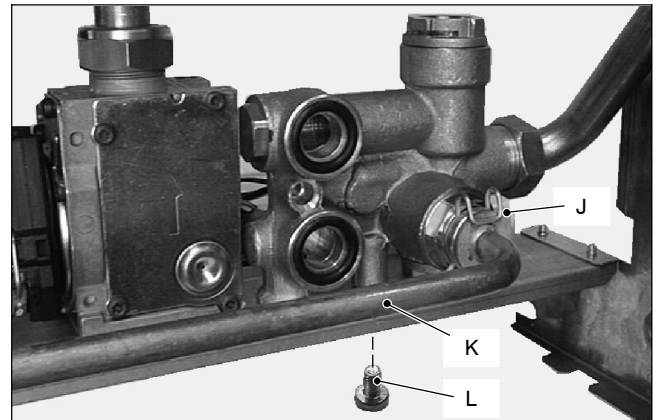


Fig. 6 Rear view of the boiler

- 10 Refer to the exploded view in Fig. 7 to remove the internal parts of the three way diverter valve.



Fig. 7

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

9 Electronic starting control p.c.b.

9.1 Function

Inlet Information

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

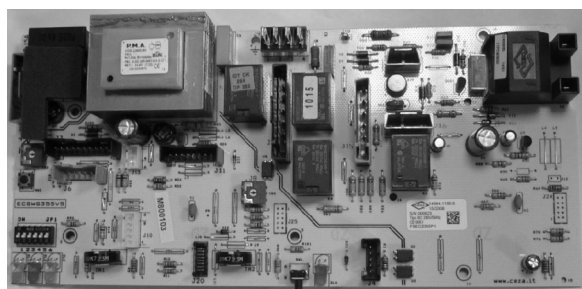
- Function control*
- C.h. temperature adjustment*
- D.h.w. temperature adjustment*
- Function dip-switches
- Max. c.h. gas pressure adjustment
- Ignition gas pressure adjustment
- Boiler reset button*

*control panel fascia

From other boiler devices....

- C.h. temperature probe NTC
- D.h.w. temperature probe NTC
- D.h.w. flow switch
- Primary circuit flow switch
- Room thermostat (if fitted)
- Time switch
- Flame presence signal*

*from the full sequence ignition device



Outlet command

- Pump
- Three way diverter valve
- Full sequence ignition device
- Modulation operator
- Appliance operation light*
- Operation/service lamps
- Lock-out signal lamp*

*control panel fascia

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

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

Generally, the Electronic starting control p.c.b. receives inlet information coming from the boiler (the sensors) or from the outside (knobs, room thermostat, etc.), processes it and consequently acts with outlet commands on other components of the boiler (Fig. 1).

9.2 Selection and adjustment devices

On the Electronic starting control p.c.b. several selection, adjustment and protection devices are located. (Fig. 2).

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

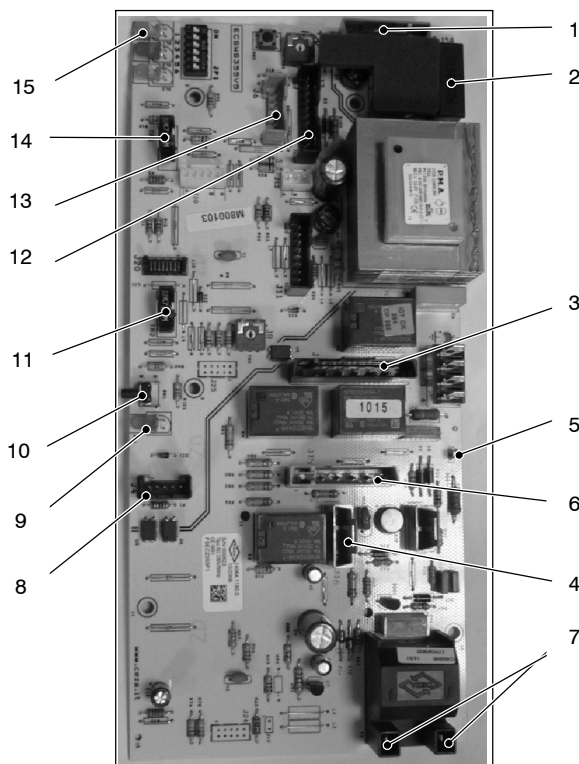


Fig. 2

- 1 Connector J1 electric supply terminal block
- 2 Fuse F1 (3,15A – 250V)
- 3 Connector J3 (Pomp, three way diverter valve)
- 4 Connector J16 (On-off operators gas valve)
- 5 Connector J19 (Flame detection electrode)
- 6 Connector J15 (Fan, Air pressure switch, Safety thermostat)
- 7 Connector J20 e J21 (Ignition electrodes)
- 8 Connector J4 Time switch
- 9 Lock-out signal lamp
- 10 Boiler reset button
- 11 Function control / C.h. temperature adjustment

Fig. 1


- 12 Connector J7 c.h. temperature probe NTC, primary circuit flow switch, modulating gas valve
- 13 Connector J6 d.h.w. temperature probe NTC, d.h.w. flow switch
- 14 D.h.w. temperature adjustment
- 15 Operation lamps

9.3 Checking the temperature

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

The temperature of the water is converted into an electric signal by means of temperature probes. The user, setting the desired temperature with the control panel knobs operates the variable elements (11 and 14 in Fig. 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. 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 modulation of the gas valve, consequently changing the useful output of the boiler.

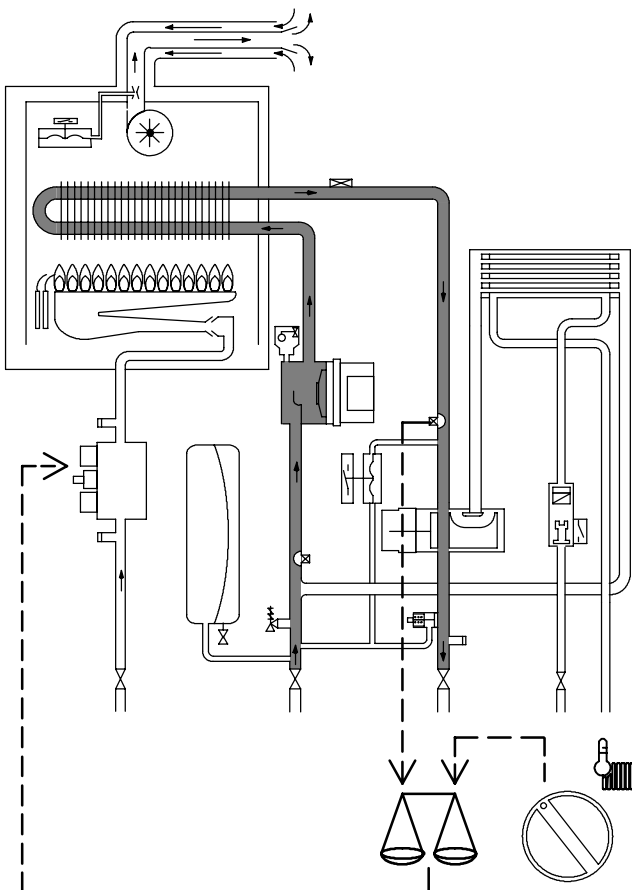



Fig. 3

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

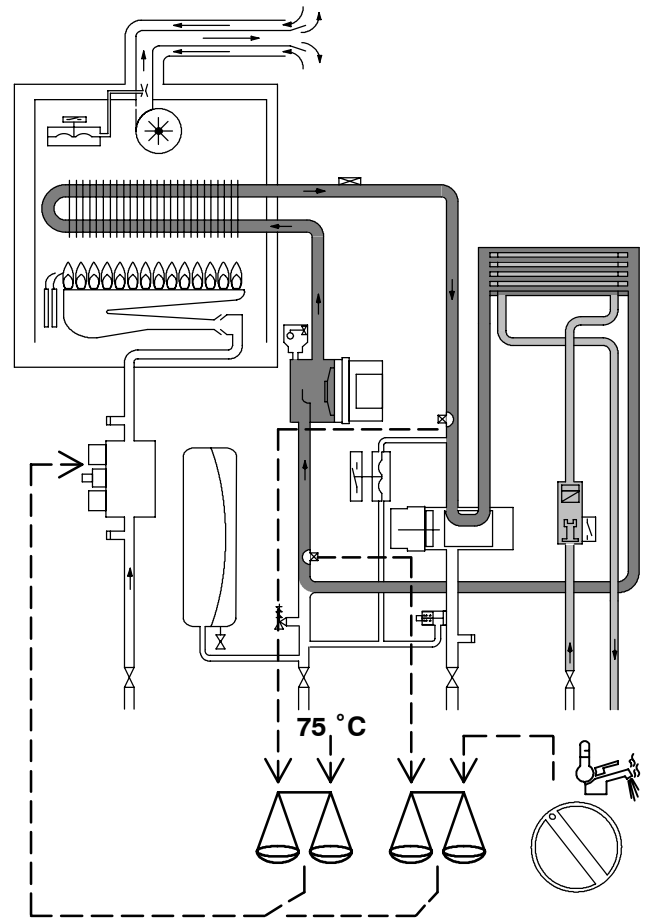




Fig. 4

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

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

The control sequences in  function and in  function are illustrated in detail in sections 9.13 and 9.12.

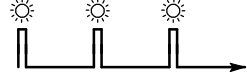
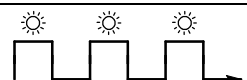
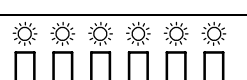
9.4 Operation lamps

The Electronic starting control p.c.b. is provided with three lamps (L.E.D. indicators) 15 in Fig. 2 that give optical information during the normal operation of the boiler or for service purpose.

- Normal operation

Only the green lamp on the left is directly visible on the control panel fascia and it gives information during the normal operation of the boiler. The other two lamps are normally switched off.

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

 <p>A short pulse every 4 seconds</p>	<p>Boiler in stand-by condition. (function control in 0 position). Anti-freeze system active.</p>
 <p>1 second ON 1 second OFF</p>	<p>Boiler ON condition (function control in ❄️ or ☀️ position)</p>
 <p>Very fast pulses (4 per second)</p>	<p>Faulty boiler or irregular operation as:</p> <ul style="list-style-type: none"> - Empty primary circuit - No primary circuit flow - Lack of burner ignition - Excessive temperature in the primary circuit. - Faulty temperature probe - Faulty air pressure switch

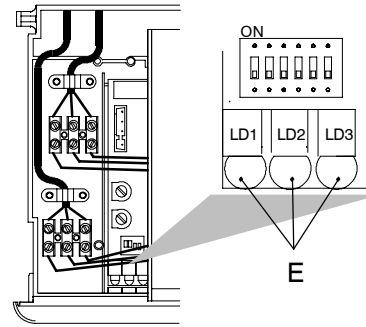


Fig. 7

3 The lamps E should give the indication as in Fig. 7 – Fig. 8 (reignition frequency). If not, press the reset button repeatedly to obtain it.

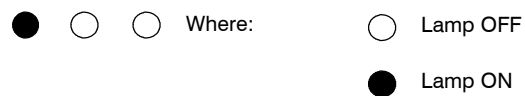


Fig. 8

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 E will flash a number of times corresponding to the setting (Fig. 9).

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.

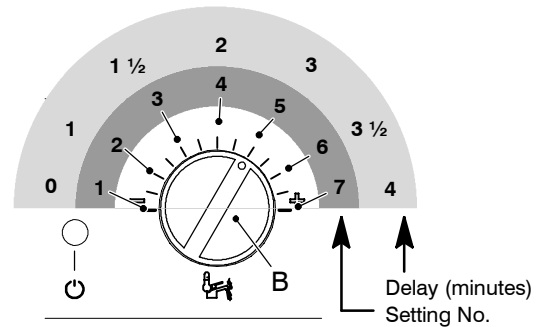


Fig. 9

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 = 3minutes

9.7 Ignition gas pressure adjustment

- 1 Turn the boiler OFF.
- 2 Remove the front panel of the case.
- 3 Open the gas valve outlet pressure test point (8, see section 10.2) and connect the gauge.
- 4 Turn the boiler ON positioning the function selector knob A as indicated in Fig. 10 and ensure that

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. 5).

The knob B is used just for boiler setting and doesn't affect the boiler functions during the normal operation.

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

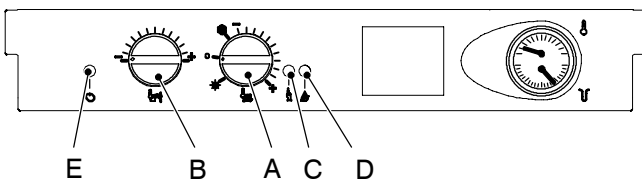


Fig. 5

9.6 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. 6.

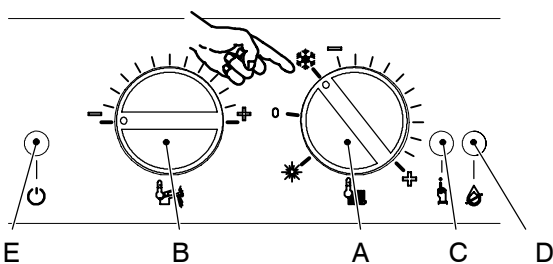


Fig. 6

2 Keep pressed the reset button C for about 10 seconds until the lock-out signal lamp D blinks.

the timer selector switch and room thermostat, if fitted, are set to "heat demand".
Run the boiler in c.h. mode (do not open any d.h.w. tap).

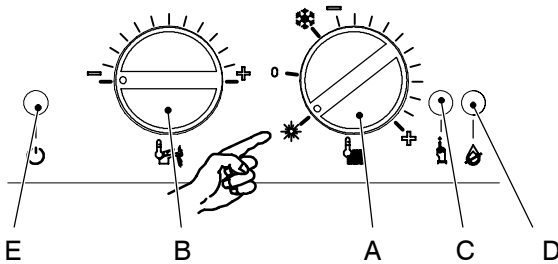


Fig. 10

- 5 Keep pressed the reset button C for about 10 seconds until the lock-out signal lamp D blinks.

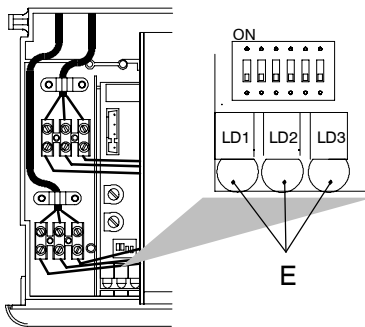


Fig. 11

- 6 The lamps E should give the indication as in Fig. 11 – Fig. 12. If not, press the reset button repeatedly to obtain it.

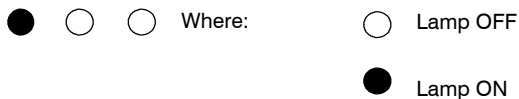


Fig. 12

- 7 Keep pressed the reset button C for about 5 seconds until the lock-out signal lamp D is switched OFF.
The boiler runs in c.h. mode and the lamps E give the indication as in Fig. 13.

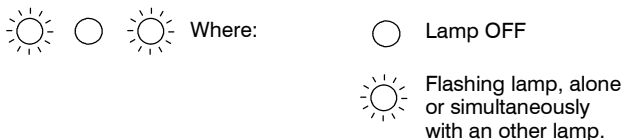


Fig. 13

- 8 Rotate the knob B on a position corresponding to an adequate ignition pressure. Refer to the value indicated in the tables of the User/Installation manual (*Technical information* section, *Gas pressures at the burner* table). By rotating clockwise the pressure increases.
- 9 Make a note of the position of the knob B.
- 10 Turn the boiler OFF and ON positioning the function selector knob A as indicated in Fig. 14

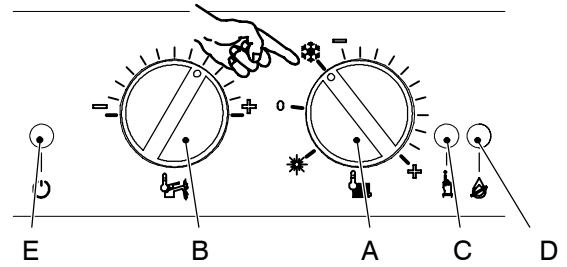


Fig. 14

- 11 Keep pressed the reset button C for about 10 seconds until the lock-out signal lamp D blinks.
- 12 Press the reset button C repeatedly (4 times) until the lamps E give the indication as in Fig. 15 (ignition pressure adjustment mode).

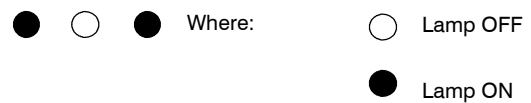


Fig. 15

- 13 Turn the knob B to the minimum (fully counter-clockwise) and then on the position corresponding to the position obtained on step 8. By turning the knob B, the lock-out signal lamp D blinks quickly (2 per second) indicating that the setting has changed and must be memorised.
- 14 To memorize the setting keep pressed the reset button C for about 5 seconds until the lights E briefly blinks simultaneously.
- 15 To reset the boiler to the normal operation turn it OFF and ON by the function selector knob A checking the ignition pressure and that the burner lights up uniformly. In any case, the boiler automatically resets to its normal operation after 10 minutes.

9.8 Adjustment of useful c.h. output

This adjustment does not influence the maximum useful output delivered during the d.h.w. operating mode.

- 1 Turn the boiler OFF.
- 2 Remove the front panel of the case.
- 3 Open the gas valve outlet pressure test point (8, see section 10.2) and connect the gauge.
- 4 Turn the boiler ON positioning the function selector knob A as indicated in Fig. 16 and ensure that the timer selector switch and room thermostat, if fitted, are set to "heat demand".
Run the boiler in c.h. mode (do not open any d.h.w. tap).

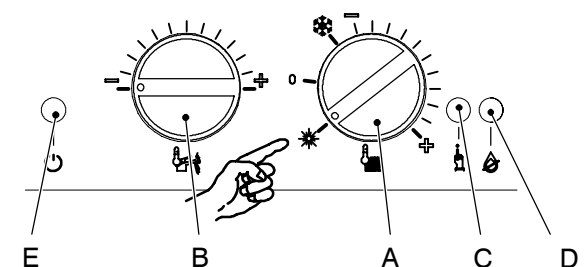


Fig. 16

- 5 Keep pressed the reset button C for about 10 seconds until the lock-out signal lamp D blinks.

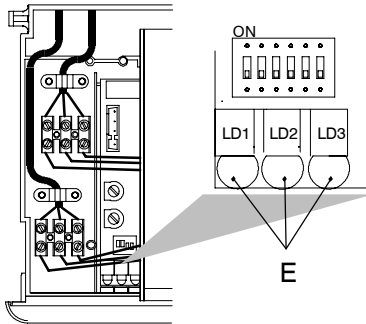


Fig. 17

- 6 The lamps E should give the indication as in Fig. 17 – Fig. 18. If not, press the reset button repeatedly to obtain it.

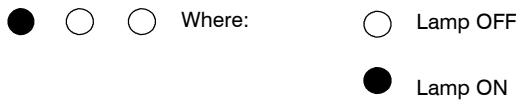


Fig. 18

- 7 Keep pressed the reset button C for about 5 seconds until the lock-out signal lamp D is switched OFF. The boiler runs in c.h. mode and the lamps E give the indication as in Fig. 19.

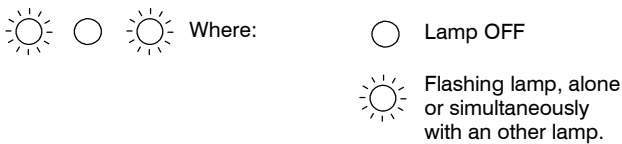


Fig. 19

- 8 Rotate the knob B to obtain the pressure to the burner to meet with the central heating system requirements. Refer to diagrams indicated in the tables of the User/Installation manual (*Commissioning section, Adjustment of useful c.h. output*). By rotating clockwise the pressure increases.
- 9 Make a note of the position of the knob B.
- 10 Turn the boiler OFF and ON positioning the function selector knob A as indicated in Fig. 20

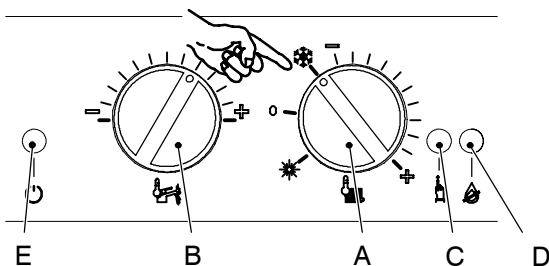


Fig. 20

- 11 Keep pressed the reset button C for about 10 seconds until the lock-out signal lamp D blinks.

- 12 Press the reset button C repeatedly (2 times) until the lamps E give the indication as in Fig. 21 (useful c.h. output adjustment mode).

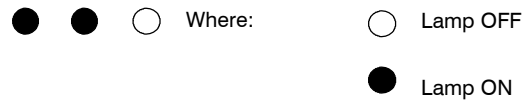


Fig. 21

- 13 Turn the knob B to the minimum (fully counter-clockwise) and then on the position corresponding to the position obtained on step 8. By turning the knob B, the lock-out signal lamp D blinks quickly (2 per second) indicating that the setting has changed and must be memorised.
- 14 To memorize the setting keep pressed the reset button C for about 5 seconds until the lights E briefly blinks simultaneously.
- 15 To reset the boiler to the normal operation turn it OFF and ON by the function selector knob A checking the ignition pressure and that the burner lights up uniformly. In any case, the boiler automatically resets to its normal operation after 10 minutes.

9.9 Gas conversion

Refer to User/Installation manual (*Gas conversion section, Procedures*)

- 1 Turn the boiler OFF positioning the function selector knob A as indicated in Fig. 22.

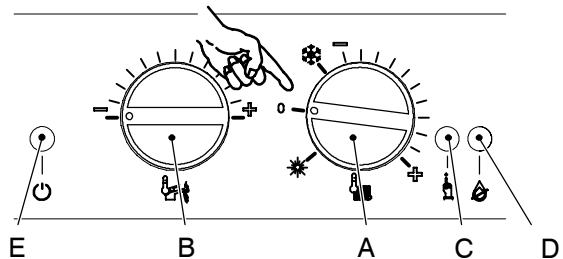


Fig. 22

- 2 Remove the front panel of the case.
- 3 Disconnect the C.h. temperature probe NTC (Fig. 23)

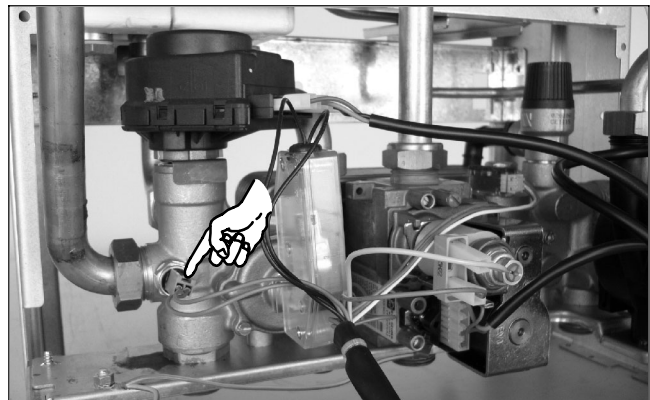


Fig. 23

- 4 Keep pressed the reset button C for about 10 seconds until the lock-out signal lamp D blinks.

- 5 Connect the C.h. temperature probe NTC (Fig. 23)

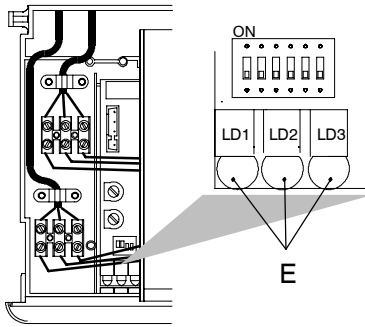


Fig. 24

- 6 Press the reset button C repeatedly (4 times) until the lamps E give the indication as in Fig. 24 – Fig. 25 (gas type mode).

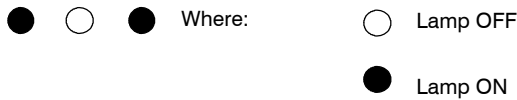


Fig. 25

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 E will flash a number of times corresponding to the setting (Fig. 26 – Fig. 27).

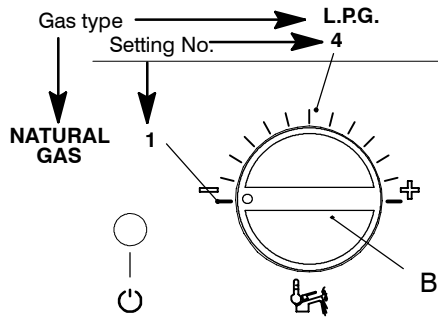


Fig. 26

- 7 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.

Gas supply	Position of knob B	Approx. Max current through the modulator device
Natural gas	1	125 mA
L.P.G.	4	165 mA

Fig. 27

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

Factory setting = Natural gas

9.10 Checks

- ✓ Check that the fuse is complete
- If the Electronic starting control p.c.b. does not supply any device (pump, fan, etc.) check that the fuse 2 (Fig. 2) is complete.
- If the fuse has blown replace it with one that has the same characteristics after having identified the reason for failure.
- ✓ Check the setting jumpers position
- Two setting jumpers must be fitted on the Electronic starting control p.c.b. as shown in NO TAG.

9.11 Removal of the electronic control p.c.b

- ⚡ **Warning: isolate the boiler from the mains electricity supply before removing any covering or component.**
- 1 Gain access to the parts located inside the control panel as explained in the section 2.3 of this manual.
 - 2 Remove all the wiring connected to the Electronic starting control p.c.b..
To disconnect the connectors J1, J3, J7, J15, J16 and (5, 1, 9, 15 and 6 in Fig. 2) 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. 28.

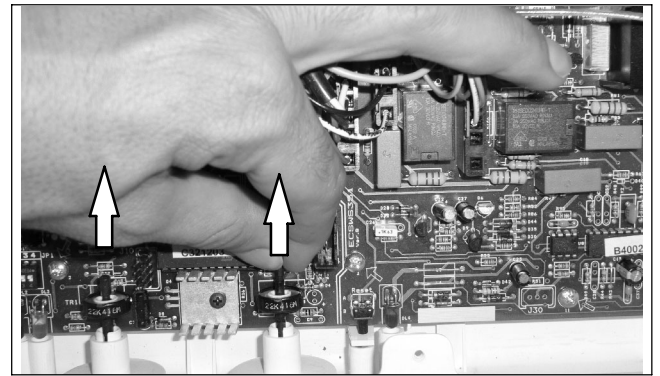


Fig. 28

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

Important

- When re-assembling the Electronic starting control p.c.b.:
- 7 Fit the p.c.b. into the control panel by first inserting the front lower edge under the control knob shafts. Lower the rear edge and ensure that no wiring is trapped beneath.
 - 8 Insert the spindles in the control panel knobs until the notch A (Fig. 29) reaches the potentiometer.

meter edge. It is not necessary to force them in the knob.

- 9 While tightening the screws that fix the Electronic starting control p.c.b. on the control panel, keep the p.c.b. towards the control panel fascia making sure of the contact between the boiler reset button *B* and the tab *C* (Fig. 29).

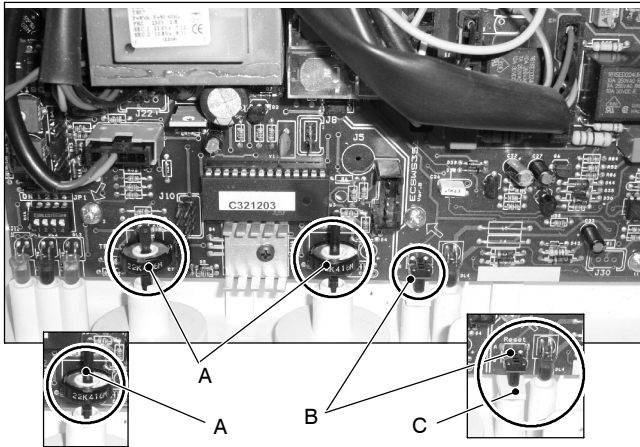


Fig. 29

Attention

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

- 10 Make sure the c.h. (🔥) and d.h.w. (🚿) temperature adjustment knobs can move freely for the complete range.
If not, remove the spindle again as described at step 3, turn the knob half a turn and re-insert the spindle.
- 11 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 refer to section *Combustion analysis check* in the chapter *Maintenance of the installation instructions manual*.

9.12 Thermal control in the ❄️ mode

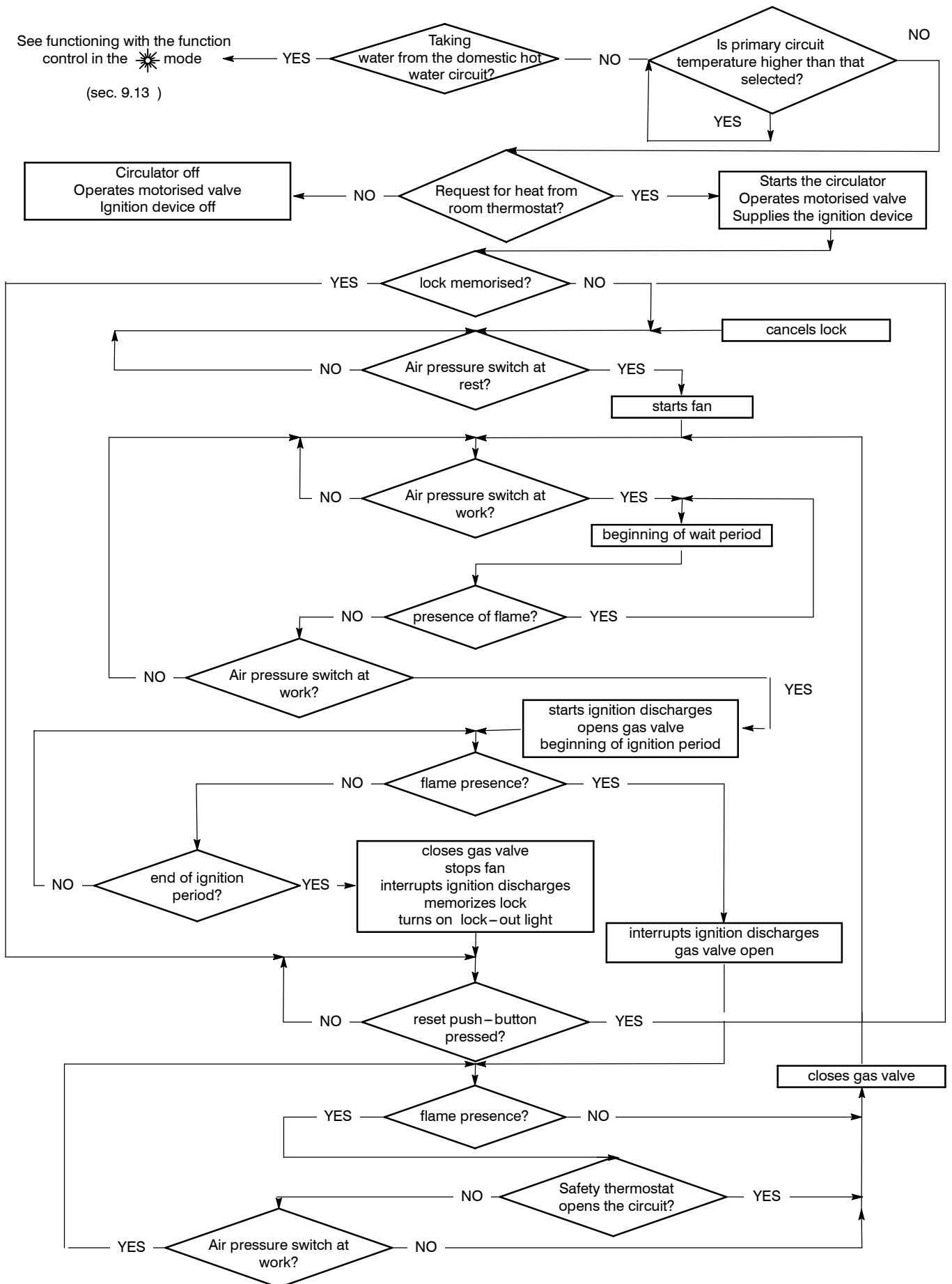


Fig. 30

9.13 Thermal control in the "☼" mode

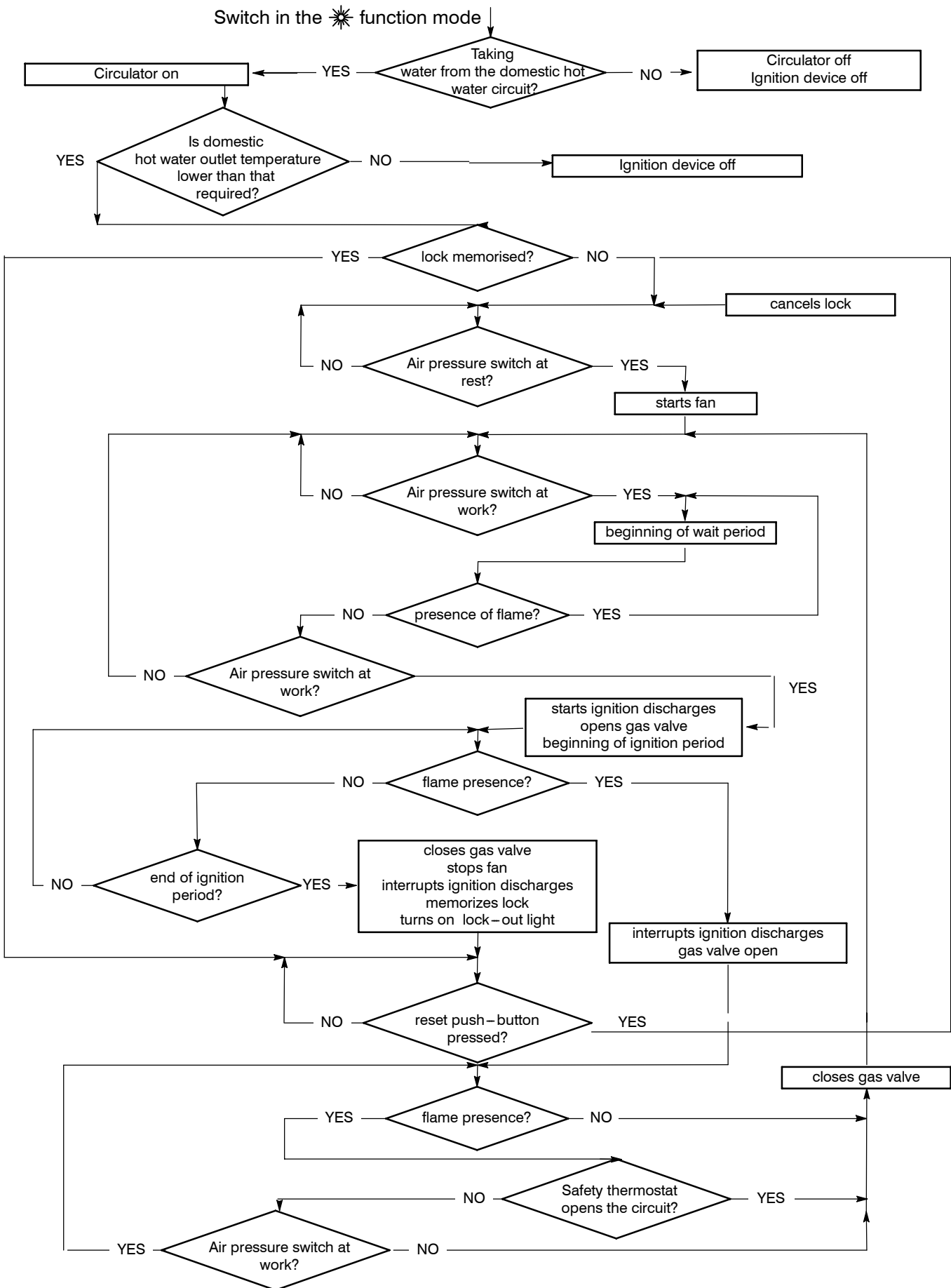


Fig. 31

10 Modulating gas valve

10.1 Function

The Modulating gas valve A in Fig. 1 controls the gas inflow to the boiler burner.

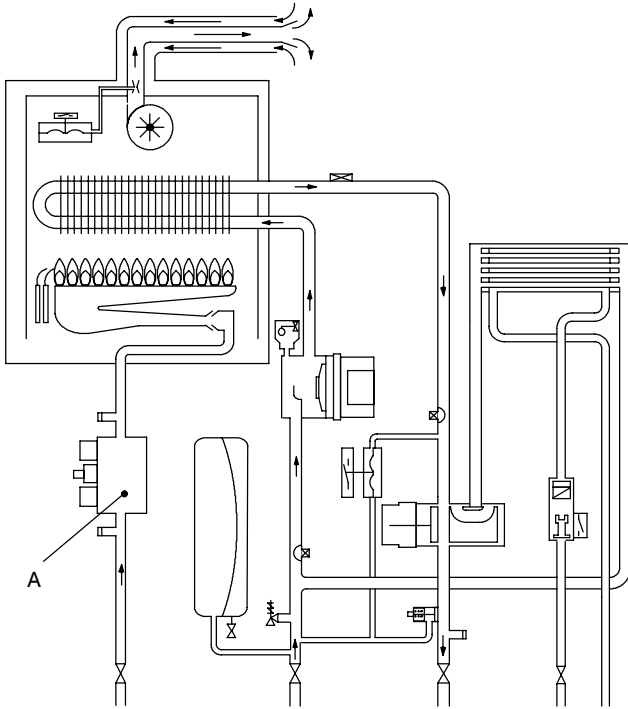


Fig. 1

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

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

10.2 Nomenclature of the parts (Fig. 2)

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

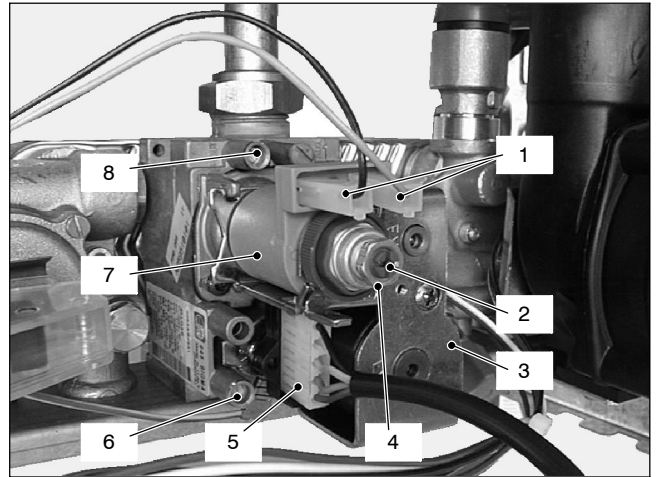


Fig. 2

10.3 Adjustment

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

- 1 Remove the front panel of the case.
- 2 Open the gas valve inlet pressure test point (6 in Fig. 2) at the valve input, connect a suitable pressure gauge and check the gas pressure of the supply network.
- 3 Remove the gauge and close the pressure test point 6.
- 4 Open the gas valve outlet pressure test point (8 in Fig. 2) and connect the gauge;
- 5 Remove the protection cap from the mechanical pressure adjustment components;
- 6 Start the boiler at its maximum power. Operate the boiler in d.h.w. mode or ensure that the boiler is not range rated if the test is carried out in c.h. mode.
- 7 Rotate the maximum gas pressure adjustment (4 in Fig. 2) until you obtain the required pressure (by rotating clockwise the pressure increases).
- 8 Disconnect one of the two connectors (1 in Fig. 2) or, alternatively, remove the service panel as explained in the section 2.3 of this manual and set the dip–switch selector 1 (see section NO TAG) to the OFF position.
- 9 Rotate the minimum gas pressure adjustment (2 in Fig. 2) until you obtain the required pressure (by rotating clockwise the pressure increases).
- 10 Turn the boiler off and re–connect the wire to the modulating operator (or set the dip–switch selector 1 back to the ON position).
- 11 Start the boiler and check again the maximum gas pressure setting.
- 12 Turn the boiler off and disconnect the gauge.

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

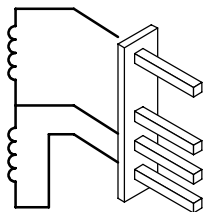
10.4 Checks

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

- ✓ Check the modulation operator coil
 - 1 Remove the front panel of the case.
 - 2 Disconnect the connectors *B* (Fig. 5) from the modulating operator and measure the electrical resistance of the coil. Its electrical resistance value must be approx. $80 \Omega^*$.
- ✓ Check the on-off operators coils
 - 1 Remove the front panel of the case.
 - 2 Disconnect the electrical connector *C* (Fig. 5).
 - 3 Measure the electrical resistance between the connector pins of the on-off operators as illustrated in Fig. 3.

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

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



* at ambient temperature.
Fig. 3

10.5 Removal of the on-off operators coils

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

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

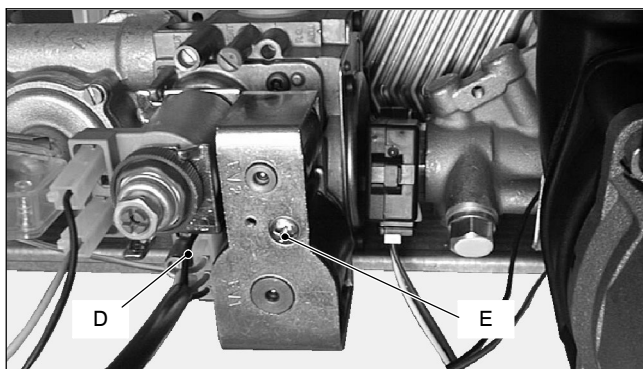


Fig. 4

10.6 Removal of the gas valve

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

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

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

Warning: After cleaning or replacement as detailed above refer to section *Combustion analysis check* in the chapter *Maintenance of the installation instructions manual*.

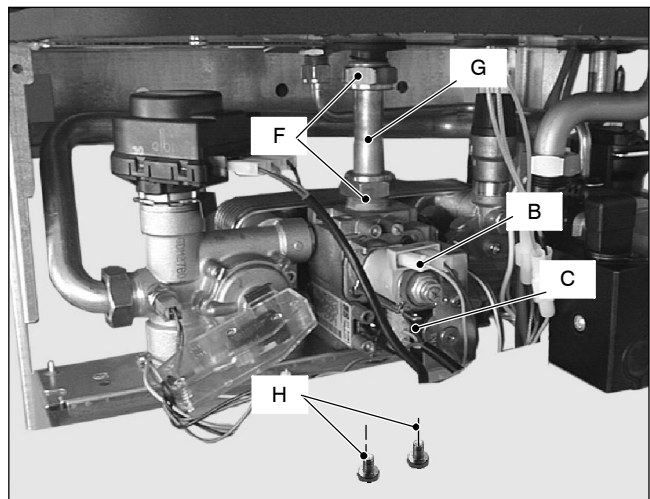


Fig. 5

11 Primary circuit flow switch

11.1 Function

The Primary circuit flow switch (A in Fig. 1) function is to detect water flowrate through the primary hydraulic circuit of the boiler.

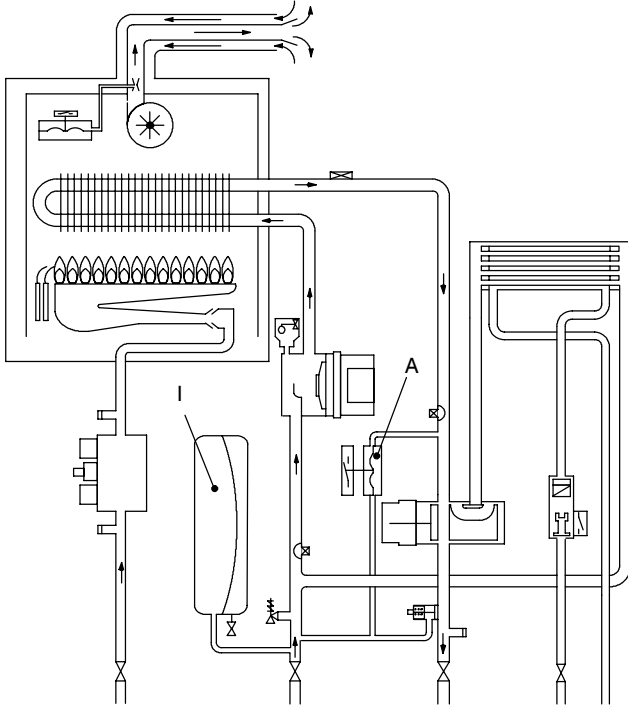


Fig. 1

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.

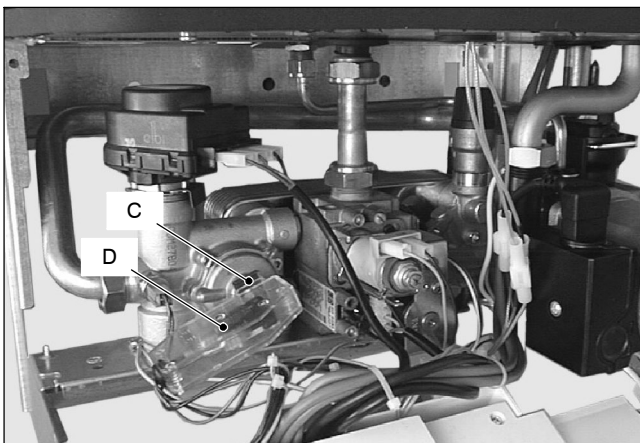


Fig. 2

11.2 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. 3.

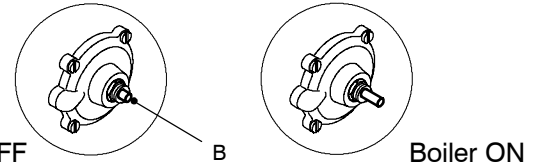


Fig. 3

✓ 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 11.3.
- 2 Measure the electrical resistance between the tabs marked C. and N.O. (Fig. 4). The contact must be normally open.
- 3 Operate the switch by hand and verify that the contact is now closed.

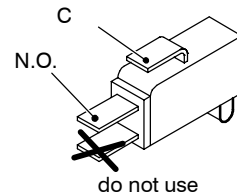


Fig. 4

11.3 Removal

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

✓ Removal of the switch

- 1 Remove the front and right hand side panels of the case.
- 2 Remove the fork C (Fig. 2).
- 3 Open the box and disconnect the switch.
- 4 Re-assemble the parts in reverse order of removal. Refer to Fig. 4 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. 2).
- 3 Unscrew the four screws E (see Fig. 5) open the hydraulic operator and remove the membrane F.

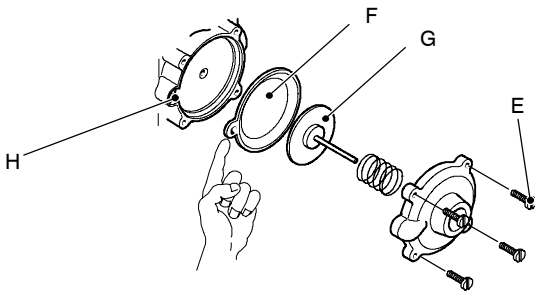


Fig. 5

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. 5).

12 Expansion vessel and temperature–pressure gauge

12.1 Function

The Expansion vessel (I in Fig. 1) function is to allow for the volume expansion of the c.h. circuit water due to the temperature rise.

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

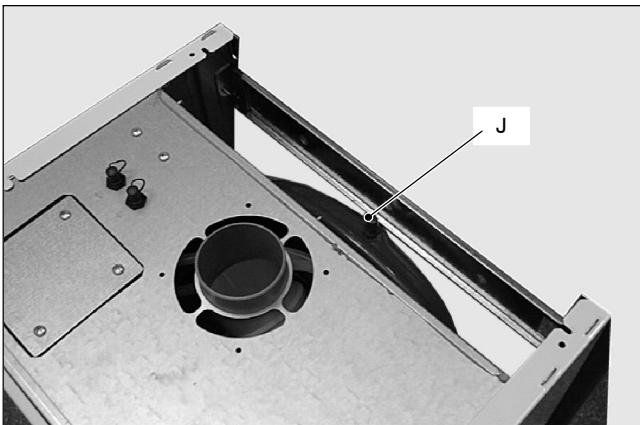


Fig. 6

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

12.3 Removal of the expansion vessel

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

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

- 1 Remove the front and left hand side panels of the case, turn off the flow and return isolation valves and empty the primary circuit.
- 2 Completely unscrew the connection K, the lock-nut L (Fig. 7) and remove the expansion vessel from the top of the boiler.

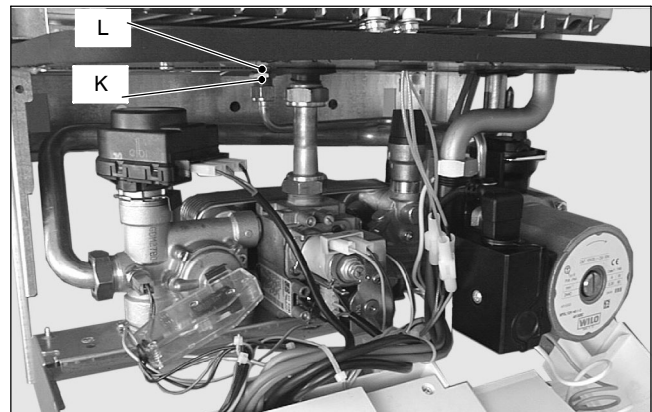


Fig. 7

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

12.4 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. 8).
- 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.

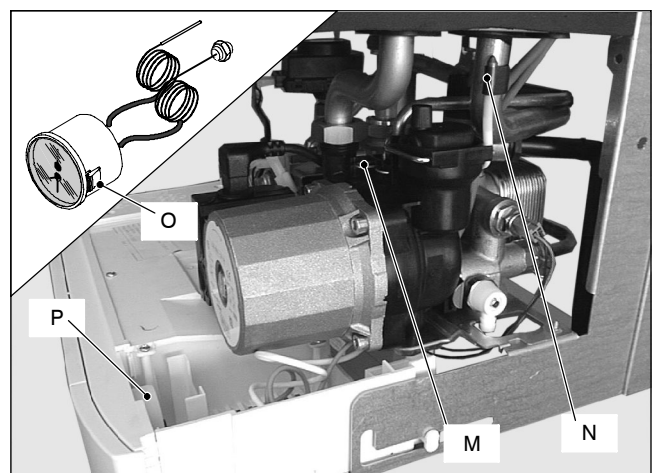


Fig. 8

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

13.1 Function

The d.h.w. flow switch *A* in Fig. 1 is a device that generates an electrical signal when hot water is drawn.

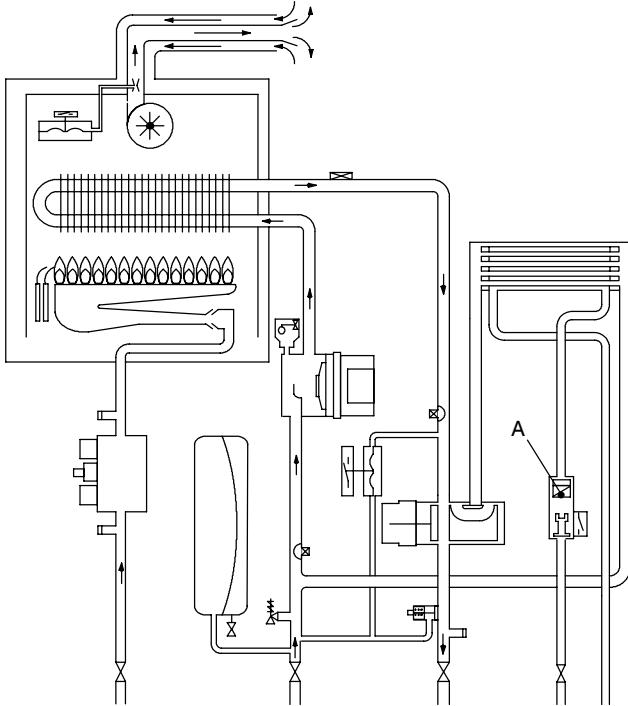


Fig. 1

When the flow rate through the d.h.w. circuit reaches about 2,5 litres/min', the float 6 (Fig. 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.

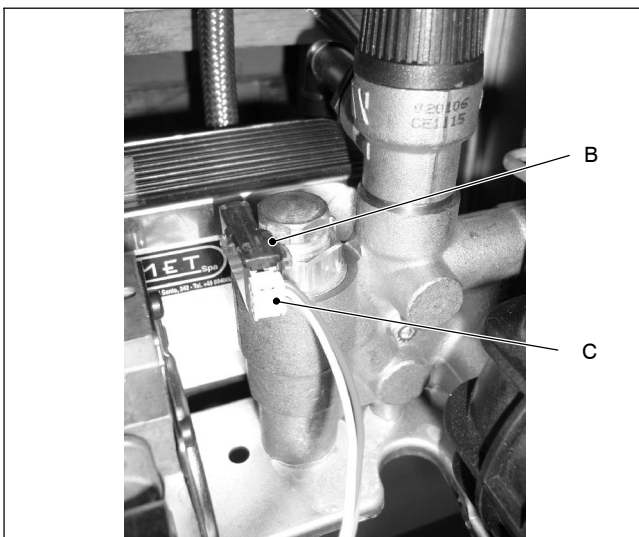


Fig. 2

13.2 Nomenclature and location of parts (Fig. 3)

- 1 Flow switch sensor
- 2 Body
- 3 O-ring
- 4 Spring
- 5 Magnetic ring
- 6 Float
- 7 Threaded ring
- 8 Flow limiter (optional accessory)
- 9 Filter
- 10 Spring seat

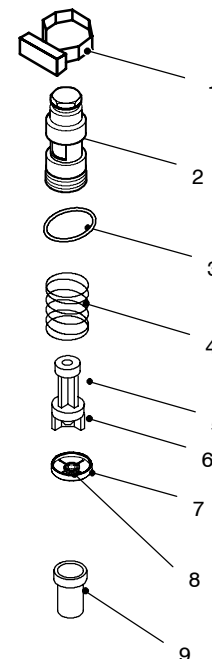


Fig. 3

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

13.4 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. 2) and remove the sensor by delicately levering downwards with a screwdriver.

13.5 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 13.4).
- 3 Unscrew the body 2(Fig. 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. 3) by levering it.
- 5 Reassemble the parts following the removing sequence in reverse order.

13.6 Flow limiter

The M90E.24S model is factory fitted with a 10 litre/min.

flow limiter.

If on the M90E.28S and M90E.32S 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
14	Pink

To install the threaded ring with the flow limiter:

- 1 Remove the flow switch group as explained in the section 13.5.
- 2 Remove the filter from the flow switch group.
- 3 Unscrew the threaded ring 7 (Fig. 3) and remove it from the body 2.
- 4 Reassemble the group following the above sequence in reverse order.

14 Temperature probe

14.1 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. 1.

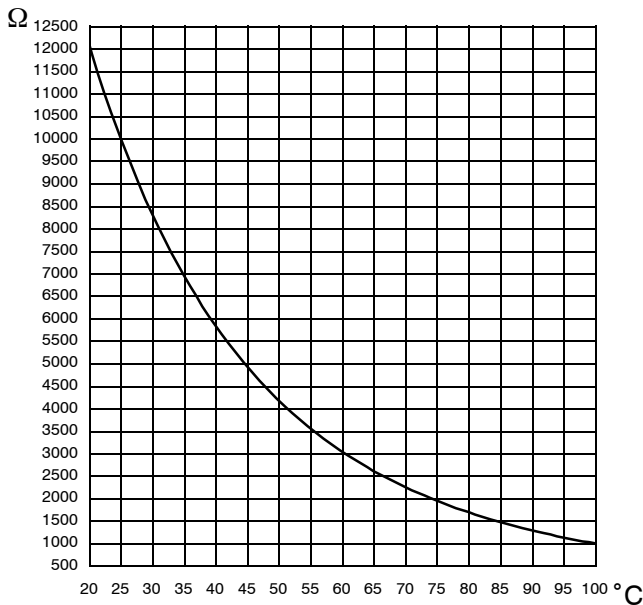


Fig. 1

On the boiler there are two Temperature probes. One on the output of the primary heat exchanger (c.h. Temperature probe) A in Fig. 2 and Fig. 3; one on its input, before the pump (d.h.w. Temperature probe) B in Fig. 2 and Fig. 4.

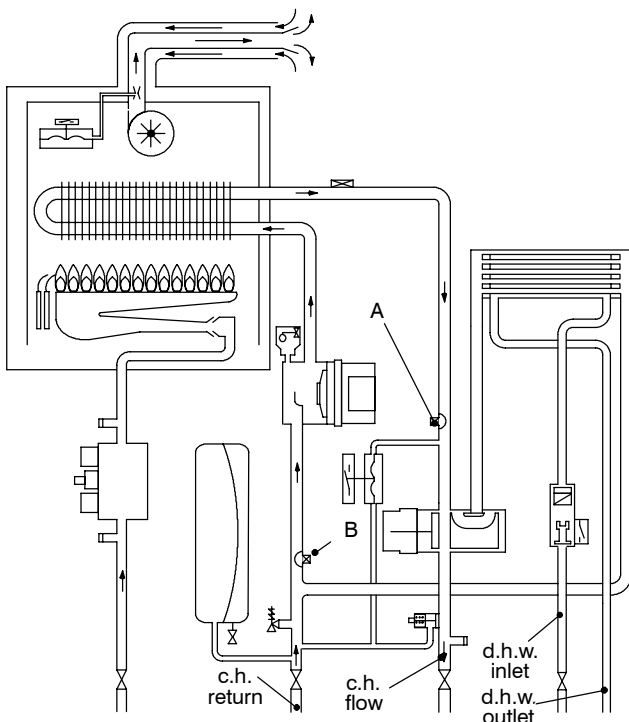


Fig. 2

14.2 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. 1.

14.3 Removal

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

Refer to Fig. 3 for the c.h. Temperature probe and to Fig. 4 for the d.h.w. Temperature probe.

- 1 To remove the Temperature probes remove the front and right hand side panels of the case.
- 2 Empty the primary circuit of the boiler.
- 3 Remove the electric connector of the Temperature probe and unscrew it.
- 4 Reassemble the Temperature probe carrying out the removal operations in reverse order.

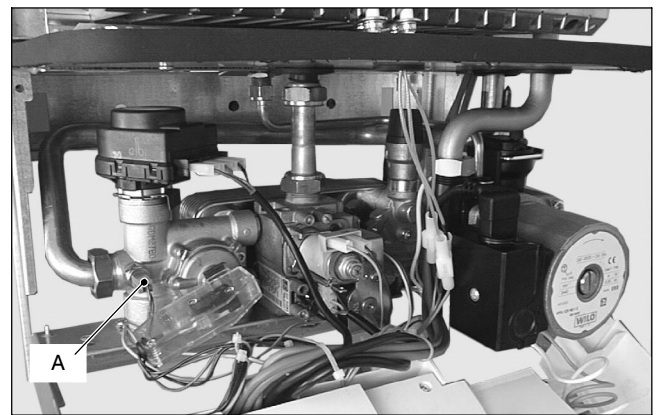


Fig. 3

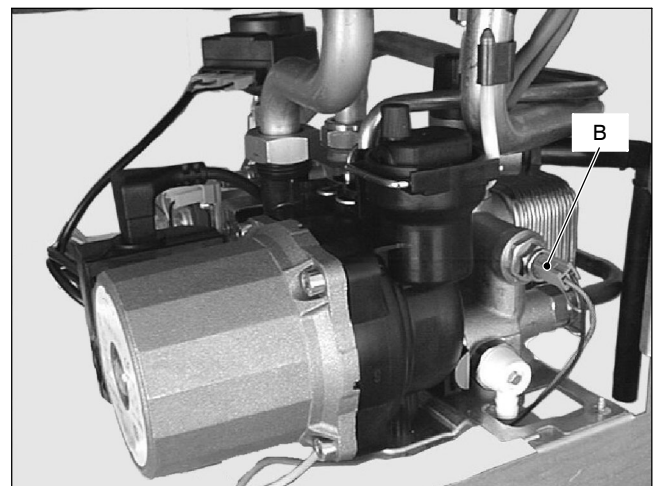


Fig. 4

15 By-pass valve

15.1 Function

The By-pass valve *A* in Fig. 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.

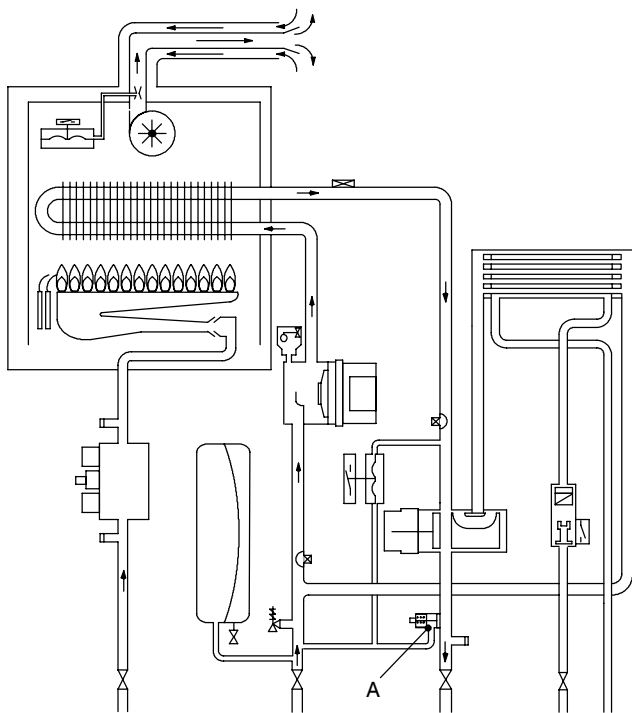


Fig. 1

15.2 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. 2).

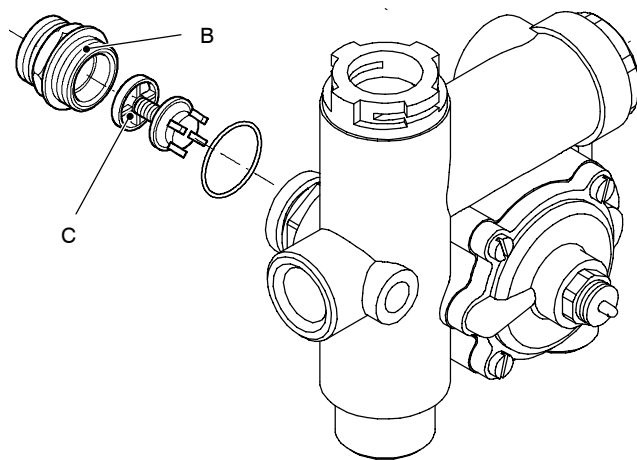


Fig. 2

- 5 Reassemble the by-pass valve as illustrated in Fig. 2 reversing the order of removal.

16 Fan, venturi device and Air pressure switch

16.1 Function

The function of the Fan is to force the products of combustion to the outside air via the flue system.

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

Its correct functioning is controlled by means of a system incorporating a built in venturi device (A in Fig. 6) and an Air pressure switch.

16.2 Checks

✓ Check of the fan

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

- 1 Remove all the case panels and the sealed chamber lid.
- 2 Disconnect the connectors B (Fig. 1) and measure the electrical resistance of the motor that has to be about:
 - 47 Ω – M90E.24S
 - 43 Ω – M90E.28S
 - 25 Ω – M90E.32S
 (at ambient temperature).

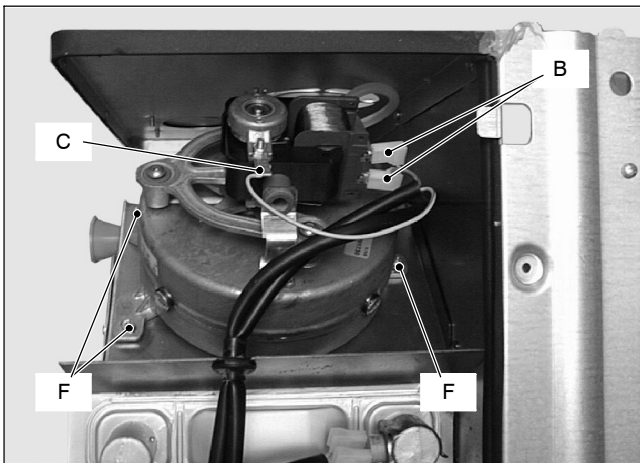


Fig. 1

✓ Check of the Air pressure switch operation

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

- 1 Remove all the case panels and the sealed chamber lid.
- 2 Disconnect the wires and check the electrical resistance between the connections of the Air pressure switch. Refer to the Fig. 2

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

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

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

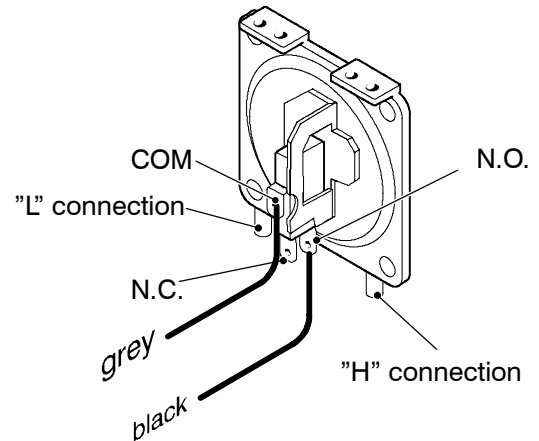


Fig. 2

✓ Check of the venturi device

This test must be carried out with the sealed chamber closed

- 1 Remove the caps of the pressure test points located on the top of the boiler and connect a differential pressure gauge (Fig. 3).
- 2 Switch on the boiler.

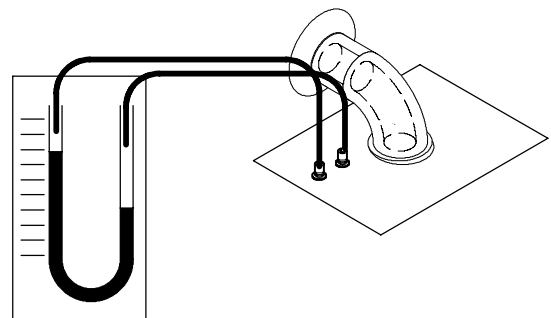


Fig. 3

- 3 Compare the value on the gauge with the following minimum values:

90 Pa (0,9 mbar) – M90E.24S
 100 Pa (1,0 mbar) – M90E.28S
 130 Pa (1,3 mbar) – M90E.32S

16.3 Removal of the Fan

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

- 1 Remove all the case panels, the sealed chamber lid and the combustion chamber lid.
- 2 Disconnect the connectors B and the earth connection C (Fig. 1).
- 3 Disconnect the pipe which connect the venturi device to the Air pressure switch.

- 4 Unscrew the screws *D* and remove the clamp *E* (Fig. 4).

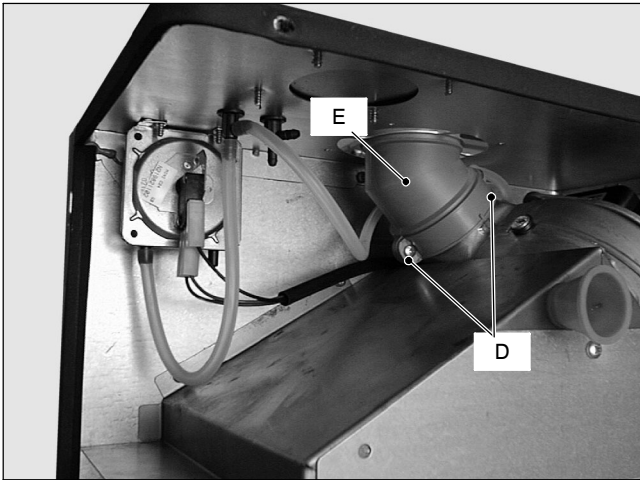


Fig. 4

- 5 Remove the three screws *F* (Fig. 1) securing the Fan to the flue hood and remove the fan.
- 6 Assemble the fan carrying out the removal operations in reverse sequence.

Warning: to correctly connect the venturi device to the Air pressure switch, refer to Fig. 5.

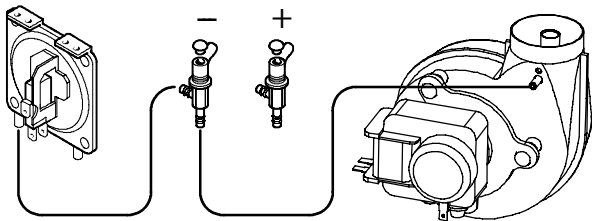


Fig. 5

Warning: After cleaning or replacement as detailed above refer to section *Combustion analysis check* in the chapter *Maintenance of the installation instructions manual*.

16.4 Inspection and removal of the venturi device

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

- 1 Remove the fan (section 16.3).
- 2 Remove the venturi device by unscrewing the screw *G*.

- 3 Inspect the venturi device *A* and the connection pipe *H*. Ensure they are clean.
- 4 Re-assemble the parts in reverse order of removal.

Warning: After cleaning or replacement as detailed above refer to section *Combustion analysis check* in the chapter *Maintenance of the installation instructions manual*.

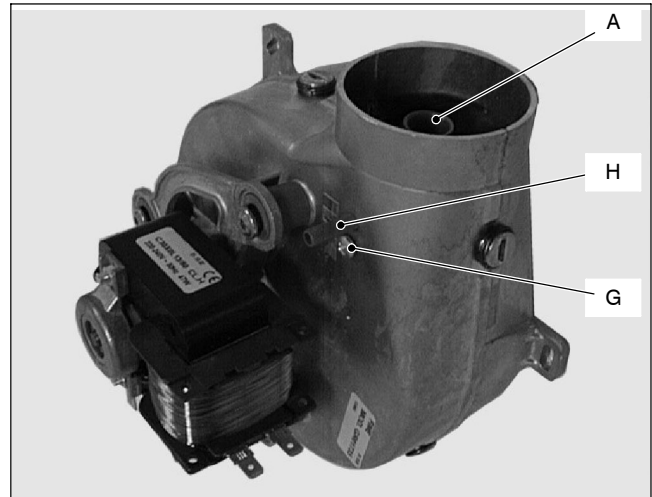


Fig. 6

16.5 Removal of the Air pressure switch

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

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

Warning: to correctly connect the Air pressure switch, refer to Fig. 5 and Fig. 2a or Fig. 2b for the correct wiring.

Warning: After cleaning or replacement as detailed above refer to section *Combustion analysis check* in the chapter *Maintenance of the installation instructions manual*.

17 Ignition and detection electrodes

17.1 Function

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

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

Fig. 1 shows the electrodes configuration on the models M90E.24S, M90E.28S.

Fig. 2 shows the electrodes configuration on the model M90E.32S.

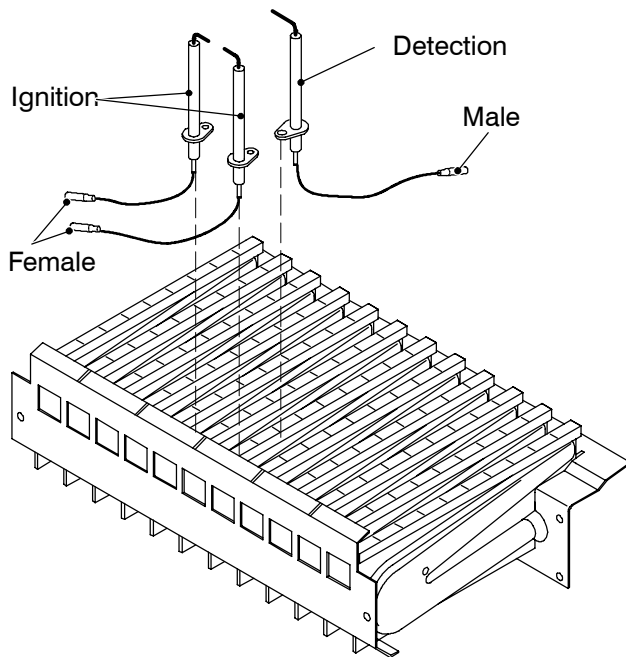


Fig. 1

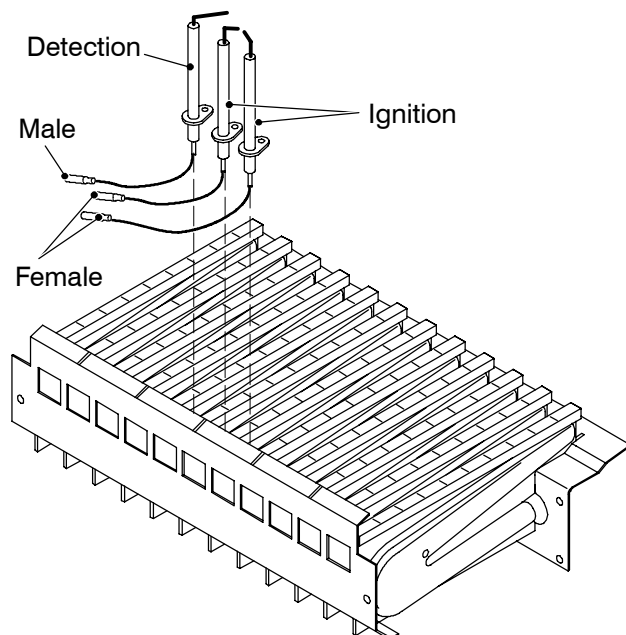


Fig. 2

17.2 Checks

✓ Check the position of the electrode edges

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

- 1 Remove all the case panels, the sealed chamber lid and the combustion chamber lid.
- 2 Check for the correct distance between the metallic edges of the ignition electrodes (see Fig. 3).

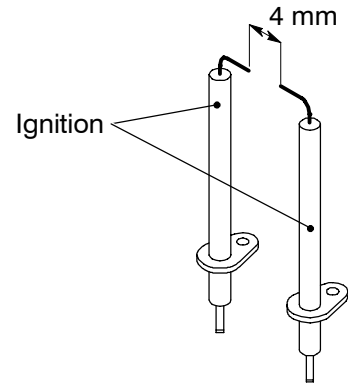


Fig. 3

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

✓ Check the connection wires.

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

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

17.3 Removal

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

- 1 Remove all the case panels, the sealed chamber lid and the combustion chamber lid.
- 2 Disconnect the electrode wires from the full sequence ignition device.
- 3 Remove the burner by unscrewing the four screws placed at the right and left sides of the burner.
- 3b For model M90E.28S and M90E.32S remove also the plate C (see Fig. 2 on page 35).
- 4 Unscrew the screws A (Fig. 4) which hold the electrodes to the burner.
Two screws are used on the models M90E.24S, M90E.28S
Three screws, one for each electrode, are used on the model M90E.32S.

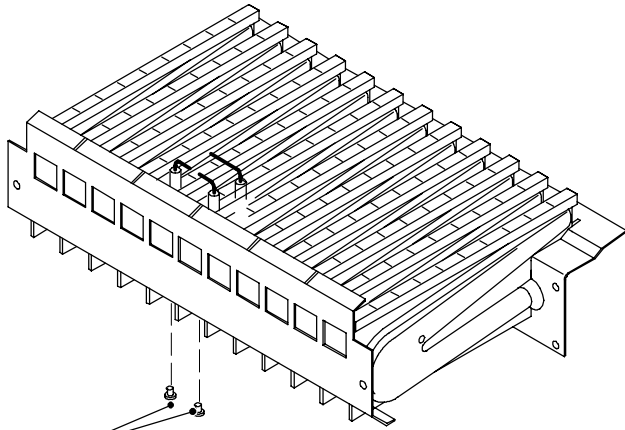


Fig. 4

- 5 Extract the electrodes from the burner.
- 6 Assemble the electrodes carrying out the removal operation in reverse order.
Refer to Fig. 1 in order to recognise the electrodes and to correctly connect the wiring.

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

Warning: After cleaning or replacement as detailed above refer to section *Combustion analysis check* in the chapter *Maintenance of the installation instructions manual*.

18 Safety thermostat

18.1 Function

The safety thermostat *A* in Fig. 1 is a device that senses the temperature of the primary circuit water which flows in the outlet pipe of the primary heat exchanger.

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

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

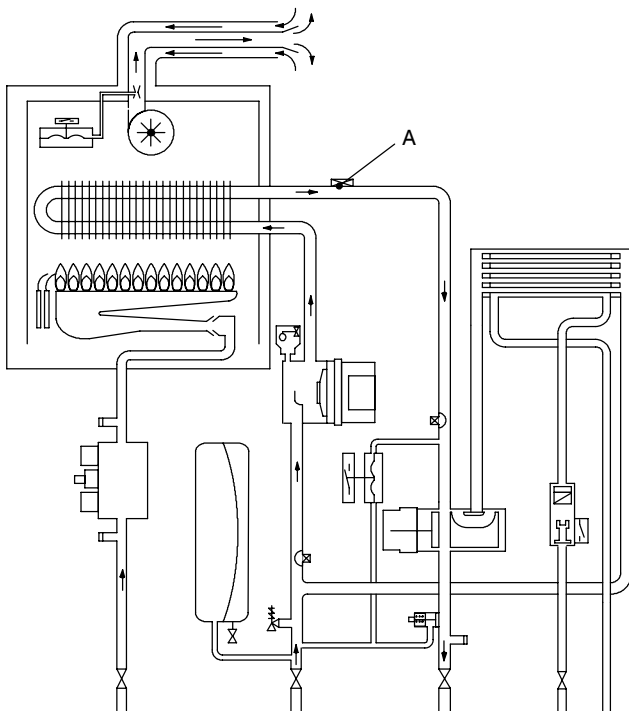


Fig. 1

18.2 Checks

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

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.

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).

18.3 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.
- 1b For model M90E.28S and M90E.32S remove the screw *B* and the plate *C* (Fig. 2).

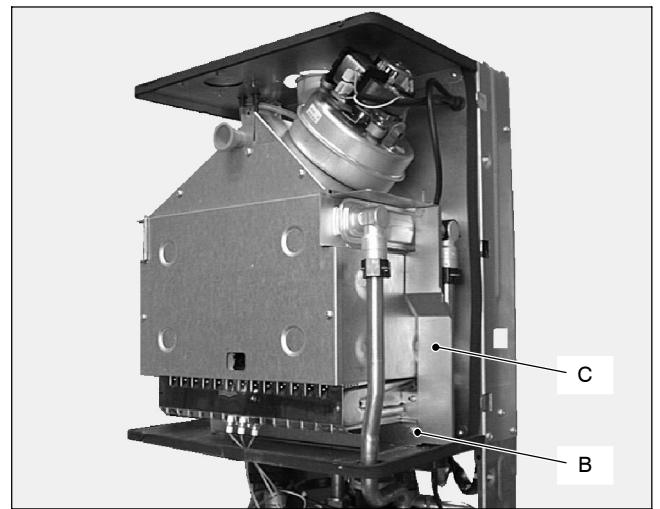


Fig. 2

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

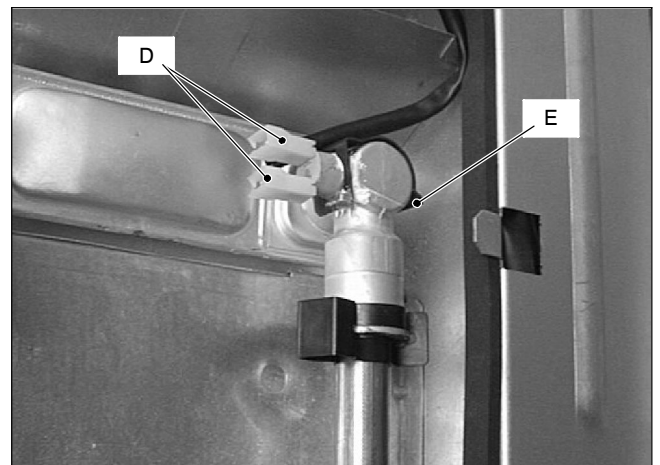


Fig. 3

- 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.

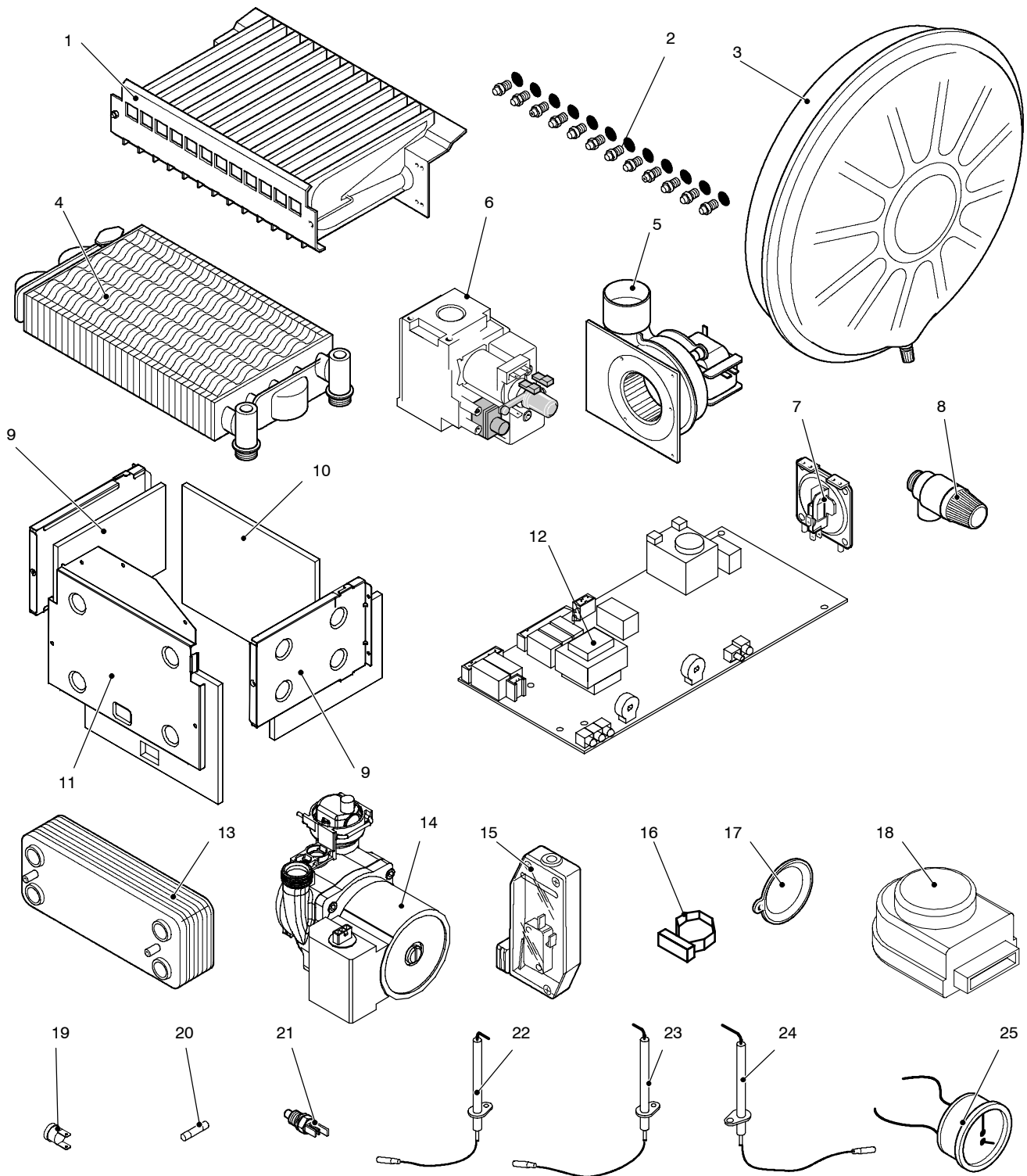
Warning: After cleaning or replacement as detailed above refer to section **Combustion analysis check** in the chapter **Maintenance of the installation instructions manual**.

Safety thermostat

19 Short spare parts list

Key	G.C. part no.	Description	Q.ty	Manufacturer part no.	Manufacturer's reference
1	173-148	Burner (mod. M90E.24S,)	1	KI1004 102	Polidoro
	173-149	Burner (mod. M90E.28S)	1	KI1004 147	
		Burner (mod. M90E.32S)	1	BI1193 100	
2	169-069	Injectors for natural gas (mod. M90E.24S)	12	KI1064 505	Polidoro
		Injectors for natural gas (mod. M90E.28S)	14		
		Injectors for natural gas (M90E.32S)	16	BI1193 500	
	169-070	Injectors for LPG (mod. M90E.24S)	12	KI1064 506	
		Injectors for LPG (mod. M90E.28S)	14		
3	E83-121	Expansion vessel	1	BI1172 103	CIMM 6 litres
4		Main heat exchanger (mod. M90E.24S)	1	BI1202 101	
		Main heat exchanger (mod. M90E.28S)	1	BI1202 102	
		Main heat exchanger (mod. M90E.32S)	1	BI1222 100	
5		Fan (mod. M90E.24S,)	1	BI1366 102	FIME GR02040 39W
		Fan (mod. M90E.28S,)	1	BI1366 103	FIME GR02045 47W
		Fan (mod. M90E.32S)	1	BI1376 105	FIME GR02050 60W
6	E83-129	Gas valve	1	BI1193 105	SIT 845 Sigma
7	169 127	Air pressure switch 0,88-0,74 mbar (mod. M90E.24S)	1	KI1267 103	Yamatake-Honeywell C6065 SIT 380 (alternative)
		Air pressure switch 1,04-0,92 mbar (mod. M90E.28S)	1	BI1366 107	
		Air pressure switch 1,38-1,25 mbar (mod. M90E.32S)		BI1376 104	
8	E83-013	Safety valve	1	BI1131 100	Watts Orkly (alternative)
9	E83-178	Combustion chamber side panels	2	BI1326 100	
10	E83-180	Combustion chamber rear panel (mod. M90E.24S)	1	BI1326 107	
	E83-181	Combustion chamber rear panel (mod. M90E.28S, M90E.32S)	1	BI1326 108	
11	E83-196	Combustion chamber front panel (mod. M90E.24S)	1	BI1326 101	
	E83-197	Combustion chamber front panel (mod. M90E.28S, M90E.32S)	1	BI1366 109	
12		Electronic regulation p.c.b.	1	BI1885 101	
13	E01-204	D.h.w. heat exchanger (mod. M90E.24S,)	1	BI1001 101	
	E01-205	D.h.w. heat exchanger (mod. M90E.28S)	1	BI1001 102	
		D.h.w. heat exchanger (mod. M90E.32S)	1	BI1161 100	
14		Pump	1	BI1272 100	WSC - NFSL 12/5
15	E00-684	Primary circuit flow switch	1	BI1011 505	
16	E83-082	D.h.w. flow switch	1	BI1271 101	
17	E00-688	Main. flow switch membrane	1	BI1011 103	
18	E83-086	Three way diverter valve (electric actuator)	1	BI1101 102	Elbi
19	E83-101	Overheat thermostat	1	BI1172 105	ELTH - type 261
20	169-083	Fuse 1,6 A T	1	BI1005 105	
21	164-026	Temperature probe (main or d.h.w. circuit)	1	BI1001 117	
22	E83-127	Ignition electrode - left (M90E.24S, M90E.28S)	1	BI1123 101	
		Ignition electrode - left (mod. M90E.32S)	1	BI1193 102	
23	E83-126	Ignition electrode - right (M90E.24S, M90E.28S)	1	BI1123 103	
		Ignition electrode - right (mod. M90E.32S)	1	BI1193 103	
24	E83-122	Detection electrode (M90E.24S, M90E.28S)	1	BI1123 102	
		Detection electrode (mod. M90E.32S)	1	BI1193 104	
25	E83-145	Temperature-pressure gauge	1	BI1475 108	IMIT

Short spare parts list





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