
Wall hung, fanflue, roomsealed, high efficiency gas boiler

Service manual

Advance Plus

Models	G.C. Appl. No.
Advance Plus 25C	47-583-29
Advance Plus 30C	47-583-30
Advance Plus 35C	47-583-31
Advance Plus 16S	41-583-22
Advance Plus 25S	41-583-23
Advance Plus 30S	41-583-24

Leave this manual adjacent to the gas meter

Warning:



Service / repairs must be carried out, only by a qualified Gas Safety Registered Engineer, who will be responsible for the current Regulations for gas appliances.

Note:

After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist of the user and installation manual.



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OVERALL INFORMATION

1 OVERALL INFORMATION

1.1 Overall View

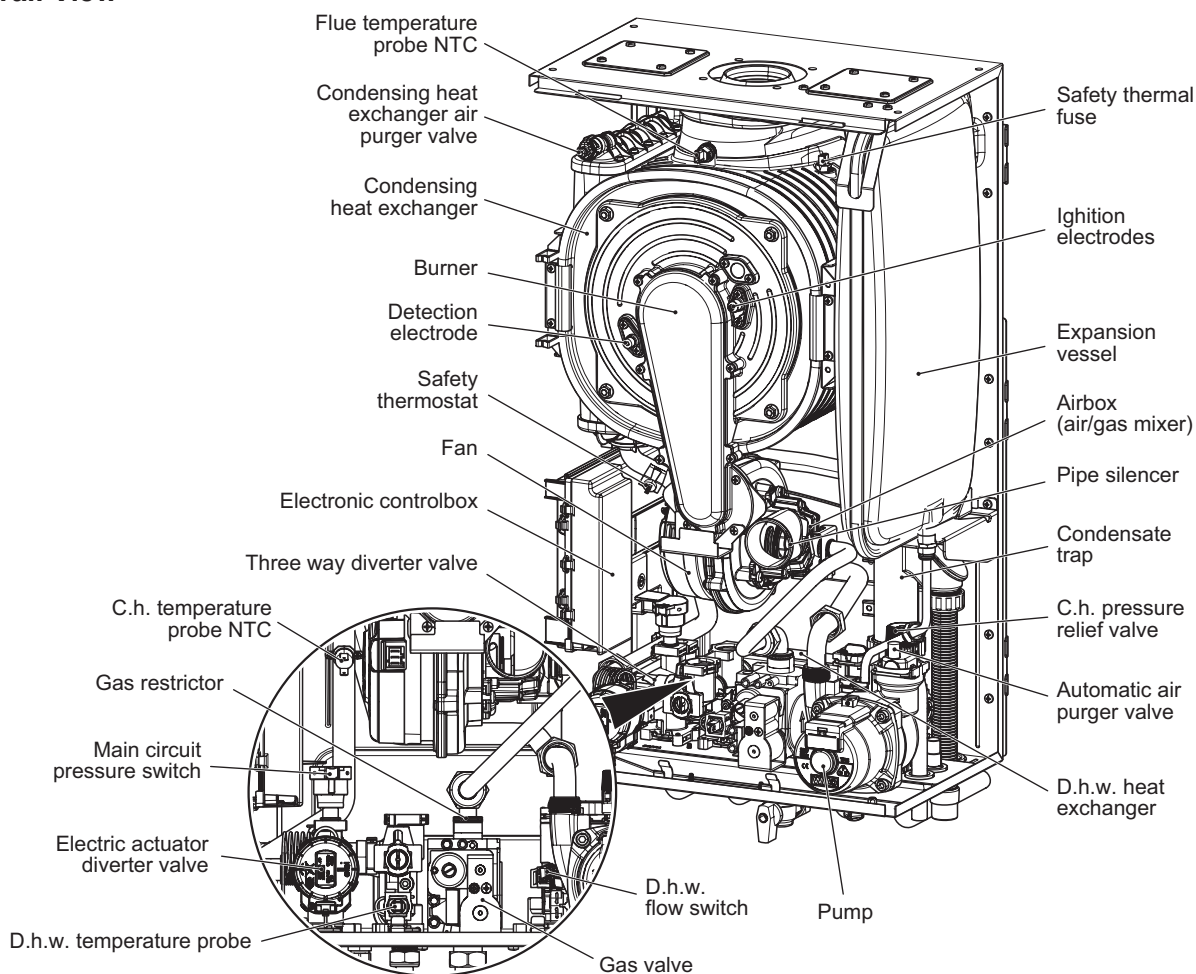


Figure 1.1

1.2 Hydraulic diagram

Central heating (c.h.) operation

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

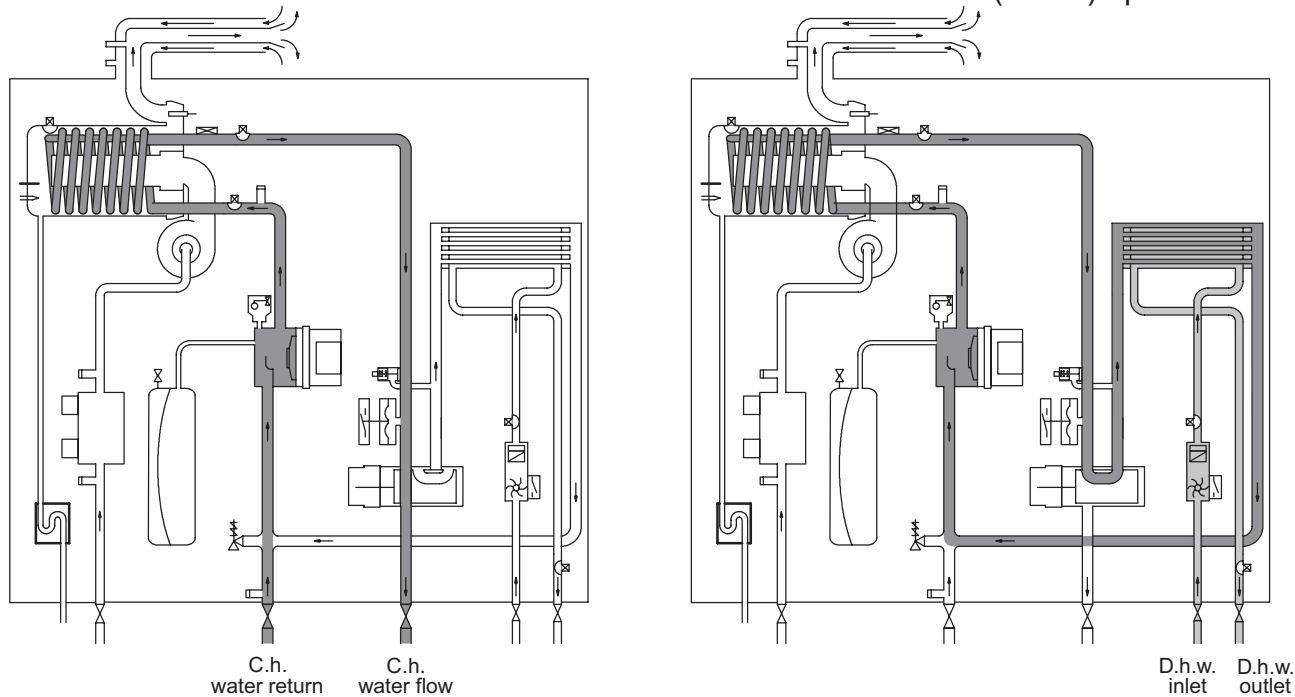


Figure 1.2

GENERAL ACCESS AND EMPTYING HYDRAULIC CIRCUITS

2 GENERAL ACCESS AND EMPTYING HYDRAULIC CIRCUITS

2.1 Nomenclature

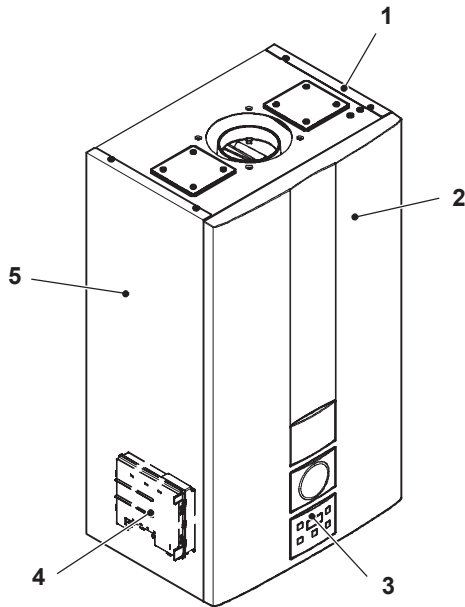


Figure 2.1

- 1 Right side panel
- 2 Front panel
- 3 Control panel
- 4 Main electronic p.c.b. box
- 5 Left side panel

2.2 Case 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 loosen screws A (Figure 2.2), lift the panel and remove it.

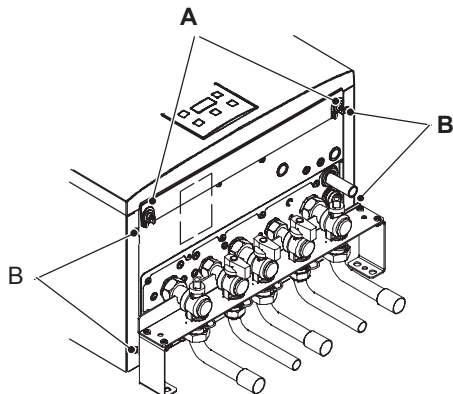


Figure 2.2 - Bottom view of the boiler

Pull the lower part of the front panel and lift it upwards (Figure 2.3).

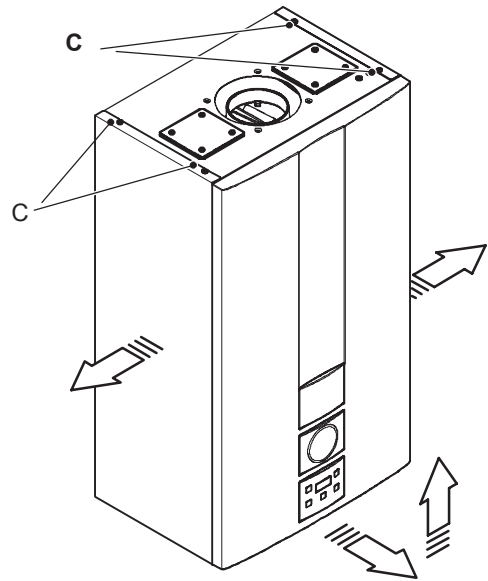


Figure 2.3

To remove the side panels loosen the screws B (Figure 2.2) and C (Figure 2.3).

Pull the side panels towards the outside.

To Fit the case panels

Fit the side case panels.



Warning: Fit the front panel hooking it on the upper side.

Push the spring towards the internal side of the boiler and simultaneously push the front case panel until it is completely hold in place (Figure 2.4 step 1, 2).

Repeat the same operation on the opposite side of the front panel (Figure 2.4 step 3, 4).

Ensure that the front panel edge is close-fitting to the side panels. Lock in place the panel with the appropriate screws.

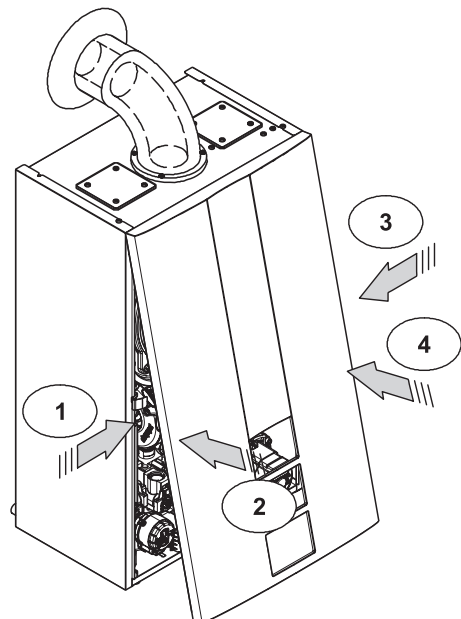


Figure 2.4

GENERAL ACCESS AND EMPTYING HYDRAULIC CIRCUITS

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 Unscrew the screw D (Figure 2.5).
- 3 Free the hooks indicated and rotate the lid towards left.

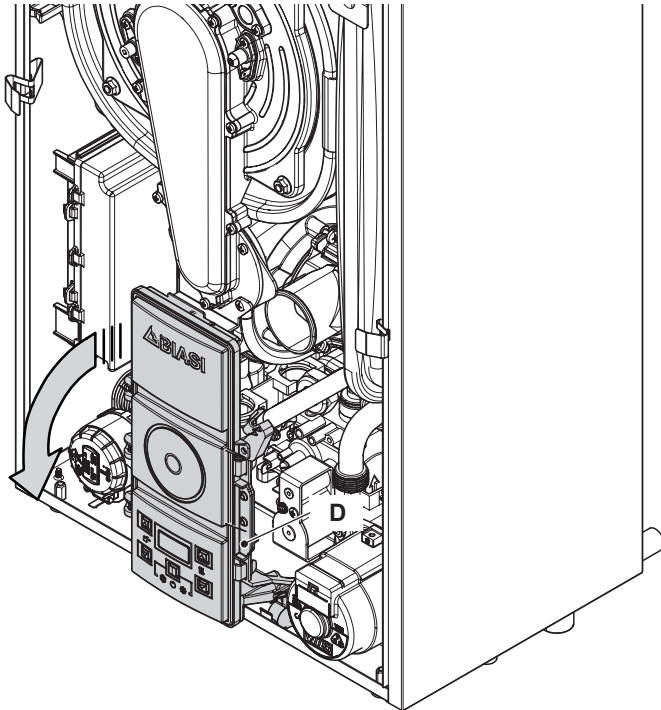


Figure 2.5

- 4 To access to the parts located behind the control panel to free the hook E and turn it as shown in Figure 2.6.

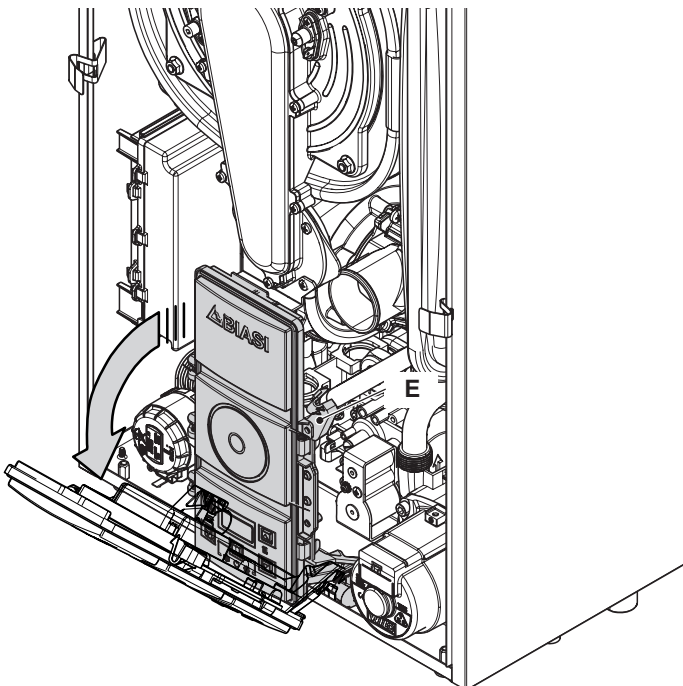


Figure 2.6

2.4 Main electronic p.c.b. box



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

To gain access to the parts located into main electronic p.c.b. box proceed as follows:

- 1 Remove the front panel of the case.

Terminal block lid removal

- 2 To remove the terminal block lid F (Figure 2.7), free the front hooks.

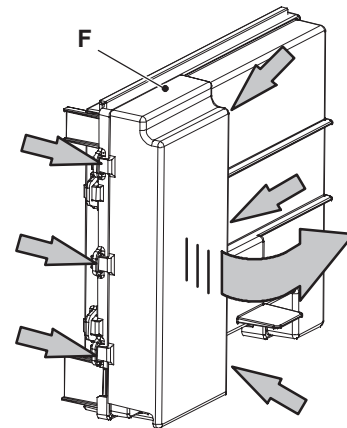


Figure 2.7

- 3 Slightly rotate the lid as indicated by the curved arrow and free the rear hooks.
- 4 Remove the lid.

Main electronic p.c.b. lid removal

To get access to the main electronic p.c.b.:

- 5 Pull the box that contains the electronic p.c.b. and rotate it (Figure 2.8).

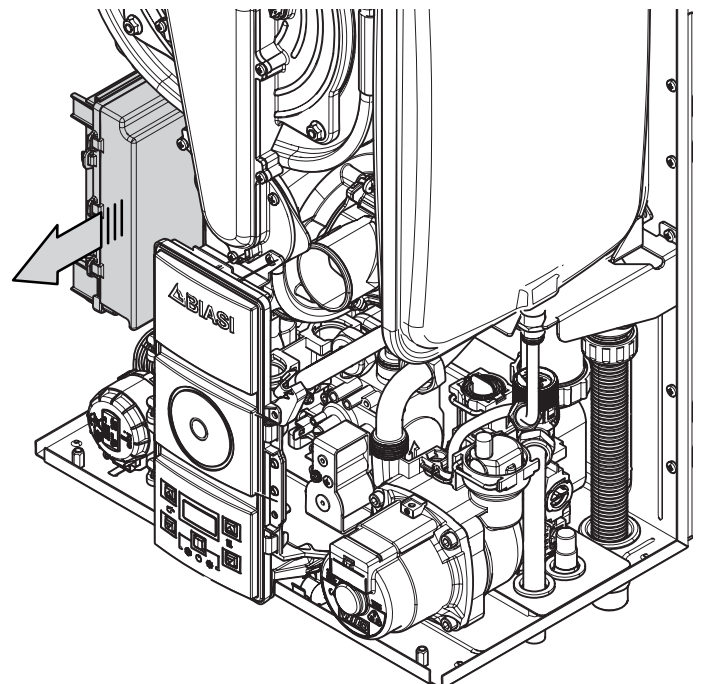


Figure 2.8

GENERAL ACCESS AND EMPTYING HYDRAULIC CIRCUITS

- 6 Remove the terminal block lid F (Figure 2.7).
- 7 Free the hooks placed on the three sides indicated and rotate the lid towards left (Figure 2.9).

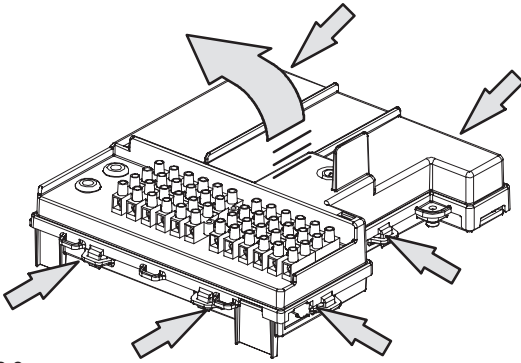


Figure 2.9

2.5 Emptying the primary circuit

- 1 Close the c.h. circuit flow and return cocks G (Figure 2.10).

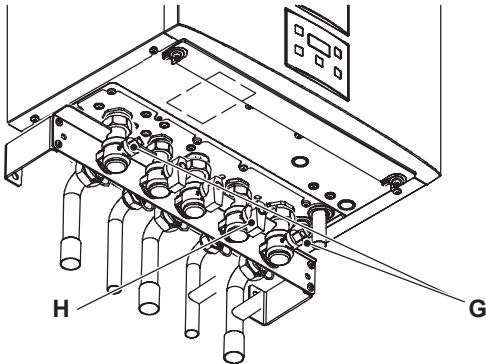


Figure 2.10

- 2 Remove the front and right panels of the boiler.
- 3 Open the drain tap I (Figure 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.

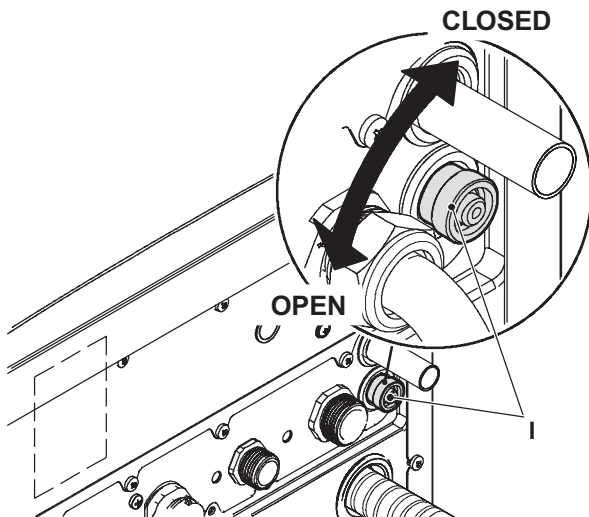


Figure 2.11

2.6 Emptying the d.h.w. circuit

- 1 Close the d.c.w. inlet cock H (Figure 2.10).
- 2 Open one or more hot water taps until the boiler has been completely emptied.

DIAGRAMS

3 DIAGRAMS

3.1 Wiring diagram Advance Plus 25C - Advance Plus 30C - Advance Plus 35C

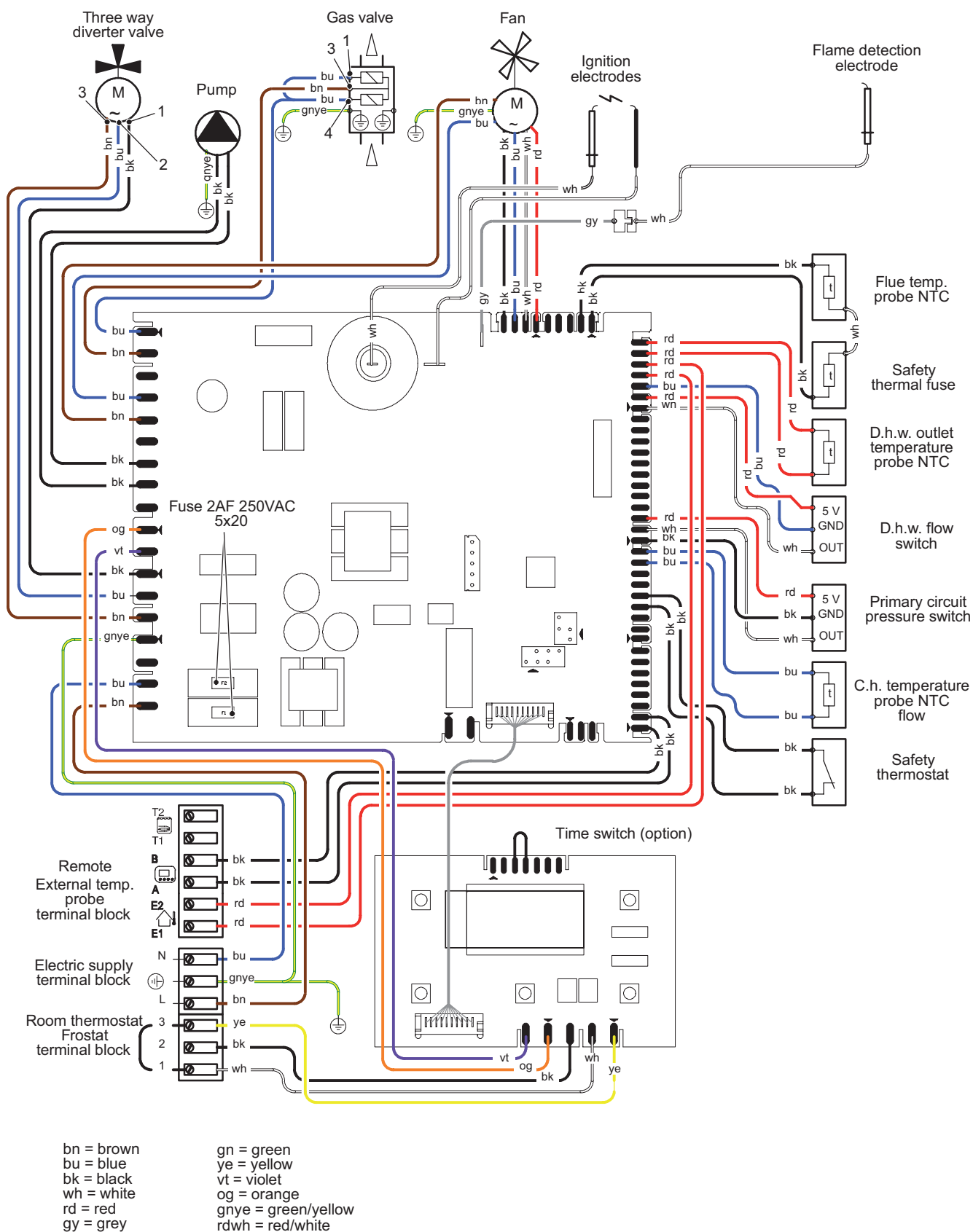


Figure 3.1

DIAGRAMS

3.2 Wiring diagram Advance Plus 16S - Advance Plus 25S - Advance Plus 30S

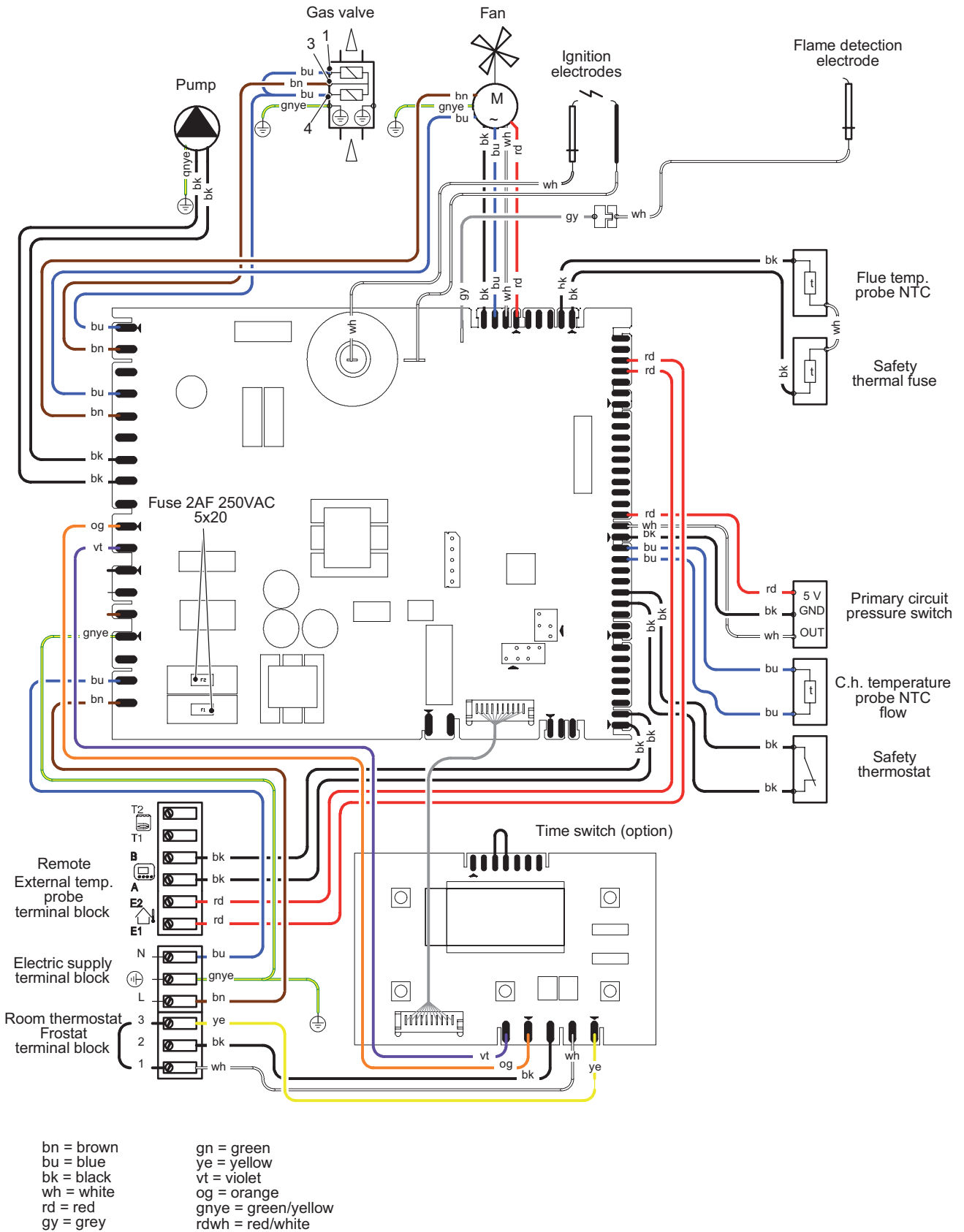


Figure 3.2

DIAGRAMS

3.3 Circuit voltages

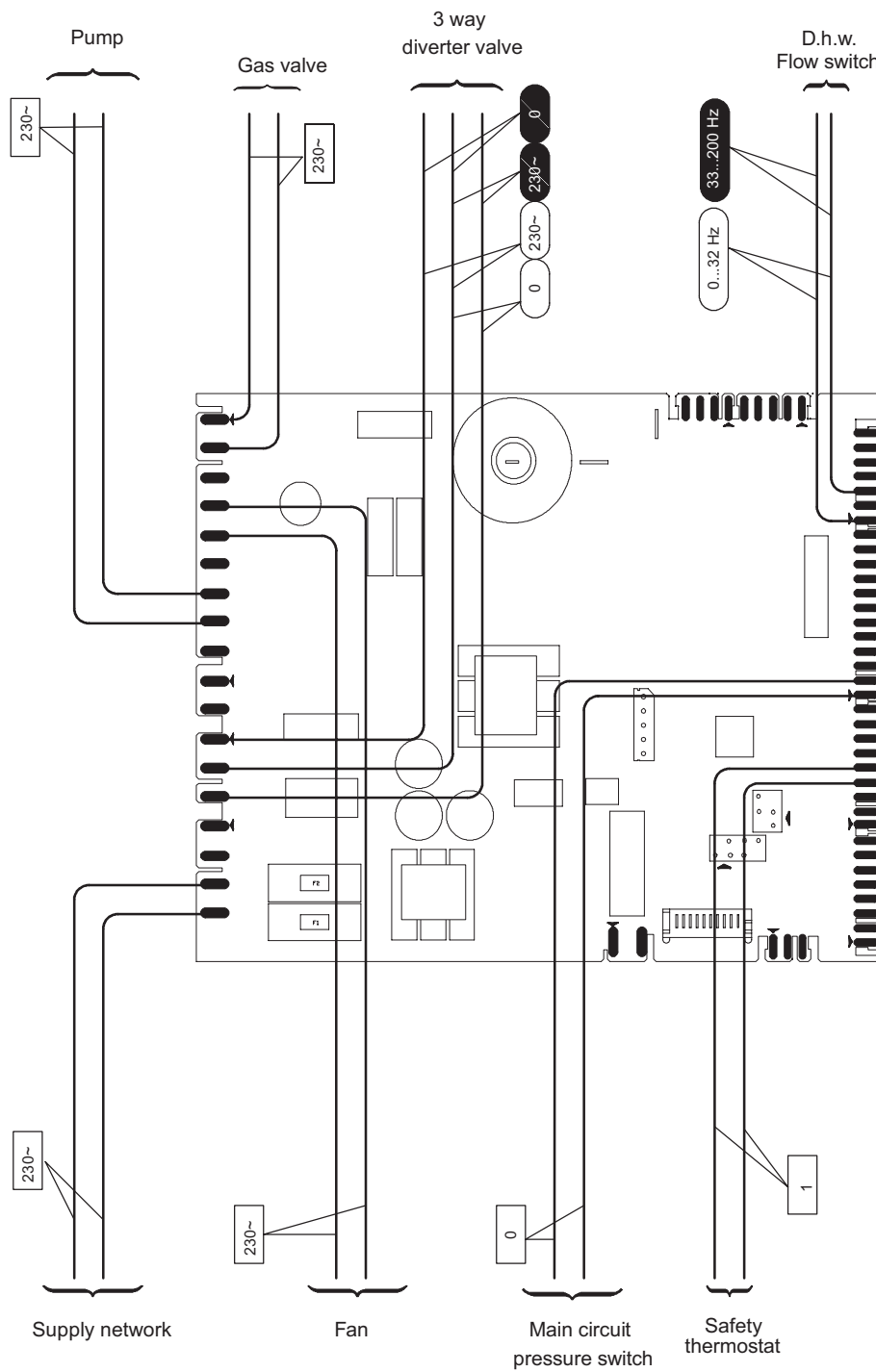
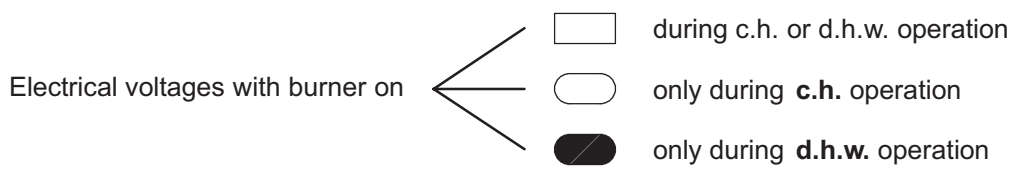


Figure 3.3

FAULT FINDING

4 FAULT FINDING

Section of the manual → (note ref. in brackets)		Components to check																									
		(1)	(2)	(3)	21.1	(4)	5	6	7.2	8.2	14.3	9.5	10	11.4	12.2	14.5	15.2	16	17	18.4	19.2	19.2	20.1	(7)	1	1	
Appliance lock – out (*)	Defect ↓																										
		Er 01	Er 02	Er 03	Er 04	Er 05	Er 06	Er 07	Er 08	Er 09	Er 10	Er 11	Er 14	Li 01													
	Power supply line	●																									
	Gas supply line																										
	Flue pipes																										
	Cond. drain pipe and trap	●																									
	C.h. circuit																										
	D.h.w. circuit																										
	Condensing heat exchanger																										
	D.h.w. heat exchanger																										
	Pump																										
	Diverter valve																										
	D.h.w. flow switch																										
	Fuses (Electronic p.c.b.)																										
	Main electronic p.c.b.																										
	Boiler settings																										
	Control panel electr. p.c.b.																										
	Gas valve																										
	Main circuit pressure switch																										
	D.h.w. filter																										
	Main circuit temp. probe																										
	D.h.w. temp. probe																										
	By-pass valve																										
	Fan / air restrictor																										
	Ignition electrode																										
	Detection electrode																										
	Safety thermostat																										
	Gas restrictor																										
	Flue temp. probe NTC																										
	Expansion vessel																										
	Safety valve																										
	Pressure gauge																										
	External temp. probe																										

Display indicates "Er"

FAULT FINDING

Section of the manual → (note ref. in brackets)		Components to check																																				
		(1)	(2)	(3)	21.1	(4)	(4)	(4)	Cond. drain pipe and trap	C.h. circuit	D.h.w. circuit	Condensing heat exchanger	D.h.w. heat exchanger	Pump	7.2.5	8.2	14.3	9.5	10	11.4	12.2	14.5	15.2	16	17	18.4	19.2	19.2	20.1	(7)	(7)	Expansion vessel	Safety valve	Pressure gauge	External temp. probe			
Appliance lock-out (*)	Defect	●																		●																		
	The boiler does not start either in c/h or d.h.w. mode. The control panel display OFF Fan still.																			●																		
	The boiler does not supply d.h.w. (cold water from the tap). Regular operation in c/h mode even during a drawing off d.h.w.																			●																		
	On c/h mode the temperature of the main circuit reaches 90 °C and the c/h system does not heat. The boiler operates correctly on d.h.w. mode.																			●																		
	Incorrect modulation																			●																		
	Noisy boiler		●																		●																	
	Poor c.h. / d.h.w. temperature (9)		●																																			
	Poor d.h.w. temperature. Regular operation in c/h mode.		●																																			
	Low d.h.w. flow rate																																					
-	Water leaks from the safety valve during operation on c/h																																				●	●
-	Water leaks from the safety valve when the boiler is off.																																				●	●

* Lock out is indicated as "Er" on the display.

Note

Useful information can be obtained also from the optical indication given by the appliance display (see section 4.1).

1 Check for 230V~ between line (L) and neutral (N)
Verify the integrity of supply cable, plug and external fuses.

2 Check the polarity of line and neutral connection

3 Check the gas supply pipe and isolation tap for gas tightness.

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

6 A jammed by-pass valve 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.

FAULT FINDING

4.1 Display diagnostic

The display indications provide help in the diagnosis of fault finding.

The control panel display gives other information for the user.

The following table gives fault code, error and the reason for the fault.

Er 01 + RESET	Lack of burner ignition
Er 02 + RESET	Safety thermostat lockout
Er 03 + RESET	Other faults
Er 04 + ⚡	Faulty primary circuit (no water or absence of flow)
Er 05 + ⚡	Faulty fan control system
Er 06 + ⚡	Faulty c.h. temperature probe NTC
Er 07 + ⚡	Faulty d.h.w. temperature probe NTC
Er 08 + ⚡	Faulty external temperature probe NTC (if fitted)
Er 09 + ⚡	Faulty flue temperature probe NTC
Er 10 + RESET	Lockout ---flue temperature probe NTC (Flue temperature > 120 °C)
Er 11 + RESET	Flame detection error
Er 14 + ⚡	Faulty primary circuit (no water or absence of flow) (temperature increase > 2K/s) (the boiler can't restart for 10 minutes)
Er 14 + RESET	Faulty pump (absence of water flow in the main circuit) or primary temperature above 105 °C
Li 01	Primary circuit temperature limit during d.h.w. operation
An 11	Parasite flame

CONDENSING HEAT EXCHANGER

5 CONDENSING HEAT EXCHANGER

5.1 Function

The Condensing heat exchanger A in Figure 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.

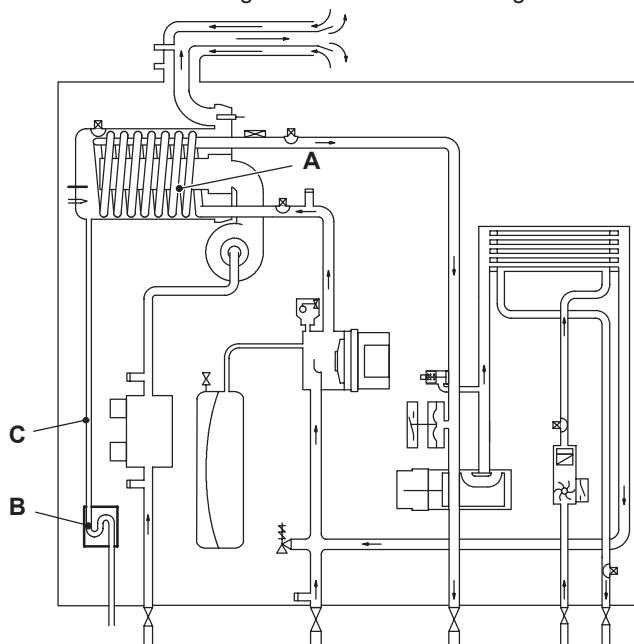


Figure 5.1

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 fan group (rubber pipe, gas pipe) following the instructions from 1 to 6 in section "Removal of the Air box and the Fan" page 40.
- 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 side of the connector (Figure 5.2).
- 5 Unscrew the nuts H (Figure 5.2).
- 6 Remove the fan-burner group I.
- 7 Empty the primary circuit of the boiler.
- 8 Remove the clips J (Figure 5.2).
- 9 Loosen the connection K and slightly move the pipe L upwards, turn it towards left (Figure 5.2) and then move the pipe downwards freeing it from the Condensing heat exchanger.

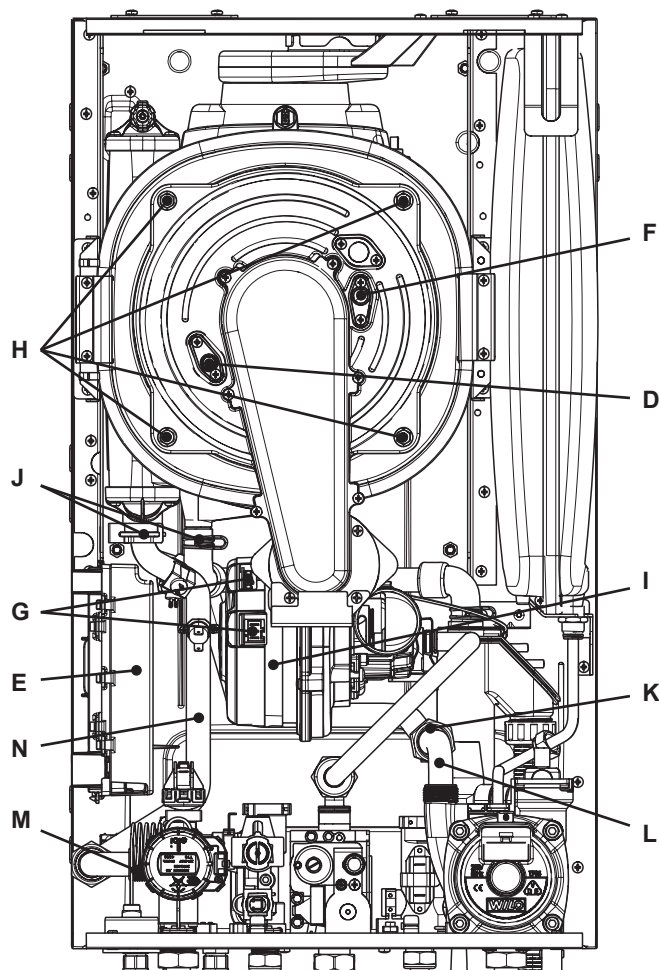


Figure 5.2

- 10 Loosen the connection M and slightly move the pipe N upwards, turn it towards left (Figure 5.2) and then move the pipe downwards freeing it from the Condensing heat exchanger.

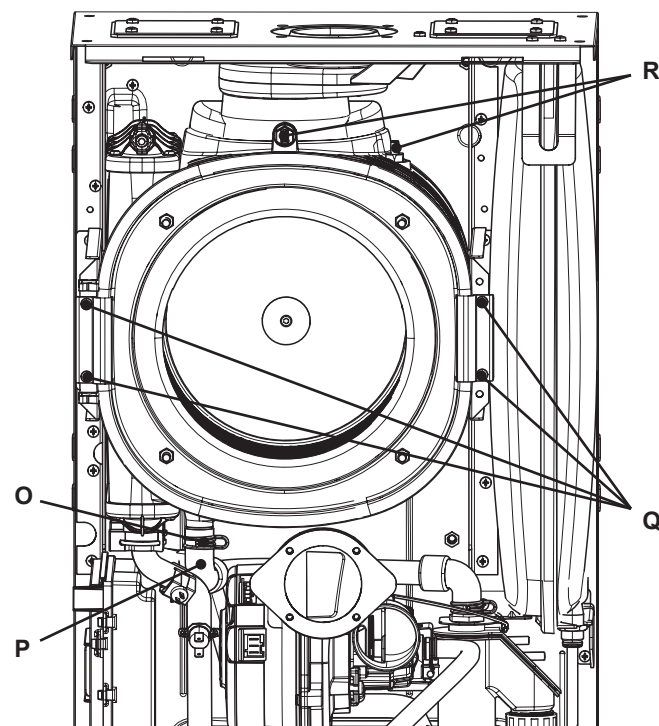


Figure 5.3

CONDENSING HEAT EXCHANGER

- 11 Using pliers, remove the spring O moving it downwards and disconnect the rubber pipe P (Figure 5.3).
- 12 Unscrew the screws Q and remove the clamps (Figure 5.3).
- 13 Disconnect the two connectors R by pressing the plastic hook placed on the side of the connector (Figure 5.3).
- 14 Remove the Condensing heat exchanger by levering it and sliding it forwards.
- 15 Reassemble the Condensing heat exchanger carrying out the removal operations in reverse order.

Ensure to tighten the nuts H - Figure 5.2 firmly.

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 as detailed in chapter 11.3 section 11.

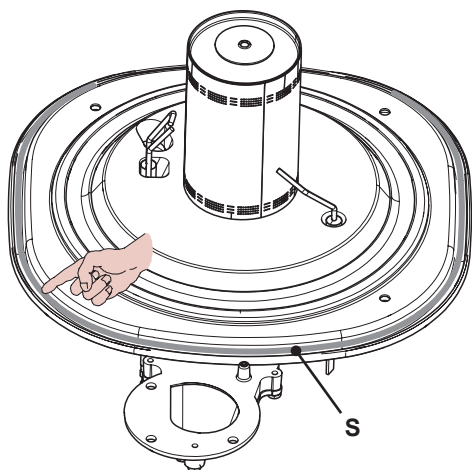


Figure 5.4

Caution:

After any periodical servicing or disturbance the combustion chamber silicon seal S Figure 5.4 must be fully inspected and replaced at the discretion of the service engineer.

After any disturbance to the chamber door seal the appliance must undergo a full analytical combustion performance check.

6 D.H.W. HEAT EXCHANGER

6.1 Function

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

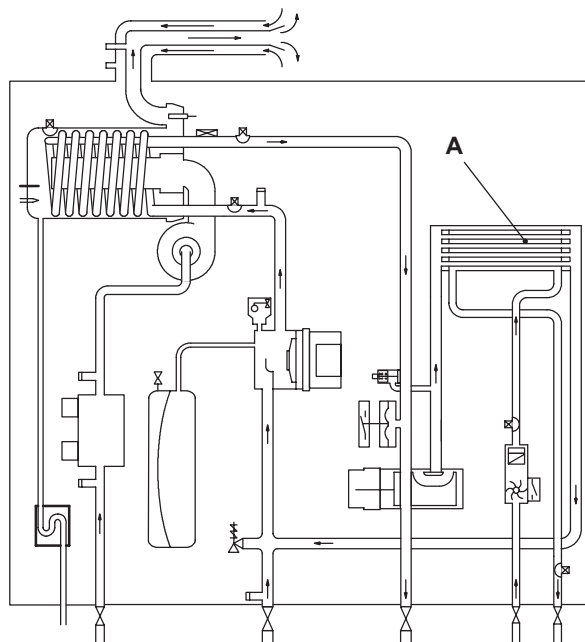


Figure 6.1

The schematic structure is shown in Figure 6.2.

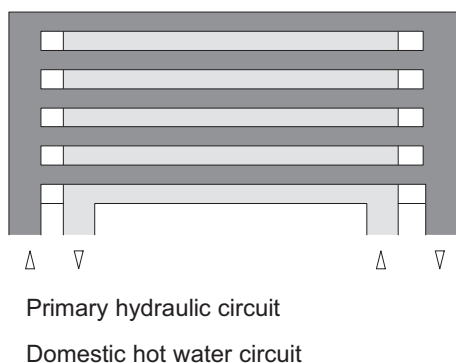


Figure 6.2

6.2 Removal



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

- 1 Remove the panels of the case.
- 2 Empty the primary circuit and the d.h.w circuit of the boiler.
- 3 Remove the control panel following the instructions from 4 in section 2.3.
- 4 Remove main electronic p.c.b. box following the instructions from 5 in section 2.4.
- 5 Remove the pump following the instructions in section 7.2.
- 6 Completely unscrew the Allen key screws B in Figure 6.3 which hold the exchanger to the plastic groups.

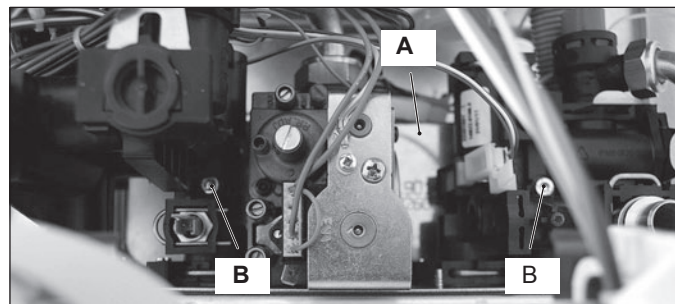


Figure 6.3

- 7 Move the exchanger towards the rear of the boiler and extract it to the left.

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



Warning: to lubricate the O-ring gaskets exclusively use a silicone base grease compatible to be in contact with foods and approved by the local water Authorities.



Warning: When reassembling the exchanger be sure to put the off center location/securing pin indicated in Figure 6.4 towards the left side of the boiler.

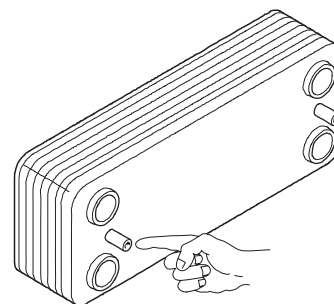


Figure 6.4

7 PUMP

7.1 Function

The pump A in Figure 7.1 and Figure 7.3 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).

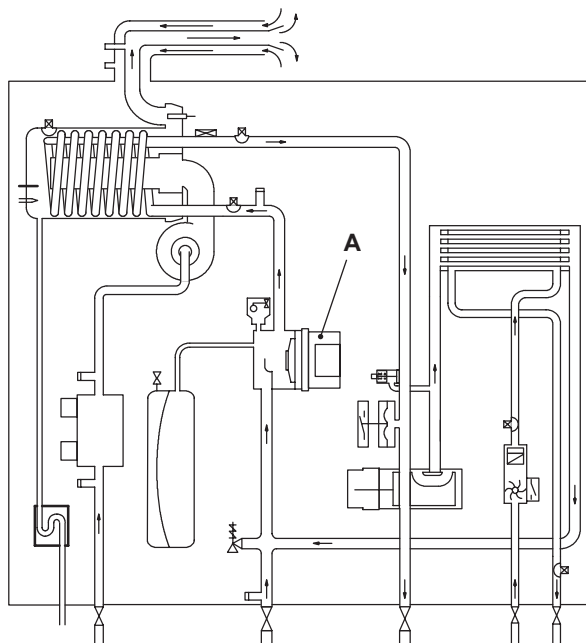


Figure 7.1

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 (Figure 7.3) following the indications given on the connector box.

Measure the electrical resistance between the pump supply connections.

Electrical resistance of the windings (at ambient temperature) must be about 213 Ω (coil 1) and 480 Ω (coil 2) (Figure 7.2).

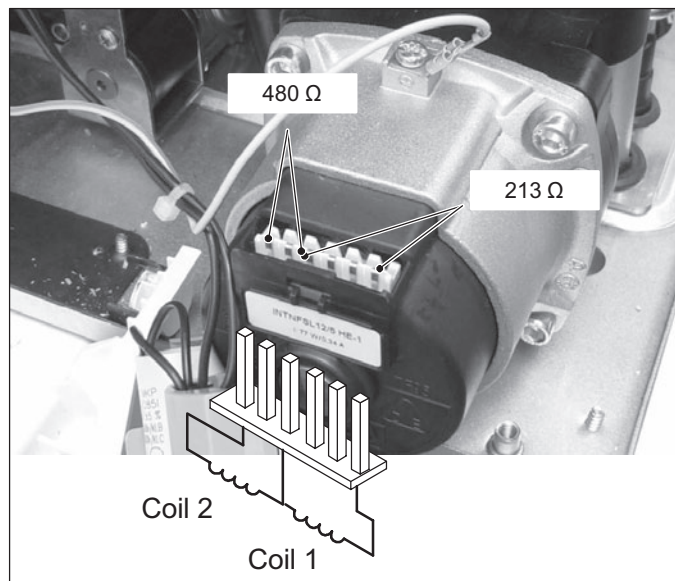


Figure 7.2

✓ 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

7.2 Removal pump

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 Disconnect the connector B (Figure 7.3) following the indications given on the connector box.
- 4 Disconnect the earth connector C.

PUMP

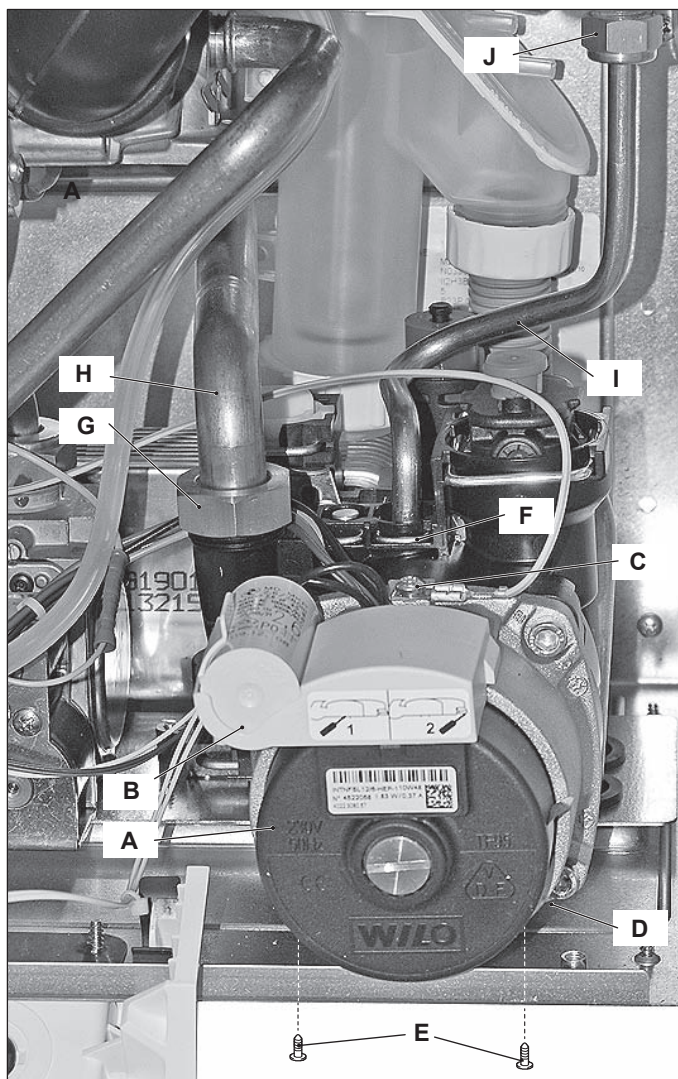


Figure 7.3

- 5 Loosen the connection G, and pull up and turn to the left the pipe H.
- 6 Remove the fork F, loosen the connection J and remove the pipe I.
- 7 Remove the locking plate D.
- 8 Unscrew the two screws E that hold the pump on the frame and remove the pump.

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 plastic group.

7.3 Removal electrical capacitor



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 Disconnect the connector B (Figure 7.3) following the indications given on the connector box.
- 3 Remove the connector K of the cover box by levering with a screwdriver in as shown in (Figure 7.4)

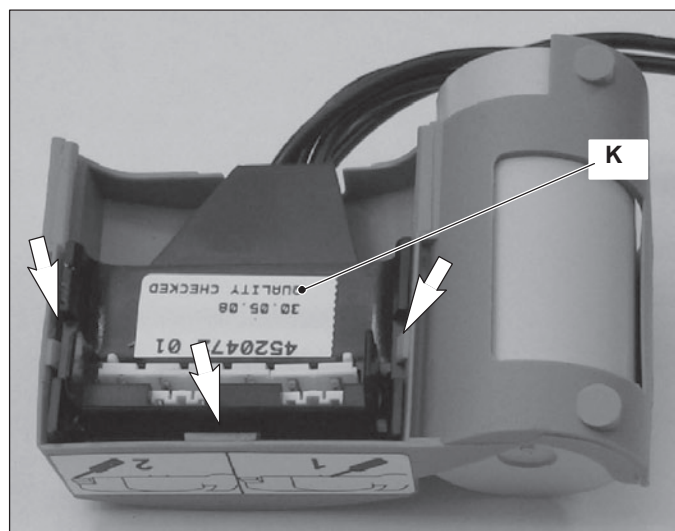


Figure 7.4

- 4 Remove the capacitor connection block L freeing it from the hook M and pulling it as indicated by the arrow (Figure 7.5).

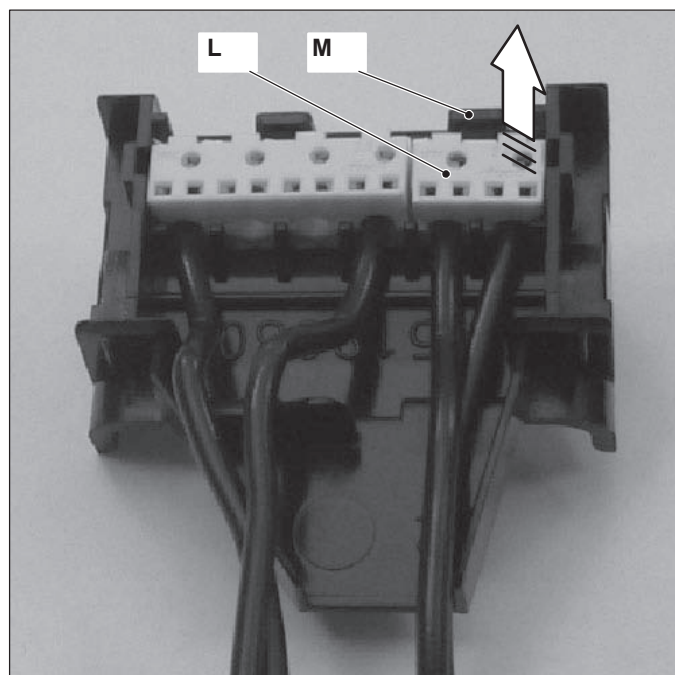


Figure 7.5

THREE WAY DIVERTER VALVE

8 THREE WAY DIVERTER VALVE

8.1 Function

The diverter valve A (Figure 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.

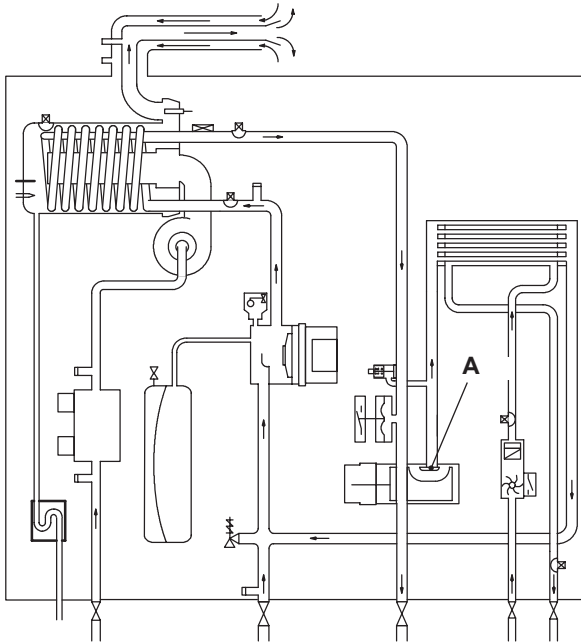


Figure 8.1

8.2 Checks



Warning: check the electrical continuity.

Figure 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**.

Figure 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.

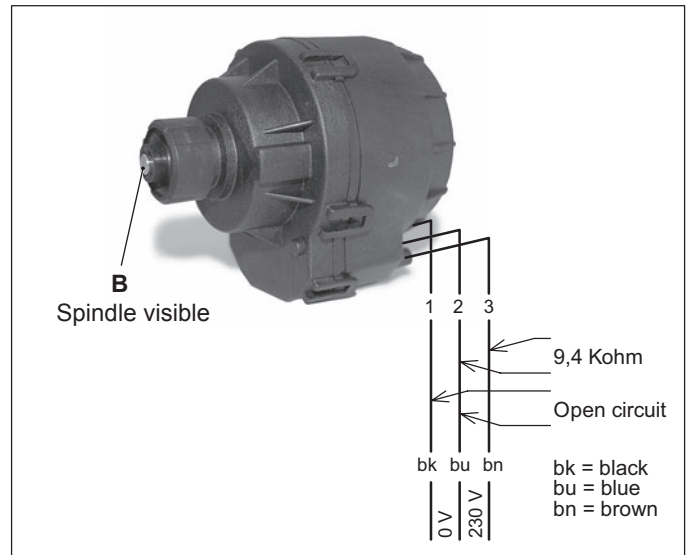


Figure 8.2 D.h.w. mode

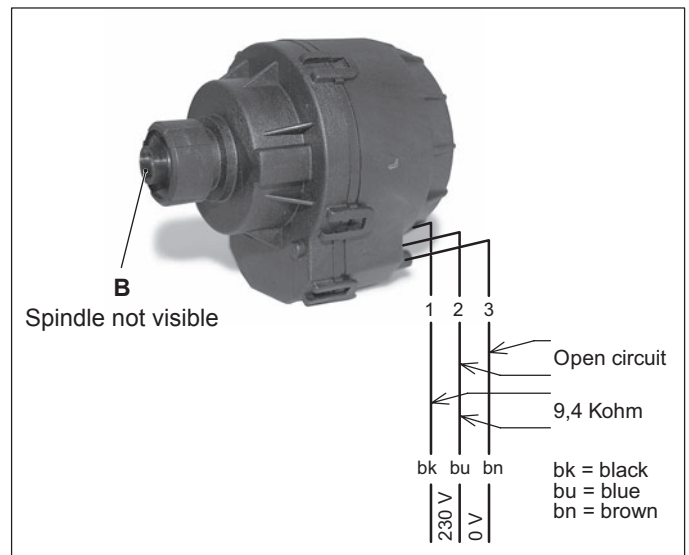


Figure 8.3 C.h. mode

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 (Figure 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 Figure 8.3 or to the wiring diagram in section 3 for the correct wiring connection.

THREE WAY DIVERTER VALVE

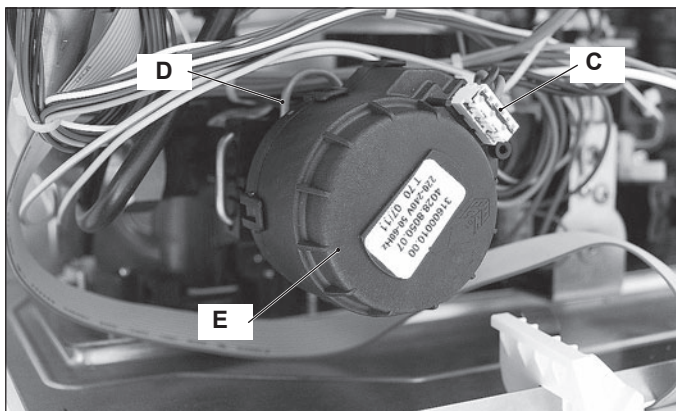


Figure 8.4

8.4 Removal of the three way diverter valve

- 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 "Removal of the electric actuator" page 19).
- 4 Remove the fixing spring F (Figure 8.5)
- 5 Remove the three way diverter valve G by levering with a screwdriver in as shown in Figure 8.5.

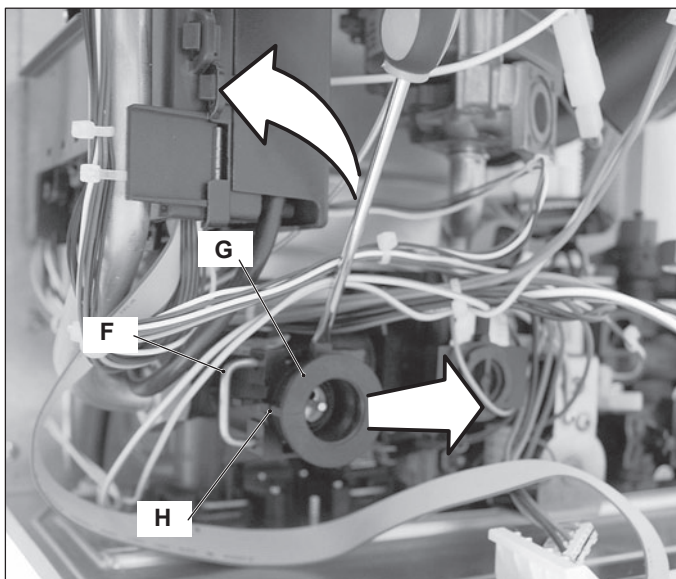



Figure 8.5

Reassemble the three way diverter valve carrying out the removal operations in the reverse order.

 **Warning:** to lubricate the O-ring gaskets exclusively use a silicone base grease compatible to be in contact with foods and approved by the local water Authorities.

Attention. When reassembling the three way diverter valve be sure that the three way diverter is correctly oriented by matching the reference H with the notch of the water group Figure 8.5.

8.5 Removal of the diverter group

- 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 (section "Removal of the electric actuator" page 19).
- 4 Remove the fixing spring I (Figure 8.6) and remove the primary circuit flow switch J.

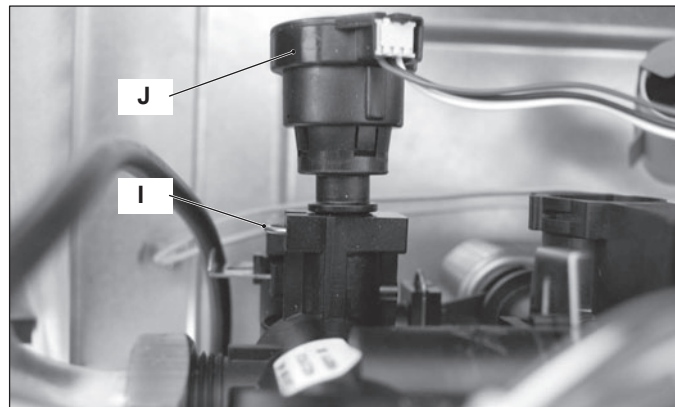


Figure 8.6

- 5 Disconnect d.h.w. temperature probe K.

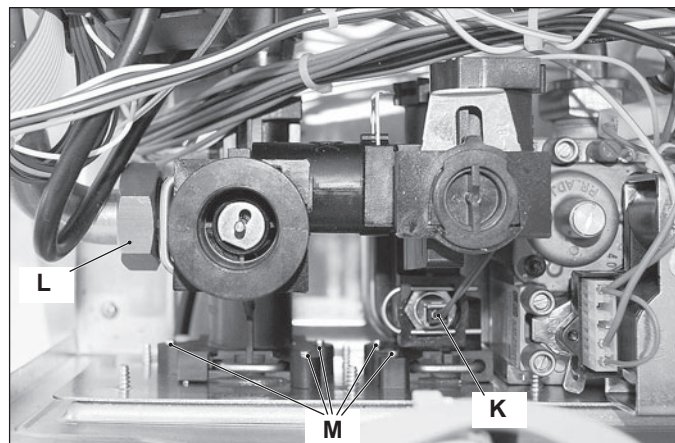



Figure 8.7

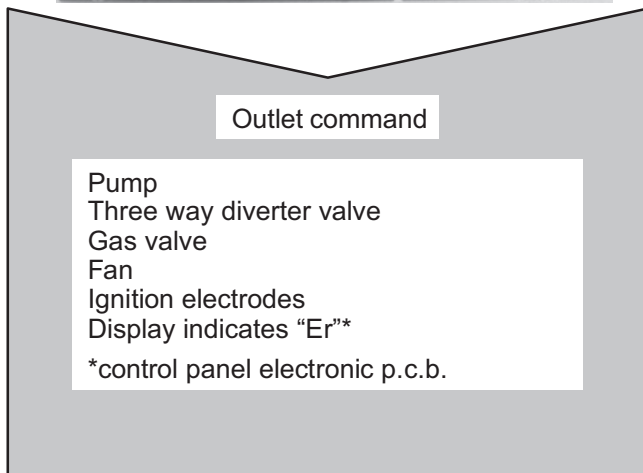
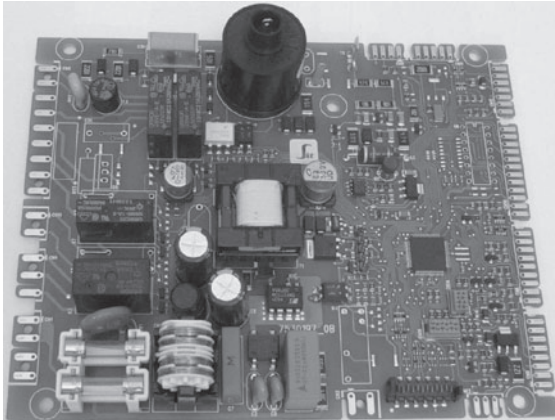
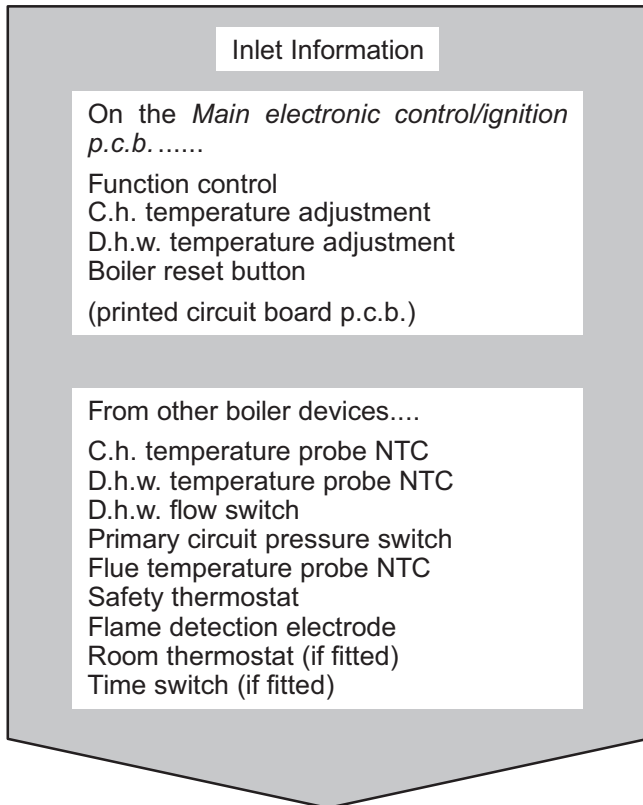
- 6 Unscrew the connector L (Figure 8.7), the c.h. flow connector and the d.h.w. outlet connector.
- 7 Remove the d.h.w. heat exchanger (see "Removal" page 16).
- 8 Unscrew the screw M and remove the diverter group.
- 9 Reassemble the diverter group carrying out the removal operations in the reverse order.

 **Warning:** to lubricate the O-ring gaskets exclusively use a silicone base grease compatible to be in contact with foods and approved by the local water Authorities.

MAIN ELECTRONIC CONTROL/IGNITION P.C.B.

9 MAIN ELECTRONIC CONTROL/IGNITION P.C.B.

9.1 Function



The fundamental function of the *Main 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 *Main electronic control/ignition p.c.b.* receives inlet information coming from the boiler (the sensors) or from the outside (printed circuit board p.c.b., room thermostat, etc.), processes it and consequently acts with outlet commands on other components of the boiler (Figure 9.1).

The *Main 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 *Main 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 *Main 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-out is signalled on the display of the printed circuit board p.c.b. and can be reset only by using the boiler reset button placed on the control panel electronic p.c.b. (see section 10.1).

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 *Main electronic control/ignition p.c.b.*

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

Figure 9.13 and Figure 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 *Main electronic control/ignition p.c.b.* several selection, adjustment and protection devices are located. (Figure 9.2).

Some of these devices are directly accessible by the user (function control, temperature adjustment etc.) others, like the fuses, are accessible by removing the main electronic p.c.b. lid.

Figure 9.1

MAIN ELECTRONIC CONTROL/IGNITION P.C.B.

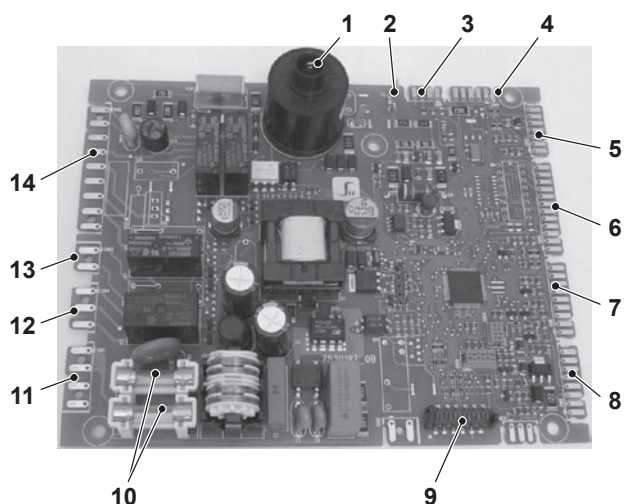


Figure 9.2

- 1 Connector - ignition electrode.
- 2 Connector - flame detection electrode
- 3 Connector - controler fan
- 4 Connector - flue temperature probe NTC
- 5 Connector - d.h.w. temperature probe NTC, d.h.w. flow switch and external temperature probe (optional)
- 6 Connector - Primary circuit pressure switch
- 7 Connector - safety thermostat and c.h. temperature probe NTC
- 8 Connector - remote control (optional)
- 9 Connector - display and function control / c.h. / d.h.w. temperature adjustment control panel p.c.b.
- 10 Fuse F1, F2 2A F
- 11 Connector - electric supply Main electronic control/ignition p.c.b.
- 12 Connector - 3 way diverter valve
- 13 Connector - electric supply control panel p.c.b.
- 14 Connector - gas valve, pump and fan

9.3 Checking the temperature

The *Main 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 p.c.b. key \triangle F ∇ or \triangle F ∇ .

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 (Figure 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 (key \triangle F ∇). 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.

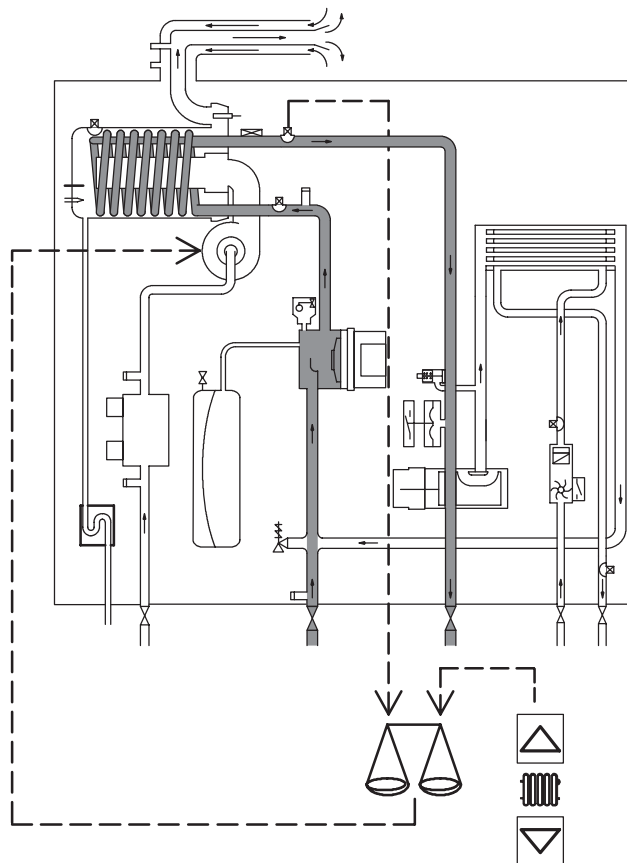


Figure 9.3

When the boiler functions in d.h.w. (Figure 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 (key \triangle F ∇).

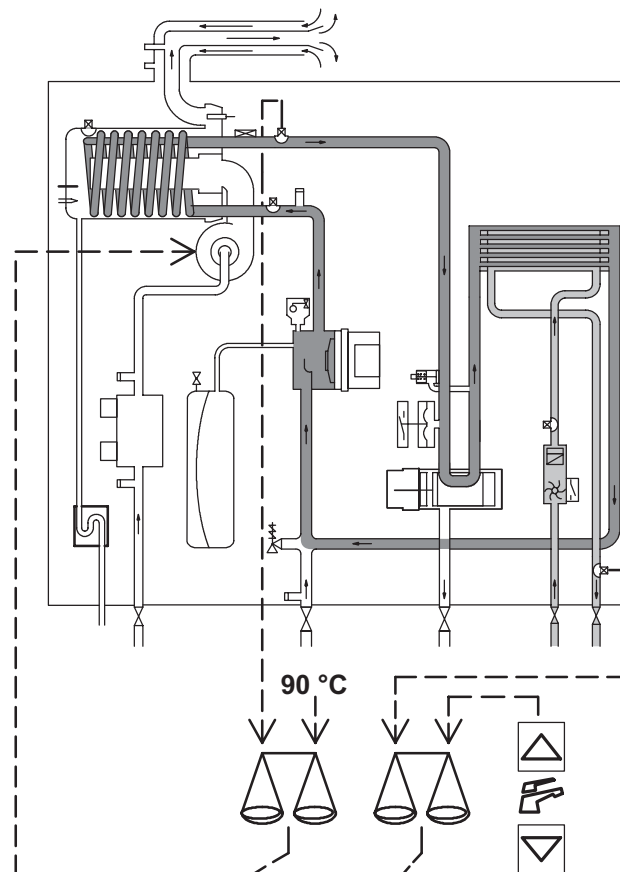




Figure 9.4

MAIN ELECTRONIC CONTROL/IGNITION P.C.B.

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 9.7 and 9.8.

9.4 Setting the boiler control function modes

It is possible to select the various boiler control function modes hereafter named "parameters" by using the keys of the control panel p.c.b.

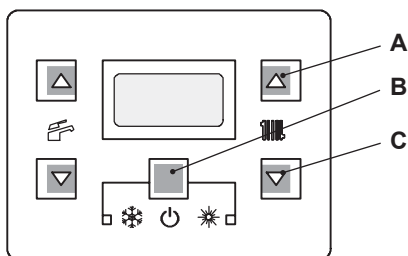


Figure 9.5

- 1 To enter in the parameters setting mode press contemporary the 3 keys (A - B - C Figure 9.5) for 10 second until the display shows Figure 9.6.



Figure 9.6

- 2 To move through the parameters press c.h. set keys (A or C Figure 9.7)

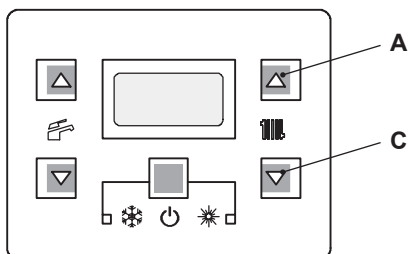


Figure 9.7

- 3 The display shows Figure 9.8

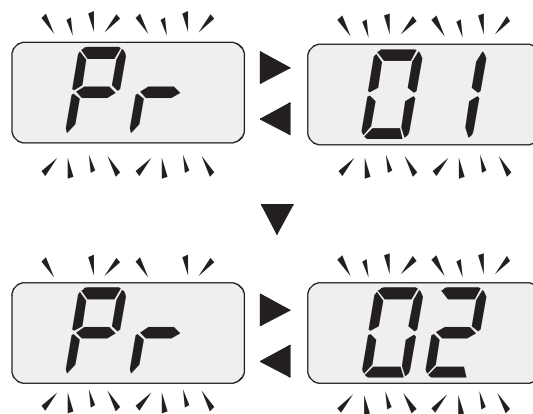


Figure 9.8

- 4 To modify the parameter press contemporary the keys (A - B Figure 9.9).

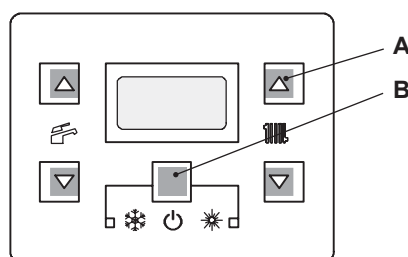


Figure 9.9

- 5 To change the parameters press c.h. set keys (A or C Figure 9.7).

- 6 To memorize the setting press the key (B Figure 9.10).

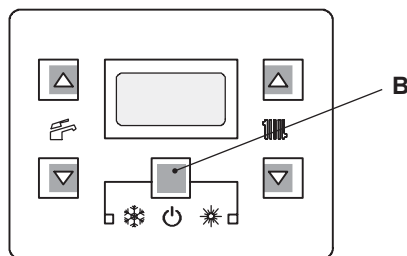


Figure 9.10

- 7 To exit for setting without modifying the set press the keys (B - C Figure 9.11)

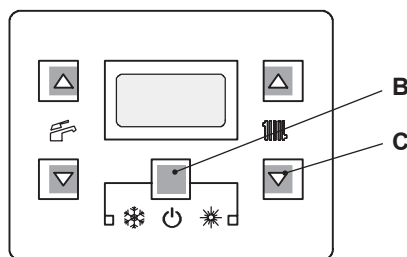















Figure 9.11

To reset the boiler to the normal operation press contemporary the 3 keys (A - B - C Figure 9.5) for 10 second. The following table gives details of each parameter and the possible value that can be set.

MAIN ELECTRONIC CONTROL/IGNITION P.C.B.

Important: at the end of the setting operation it is important to fill/update the table in the installation manual see chapter COMMISSIONING section: Setting record.

PARAMETER	DIGIT	VALUES
Boiler type (to be updated with the complete range)	Pr 01	00 = No power Er 99 35 = Advance Plus 25C 36 = Advance Plus 30C 37 = Advance Plus 35C 40 = Advance Plus 16S 41 = Advance Plus 25S 42 = Advance Plus 30S
Type of water sensors (C.h. / d.h.w.)	Pr 02	00 =  +  01 =  +  factory set 02 =  +  03 =  +  00 =  01 = 
Pump speed	Pr 03	00 =  (2) Max factory set 01 =  (1) Med 02 =  Self regulat
Zone valve setting Room Thermostat / Remote Control	Pr 04	00 = No (factory set) 01 = Z1 with R.T., Z2 with R.C., Max. c.h. flow temperature 02 = Z1 with R.T., Z2 with R.C., Min. c.h. flow temperature
Gas type	Pr 05	00 = G20 Natural 01 = G25 02 = --- --- --- 03 = --- --- --- 04 = G30 Butane 05 = G31 Propane
Not used	Pr 06	
C.h. flow max temperature °C	Pr 07	85÷45 (factory set 85 °C)
Factory parameters reset	Pr 08	00 = No reset 04 = All parameters return to factory set with the ex- clusion of Pr 01 and Pr 05 39 = All parameters return to factory set included Pr 01 and Pr 05

PARAMETER	DIGIT	VALUES
Chimney sweep function	Pr 09	00 = No chimney sweep fun (factory set) 01 = D.h.w. low power sweep---test 02 = C.h. low power sweep---test 03 = C.h. max power sweep---test 04 = D.h.w. max power sweep---test
C.h. reignition frequency	Pr 10	00÷99 (0÷600 sec.) (factory set 30 = 3 minutes)
C.h. pump post-circu- lation	Pr 11	00÷99 (0÷600 sec.) (factory set 10 = 1 minute)
Max. useful output in c.h. mode	Pr 12	00÷99 (0÷100%) factory set: 74 = Advance Plus 25C 78 = Advance Plus 30C 84 = Advance Plus 35C 99 = Advance Plus 16S 99 = Advance Plus 25S 99 = Advance Plus 30S
C.h. pump working type	Pr 13	00 = Depends on room thermostat (factory set) 04 = Always running
Ignition power	Pr 14	00÷99 (0÷100%) factory set: Natural gas (G20) 20 = Advance Plus 25C 31 = Advance Plus 30C 25 = Advance Plus 35C 30 = Advance Plus 16S 37 = Advance Plus 25S 30 = Advance Plus 30S Propane (G31) 26 = Advance Plus 25C 37 = Advance Plus 30C 31 = Advance Plus 35C 36 = Advance Plus 16S 43 = Advance Plus 25S 37 = Advance Plus 30S
K value (external probe diagram)	Pr 15	01 (=0,1)÷ 60 (=6,0) K value factory set: 00 = Off
Min. useful output c.h.	Pr 16	00 ÷ 99 (0%÷100 %) (factory set 00 = 0%)
D.h.w. burner turn off function	Pr 17	00 = Burner off at fixed d.h.w. = 65 °C (factory set) 01 = Brurner off at set point +5 °C
NTC on the c.h. return	Pr 18	00 = Probe not present (factory set) 01 = Probe present
LCD type	Pr 19	02 = (factory set)
Not used	Pr 20	
Not used	Pr 21	
Not used	Pr 22	
Not used	Pr 23	
Not used	Pr 24	
Not used	Pr 25	
Not used	Pr 26	
C.h. minimum setpoint	Pr 27	25÷45 (factory set 25 °C)

MAIN ELECTRONIC CONTROL/IGNITION P.C.B.

PARAMETER	DIGIT	VALUES
Maintenance intervals	Pr 28	00 ÷ 48 (= months) (factory set 12 months)
Presence of domestic cold water temp. probe or set of inlet cold water with solar control	Pr 29	00 = No NTC probe (factory set) 01 = Yes NTC probe 04 ÷ 45 (°C) temp. NTC inlet probe with solar control
Correct pressure c.h. system	Pr 30	05 (0,5 bar) ÷ 15 (1,5 bar) factory set 10 (=1 bar)

Tab 9.1

9.5 Checks

✓ Check that the fuses are complete

If the Main electronic control/ignition p.c.b. does not supply any device (pump, fan, etc.) check that the fuses 10 (Figure 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 Main electronic control/ignition p.c.b. must carry out four complete ignition cycles and then, after about 4 minutes, goes to lock-out state.

Switch off and on the electricity supply to the boiler, by means of the fused spur isolation switch, the device must not unlock and the burner must not turn on.

9.6 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 Main electronic control/ignition p.c.b. all parameters must be correctly checked / adjusted accordingly with the values noted in table in the installation manual see chapter COMMISSIONING section: Setting record (for information on parameters see also section 9.4).

- 1 Remove all the body panels (see section 2.2).
- 2 Gain access to the parts located inside the Main electronic p.c.b. box as explained in the section 2.4 of this manual.
- 3 Remove all the wiring connected to the *Main electronic control/ignition p.c.b.*
- 4 Delicately flex the hooks D in the directions indicated (Figure 9.12) in order to release the circuit from the box.
- 5 Remove the *Main electronic control/ignition p.c.b.*

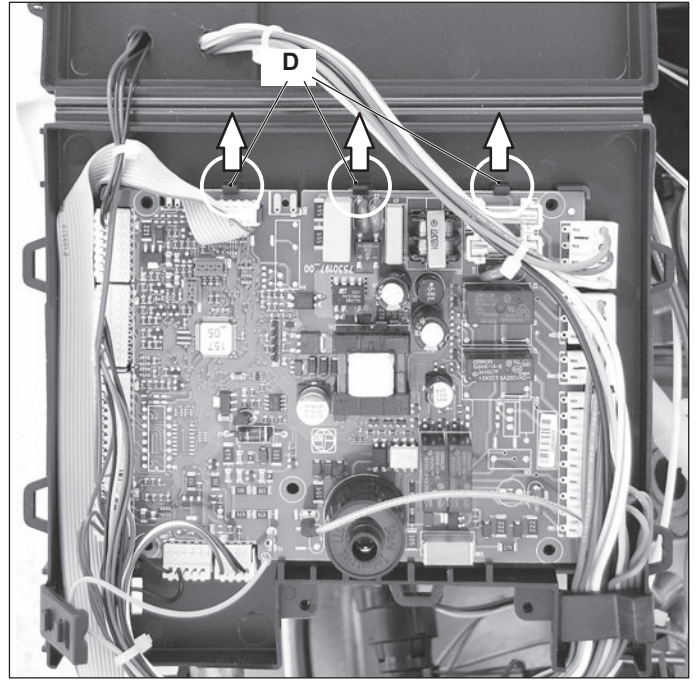


Figure 9.12

- 6 Re-assemble the *Main electronic control/ignition p.c.b.* following the removal procedures in the reverse order.

Important

When re-assembling the *Main 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.

Attention

After installing the *Main electronic control/ignition p.c.b.* properly set the parameters.



Warning: After cleaning or replacement as detailed above, it is deemed necessary to undertake a combustion analysis as detailed in section 11.3.

9.7 Thermal control in the ☼ mode

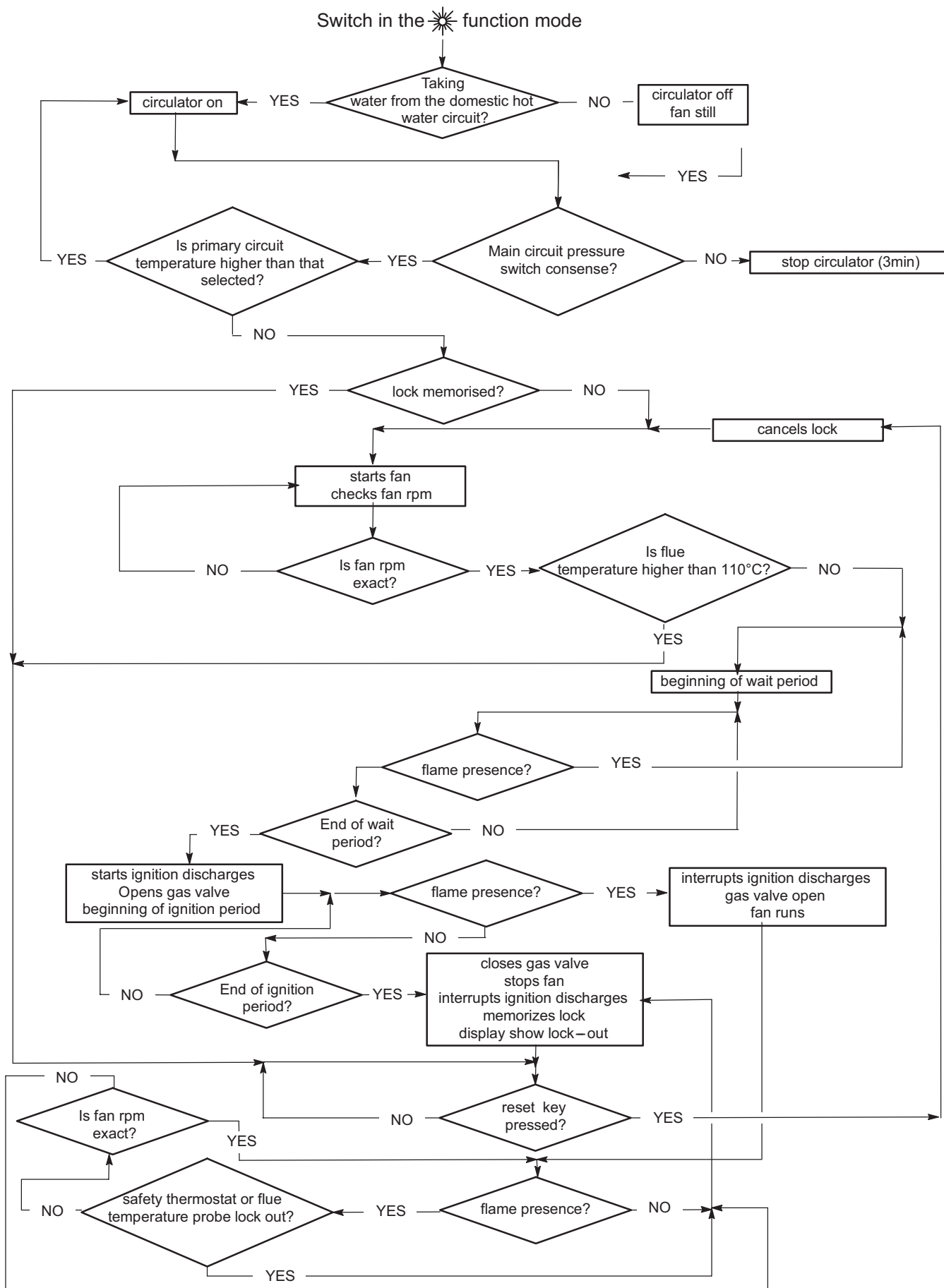


Figure 9.13

MAIN ELECTRONIC CONTROL/IGNITION P.C.B.

9.8 Thermal control in the ❄️ mode

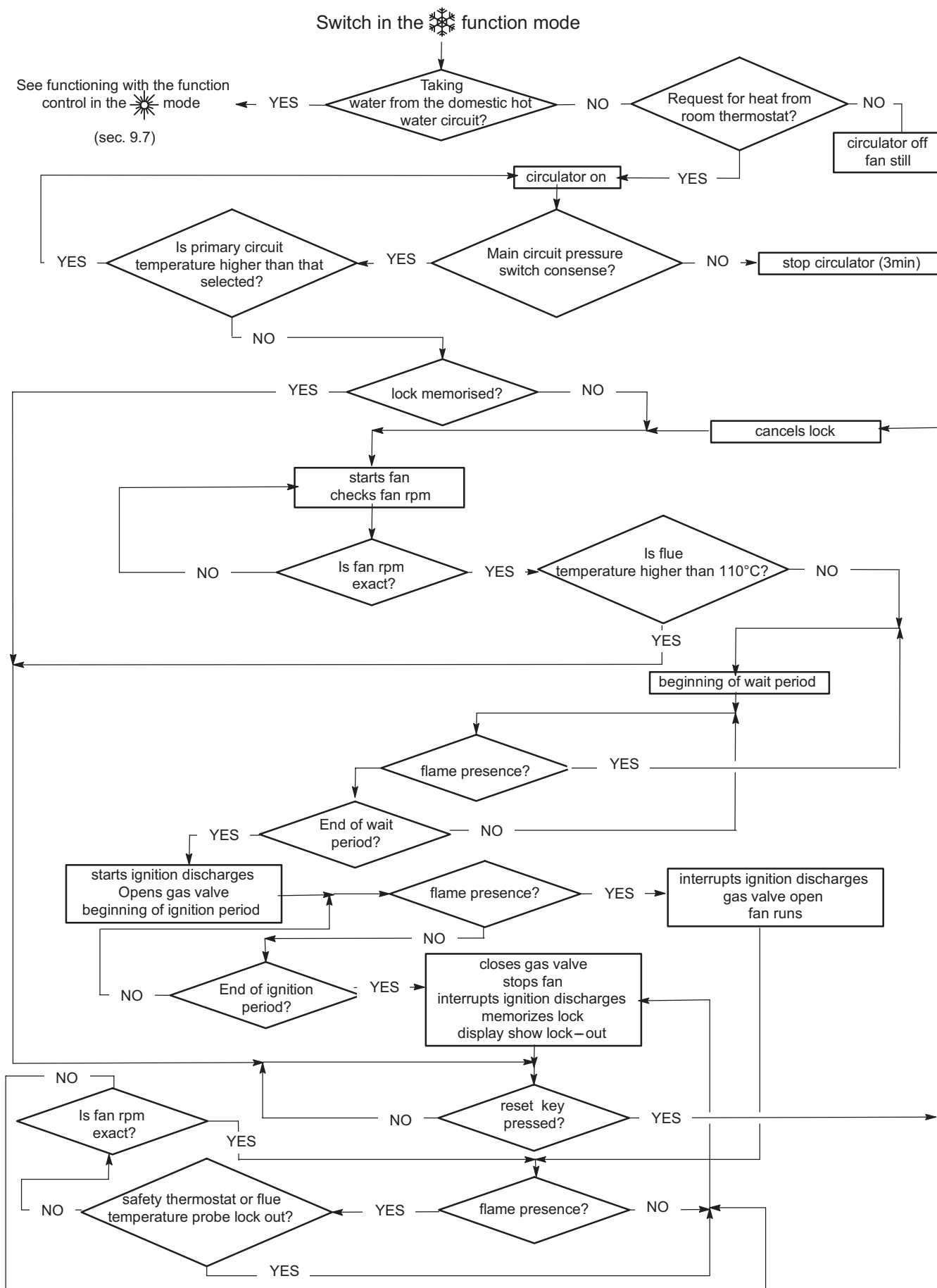


Figure 9.14

CONTROL PANEL ELECTRONIC P.C.B.

10 CONTROL PANEL ELECTRONIC P.C.B.

10.1 Function

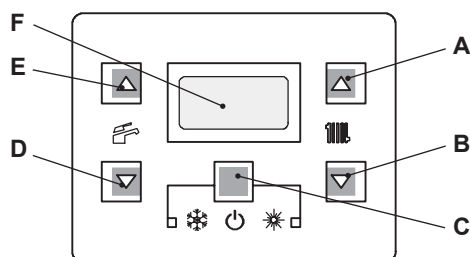


Figure 10.1



- A C.h. temperature increase key
- B C.h. temperature reduce key
- C Reset/Stand-by/Winter/Summer key
- D D.h.w. temperature reduce key
- E D.h.w. temperature increase key
- F Display

The Control panel electronic p.c.b. can give to the service 3 levels of informations:







- Normally information
- Info modality
- Function modes setting modality







10.2 Normally information

KEY

RESET	The symbol indicates that the boiler can be directly reactivated by the user, by pressing the reset button.
	The symbol indicates that the fault requires intervention on behalf of specialised technical assistance.
	All symbols represented with lines that surround them, indicate that the symbol is flashing.

SIGNAL DISPLAYED BY THE LCD

LCD	FUNCTION
Er 01 + RESET	Lack of burner ignition on safety lockout
Er 02 + RESET	Safety thermostat intervention lockout
Er 03 + RESET	General lockout
Er 10 + RESET	Flue probe interven lockout
Er 11 + RESET	Flame detection error
Er 14 + RESET	Faulty pump or primary temperature above 105° C
Er 04 + 	Faulty primary circuit (no water or absence of flow)
Er 05 + 	Faulty fan control system
Er 06 + 	Faulty c.h. temp. probe NTC
Er 07 + 	Faulty d.h.w. temp. probe NTC
Er 08 + 	Faulty external temp. probe NTC
Er 09 + 	Faulty flue temp. probe NTC

LCD	FUNCTION
Er 14 + 	Absence of flow from temperature gradient (>2k/s)
Li 01	Primary circuit temp. limit during D.h.w. operation
00	Boiler Stand-By (anti-freeze protection activated)
30 °C	Boiler waiting for heat request
31 °C	Boiler in summer mode (d.h.w.) The primary circuit temperature is displayed.
32 °C	Boiler in winter mode (c.h. + d.h.w.) The primary circuit temperature is displayed.
41 °C	Boiler on demand for d.h.w. power. The d.h.w. temperature is displayed.
34 °C	Boiler on demand for c.h. power.
	Burner ignition (spark)
0	Flame present (Burner on)
bP °C	Boiler in anti--freeze phase (bP flashing + temperature flashing)
15	
AF °C	Boiler in antifrost phase (AF flashing + temperature flashing)
16	
78 	Set c.h. (all other symbols are disabled)
46 	Set D.h.w. (all other symbols are disabled)
Po	Pump activated for the post--circulation phase (Po flashing + temperature flashing)
35	
44	
56	
 65 	Boiler in chimney sweep functioning mode. The chimney sweep is activated by setting "parameter 09=01" and is visualised by the temperature digits and the radiator+reset symbols flashing alternatively.

CONTROL PANEL ELECTRONIC P.C.B.

LCD	FUNCTION
	Flame detection error (An flashing + error flashing number)

10.3 Info modality

The INFO mode allows the display of some information on the boiler functioning status. In case of malfunctioning of the boiler, it may be useful to communicate such information to the Authorised Service Centre Engineer so that the causes can be understood.

In order to access the INFO mode, press keys A and C (Figure 10.1) at the same time until the letter di appears on the display that alternates with a code (Figure 10.1).

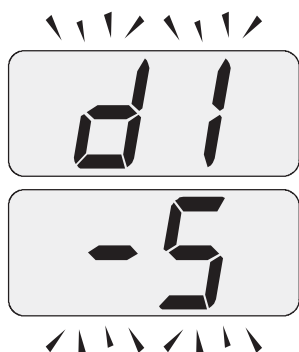


Figure 10.2

To scroll the values press B (reduce) and A (increase) keys (Figure 10.1). In order to exit the INFO mode, hold keys A and C (Figure 10.1) pressed at the same time. The following table gives details of each parameter and the possible value that can be shown.

Description	Parameter	Value
External temperature °C (if fitted)	d1	-5
K value (external probe diagram) (the value is x 10)	d2	12
Offset (Translation of K diagram $\pm 15^{\circ}\text{C}$)	d3	-10
C.h. temperature °C (calculated by external sensor)	d4	66
C.h. flow temperature °C	d5	78
C.h. return temperature °C (if fitted)	d6	44
D.h.w. temperature °C	d7	40
Flue temperature °C	d8	67
Fan speed (the value has to be x 100 = 4400 rpm)	d9	44
SW version BC (burner control)	dc	01
SW version MB (main board)	dd	03

Tab. 10.1

10.4 Function modes setting modality

It is possible to select the various boiler control function modes hereafter named "parameters" by using the keys of the control panel p.c.b.

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

To get in function modes setting modality see section 9.4

10.5 Removal of the control panel electronic p.c.b



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

- 1 Remove all the body panels (see section 2.2).
- 2 Gain access to the parts located inside the *Control panel electronic p.c.b.* as explained in the section 2.3 of this manual.
- 3 Remove all the wiring G connected to the *Control panel electronic p.c.b.* (Figure 10.3).

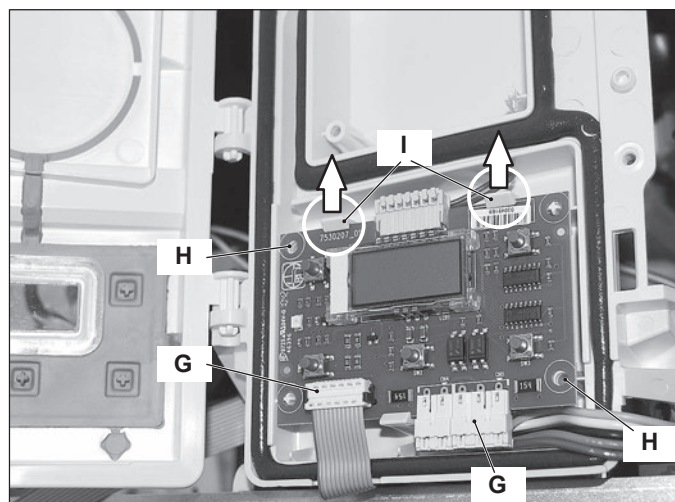


Figure 10.3

- 4 Unscrew the screws H.
- 5 Delicately flex the hooks I in the directions indicated (Figure 10.3) in order to release the circuit from the box.
- 6 Remove the *Control panel electronic p.c.b.*
- 7 Reassemble the *Control panel electronic p.c.b.* carrying out the removal operations in the reverse order.

11 GAS VALVE

11.1 Function

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

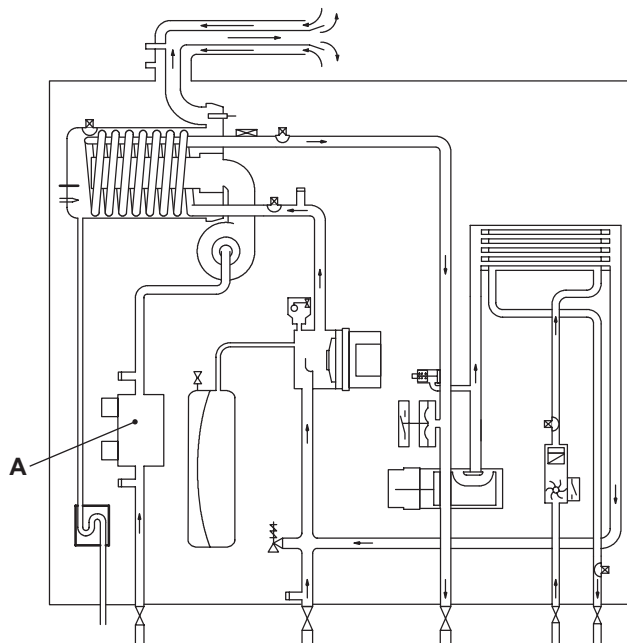


Figure 11.1

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

(Figure 11.2)

- B Maximum gas pressure adjustment
- C Minimum gas pressure adjustment
- D On-off operators
- E On-off operators electric connector
- F Gas valve inlet pressure test point

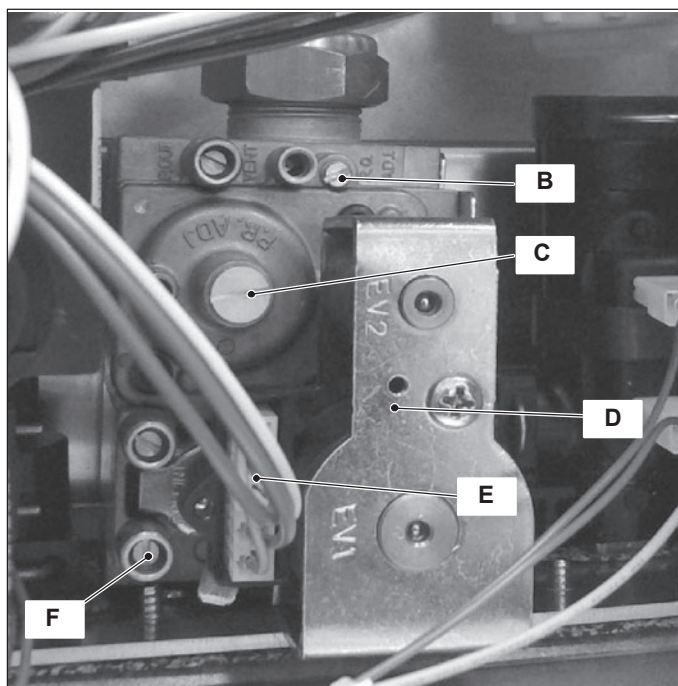


Figure 11.2

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 F (Figure 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.
- 6 Set the boiler in c.h. / d.h.w. function as illustrated in Figure 11.3.

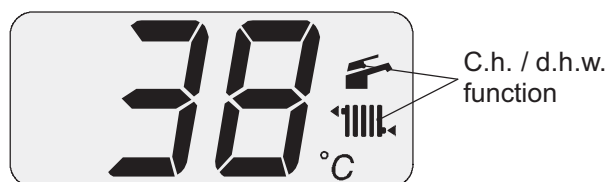


Figure 11.3

- 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 F (Figure 11.2).

Gas valve adjustment



The person carrying out a combustion measurement should have been assessed as competent in the use of a flue gas analyser and the interpretation of the results. The flue gas analyser used should be one meeting the requirements of BS7927 or BS-EN50379-3 and be calibrated in accordance with the analyser manufacturers' requirements, and have a current calibration certificate.

- 11 Fit the probe of the flue analyser in the flue exhaust sampling point located on the exhaust pipes of the boiler (Figure 11.4).

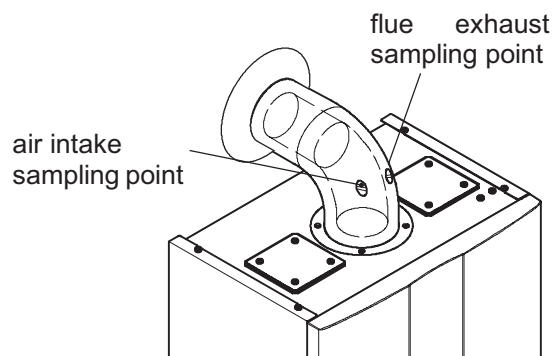


Figure 11.4

- 12 Turn on the boiler, switching on the fused spur isolation

GAS VALVE

switch.

- 13 Open the gas inlet valve.
- 14 Turn on the boiler and operate for 2 minutes to pre-heat the flue, before commencing any adjustments

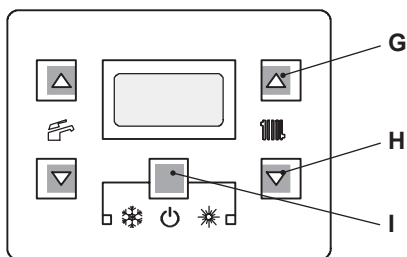


Figure 11.5

- 15 To enter in the parameters setting mode press contemporary the 3 keys (G - H - I Figure 11.5) for 10 second until the display shows Figure 11.6.



Figure 11.6

- 16 Press keys G and H (Figure 11.5) at the same time until the display shows the letters LP that alternate with the heating water temperature value (e.g. 45), indicating the activation of the "chimney sweep function" at minimum output (Figure 11.7).



Figure 11.7

- 17 Open at least one hot water tap fully.
- 18 Allow the analyser to give a stable reading.
- 19 Read the CO₂ % value. It should be between:

Model	Type gas	CO ₂ % value (range)
Advance Plus 25C Advance Plus 30C Advance Plus 35C	Natural (G20)	8,7 - 9,3
Advance Plus 16S Advance Plus 30S	Propane (G31)	9,4 - 10,4
Advance Plus 25S	Natural (G20)	8,7 - 9,5
	Propane (G31)	9,2 - 10,2

To adjust the CO₂ % value remove the brass plug by unscrewing it and rotate the Allen key screw ø 4mm (C - Figure 11.2) (by rotating it clockwise the CO₂ % increases).

Checking the maximum gas valve setting

- 20 Press key G to vary the output in chimney sweep mode: when the display shows the letters cP that alternate with the heating water temperature value (e.g. 60), the "chimney sweep function" is at maximum output in heating mode (Figure 11.8);

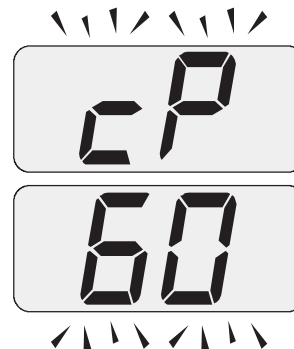


Figure 11.8

- 21 Press further key G to vary again the output in chimney sweep mode: when the display shows the letters dP that alternate with the heating water temperature value (e.g. 60), the "chimney sweep function" is at maximum output in domestic hot water mode" (Figure 11.9);

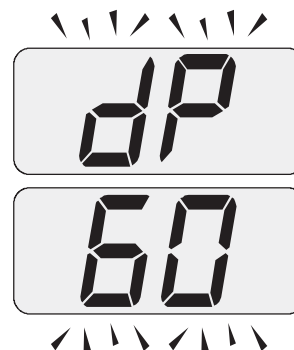


Figure 11.9

- 22 Allow the analyser to give a stable reading.

- 23 Read the CO₂ % value. It should be between:

Model	Type gas	CO ₂ % value (range)
Advance Plus 25C Advance Plus 35C	Natural (G20) Propane (G31)	9,3 - 9,9 10,0 - 10,9
Advance Plus 30C Advance Plus 16S Advance Plus 30S	Propane (G31) Natural (G20)	9,2 - 9,8 9,9 - 10,8
Advance Plus 25S	Propane (G31) Natural (G20)	9,0 - 9,8 9,9 - 10,8

To adjust the CO₂ % value rotate screw (B - Figure 11.2) (by rotating it clockwise the CO₂ % decreases).

- 24 Press keys G - H - I (Figure 11.5) at the same time again to exit the "chimney sweep mode" and return to the previously set boiler status (Figure 11.10)

GAS VALVE

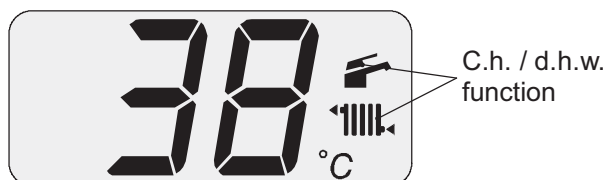


Figure 11.10

- 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 (C - Figure 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 E (Figure 11.2).
 - 3 Measure the electrical resistance between the connector pins of the on-off operators as illustrated in Figure 11.11.

Upper on-off operator
approx. 6400 Ω*

Lower on-off operator
approx. 920 Ω*

*at ambient temperature.

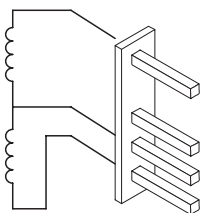


Figure 11.11

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 Disconnect the connector J (Figure 11.12).

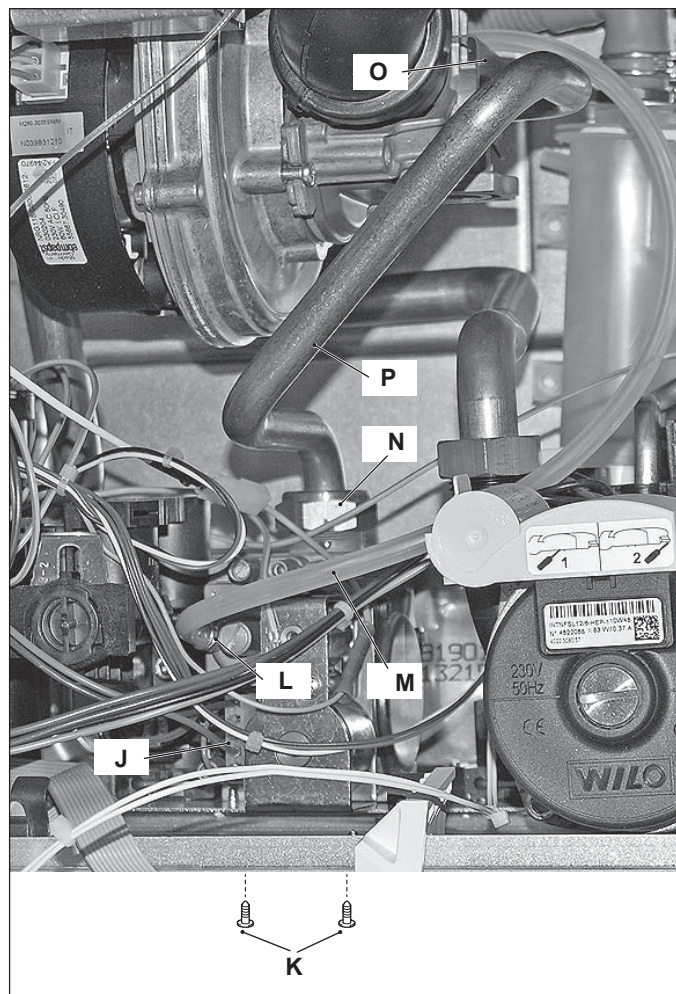


Figure 11.12

- 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 L and the rubber pipe M (Figure 11.12).
- 5 Unscrew the connector N (Figure 11.12), remove the fixing fork O and remove the pipe P.
- 6 Unscrew the screws K and remove the valve (Figure 11.12).
- 7 Reassemble the valve carrying out the removal operations in reverse order.



Warning: Be careful not to damage the OR gasket of the gas pipe when inserting the pipe in the air box (air/gas mixer).

Before fitting a new valve, it is advisable to preset it as follows.

- 8 Remove the brass plug and turn the plastic screw inside it 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 section 11.3.

PRIMARY CIRCUIT FLOW SWITCH

12 PRIMARY CIRCUIT FLOW SWITCH

12.1 Function

The Primary circuit flow switch (A in Figure 12.1) function is to check the presence of water in the primary hydraulic circuit and that the pressure is above the minimum.

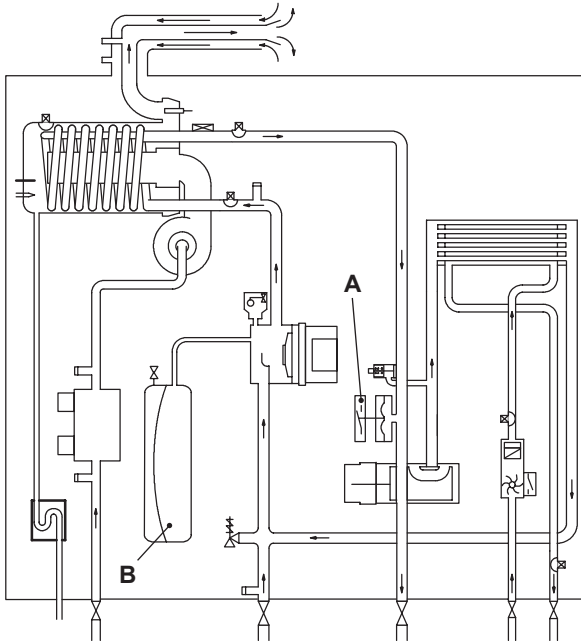


Figure 12.1

This device is connected to the main electronic control p.c.b. and if, it does not activate the control board will indicate that a fault condition (see section 4.1 of this manual) has occurred.

12.2 Checks



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

✓ Electrical check

It is possible to verify the general operation of the switch by measuring the electric resistance between the contacts "bk" and "wh" of the switch.

- 1 Measure the electrical resistance between the tabs "bk" and "wh" (Figure 12.2).

The contact must close (resistance zero) with c.h. pressure of 0,35 bar or higher.

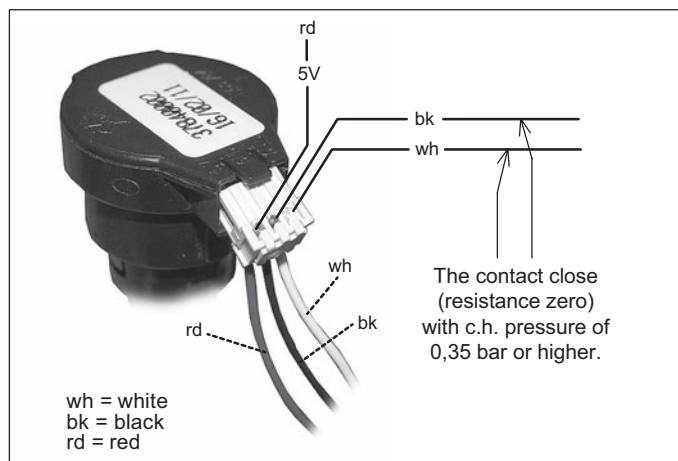


Figure 12.2

12.3 Removal



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

- 1 Remove the front and right hand side panels of the case, turn off the flow and return isolation valves and empty the primary circuit.
- 2 Remove the fixing spring D (Figure 12.3) and remove the primary circuit pressure switch C.
- 3 Disconnect the connectors E (Figure 12.3).

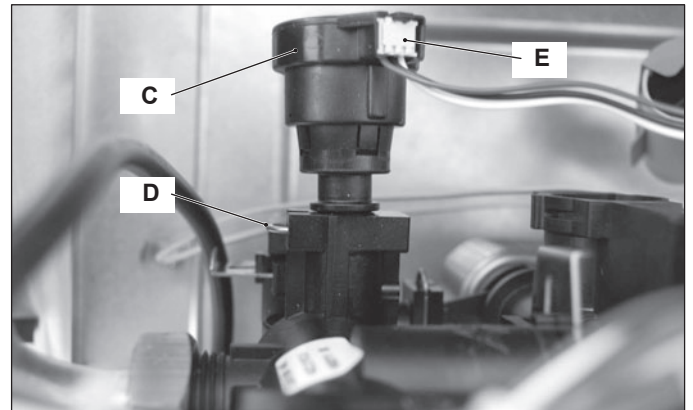


Figure 12.3

- 4 Reassemble the primary circuit pressure switch in reverse order of removal.



Warning: to lubricate the O-ring gaskets exclusively use a silicone base grease compatible to be in contact with foods and approved by the local water Authorities.

EXPANSION VESSEL AND PRESSURE GAUGE

13 EXPANSION VESSEL AND PRESSURE GAUGE

13.1 Function

The Expansion vessel (A in Figure 13.1) function is to allow for the volume expansion of the c.h. circuit water due to the temperature rise.

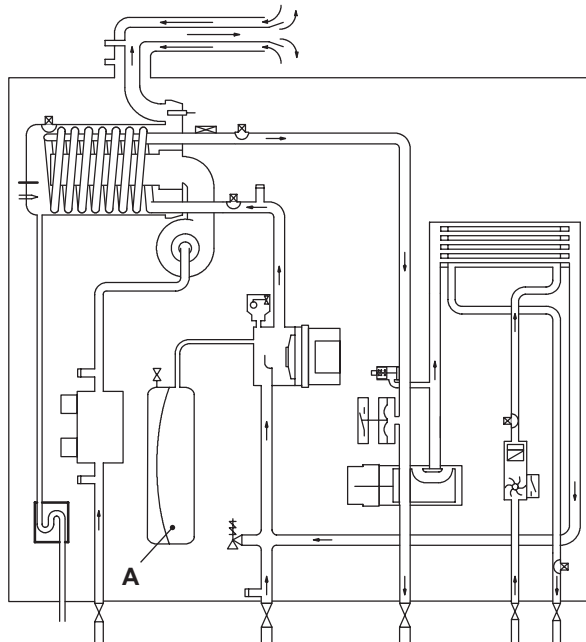


Figure 13.1

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 B in Figure 13.2 from the valve on the top of the expansion vessel and connect a suitable air pressure gauge.

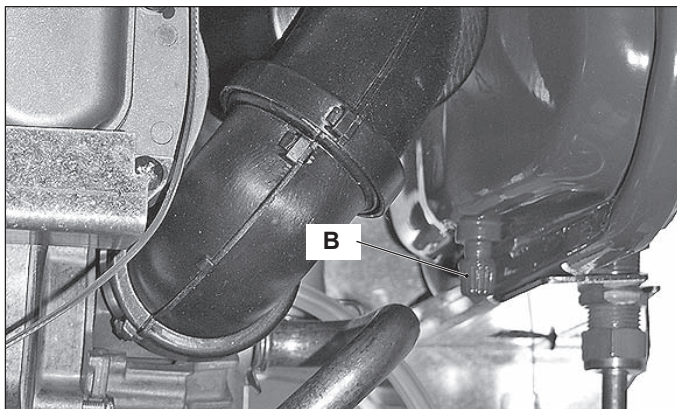


Figure 13.2

- 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



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, turn off the flow and return isolation valves and empty the primary circuit.
- 2 Completely unscrew the connection C, the locknut D (Figure 13.3).
- 3 Unscrew the screws E and remove the bracket F (Figure 13.3).
- 4 Remove the expansion vessel from the front of the boiler.
- 5 Re-assemble the parts in reverse order of removal.

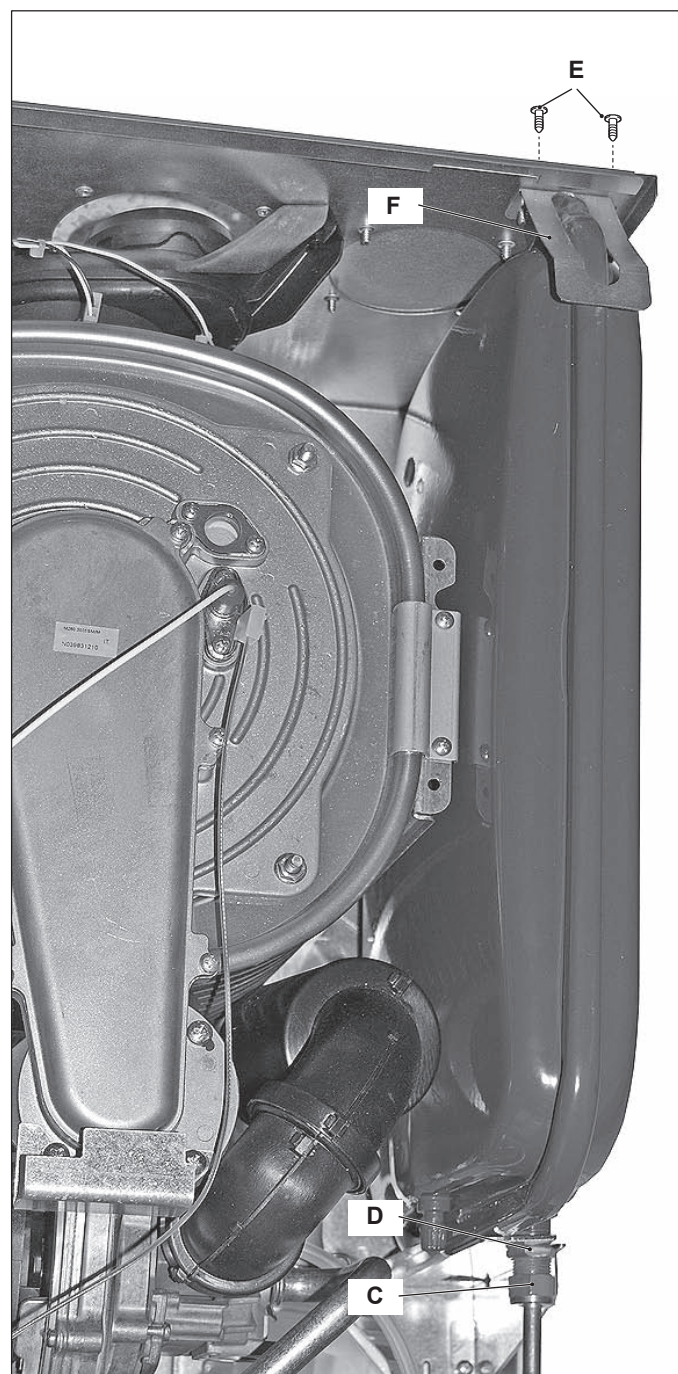


Figure 13.3

D.H.W. FLOW SWITCH, FILTER AND FLOW LIMITER

14 D.H.W. FLOW SWITCH, FILTER AND FLOW LIMITER

14.1 Function

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

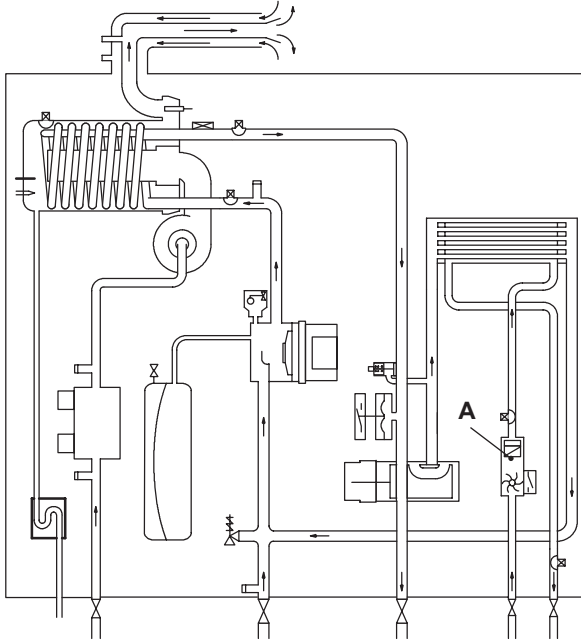


Figure 14.1

When the flow rate through the d.h.w. circuit reaches about 2,5 litres/min', the sensor closes the electric contact that switches the boiler d.h.w operation ON.

14.2 Description and location of parts - (Figure 14.2)

- 1 Flow switch plug
- 2 O-ring
- 3 Flow limiter (Advance Plus 30C. Advance Plus 35C. optional accessory)
- 4 Body with flow meter turbine
- 5 Filter

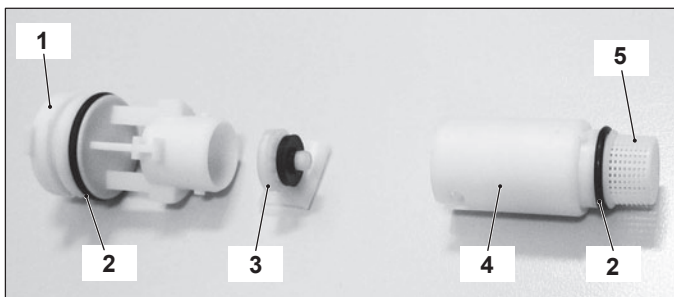


Figure 14.2

14.3 Removal of the sensor



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

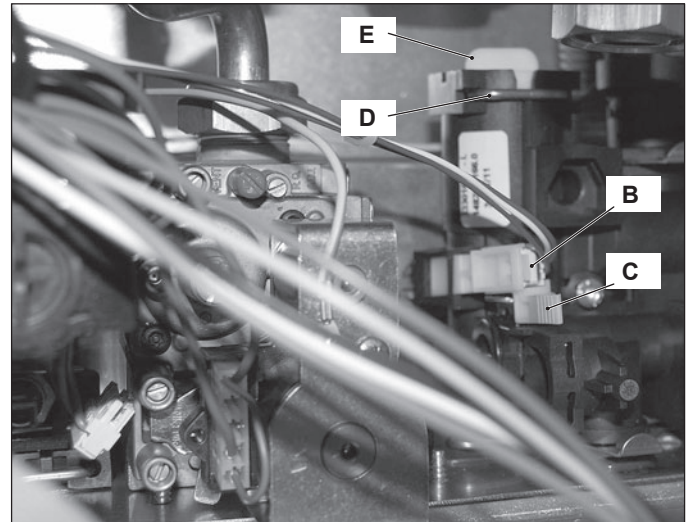


Figure 14.3

- 1 Remove the front panel of the case.
- 2 Disconnect the connectors B and remove the sensor holder C (Figure 14.3).
- 3 Remove the sensor.

14.4 Checks



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

✓ Sensor operation

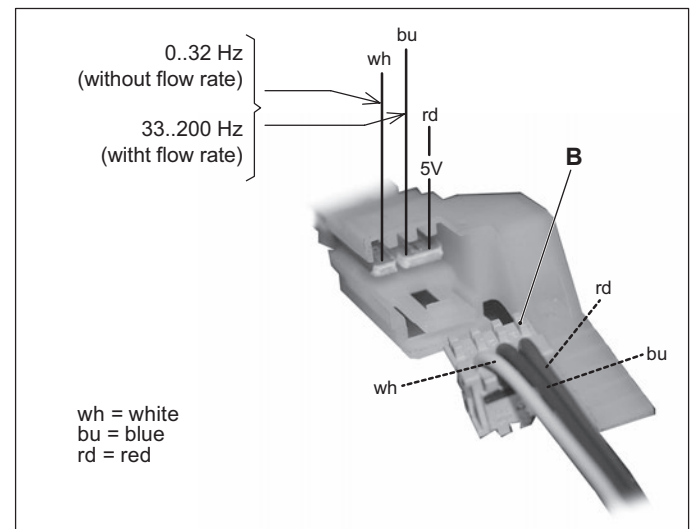


Figure 14.4

- 1 Remove the front panel of the case.
- 2 Don't disconnect the connectors B
- 3 Measure the electrical frequency at the leads of the sensor. Without flow rate the electrical frequency must be 0÷32Hz. With flow rate the electrical frequency must be 33÷200Hz.

D.H.W. FLOW SWITCH, FILTER AND FLOW LIMITER

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 fork D and pull up the flow switch plug E (Figure 14.3) with the help of a screwdriver.
- 3 To remove the body 4 with the filter from the flow switch group rotate the flow switch plug 1 (Figure 14.5).
- 4 Reassemble the parts following the removing sequence in reverse order.

14.6 Flow limiter

The Advance Plus 25C model is factory fitted with a 10 litres/min. flow limiter (white).

To install the flow limiter:

- 1 Remove the flow switch group as explained in the section 14.5.
- 2 Rotate the flow switch plug 1 to separate it from the body 4 (Figure 14.5).

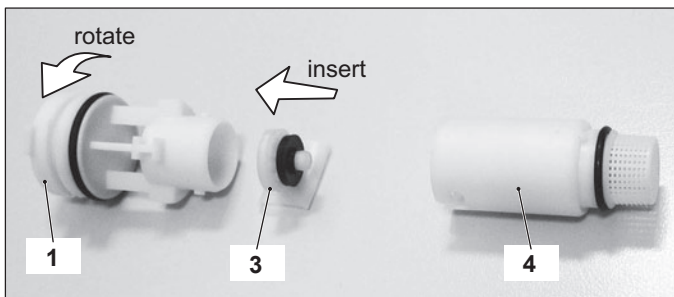


Figure 14.5

- 3 Insert the flow limiter 3 as shown in Figure 14.5.
- 4 Reassemble the group following the above sequence in reverse order.

TEMPERATURE PROBE

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 Figure 15.1.

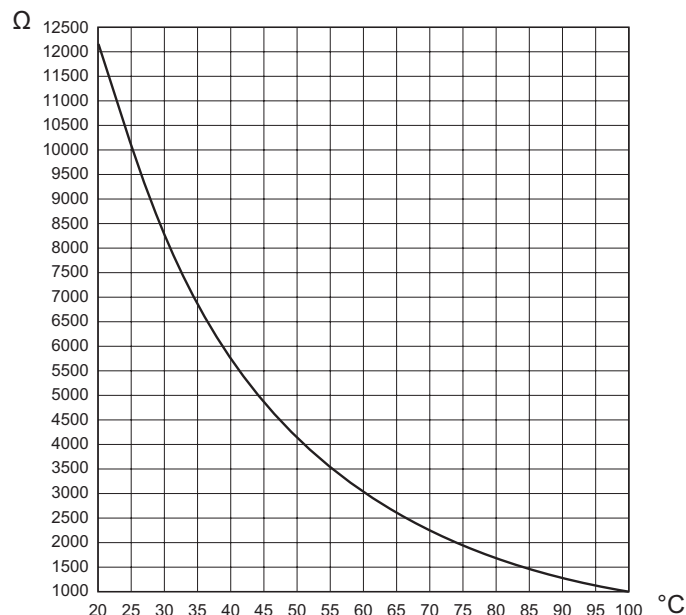


Figure 15.1

On the boiler there are two temperature probes. One on the output of the primary condensing heat exchanger (c.h. temperature probe) A in Figure 15.2 and Figure 15.3; one on the output of the d.h.w. heat exchanger (d.h.w. temperature probe) B in Figure 15.2 and Figure 15.4.

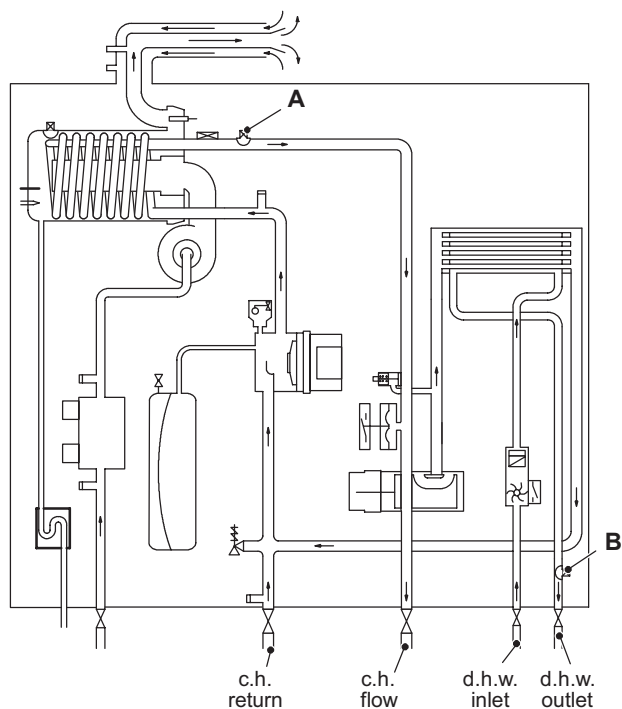


Figure 15.2

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 pipe D (only c.h. temperature probe) where the Temperature probe is located and check the electrical resistance according to the graph in Figure 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 C and unscrew the c.h. Temperature probes A (Figure 15.3).
- 4 Reassemble the c.h. Temperature probes carrying out the removal operations in reverse order.

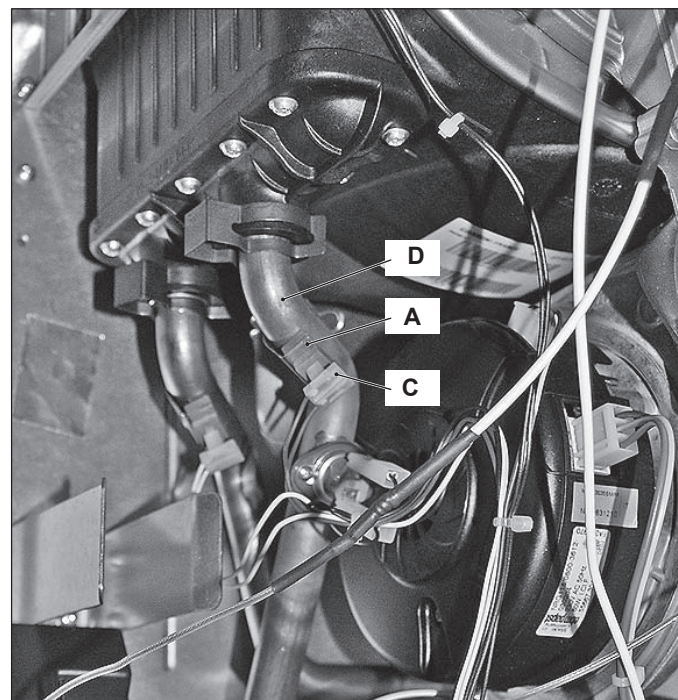


Figure 15.3

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




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

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

- 1 Remove the front panel of the case and lower the control panel.
- 2 Empty the d.h.w. circuit of the boiler.
- 3 Remove the electric connector E (Figure 15.4)
- 4 Remove the fork F and pull the d.h.w. Temperature probe B.

TEMPERATURE PROBE

- 5 Reassemble the d.h.w. Temperature probe carrying out the removal operations in reverse order.

 **Warning:** to lubricate the O-ring gaskets exclusively use a silicone base grease compatible to be in contact with foods and approved by the local water Authorities.

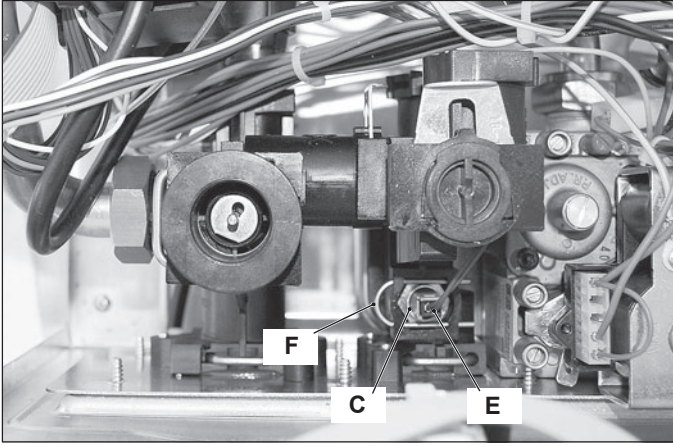


Figure 15.4

BY-PASS VALVE

16 BY-PASS VALVE

16.1 Function

The By-pass valve A in Figure 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.

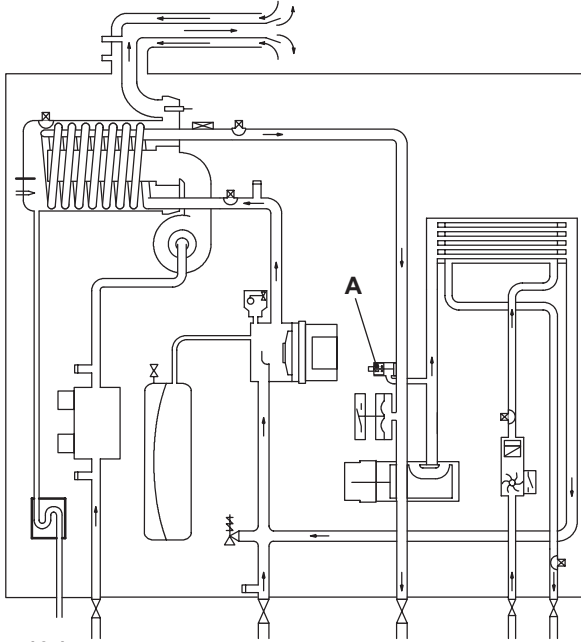


Figure 16.1



Warning: to lubricate the O-ring gaskets exclusively use a silicone base grease compatible to be in contact with foods and approved by the local water Authorities.

Attention. When reassembling the By-pass valve be sure that it is correctly oriented by matching the reference C with the notch D of the water group Figure 16.3

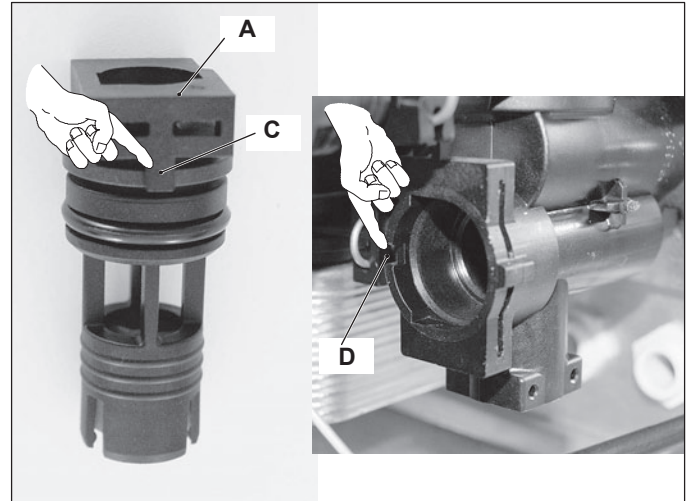


Figure 16.3

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 locking plate B and pull up the by-pass valve A (Figure 16.2).

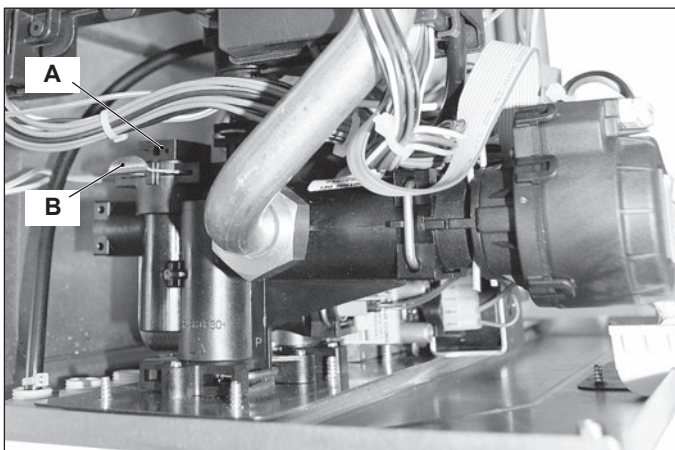


Figure 16.2

- 4 Reassemble the by-pass valve as illustrated in Figure 16.2 reversing the order of removal.

17 FAN AND AIR BOX

17.1 Function

The function of the Fan A (Figure 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.

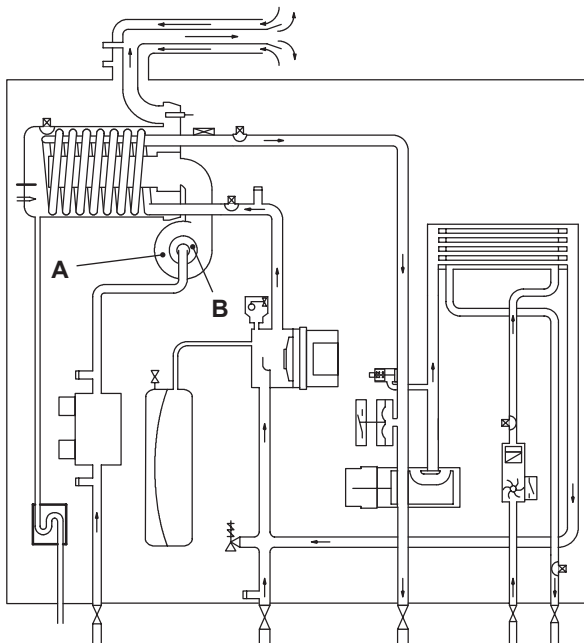



Figure 17.1

17.2 Removal of the Air box and the Fan

 **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 (see section 2).

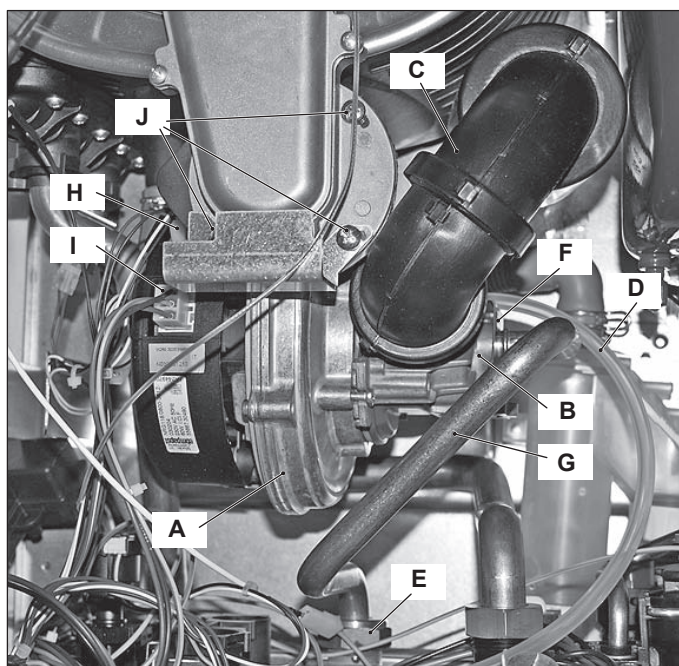


Figure 17.2

- 3 Disconnect the air manifold E (Figure 17.2).
- 4 Disconnect the rubber pipe F.
- 5 Unscrew the gas connector G.
- 6 Remove the fixing fork H and remove the gas pipe I.
- 7 Disconnect the connector C
- 8 Disconnect the fan connector D by pressing the plastic hook placed on the side of the connector.
- 9 Unscrew the screws J.
- 10 Remove the fan A with the air box B.
- 11 Remove the screws K and the air box B (Figure 17.3).

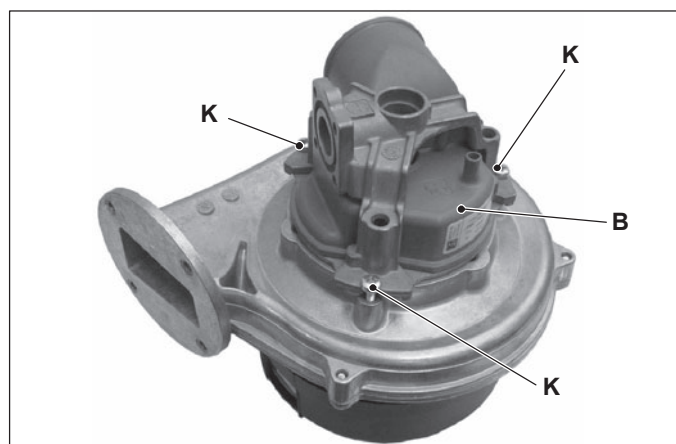




Figure 17.3

- 12 Assemble the Fan and the Air box carrying out the removal operations in reverse sequence.

Before reassembling ensure the fan gasket (Figure 17.2) is correctly mounted.

 **Warning:** Be careful not to damage the OR gasket of the gas pipe when inserting the pipe in the air box (air/gas mixer).

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 section 11.3.

IGNITION AND DETECTION ELECTRODES

18 IGNITION, DETECTION ELECTRODES AND BURNER

18.1 Function

Three electrodes are fitted on the fan-burner group. Two of them, fitted on the right side of the fan-burner group A, are the ignition electrodes B. On the left side is the detection electrode C and it detects the presence of the flame.

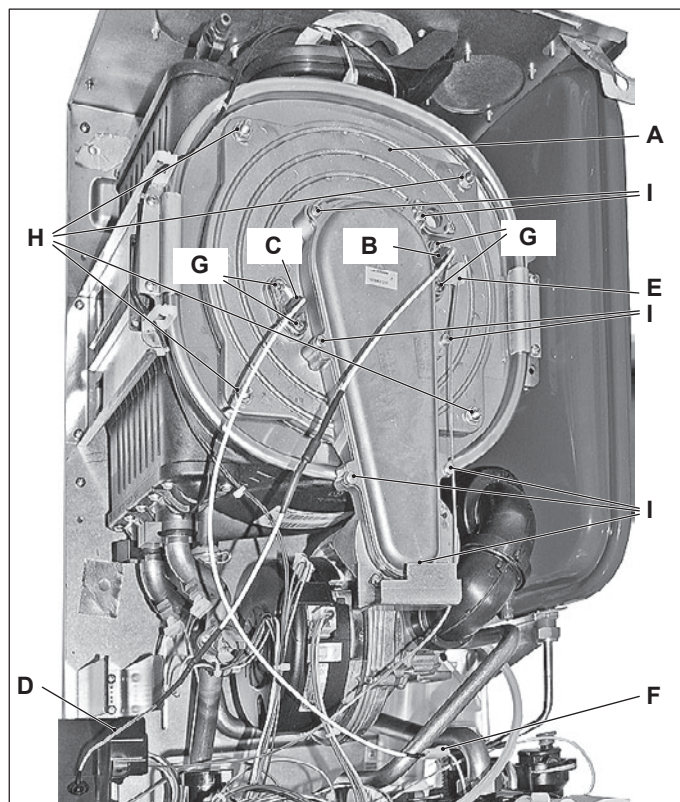


Figure 18.1

The burner J is fitted on the rear of the fan-burner group A.

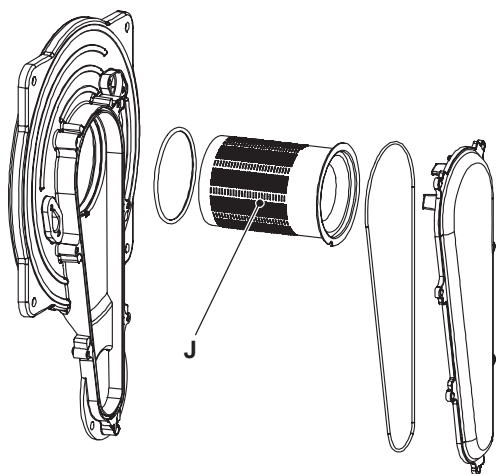



Figure 18.2

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 (see section 2).
- 2 Disconnect the ignition electrodes connector D and the earth wire E (Figure 18.1) and disconnect the detection electrode connector F.
- 3 Unscrew the screws G and remove the ignition electrodes B and the detection electrode C.
- 4 Assemble the Ignition and detection electrodes carrying out the removal operation in reverse order.

18.3 Removal of the burner

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

- 1 Remove the air box and the fan (see section "Removal of the Air box and the Fan" page 40)
- 2 Remove the Ignition and detection electrodes (see section "Removal of the Ignition and detection electrodes" page 41).
- 3 Unscrew the screws H (Figure 18.1) and remove the cover of the combustion chamber.
- 4 Unscrew the screws I (Figure 18.1) and remove the Air-gas duct lid.
- 5 Remove the burner by sliding it forward.

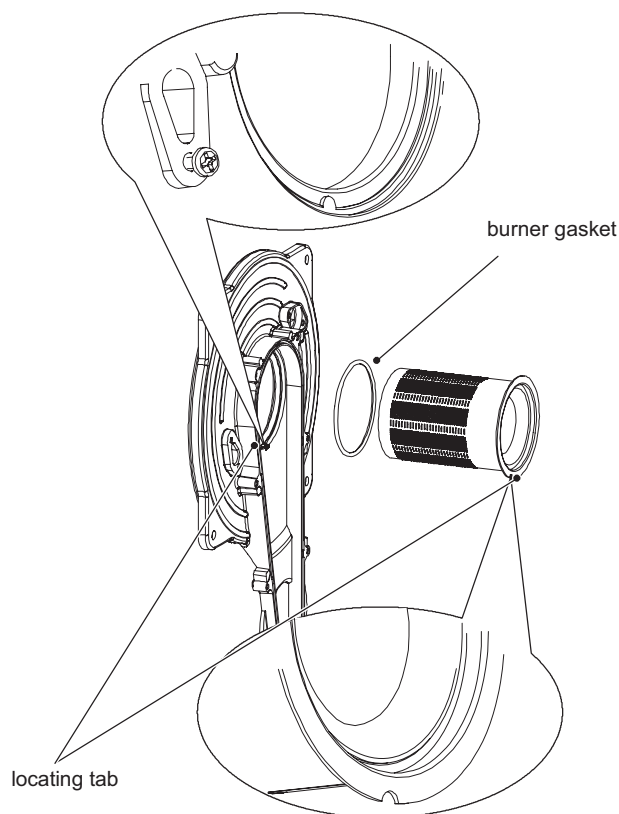


Figure 18.3

- 6 Assemble the burner carrying out the removal operation in reverse order. Ensure the burner is correctly located by lining up the locating tab (Figure 18.3).

IGNITION AND DETECTION ELECTRODES

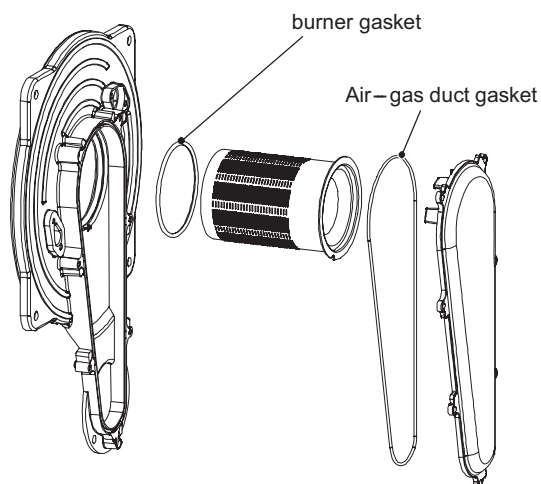


Figure 18.4

Before reassembling ensure the burner gasket is correctly located.



Warning: After cleaning or replacement as detailed above, it is deemed necessary to undertake a combustion analysis as detailed in section "Adjustment" page 30.

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 "Removal of the Ignition and detection electrodes" page 41).
- 2 Remove the burner (see section "Removal of the burner" page 41).
- 3 Remove the front insulation panel (Figure 18.5).
- 4 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.

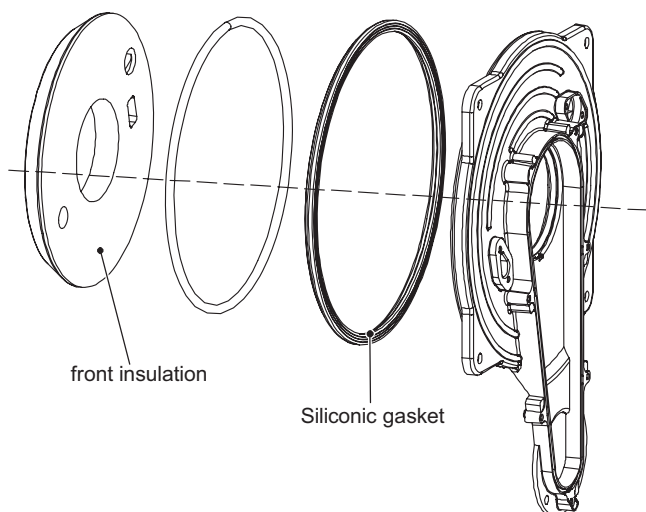


Figure 18.5

Caution:

After any periodical servicing or disturbance the combustion chamber silicon seal (Figure 18.5) must be fully inspected and replaced at the discretion of the service engineer.

After any disturbance to the chamber door seal the appliance

must undergo a full analytical combustion performance check.

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 Do the operations of section "Removal of the burner" page 41 from step 1 to step 3.
- 2 Unscrew the screw K, remove the washer L and the rear insulation M (Figure 18.6).

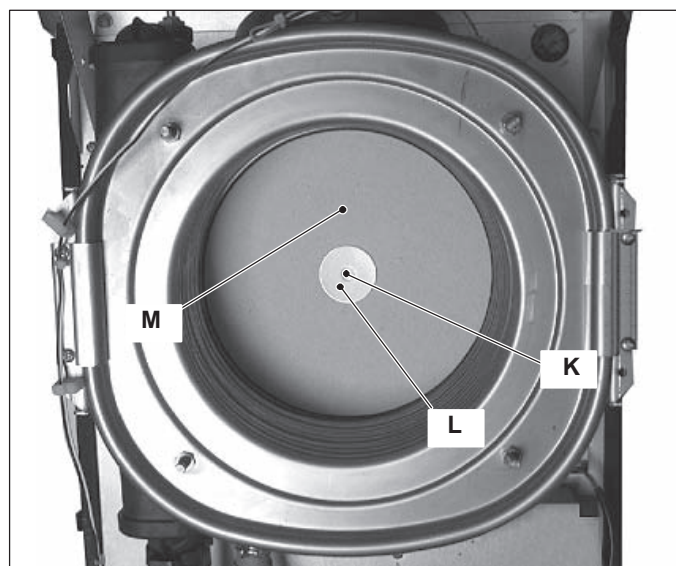


Figure 18.6

18.6 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 "Removal of the Ignition and detection electrodes" page 41)
- 2 Check for the correct distance between the metallic edges of the ignition electrode (see Figure 18.7 - Figure 18.8).

IGNITION AND DETECTION ELECTRODES

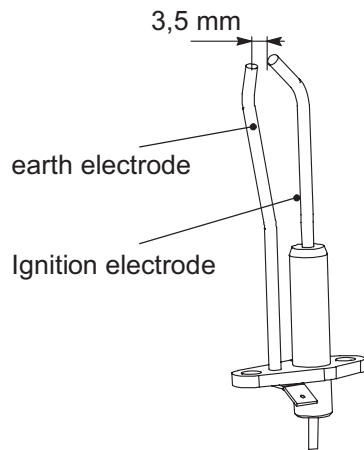


Figure 18.7

✓ Check the connection wires



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

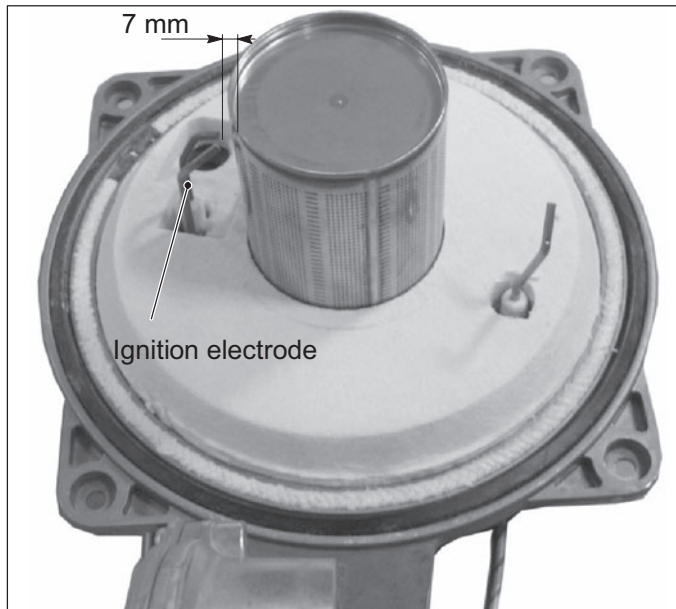


Figure 18.8

- 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 Figure 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 on the display.

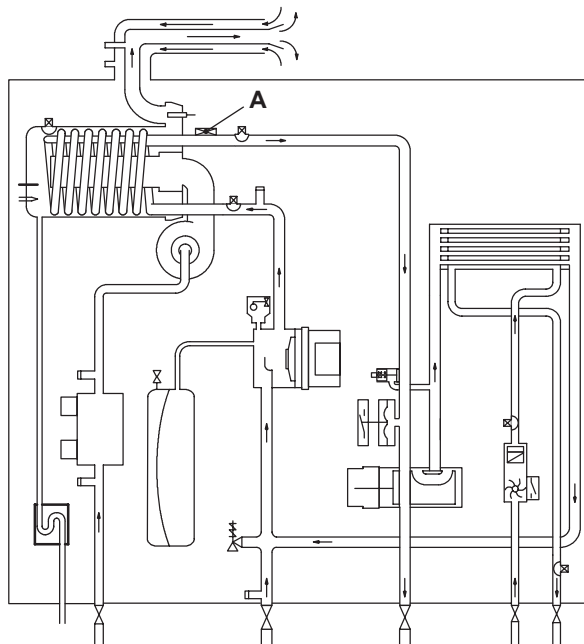


Figure 19.1

19.2 Checks

✓ Overheat temperature value

- 1 Run the boiler and set the temperature at maximum by pressing the appropriate key.
- 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.
- 2 Disconnect the wiring B (detail in Figure 19.2).
- 3 Unscrew the screws C and remove the overheat thermostat.

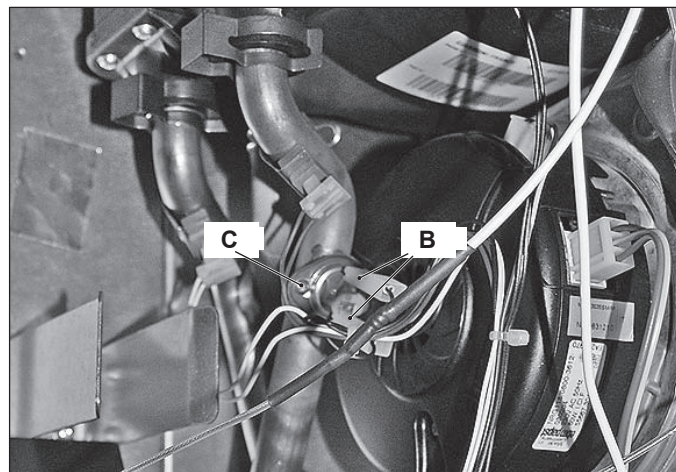


Figure 19.2

- 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 as detailed in section 11.3.

FLUE TEMPERATURE PROBE NTC AND SAFETY THERMAL FUSE

20 FLUE TEMPERATURE PROBE NTC AND SAFETY THERMAL FUSE

20.1 Function

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

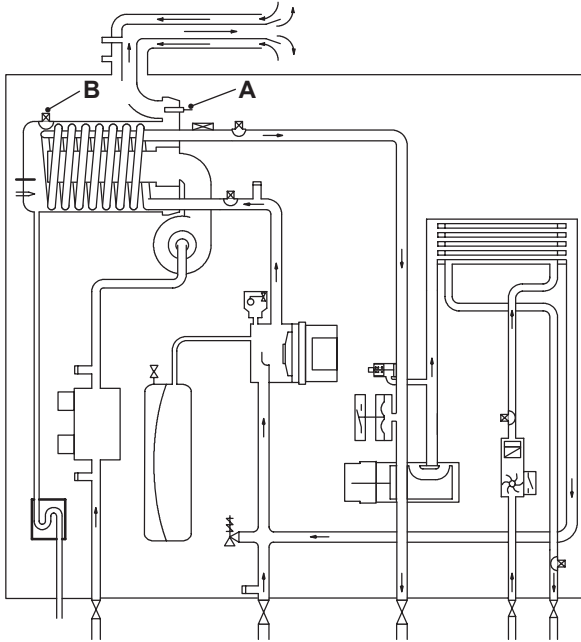


Figure 20.1

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 (lock-out).

This allows 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.

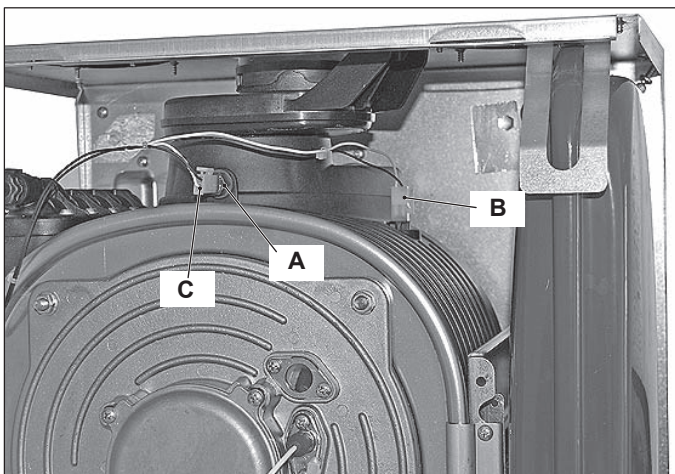


Figure 20.2

A Safety thermal fuse B in Figure 20.1 - Figure 20.2 is also connected in series with the Flue temperature probe NTC and acts as a safety device in extreme case of incorrect operation of the Flue temperature control system.

Reaching the breakdown temperature it opens the circuit and locks out the boiler.

In case of intervention of this safety device the heat exchanger (part shown in Figure 20.3) may be damaged and must be replaced.



Figure 20.3

20.2 Removal



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

- 1 Remove all the case panels.
- 2 Disconnect the connector C from the Flue temperature probe NTC by pressing the plastic hook placed on the side of the connector.
- 3 Unscrew and remove the flue temperature probe A (Figure 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 (Figure 20.4)

FLUE TEMPERATURE PROBE NTC AND SAFETY THERMAL FUSE

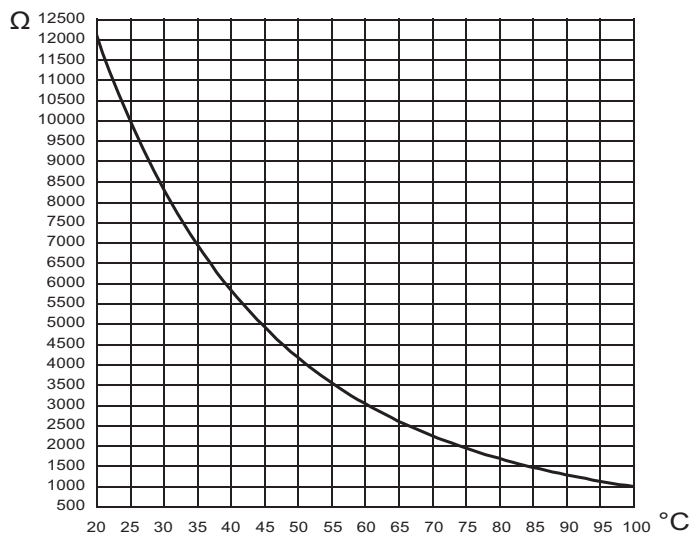


Figure 20.4

CONDENSATE TRAP

21 CONDENSATE TRAP

21.1 Function

The condensate trap A in Figure 21.1 and Figure 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.

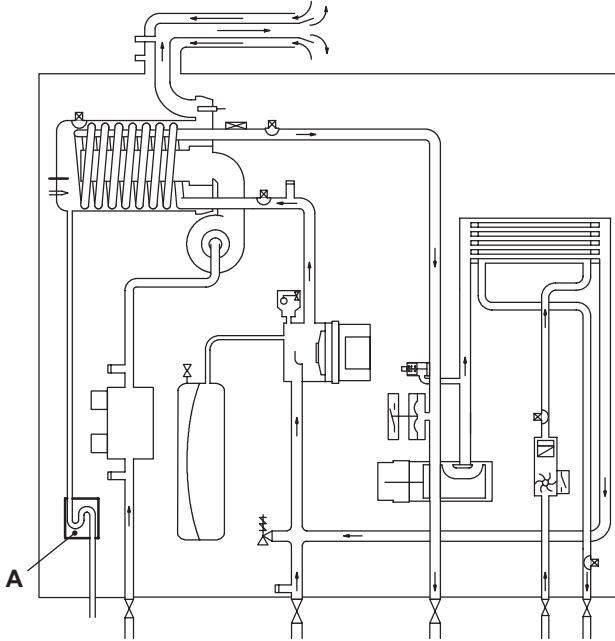


Figure 21.1

If the drain pipe becomes blocked, or condensate cannot drain, the condensate level in the trap rises until it reaches the screw attached to the flame detection electrode, this will cause the boiler lock-out.

21.2 Check the cleanness of the trap

Unscrew the plug B on the bottom of the trap A and remove dirt eventually deposit (Figure 21.2).

21.3 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 Unscrew the threaded locking ring B and remove the flexible pipe C (Figure 21.2).
- 3 Using pliers, remove the spring D moving it upwards.
- 4 Unscrew the screw E and remove the trap A from the pipe F.
- 5 Reassemble carrying out the removal operations in reverse order.

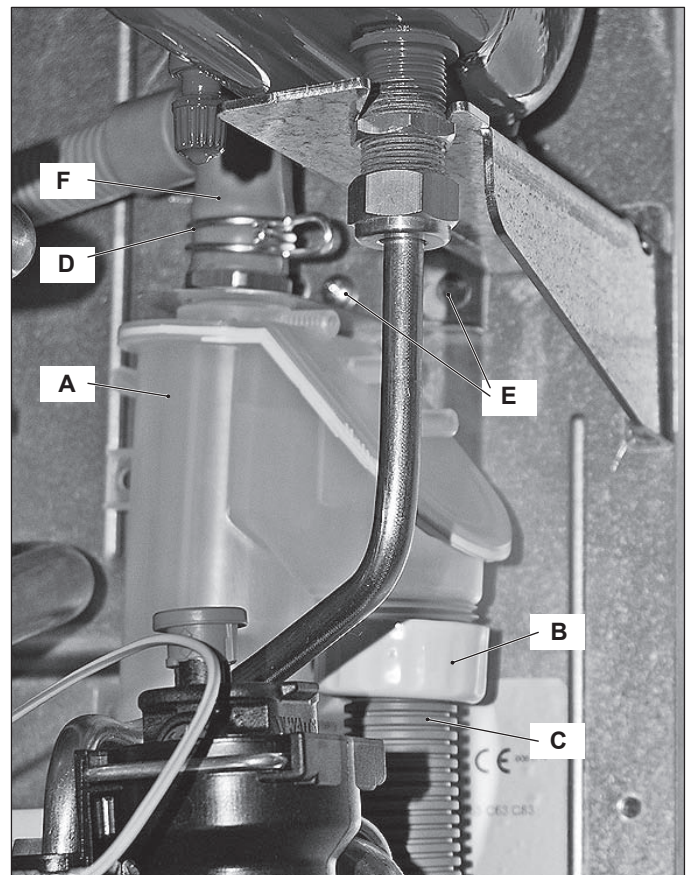


Figure 21.2

SHORT SPARE PARTS LIST

22 SHORT SPARE PARTS LIST

Key	G.C. part no.	Description	Q.ty	Manufacturer part no.	Manufacturer's reference
1		Burner (mod. Advance Plus 25C, Advance Plus 25S, Advance Plus 16S)	1	BI1293 100	
		Burner (mod. Advance Plus 30C, Advance Plus 35C, Advance Plus 30S)	1	BI1293 101	
2		Expansion vessel	1	BI1462 100	
3	H58-660	Condensing heat exchanger (mod. Advance Plus 30C, Advance Plus 35C, Advance Plus 30S)	1	BI1432 101	
	H58-659	Condensing heat exchanger (mod. Advance Plus 25C, Advance Plus 25S, Advance Plus 16S)	1	BI1432 100	
4		Fan	1	BI1313 102	
5		Gas valve	1	BI1313 103	SIT 848 Sigma 0848135
6	E83-013	Safety valve (mod. Advance Plus 25C, Advance Plus 30C, Advance Plus 35C)	1	BI1441 116	Watts
		Safety valve (mod. Advance Plus 25S, Advance Plus 16S, Advance Plus 30S)	1	BI1131 100	Watts
7		Main Electronic control/ignition p.c.b.	1	BI2035 100	
8		Control panel electronic p.c.b.	1	BI2035 101	
9	E01-204	D.h.w. heat exchanger (mod. Advance Plus 25C)	1	BI1001 101	
	E01-205	D.h.w. heat exchanger (mod. Advance Plus 30C, Advance Plus 35C)	1	BI1001 102	
10		Pump	1	BI1552 100	Wilo INTNFSL12/6-HE-1-12
11	H74-553	Temperature probe (main circuit)	1	BI1442 106	
12		D.h.w. flow switch	1	BI1441 501	
13		D.h.w. flow sensor	1	BI1441 104	
14		Primary circuit pressure switch	1	BI1431 101	
15		Three way diverter valve (electric actuator)	1	BI1431 100	
16	H74-550	Condensate trap	1	BI1442 104	
17	E83-101	Overheat thermostat	1	BI1172 105	ELTH - type 261
18	H58-661	Flue temperature probe NTC	1	BI1432 102	
19	E23-792	Fuse 2 AF 250VAC 5x20	2	BI1165 112	
20	169-016	Temperature probe (D.h.w. circuit)	1	KI1042 501	
21	H58-709	Detection electrode	1	BI1293 103	
22		Ignition electrode	1	BI1363 103	

SHORT SPARE PARTS LIST

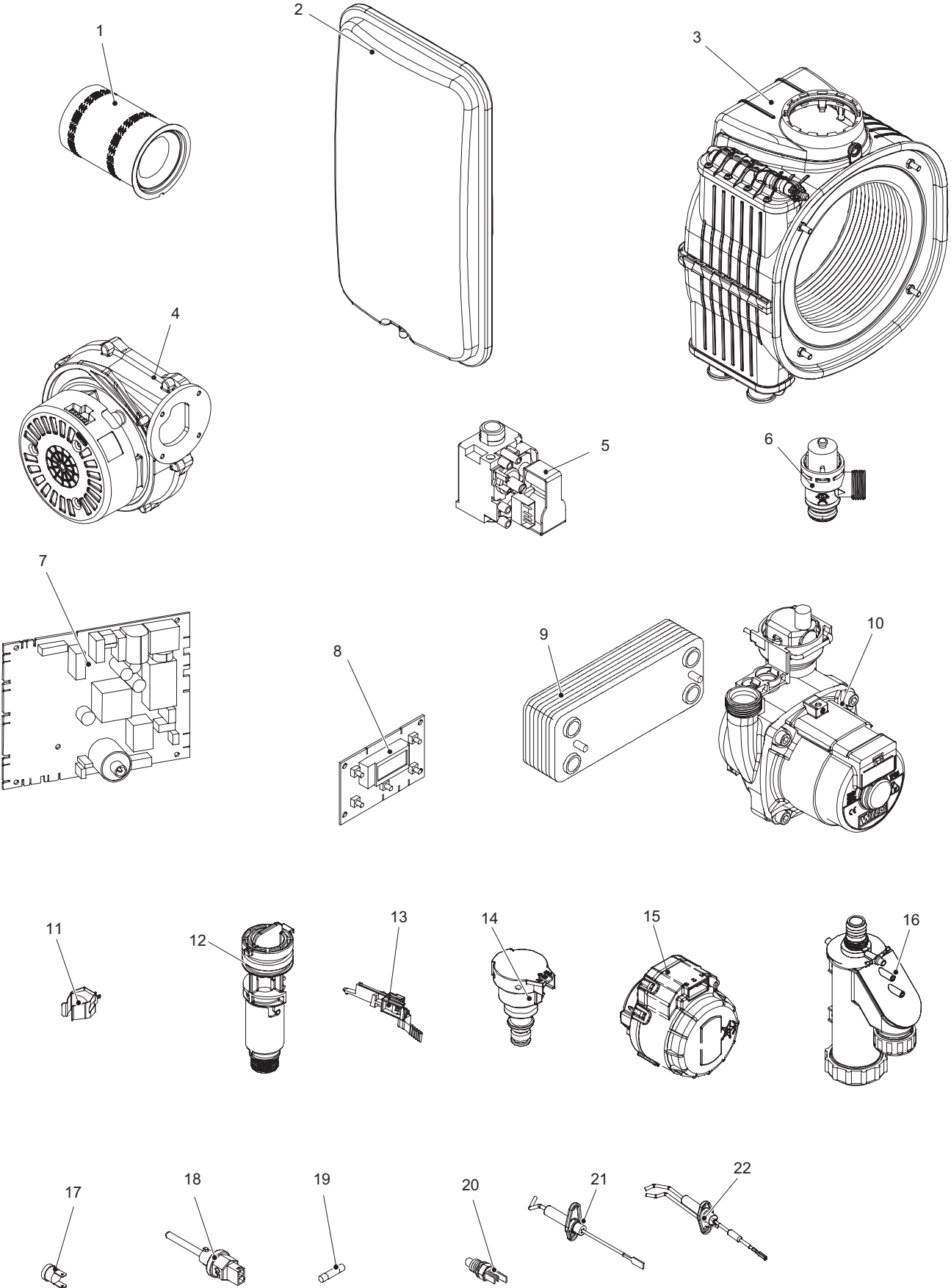


Figure 22.1

NOTE



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