

RINNOVA PREMIUM



**User manual and
installation
instructions**

Congratulations on choosing this product.

Your modulating boiler is electronically adjusted and ignited.

- It is highly efficient.
- It has a sealed chamber.

The materials used and the control systems offer safety, high levels of comfort and energy savings so you can appreciate the maximum advantages of autonomous heating.



DANGER: Instructions marked with this symbol must be observed to prevent mechanical or generic accidents (e.g. injuries or bruises).



DANGER: Instructions marked with this symbol must be observed to avoid electrical accidents (electrocution).



DANGER: Instructions marked with this symbol must be observed to avoid the risk of fire or explosions.



DANGER: Instructions marked with this symbol must be observed to avoid heat-related accidents (burns).



WARNING: Instructions marked with this symbol must be observed to avoid malfunctions and/or material damage to the unit or other items.



WARNING: Instructions marked with this symbol contain important information that must be read carefully.



WARNING: Risk of cutting / stabbing. Protective gloves must be worn.



IMPORTANT



WARNING

- ✓ **The manual** must be read carefully to ensure rational and safe use of the boiler. It must be stored with care as it may be necessary to consult it in the future. If the unit is transferred to another owner, the manual must accompany the boiler.
- ✓ **The initial switch-on** must be carried out by an Authorised Service Centre. A list of these can be found at www.biasi.it/assistenza. The validity of the warranty starts from the date the product is purchased (see conditions listed on the specific certificate).
- ✓ **The manufacturer** declines all liability for translations of this manual from which incorrect interpretations may result. It cannot be considered responsible for failure to observe the instructions contained in this manual or the consequences of any actions that have not been specifically described.

DURING INSTALLATION

- ✓ After removing the packaging, make sure that the appliance **is not damaged**. If damaged **do not install or start up** the appliance as it may be dangerous. Contact your retailer or the nearest authorised service centre.
- ✓ **Installation** must be carried out by qualified personnel who are responsible for compliance with all applicable national and local laws and standards.
- ✓ **The boiler** is used to heat water to a temperature that is lower than boiling point, and must be connected to a heating system and/or a domestic hot water distribution network that is compatible with its performance and power.
The boiler must be supplied with **Methane gas (G20) or LPG (Propane G31)**.
The boiler must only be used for the purpose for which it was designed. Furthermore:
 - It must not be exposed to atmospheric agents.
 - This unit is not meant for use by people with reduced psychological or motor skills or who lack experience and knowledge (including children), unless they are supervised by a person responsible for their safety and have been properly instructed in using the unit.
 - Children must be supervised to make sure they do not play with the unit.
 - Prevent incorrect use of the boiler.
 - Avoid making adjustments to the sealed devices.
 - Avoid contact with hot parts during operation.

DURING USE

- ✓ **It is prohibited and dangerous** to obstruct, even partially, the air intakes for the ventilation of the room where the boiler is installed (UNI 11071 and related standards);
- ✓ **Repairs** must only be carried out by authorised service centres using original spare parts. Therefore, in the case of a problem, deactivate the boiler only (see instructions).
- ✓ **If you smell gas:**
 - Do not turn on electric switches, the telephone or any other object that could create sparks.
 - Immediately open up the doors and windows to create an air current that cleans the room.
 - Close the gas cocks.
 - Request the intervention of professionally qualified personnel.
- ✓ **Before starting the boiler**, have a qualified professional check that the gas supply system:
 - Is perfectly sealed.
 - Is the right size for the required flow rate to the boiler.
 - Is equipped with the safety and control devices required by current standards;
 - Make sure that the installer has connected the safety valve drain to a outlet funnel. The manufacturer is not responsible for damage caused by the water released when the safety valve opens, if it is not correctly connected to a drainage system.
 - Make sure that the installer has connected the condensate siphon drain to a specific outlet funnel (UNI 11071 and related standards), which must be implemented in order to avoid the condensate freezing and ensure it is correctly drained.
- ✓ **Do not touch the unit** with wet or damp body parts and/or in bare feet.
- ✓ **If performing structural work or maintenance** near the flue gas ducts and/or the flue gas exhaust devices or their accessories, turn off the unit and, when the work is complete, have a qualified technician check the efficiency.

Appliance category: II2H3P (gas G20 20 mbar, G31 37 mbar)

Destination country: JO

This unit is compliant with the following European Directives:

Gas Appliance Directive 2009/142/EC

Is in conformity with essential requirements of Regulation (EU) 2016/426 (Gas appliances)

Boiler Efficiency Directive 92/42/EEC

Electromagnetic Compatibility Directive 2014/30/EC

Low Voltage Directive 2014/35/EC

In order to constantly improve its products, the manufacturer reserves the right to change the data provided in this documentation at any time and without notice.

This documentation is provided for information purposes and cannot be considered as a contract with third parties.

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Models and boiler certification code

RINNOVA PREMIUM M290F.24CM

RINNOVA PREMIUM M290F.28CM

RINNOVA PREMIUM M290F.32CM

BOILER DESCRIPTION

1 BOILER DESCRIPTION

1.1 Assembly view

The boiler model and serial number are printed on the warranty certificate.

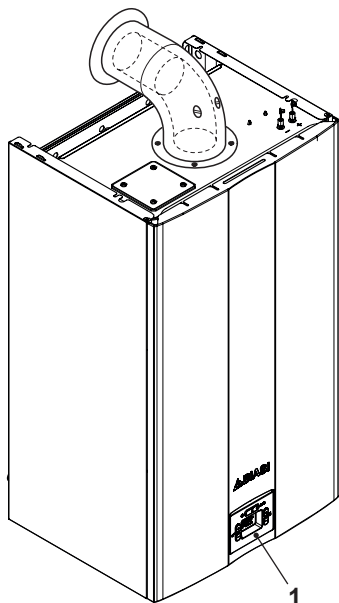


Figure 1.1

- 1 Control panel

1.2 Shut-off valves and cocks

Install a shut-off cock for the DHW inlet.

The figures in this manual only show one of the possible ways of installing cocks, pipes and fittings.

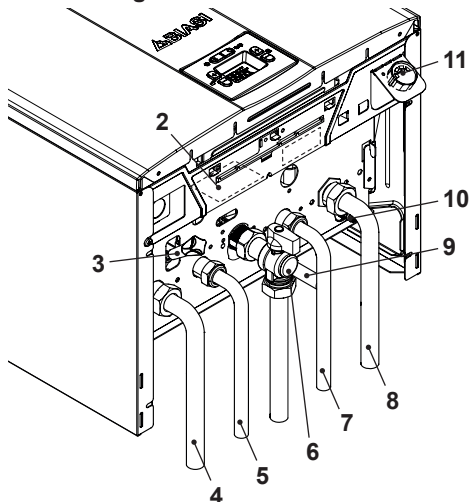


Figure 1.2

- 2 Gas supply label
3 Heating circuit filling cock
4 Heating delivery pipe
5 Domestic hot water outlet pipe
6 Gas cock
7 Domestic hot water inlet pipe
8 Heating return pipe
9 Heating circuit safety valve discharge pipe
10 Heating circuit drain cock
11 Heating circuit pressure gauge

BOILER DESCRIPTION

1.3 Control panel

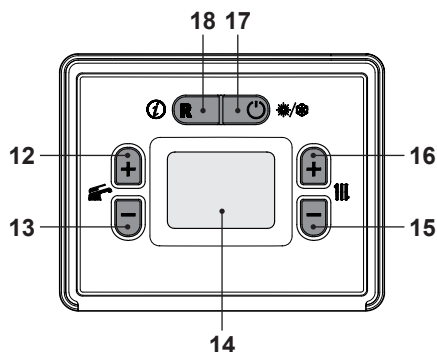


Figure 1.3

- 12 Domestic hot water temperature increase button
- 13 Domestic hot water temperature decrease button
- 14 LCD display
- 15 Heating temperature decrease button
- 16 Heating temperature increase button
- 17 Stand-by/Winter/Summer button
- 18 Reset button

1.4 General LCD characteristics

For the boiler technical specifications, consult the section "TECHNICAL SPECIFICATIONS" on page 16.

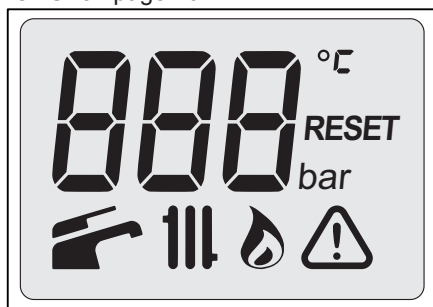


Figure 1.4












KEY










	The symbol indicates a volatile error. The boiler is reactivated automatically once the fault has been resolved
	The symbol indicates that the boiler can be restarted directly by the user by pressing the reset button
	All symbols with lines radiating from them indicate that the symbol is flashing

LCD SIGNALS

LCD	FUNCTION
E01 + RESET	Safety lockout due to failed ignition
E02 + RESET	Lockout due to safety thermostat
E03 + RESET	EEPROM error
E04 + !	Pump circulation failure or insufficient system pressure
E05 + !	Flue gas pressure switch anomaly
E06 + !	Heating NTC probe failure
E07 + !	DHW NTC probe failure
E08 + !	External NTC probe failure
E11 + !	Parasite flame
E12 + !	Return NTC probe failure
E14 + !	Temperature gradient circulation failure (>2K/s)

BOILER DESCRIPTION

LCD	FUNCTION
E22 + RESET	Heating delivery temperature between 90°C and 100°C
E25 + 	Boiler in antifreeze
E26 + RESET	Gas valve fault
E28 + 	Tank NTC probe failure
E50 + 	Communication with remote control lost
E52 + RESET	Maximum number of remote unlock attempts
E68 + 	Modulating operator fault
E69 + 	Incorrect boiler configuration
OFF	Boiler off, (antifreeze protection active)
	Boiler in winter (heating/DHW) and stand-by
	Boiler in summer (DHW only) and stand-by
 45 °C	Boiler with DHW power request. The DHW temperature is displayed.
 65 °C	Boiler with heating power request. The temperature of the primary heating circuit is displayed.
	Burner ignition (discharge)
	Flame detected (burner ignited)

LCD	FUNCTION
 5 °C	Boiler in DHW anti-freeze phase (the  symbol flashes)
 5 °C	Boiler in heating anti-freeze phase (the  symbol flashes)
 78 °C	Heating set temperature (all other symbols are disabled)
 46 °C	DHW set temperature (all other symbols are disabled)
 45 °C	Boiler in chimney sweep function. To activate the chimney sweep function, set "parameter P06#0". 1 = minimum power 2 = maximum power During the the chimney sweep function, the  and/or  symbols do not flash.

USER INSTRUCTIONS

2 USAGE INSTRUCTIONS

2.1 Warnings



Check that the heating circuit is correctly filled with water, even if the boiler is only used for producing domestic hot water.

If it is not, proceed with filling; see section "Filling the heating circuit" on page 13.

All boilers have an antifreeze system that is activated if the temperature falls below 5°C; therefore **do not turn off the boiler**.

If the boiler is not used during cold periods, with the resulting risk of freezing, proceed as described in section "Antifreeze protection" on page 13.

2.2 Ignition

- The boiler cocks and the cocks used during installation must be open (Figure 2.1).

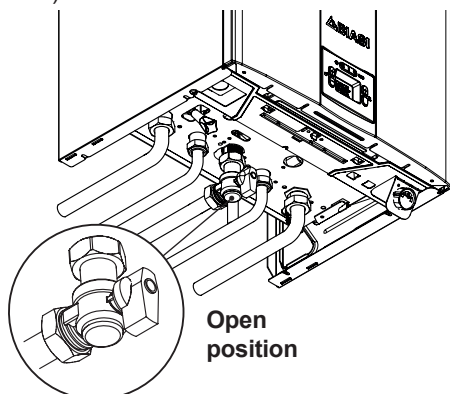




Figure 2.1

- Power the boiler by turning on the two-way switch fitted during installation. The LCD display shows the **OFF** status (only the heating and DHW antifreeze functions are active) Figure 2.2.



Figure 2.2

Heating/DHW operation

- Press the 17 button and hold until both symbols  and  appear on the display.

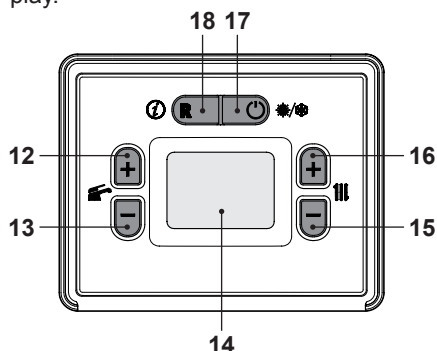


Figure 2.3




The LCD display shows the stand-by status and the  and  symbols (Figure 2.4).



Figure 2.4

Operation with production of hot water only

- Press the 17 button until the symbol  appears on the display Figure 2.5.

USER INSTRUCTIONS

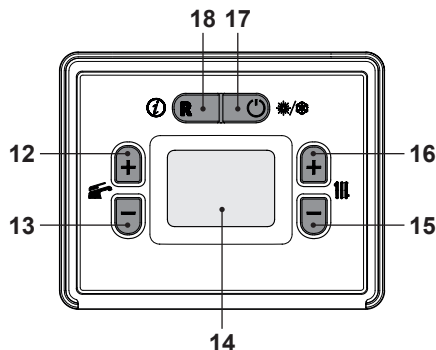



Figure 2.5

The LCD display shows the stand-by status and the  symbol (Figure 2.6).

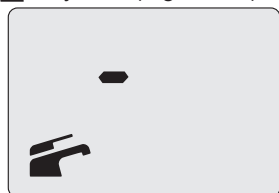



Figure 2.6

2.3 Heating circuit temperature

The heating delivery hot water temperature can be adjusted using the 15 (decrease) and 16 (increase) buttons (Figure 2.5) from a minimum of approx. 28°C to a maximum of approx. 55°C or from a minimum of approx. 50°C to a maximum of approx. 80°C (see "Selecting the heating temperature set" on page 41). The first time one of these two buttons is pressed the "set" value is displayed; the second time it is pressed this can be changed.

Signal on the LCD display:

- the "set" value of the heating delivery hot water temperature and the  symbol flash. The display background lights up (Figure 2.7).

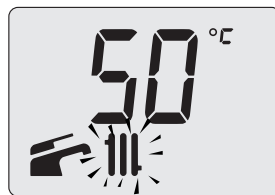



Figure 2.7

Adjusting the heating temperature based on the outdoor temperature (without external sensor)

Adjust the heating delivery hot water temperature as follows:

- from 27 to 35 with an outdoor temperature of between 5°C and 15°C
- from 35 to 60 with an outdoor temperature of between -5°C and +5°C
- from 60 to 80 with an outdoor temperature of below -5°C.

Your qualified installer may suggest more suitable settings for your system.

The set temperature has been reached when the  symbol is not visible on the LCD display.

Heating power demand



When the boiler receives a heating power request, the display shows the  symbol followed by an increase in the heating delivery water temperature. The  symbol flashes (Figure 2.8).



Figure 2.8

USER INSTRUCTIONS

Adjusting the heating temperature with an external sensor installed

When the optional external sensor is installed, your boiler will automatically adjust the heating system's delivery water temperature according to the outdoor temperature.


In this case, the boiler must be set by a qualified installer (see "Enabling operation with the external sensor and setting the K coefficient" on page 38).

If the room temperature is not comfortable, you can increase or decrease the heating system delivery temperature by $\pm 15^{\circ}\text{C}$ using the 15 (decrease) and 16 (increase) buttons (Figure 2.5).

2.4 Domestic hot water temperature

The domestic hot water temperature can be adjusted using the 12 (increase) and 13 (decrease) buttons (Figure 2.5) from a minimum of approx. 35°C to a maximum of approx. 60°C . The first time one of these two buttons is pressed, the "set" value is displayed. The second time it is pressed, the value can be changed.

Signal on the LCD display:

- the "set" value of the domestic hot water and the  symbol flash. The display background lights up (Figure 2.9).

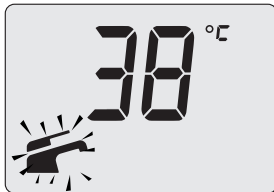


Figure 2.9

Adjustments

Adjust the temperature of the domestic hot water to a value that suits your needs.

Limit the need to mix hot water with cold water.

In this way, you can take full advantage of the automatic setting.

If the water is particularly hard, we recommend setting the boiler temperature to below 50°C .

In such cases, we recommend installing a water softener in the DHW system.

If the maximum flow rate of the domestic hot water is too high for a sufficient temperature to be reached, contact an authorised support technician to install a flow rate limiter.

Domestic hot water demand



When the boiler receives a request for domestic hot water, the display shows the  symbol followed by an increase in the temperature of the domestic hot water. The  symbol flashes (Figure 2.10).



Figure 2.10

USER INSTRUCTIONS

2.5 Shutdown

Press the 17 button (Figure 2.11) until the message **OFF** appears on the LCD display (Figure 2.12).

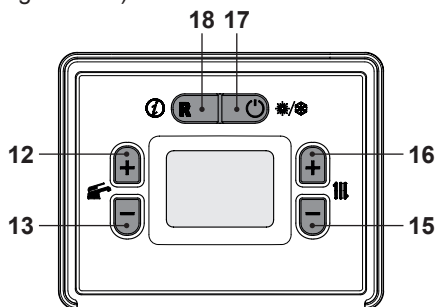


Figure 2.11



Figure 2.12

In **OFF** mode, the antifreeze protection is active.

If the boiler will be inactive for a long period of time:

- Disconnect the boiler from the electric power supply;
- Close the boiler cocks Figure 2.13;

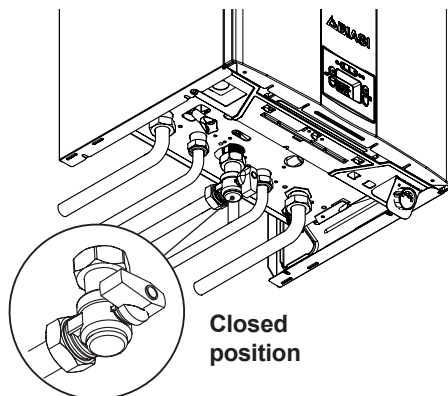


Figure 2.13

- If necessary, empty the hydraulic circuits (see section "Emptying the DHW circuit" on page 56 and section "Emptying the heating circuit" on page 56).

USEFUL TIPS

3 USEFUL TIPS

3.1 Filling the heating circuit

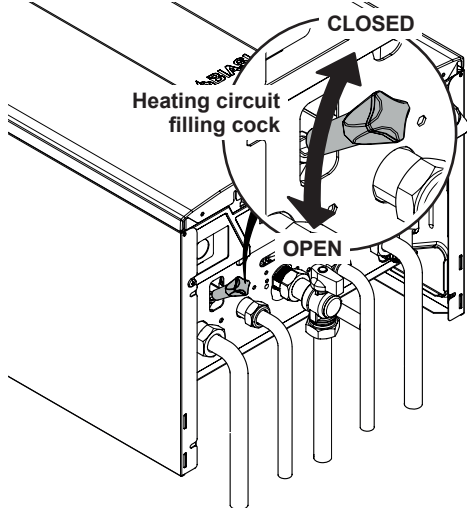


Figure 3.1

Open the filling cock in Figure 3.1 located under the boiler and check the heating circuit pressure on the pressure gauge at the same time. The correct cold system pressure value should be within the first green bar on the pressure gauge quadrant (Figure 3.2).

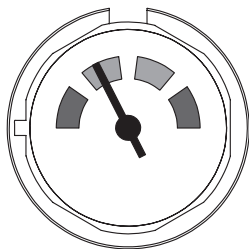


Figure 3.2

When the operation is complete, close the filling cock and bleed any air from the radiators.

3.2 Heating

For rational and economical service, have a room thermostat installed.

Never turn off the radiator in the room where the room thermostat is installed.

If a radiator (or convector) does not heat up, check if there is any air in the system and make sure that the cock is open.

If the room temperature is too high, do not adjust the radiator cocks but decrease the heating temperature setting using the room thermostat or the heating control buttons 15 and 16 (Figure 3.3).

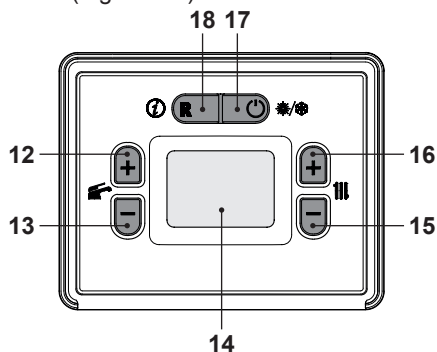


Figure 3.3

3.3 Antifreeze protection

The antifreeze system, and any additional protective devices, safeguard the boiler against possible damage due to freezing.

This system does not guarantee protection for the entire hydraulic system.

Where the outdoor temperature could fall below 0°C, it is recommended to leave the entire system on, setting the room thermostat to a low temperature.

The antifreeze function is active even if the boiler is in **OFF** (Figure 3.4).



Figure 3.4

If the boiler is turned off, have a qualified technician empty the boiler (heating and DHW circuit) and empty the heating system and the DHW system.

3.4 Periodic maintenance

For efficient and regular boiler operation, it is recommended that the boiler be serviced and cleaned at least once a year by a technician from an authorised service centre.

During this check, the most important boiler components are inspected and cleaned. This check may be performed within the scope of a maintenance contract.

3.5 External cleaning

Before performing any cleaning operation, disconnect the boiler from the electric mains supply.

To clean, use a cloth soaked in soap and water.

Do not use: Solvents, flammable substances or abrasive substances.

3.6 Operating anomalies


If the boiler is not working and an error code flashes on the display and the  symbol is shown, it is a volatile lockout. The boiler is reactivated automatically once the fault has been resolved (see "General LCD characteristics" on page 7); the boiler is in lockout mode (Figure 3.5).



Figure 3.5




Each fault is classified according to the level of priority. If more than one faults are detected at the same time, the most urgent error code is shown.



Frequent safety lockouts should be reported to an authorised service centre.

Other possible anomalies shown on the LCD display

If an error code, the  symbol and the **RESET** symbol are shown on the LCD display, the lockout is NOT volatile (Figure 3.6).

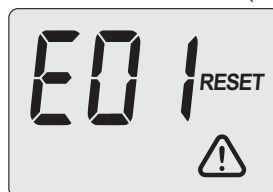


Figure 3.6

To restore operation, press the reset button 18 (Figure 3.3) on the boiler control panel.

Air bubble noises

Check the pressure of the heating circuit and fill it if necessary, see section "Filling the heating circuit" on page 13.

Low system pressure

Add more water to the heating system. To do this, refer to section "Filling the heating circuit" on page 13.

USEFUL TIPS

The user is responsible for periodically checking the pressure of the heating system.

If water needs to be added too often, have the technical support centre check if there are any leaks in the heating system or the boiler itself.

Water leaks from the safety valve

Check if the filling cock is closed tightly (see "Filling the heating circuit" on page 13).

Check on the pressure gauge that the heating circuit pressure is not close to 3 bar. Should this be the case, drain a part of the water from the system through the air relief valves in the radiators in order to reduce the pressure to a normal value.



In the case of malfunctions other than those described above, shut down the boiler as described in section "Shutdown" on page 12 and call a technician from the authorised service centre.

3.7 Displays in INFO mode

INFO mode is used to view boiler status information. In the case of a boiler malfunction, provide this information to the service centre so that they can work out its causes.

To access INFO mode, press 18 (Figure 3.3) and hold for 5 seconds until the code **n02** shows on the display (Figure 3.7).



Figure 3.7

To scroll through the values, press 12 (increase) and 13 (decrease). Press 17 and hold for 5 seconds to exit INFO mode (Figure 3.3).

The table summarises the possible values visible in INFO mode.

Table of contents	Value shown
n02	DHW output temp.
n03	NTC return temperature (not present)
n04	(not used)
n05	Outdoor temperature
n08	(not used)
n09	Modulating operator current
n11	Flow rate
n14	PWM pump speed percentage
n15	(not used)
n20	(not used)
n21	Last error code
n22	Second-to-last error code
n26	Calculated heating set point (with climatic curve or configured set)

TECHNICAL SPECIFICATIONS

4 TECHNICAL SPECIFICATIONS

4.1 Assembly view

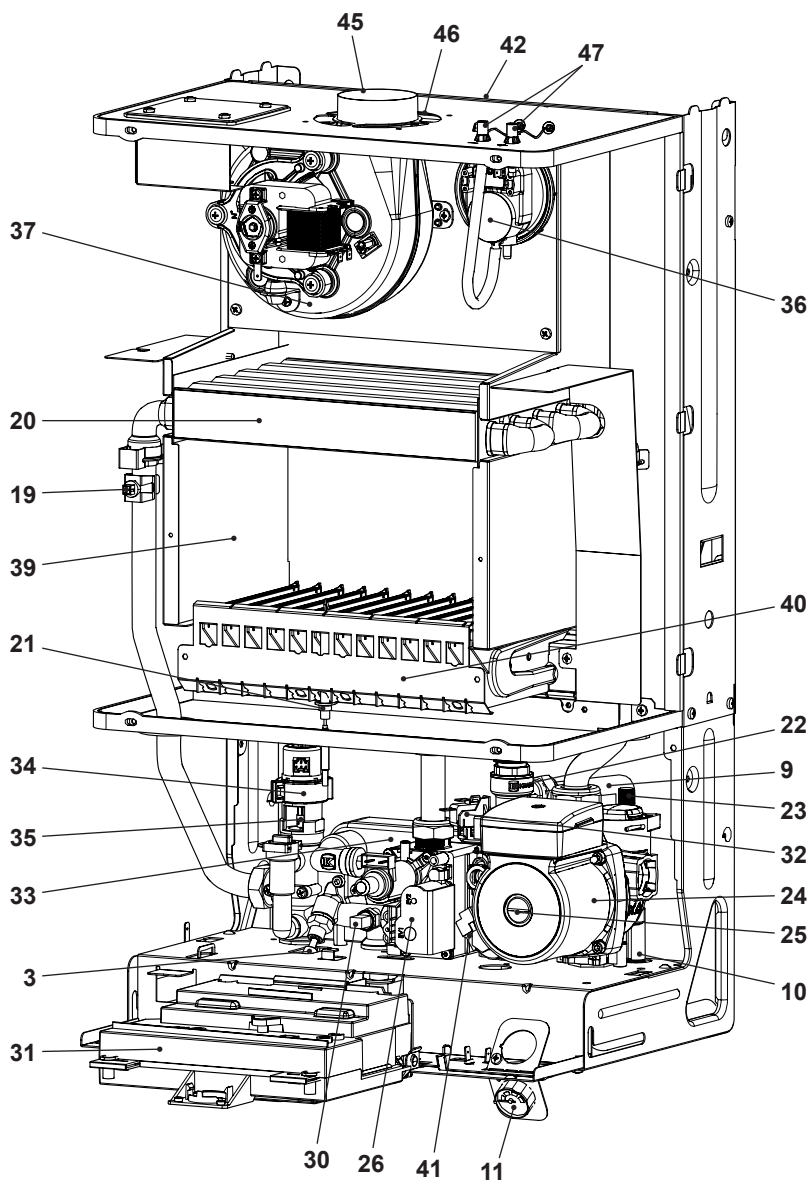


Figure 4.1

TECHNICAL SPECIFICATIONS

4.2 Schematic diagram

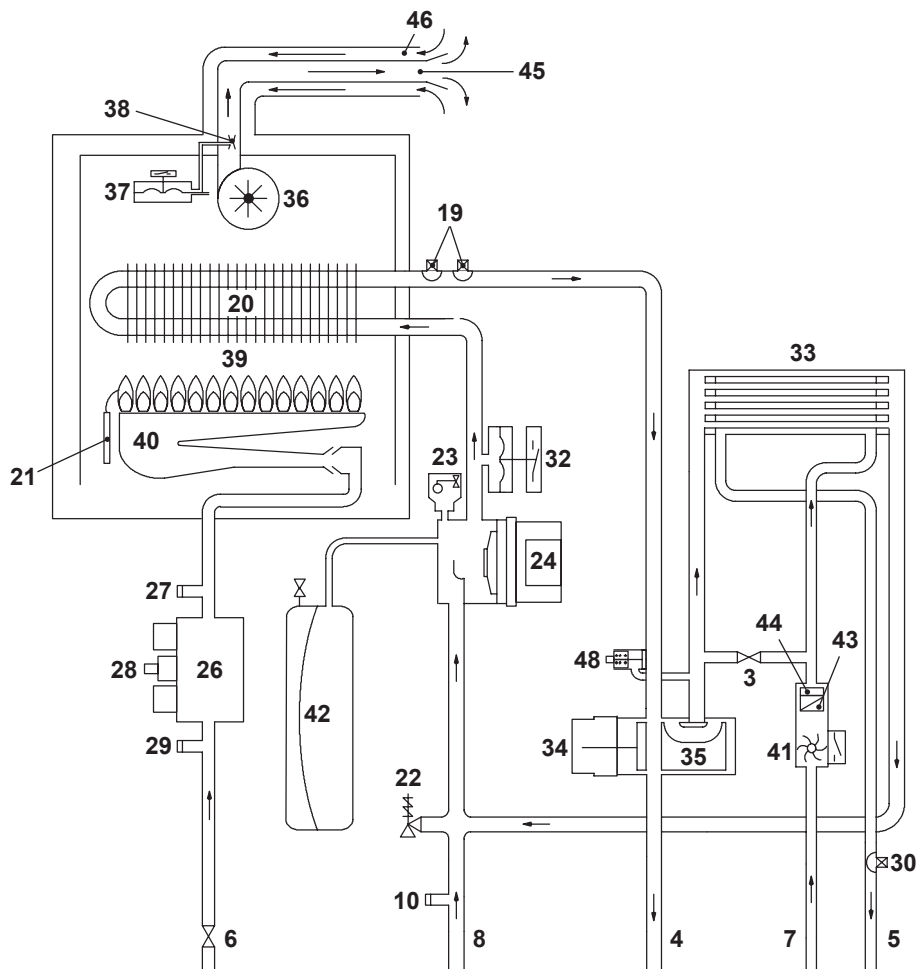


Figure 4.2

- | | |
|----------------------------------|---|
| 3 Heating circuit filling cock | 9 Heating circuit safety valve discharge pipe |
| 4 Heating delivery pipe | 10 Heating circuit drain cock |
| 5 Domestic hot water outlet pipe | 11 Heating circuit pressure gauge |
| 6 Gas cock | 19 Heating NTC - Max temperature NTC |
| 7 Domestic hot water inlet pipe | 20 Primary exchanger |
| 8 Heating return pipe | |

TECHNICAL SPECIFICATIONS

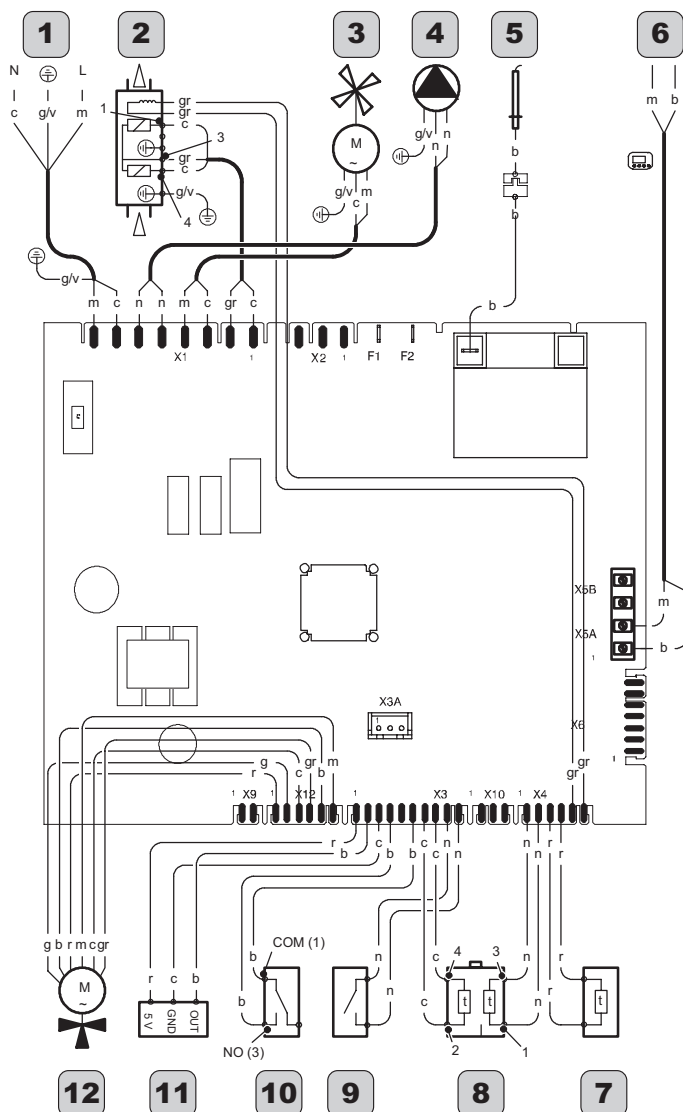
- 21 Flame detection electrode/ignition electrode
- 22 3 bar safety valve
- 23 Automatic bleed valve
- 24 Pump
- 25 Pump bleed cap
- 26 Gas valve
- 27 Gas valve outlet tapping point
- 28 Modulating operator
- 29 Gas valve inlet tapping point
- 30 DHW NTC probe
- 31 Control panel containing:
 - Terminal board for external temperature probe, low-voltage ambient thermostat cable or remote control (optional), electric power supply cable
- 32 Heating pressure switch
- 33 DHW exchanger
- 34 Three-way valve
- 35 Three-way valve plug
- 36 Fan
- 37 Flue gas pressure switch
- 38 Venturi
- 39 Combustion chamber
- 40 Burner
- 41 DHW flowmeter
- 42 Expansion tank
- 43 Domestic hot water filter
- 44 DHW flow rate limiter (optional)
- 45 Flue gas exhaust duct
- 46 Air suction duct
- 47 Venturi vacuum check points
- 48 Integrated by-pass

* To access the *Data plate*, remove the front panel from the body as described in the *Maintenance* section.

TECHNICAL SPECIFICATIONS

4.3 Wiring diagram

1	Electrical power supply	4	Pump	7	DHW NTC	10	Flue gas pressure switch
2	Gas valve	5	Ignition and detection electrode	8	Heating NTC - Max temperature NTC	11	DHW flowmeter
3	Fan	6	Remote control / room thermostat cable	9	Heating pressure switch	12	Three-way valve



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

Figure 4.3

TECHNICAL SPECIFICATIONS

4.4 Technical data M290F.24CM

(nom.Q.) Nominal heating/d.h.w. heat input (Hi)	kW	25,5
	kcal/h	21926
(nom.Q.) Minimum heat input (Hi) for heating	kW	11,0
	kcal/h	9458
(nom.Q.) Minimum d.h.w. heat input (Hi)	kW	11,0
	kcal/h	9458
Maximum output power for heating/d.h.w.	kW	23,7
	kcal/h	20378
Minimum output power for heating	kW	9,8
	kcal/h	8426
Minimum output power for d.h.w.	kW	9,8
	kcal/h	8426

Measured efficiency		
Nominal efficiency 60°/80°C	%	93,1
Min. efficiency 60°/80°C	%	89,2
Efficiency at 30 % of load	%	92,3
Energy efficiency		n.a.
Heat loss at the chimney with burner operating	Pf (%)	6,4
Heat loss at the chimney with burner off ΔT 50°C	Pfbs (%)	0,2
Heat loss towards the environment through the casing with the burner operating	Pd (%)	0,5
NOx class		3
Weighted NOx ***	mg/kWh	130
	ppm	74

Heating		
Adjustable temperature **	°C	50 - 80
Max. operating temp.	°C	90
Maximum pressure	kPa	300
	bar	3,0
Minimum pressure	kPa	30
	bar	0,3
Available pressure difference (at 1000 l/h)	kPa	20,4
	bar	0,204

** At minimum useful power

Domestic hot water		
Temp. Minimum-Maximum	°C	30 - 60
Maximum pressure	kPa	1000
	bar	10
Minimum pressure	kPa	30
	bar	0,3
Maximum flow rate		
(ΔT =25 K)	l/min	13,6
(ΔT =35 K)	l/min	9,7
Minimum flow rate	l/min	2,5
Specific d.h.w. flow rate (ΔT =30 K) *	l/min	11,2

* Reference standard EN 625

Gas supply pressures			
Gas		Pa	mbar
Methane G20	Nom.	2000	20
	Min.	1700	17
	Max.	2500	25
Propane G31	Nom.	3700	37
	Min.	2500	25
	Max.	4500	45

TECHNICAL SPECIFICATIONS

Electrical data		
Voltage	V ~	230
Frequency	Hz	50
Output at nominal heat input	W	132
Output at minimum heat input	W	130
Output in stand-by	W	3
Degree of protection	IPX5D	

Heating/d.h.w. maximum gas flow rate		
Methane G20	m³/h	2,70
Propane G31	kg/h	1,98
Minimum gas flow rate in heating mode		
Methane G20	m³/h	1,16
Propane G31	kg/h	0,85
Minimum gas flow rate in d.h.w. mode		
Methane G20	m³/h	1,16
Propane G31	kg/h	0,85

Max. gas pressure at the burner in heating mode		
Methane G20	Pa	1350
	mbar	13,5
Propane G31	Pa	3500
	mbar	35,0
Min. gas pressure at the burner in heating mode		
Methane G20	Pa	200
	mbar	2,0
Propane G31	Pa	660
	mbar	6,6

Ignition pressure		
Methane G20	Pa	700
	mbar	7,0
Propane G31	Pa	1700
	mbar	17,0

Nozzles	N°	Ø mm /100
Methane G20	11	130
Propane G31	11	82

Chimney design #		
Max. flue gas temperature	°C	140
Min. flue gas temperature	°C	108
Max. flue gas mass flow rate	kg/s	0,0188
Min. flue gas mass flow rate	kg/s	0,0223
Max. air mass flow rate	kg/s	0,0183
Min. air mass flow rate	kg/s	0,0221

Values refer to tests with 80 mm 1 + 1 twin pipe discharge and Methane gas G20

Flue gas discharges		
Boiler type		
B22 C12 C32 C42 C52 C62 C82		
Coaxial air/flue gas duct Ø	mm	60/100
Twin pipe air/flue gas duct Ø	mm	80/80
Coaxial air/flue gas duct to roof Ø	mm	80/125

Other characteristics		
Height	mm	703
Width	mm	400
Depth	mm	325
Weight	kg	32,7
Max. ambient temperature	°C	60
Min. ambient temperature	°C	-15

G20 Hi. 34.02 MJ/m3 (15°C, 1013.25 mbar)

G31 Hi. 46.34 MJ/kg (15°C, 1013.25 mbar)

1 mbar corresponds to approx. 10 mm H2O (2572)

TECHNICAL SPECIFICATIONS

4.5 Technical data M290F.28CM

(nom.Q.) Nominal heating/d.h.w. heat input (Hi)	kW	29,0
	kcal/h	24936
(nom.Q.) Minimum heat input (Hi) for heating	kW	14,0
	kcal/h	12038
(nom.Q.) Minimum d.h.w. heat input (Hi)	kW	14,0
	kcal/h	12038
Maximum output power for heating/d.h.w.	kW	27,1
	kcal/h	23302
Minimum output power for heating	kW	12,6
	kcal/h	10834
Minimum output power for d.h.w.	kW	12,6
	kcal/h	10834

Measured efficiency		
Nominal efficiency 60°/80°C	%	93,4
Min. efficiency 60°/80°C	%	90,2
Efficiency at 30 % of load	%	92,5
Energy efficiency		n.a.
Heat loss at the chimney with burner operating	Pf (%)	6,2
Heat loss at the chimney with burner off ΔT 50°C	Pfbs (%)	0,2
Heat loss towards the environment through the casing with the burner operating	Pd (%)	0,4
NOx class		3
Weighted NOx ***	mg/kWh	127
	ppm	72

Heating		
Adjustable temperature **	°C	50 - 80
Max. operating temp.	°C	90
Maximum pressure	kPa	300
	bar	3,0
Minimum pressure	kPa	30
	bar	0,3
Available pressure difference (at 1000 l/h)	kPa	28,5
	bar	0,285

** At minimum useful power

Domestic hot water		
Temp. Minimum-Maximum	°C	30 - 60
Maximum pressure	kPa	1000
	bar	10
Minimum pressure	kPa	30
	bar	0,3
Maximum flow rate		
(ΔT =25 K)	l/min	15,5
(ΔT =35 K)	l/min	11,1
Minimum flow rate	l/min	2,5
Specific d.h.w. flow rate (ΔT =30 K) *	l/min	13,1

* Reference standard EN 625

Gas supply pressures			
Gas		Pa	mbar
Methane G20	Nom.	2000	20
	Min.	1700	17
	Max.	2500	25
Propane G31	Nom.	3700	37
	Min.	2500	25
	Max.	4500	45

TECHNICAL SPECIFICATIONS

Electrical data		
Voltage	V ~	230
Frequency	Hz	50
Output at nominal heat input	W	150
Output at minimum heat input	W	148
Output in stand-by	W	3
Degree of protection	IPX5D	

Heating/d.h.w. maximum gas flow rate		
Methane G20	m³/h	3,07
Propane G31	kg/h	2,25
Minimum gas flow rate in heating mode		
Methane G20	m³/h	1,48
Propane G31	kg/h	1,09
Minimum gas flow rate in d.h.w. mode		
Methane G20	m³/h	1,48
Propane G31	kg/h	1,09

Max. gas pressure at the burner in heating mode		
Methane G20	Pa	1160
	mbar	11,6
Propane G31	Pa	3300
	mbar	33,0
Min. gas pressure at the burner in heating mode		
Methane G20	Pa	220
	mbar	2,2
Propane G31	Pa	750
	mbar	7,5

Ignition pressure		
Methane G20	Pa	730
	mbar	7,3
Propane G31	Pa	1550
	mbar	15,5

Nozzles	N°	Ø mm /100
Methane G20	13	130
Propane G31	13	79

Chimney design #		
Max. flue gas temperature	°C	142
Min. flue gas temperature	°C	113
Max. flue gas mass flow rate	kg/s	0,0207
Min. flue gas mass flow rate	kg/s	0,0228
Max. air mass flow rate	kg/s	0,0201
Min. air mass flow rate	kg/s	0,0225

Values refer to tests with 80 mm 1 + 1 twin pipe discharge and Methane gas G20

Flue gas discharges		
Boiler type		
B22 C12 C32 C42 C52 C62 C82		
Coaxial air/flue gas duct Ø	mm	60/100
Twin pipe air/flue gas duct Ø	mm	80/80
Coaxial air/flue gas duct to roof Ø	mm	80/125

Other characteristics		
Height	mm	703
Width	mm	400
Depth	mm	325
Weight	kg	34,5
Max. ambient temperature	°C	60
Min. ambient temperature	°C	-15

G20 Hi. 34.02 MJ/m3 (15°C, 1013.25 mbar)

G31 Hi. 46.34 MJ/kg (15°C, 1013.25 mbar)

1 mbar corresponds to approx. 10 mm H2O (2574)

TECHNICAL SPECIFICATIONS

4.6 Technical data M290F.32CM

(nom.Q.) Nominal heating/d.h.w. heat input (Hi)	kW	31,2
	kcal/h	26827
(nom.Q.) Minimum heat input (Hi) for heating	kW	14,0
	kcal/h	12038
(nom.Q.) Minimum d.h.w. heat input (Hi)	kW	14,0
	kcal/h	12038
Maximum output power for heating/d.h.w.	kW	29,1
	kcal/h	25021
Minimum output power for heating	kW	12,6
	kcal/h	10834
Minimum output power for d.h.w.	kW	12,6
	kcal/h	10834

Measured efficiency		
Nominal efficiency 60°/80°C	%	93,3
Min. efficiency 60°/80°C	%	90,2
Efficiency at 30 % of load	%	92,3
Energy efficiency		n.a.
Heat loss at the chimney with burner operating	Pf (%)	6,2
Heat loss at the chimney with burner off ΔT 50°C	Pfbs (%)	0,2
Heat loss towards the environment through the casing with the burner operating	Pd (%)	0,5
NOx class		3
Weighted NOx ***	mg/kWh	132
	ppm	75

Heating		
Adjustable temperature **	°C	50 - 80
Max. operating temp.	°C	90
Maximum pressure	kPa	300
	bar	3,0
Minimum pressure	kPa	30
	bar	0,3
Available pressure difference (at 1000 l/h)	kPa	28,5
	bar	0,285

** At minimum useful power

Domestic hot water		
Temp. Minimum-Maximum	°C	30 - 60
Maximum pressure	kPa	1000
	bar	10
Minimum pressure	kPa	30
	bar	0,3
Maximum flow rate		
(ΔT=25 K)	l/min	16,7
(ΔT=35 K)	l/min	11,9
Minimum flow rate	l/min	2,5
Specific d.h.w. flow rate (ΔT=30 K) *	l/min	14,1

* Reference standard EN 625

Gas supply pressures			
Gas		Pa	mbar
Methane G20	Nom.	2000	20
	Min.	1700	17
	Max.	2500	25
Propane G31	Nom.	3700	37
	Min.	2500	25
	Max.	4500	45

TECHNICAL SPECIFICATIONS

Electrical data		
Voltage	V ~	230
Frequency	Hz	50
Output at nominal heat input	W	150
Output at minimum heat input	W	148
Output in stand-by	W	3
Degree of protection	IPX5D	

Heating/d.h.w. maximum gas flow rate		
Methane G20	m³/h	3,30
Propane G31	kg/h	2,42
Minimum gas flow rate in heating mode		
Methane G20	m³/h	1,48
Propane G31	kg/h	1,09
Minimum gas flow rate in d.h.w. mode		
Methane G20	m³/h	1,48
Propane G31	kg/h	1,09

Max. gas pressure at the burner in heating mode		
Methane G20	Pa	1340
	mbar	13,4
Propane G31	Pa	3480
	mbar	34,8
Min. gas pressure at the burner in heating mode		
Methane G20	Pa	220
	mbar	2,2
Propane G31	Pa	750
	mbar	7,5

Ignition pressure		
Methane G20	Pa	730
	mbar	7,3
Propane G31	Pa	1550
	mbar	15,5

Nozzles	N°	Ø mm /100
Methane G20	13	130
Propane G31	13	79

Chimney design #		
Max. flue gas temperature	°C	145
Min. flue gas temperature	°C	113
Max. flue gas mass flow rate	kg/s	0,0205
Min. flue gas mass flow rate	kg/s	0,0228
Max. air mass flow rate	kg/s	0,0199
Min. air mass flow rate	kg/s	0,0225

Values refer to tests with 80 mm 1 + 1 twin pipe discharge and Methane gas G20

Flue gas discharges		
Boiler type		
B22 C12 C32 C42 C52 C62 C82		
Coaxial air/flue gas duct Ø	mm	60/100
Twin pipe air/flue gas duct Ø	mm	80/80
Coaxial air/flue gas duct to roof Ø	mm	80/125

Other characteristics		
Height	mm	703
Width	mm	400
Depth	mm	325
Weight	kg	34,5
Max. ambient temperature	°C	60
Min. ambient temperature	°C	-15

G20 Hi. 34.02 MJ/m3 (15°C, 1013.25 mbar)

G31 Hi. 46.34 MJ/kg (15°C, 1013.25 mbar)

1 mbar corresponds to approx. 10 mm H2O (2576)

TECHNICAL SPECIFICATIONS

4.7 Hydraulic characteristics

The hydraulic characteristics represent the pressure (head) available in the heating system based on the flow rate.

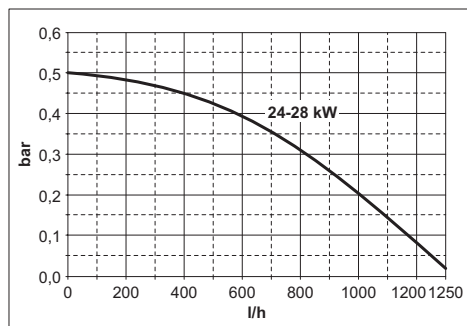


Figure 4.4

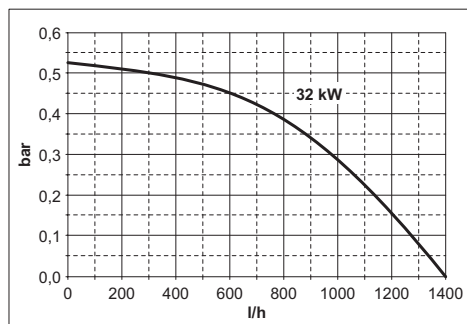


Figure 4.5

The load loss for the boiler has already been subtracted.

Flow rate with the thermostatic cocks closed

The boiler has an automatic by-pass, which protects the primary condensate exchanger. If the circulation of water in the heating system decreases too much or totally stops due to the closure of thermostatic valves or circuit cocks, the by-pass guarantees a minimum circulation of water inside the primary condensate exchanger.

The by-pass is calibrated for a differential pressure of approx. 0.3-0.4 bar.

4.8 Expansion vessel

The difference in height between the safety valve and the highest point in the system can be max. 10 metres.

If differences are greater, increase the pre-load pressure of the expansion tank and the cold system by 0.1 bar for each 1 metre increase.

Total capacity	l	8.0
Pre-load pressure	kPa	100
	bar	1.0
Useful capacity	l	4.0
Maximum system content *	l	124

Figure 4.6

* In conditions of:

- Max. average system temperature of 85°C
- Initial temperature when filling the system 10°C.



For systems with contents that exceed the maximum system content (indicated in the table), a supplementary expansion tank must be installed.

INSTALLATION

5 INSTALLATION

5.1 Warnings



Protective gloves must be worn.



The unit must discharge the combustion products directly outside or into a suitable exhaust flue designed for that purpose and in compliance with current national and local standards.

The unit is not suitable for receiving condensate from the combustion product evacuation system.

Before installation, it is **mandatory** to thoroughly wash all of the system pipes with non-aggressive chemical products. The purpose of this procedure is to remove any residues or impurities that could jeopardise good boiler operation.

After washing, the system must be treated. The conventional warranty does not cover any problems resulting from failure to follow these instructions.

Check:

- That the boiler is suitable for the type of gas supplied (see adhesive label). If it is necessary to adapt the boiler to a different type of gas, see section "GAS CONVERSION" on page 53.
- That the characteristics of the electric, water and gas supply networks comply with those on the plate.

The minimum heating system return temperature must never be lower than 40 °C.

The combustion products may only be discharged using the flue gas exhaust kits provided by the manufacturer, as they are an integral part of the boiler.

For LPG gas (Propane G31), the installation must also comply with the requirements of the distributing companies and with the requirements of current technical standards and laws.

The safety valve must be connected to a suitable discharge duct to avoid flooding if it is triggered.

The electric installation must comply with technical standards, in particular:

- It is **mandatory** to connect the boiler to an effective earthing system via a specific terminal.
- A multiway switch must be installed near the boiler to allow complete disconnection in conditions of category III over-voltage. For the electrical connections, refer to section "Electrical connections" on page 35.
- **The electric conductors for connecting the ambient thermostat and the external sensor to the boiler** must go through different channels than those for the mains voltage (230 V), as they are supplied with low safety voltage.

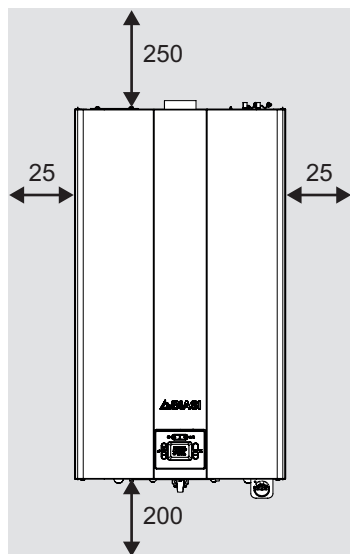
5.2 Installation precautions



Follow these installation instructions:

- Mount the boiler on a strong wall.
- Respect the measurements of the flue gas evacuation duct (provided in section "Flue gas outlet dimensions and lengths" on page 30) and the correct systems for installing the duct shown in the instruction sheet provided together with the flue gas evacuation pipe kit.
- Leave the minimum distances indicated in Figure 5.1 around the unit.

INSTALLATION



All measurements are in mm

Figure 5.1

- Leave 5 cm of free space in front of the boiler if it is inserted in a cabinet, shelter or niche.
- In the case of an old heating system, before installing the boiler, carefully clean it in order to remove any sludgy deposits that have formed over time.
- We recommended installing a purification filter in the system or using a product that conditions the circulating water. This latter solution, in particular, not only cleans the system but also provides anti-corrosion protection by forming a protective film on the metal surfaces and neutralising the gases in the water.



Filling the central heating system:

- If the boiler is installed in rooms where the ambient temperature could fall below 0°C, it is recommended to take the proper precautions in order to prevent damaging

the boiler.

- Do not add antifreeze or anticorrosion products to the heating water in the wrong concentrations or use those with chemical/physical characteristics that are incompatible with the boiler's hydraulic components.

The manufacturer does not assume any liability for this type of damage.

Inform the user about the boiler's anti-freeze function and any chemical products added to the heating system.

5.3 Installing the boiler bracket

The boiler is provided with a bracket for assembly.

A paper template that contains all the measurements and information for correctly installing the support is provided.

The hydraulic and gas system must terminate with female fittings, 3/4" for the gas fitting and for the heating delivery and return, and 1/2" for the DHW inlet and outlet, or with welded copper pipes with, respectively, 18 mm Ø and 14 mm Ø.

For measurements and useful data see section "Dimensions" on page 29, "Fittings" page 29, "Flue gas outlet dimensions and lengths" page 30.

INSTALLATION

5.4 Dimensions

The boiler complies with the following dimensions:

- A** Flue gas exhaust / air suction (coaxial Ø 100/60)
- B** Flue gas exhaust (Ø 80 twin pipe)
- C** Air suction (Ø 80 twin pipe)
- D** Boiler mounting bracket
- E** Area for positioning the electric connection channels
- F** MR - Heating delivery
- G** US - DHW output
- H** Gas
- I** ES - DHW inlet
- J** RR - Heating return

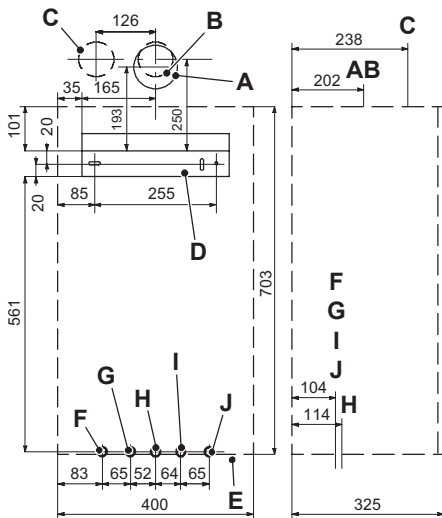


Figure 5.2

5.5 Fittings

The boiler uses the following fittings:

	Cock	Pipe Ø
MR		Ø 16/18
US		Ø 12/14
Gas	G 3/4 MF	Ø 16/18
ES		Ø 12/14
RR		Ø 16/18
G1/2F 3 bar safety valve fitting		

5.6 Boiler assembly

- Remove the protective caps from the boiler pipes.
- Hook the boiler onto the bracket.
- Screw the cock on the boiler.
- Fix or weld the flared stub pipes, respectively Ø 14 mm for the DHW inlet and outlet, and Ø 18 mm for the hydraulic system return, delivery and gas.

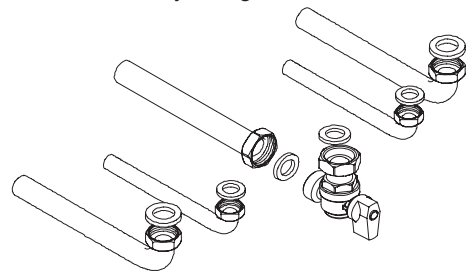


Figure 5.3

- Install a shut-off cock on the DHW inlet. The purpose of the cock is to hydraulically isolate the unit, making normal maintenance possible.
- If the hydraulic heating system is higher than the boiler surface, cocks should be installed in order to disconnect the system for maintenance purposes.
- Block the pipes by placing 1/2" and 3/4" gaskets between the boiler fittings.
- Carry out a leakage test for the gas supply system.

INSTALLATION

- Connect the safety valve discharge 9 (Figure 5.4) to an outlet funnel.

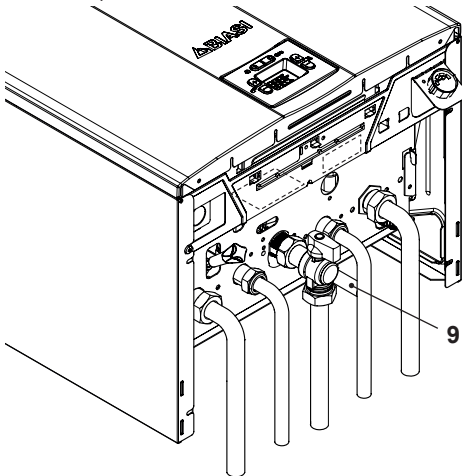


Figure 5.4

5.7 Flue gas outlet dimensions and lengths

The flue gas outlet/air suction can be set up in the following ways:

C₁₂ C₃₂ C₄₂ C₅₂ C₆₂ C₈₂ B₂₂

Consult the sheet provided with the selected kit which is packaged separately.

The horizontal sections of the flue gas pipes must have a slope of approx. 1.5 degrees (25 mm per metre).



The outlet duct must be constructed in such a way as to absolutely prevent the stagnation of condensate inside the duct as well as the backflow of the condensate inside the combustion chamber, therefore the terminal must be lower than the boiler side opening.

Therefore, follow the general instructions for installing the horizontal sections and install one or more condensate collection

kits where necessary.

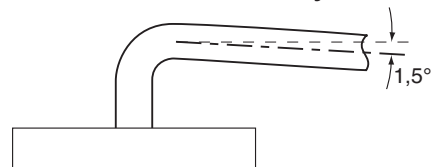


Figure 5.5

The following kits are available for connection to the boiler:

Wall-mounted flue gas outlet kit (Figure 5.8 A)

Coaxial duct Ø 60/100 mm with a nominal length (L Figure 5.8) of 915 mm.

This kit is used to release flue gases through the wall behind or to the side of the boiler. The minimum length of the duct and the maximum length with an extension must comply with the following parameters:

Coaxials Ø 60/100 mm	Diaphragm
M290F.24CM	
For lengths between 0.5 m and 2 m	Ø 39 mm
For lengths between 2 m and 4 m	None
M290F.28CM - M290F.32CM	
For lengths between 0.5 m and 2 m	Ø 44 mm
For lengths between 2 m and 4 m	None

Figure 5.6



The diaphragm must be inserted or removed following the instructions in Figure 5.6.

The diaphragm must be positioned as shown in Figure 5.7.

INSTALLATION

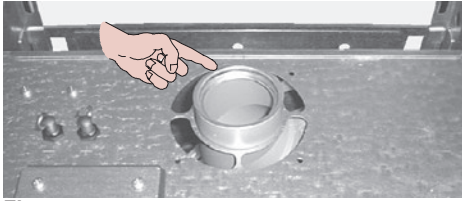


Figure 5.7

Vertical flue gas outlet kit with 90° elbow (Figure 5.8 B)

Coaxial duct Ø 60/100 mm (Figure 5.8).

This kit is used to raise the outlet axis of the boiler by 635 mm.

The minimum length of the duct and the maximum length with an extension must comply with the parameters in the previous tables.

The terminal must always discharge horizontally.

Additional 45° or 90° elbows (Figure 5.8 C)

Coaxial elbows Ø 60/100 mm. When these elbows are used in the duct, they reduce the maximum length of the flue gas duct by:

For a 45° elbow loss	0.5 m
For a 90° elbow loss	1 m

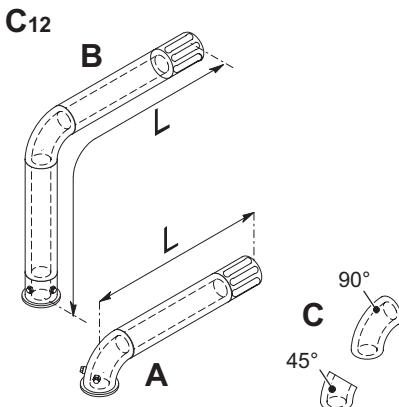


Figure 5.8

Twin pipe suction outlet duct kit Ø 80 mm (Figure 5.12 - Figure 5.13)

This kit is used to separate the flue gas outlet from the air suction.

The terminals can be inserted in exhaust flues designed for this purpose, or discharge flue gas or intake air directly on the wall.

The minimum length of the pipes may not be less than 1 m, while the max sum of the sections **A + B** (see Figure 5.12 and Figure 5.13) that can be achieved using extensions must not exceed the values provided in the following table (see also the table in Figure 5.10 for the 24 kW model, the table in Figure 5.11 for the 28 kW and 32 kW models):

Model	Max length (A+B)
24 kW	25 meters
28 kW	15.5 meters
32 kW	15.5 meters

Extensions are available in order to achieve the maximum permissible lengths.



Based on the maximum length that can be implemented with the kit, insert the correct diaphragm between the boiler surface and the flue gas /air suction stub pipe.

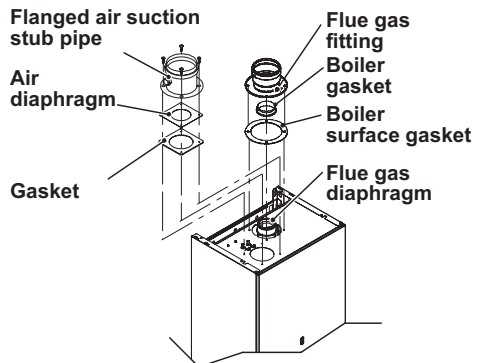


Figure 5.9

INSTALLATION

M290F.24CM

Twin split pipes Ø 80/80 mm	Diaphragm	
	Flue gas	Air
For lengths between 0.5 m and 25 m	Ø 45 mm	Ø 50 mm

Figure 5.10

M290F.28CM - M290F.32CM

Twin split pipes Ø 80/80 mm	Diaphragm	
	Flue gas	Air
For lengths between 0.5 m and 6 m	Ø 45 mm	Ø 50 mm
For lengths between 6 m and 15.5 m	Ø no	Ø 50 mm

Maximum length of the suction duct 13 metres

Figure 5.11

C12

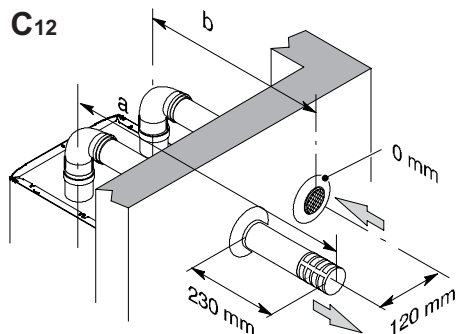


Figure 5.12

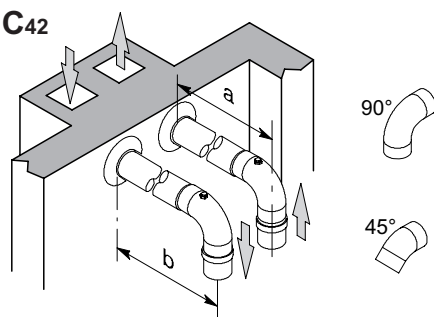


If the flue gas outlet pipe crosses through inflammable walls, it must be insulated with at least 5 cm of insulation.

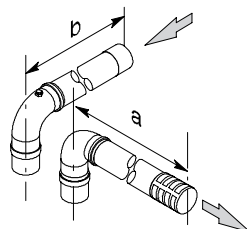
90° and 45° elbows are available that reduce the total max length of the ducts by:

For a 45° elbow loss	0.9 m
For a 90° elbow loss	1.65 m

C42



C52



C82

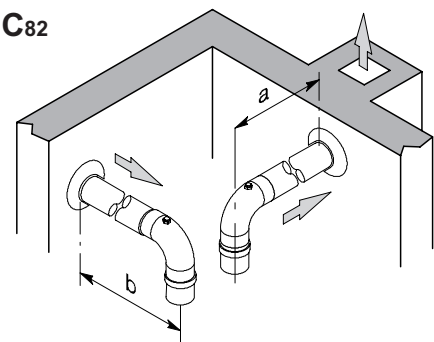


Figure 5.13



The air intake and the flue gas outlet must not be installed on opposite walls of the building (EN 483).



In the flue gas exhaust duct there's a risk of condensation for sections longer than 7 metres.

TYPE C62

If using ducts and terminals from another manufacturer (type C62), these must be ap-

INSTALLATION

proved and, in the case of a flue gas duct, materials must be used that comply with the condensation products.

When dimensioning the ducts, take into account the residual pressure difference at the fan:

Useful static pressure at nominal heat input	24 kW	160	Pa
	28 kW	160	Pa
	32 kW	160	Pa
Overheated flue	24 kW	146	°C
	28 kW	144	°C
	32 kW	148	°C
Maximum recirculation of CO2 in the suction duct	24 kW	0,65	%
	28 kW	0,82	%
	32 kW	0,82	%

Roof-mounted flue gas outlet kit (Figure 5.14)

Coaxial duct Ø 80/125 mm with a nominal length of 0.96 m.

This kit makes it possible to release the flue gases directly through the roof.

C32

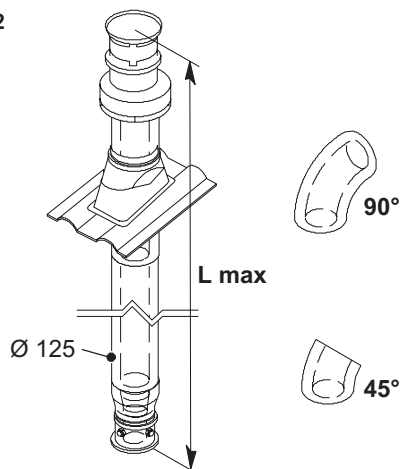


Figure 5.14

Extensions are available for reaching the maximum height.
Its maximum height (L Figure 5.14) with the

extensions is:

Coaxials Ø 80/125 mm (Roof outlet)	Diaphragm
M290F.24CM	
For lengths between 0.5 m and 4.0 m	Ø 39 mm
For lengths between 4.0 m and 8.5 m	None
M290F.28CM - M290F.32CM	
For lengths between 0.5 m and 4.0 m	Ø 44 mm
For lengths between 4.0 m and 8.5 m	None
<i>For lengths greater than 1 metre, install the condensate collection fitting</i>	

Figure 5.15



The diaphragm must be inserted or removed following the instructions provided in this section. The diaphragm must be positioned as shown in Figure 5.7.

Coaxial Ø 80/125 mm 90° and 45° elbows are available that reduce the total max. length of the ducts by:

For a 45° elbow loss	0.5 m
For a 90° elbow loss	1 m



For lengths greater than 1 metre, install the condensate collection fitting.

Outlet kit TYPE B22 (Figure 5.16)

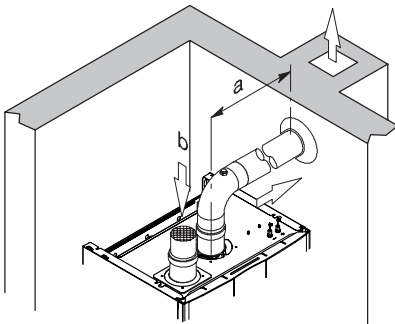
This type of flue gas outlet extracts the necessary combustion air from the same room as the boiler is installed in; the combustion products must be released outside and the outlet pipe can be through the wall or a chimney.

INSTALLATION



There must be a suitable air intake in the room where the boiler is installed for the supply of combustion air and for room ventilation.

For proper operation, the minimum necessary air exchange must be 2 m³/h for each kW of heat input.



B22

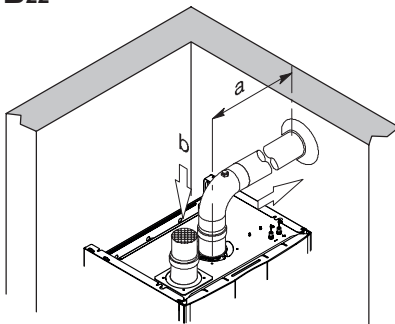


Figure 5.16

Extensions are available in order to achieve the maximum permissible lengths.

B22 Ø 80 mm outlet	Diaphragm	
	Flue gas	Air
M290F.24CM		
For lengths between 0.5 m and 15 m	Ø 45 mm	Ø 50 mm
M290F.28CM - M290F.32CM		
For lengths between 0.5 m and 6 m	Ø 45 mm	Ø 50 mm
For lengths between 6 m and 15 m	None	Ø 50 mm
<i>For lengths greater than 1 metre, install the condensate collection fitting</i>		

Figure 5.17



The diaphragm must be positioned as shown in Figure 5.7.



For flue gas/air diaphragms and the maximum lengths, refer to figures Figure 5.9, Figure 5.10 and Figure 5.11.

90° and 45° elbows are available that reduce the total max length of the ducts by:

For a 45° elbow loss	0.9 m
For a 90° elbow loss	1.65 m



In the flue gas exhaust duct there's a risk of condensation for sections longer than 7 metres.

INSTALLATION

5.8 Electrical connections

- Unscrew the screws **K** and remove the front panel **L** by pulling it towards you Figure 5.18.

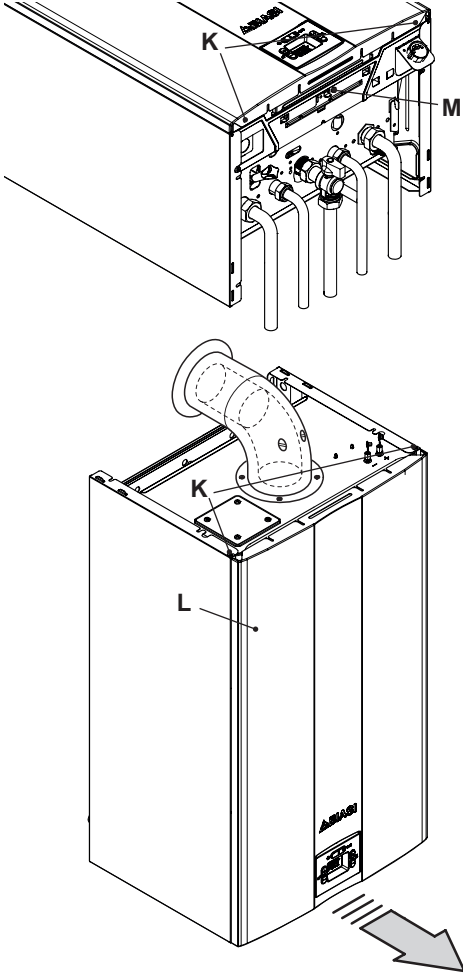


Figure 5.18

- Unscrew the screw **M** (Figure 5.18) and turn the control panel **N**, as shown in Figure 5.19.

To access the electric power supply, remote and external sensor terminal boards and the control board, proceed as follows:

- Unscrew the screw **O** and lift the cover **P** to release the cables from the cable gland (Figure 5.19).
- Loosen the screws **Q** and lift the cover **R** (Figure 5.19).

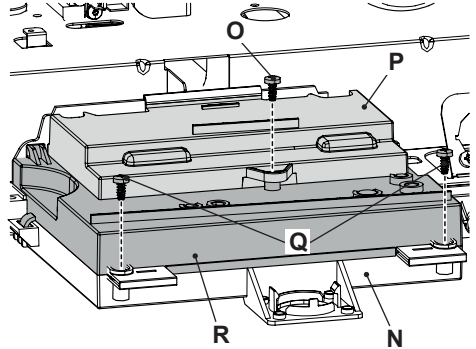


Figure 5.19

Connecting to the electric power supply grid

- Connect the electric power supply cable to the all-pole switch, respecting the correspondence of the power line (brown wire) and the neutral (blue wire) Figure 5.20.
- Connect the earth wire (yellow/green) to an effective earthing system.

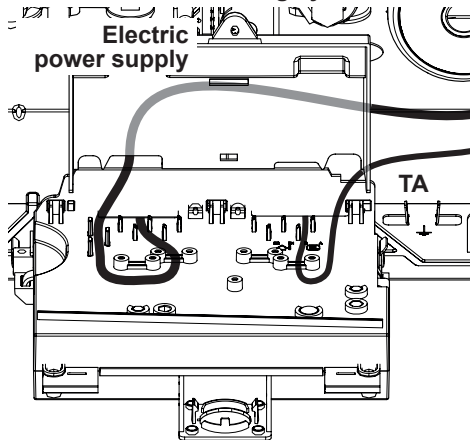


Figure 5.20

INSTALLATION



The earth wire must be longer than the electric power wires.

The unit's electric power supply cable or wire must have a minimum section of 0.75 mm², be kept away from hot or sharp parts, and comply with current technical standards.

5.9 Connecting a room thermostat or zone valves

Connect the cable for the room thermostat with a label in Figure 5.21.



Do not connect live cables to the room thermostat cable.

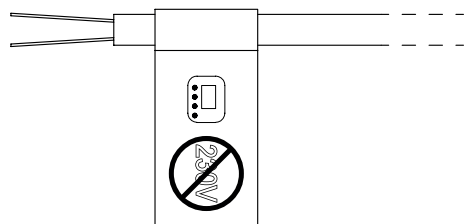


Figure 5.21

The thermostat must have class II insulation (□) or be correctly connected to the earth.

Connecting zone valves controlled by the room thermostat

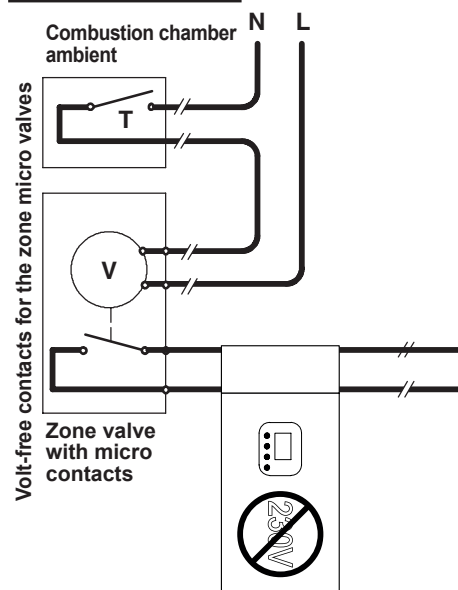


Figure 5.22

Use the room thermostat cable indicated in Figure 5.21 to connect the zone valves. The electric conductors on the zone valve micro contacts must be connected to the ambient thermostat cable wires as shown in Figure 5.22.



Do not connect live cables to the room thermostat cable.

5.10 Electrical connection of the remote control (optional)

Use the ambient thermostat cable marked with a label indicated in Figure 5.21 to connect the remote.

5.11 Enabling of operation with remote control (optional)

The boiler leaves the factory with a room thermostat enabled.

INSTALLATION

To change this setting to remote control, enter “programming mode” by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 5.23). The code **P00** appears on the display, indicating entry into “parameter P00” (Figure 5.24).

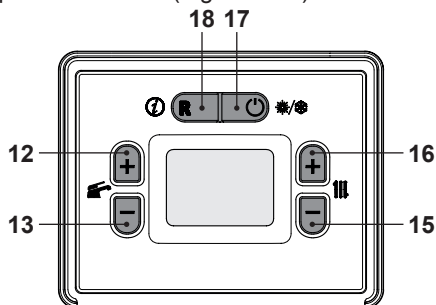


Figure 5.23



Figure 5.24

- Scroll through the various parameters using 12 or 13 until the LCD display shows the message **Cod**, indicating entry into “parameter Cod” (Figure 5.25), and then displays three dashes “- - -”.



Figure 5.25

- Press the 16 button to set “1 - -”, then press 12 to confirm the 1 and go to the next segment.
- Press the 16 button to set “1°9 -”, then press 12 to confirm the 9 and go to the next segment.

- Press the 16 button to set “1°9°8”, then press 12 to confirm the 8 and go back to the list of parameters.
- Press button 13 and hold until the LCD display shows the code **A21**, indicating entry into “parameter A21” (Figure 5.26).



Figure 5.26

- By using buttons 15 or 16 (Figure 5.23) it is possible to modify the value of parameter A21 (Figure 5.27).

00 = Room thermostat

01 = Remote control

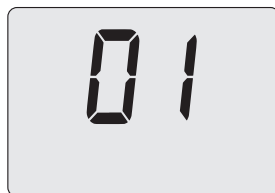


Figure 5.27

- Press 12 or 13 (Figure 5.23) to confirm the value entered and return to the list of parameters (Figure 5.26).
- Press the 17 button (Figure 5.23) to exit “programming mode”.

5.12 Installing the external temperature sensor (optional)

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

- Direct radiation of the sun's rays.
- Damp walls or walls where mould forms.
- Installation near fans, drain outlets or chimneys.

INSTALLATION

5.13 Electrical connection between the boiler and the external sensor

To connect the external sensor to the boiler, use electric cables with a cross section of no less than 0.50 mm².

The electrical conductors for connecting the external sensor to the boiler must go through different channels to those for the mains voltage (230 V), as they are supplied at a safe low voltage and cannot exceed 20 metres in length.

Use the control board terminals indicated in Figure 5.28 to connect the external sensor. The external sensor connection wires must follow the path indicated of the ambient thermostat and come through the back of the boiler.

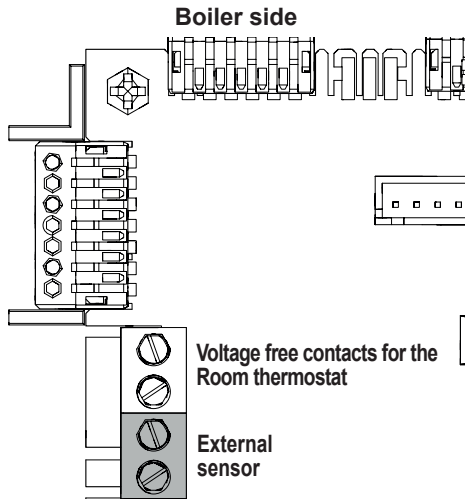


Figure 5.28

5.14 Enabling operation with the external sensor and setting the K coefficient

The boiler is set with a K coefficient equal to zero for boiler operation without the probe connected.

The K coefficient is a parameter that increases or decreases the boiler delivery temperature as the outdoor temperature varies.

When installing the external sensor, this parameter must be set based on the efficiency of the heating system to optimise the delivery temperature.

With heating temperature setting **28-55°C** (Figure 5.29) or temperature setting **50-80°C** (factory set) (Figure 5.30) (see "Selecting the heating temperature set" on page 41).

Delivery temperature °C (28-55°C)

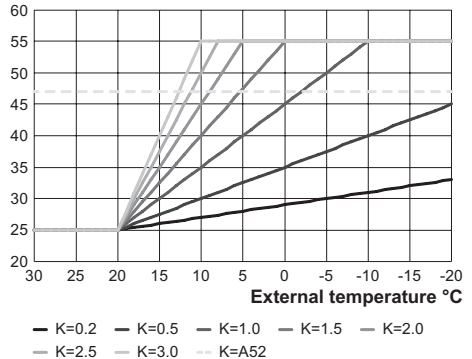


Figure 5.29

Delivery temperature °C (50-80°C)

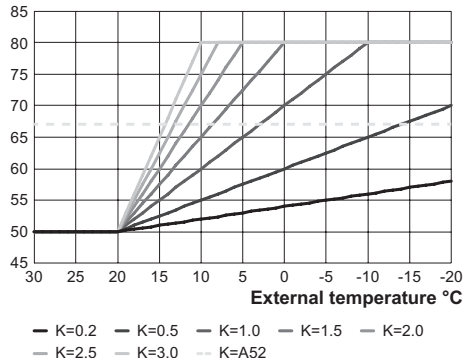


Figure 5.30

INSTALLATION

Sequence for setting the K coefficient

- Enter “programming mode” by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 5.31). The code **P00** appears on the display, indicating entry into “parameter P00” (Figure 5.32).

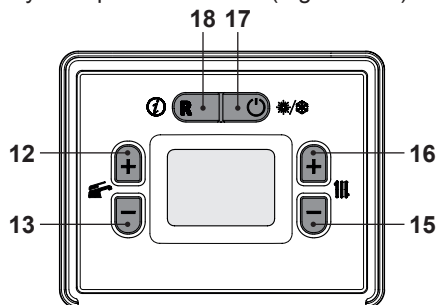


Figure 5.31



Figure 5.32

- Scroll through the various parameters using 12 or 13 until the LCD display shows the code **P07**, indicating entry into “parameter P07” (Figure 5.33).

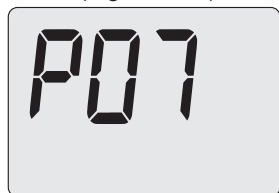


Figure 5.33

- Press 16 (Figure 5.31) to show the value of parameter P07 on the LCD display (Figure 5.34).

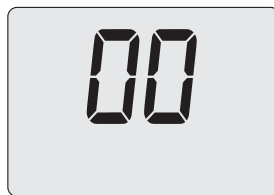


Figure 5.34

- By using buttons 15 or 16 (Figure 5.31) it is possible to modify the value of parameter P07:
00 = probe disabled (preset)
01 = probe enabled
- Press 12 or 13 (Figure 5.31) to confirm the value entered and return to the list of parameters Figure 5.33.
- Press the 17 button (Figure 5.31) to exit “programming mode”.
- Press 13 and hold until the LCD display shows the code **P08**, indicating entry into “parameter P08” (Figure 5.35).

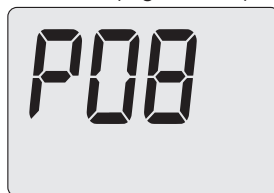


Figure 5.35

- Using buttons 15 or 16 it is possible to change the value of parameter P08 from a minimum of **1.0** to a maximum of **3.0** based on the selected curve of the K coefficient in Figure 5.29 (the value read on the display corresponds to the decimal values of the K coefficients).
- Press 12 or 13 (Figure 5.31) to confirm the value entered and return to the list of parameters (Figure 5.35).
- Press the 17 button (Figure 5.31) to exit “programming mode”.

At this point the system delivery tempera-

INSTALLATION

ture will follow the trend in relation to the set K coefficient.

If the room temperature is not comfortable, you can increase or decrease the heating system delivery temperature by $\pm 5^{\circ}\text{C}$ using the 15 (decrease) and 16 (increase) buttons (Figure 5.31).

With heating temperature setting **28-55°C** the temperature trend for **K 1.0** is shown in Figure 5.36, while, with temperature setting **50-80°C** (factory preset), the temperature trend for **K 1.0** is shown in Figure 5.37.

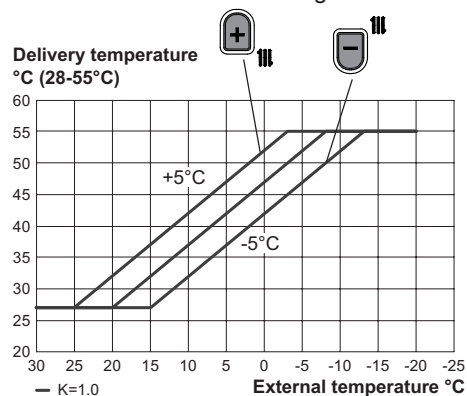


Figure 5.36

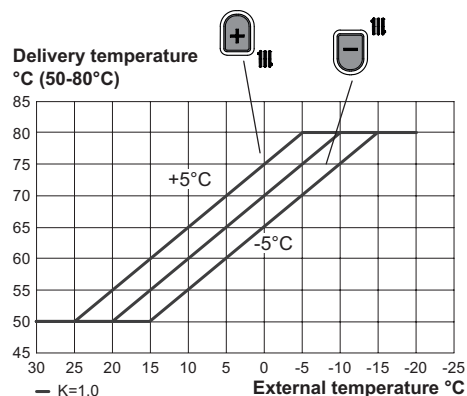


Figure 5.37

5.15 Selecting the maximum heating temperature setpoint with climatic curve set

Depending on the type of high or low temperature heating system, the maximum climatic curve temperature can be set.

In heating mode, the boiler is set for a temperature range of between a minimum of 50°C and a maximum of 80°C (high temperature) or a minimum of 27°C and a maximum of 55°C (low temperature). Please see also "Selecting the heating temperature setpoint". For specific heating system needs, once the climatic curve has been set, the maximum temperature can be lowered.

- Enter "programming mode" by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 5.38). The code **P00** appears on the display, indicating entry into "parameter P00" (Figure 5.39).

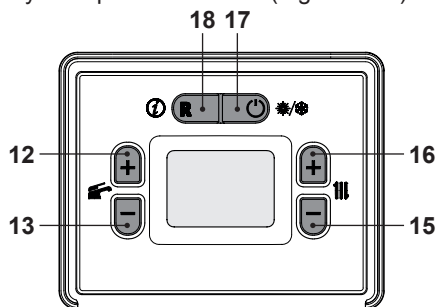


Figure 5.38



Figure 5.39

- Scroll through the various parameters using 12 or 13 until the LCD display shows the message **Cod**, indicating entry into "parameter Cod" (Figure 8.4), and then

INSTALLATION

displays three dashes “- - -”.



Figure 5.40

- Press the 16 button to set “1 - -”, then press 12 to confirm the 1 and go to the next segment.
- Press the 16 button to set “1°9 -”, then press 12 to confirm the 9 and go to the next segment.
- Press the 16 button to set “1°9°8”, then press 12 to confirm the 8 and go back to the list of parameters.
- Press 12 and hold until the LCD display shows the code **A52**, indicating entry into “parameter A52” (Figure 5.41).

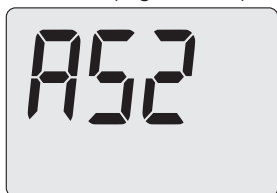


Figure 5.41

- By using buttons 15 or 16 (Figure 5.38) it is possible to modify the value of parameter A52:
 $80^{\circ}\text{C} \div 50^{\circ}\text{C}$ = high temperature
 $55^{\circ}\text{C} \div 27^{\circ}\text{C}$ = low temperature
- Press 12 or 13 (Figure 5.38) to confirm the value entered and return to the list of parameters (Figure 5.41).
- Press the 17 button (Figure 5.38) to exit “programming mode”.

5.16 Selecting the heating temperature set

Depending on the type of high or low tem-

perature heating system, the temperature setting range can be set.

In heating mode, the boiler is set for temperatures between 50°C and 80°C . This range can be changed to a minimum of 28°C and a maximum of 55°C .

- Enter “programming mode” by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 5.42). The code **P00** appears on the display, indicating entry into “parameter P00” (Figure 5.43).

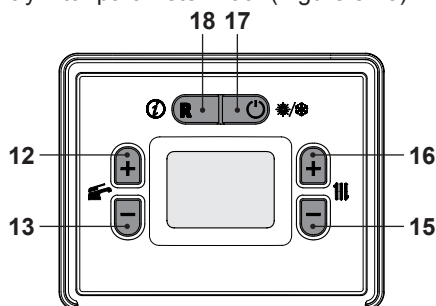


Figure 5.42



Figure 5.43

- Scroll through the various parameters using 12 or 13 until the LCD display shows the message **Cod**, indicating entry into “parameter Cod” (Figure 8.4), and then displays three dashes “- - -”.



Figure 5.44

INSTALLATION

- Press the 16 button to set “1 - -”, then press 12 to confirm the 1 and go to the next segment.
- Press the 16 button to set “1°9 -”, then press 12 to confirm the 9 and go to the next segment.
- Press the 16 button to set “1°9°8”, then press 12 to confirm the 8 and go back to the list of parameters.
- Press 12 and hold until the LCD display shows the code **A02**, indicating entry into “parameter A02” (Figure 5.45).



Figure 5.45

- By using buttons 15 or 16 (Figure 5.42) it is possible to modify the value of parameter A02:
01 = high temperature (50/80°C)
02 = low temperature (28/55°C)
- Press 12 or 13 (Figure 5.42) to confirm the value entered and return to the list of parameters (Figure 5.45).
- Press the 17 button (Figure 5.42) to exit “programming mode”.

5.17 Setting pump post-circulation

The pump, in heating mode, is set for a post-circulation of about one minute at the end of each heat request.

This time can be programmed from a minimum of zero to a maximum of ninety-nine seconds.

- Enter “programming mode” by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 5.46). The code **P00** appears on the display, indicating entry into “parameter P00” (Figure 5.47).

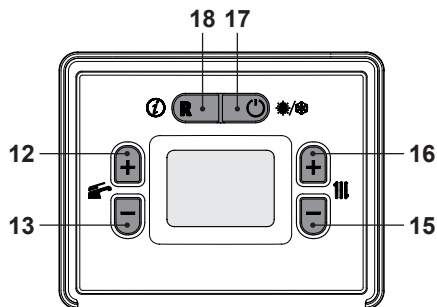


Figure 5.46



Figure 5.47

- Scroll through the various parameters using 12 or 13 until the LCD display shows the code **P03**, indicating entry into “parameter P03” (Figure 5.48).

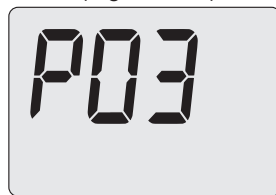


Figure 5.48

- Press 16 (Figure 5.46) to show the value of parameter P03 on the LCD display (Figure 5.49).

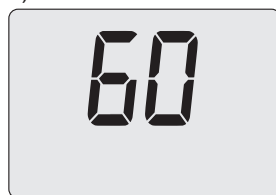


Figure 5.49

- By using buttons 15 or 16 it is possible to

INSTALLATION

modify the value of parameter 03 from 0 to 99 seconds.

- Press 12 or 13 (Figure 5.46) to confirm the value entered and return to the list of parameters (Figure 5.48).
- Press the 17 button (Figure 5.46) to exit "programming mode".

5.18 Selecting re-ignition frequency

When the boiler functions in normal on/off heating mode, the minimum time between two ignitions is set to 1 minute (re-ignition frequency).

This time can be programmed from a minimum of 0 to a maximum of 255 minutes.

- Enter "programming mode" by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 5.50). The code **P00** appears on the display, indicating entry into "parameter P00" (Figure 5.51).

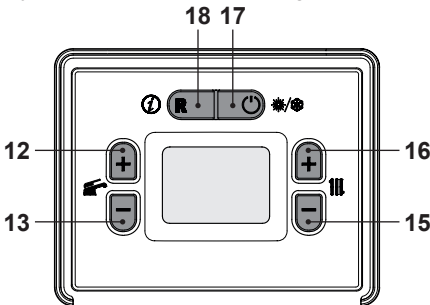


Figure 5.50



Figure 5.51

- Scroll through the various parameters using 12 or 13 until the LCD display shows the code **P05**, indicating entry into "pa-

rameter P05" (Figure 5.52).



Figure 5.52

- Press 16 (Figure 5.50) to show the value of parameter P05 on the LCD display (Figure 5.53).



Figure 5.53

- By using buttons 15 or 16 it is possible to modify the value of parameter P05 from 0 to 255 minutes.
- Press 12 or 13 (Figure 5.50) to confirm the value entered and return to the list of parameters (Figure 5.52).
- Press the 17 button (Figure 5.50) to exit "programming mode".

INSTALLATION

5.19 Examples of hydraulic systems with hydraulic separator (optional)

The hydraulic separator creates a reduced load loss zone that makes the primary circuit and secondary circuit hydraulically independent.

In this case, the flow rate that passes through the circuits depends exclusively on the characteristics of the flow rate of the pumps.

Therefore by using a hydraulic separator, the secondary circuit's flow rate is circulated only when the relative pump is on.

When the pump for the secondary circuit is off, there is no circulation in the corresponding circuit and therefore the flow rate pushed by the pump in the primary circuit is by-passed through the separator.

Therefore, with a hydraulic separator it is possible to have a production circuit with a constant flow rate and a distribution circuit with a variable flow rate.

Examples of hydraulic systems

High temperature zone + low temperature zone.

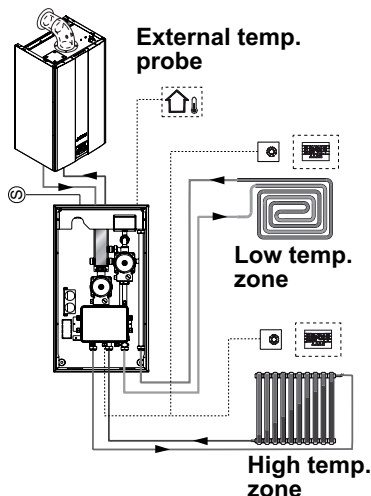


Figure 5.54

High temperature zone + 2 low temperature zones.

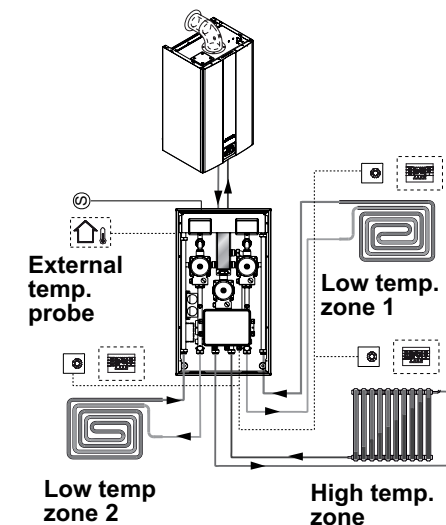


Figure 5.55

PREPARATION FOR SERVICE

6 PREPARATION FOR SERVICE

6.1 Warnings

- Before performing the operations described below, make sure that the installed two-way switch is in the off position.

6.2 Sequence of operations

Gas supply

- Open the cock for the gas meter and for the boiler 6 in Figure 6.1.

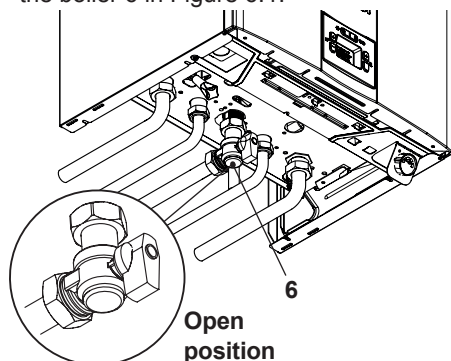


Figure 6.1

- Check for leaks in the gas fitting using a soapy solution or equivalent.
- Close the gas cock 6 in Figure 6.2.

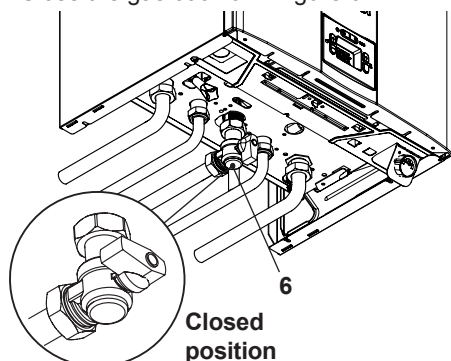


Figure 6.2

Filling the circuit

- Remove the front panel on the body, see section "Removing the body panels" on page 55.
- Open the installed water cocks.
- Open one or more hot water cocks to bleed the pipes.
- Loosen the automatic bleed valve cap 23 in Figure 6.3.

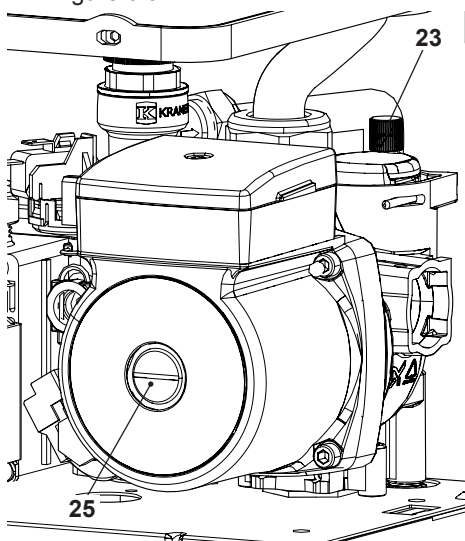


Figure 6.3

- Open the radiator cocks.
 - Fill the heating circuit, see section "Filling the heating circuit" on page 13.
 - Bleed the radiators and the various high points of the installation, then close any manual bleeding devices again.
 - Remove the cap 25 in Figure 6.3 and release the pump by turning the impeller using a screwdriver.
 - Bleed the pump during this operation.
 - Close the pump cap.
 - Finish filling the heating system.
- The installation as well as the pump must be bled multiple times.


- Assemble the front panel of the body.

PREPARATION FOR SERVICE

- Electrically power the boiler by activating the installed bipolar switch. The LCD display will show the message **OFF** (Figure 6.4).



Figure 6.4

- Press the 17 button and hold until both symbols  and  appear on the display.

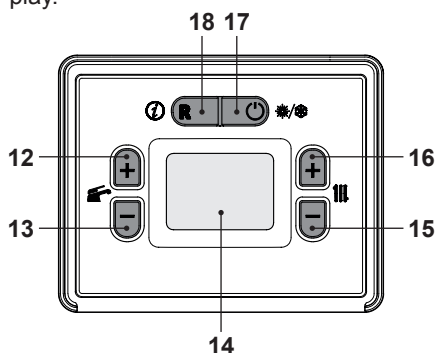


Figure 6.5



The LCD display shows the stand-by status and the  and  symbols (Figure 6.6).



Figure 6.6

shown in section "CHECKING THE GAS SETTING" on page 47 of this manual.

- Check that the condensate produced during operation fills the siphon and is drained correctly in the system discharge pipe.
- Press the 17 button (Figure 6.5) until the message **OFF** appears on the LCD display (Figure 6.4).

In **OFF** mode, the antifreeze protection is active.

- Show the user how to use the appliance correctly and also explain:
 - ignition;
 - shut off;
 - making adjustments.

The user is responsible for keeping the documentation together and intact, and within reach for consultation.

CHECKING THE GAS SETTINGS

7 CHECKING THE GAS SETTING

7.1 Warnings



Each time after measuring the gas pressure, fully close all tapping points that were used.

After each gas adjustment, the valve adjustment components must be sealed.



Warning: risk of electrocution.

The boiler is live during the operations described in this section.

Never touch any electrical parts.

7.2 Gas operations and setting

- Remove the front panel on the boiler body, see section "Removing the body panels" on page 55.

Checking the network pressure

- With the boiler turned off (out of service), check the supply pressure using the tapping point 29 in Figure 7.8 and compare the value read with those shown in the Gas supply pressure table in section "Technical data M290F.24CM" on page 20, "Technical data M290F.28CM" on page 22 and "Technical data M290F.32CM" on page 24.
- Fully close the tapping point 29 in Figure 7.8.

Check maximum burner pressure

- Open the tapping point 27 in Figure 7.8 and connect a pressure gauge.
- Unscrew the screw A and remove the protective cap B of the modulating operator 28 in Figure 7.1.

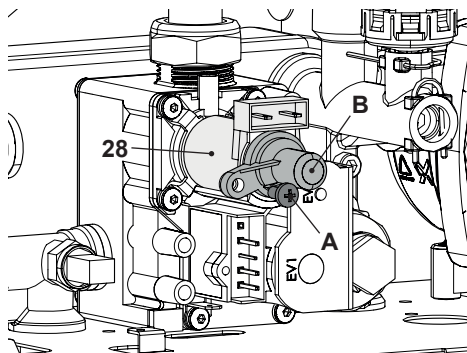


Figure 7.1

- Make sure that the room thermostat is in the "heat request" position.
- Draw off an abundant amount of DHW by opening the taps.
- Enter "programming mode" by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 7.2). The code **P00** appears on the display, indicating entry into "parameter P00" (Figure 7.3).

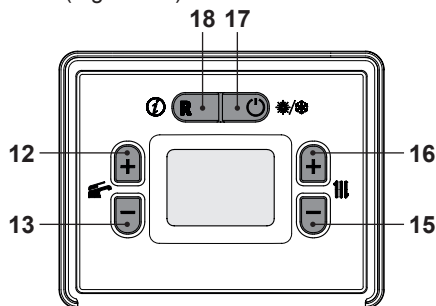


Figure 7.2



Figure 7.3

- Scroll through the various parameters using

CHECKING THE GAS SETTINGS

12 or 13 until the LCD display shows the code **P06**, indicating entry into "parameter P06" (Figure 7.4).

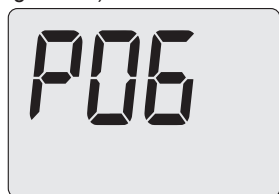


Figure 7.4

- Press 16 (Figure 7.2) to show the value of parameter P06 on the LCD display (Figure 7.5).

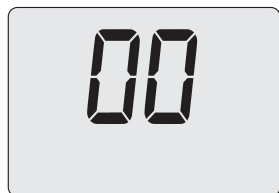


Figure 7.5

- Press 15 and the LCD display shows the number **02**, indicating activation of the "chimney sweep function" at maximum output (Figure 7.6).
- Press the 12 button (Figure 7.2) to confirm the value entered and activate the function.

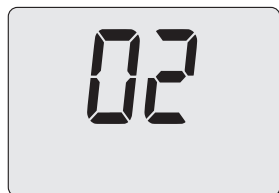


Figure 7.6

- Press the 17 button (Figure 7.2) to exit "programming mode" (Figure 7.7).

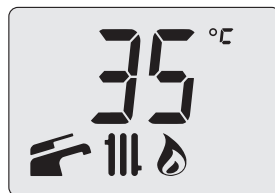


Figure 7.7

Compare the pressure value measured with that shown in the "Maximum gas pressure at burner" tables. To calibrate the pressure at the burner turn the large brass hexagonal nut of the modulating operator 28 MAX in Figure 7.8 (turning it clockwise increases the pressure).

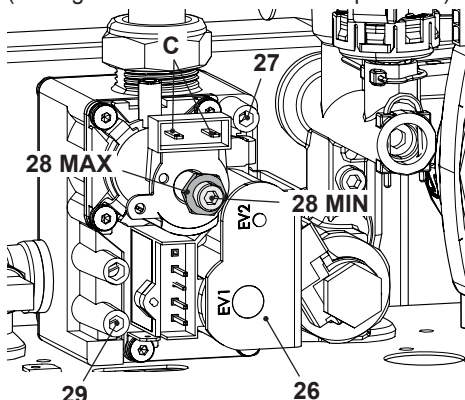


Figure 7.8

M290F.24CM - Max. gas pressure at the burner		
Methane G20	Pa	1350
	mbar	13,5
Propane G31	Pa	3500
	mbar	35,0

1 mbar corresponds to approx. 10 mm H2O

Figure 7.9

CHECKING THE GAS SETTINGS

M290F.28CM - Max. gas pressure at the burner		
Methane G20	Pa	1160
	mbar	11,6
Propane G31	Pa	3300
	mbar	33,0

1 mbar corresponds to approx. 10 mm H2O

Figure 7.10

M290F.32CM - Max. gas pressure at the burner		
Methane G20	Pa	1340
	mbar	13,4
Propane G31	Pa	3480
	mbar	34,8

1 mbar corresponds to approx. 10 mm H2O

Figure 7.11

Check minimum burner pressure

- Enter "programming mode" by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 7.2). The code **P00** appears on the display, indicating entry into "parameter P00" (Figure 7.12).

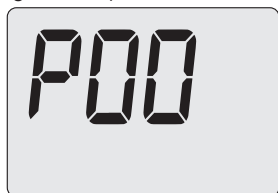


Figure 7.12

- Scroll through the various parameters using 12 or 13 until the LCD display shows the code **P06**, indicating entry into "parameter P06" (Figure 7.13).



Figure 7.13

- Press 16 (Figure 7.2) to show the value of parameter P06 on the LCD display (Figure 7.14).

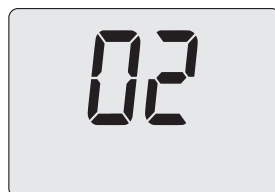


Figure 7.14

- Press 15 and the LCD display shows the number **01**, indicating activation of the "chimney sweep function" at minimum output ().
- Press the 12 button (Figure 7.2) to confirm the value entered and activate the function (Figure 7.15).

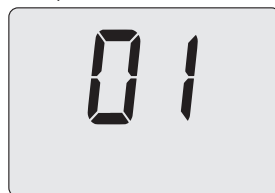


Figure 7.15

- Press the 17 button (Figure 7.2) to exit "programming mode" (Figure 7.16).



Figure 7.16

- Compare the pressure value measured with that shown in the "Minimum gas pressure at burner" tables. To calibrate the pressure at the boiler turn the plastic screws (28 MIN in Figure 7.8) keeping the large brass hexagonal nut (28 MAX in Figure 7.8) of the modulating operator stationary (turning it clockwise increases the pressure).

CHECKING THE GAS SETTINGS

M290F.24CM - Min. gas pressure at the burner		
Methane G20	Pa	200
	mbar	2,0
Propane G31	Pa	660
	mbar	6,6

1 mbar corresponds to approx. 10 mm H2O

Figure 7.17

M290F.28CM - Min. gas pressure at the burner		
Methane G20	Pa	220
	mbar	2,2
Propane G31	Pa	750
	mbar	7,5

1 mbar corresponds to approx. 10 mm H2O

Figure 7.18

M290F.32CM - Min. gas pressure at the burner		
Methane G20	Pa	220
	mbar	2,2
Propane G31	Pa	750
	mbar	7,5

1 mbar corresponds to approx. 10 mm H2O

Figure 7.19

- Activate the "chimney sweep function" at maximum output (parameter **P06** at value **02**).
- Recheck the maximum pressure at the burner.
- To exit the chimney sweeper, reset the value of parameter **P06** to **00** or wait 15 minutes with the boiler off (**OFF**).
- Close the domestic hot water cocks.
- Turn the boiler off by pressing the 17 button (Figure 7.2) until the message **OFF** appears on the LCD display (Figure 7.20).



Figure 7.20

During the operations to check maximum and minimum pressure at the burner, check the flow rate of gas to the meter and compare its value with the gas flow rate data; see section "Technical data M290F.24CM" on page 20, "Technical data M290F.28CM" on page 22 and "Technical data M290F.32CM" on page 24.

IMPORTANT: Each time after measuring the gas pressure, properly close all tapping points that were used (27 and 29 in (Figure 7.8). After each gas adjustment, the valve adjustment components must be sealed.

7.3 Setting burner ignition

- Disconnect the boiler from the electric power supply.
- Make sure that the ambient thermostat is in the "heat request" position.
- Open the tapping point 27 in Figure 7.8 and connect a pressure gauge.
- Restore electric power to the boiler.
- Check that burner ignition occurs uniformly and if necessary calibrate the ignition level, referring to the ignition pressure tables in the section section "Technical data M290F.24CM" on page 20, "Technical data M290F.28CM" on page 22 and "Technical data M290F.32CM" on page 24.

Calibrating ignition with methane gas (G20)

- Make sure that the room thermostat is in the

CHECKING THE GAS SETTINGS

“heat request” position.

- Draw off an abundant amount of DHW by opening the taps
- Enter “programming mode” by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 7.21). The code **P00** appears on the display, indicating entry into “parameter P00” (Figure 7.22).

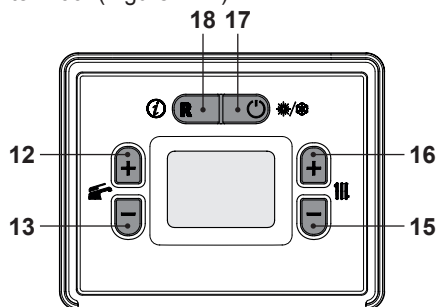


Figure 7.21



Figure 7.22

- Press 16 (Figure 7.21) to show the value of parameter P00 on the LCD display (Figure 7.23).



Figure 7.23

- By using buttons 15 or 16 it is possible to modify the value of parameter 00 from **0** to **99**.
- Press 12 or 13 (Figure 7.21) to confirm the value entered and return to the list of parameters (Figure 7.22).

The new ignition pressure value can be read on the pressure gauge connected to the tapping point on the gas valve output.

- Press the 17 button (Figure 7.21) to exit “programming mode”.

IMPORTANT: Each time after measuring the gas pressure, properly close all tapping points that were used (27 and 29 in (Figure 7.8).

Calibrating ignition with LPG gas (G31)

- Make sure that the room thermostat is in the “heat request” position.
- Draw off an abundant amount of DHW by opening the taps
- Enter “programming mode” by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 7.21). The code **P01** appears on the display, indicating entry into “parameter P01” (Figure 7.24).

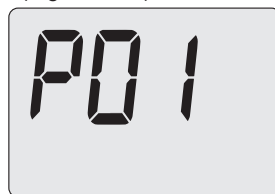


Figure 7.24

- Press 16 (Figure 7.21) to show the value of parameter P01 on the LCD display (Figure 7.25).

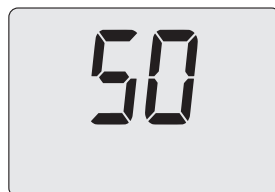


Figure 7.25

- By using buttons 15 or 16 it is possible to modify the value of parameter 00 from **0** to **99**.
- Press 12 or 13 (Figure 7.21) to confirm the

CHECKING THE GAS SETTINGS

value entered and return to the list of parameters (Figure 7.24).

The new ignition pressure value can be read on the pressure gauge connected to the tapping point on the gas valve output.

- Press the 17 button (Figure 7.21) to exit "programming mode".

IMPORTANT: Each time after measuring the gas pressure, properly close all tapping points that were used (27 and 29 in (Figure 7.8).

GAS CONVERSION

8 GAS CONVERSION

8.1 Warnings

! The operations to adapt the boiler to the type of gas available must be carried out by an authorised service centre.

The components used for adapting to the type of gas available must only be original spare parts.

For instructions regarding calibrating the boiler gas valve, refer to section "CHECKING THE GAS SETTING" on page 47.

8.2 Gas operations and setting



Check that the gas cock mounted on the gas piping to the boiler is closed and that the unit is not powered.

- Remove the front and side panels as shown in section "Maintenance" on page 55.
- Remove the movable wall from the sealed chamber.
- Remove the front panel from the combustion chamber and the burner in Figure 8.1.

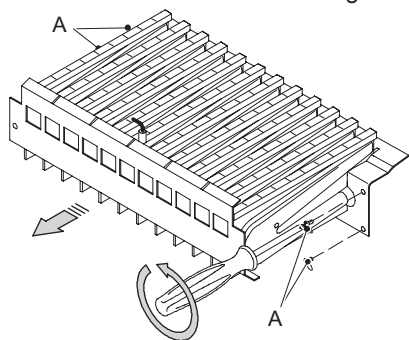


Figure 8.1

- Convert the type of gas by correctly replacing the burner nozzles and gaskets.
- Reassemble the burner Figure 8.1, the front combustion chamber panel and the

movable wall of the sealed chamber.

- Restore electric power to the boiler.

The boiler is factory set to operate with natural gas (G20).

To set boiler operation to **LPG gas (G31)**, carry out the following settings:

- Enter "programming mode" by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 8.2). The code **P00** appears on the display, indicating entry into "parameter P00" (Figure 8.3).

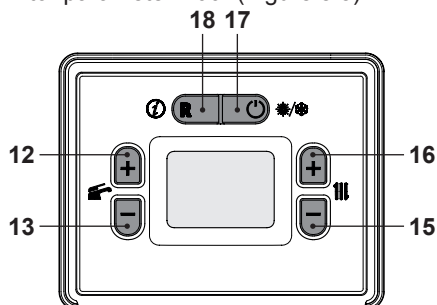


Figure 8.2



Figure 8.3

- Scroll through the various parameters using 12 or 13 until the LCD display shows the message **Cod**, indicating entry into "parameter Cod" (Figure 8.4), and then displays three dashes "- - -".



Figure 8.4

GAS CONVERSION

- Press the 16 button to set “1 - -”, then press 12 to confirm the 1 and go to the next segment.
- Press the 16 button to set “1°9 -”, then press 12 to confirm the 9 and go to the next segment.
- Press the 16 button to set “1°9°8”, then press 12 to confirm the 8 and go back to the list of parameters.
- The code **A01** appears on the display, indicating entry into “parameter A01” (Figure 8.5).
- Reposition the control panel and reassemble the front panel of the body.
- Apply the label indicating the type of gas and the pressure value for which the unit is set. The self-adhesive label is included in the conversion kit.



Figure 8.5

- By using buttons 15 or 16 (Figure 8.2) it is possible to modify the value of parameter A01 (Figure 8.6).

00 = Methane gas (G20)

01 = Propane gas - LPG (G31)

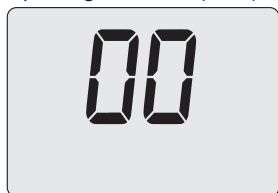


Figure 8.6

- Press 12 or 13 (Figure 8.2) to confirm the value entered and return to the list of parameters (Figure 8.5).
- Press the 17 button (Figure 8.2) to exit “programming mode”.
- Calibrate the gas valve according to the instructions in section "CHECKING THE GAS SETTING" on page 47.

MAINTENANCE

9 MAINTENANCE

9.1 Warnings



Protective gloves must be worn.



Cool down the appliance by shutting off the gas cock and withdrawing a large quantity of water by opening the system's DHW cocks.



The operations described in this section must only be performed by professionally qualified personnel, therefore you are advised to contact an authorised service centre.

For efficient and continuous boiler operation, the user must have maintenance and cleaning carried out once a year by an authorised service centre technician. If these operations are not carried out, damage to components and boiler operation problems will not be covered by the standard warranty.

Before performing any cleaning or maintenance operation or before opening or removing the boiler panels, **isolate the unit from the electric power supply** using the multi-way switch installed in the system and **close the gas valve**.

9.2 Removing the body panels

Front panel

- Unscrew the screws **A** and **G** then remove the front panel **D** by pulling it towards you (Figure 9.1 and Figure 9.2).

Side panels

Loosen screws **B** in Figure 9.1 and remove the two side panels **E** and **F** pulling them outwards and pushing them upwards to re-

lease them from the upper supports.

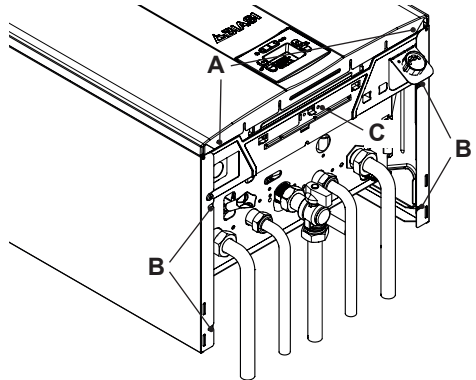


Figure 9.1

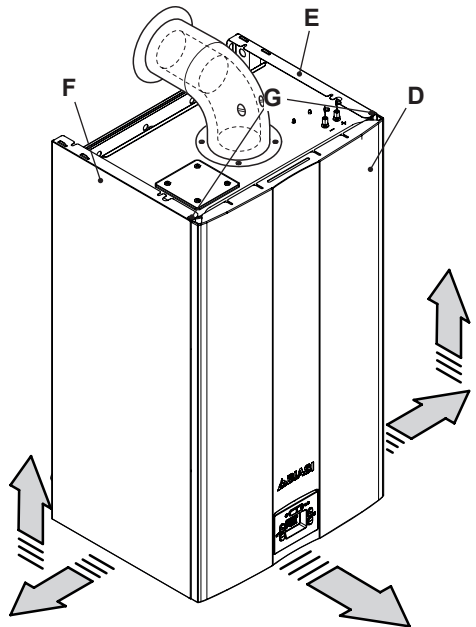


Figure 9.2

Control panel

- Unscrew the screw **C** in (Figure 9.1).
- Turn the control panel **H**, as shown in Figure 9.3 for easy access to the components inside the boiler.

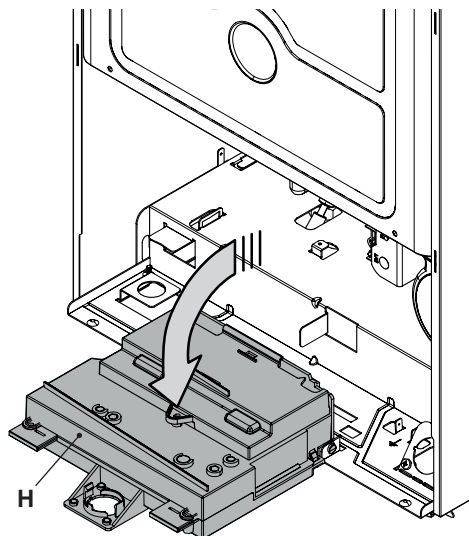


Figure 9.3

9.3 Emptying the DHW circuit

- Close the installed DHW inlet cocks .
- Open the system's DHW cocks.

9.4 Emptying the heating circuit

- Close the installed heating system delivery and return cocks.
- Loosen the heating circuit drain cock 10 indicated in Figure 9.4.

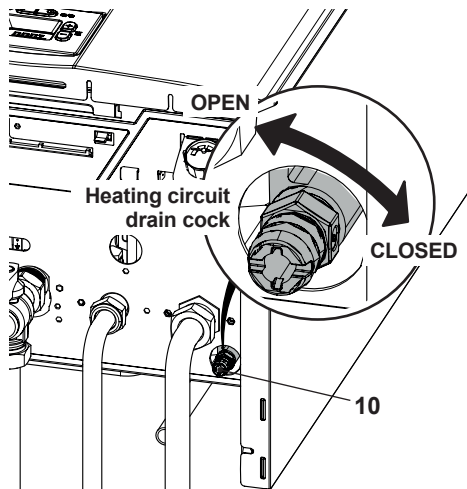


Figure 9.4

- To make draining easier, unscrew the automatic bleed valve cap 23 in Figure 9.5.

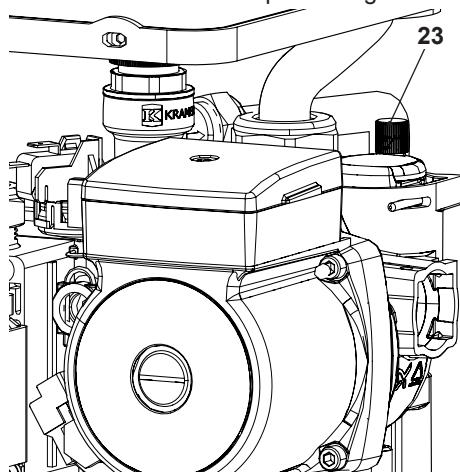


Figure 9.5

9.5 Cleaning the primary exchanger

Remove the front body panel and the front combustion chamber panel.

If there is dirt on the primary exchanger fins, fully cover the surface of the burner ramps (using a piece of newspaper or similar) and

brush the primary exchanger using a bristle brush.

9.6 Check the pressure in the heating expansion tank

Empty the heating circuit as described in section "Emptying the heating circuit" on page 56 and check that the expansion tank pressure is not less than 1 bar.

If the pressure is lower, correct the pressure.

9.7 Cleaning the domestic hot water exchanger

Descaling the domestic hot water exchanger will be assessed by a technician from an Authorised Service Centre, who will perform the cleaning using specific products.

9.8 Cleaning the burner

The ramp and multi-gas type burner does not require any special maintenance, simply dust it off using a bristle brush. More specific maintenance for this component will be assessed and performed by a technician from an authorised service centre.

9.9 Controlling the flue gas exhaust duct

Have a technician from an authorised service centre periodically check the condition of the flue gas exhaust duct, the air duct and the efficiency of the flue gas safety circuit (at least once a year).

To check the vacuum of the Venturi, use the tapping points indicated in Figure 9.6.

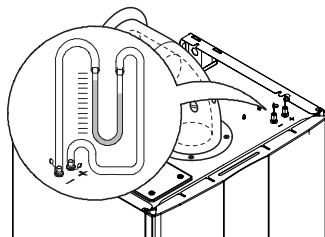


Figure 9.6

Refer to the following table for the minimum pressure value for the Venturi:

M290F.24CM model		
Minimum Venturi pressure	Pa	76
	mbar	0.76
M290F.28CM model		
Minimum Venturi pressure	Pa	111
	mbar	1.11
M290F.32CM model		
Minimum Venturi pressure	Pa	149
	mbar	1.49

Figure 9.7

9.10 Checking boiler efficiency

Carry out performance checks at the intervals anticipated by the regulations in force.

- Make sure that the room thermostat is in the "heat request" position.
- Draw off an abundant amount of DHW by opening the taps.
- Activate the "chimney sweep function" at maximum output in DHW mode (see "Setting the boiler's chimney sweep function" on page 58)
- Check boiler combustion using the flue gas outlet on the flue gas exhaust pipe near the boiler and compare the data measured with those below.

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Model M290F.24CM		
Nominal heat input	kW	25,5
Nominal efficiency	%	93,1
Combustion efficiency	%	93,6
Air index	n	2,1
Composition of CO2 fumes	%	5,6
Composition of O2 fumes	%	10,9
Flue gas temperature	°C	140

Values refer to tests with 60/100 1 m concentric discharge and Methane gas G20 and with heating delivery/return temperature of 60°/80°C

Figure 9.8

Model M290F.28CM		
Nominal heat input	kW	29,0
Nominal efficiency	%	93,4
Combustion efficiency	%	93,8
Air index	n	2,0
Composition of CO2 fumes	%	5,8
Composition of O2 fumes	%	10,6
Flue gas temperature	°C	142

Values refer to tests with 60/100 1 m concentric discharge and Methane gas G20 and with heating delivery/return temperature of 60°/80°C

Figure 9.9

Model M290F.32CM		
Nominal heat input	kW	31,2
Nominal efficiency	%	93,3
Combustion efficiency	%	93,8
Air index	n	1,9
Composition of CO2 fumes	%	6,3
Composition of O2 fumes	%	9,7
Flue gas temperature	°C	145

Values refer to tests with 60/100 1 m concentric discharge and Methane gas G20 and with heating delivery/return temperature of 60°/80°C

Figure 9.10

9.11 Setting the boiler's chimney sweep function

With the boiler set to chimney sweep mode, some automatic boiler functions can be disabled, which makes checking and monitoring operations easier.

- Enter “programming mode” by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 9.11). The code **P00** appears on the display, indicating entry into “parameter P00” (Figure 9.12).

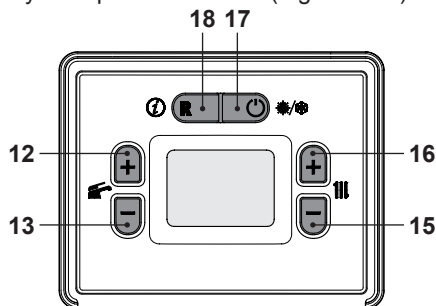


Figure 9.11



Figure 9.12

Chimney sweep function at minimum output in domestic hot water mode

- Scroll through the various parameters using 12 or 13 until the LCD display shows the code **P06**, indicating entry into “parameter P06” (Figure 9.13).



Figure 9.13

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- Press 16 (Figure 9.11) to show the value of parameter P06 on the LCD display (Figure 9.14).

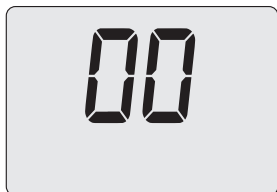


Figure 9.14

- Press 16 and the LCD display shows the number **01**, indicating activation of the “chimney sweep function” at minimum output (Figure 9.15).
- Press the 12 button (Figure 9.11) to confirm the value entered and activate the function.



Figure 9.15

Chimney sweep function at maximum output in domestic hot water mode

- Press 16 and the LCD display shows the number **02**, indicating activation of the “chimney sweep function” at maximum output.
- Press the 12 button (Figure 9.11) to confirm the value entered and activate the function (Figure 9.16).



Figure 9.16

- To exit the chimney sweeper, reset the value of parameter **P06** to **00** or wait 15

minutes with the boiler off (**OFF**).

- Turn the boiler off by pressing the 17 button (Figure 9.11) until the message **OFF** appears on the LCD display (Figure 9.17).



Figure 9.17

9.12 Settings for changing the control board

When the control board is replaced, it must be configured for the exact boiler type.

- Enter “programming mode” by holding down buttons 17 and 18 for 5 seconds at the same time (Figure 9.18). The code **P00** appears on the display, indicating entry into “parameter P00” (Figure 9.19).

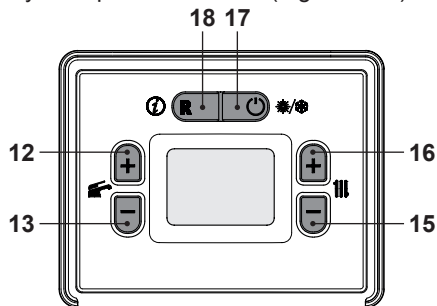


Figure 9.18



Figure 9.19

- Scroll through the various parameters us-

MAINTENANCE

ing 12 or 13 until the LCD display shows the message **Cod**, indicating entry into “parameter Cod” (Figure 9.20), and then displays three dashes “- - -”.



Figure 9.20

- Press the 16 button to set “1 - -”, then press 12 to confirm the 1 and go to the next segment.
- Press the 16 button to set “1 9 -”, then press 12 to confirm the 9 and go to the next segment.
- Press the 16 button to set “1 9 8”, then press 12 to confirm the 8 and go back to the list of parameters.
- The code **A01** appears on the display, indicating entry into “parameter A01” (Figure 9.21).



Figure 9.21

- By using buttons 15 or 16 (Figure 9.18) it is possible to modify the value of parameter A01 (Figure 9.22).
00 = Methane gas (G20)
01 = Propane gas - LPG (G31)

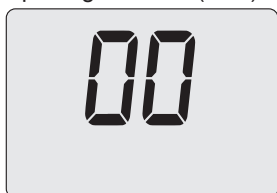


Figure 9.22

- Press 12 or 13 (Figure 9.18) to confirm the value entered and return to the list of parameters (Figure 9.21).
- Press 12 and hold until the LCD display shows the code **A02**, indicating entry into “parameter A02” (Figure 9.23).



Figure 9.23

- By using buttons 15 or 16 (Figure 9.18) it is possible to modify the value of parameter A02:
01 = high temperature (50/80°C)
02 = low temperature (28/55°C)
- Press 12 or 13 (Figure 9.18) to confirm the value entered and return to the list of parameters (Figure 9.23).
- Press button 13 and hold until the LCD display shows the code **A21**, indicating entry into “parameter A21” (Figure 9.24).

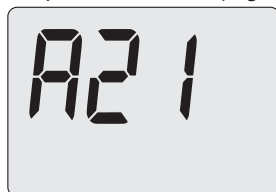


Figure 9.24

- By using buttons 15 or 16 (Figure 9.18) it is possible to modify the value of parameter A21 (Figure 9.25).
00 = Room thermostat
01 = Remote control

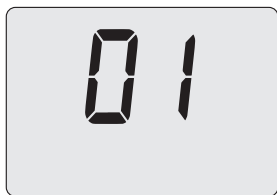


Figure 9.25

- Press 12 or 13 (Figure 9.18) to confirm the value entered and return to the list of parameters (Figure 9.24).
- Press button 13 and hold until the LCD display shows the code **A54**, indicating entry into “parameter A54” (Figure 9.26).

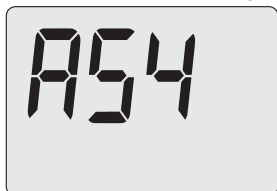


Figure 9.26

- By using buttons 15 or 16 (Figure 9.18) it is possible to modify the value of parameter A54 (Figure 9.27).
 - 3.0** = 24 kW
 - 3.7** = 28 kW
 - 4.0** = 32 kW

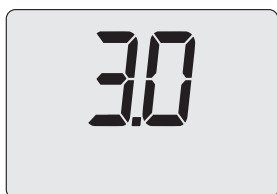


Figure 9.27

- Press 12 or 13 (Figure 9.18) to confirm the value entered and return to the list of parameters (Figure 9.26).
- Press the 17 button (Figure 9.18) to exit “programming mode”.

BOILER DISPOSAL AND RECYCLING

10 BOILER DISPOSAL AND RECYCLING

The boiler and any accessories must be disposed of correctly, recycling the different materials where possible.

The installer must dispose of the packaging used to transport the boiler.



Please observe the regulations currently in force regarding recycling and disposing of the boiler and any accessories.

For electronic appliances specifically, please see Directive 2012/19/EU and ANNEX IX of the Italian Decree transposing this Directive, DL49/14.





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This manual replaces previous versions.

In order to constantly improve its products, BSG Caldaie a Gas S.p.A. reserves the right to change the data provided in this manual at any time and without notice. Product warranty pursuant to Leg. Decree. no. 24/2002