RinNOVA

User manual and installation instructions

CE

BIASI

WARNING

Congratulations on your selection.

Your modulating boiler is electronically adjusted and ignited.
- highly efficient
- sealed chamber
- with steel domestic hot water heat exchanger.

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

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

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

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

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

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

ATTENTION: Information marked with this symbol is important information that must be read carefully.

IMPORTANT

- ✓ **The manual** must be read carefully in order to use the boiler in a rational and safe manner. 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 first ignition** must be carried out by one of the Authorised Service Centres, which validates the warranty from the date on which it is performed.
- ✓ **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 results of performing manoeuvres that have not been specifically described.

DURING INSTALLATION

- ✓ **Installation** must be carried out by qualified personnel who shall be 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 the boiling point and must be connected to a central heating system and/or a domestic hot water distribution network that is compatible with its performance and its power.
  The boiler must be supplied with **Methane gas (G20) or LPG (BUTANE G30 - 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 psychic or motor skills or who lack in experience and knowledge (including children), unless there they are supervised by a person who is responsible for their safety and they 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 manoeuvres on the sealed devices.
  - Avoid contact with hot parts during operation.

WARNING

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 7129/08).
- ✓ **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**, it is recommended to have professionally qualified personnel check that the gas supply system :
  - is perfectly sealed.
  - is dimensioned for the flow rate necessary 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 discharge to a discharge 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 drain.
- ✓ **Do not touch the unit** with wet or moist body parts and/or with bare feet.
- ✓ **If performing structural work or maintenance** near the flue gas duct and/or the flue gas exhaust devices or their accessories, turn off the unit and, when the work is completed, have its efficiency checked by professionally qualified personnel.

TABLE OF CONTENTS

Model	*Boiler certification code*
RinNOVA 24S	M290.24CM/...
RinNOVA 28S	M290.28CM/...
RinNOVA 32S	M290.32CM/...

Unit in category: II$_{2H3+}$ (gas G20 20 mbar, G30 29 mbar, G31 37 mbar)
Country of destination: EN
This unit is compliant with the following European Directives:
Gas Directive Gas 2009/142/EC
Efficiency Directive 92/42/EEC
Electromagnetic Compatibility Directive 2004/108/EC
Low Voltage Directive 2006/95/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.

1 BOILER DESCRIPTION

1.1 Assembly view

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

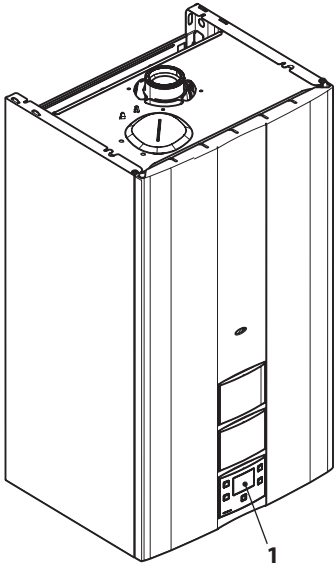


Figure 1.1

1 Control panel

1.2 Shut-off valve and cocks

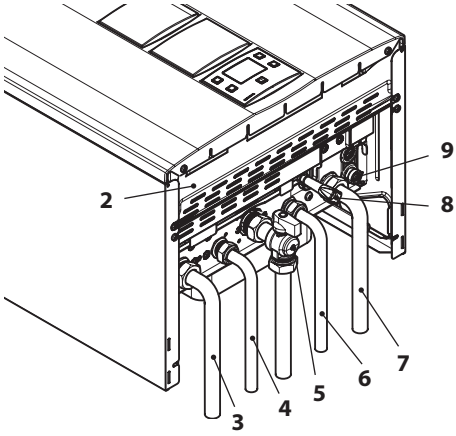


Figure 1.2

2 Gas supply label
3 Central heating flow pipe
4 Domestic hot water outlet pipe
5 Gas cock
6 Domestic cold water inlet pipe
7 Central heating return pipe
8 Central heating circuit filling cock
9 Central heating circuit drain cock

1.3 Control panel

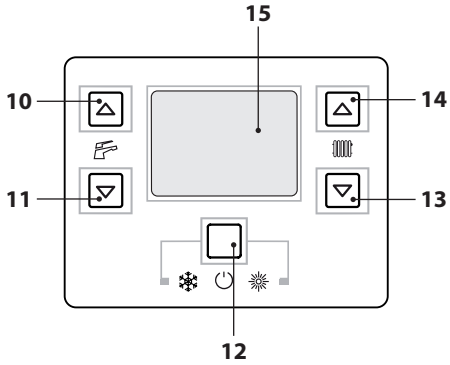


Figure 1.3

10 Domestic hot water temperature increase key
11 Domestic hot water temperature reduce key
12 Reset/Stand-by/winter/Summer key
13 Domestic hot water temperature reduce key
14 Central heating temperature increase key
15 LCD display

The RESET that restores all parameters to the factory settings occurs only by setting "parameter 08=04". When the reset is complete, this is displayed by all the symbols on the display turning on.

1.4 General LCD characteristics

For the technical specifications of the boiler consult the section "TECHNICAL SPECIFICATIONS" on page 18.

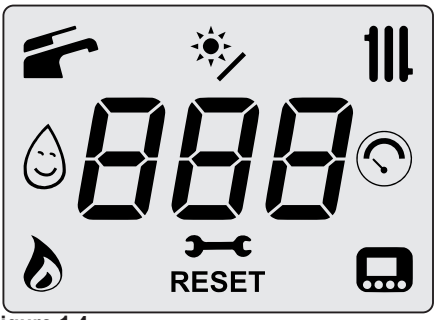


Figure 1.4

KEY

	All symbols represented with lines around it indicate that the symbol is flashing
	Constantly illuminated: d.h.w. function enabled Flashing: d.h.w function in process
	Constantly illuminated: solar control unit connected Flashing: solar pump operating
	Illuminated fixed: central heating function enabled (winter) Flashing: central heating function in progress
	Constantly illuminated: 3 star preheating function active Flashing: 3 star preheating function in process
	Illuminated fixed: for 15s only after system loading Flashing: in the case of low system pressure or if viewing the pressure from the "INFO" menu
	Constantly illuminated: flame present Flashing: drain upon ignition in progress
	Constantly illuminated: maintenance due pre-warning Flashing: maintenance required or maintenance due
RESET	Constantly illuminated: lockout error. The boiler can be restarted by the user by pressing the reset button
	Constantly illuminated: remote control connected Flashing: request from remote control in process

LCD SIGNALS

LCD	FUNCTION
E01 + RESET	Safety lockout due to failed ignition
E02 + RESET	Lockout due to safety thermostat operation
E03 + RESET	Generic lockout
E04 +	Pump circulation failure or insufficient system pressure
E05 +	Flue gas pressure switch anomaly
E06 +	Central heating NTC probe failure
E07 +	D.h.w. NTC probe failure
E08 +	External NTC probe failure
E11 +	Parasite flame presence
E14 +	Temperature gradient circulation failure (>2K/s)
E20 +	EVG lockout

BOILER DESCRIPTION

LCD	FUNCTION
E21 +	EVG lockout
E22 +	EVG lockout
E23 +	EVG lockout
E24 +	Abnormal combustion ignition lockout
E25 +	Abnormal combustion operation lockout
E69 +	Wiring error lockout
L 01	Primary NTC limitation in d.h.w. mode
- - -	Boiler Stand-By, hyphens are turned on in sequence to simulate running (antifreeze protection activated)
b09	In the case of low pressure, the value is automatically displayed with the symbol flashing. When pressure is achieved the symbol remains on for 15s and then disappears. The current pressure without a decimal point can be displayed from the "INFO" menu.
Po 35	Pump active for the post-circulation phase (flashing Po + flashing temperature)
bP 15	Boiler in antifreeze phase (flashing bP + flashing temperature)
41	Boiler with d.h.w. power demand The d.h.w. temperature is displayed.

LCD	FUNCTION
34	Boiler with central heating power demand.
78	Central heating set (all other symbols are disabled)
46	D.h.w. set (all other symbols are disabled)
uu 56	Delay burner ignition due to system setting (flashing uu + flashing temperature)
RESET 65	Boiler in chimney sweep function. The activation of the chimney sweep occurs configuring the "parameter P09=01" and the following is visualized: LP = minimum dhw hP = minimum output in heating mode cP = maximum output in heating mode dP = maximum output in domestic hot water mode The transition occurs with keys 14 (increase) and 13 (decrease) dhw temperature.

USE

2 USER INSTRUCTIONS

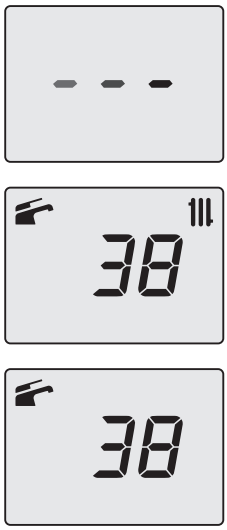
2.1 Warnings

Check that the heating circuit is regularly filled with water even if the boiler should only be used for producing domestic hot water.

Otherwise, proceed with its filling, see section "Filling the heating circuit" on page 14.

All boilers have an "antifreeze" system that is activated if its temperature decreases 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 14.



Stand-by
Hyphens are turned on in sequence to simulate running

Winter

Summer

Figure 2.2

2.2 Ignition

- The boiler cocks and those provided during installation must be open (Figure 2.1).

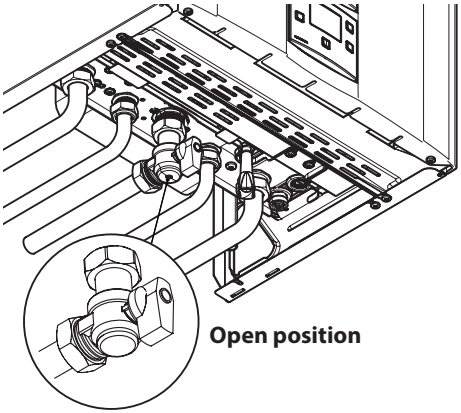


Figure 2.1

- Electrically power the boiler by turning on the installed bipolar switch. The LCD display shows the boiler status (last stored) (Figure 2.2).

Heating/d.h.w. operation

- Press key 12 for 2 seconds until both symbols and appear on the display (Figure 2.3).

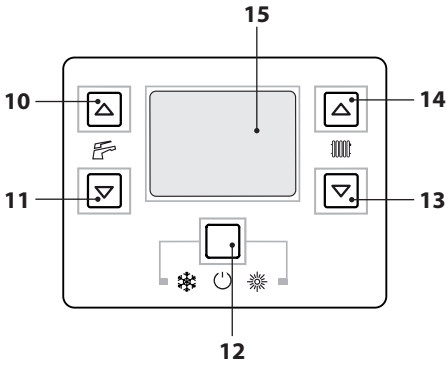


Figure 2.3

- The LCD display shows the boiler temperature (primary circuit) and the symbols and (Figure 2.4).

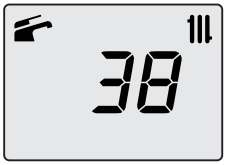


Figure 2.4

Operation with only production of hot water

- Press key 12 for 2 seconds until the symbol appears on the display (Figure 2.5).

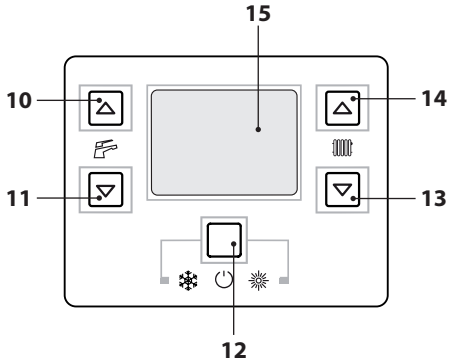


Figure 2.5

- The LCD display shows the boiler temperature (primary circuit) and the symbol (Figure 2.6).

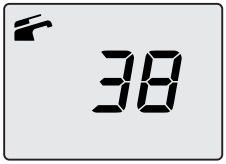


Figure 2.6

2.3 Heating circuit temperature

The heating delivery temperature of the hot water can be adjusted using keys 13 (decrease) and 14 (increase) (Figure 2.5) between a minimum of approx. 38°C and a maximum of approx. 85°C. The first time one of those keys is pressed, the "set" value is displayed. The second time it is pressed makes it possible to modify it.

Data shown on the LCD display:

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

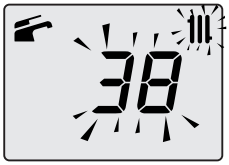


Figure 2.7

Adjustment of the heating temperature based on the external temperature (without external probe)

Adjust the temperature of the heating delivery hot water as follows:

- between 38 and 50 with an external temperature between 5 and 15°C
- between 50 and 73 with an external temperature between -5 and +5°C
- between 73 and 85 with an external temperature below -5°C.

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

It is possible to verify that the set temperature has been reached when the symbol is not visible on the LCD display.

Heating power demand

When the boiler has a heating power demand, the display will show the symbol followed by an increase in the temperature of the heating delivery water temperature. The symbol will flash (Figure 2.8).

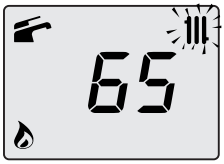


Figure 2.8

Adjusting the heating temperature with an installed external probe

When the optional external probe is installed, your boiler will automatically adjust the temperature of the heating system's delivery water temperature in relation to the external temperature.
In this case, the boiler must be set by a qualified installer (section "Setting the K coefficient of the external probe" on page 45).
If the ambient temperature is not comfortable, you can increase or decrease the heating system delivery temperature by ± 15°C with the keys 13 (decrease) and 14 (increase) (Figure 2.5).

2.4 Domestic hot water temperature

The domestic hot water temperature can be adjusted using keys 10 (decrease) and 11 (increase) (Figure 2.5) between a minimum of approx. 35°C and a maximum of approx. 60°C. The first time one of those keys is pressed, the "set" value is displayed. The second time it is pressed makes it possible to modify it.

Data shown on the LCD display:

- The "set" value of the domestic hot water the symbol will flash. The background of the display will be illuminated (Figure 2.7).

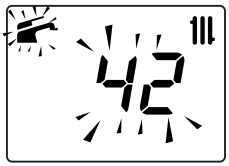


Figure 2.9

Regulation

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 will appreciate the characteristics of automatic regulation.
If the water is particularly hard, we recommend regulating the boiler temperature to below 50°C.
In these cases, we recommend installing a water softener in the d.h.w. system.
If the maximum flow rate of the domestic hot water is too high so that a sufficient temperature cannot be reached, request an Authorised Support Technician to install a flow rate limiter.

Domestic hot water demand

When the boiler has a domestic hot water demand, the display will show the symbol followed by an increase in the temperature of the domestic hot water. The symbol will flash (Figure 2.10).

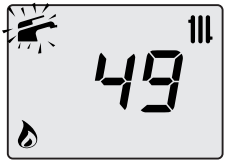


Figure 2.10

2.5 3 star preheating function

This function reduces consumption of the domestic water supply at the time of withdrawal, preparing the boiler temperature at the requested temperature.
To activate the 3 star preheating function press keys 10 and 11 together (Figure 2.12) until the symbol appears on the LCD display (Figure 2.11).
When the symbol flashes, the function is in process.

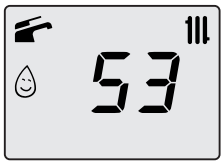


Figure 2.11

NOTE: Should the power to the boiler fail, wait at least one minute before reactivating the function upon reactivation.
To disable the 3 star preheating function press keys 10 and 11 (Figure 2.12) until the symbol disappears from the LCD display .

2.6 Extinguishing

Press key 12 (Figure 2.12) for 2 seconds until the symbol – – – appears on the display (the dashes appear in sequence to simulate flowing) (Figure 2.13).

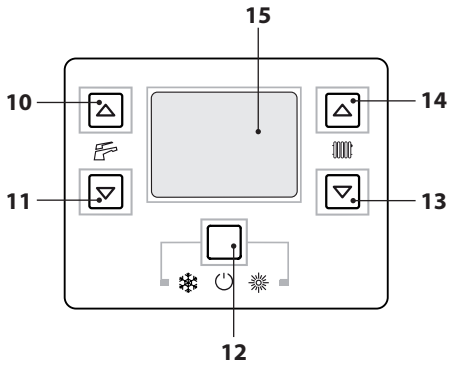


Figure 2.12

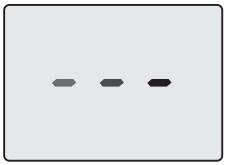


Figure 2.13

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 2.14);

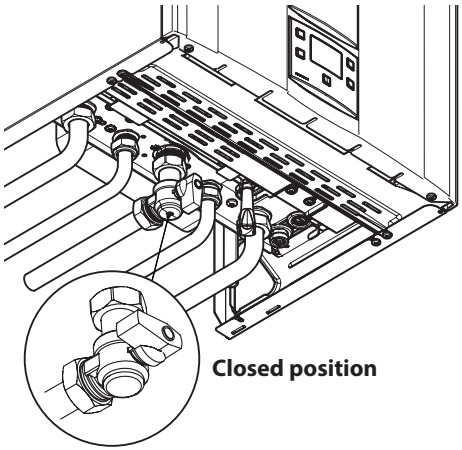


Figure 2.14

- If necessary, empty the hydraulic circuits, see section "Emptying the d.h.w. circuit" on page 60 and section "Emptying the central heating circuit" on page 60.

3 USEFUL TIPS

3.1 Filling the heating circuit

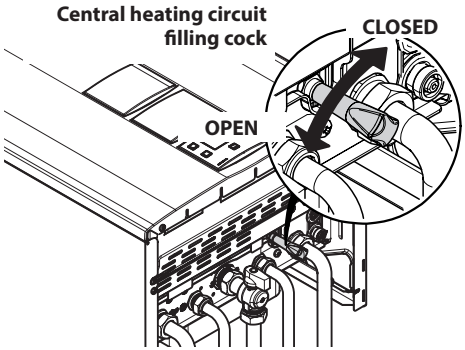


Figure 3.1

Press keys 12 and 14 together to access the "INFO" (information) menu. The index value "**J00**" will be shown on the display in alternation with the pressure value "**b13**" (1.3 bar). The number indicating the pressure is displayed without a decimal point, and the letter indicates the unit of measure (bar) (Figure 3.2).

Figure 3.2

Open the filling cock in Figure 3.1 located under the boiler also check the heating circuit pressure on the display. The pressure must be between 1 bar and 1.5 bar (e.g. 1.3 bar in Figure 3.2).

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

3.2 Heating

For rational and economic service, have an ambient thermostat installed.

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

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

If the ambient temperature is too high, do not adjust the radiator cocks but decrease the heating temperature regulation using the ambient thermostat or the heating regulation keys 13 and 14 (Figure 3.3).

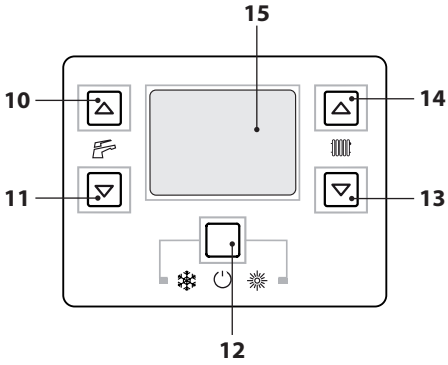


Figure 3.3

3.3 Antifreeze protection

The antifreeze system, and any additional protections, protect the boiler from possible damage due to freezing.

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

If the external temperature could reach values below 0°C it is recommended to leave the entire system on, setting the ambient thermostat to a low temperature.

The antifreeze function is also active when the boiler is in stand-by (the dashes are turned on in sequence to simulate flowing) (Figure 3.4).

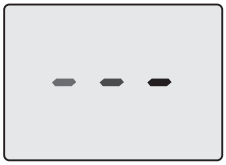


Figure 3.4

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

3.4 Periodic maintenance

For efficient and regular boiler operation, it is recommended to have it serviced and cleaned at least once a year by technician from an Authorised Service Centre.
During this check, the most important boiler components will be 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, abrasive substances.

3.6 Operating anomalies

If the boiler is not operating and a code appears on the LCD display that is preceded by the letter "**E**" and the message **RESET** (section "General LCD characteristics" on page 8) the boiler is in lockout. The background of the display will flash (Figure 3.5).

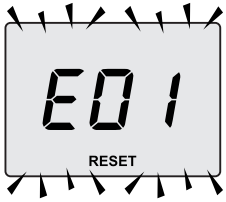


Figure 3.5

To restore operation, press the reset key 12 (Figure 3.3) on the boiler control panel.

Frequent safety lockouts should be reported to the Authorised Service Centre.

Other possible anomalies shown on the LCD display

If the LCD display shows a code that is preceded by the letter **E** and the symbol the boiler has an anomaly that cannot be reset.
The background of the display will flash (Figure 3.6).

Figure 3.6

Another possible signal occurs when the d.h.w. exchanger is not able to exchange all the power delivered by the boiler.
E.g. D.h.w. exchanger blocked by limescale. This occurs only when the boiler has a demand for domestic hot water.

Code **01** preceded by the letter **L** will appear on the LCD display. The background of the display will flash (Figure 3.7).

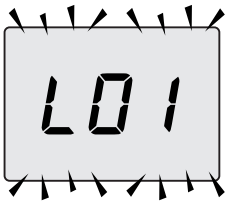


Figure 3.7

To reset proper boiler operation contact a technician at the Authorised Service Centre

Air bubble noises

Check the pressure of the heating circuit and fill it if necessary, see section "Filling the heating circuit" on page 14.

Low system pressure

Add more water to the heating system.
For the operation, refer to section "Filling the heating circuit" on page 14.
The user is responsible for periodically checking the pressure of the heating system.
If water must be added too often, have the technical support centre check if there are leaks in the heating system or the boiler itself.

Water leaks from the safety valve

Check if the filling cock is well closed (section "Filling the heating circuit" on page 14).
Check from the "INFO" (information) menu that the heating circuit pressure is not close to 3 bar.
In this case it is recommended to 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 regular value.

In the case of malfunctions other than those described above, shut down the boiler as described in section "Extinguishing" on page 13 and contact the technician from the Authorised Service Centre.

3.7 Displays in INFO mode

The INFO mode makes it possible to view boiler operation status information. In the case of a boiler malfunction, it is recommended to provide this information to the Service Centre to understand the causes.

To access the INFO mode, press keys 12 and 14 together (Figure 3.8) until the index "**J00**" is shown on the display in alteration with the parameter value (Figure 3.9).

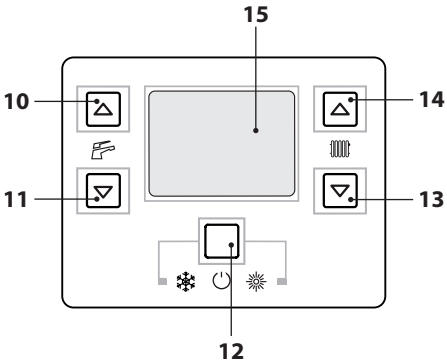


Figure 3.8

Figure 3.9

To scroll the values press the keys 13 (decrease) and 14 (increase). Briefly press the key 12 to exit

INFO mode (Figure 3.8). Exit will occur automatically after 30 seconds if no key is pressed.

The table summarises the possible values visible in INFO mode.

Value visualised	Index
Primary circuit pressure	J00 + value
External temperature	J01 + value
K curve value configured in loco	J02 + value
Offset climatic curve value	J03 + value
Calculated heating set point (with climatic curve or set configured)	J04 + value
Delivery NTC pressure	J05 + value
Temperature NTC return	J06 + value
Domestic set	J07 + value
Temp. Dhw inlet (if foreseen)	J08 + value
Temp. Dhw output	J09 + value
Dhw capacity	J10 + value
Flue gas temperature (if foreseen)	J11 + value
Fan speed (if foreseen)	J12 + value
Pressure transducer pressure (if foreseen)	J13 + value
Ionization value	J14 + value
Number of months to maintenance	J15 + value
3 star status (ON=01, OFF=00)	J16 + value
HWCH Hardware code high	J17 + value
HWCL Hardware code low	J18 + value
SWCH Software code high	J19 + value
SWCL Software code low	J20 + value

3.8 Remote anomaly code

If the optional remote is connected to the boiler, a code can be shown on the central part of the display that indicates a boiler anomaly.
The current anomaly is indicated by a numeric code followed by the letter **E**.
The table summarises the possible codes that can be displayed on the remote.

Anomaly	Code
Ignition failed lockout	01E
Safety thermostat trip lockout	02E
Generic lockout	03E
No water in the heating or circulation circuit	04E
Flue gas pressure switch anomaly	05E
Heating NTC probe anomaly	06E
D.h.w. NTC probe anomaly	07E
External NTC probe anomaly	08E
Parasite flame	11E
No circulation or pump failure or activation due to primary temperature limit	14E

4 TECHNICAL SPECIFICATIONS

4.1 Assembly view

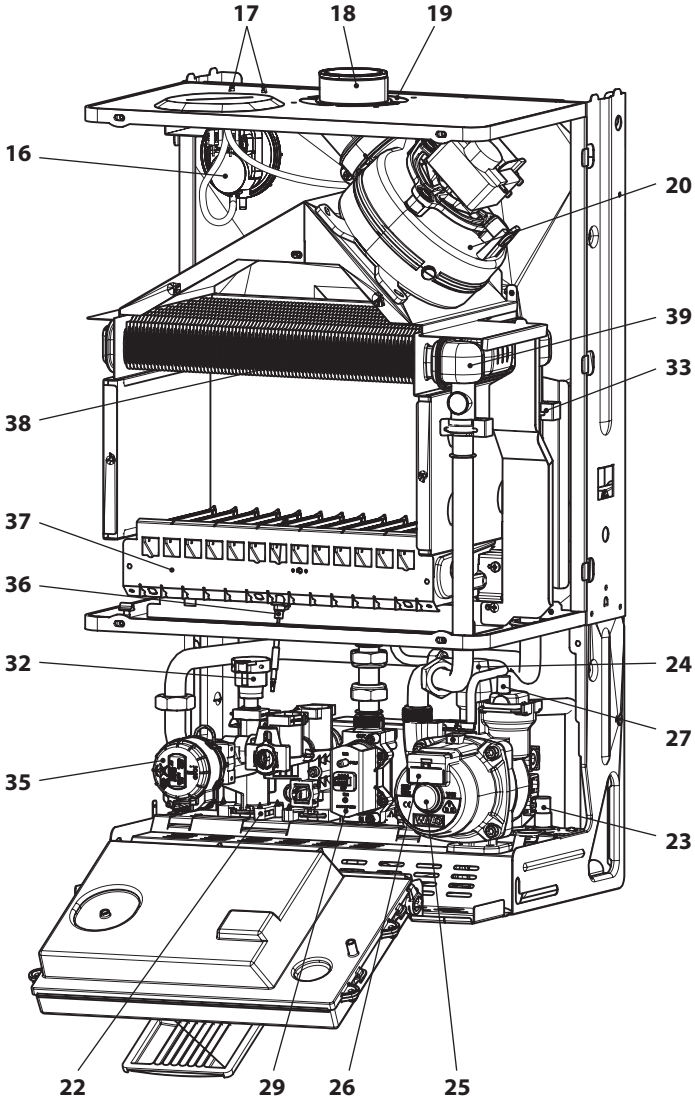


Figure 4.1

4.2 Schematic diagram

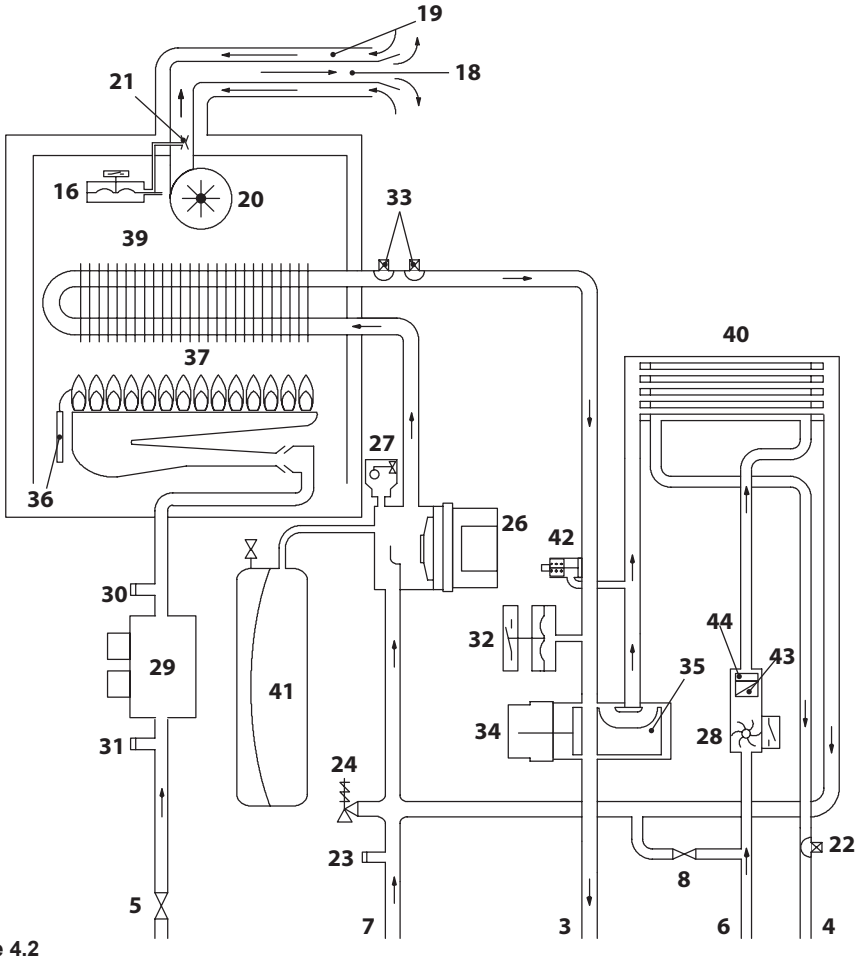


Figure 4.2

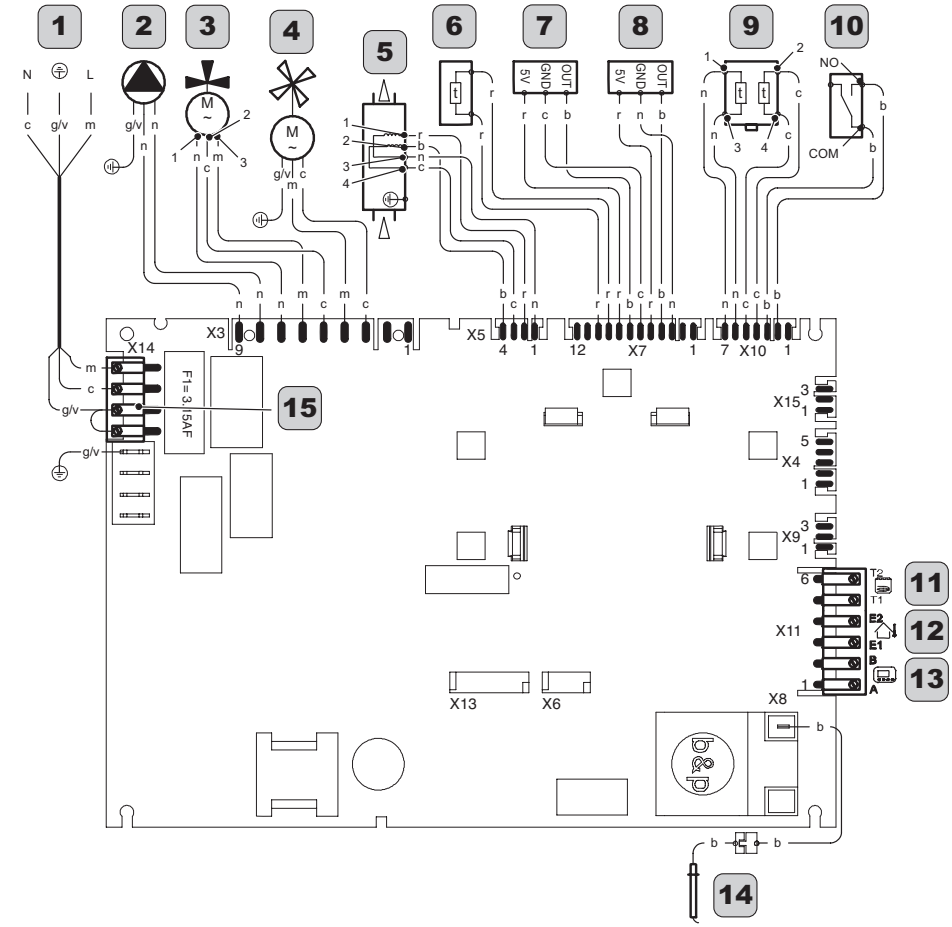
3 Heating flow pipe
4 Domestic hot water outlet pipe
5 Gas cock
6 Domestic cold water inlet pipe
7 Heating return pipe
8 Heating circuit filling cock
16 Flue gas pressure switch
17 Venturi vacuum check points
18 Flue gas exhaust duct
19 Air suction duct
20 Fan
21 Venturi
22 D.h.w. NTC probe
23 Primary circuit emptying cock

24 3 bar safety valve
25 Pump bleed cap
26 Pump
27 Automatic bleed valve
28 D.h.w. flowmeter
29 Modulating gas valve
30 Gas valve outlet tapping point
31 Gas valve outlet tapping point
32 Heating pressure transducer
33 Heating NTC /maximum heating temperature probe
34 Three-way valve
35 Three-way valve plug
36 Flame detection electrode / ignition electrode
37 Burner
38 Combustion chamber
39 Primary exchanger
40 D.h.w. exchanger
41 Expansion tank
42 Integrated by-pass
43 Domestic hot water filter
44 D.h.w. flow rate limiter (optional)

* To access the plate, remove the front panel from the body as described in the *Maintenance* chapter

4.3 Wiring diagram

1	Electric power supply cable	**6**	D.h.w. NTC	**11**	Boiler thermostat - boiler probe
2	Pump	**7**	D.h.w. flowmeter	**12**	External probe terminal board
3	Three-way valve	**8**	Heating transducer	**13**	Remote terminal board - Ambient thermostat
4	Fan	**9**	Heating NTC - Max temperature NTC Max	**14**	Ignition/detection electrode
5	Gas valve	**10**	Flue gas pressure switch	**15**	Electric power supply terminal board



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

Figure 4.3

4.4 Technical data M290.24CM/M

(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	14,5
	kcal/h	12468
(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	12,9
	kcal/h	11092
Minimum output power for d.h.w.	kW	9,8
	kcal/h	8426

Measured efficiency		
Nominal efficiency 60°/80°C	%	92,8
Min. efficiency 60°/80°C	%	89,2
Efficiency at 30 % of load	%	90,7
Energy efficiency		* * *
Heat loss at the chimney with burner operating	Pf (%)	6,3
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 (%)	0,9
NOx class		2
Weighted NOx	mg/kWh	168
	ppm	95

Heating		
Adjustable temperature **	°C	38 - 85
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	35 - 60
Maximum pressure	kPa	1000
	bar	10
Minimum pressure	kPa	30
	bar	0,3
Maximum flow rate		
(ΔT=25 K)	l/min	15,2
(ΔT=35 K)	l/min	10,6
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
Butane G30	**Nom.**	2900	29
	Min.	2000	20
	Max.	3500	35
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	107
Output at minimum heat input	W	106
Output in stand-by	W	3
Degree of protection		IPX5D

Heating/d.h.w. maximum gas flow rate		
Methane G20	m^3/h	2,70
Butane G30	kg/h	2,01
Propane G31	kg/h	1,98
Minimum gas flow rate in heating mode		
Methane G20	m^3/h	1,53
Butane G30	kg/h	1,14
Propane G31	kg/h	1,13
Minimum gas flow rate in d.h.w. mode		
Methane G20	m^3/h	1,16
Butane G30	kg/h	0,87
Propane G31	kg/h	0,85

Max. gas pressure at the burner in heating mode		
Methane G20	Pa	1280
	mbar	12,8
Butane G30	Pa	2820
	mbar	28,2
Propane G31	Pa	3600
	mbar	36,0
Min. gas pressure at the burner in heating mode		
Methane G20	Pa	400
	mbar	4,0
Butane G30	Pa	980
	mbar	9,8
Propane G31	Pa	1230
	mbar	12,3

Ignition pressure		
Methane G20	Pa	900
	mbar	9,0
Butane G30	Pa	1970
	mbar	19,7
Propane G31	Pa	2520
	mbar	25,2

Nozzles	N°	Ø mm /100
Methane G20	11	130
Butane G30	11	78
Propane G31	11	78

Chimney design #		
Max. flue gas temperature	°C	123
Min. flue gas temperature	°C	110
Max. flue gas mass flow rate	kg/s	0,0154
Min. flue gas mass flow rate	kg/s	0,0172
Max. air mass flow rate	kg/s	0,0149
Min. air mass flow rate	kg/s	0,0169

 # 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

TECHNICAL SPECIFICATIONS

Other characteristics		
Height	mm	703
Width	mm	400
Depth	mm	325
Weight	kg	32,9
Max. ambient temperature	°C	60
Min. ambient temperature	°C	-15

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

G30 Hi. 45.65 MJ/kg (15°C, 1013.25 mbar)

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

1 mbar corresponds to approx. 10 mm H20

4.5 Technical data M290.28CM/M

(nom.Q.) Nominal heating/d.h.w. heat input (Hi)	kW	31,1
	kcal/h	26741
(nom.Q.) Minimum heat input (Hi) for heating	kW	16,5
	kcal/h	14187
(nom.Q.) Minimum d.h.w. heat input (Hi)	kW	13,0
	kcal/h	11178
Maximum output power for heating/d.h.w.	kW	29,1
	kcal/h	25021
Minimum output power for heating	kW	14,9
	kcal/h	12812
Minimum output power for d.h.w.	kW	11,8
	kcal/h	10146

Measured efficiency		
Nominal efficiency 60°/80°C	%	93,3
Min. efficiency 60°/80°C	%	90,6
Efficiency at 30 % of load	%	92,2
Energy efficiency		* * *
Heat loss at the chimney with burner operating	Pf (%)	5,2
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 (%)	1,5
NOx class		2
Weighted NOx	mg/kWh	179
	ppm	101

Heating		
Adjustable temperature **	°C	38 - 85
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	21,0
	bar	0,210

** At minimum useful power

Domestic hot water		
Temp. Minimum-Maximum	°C	35 - 60
Maximum pressure	kPa	1000
	bar	10
Minimum pressure	kPa	30
	bar	0,3
Maximum flow rate		
(ΔT=25 K)	l/min	18,1
(ΔT=35 K)	l/min	12,7
Minimum flow rate	l/min	2,5
Specific d.h.w. flow rate (ΔT=30 K) *	l/min	13,6

** Reference standard EN 625*

Gas supply pressures			
Gas		Pa	mbar
Methane G20	**Nom.**	2000	20
	Min.	1700	17
	Max.	2500	25
Butane G30	**Nom.**	2900	29
	Min.	2000	20
	Max.	3500	35
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	116
Output at minimum heat input	W	115
Output in stand-by	W	3
Degree of protection		IPX5D

Heating/d.h.w. maximum gas flow rate		
Methane G20	m^3/h	3,29
Butane G30	kg/h	2,45
Propane G31	kg/h	2,42
Minimum gas flow rate in heating mode		
Methane G20	m^3/h	1,75
Butane G30	kg/h	1,30
Propane G31	kg/h	1,28
Minimum gas flow rate in d.h.w. mode		
Methane G20	m^3/h	1,38
Butane G30	kg/h	1,03
Propane G31	kg/h	1,01

Max. gas pressure at the burner in heating mode		
Methane G20	Pa	1180
	mbar	11,8
Butane G30	Pa	2790
	mbar	27,9
Propane G31	Pa	3550
	mbar	35,5
Min. gas pressure at the burner in heating mode		
Methane G20	Pa	320
	mbar	3,2
Butane G30	Pa	820
	mbar	8,2
Propane G31	Pa	1050
	mbar	10,5

Ignition pressure		
Methane G20	Pa	830
	mbar	8,3
Butane G30	Pa	1950
	mbar	19,5
Propane G31	Pa	2490
	mbar	24,9

Nozzles	N°	Ø mm /100
Methane G20	14	130
Butane G30	14	77
Propane G31	14	77

Chimney design #		
Max. flue gas temperature	°C	111
Min. flue gas temperature	°C	100
Max. flue gas mass flow rate	kg/s	0,0171
Min. flue gas mass flow rate	kg/s	0,0180
Max. air mass flow rate	kg/s	0,0165
Min. air mass flow rate	kg/s	0,0177

 # 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

TECHNICAL SPECIFICATIONS

Other characteristics		
Height	mm	703
Width	mm	400
Depth	mm	325
Weight	kg	33,6
Max. ambient temperature	°C	60
Min. ambient temperature	°C	-15

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

G30 Hi. 45.65 MJ/kg (15°C, 1013.25 mbar)

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

1 mbar corresponds to approx. 10 mm H20

4.6 Technical data M290.32CM/M

(nom.Q.) Nominal heating/d.h.w. heat input (Hi)	kW	33,9
	kcal/h	29149
(nom.Q.) Minimum heat input (Hi) for heating	kW	20,0
	kcal/h	17197
(nom.Q.) Minimum d.h.w. heat input (Hi)	kW	15,5
	kcal/h	13328
Maximum output power for heating/d.h.w.	kW	30,6
	kcal/h	26311
Minimum output power for heating	kW	18,0
	kcal/h	15477
Minimum output power for d.h.w.	kW	14,0
	kcal/h	12038

Measured efficiency		
Nominal efficiency 60°/80°C	%	93,1
Min. efficiency 60°/80°C	%	90,2
Efficiency at 30 % of load	%	90,9
Energy efficiency		* * *
Heat loss at the chimney with burner operating	Pf (%)	5,9
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 (%)	1
NOx class		2
Weighted NOx	mg/kWh	169
	ppm	96

Heating		
Adjustable temperature **	°C	38 - 85
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	35 - 60
Maximum pressure	kPa	1000
	bar	10
Minimum pressure	kPa	30
	bar	0,3
Maximum flow rate		
(ΔT=25 K)	l/min	20
(ΔT=35 K)	l/min	14,2
Minimum flow rate	l/min	2,5
Specific d.h.w. flow rate (ΔT=30 K) *	l/min	15,2

** Reference standard EN 625*

Gas supply pressures			
Gas		Pa	mbar
Methane G20	**Nom.**	2000	20
	Min.	1700	17
	Max.	2500	25
Butane G30	**Nom.**	2900	29
	Min.	2000	20
	Max.	3500	35
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	139
Output at minimum heat input	W	137
Output in stand-by	W	3
Degree of protection		IPX5D

Heating/d.h.w. maximum gas flow rate		
Methane G20	m^3/h	3,59
Butane G30	kg/h	2,67
Propane G31	kg/h	2,63
Minimum gas flow rate in heating mode		
Methane G20	m^3/h	2,12
Butane G30	kg/h	1,58
Propane G31	kg/h	1,55
Minimum gas flow rate in d.h.w. mode		
Methane G20	m^3/h	1,64
Butane G30	kg/h	1,22
Propane G31	kg/h	1,20

Max. gas pressure at the burner in heating mode		
Methane G20	Pa	1200
	mbar	12
Butane G30	Pa	2770
	mbar	27,7
Propane G31	Pa	3310
	mbar	33,1
Min. gas pressure at the burner in heating mode		
Methane G20	Pa	400
	mbar	4,0
Butane G30	Pa	940
	mbar	9,4
Propane G31	Pa	1300
	mbar	13,0

Ignition pressure		
Methane G20	Pa	720
	mbar	7,2
Butane G30	Pa	1930
	mbar	19,3
Propane G31	Pa	2320
	mbar	23,2

Nozzles	N°	Ø mm /100
Methane G20	15	130
Butane G30	15	78
Propane G31	15	78

Chimney design #		
Max. flue gas temperature	°C	125
Min. flue gas temperature	°C	114
Max. flue gas mass flow rate	kg/s	0,0196
Min. flue gas mass flow rate	kg/s	0,0205
Max. air mass flow rate	kg/s	0,0190
Min. air mass flow rate	kg/s	0,0205

 # 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

TECHNICAL SPECIFICATIONS

Other characteristics		
Height	mm	703
Width	mm	400
Depth	mm	325
Weight	kg	34,7
Max. ambient temperature	°C	60
Min. ambient temperature	°C	-15

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

G30 Hi. 45.65 MJ/kg (15°C, 1013.25 mbar)

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

1 mbar corresponds to approx. 10 mm H20

4.7 Hydraulic characteristic

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

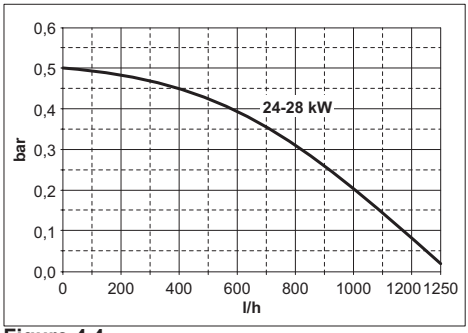


Figure 4.4

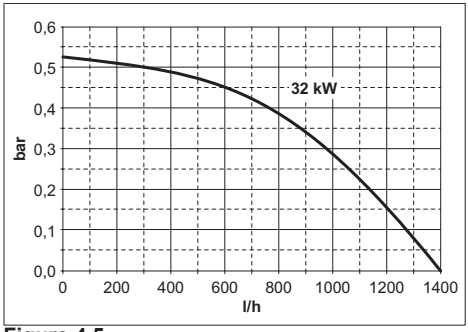


Figure 4.5

The loss of load for the boiler has already been subtracted.

<u>Flow rate with the thermostatic cocks closed</u>

The boiler has an automatic by-pass, which protects the primary 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 exchanger.

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

4.8 Expansion tank

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 preload pressure of the expansion tank and the cold system by 0.1 bar for each 1 metre increase.

Total capacity	l	7.0
Preload pressure	kPa	100
	bar	1.0
Useful capacity	l	3.5
Maximum system content *	l	109

Figure 4.6

* In conditions of:

- Average max. temperature of the system 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.

5 INSTALLATION

5.1 Warnings

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

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 residuals or impurities that could jeopardise proper boiler operation.
After washing, the system must be treated.
The conventional warranty does not cover any problems resulting from the failure to follow these instructions.

Check:

- That the boiler is suitable for the type of gas distributed (check adhesive label).
  If it is necessary to adapt the boiler to a different type of gas, see section "GAS CONVERSION" on page 57.
- That the characteristics of the electric, water and gas supply networks comply with those of 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, the installation must comply with the requirements of the distributing companies and comply 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 activated.

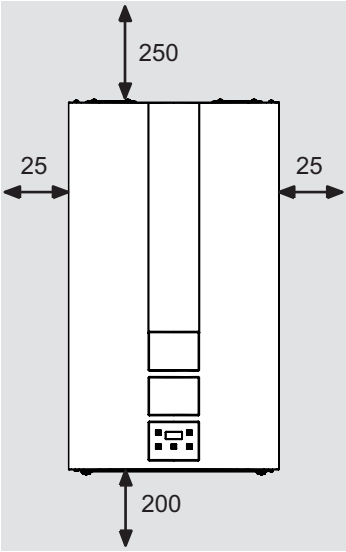
The electric installation must comply with technical standards, in particular:

- It is **mandatory** to connect the boiler to an effective grounding system with a specific terminal.
- A single pole switch must be installed near the boiler to permit complete disconnection in the conditions of overvoltage category III. For the electrical connections refer to section "Electrical connection" on page 41.
- **The electric conductors for connecting the remote control 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 Precautions for installation

Follow these directions for installation:

- Mount the boiler on a resistant wall
- Respect the measurements of the flue gas evacuation duct (provided in section "Flue gas discharge dimensions and lengths" on page 35) 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.



All measurements are expressed in mm
Figure 5.1

- Leave 6 cm of free space in front of the boiler if it is inserted in a cabinet, protection 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.
- It is recommended to install a purification filter in the system or use a product that conditions the circulating water. This latter solution, in particular, not only cleans the system but also provides anticorrosion protection by forming a protective film on the metal surfaces and neutralising the gases in the water.

Filling the heating system:

- If the boiler is installed in rooms where the ambient temperature could go 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 with chemical/physical characteristics that are incompatible with the hydraulic boiler components.

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

Inform the user about the antifreeze function of the boiler and any chemical products added to the heating system.

5.3 Installing the boiler support

The boiler is provided with a support for assembly.
A paper template (provided) is available that contains all the measures and information for correctly installing the support.

5.4 Dimensions

The boiler complies with the following dimensions:

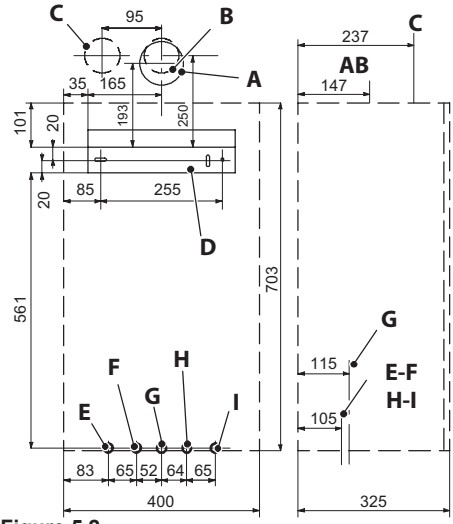


Figure 5.2

A Flue gas exhaust / air suction (coaxial ø 60/100)
B Flue gas exhaust (ø 80 twin pipe)
C Flue gas exhaust (ø 80 twin pipe)
D Boiler mounting support
E MR - Heating delivery
F US - D.h.w. outlet
G Gas
H ES - D.h.w. inlet
I RR - Heating return

All measurements are expressed in mm.

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 on the support.
- Screw the cock on the boiler.
- Fix or weld the flared stub pipes, respectively Ø 14 mm for d.h.w. inlet and outlet and Ø 18 mm for hydraulic system return, delivery and gas.

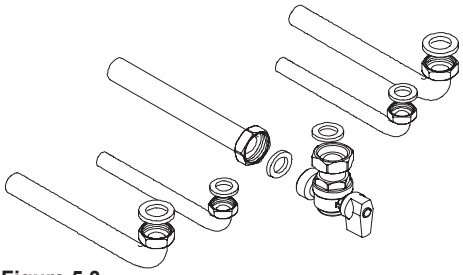


Figure 5.3

- Install a shut-off valve on the d.h.w. 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.
- Connect the safety valve discharge to a discharge funnel Figure 5.4.

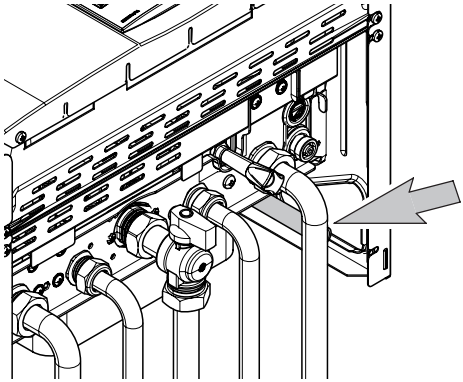


Figure 5.4

5.7 Flue gas discharge dimensions and lengths

The flue gas discharge/air suction can be implemented with the following methods:
C_{12} C_{32} C_{42} C_{52} C_{62} C_{82} B_{22}

Consult the sheet provided together with the selected, separately packaged kit.
The horizontal sections of the flue gas pipes must have a slope of approx. 1.5 degrees (25 mm per metre).

The discharge duct must be implemented in order 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 entrance.

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

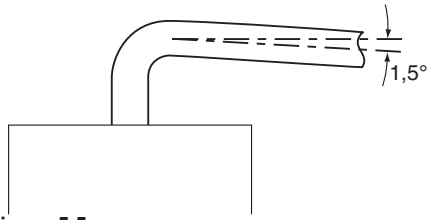


Figure 5.5

The following kits are available for connection to the boiler:

Wall-mounting flue gas discharge kit (Figure 5.8 A)
Coaxial duct Ø 60/100 mm with a nominal length (L Figure 5.8) of 915 mm.

This kit makes it possible to discharge the flue gas in 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:

Coaxial Ø 60/100 mm	Diaphragm
M290.24CM/..	
For lengths between 0.5 m and 1 m	ø 38 mm
For lengths between 1 m and 2 m	ø 47 mm
For lengths between 2 m and 4 m	without
M290.28CM/..	
For lengths between 0.5 m and 1 m	ø 38 mm
For lengths between 1 m and 2 m	ø 47 mm
For lengths between 2 m and 4 m	without
M290.32CM/..	
For lengths between 0.5 m and 1 m	ø 41 mm
For lengths between 1 m and 3 m	without

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.

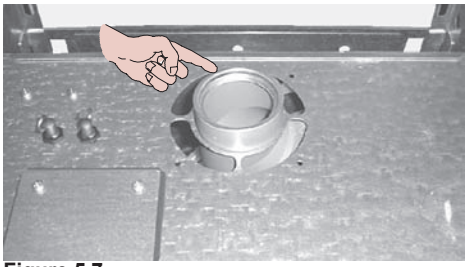


Figure 5.7

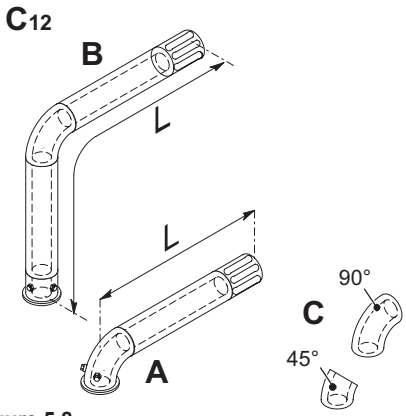


Figure 5.8

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

Coaxial duct Ø 60/100 mm (Figure 5.8).
This kit makes it possible to raise the discharge 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.

Supplementary 45° or 90° elbow (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 ducts for:

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

Twin pipe suction discharge duct kit Ø 80 mm (Figure 5.11 - Figure 5.12)

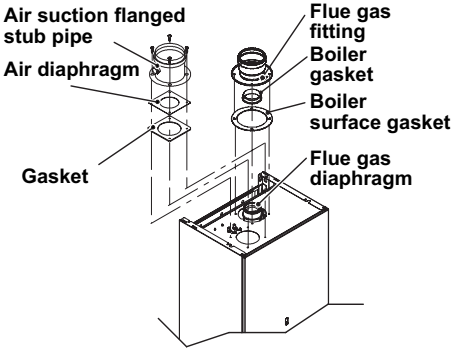
This kit makes it possible to separate the flue gas discharge from the air suction.
The terminals can be inserted in exhaust flues designed for this purpose, or discharge flue gas or intake air directly on the wall.
The minimum length of the pipes may not be less than 1 m, while the max, sum of the sections **A + B** (see Figure 5.11 and Figure 5.12) 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 and graphs in Figure 5.13 for the 28 and 32 kW models):

Model	*Max length (A+B)*
24 kW	30 metres
28 kW	30 metres
32 kW	15 metres

Extensions are available for reaching 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.

Model 24 kW



Models 28 and 32 kW

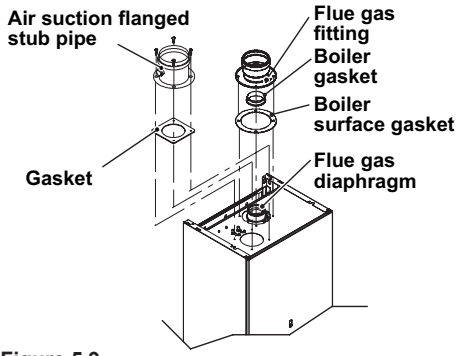


Figure 5.9

M90.24CM/..		
Twin split pipes Ø 80/80 mm	**Diaphragm**	
	Flue gas	**Air**
For lengths between 0.5 m and 15 m	ø 38 mm	Ø no
For lengths between 15 m and 30 m	Ø 47 mm	Ø 50 mm

Figure 5.10

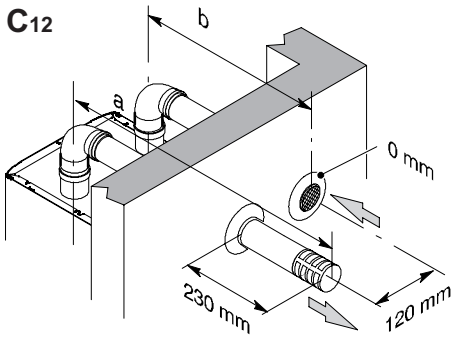


Figure 5.11

If the flue gas discharge 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:

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

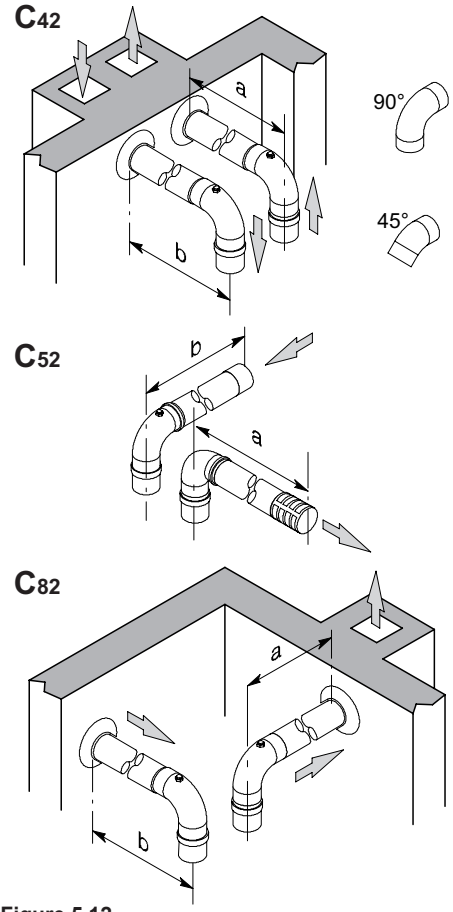
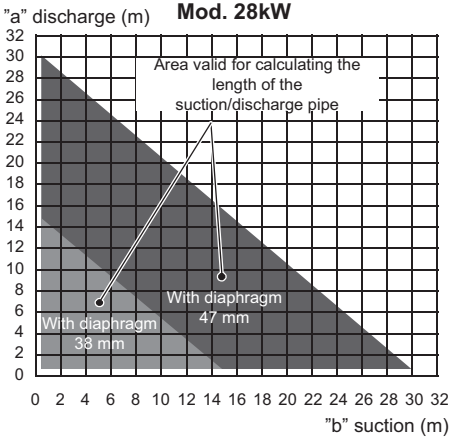


Figure 5.12



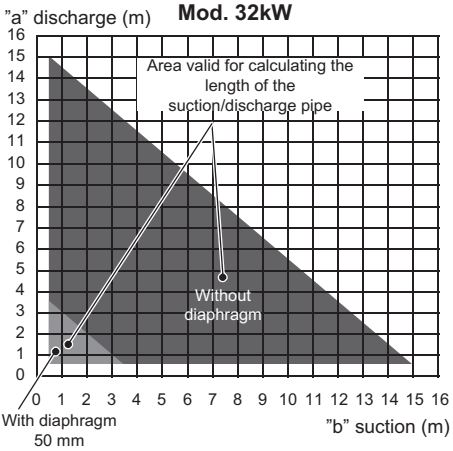


Figure 5.13

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

In the flue gas exhaust duct with risk of condensation for sections longer than 7 metres.

To determine the maximum permissible lengths of the flue gas suction and exhaust ducts, refer to the following table:

TYPE C_{62}

If using ducts and terminals from another manufacturer (type C_{62}), these must be approved and in the case of a flue gas duct, materials must be used that comply with the condensation products.

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

Useful static pressure at nominal heat input	**24 kW**	75	Pa
	28 kW	106	Pa
	32 kW	93	Pa
Flue gas overtemperature	**24 kW**	139	°C
	28 kW	130	°C
	32 kW	167	°C
Maximum recirculation of CO_2 in the suction duct	**24 kW**	0.9	%
	28 kW	0.8	%
	32 kW	0.6	%

Roof-mounting flue gas discharge kit (Figure 5.14)

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

This kit makes it possible to discharge directly to the roof.

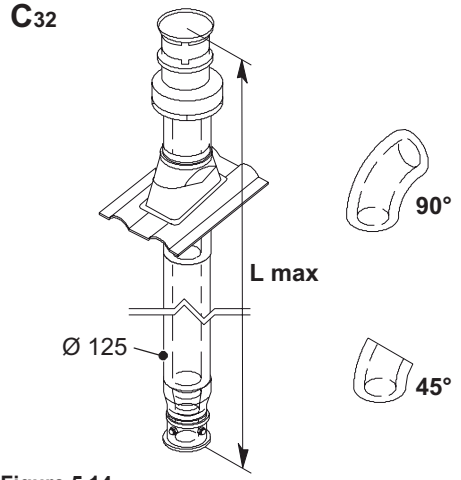


Figure 5.14

Extensions are available for reaching the maximum height.

Its maximum height (L Figure 5.14) with the extensions is:

Coaxial Ø 80/125 mm (Roof discharge)	Diaphragm
M290.24CM/..	
For lengths between 0.5 m and 2.0 m	ø 38 mm
For lengths between 2.0 m and 6.5 m	ø 47 mm
For lengths between 6.5 m and 8.5 m	without
M290.28CM/..	
For lengths between 0.5 m and 1.0 m	ø 38 mm
For lengths between 1.0 m and 6.5 m	ø 47 mm
For lengths between 6.5 m and 8.5 m	without
M290.32CM/..	
For lengths between 0.5 m and 1.0 m	ø 41 mm
For lengths between 1.0 m and 6.0 m	without
For lengths greater than 1 metre, install the condensate collection fitting	

Figure 5.15

The diaphragm must be inserted or removed following the instructions provided in this chapter. 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:

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.

Discharge kit TYPE B_{22} (Figure 5.16)

This type of flue gas discharge takes the comburent air necessary in the same room where the boiler is installed, the combustion product must be discharged outside and can be wall mounted or boiler mounted.

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

For proper operation, the minimum air exchange necessary must be 2 m^3/h for each kW of heat input.

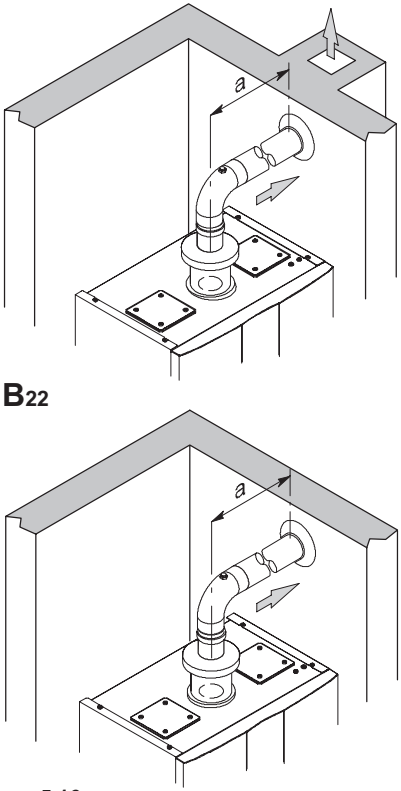


Figure 5.16

Extensions are available for reaching the maximum permissible lengths.

B22 Ø 80 mm discharge	Diaphragm
M290.24CM/..	
For lengths between 0.5 m and 15 m	ø 38 mm
M290.28CM/..	
For lengths between 0.5 m and 15 m	ø 38 mm
M290.32CM/..	
For lengths between 0.5 m and 3.5 m	ø 50 mm
For lengths between 3.5 m and 15 m	without
For lengths greater than 1 metre, install the condensate collection fitting	

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 the figures Figure 5.9 and Figure 5.13.

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

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

In the flue gas exhaust duct with risk of condensation for sections longer than 7 metres.

Discharge kit for exteriors (Figure 5.18)

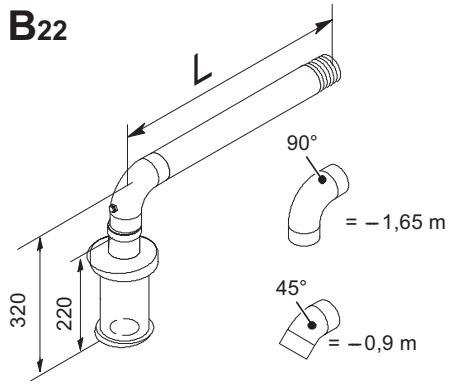


Figure 5.18

Extensions are available for reaching the maximum permissible lengths.
The minimum length of the duct and the maximum length with an extension must comply with the parameters in Figure 5.17:

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

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

In the flue gas exhaust duct with risk of condensation for sections longer than 7 metres.

5.8 Electrical connection

- Unscrew the screws J and remove the front panel K by pulling it towards you and then pushing it upwards in order to free it from the upper seats Figure 5.19.

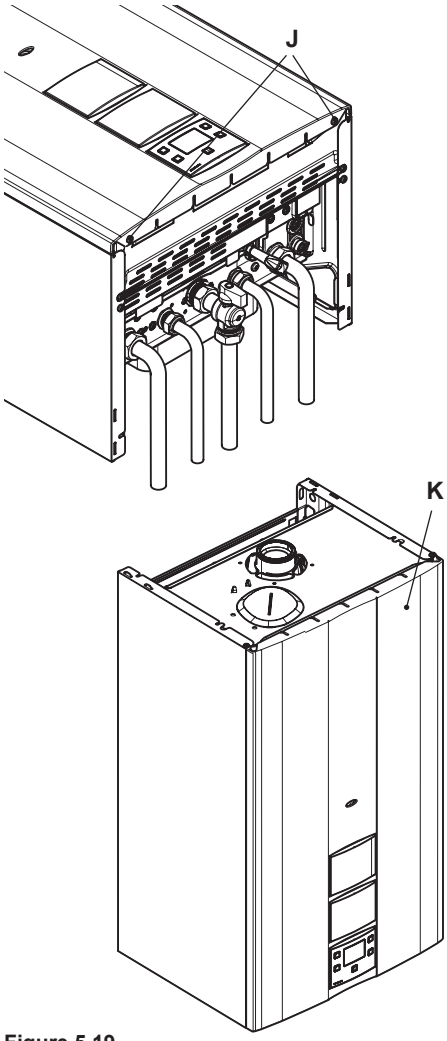


Figure 5.19

- Identify the terminal board cover L (Figure 5.20) remove the sealing screws and open it.

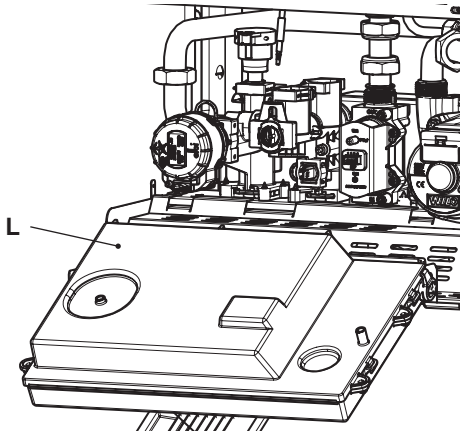


Figure 5.20

If the power supply cable is damaged, it must be replaced by the manufacturer or by its technical support service or by a person with similar qualifications.

Connecting to the electric power supply network

- Connect the electric power supply cable to the single pole switch, respecting the correspondence of the line (brown wire) and the neutral (blue wire).
- **Connect the ground wire (yellow/green) to an effective grounding system.**

The electric power supply cable or wire for the unit must have a minimum section of 0.75 mm^2, be kept at a distance from hot or sharp parts and comply with current technical standards.

5.9 Connecting an ambient thermostat or zone valves

Use the terminals indicated in (Figure 5.21) to connect the ambient thermostat.

The installation of the ambient thermostat excludes the installation of the remote control.
When connecting any type of ambient thermostat, the electric jumper between "A and B" must be removed.

The electric conductors for the ambient thermostat must be inserted between terminals "A and B" as shown in (Figure 5.21).

Do not connect live cables on the "A and B" terminals.

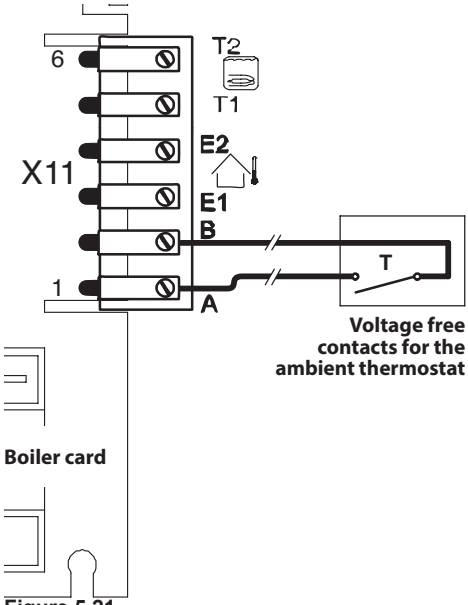


Figure 5.21

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

Connecting zone valves controlled by the ambient thermostat

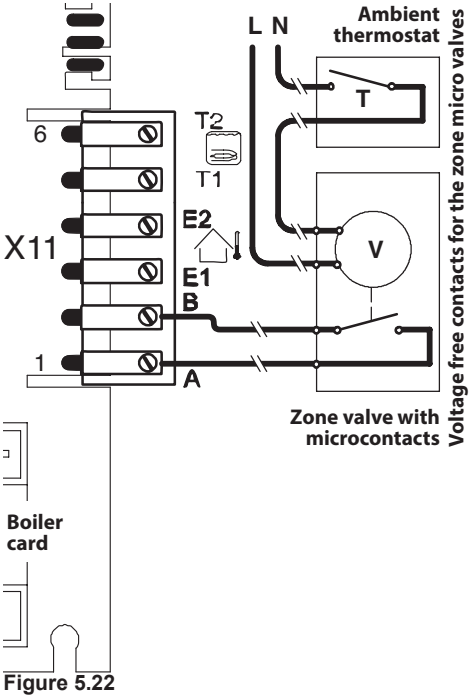


Figure 5.22

Use the ambient thermostat terminals indicated in Figure 5.22 to connect the zone valves. The electric conductors of the zone valve micro contacts must be inserted in the "A and B" terminals of the ambient thermostat terminal board as shown in Figure 5.22.

The electric jumper between "A and B" must be removed.

Do not connect live cables on the "A and B" terminals.

5.10 Installing the external temperature probe (optional)

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

- Direct radiation of the sun's rays.
- Humid walls or walls subject to the formation of mildew.
- Installation near fans, drain outlets or chimneys.

5.11 Electric connection between the boiler and the external probe

To connect the external probe to the boiler use electric cables with a section no less than 0.50 mm^2.

The electric conductors for connecting the external probe to the boiler must go through different channels than those for the mains voltage (230 V), as they are supplied with low safety voltage and their maximum length may not exceed 20 metres.

Use the terminals indicated in (Figure 5.23) to connect the external probe.

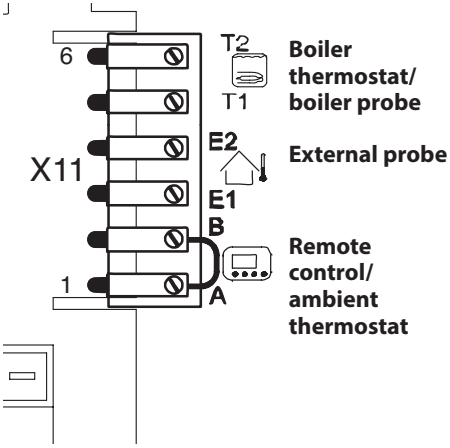


Figure 5.23

5.12 Electrical connection of the remote control (optional)

Use the terminals indicated in (Figure 5.23) to connect the remote control.

The installation of the remote control excludes the installation of the remote control.

To connect the remote control to the boiler, refer also to the REMOTE CONTROL manual.

The electric jumper between "A and B" must be removed (Figure 5.23).

5.13 Remote enabling of operation with the external probe

Functioning with the external probe in the boiler must be enabled if the remote control is used.

The programming of the REMOTE (if installed) is used to enable its operation.

- Press the button for more than 3 seconds to enter *INFO* mode.

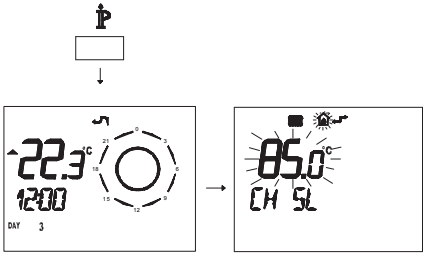


Figure 5.24

Press buttons and together to enter transparent programming (Figure 5.25).

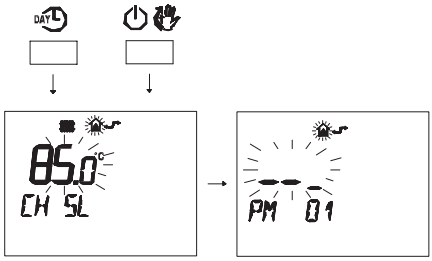


Figure 5.25

- Press buttons ▼ or ▲ to display the "**PM15**" program that enables the external probe (Figure 5.26).

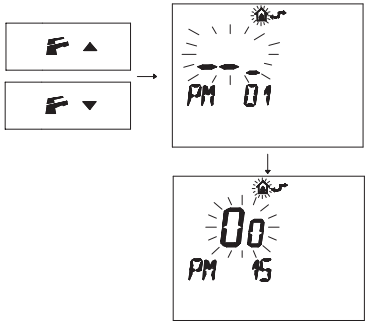


Figure 5.26

- Modify the programmed SET by pushing ▲ or ▼ until a **setting of 60** is displayed and wait for the programmed number to flash (Figure 5.27).

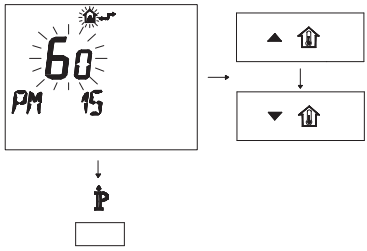


Figure 5.27

- Press to exit programming.

5.14 Setting the K coefficient of the external probe

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

If the remote control (optional) **IS CONNECTED** to the boiler, refer to Figure 5.28.
In this case, the K coefficient must be set remotely.

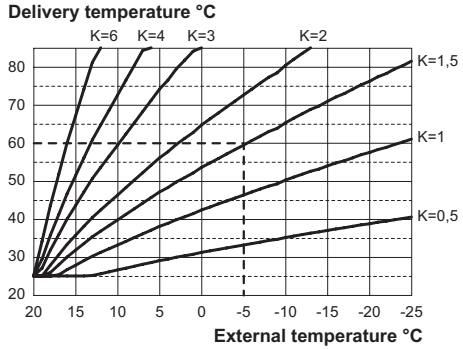


Figure 5.28

The K coefficient is a parameter that increases or decreases the boiler delivery temperature as the external temperature varies.
When installing the external probe, this parameter must be set based on the efficiency of the heating plant to optimise the delivery temperature (Figure 5.28).
E.g. To achieve a temperature delivered to the heating system of 60°C with an outdoor temperature of -5°C, set a K of 1.5 (dashed line in Figure 5.28).

Sequence for setting the K coefficient

- Enter "programming mode" by pressing keys 12-13-14 together for 10 seconds (Figure 5.29) until the LCD display indicates the letters **P01,** alternating with the value of the parameter, indicating entry in "parameter 01" (Figure 5.30).

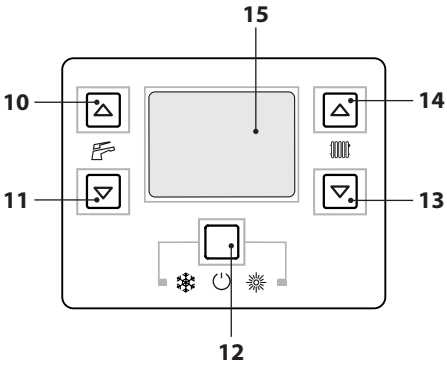


Figure 5.29

Figure 5.30

- Scroll the various parameters using keys 13 or 14 until the LCD display indicates the letters **P15** and the value of the parameter, indicating entry in "parameter 15" (Figure 5.31).

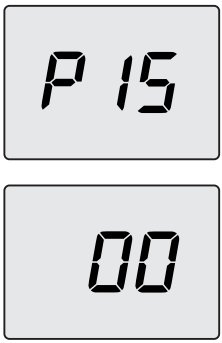


Figure 5.31

- Using key 10 or 11 it is possible to change the value of parameter 15 from a minimum of **01** to a maximum of **60** based on the selected curve of the K coefficient in Figure 5.28 (the value read on the display corresponds to the decimal values of the K coefficients).
- By pressing key 12 (Figure 5.29) confirmation of the inserted value is obtained.
- By pressing keys 12 and 13 together (Figure 5.29) you will exit without changing the value (return to the parameter list Figure 5.31).
- Press keys 12-13-14 together for 10 seconds (Figure 5.29) to exit "programming mode".

At this point the plant delivery temperature will follow the trend in relation to the set K coefficient.

If the ambient temperature is not comfortable, you can increase or decrease the heating system delivery temperature by ± 15°C with the keys 13 (decrease) and 14 (increase) (Figure 5.29).

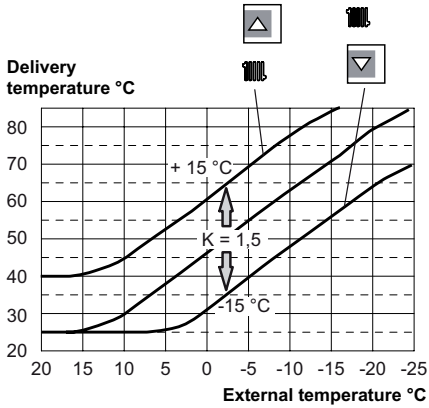


Figure 5.32

The temperature trend when changing the setting using keys 13 and 14 for a **K 1.5** is shown in Figure 5.33.

Sequence for setting the K coefficient with the remote connected

The setting of the K coefficient can be selected with the REMOTE programming.

- Electrically power the boiler by turning on the installed bipolar switch.
- Press the button P for more than 3 seconds to enter INFO mode (Figure 5.33).

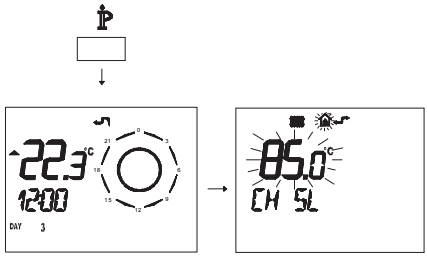


Figure 5.33

Press the button OK to display the **K REG** window (Figure 5.34).

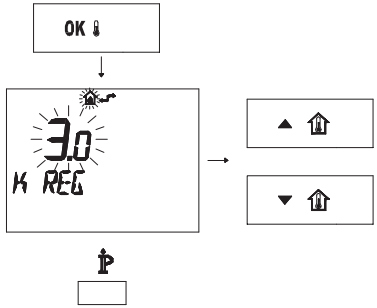


Figure 5.34

Use buttons ▲ and ▼ to change the value.

Press P to exit the INFO mode (Figure 5.34).

5.15 Setting pump post-circulation

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

This time can be changed from a minimum

of zero to a maximum of four minutes by programming it either from the control panel or remotely.

- Enter "programming mode" by pressing keys 12-13-14 together for 10 seconds (Figure 5.35) until the LCD display indicates the letters **P01,** alternating with the value of the parameter, indicating entry in "parameter 01" (Figure 5.36).

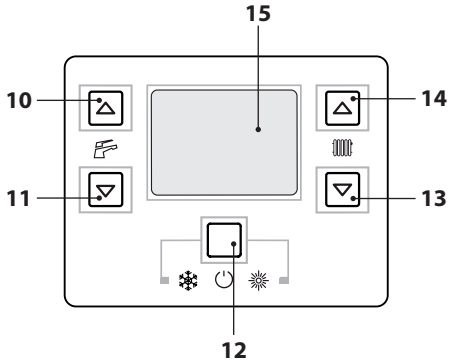


Figure 5.35

Figure 5.36

- Scroll the various parameters using keys 13 or 14 until the LCD display indicates the letters **P15** and the value of the parameter, indicating entry in "parameter 11" (Figure 5.37).

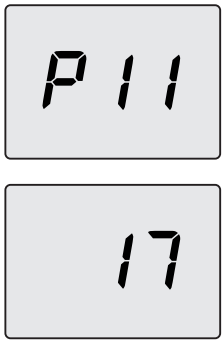


Figure 5.37

- It is possible to modify the value of parameter 11 between **00**=0s to **99**=255s using keys 10 or 11 (each unit increase or decrease on the display corresponds to 2.5 seconds). E.g. 17=42 seconds.
- By pressing key 12 (Figure 5.35) confirmation of the inserted value is obtained.
- By pressing keys 12 and 13 together (Figure 5.35) you will exit without changing the value (return to the parameter list Figure 5.37).
- Press keys 12-13-14 together for 10 seconds (Figure 5.35) to exit "programming mode".

REMOTE programming

- Press the button for more than 3 seconds to enter INFO mode (Figure 5.38).

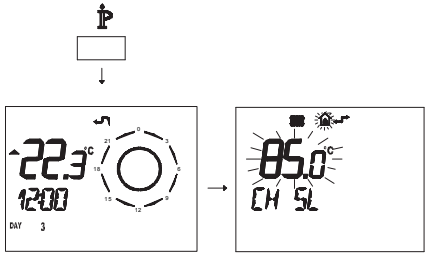


Figure 5.38

- Press buttons and together to enter transparent programming (Figure 5.39).

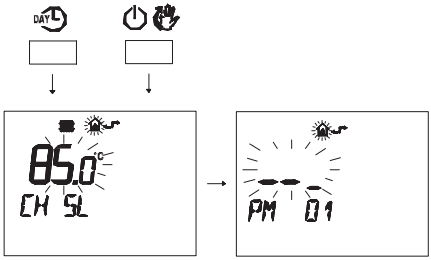


Figure 5.39

- Press buttons ▼ or ▲ to display the "**PM11**" program that enables pump post-circulation (Figure 5.40).

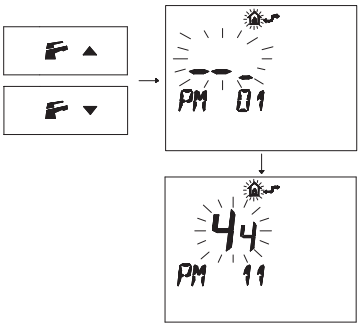


Figure 5.40

- To modify the programmed SET, press ▲ or ▼ and wait for the programmed number to start to flash (Figure 5.41). Each step increase or decreased corresponds to 1 second.

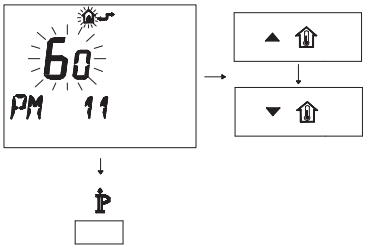


Figure 5.41

- Press P to exit programming.

5.16 Selecting reignition frequency

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

This time can be changed from a minimum of zero to a maximum of eight and a half minutes by programming it either from the control panel or remotely.

- Enter "programming mode" by pressing keys 12-13-14 together for 10 seconds (Figure 5.42) until the LCD display indicates the letters **P01,** alternating with the value of the parameter, indicating entry in "parameter 01" (Figure 5.43).

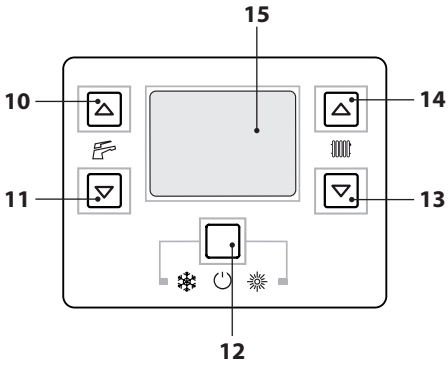


Figure 5.42

Figure 5.43

- Scroll the various parameters using keys 13 or 14 until the LCD display indicates the letters **P10** and the value of the parameter, indicating entry in "parameter 10" (Figure 5.44).

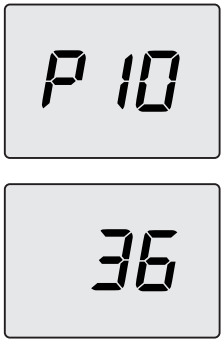


Figure 5.44

- It is possible to modify the value of parameter 10 between **00**=0s to **100**=510s using keys 10 or 11 (each unit increase or decrease on the display corresponds to 5 seconds). E.g. 36=180 seconds.
- By pressing key 12 (Figure 5.42) confirmation of the inserted value is obtained.
- By pressing keys 12 and 13 together (Figure 5.42) you will exit without changing the value (return to the parameter list Figure 5.44).
- Press keys 12-13-14 together for 10 seconds (Figure 5.42) to exit "programming mode".

REMOTE programming

Via REMOTE programming you can select a minimum time between two ignitions when the boiler is operating in normal on/off heating mode.

- Press the button for more than 3 seconds to enter INFO mode (Figure 5.45).

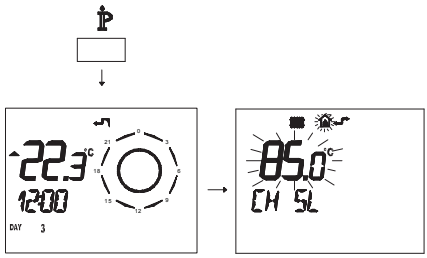


Figure 5.45

- Press buttons and together to enter transparent programming (Figure 5.46).

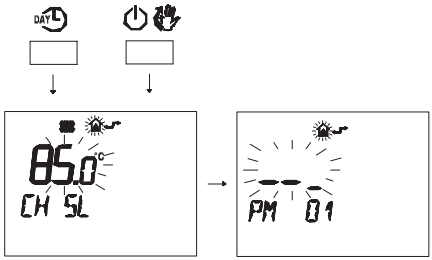


Figure 5.46

- Press buttons or to display the "**PM10**" program for selecting ignition frequency (Figure 5.47).

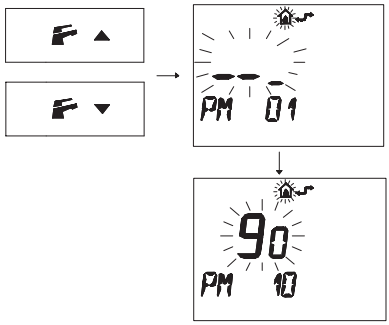


Figure 5.47

Figure 5.47 shows a programmed SET of **90**, which corresponds to a re-ignition time of approx. 3 minutes.
The adjustment range is between 0 and 8 and

a half minutes.
Each step increase or decreased corresponds to 2 seconds.

- To modify the programmed SET, press ▲ or ▼ and wait for the programmed number to start to flash (Figure 5.48).

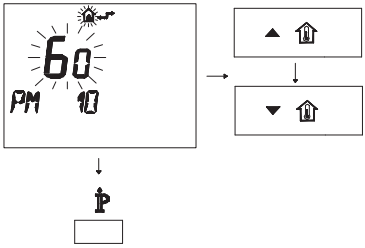


Figure 5.48

- Press to exit programming.

5.17 Examples of hydraulic plants 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 of 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 plants

High temperature zone + low temperature zone.

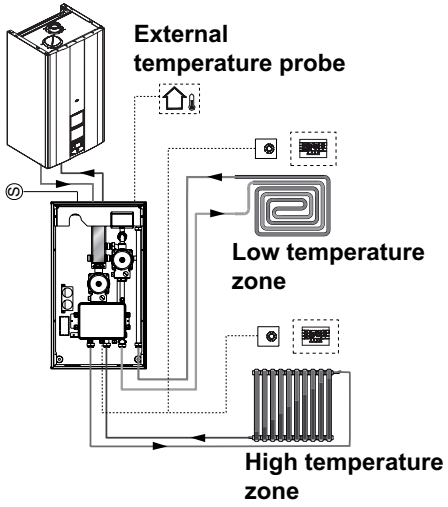


Figure 5.49

High temperature zone + 2 low temperature zones.

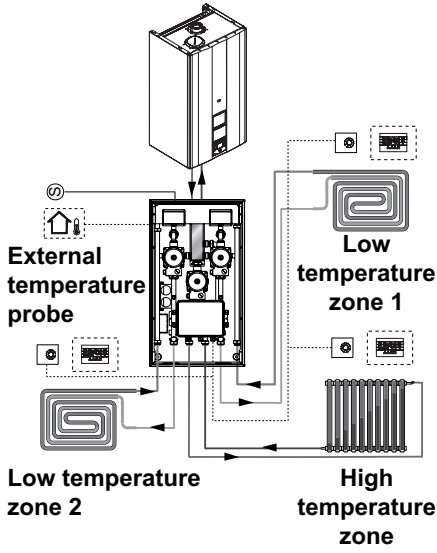


Figure 5.50

6 PREPARATION FOR SERVICE

6.1 Warnings

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

6.2 Sequence of the operations

Gas supply

- Open the cock for the gas meter and for the boiler 5 in Figure 6.1.

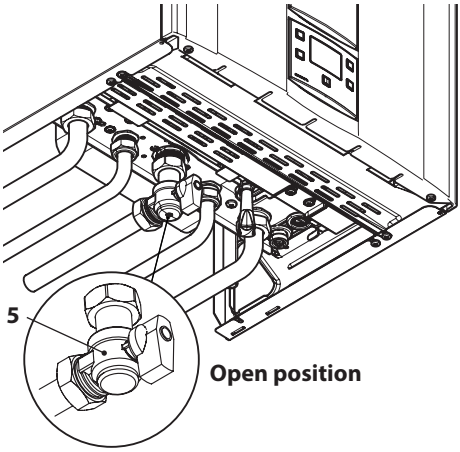


Figure 6.1

- Check for leaks in the gas fitting using a soapy solution or an equivalent product.
- Reclose the gas cock 5 in Figure 6.2.

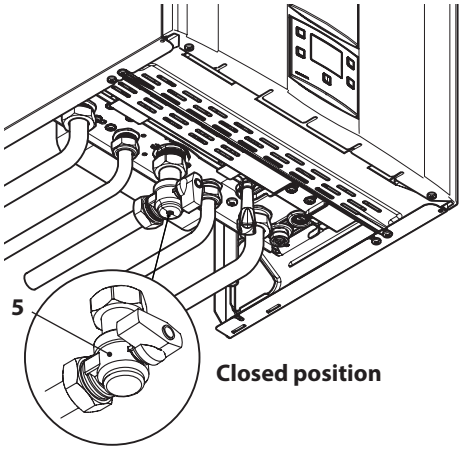


Figure 6.2

Filling the heating system

- Remove the front panel on the body, see section "Removing the body panels" on page 59.
- Open the installed system cocks
- Open one or more hot water cocks to bleed the pipes.
- Loosen the automatic bleed valve cap 27 in Figure 6.3.

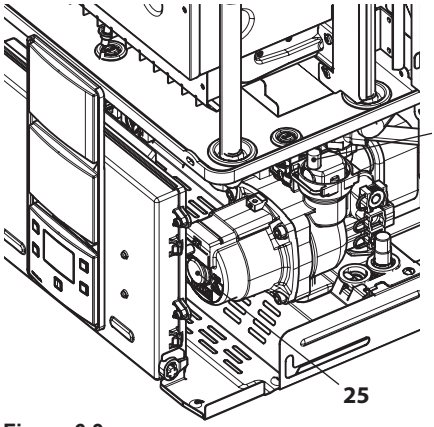


Figure 6.3

- Open the radiator cocks.

- Fill the heating circuit, see section "Filling the heating circuit" on page 14 .
- Bleed the radiators and the various high points of the installation, then reclose any manual bleeding devices.
- Remove the cap 25 in Figure 6.3 and release the pump by turning the rotor using a screwdriver.
  Bleed the pump during this operation.
- Reclose the pump cap.
- Complete filling the heating system.
  The installation as well as the pump must be bled multiple times.
- Remove the front panel on the body.
- Electrically power the boiler by turning on the installed bipolar switch. The LCD display shows the symbol - - - (the dashes are turned on in sequence to simulate flowing) (Figure 6.4).

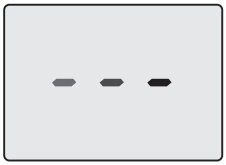


Figure 6.4

- Press key 12 for 2 seconds until both symbols and appear on the display (Figure 6.5).

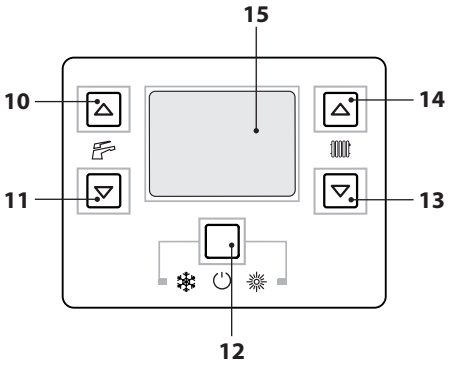


Figure 6.5

The LCD display shows the boiler temperature (primary circuit) and the symbols and (Figure 6.6).

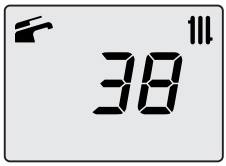


Figure 6.6

- Open the gas cock
- Make sure that the ambient thermostat is in the position "call for heat".
- Both the correct operation of the boiler, both in d.h.w. mode as well as in heating mode.
- Check the gas pressures and flow rates as shown in section "CHECKING THE GAS REGULATION" on page 53 in this manual.

- Turn off the boiler by pressing key 12 (Figure 6.5) for 2 seconds until the symbol - - - appears on the display (the dashes appear in sequence to simulate flowing) (Figure 6.4).

- Instruct the user about the correct use of the unit and the following operations:
  - ignition
  - switching off
  - regulation

The user is responsible for keeping the documentation complete and within reach for consultation.

7 CHECKING THE GAS REGULATION

7.1 Warnings

Each time after measuring the gas pressure, properly close all tapping points that were used.
After each gas regulation operation, the valve adjustment components must be sealed.

Attention, danger of electrocution. The boiler is live during the operations described in this section. Never touch any electrical part.

7.2 Operations and gas setting

- Remove the front panel on the body, see section "Removing the body panels" on page 59.

Checking the network pressure

With the boiler off, check the supply pressure using the tapping point 31 in Figure 7.1 and compare the read value with the one shown in the Gas supply pressure table in the section "Technical data M290.24CM/..." on page 22, "Technical data M290.28CM/..." on page 25 and "Technical data M290.32CM/..." on page 28.

- Properly reclose the tapping point 31 in Figure 7.1.

Checking the burner pressure in d.h.w. mode

- Open the tapping point 30 in Figure 7.1 and connect a pressure gauge.

Figure 7.1

- Enter "programming mode" by pressing keys 12-13-14 together for 10 seconds (Figure 7.2) until the LCD display indicates the letters **P01,** alternating with the value of the parameter, indicating entry in "parameter 01" (Figure 7.3).

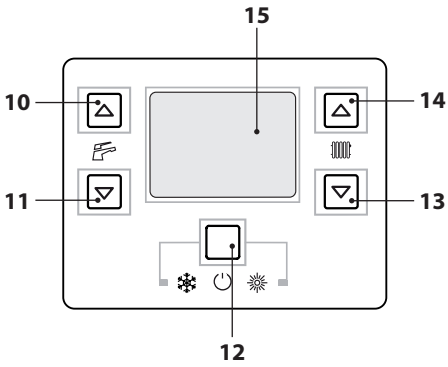


Figure 7.2

Figure 7.3

- Press key 13 or 14 (Figure 7.2) to scroll the parameters until parameter **P09** that alternates with the value of the parameter, indicating entry in "parameter 09" (chimney sweep **00** = chimney sweep not activated) (Figure 7.4.

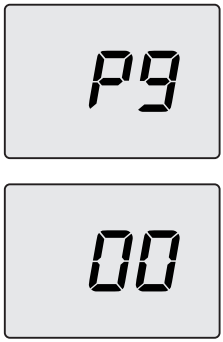


Figure 7.4

- Use keys 10 or 11 to change this value to **01** (chimney sweep activated in minimum dhw mode) and press 12 to confirm. **LP** will appear on the display alternated with the minimum d.h.w. temperature (Figure 7.5).

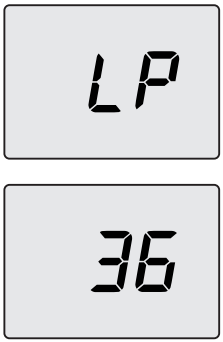


Figure 7.5

- Make sure that the ambient thermostat is in the position "call for heat".
- Withdraw an abundant amount of dhw by opening the cocks.

- Compare the measures pressure value with the one indicated in the following tables.

M290.24CM - Min. gas pressure at the burner		
Methane G20	Pa	220
	mbar	2,2
Butane G30	Pa	560
	mbar	5,6
Propane G31	Pa	650
	mbar	6,5

1 mbar corresponds to approx. 10 mm H20

Figure 7.6

M290.28CM - Min. gas pressure at the burner		
Methane G20	Pa	180
	mbar	1,8
Butane G30	Pa	490
	mbar	4,9
Propane G31	Pa	640
	mbar	6,4

1 mbar corresponds to approx. 10 mm H20

Figure 7.7

M290.32CM - Min. gas pressure at the burner		
Methane G20	Pa	220
	mbar	2,2
Butane G30	Pa	570
	mbar	5,7
Propane G31	Pa	750
	mbar	7,5

1 mbar corresponds to approx. 10 mm H20

Figure 7.8

- Use keys 13 or 14 (Figure 7.2) to change the status to **dP** (chimney sweep activated in maximum dhw mode) and press 12 to confirm. **dP** will appear on the display alternated with the maximum d.h.w. temperature.

Figure 7.9

- Compare the measures pressure value with the one indicated in the following tables.

M290.24CM - Max. gas pressure at the burner		
Methane G20	Pa	1280
	mbar	12,8
Butane G30	Pa	2820
	mbar	28,2
Propane G31	Pa	3600
	mbar	36,0

1 mbar corresponds to approx. 10 mm H20

Figure 7.10

M290.28CM - Max. gas pressure at the burner		
Methane G20	Pa	1180
	mbar	11,8
Butane G30	Pa	2790
	mbar	27,9
Propane G31	Pa	3550
	mbar	35,5

1 mbar corresponds to approx. 10 mm H20

Figure 7.11

M290.32CM - Max. gas pressure at the burner		
Methane G20	Pa	1200
	mbar	12,0
Butane G30	Pa	2770
	mbar	27,7
Propane G31	Pa	3310
	mbar	33,1

1 mbar corresponds to approx. 10 mm H20

Figure 7.12

- If the read pressures do not coincide with the ones in the tables, exit programming by pressing key 12 and then following calibration operations described below.

Calibrating the gas valve

- Enter "programming mode" by pressing keys 12-13-14 together for 10 seconds (Figure 7.2) until the LCD display indicates the letters **P01,** alternating with the value of the parameter, indicating entry in "parameter 01" (Figure 7.3).
- Press key 14 (Figure 7.2) to scroll the parameters until displaying parameter **P09** (chimney sweep) (Figure 7.4).
- Use key 10 to change this value to **15** and then press key 12 to confirm. **S-H** will appear on the display alternating with the absolute maximum power parameter (Figure 7.13).

Figure 7.13

- Use keys 14 or 13 (Figure 7.2) to increase or decrease the value. Wait 3 seconds for the gas pressure to stabilise and then read the value on the gas pressure gauge. **Remember to keep the trend upward**.
- Press key 11 (Figure 7.2) for 5 seconds to store the value.
- Press key 10 (Figure 7.2) to calibrate the gas minimum. S-L will appear on the display alternating with the absolute minimum power parameter (Figure 7.14).

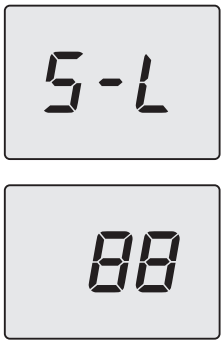


Figure 7.14

- Use keys 14 or 13 (Figure 7.2) to increase or decrease the value. Wait 3 seconds for the gas pressure to stabilise and then read the value on the gas pressure gauge. **Remember to keep the trend downward**.
- Press key 11 (Figure 7.2) for 5 seconds to store the value.
- Press key 10 (Figure 7.2) to check the maximum set value and correct it if necessary by following the procedure described above.
- Press key 10 (Figure 7.2) to check the minimum set value and correct it if necessary by following the procedure described above.
- Disconnect the power supply to exit from calibration.
- Close the domestic hot water cocks.

Properly reclose the tapping point.

8 GAS CONVERSION

8.1 Warnings

The operations for adapting the boiler to the type of gas available must be performed by an Authorised Service Centre.

The components used for adapting to the type of gas available must only be done using original spare parts.
For instructions regarding calibrating the boiler gas valve, refer to section "CHECKING THE GAS REGULATION" on page 53.

8.2 Operations

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

- Remove the body's front and side panels as shown in section "Maintenance" on page 59.
- Remove the mobile wall from the sealed chamber.
- Remove the front panel from the combustion chamber and the burner in Figure 8.1.

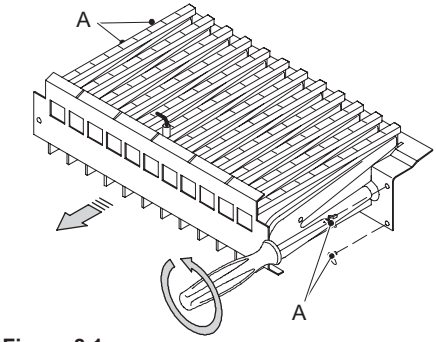


Figure 8.1

- 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 mobile wall of the sealed chamber.
- Restore electric power to the boiler.

To set boiler operation with LPG gas (G30 - G31) carry out the following settings:

- Enter "programming mode" by pressing keys 12-13-14 together for 10 seconds (Figure 8.2) until the LCD display indicates the letters **P01,** alternating with the value of the parameter, indicating entry in "parameter 01" (Figure 8.3).

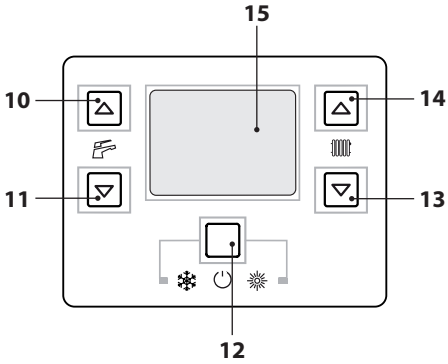


Figure 8.2

Figure 8.3

- Scroll the various parameters using keys 13

or 14 until the LCD display indicates the letters **P05** and the value of the parameter, indicating entry in "parameter 05" (Figure 8.4).

Figure 8.4

- Pressing the 10 key 5 times it is possible to modify the value of parameter 05 (see table).

Parameter	Gas type
00	G20
05	G31

- By pressing key 12 (Figure 8.2) confirmation of the inserted value is obtained.
- By pressing keys 12 and 13 together (Figure 8.2) you will exit without changing the value (return to the parameter list Figure 8.4).
- Press keys 12-13-14 (Figure 8.2) together for 10 seconds to exit "programming mode".

- Calibrate the gas valve according to the instructions in section "CHECKING THE GAS REGULATION" on page 53.

- Reposition the control panel and remount the front panel of the body.

- Apply the label indicating the type of gas and the pressure value for which the unit is regulated. The self-adhesive label is included in the transformation kit.

9 MAINTENANCE

9.1 Warnings

The operations described in this chapter must only be performed by professionally qualified personnel, therefore you are advised to contact an Authorised Service Centre.

For efficient and continuous 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 conventional 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 bipolar switch installed on the plant and **close the gas cock**.

9.2 Removing the body panels

Front panel

- Remove the screws A. Remove the front panel by moving it upward to free it from the lower hooks in Figure 9.1.

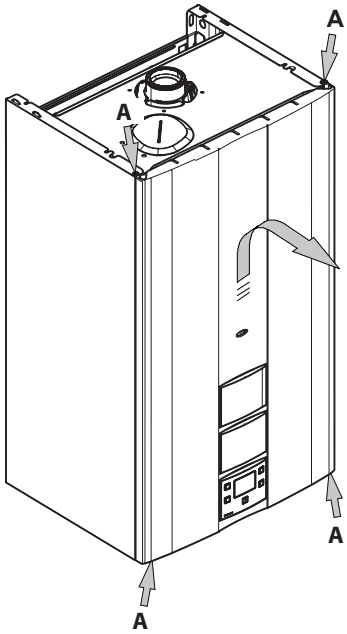


Figure 9.1

Side panels

- Loosen screw B in Figure 9.2 and remove the side panels, pushing them upward to free them from the upper supports.

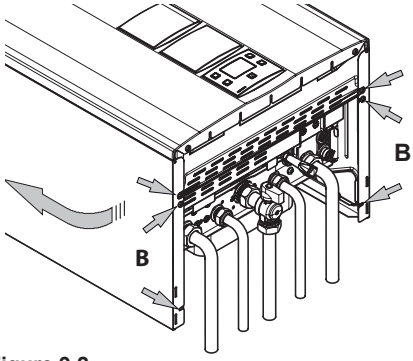


Figure 9.2

Control panel

Turn the control panel C, as shown in figure Figure 9.3, to access the components inside

the boiler in an optimal manner.

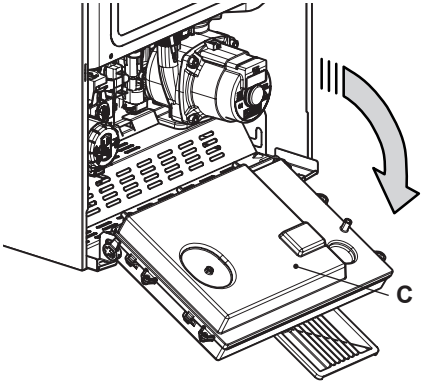


Figure 9.3

9.3 Emptying the d.h.w. circuit

- Close the installed inlet cocks.
- Open the system's domestic hot water cocks.

9.4 Emptying the central heating circuit

- Close the central heating system delivery and return cocks.
- Loosen the boiler drain cock 23 indicated in Figure 9.4.

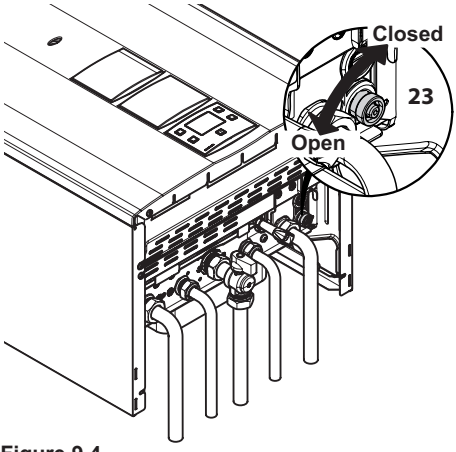


Figure 9.4

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 them using a bristle brush.

9.6 Checking the pressure of the expansion tank

Empty the heating circuit as described in section "Emptying the central heating circuit" on page 60 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 multigas type burner does not require particular maintenance, simply dust it off using a bristle brush. Most specific maintenance for this component will be assessed and performed by a technician from an Authorised Service Centre.

9.9 Controlling the flue gas expulsion duct

Have a technician from an Authorised Service Centre periodically check (at least once a year) the condition of the flue gas expulsion duct, the air duct and the efficiency of the flue gas

safety circuit.
To check the vacuum of the Venturi, use the tapping points indicated in Figure 9.5.

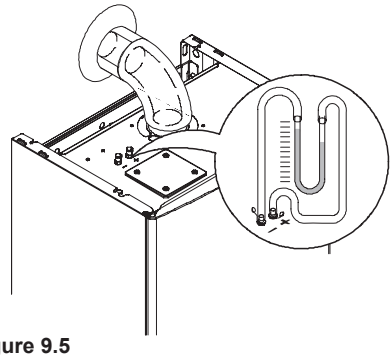


Figure 9.5

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

Model M290.24CM/..		
Minimum Venturi pressure	Pa	76
	mbar	0.76
Model M290.28CM/..		
Minimum Venturi pressure	Pa	111
	mbar	1.11
Model M290.32CM/..		
Minimum Venturi pressure	Pa	149
	mbar	1.49

Figure 9.6

9.10 Checking boiler efficiency

Carry out performance checks at the intervals provided by the laws in force.

See also section "Setting the boiler chimney sweep function" on page 62.

- Start the boiler in heating mode at maximum power.
- Check boiler combustion using the flue gas outlet on the flue gas expulsion pipe near the boiler and compare the measured data with the data in the table.

This check may also be carried out with the boiler operating at maximum power in domestic hot water mode. In that case, this must be specified in the check report.

Model M290.24CM		
Nominal heat input	kW	25,5
Nominal efficiency	%	92,8
Combustion efficiency	%	93,7
Air index	n	1,7
Composition of CO2 fumes	%	6,9
Composition of O2 fumes	%	8,6
Flue gas temperature	°C	123

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 9.7

Model M290.28CM		
Nominal heat input	kW	31,1
Nominal efficiency	%	93,3
Combustion efficiency	%	94,8
Air index	n	1,5
Composition of CO2 fumes	%	7,6
Composition of O2 fumes	%	7,3
Flue gas temperature	°C	111

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 M290.32CM		
Nominal heat input	kW	33,9
Nominal efficiency	%	93,1
Combustion efficiency	%	94,1
Air index	n	1,6
Composition of CO2 fumes	%	7,2
Composition of O2 fumes	%	8,1
Flue gas temperature	°C	125

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

9.11 Setting the boiler chimney sweep function

With the boiler set to chimney sweep mode, some automatic boiler functions can be excluded, which makes check and control operations easier.

- Enter "programming mode" by pressing keys 12-13-14 together for 10 seconds (Figure 9.10) until the LCD display indicates the letters **P01,** alternating with the value of the parameter, indicating entry in "parameter 01" (Figure 9.11).

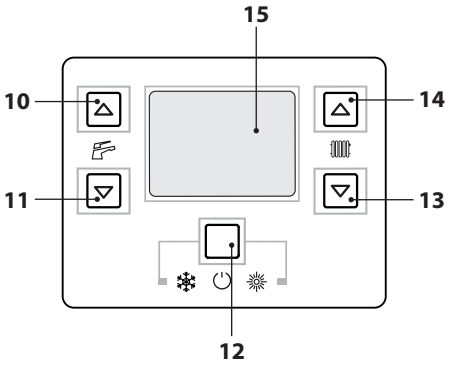


Figure 9.10

Figure 9.11

<u>Chimney sweep function at minimum output in domestic hot water mode</u>

- Press keys 13 and 14 (Figure 9.10) together until the LCD displays the letters **LP** that alternate with the minimum domestic hot water temperature value (e.g. **45**), indicating the activation of the "chimney sweep function" at minimum d.h.w. output (Figure 9.12).

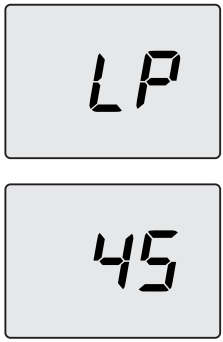


Figure 9.12

<u>Chimney sweep function at minimum output in heating mode</u>

- Press key 14 to vary the output in chimney sweep mode: when the LCD displays the letters **LP** that alternate with the minimum domestic hot water temperature value (e.g. **32**), indicating the activation of the "chimney sweep function" at minimum d.h.w. output

(Figure 9.13).

Figure 9.13

Chimney sweep function at maximum output in heating mode

- Press key 14 to vary the output in chimney sweep mode: when the LCD displays the letters **cP** that alternate with the temperature of the heating water (e.g. **78**), the "chimney sweep function" is at maximum output in heating mode (Figure 9.14);

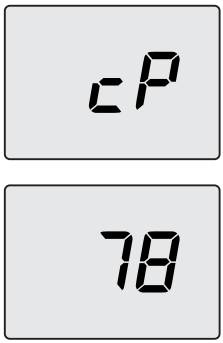


Figure 9.14

Chimney sweep function at maximum output in domestic hot water mode

- Press key 14 again to vary the output in chimney sweep mode: when the LCD displays the letters **dP** that alternate with the temperature of the heating water (e.g. **60**), the "chimney sweep function" is at maximum output in domestic hot water mode (Figure 9.15);

Figure 9.15

- Press key 12 (Figure 9.10) to exit "chimney sweep mode" and return to the previously set boiler status (Figure 9.16).

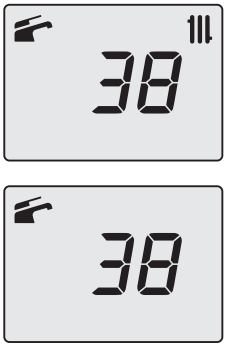


Figure 9.16

9.12 Settings for changing the control card

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

Important: In order to check boiler operation and any change to parameters set in the factory, the table shown in Figure 9.17 must be filled out with the values that are displayed when scrolling the control card configuration parameters.

This makes it possible to correctly adjust this boiler if the control card is replaced.

PARAMETERS	LCD	VALUE
Boiler model/type	**P 01**	
Boiler type	**P 02**	
D.h.w. exchanger	**P 03**	
Not used	**P 04**	----------
Type of gas	**P 05**	
CO_2 offset	**P 06**	
Maximum heating delivery temperature °C	**P 07**	
Reset (restores the factory parameters)	**P 08**	
Chimney sweep	**P 09**	
Reignition frequency in heating mode	**P 10**	
Pump post-circulation	**P 11**	
Regulation of the useful power in heating mode	**P 12**	
Pump mode operation	**P 13**	
Burner ignition power	**P 14**	
Value of the external probe K	**P 15**	
Minimum power in heating mode	**P 16**	
Burning shut off in function of d.h.w. temp.	**P 17**	
Not used	**P 18**	----------
User interface	**P 19**	
Not used	**P 20**	----------
Not used	**P 21**	----------
Not used	**P 22**	----------
Not used	**P 23**	----------
Not used	**P 24**	----------
Minimum gas valve calibration value	**P 25**	
Maximum gas valve calibration value	**P 26**	
Minimum heating return temperature °C	**P 27**	
Maintenance intervals	**P 28**	
D.h.w. entry temperature for calculation def=10	**P 29**	
Pon reference pressure	**P 30**	
Relay 1 configuration	**P 31**	
Relay 2 configuration	**P 32**	

Figure 9.17

- Enter "programming mode" by pressing keys 12-13-14 (Figure 9.18) together for 10 seconds until the LCD display indicates the letters **P01** alternating with the value of the parameter, indicating entry in "parameter 01" (Figure 9.19).

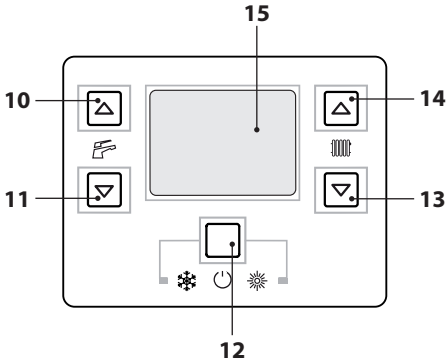


Figure 9.18

Figure 9.19

- Use keys 10 or 11 to modify the value of parameter 01:
  01 = 24 kW
  02 = 28 kW
  03 = 32 kW.

- By pressing key 12 (Figure 9.18) confirmation of the inserted value is obtained.
- Press keys 14 or 13 to exit without confirming the modified value.

- Press key 14 to switch to parameter **P02** and display the relative value that was set:
  00 = combustion check with flue gas pressure switch.

- Press keys 10 or 11 to change the value and confirm the value of the parameter with key 12.

- Press keys 14 or 13 to exit without confirming the modified value.

- Press key 14 to switch to parameter **P03** and display the relative value that was set:
  00 = domestic hot water plate heat exchanger.

- Press keys 10 or 11 to change the value and confirm the value of the parameter with key 12.
- Press keys 14 or 13 to exit without confirming the modified value.

- Press keys 12-13-14 together for 10 seconds (Figure 9.18) to exit "programming mode".

NOTES

17962.2162.0 3013 68A5 IT

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