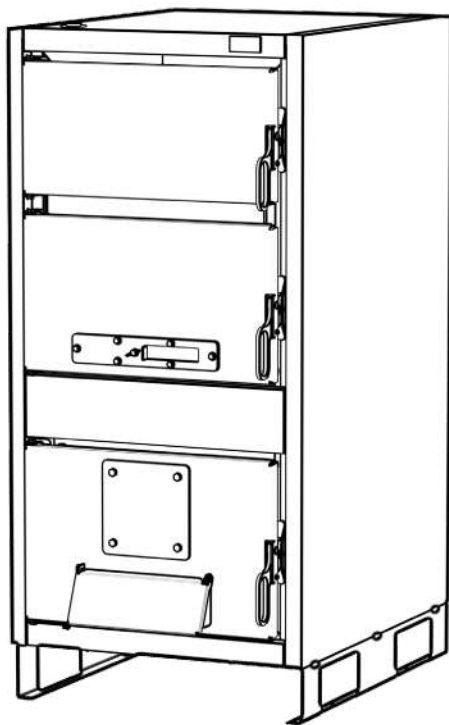


Mareli Systems



LC 25 / 30 / 35 / 40 / 50 KW

SOLID FUEL BOILER


Assembly and exploitation manual

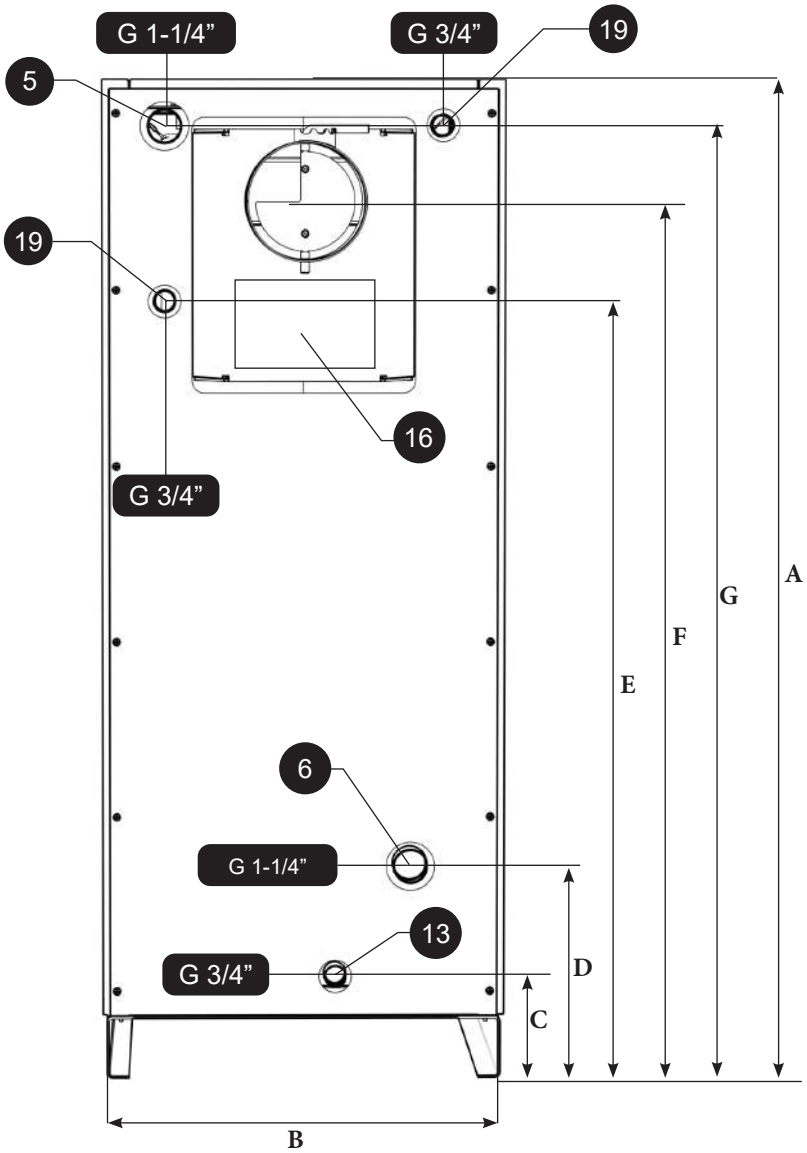
Mareli Systems

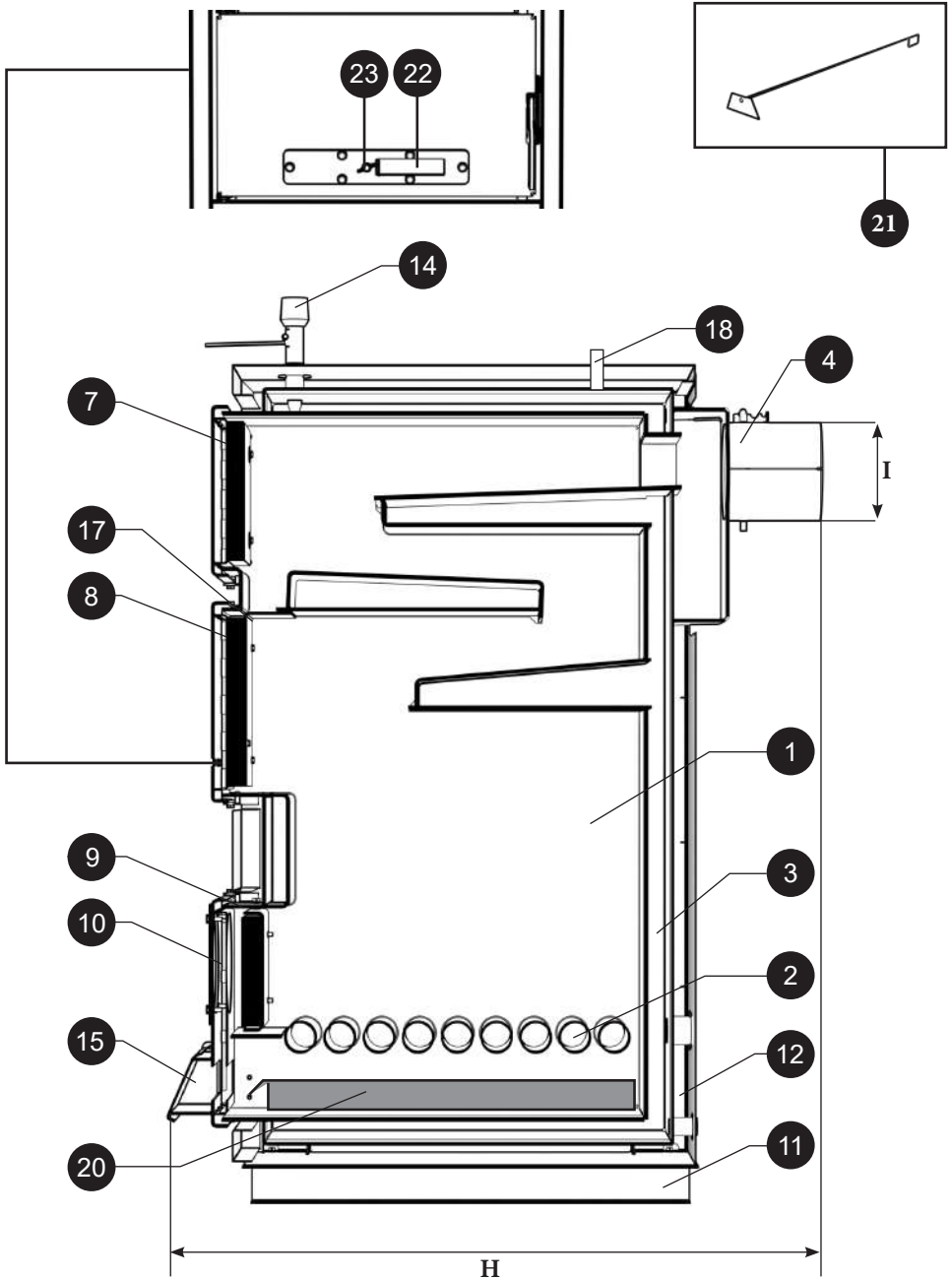
Observing the prescriptions of the present manual is in the user's favour and is one of the warranty conditions. Compliance with this instruction is in the interest of the consumer and one of the warranty terms. These instructions are an integral part of this product. All rights reserved. Reproduction of content of this document and transfer to third parties is not allowed without written approval from manufacturer. Make sure the instructions are always with the device, even if its sale transfer of another owner to the user or staff authorized for maintenance or repairs to consult.

INSTRUCTIONS FOR SECURITY:

- This appliance is not intended for use by people (including children) with limited physical, sensory or mental abilities or lack of experience and knowledge. The installation must be performed by a qualified expert in the field of heating installations or authorized by "Mareli Systems' service. The place and way of connecting the boiler should be selected carefully in accord with the safety instructions. Install away from flammable objects!
- Carefully read the warnings in this instruction manual as they provide important indications regarding safe installation, use and maintenance.
- The instruction manual is an integral and essential part of the product and must be kept carefully by the user, for any subsequent consultation.
- If the appliance is to be sold or transferred to another owner or if it is to be moved, always ensure that the manual accompanies the boiler so that it can be consulted by the new owner and/or the installer.
- Installation and maintenance operations must be carried out respecting the norms in force, in accordance with the manufacturer's instructions, and must be carried out by professionally qualified personnel.
- Incorrect installation or improper maintenance can cause damage to people, animals or property. Any responsibility on the part of the manufacturer is excluded for damages caused by errors in installation and use, and in general for non-observance of the instructions provided by the manufacturer.
- Before carrying out any cleaning or maintenance operation, disconnect the device from the power supply by operating the installation switch and/or using the appropriate locking devices.
- In the event of malfunction and/or malfunction of the device, disable it, avoiding any attempt at repair or direct intervention. Contact only professionally qualified personnel. Any repair or replacement of the products must be carried out only by professionally qualified personnel, using only original spare parts. Failure to comply with the above may compromise the safety of the device.
- In order to guarantee the proper functioning of the device, it is essential to ask qualified personnel to carry out periodic maintenance operations.
- This appliance must only be used for the purpose for which it was expressly designed. Any other use is considered improper and therefore dangerous.
- After unpacking, check the integrity of the contents. The packaging materials must not be left within the reach of children as they constitute a potential source of danger.
- If in doubt, do not use the device and contact the supplier.
- The device and its accessories must be disposed of properly, in accordance with the regulations in force.
- The images in this manual are a simplified representation of the product. In this representation there may be small and insignificant differences compared to the product supplied.

	READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLING THE BOILER TO HEATING SYSTEM!
	BOILER MUST NOT OPERATE IN FLAMMABLE AND EXPLOSIVE ENVIRONMENT.
	BEFORE ANY WORK ON THE BOILER, ELECTRIC ENERGY MUST BE SWITCHED OFF.





LC	Greutate (kg)	B (mm)	H (mm)	A (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	I (mm)
25	262	465	969	1294	160	300	864	1125	1235	Ø149
30	280	510	969	1294	160	300	1014	1140	1235	Ø149
35	301	560	969	1294	160	300	1014	1140	1235	Ø149
40	321	610	969	1294	160	300	1014	1115	1235	Ø179
50	350	610	1044	1294	160	300	1014	1115	1235	Ø179

1	Combustion chamber	13	Drain valve
2	Grill for burning	14	Thermoregulator connection
3	Boiler body	15	Air valve
4	Exhaust gas connection	16	Hatch for cleaning
5	Water outlet	17	Flap with opening for smoke extraction
6	Water inlet	18	Air vent valve
7	Upper door	19	Connections for the thermal safety valve
8	Central door	20	Ash container
9	Lower door	21	Cleaning tool
10	Pellet burner mounting flange	22	Secondary air regulator
11	Boiler base	23	Fixing screw for secondary air regulator
12	Insulation		

TECHNICAL DATA

LC	25	30	35	40	50
Nominal Power (kW)	25	30	35	40	50
Weight (kg)	262	280	301	321	350
Required draft (mbar)	20	21	22	23	25
Max working temperature (°C)	90	90	90	90	90
Max working pressure (bar)	2.5	2.5	2.5	2.5	2.5
Boiler water content (litres)	93	98	104	109	120
Height (mm)	1294	1294	1294	1294	1294
Width (mm)	465	510	560	610	610
Depth (mm)	969	969	969	969	1044
Flue gas exhaust connection (mm)	149	149	149	179	179
Distance boiler base - basket connection (mm)	1125	1140	1140	1115	1115
Inlet / outlet connection (")	G 1-1/4"	G 1-1/4"	G 1-1/4"	G 1-1/4"	G 1-1/4"
Combustion chamber volume (dm ³)	73	87	97	108	124
Max wood length (mm)	500	500	500	500	550
Chimney internal diameter (mm)*	200	200	200	200	200
Chimney height (m)*	7-8	7-8	8-9	9-10	10-12
Heated surface area (m ²)*	120-150	150-180	180-210	210-240	240-300

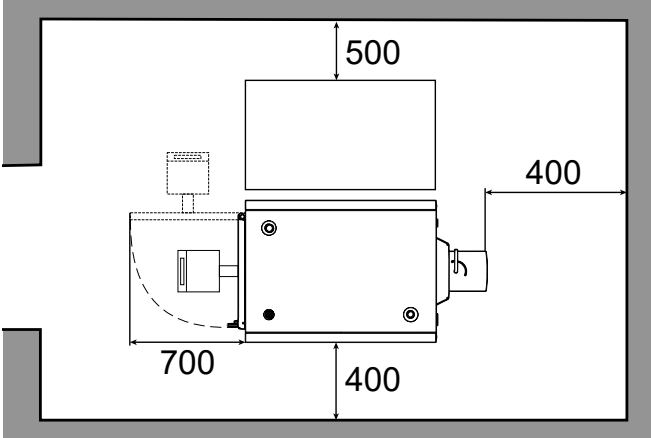
* The values in the table are indicative. For the exact calculation of the dimensions of the chimney, contact a specialized company.

- All the models from 25 to 50 kW, can work with pellets with a pellet burner kit and are designed in accordance with European norms EN 303/5.
- The thickness of the walls of the boiler that comes into contact with water is 5 mm
- The boiler is equipped with a thermometer, ash tray and cleaning kit.
- The upper door is provided with an adjustable opening for adjusting the secondary air.

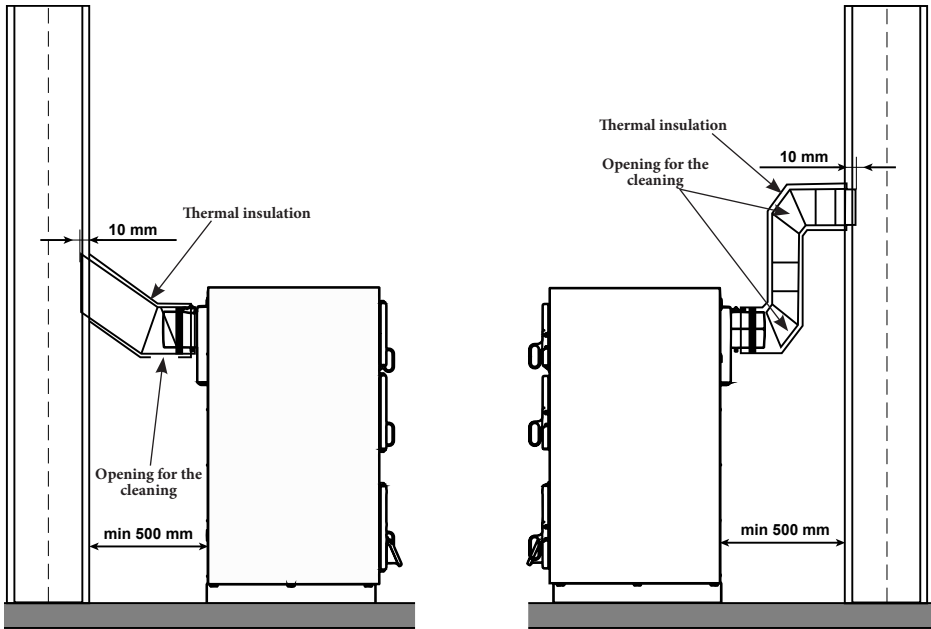
2. BOILER INSTALLATION

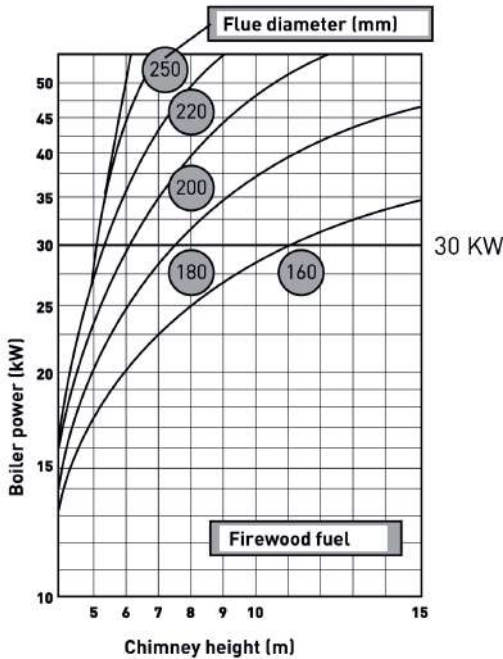
2.1 Location of the boiler

The room where the boiler is to be placed must be provided with ventilation. It must be placed in such a way that there is access on all sides, according to the attached sketch:



2.2 Connection to the chimney





The dimensioning of the chimney is a very important condition for the operation of the boiler at optimal parameters. The chimney must be designed in such a way as to make the gases escape correctly and to keep the necessary air in the boiler. The diagrams below show how to choose the height of the chimney depending on its diameter and the power of the boiler. Choosing the right insulation for the chimney is very important and it must be 30-50 mm thick. The correct choice of the chimney diameter and height are decisive in the correct operation of the boiler. To meet the above conditions, consult the chimney manufacturer's specialists. The minimum height of the chimney for solid fuel-burning boilers is 6 m. The chimney must be made of stainless steel elements, to reduce the influence of condensation.

3. BOILER INSTALLATION

3.1. Connecting the boiler to a heating system

Heat agent temperature without storage system. Regardless of the type of fuel used for heating, the water temperature must not exceed 90°C. In order to prevent the temperature from rising, it is recommended to install some safety and control accessories.

The safety valve - must always be positioned and mounted close to the boiler in such a way that access is easy. The safety valve must be calibrated at a pressure of 2.5 bar. The diameter of the valve opening must reach up to 15 mm. The connection to the boiler must be as short as possible. Any joint, welding, bends or other blockage must be avoided on the connecting pipe. In the case of unavoidable bends, they must have a curvature of $r > 3D$ (D = radius of curvature) and less than $\alpha > 90$.

The closed expansion tank must be mounted as close as possible to the boiler. The connection between the boiler and the vessel must be as short as possible. The installation of the expansion vessel must be done in line with the connecting pipe to ensure equal pressure distribution. The report must be: 1kW = 1 liter used.

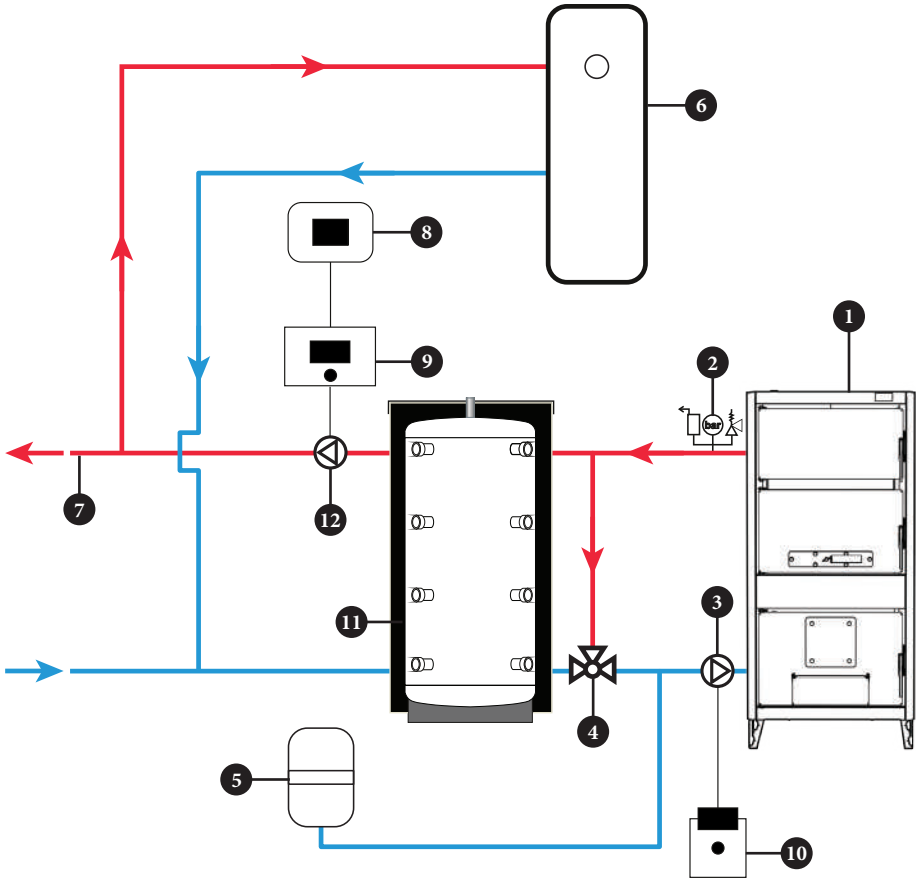
The safety valve and the expansion vessel must be mounted as close as possible to each other; in the following order: the expansion vessel closest to the boiler, followed by the safety valve.

It is also recommended that a cleaning device, filter Y, be mounted on the return.

In the event of a power cut when the boiler no longer works properly - any increase in pressure will be taken over by the expansion vessel first, and at any increase in pressure to a higher value, the safety valve will open automatically.

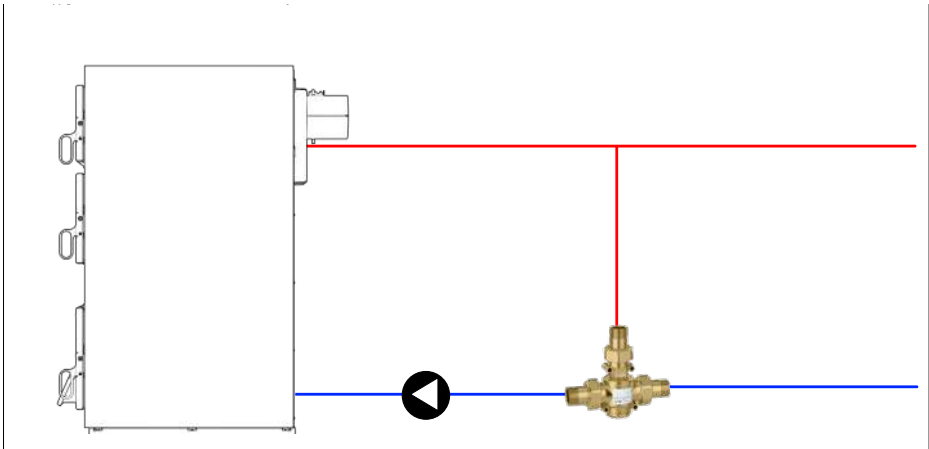
Careful! AIR MUST NOT ENTER THE BOILER!

CONNECTION EXAMPLE WITH BUFFER + BOILER



1	LC boiler	7	Heating circuit
2	Safety valve 2.5 bar	8	Room thermostat
3	Circulation Pump Buffer	9	Electronic regulation unit
4	Mixer valve (60 C)	10	Contact thermostat
5	Expansion vessel	11	Buffer Tank
6	Water Boiler	12	Circulation Pump heating

Example scheme for installation of an anti-condensation valve. It is recommended that the valve be at least 60 C. At the discretion of the installer, a valve with a higher return water temperature may be installed.



3.2. Filling the boiler and the installation with water

Filling is done through the emptying connection (which is found on the return of the boiler). The filling process is complete when no more air comes out through the automatic vent and the pressure gauge indicates a value between 1.5 and 2.5 bar (in the case of closed systems). The vent will be located at the highest point of the central heating system (closed). If the pressure drops below 1.5 bar, the filling process will be repeated.

In the case of open systems, the operating pressure depends on the total height of the system and the open expansion vessel (approx. 1 bar for every 10 m).

After the filling process, it is mandatory to close the drain valve, cut off the water supply and detach the filling pipe.

Installation of the heating system and initial start-up of the boiler is carried out by a specialist authorized by the manufacturer. In the case of an incorrectly designed system, with proven deficiencies, generated by the incorrect installation of the heating system, which can lead to the defective operation of the boiler, the full responsibility for material damage and possible new remedial costs will fall exclusively to the person responsible for installing the heating system central and not the boiler manufacturer or the seller.

4. BOILER OPERATION

Commissioning will be carried out exclusively by a person authorized by the manufacturer.

Prior to commissioning, ensure that:

- The boiler is properly connected to the central heating system.
- The boiler is properly connected to the electrical installation (if using pellets).
- The fuses are chosen accordingly, according to the electrical diagram of the boiler and its power in kW.
- There is no air in the central heating system and the pressure is within the permissible range.
- The appropriate duty cycle for the circulation pump is selected.

4.1 Solid fuel operation

Heating with solid fuel can be done in two ways:

TOP HEATING – place the solid fuel in the combustion chamber on top of the pipes (there should be no ash). The draft regulator is in the maximum position. Light the fire at the top with a small piece of wood or charcoal. When the fire starts burning, the draft regulator will be set to the desired temperature/position.

BOTTOM HEATING - place a small amount of solid fuel in the combustion chamber on top of the pipes (there should be no ash) and light the fire. The draft regulator is in the maximum position. When the fire starts to burn, add more fuel and set the draft regulator to the desired temperature/position.

Make sure the boiler doors are closed while the boiler is in use.

In the event of an uncontrolled increase in pressure and temperature of the water in the boiler, determined by various factors (such as the interruption of the electricity supply, which would lead to the interruption of the operation of the circulation pump, the failure of the circulation pump, or the uncontrolled ingress of air into system), cut off any air supply to the boiler and finally extinguish the fire if this is safely possible (provided there are no flammable materials in the area). In the event of a power outage, place the draft regulator in the zero position and the boiler flue draft flap in the closed position.

It is mandatory to pay special attention to the pressure in the installation which must be within the allowed range (>1.5 bar for closed systems). If the pressure is below the critical value, stop the operation of the boiler and refill the system only after the boiler cools down.

The water hardness will not exceed the recommended value.

It is not allowed to extinguish the fire in the boiler artificially. It is forbidden to splash water in the combustion chamber.

At the end of the cold season, clean the boiler of ash and soot and treat the combustion chamber with a corrosion protection agent.

In case of mechanical problems (the draft regulator is blocked, the circulation pump is faulty) stop the operation of the boiler first; carry out repair work only when the boiler has cooled down.

4.2 Boiler cleaning and maintenance

It is recommended to clean the boiler of ash once or twice a week or whenever necessary to allow the air required for combustion to enter through the damper of the draft regulator. A more thorough cleaning of the boiler is recommended once a month and at the end of the cold season.

Regular maintenance extends the life of the boiler. Cleaning will be carried out through the lower and upper doors of the boiler but also through the opening on the back.



PROTECTIVE GLOVES ARE OBLIGATORY!

5. SAFETY MEASURES

5.1 Safety measures in case of overheating

For the hydraulic protection in the closed system, it is necessary to install a 4-way thermal safety valve, as in the figure below (it is not included in the standard supply).

If for some reason the water temperature in the boiler exceeds 95°C, the thermal valve opens automatically, so that cold water from the network enters the boiler, to reduce the temperature of the heating agent, and an equal volume of heating agent from the boiler is discharged at sewage.

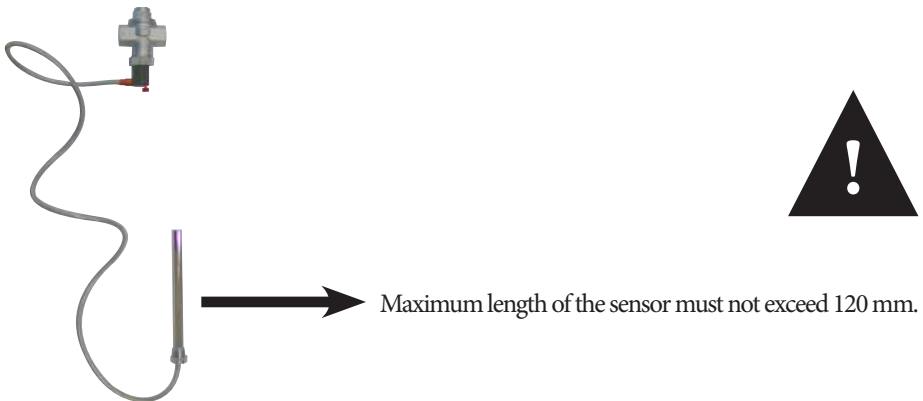
According to European EN standards, boiler thermal protection must be installed in closed heating system.

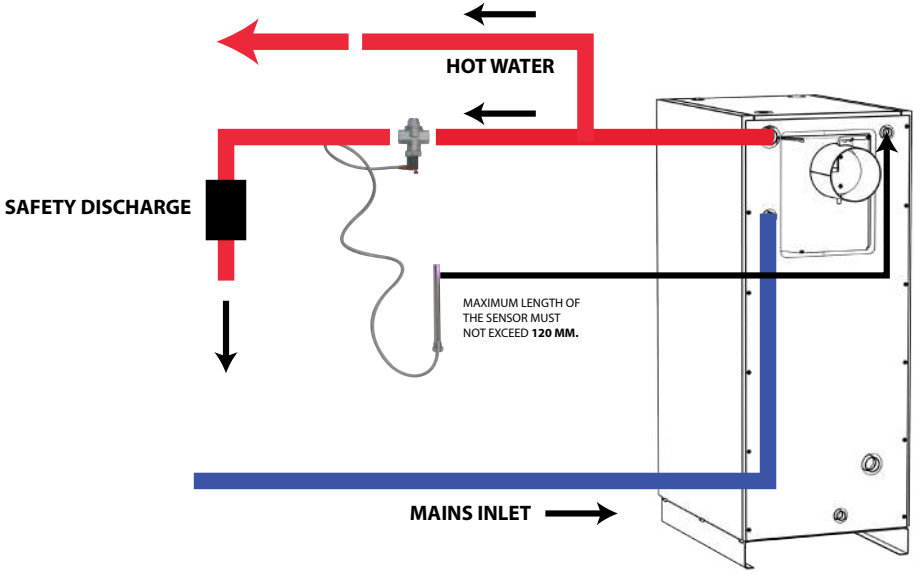
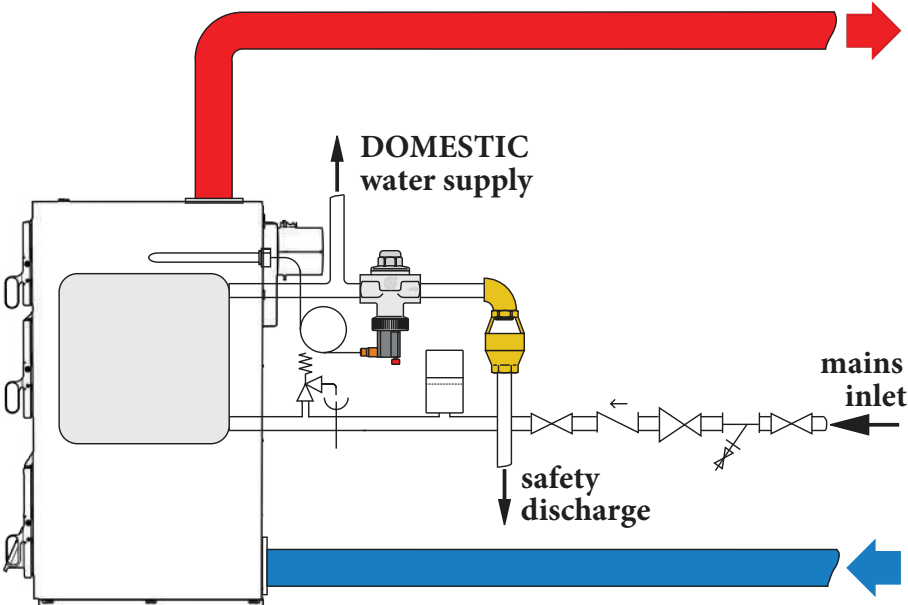
IMPORTANT:

In case of any damage of boiler installed in the closed heating system due to its overheating, and boiler or system are not equipped with any thermal protection at all, or do not have properly installed thermal protection, guarantee will not be applied.

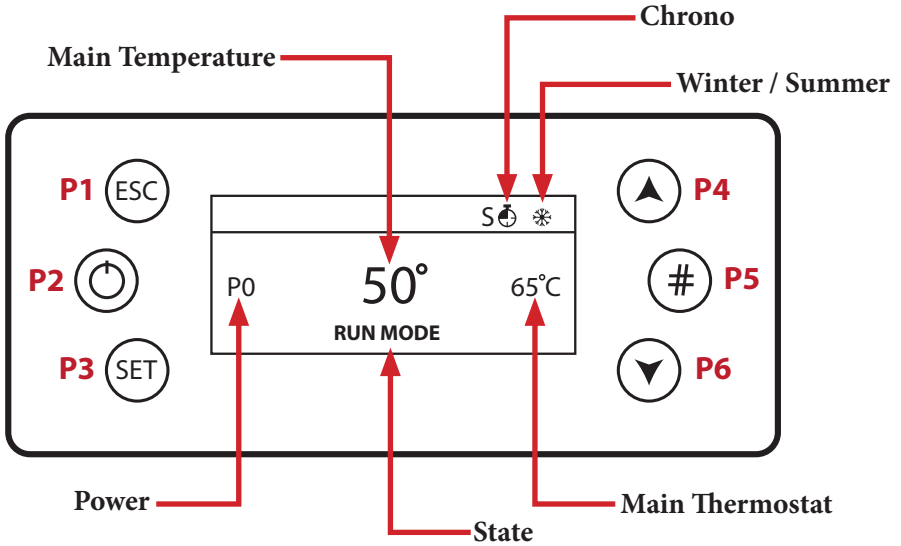
IMPORTANT:

Thermal protection must be connected to the water supply installation of the premises supplied from the water supply line and not from hydrophor. Namely, in case of failure of power supply, boiler could be overheated, and then hydrophor is not able to ensure required water supply.





CONTROL PANEL K500 (NG21)



- P1** - Exit from menu/submenu refill Function (push for 3 seconds)
- P2** - Ignition, extinguishing and errors reset (push for 3 seconds) Enable/Disable Chrono
- P3** - Access to User Menu 1/ submenu / Access to user 2 menu (push for 3 seconds) / Save Data
- P4** - Access to combustion power / Menu Increase
- P5** - Enable chrono time slot /Access to the Info Menu
- P6** - Access to Room Thermostat / Boiler Thermostat / Menu Decrease

P3 + P5 - Direct access to the Secondary Information menu inside the Service menu. (push for 3 seconds)



- G** - Daily Chrono on / **S** - Weekly chrono on / **FS** - Week End Chrono On
- DHW demand or buffer tank thermostat not reached
- Local room heating target reached

USER MENU 1

Power - Pellet Menu to modify the combustion power of the system in Pellet mode. It is possible to set it in auto or manual mode: in the first case the system chooses the power combustion, while in the second one, the user selects the power. On the left of the display the combustion mode is reported (A= automatic combustion, M=manual combustion) and the system working power.

Thermostats

Boiler - Menu to modify the Boiler Thermostat value. You can program the minimum and maximum value by setting the Thermostats Th26 and Th27. With climatic function switched on the thermostat value cannot be modified, because it is automatically computed by the system.

Buffer Tank - Menu that allows to modify the Buffer tank Thermostat value; it is shown if, it is displayed if a hydraulic plant requiring it has been selected.

DHW - Menu to edit the DHW thermostat value.

CHRONO

This Menu allows selecting the programming modalities and and the Ignition/Extinguishing time slots.

Modality - It allows selecting the desired modality, or disable all set programming.

1. Enter modification mode through the key **P3**.
2. Select the chosen modality (Daily, Weekly or Week end).
3. Enable/disable chrono modality through the keys **P2**.
4. Save the settings through the keys **P3**.

Disable
Daily
Weekly
Week -End

Programming

The system includes three type of programming: Daily, Weekly, Week end.
After selecting the desired kind of programming:

1. Select the programming time through the keys **P4/P6**.
2. Enter the adjustment modality (selected time will be flashing) through the keys **P3**.
3. Change the time via keys **P4/P6**.
4. Save the programming with the keys **P3**.
5. Enable (a "V" is displayed) or disable the time slot (a "V" is not displayed") by pressing the keys **P5**.

Monday	
ON	OFF
09:30	11:15 V
00:00	00:00
00:00	00:00

Daily

Select the day of the week to program and set the ignition and extinguishing times.

Programs around midnight

Set the clock On of the previous day at the desired time: Ex. 20:30

Set the clock of OFF of the previous day at: 23:59

Set the clock On of the following day at 00:00

Set the clock of OFF of the following day at the desired time: Ex. 6:30

The system turns on at 20.30 on Tuesday and turns off at 6.30 on Wednesday

Monday
Tuesday
Wednesday
Thursday
Friday

Weekly

The programs are the same for all days of the week.

Week-end

Choose between 'Monday-Friday' and 'Saturday-Sunday' and then set the switching on and off times.

Mon-Fri
Sat-Sun

USER MENU 2

Settings

Time and Date - It allows you to set day, month, year and current time.

Language - It allows you to modify the language of the keyboard.

Recipe - Menu for the selection of the combustion recipe.

Summer/Winter - Menu to edit the functioning of the hydraulic system according to the season.

Service

Counters - Ignitions (Number of attempted Ignitions) - **Failed Ignition** (Number of failed ignitions) -

Working hours (Operating hours in Run mode, Modulation and Safety).

Errors List - The menu shows the last 10 errors; in each line the error code and time/date of the error itself are shown.

Secondary Information - Information about configurable outputs and inputs are only available if they have been set.

Cleaning Reset - Menu to reset the function 'System Maintenance 2'. It is displayed only if T67>0.

Auger Calibration - This menu allows you to modify the default values of the Auger speed or its On times. You can set the values in a range within $-7\div7$. The default value is 0.

Fan Calibration - This menu allows you to modify the default values of the Combustion Fan speed. You can set the values in a range within $-7\div7$. The default value is 0.

Mixer Valve - Menu to manage the Mixer Valve operation.

Automatic Power - This menu allows you to set combustion power in automatic mode only. If you set it, power change menus are no longer displayed.

Loading - The procedure enables the pellet manual charge and it is automatically interrupted after 300 seconds. In order to enable this function, the system must be on mode Off.

Loading Test - The procedure allows calculating the amount of pellet used in 10 minutes with the auger.

Display

Contrast - It allows you to adjust the screen contrast.

Screen saver - This Menu allows the user to enable and disable the screen saver.

Acoustic Alarm - Menu to enable/disable the acoustic alarm.

Minimum Brightness - It allows you to adjust the screen brightness when not using the controls.

MESSAGES

Description	Code
Anomaly of the probes checking, during Check Up phase.	PRob
Room temperature greater than 99 °C.	Hi
This message notifies that the planned hours of functioning (parameter T67) are reached.	Clean
Door Open.	Port
The message appears if the system is turned off during Ignition (after Preload) not manually: the system will stop only when it goes in Run Mode.	Ignition block
Periodical Cleaning in progress.	Cleaning on
No communication between motherboard and keyboard	Link Error

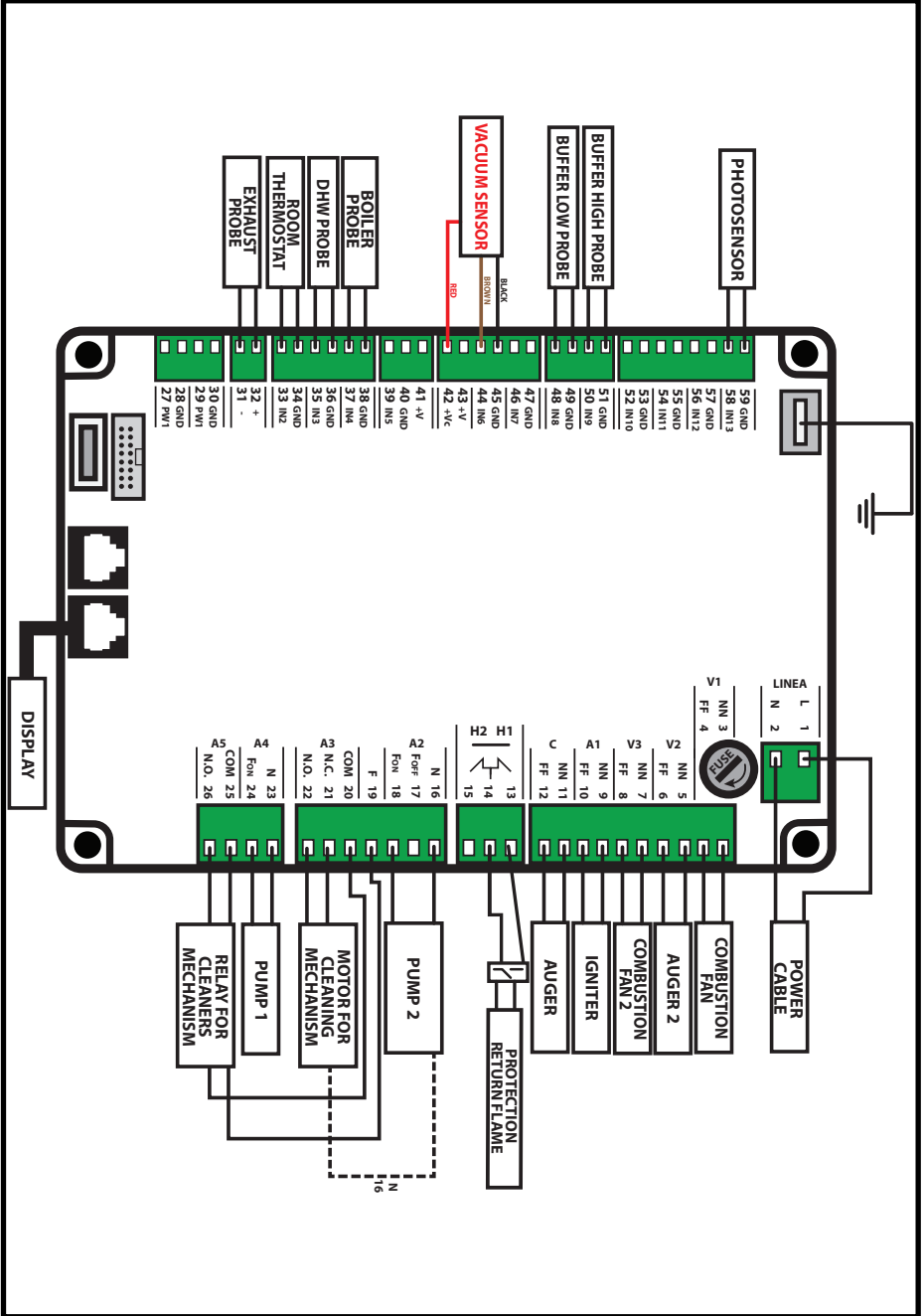
VISUALIZATIONS

Exhaust T. [°C] - Exhaust temperature;
Room T. [°C] - Room Temperature ; it is displayed only if an input has been set as a Room Probe;
Boiler T. [°C] - Boiler Temperature;
Buffer T. [°C] - Buffer Temperature, it is visible only if P26 is set on 2,3,4;
Pressure [mbar] - Water pressure;
Air Flux - Air flow; it is visible only if A24 is different from 5;
Fan Speed [rpm] - Exhaust fan speed; it is visible only if P25 is different from 0;
Auger [s] - Auger work time; it is visible only if P81 is equal to 0;
Recipe [nr] - Combustion recipe set; it is visible only if P04 is greater than 1;
Product Code: 510 - Product code;

ALARMS

Er01 - Return flame safety activated;
Er02 - Water overheating safety activated;
Er03 - Extinguishing for low exhaust temperature or missing light in the brazier;
Er04 - Extinguishing for water over temperature;
Er05 - Extinguishing due to high exhaust temperature;
Er06 - Pellet Thermostat open (flame return from the brazier);
Er07 - Encoder Error. The error may occur due to lack signal from Encoder;
Er08 - Encoder Error. The error can occur due to problems of adjustment of the number of revolutions;
Er09 - Water pressure low;
Er10 - Water pressure high;
Er11 - Clock Error. The error occurs due to problems with the internal clock;
Er12 - Extinguishing for ignition failure;
Er15 - Extinguishing due to power failure for more than 50 minutes;
Er16 - RS485 communication error (Display);
Er17 - Adjusting the Air Flow Failed;
Er18 - No more Pellet in the bunker;
Er23 - Boiler probe or Back boiler probe or probe Buffer open;
Er25 - Engine cleaning brazier broken;
Er26 - Engine cleaning broken;
Er27 - Engine cleaning 2 broken;
Er39 - Sensor Flowmeter broken;
Er41 - Minimum air flow in Check Up is not reached;
Er42 - Maximum air flow exceeded;
Er44 - Open door error;
Er47 - Error Encoder Auger: missing signal Encoder;
Er48 - Error Encoder Auger: Auger regulation speed not achieved;
Er52 - Error Module I/O I2C;
Er57 - Test 'Forced Draught High' in Check Up fail;
Service - Service error. It notifies that the planned hours of functioning is reached. It is necessary to call for service.

DIAGRAM FOR SMB 50 KW ROTARY (NG21)





IMPORTANT !!!

1. The outlet temperature always has to be over 60°C. This can be reached by obligatory connection of the 3-way thermic valve which blocks the boiler temperature from falling under the 60°C level.



Mareli Systems

Industrial Zone
Simitli, 2730
Region Blagoevgrad
Bulgaria

info@mareli-systems.com
www.mareli-systems.com

MARELI SYSTEMS disclaims any responsibility for possible inaccuracies contained in this manual if they are due to printing or transcription errors. We reserve the right to make any change that appears to be necessary or useful without harm the essential characteristics.
