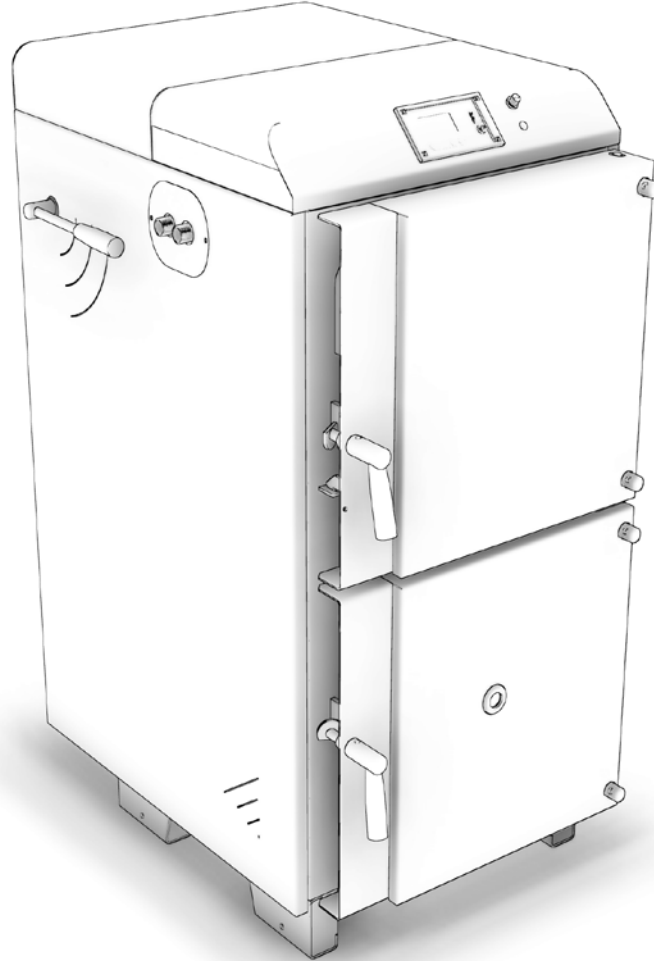




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**VENTUM SERIES
WOOD FIRED GASIFICATION HOT WATER BOILERS**

VG-20, VG-30, VG-40, VG-60, VG-80, VG-100

OPERATION, USE AND MAINTENANCE MANUAL

Rev D: October 2015



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INTRODUCTION

This manual comprises the information concerning the operation, use and maintenance of VG Model Gasification Type Wood Fired Hot Water Boilers. This manual alone is not sufficient for correct installation, operation and use; installers, services and end user must obey the rules specified in current EN + local norms, EC directives and local codes. This manual gives supplementary information and precautions.

Please keep this booklet near the appliance in a safe place in the boiler room for future reference.

Please read the manual very carefully in order to be able to operate your boiler safely and with high efficiency for a long period.

Due to the continuous development in methods, design and manufacture, the contents of this document may change at any time and without prior notice. Arıkazan A.Ş. does not accept any responsibility for errors or damage of any kind that is attributed to this publication.

WARNINGS

- These safety guidelines should be read and fully understood before the first operation of the system, to avoid incorrect usage that might lead to personal injury or damage to the system.
- This boiler must be installed in accordance with the local and international rules in force, only in a well ventilated and frost free spaces, indoor but other then living areas.
- All installation, assembly and maintenance, repair, replacement of components work must be carried out exclusively by fully trained, professionally qualified personnel and must conform with this manual and the local codes and requirements of the authority having jurisdiction, or in the absence of such requirements, apply to the EEC directives and European norms (EN).
- If the boiler is not used for the purposes other then specified in this booklet and incorrect installation, commissioning and use, can cause a fire or explosion which may result property damage, personnel injury, or loss of life.
- Boiler is designed for hot water operation only (max 90 °C) and the system pressure must be according to the limited operating pressure specified on the boiler name plate and in this booklet. Heat transfer medium is water.
- Boilers must be fired by dry wood log (humidity 15 20 %) fuels specified in this manual. Using wood logs with humidity more then %20 might cause tar creation and damages that will cause the boiler out of warranty.
- This is a B₂₃ appliance so the flue gases must be connected to an adequate draught chimney, without any flue gas leakage to the boiler room.
- It is essential that an appropriate pump is fitted in the circulation system which must be kept in operation at all the times when the boiler in use.
- The filling and make up water must be according to the specifications given in this manual. Long term water treatment is essential to the economic operation and life of both new and refurbished heating systems.
- Never obstruct the ventilation openings to the boiler room for a safe and efficient operation. An adequate air supply for combustion and ventilation must be provided at all times.
- Boilers must not be installed in areas where inflammable vapors and materials are likely to present. To avoid damage to the boilers, contamination of the combustion air by high levels of dust or halogenated hydrocarbons (e.g. Solvents, spray can propellants, cleaning agents, adhesives, ect.) must be avoided. The humidity level must not be high in boiler rooms.
- The boiler room must not be used for other purposes and must not have an open connection to the other closed living areas. Connection door must be air tight, fire resistant and self closing.
- All the control devices must be functional and operating with in the limits specified at all the time. If any of them is null functioning do not operate the system and call a qualified service.
- If the boiler is heated above 90 °C, do not supply cold water to the system for rapid cool down. It can cause an explosion. Wait the boiler cool down naturally down to 40 °C before any operation.

- Do not use this appliance if any part has been under water. Immediately call a qualified service to inspect.
- Do not touch the flue gas exit and flue box. These areas are too hot and can burn seriously.
- In starting a new installation, first commissioning shall be performed by a qualified service.
- After commissioning the repair, maintenance work is under responsibility of user and must be done with a qualified service.
- If you want to change the fuel type in the future please call your authorized service. The fuel type change can need some part or device changes and surely new adjustments. Never try to change the fuel type by yourself or by unauthorized people.
- Except the operations specified in this manual, do not touch any part of boiler for adjusting or maintenance.
- This boiler is not a condensing type, so be sure that the boiler must not condensate for long periods
- Covers on electrical components may only be removed if the power has been disconnected.
- Never open the bottom drawer while the boiler is in operation, as hot flue gases, flame and red hot dust particles can be dangerous.
- Switch off the system before servicing and chimney sweeping. The system must be allowed to cool down before the cabinet door is opened. Wait around 20 minutes, or until the boiler temperature on the display is under 40 °C
- Flammable liquids or gases must never be used in the combustion chamber.
- It is recommended that you have a tested, appropriate capacity and approved fire extinguisher on hand in the boiler room.
- There must be access or potential for access to outside air in the boiler room, such as a fixed opening must be provided and must be open always. For proper combustion boiler needs continuous fresh air supply. (min. 300 cm²)
- Overheating of the boiler water protection is integrated in the control system.
- It is recommended to use a dust mask when cleaning the boiler and emptying the ash drawer.
- It is recommended that a lifting device should be used to move and transport the boiler.
- The chimney or flue is one of the most critical factors in the successful operation of any solid fuel heater, including your VG boiler. A good chimney will provide a continuous and dependable draft to pull the exhaust gases out of your boiler. The boiler must be connected to an approved chimney by local authorities. No other appliance should be connected to this flue. The boiler should be connected to the flue with the shortest, most direct run of black stove pipe. Maintain a minimum of 460 mm between the flue pipe and combustible surfaces. Prior to operation, the installation should be inspected and approved by qualified professionals (i.e., a chimney sweep, a licensed plumbing and heating contractor, electrician, etc.). Boiler will be out of guarantee if it does not connected to a proper chimney If you have problem with draft (too much or too little), draft inducing fans or draft regulators may need to be considered. Condensation in the chimney must be discharged before boiler.
- Another important requirement is that the chimney and connecting pipe need to be insulated for safety and to prevent condensation and a reduction in the draft caused when the gas in the chimney cools too much.
- Do not use self-contained non-electric zone valves on the main heating zone as it is to be used as the overheat/dump zone. Such a valve would prevent the overheat control from cooling the boiler when necessary.
- Do not use any radiant floor heat tubing that does not have an oxygen barrier otherwise you must use a heat exchanger between the hard piping of the boiler and the radiant floor heat tubing.
- A backup power supply such as a UPS (battery-based Uninterruptible Power Supply) is required to operate the primary loop pump and dump zone valve if it is of the electrically operated variety.
- A primary loop pump must feed all zones.

- Each boiler should be connected to a heat storage tank (buffer tank) for proper operation, and the capacity of the buffer tank must be according to local standards.
- To protect the boiler against low-temperature corrosion and tar accumulation in the boiler, the end-user should assure return temperature does not reach lower than 60°C. Installing a three-way mixing valve or anti-condensation valve group (load valve for buffer tank) can solve this. If the wood log humidity is higher, higher than 60°C of return temperature can be needed.
- Before starting assembly, repairs or maintenance, as well as during any connection works, please make sure that the main power supply is disconnected and that terminals and electric wires are devoid of voltage.
 - The boiler control regulator cannot be used if its casing is damaged.
 - In no circumstances can the design of the regulator be modified.
 - Keep the regulator out of reach of children.
 - Incorrect selection of the parameters can cause malfunction and serious problems of the boiler (e.g. overheating of the boiler, etc.).
 - The programmed parameters should only be altered by an authorized service.
 - The electric system in which the regulator operates must be protected by means of a fuse, selected appropriately to the applied loads.
 - Directive WEEE 2002/96/EC: Act on electrical and electronic equipment.
 - Recycle the product and the packaging at the end of the operational use period in an appropriate manner.
 - Do not dispose of the product together with normal waste,
 - Do not burn the product.
 - The fuel storage should not be in the boiler rooms. It is recommended to store the wood logs in a cool, moisture free room.

DECLARATION of CONFORMITY



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CE Konformitätserklärung
CE Declaration of Conformity
CE Déclaration de conformité

Wir
We **Arikazan Makina Sanayi ve Ticaret A.S. - 06800 Ankara**
Neus

Erkären in alleiniger Verantwortung, dass die Heizkessel-Reihe
Declare under our sole responsibility that the boiler series
Déclarons sous notre seule responsabilité que le serie des chaudières

Wood Gasification Boilers: VG-20/ VG-30/ VG-40/ VG-60/VG-80/VG-100

conform ist mit den Anforderungen der Richtlinie
is in conformity with the requirements of the directives
est conforme aux exigences des directives

Richtlinie Directive Directive	Norm Standard Norme	Bemerkung Remark Remarque
97/23/EC Pressure Equipment Directive	EN 12953-1.2002 , EN 12953-2.2002 , EN 12953- 3.2002, EN 12953-4.2002 , EN 12953-5.2002 , EN 12953-6.2002 , EN 12953-9.2007 , EN 12953- 12.2003	-
2006/95/EC Low voltage directive	EN 60335-2-102 EN 60335-2-15	-
2004/108/EC Electromagnetic Compatibility	EN 60730-2-9 EN 60730-2-6 EN 60730-2-14	-

Arikazan A.S.

01.03.2013

Ass. General Manager

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Kavaklıdere V.D.078 002 3560

GUARANTEE AND SERVICE

Provided that the principles, warnings and standards set out in the operation in this manual and taking into account the national installation regulation of the country (in the absence or of such requirements, they shall be referred to EN norms, directives and codes) are complied with, your boiler shall be under the warranty for a period of 2 (two) years starting from the date of dispatch (from manufacturer) against any faults of material and workmanship.

The certificate of guarantee shall be filled out by seller and the verification of installation and commissioning by a qualified (by the seller) service must be filled out and forwarded to seller for warranty purposes.

Wrong installation, maintenance and use will not be covered by guarantee.

The boiler guarantee will be invalid if the boiler waterways and system water pipes are covered with debris, lime and/or carbonate deposits from the system water and/or boiler heat exchanger parts fails because of corrosion caused by the system water.

The minimum service life for these boilers are 10 (ten) years. The producer and the suppliers undertake to provide service and spare parts to the boilers during said period.

The guarantee does not apply for the boiler if it is operated with wood exceeding 20% moisture content or with fuel not prescribed by the manufacturer.

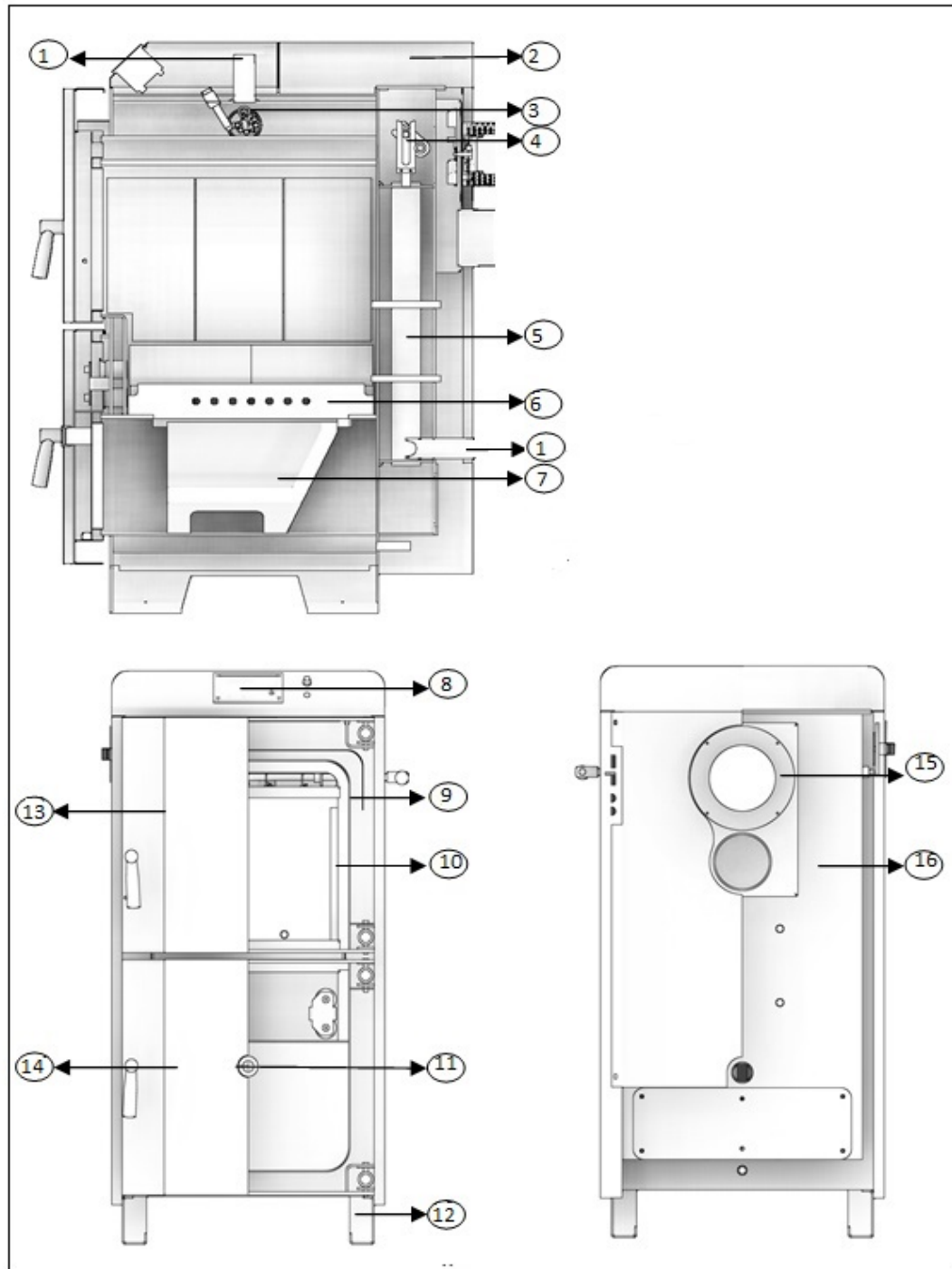
GENERAL SPECIFICATIONS

- VG boilers are a complete unit with, hot water boiler, control regulator unit, flue gas aspirator. Do not attempt to change any item. Measuring points are locked to ensure measuring devices are in place.
- VG boilers are gasification wood boilers, three-pass, wet back, elliptic shell type, hot water, wood log fired, B₂₃ steel boilers.
- They are manufactured by an ISO 9001-2008 registered company.
- The boilers have been specially designed and produced to perform efficient combustion with wood fuels especially dry logs.
- Wide water galleries and the return water connection is from the back bottom side provide excellent natural circulation and safe heat transfer.
- They have low combustion chamber loading for clean combustion with low nitrogen oxide emissions.
- The quality of the material, form and dimensioning of the components ensure that the boiler and burner will operate safely and have a long economic life.
- Primary and secondary combustion air supply can be controlled separately.
- The boiler regulator is an electronic device intended for VG boilers. It performs the following functions:
 - Automatic stabilization of a given water temperature or flue gas temperature of the boiler cycle,
 - Automatic stabilization of a given temperature of the hot utility water tank.

OPERATING PRINCIPLES

- VG boilers have been designed to heat hot water and must be connected to a heating plant and/or a domestic hot water plant within the limits of its performance and output.
- They are hot water boilers with a maximum outlet temperature of 90 °C and a maximum allowable operation pressure of 3 bar gauge. Return water temperatures must not be lower than 60°C.
- These boilers are not suitable for use as a direct water heater. Where potable or sanitary hot water is required, a matching indirect heat exchanger must be provided in the system.
- These boilers are suitable for high quality wood (log) with water content between 15 % to 20%.
- This boiler is suitable for use in open vented expansion vessel heating systems. The system must have a matching expansion system. Be sure that open vented expansion vessel and pipes are protected against frost and has no manual valves between boiler and expansion tank.
- If you will use this boiler with a closed expansion system, serious precautions and additional equipment must be provided according to local and international standards and directives. Overheating and over pressure can cause very serious hazards.
- This boiler is not a condensate type of boiler so be sure that boiler is not in condensation for long periods.
- Do not open the upper door immediately when the boiler is operating. Open the lever very slowly and be sure that all the smoke generated in the upper chamber is sucked before the door lever is free from the blockade.

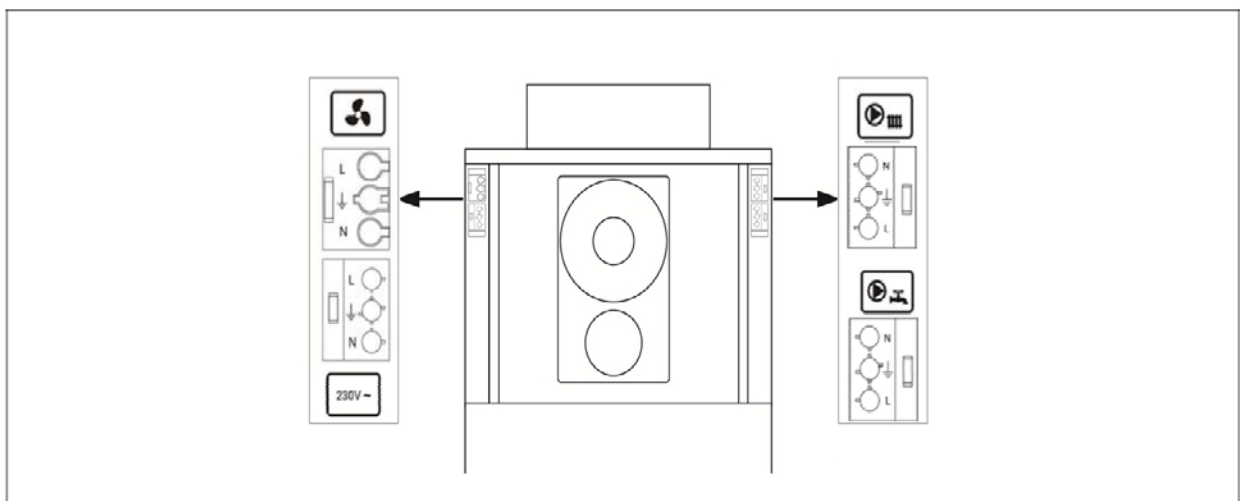
MAIN PARTS



1	Water Inlet/Outlet	9	Main Body
2	Cover Plates	10	Furnace
3	Heat Exchanger	11	Flame Monitoring
4	Tube Cleaning Mechanism	12	Feet
5	Boiler Tubes	13	Upper Door
6	Top Refractory	14	Bottom Door
7	Bottom Refractory	15	Fan Box
8	Control Panel	16	Smoke Box

INSTALLATION

- All installation, assembly and maintenance work must be carried out exclusively by fully trained, professionally qualified personnel and must conform with this manual and the local codes and requirements of the authority having jurisdiction, or in the absence of such requirements, apply to the EEC directives and European norms (EN).
- This boiler must be installed in accordance with the rules in force and only in a well ventilated and frost free spaces, indoor but other then living areas. Top and bottom ventilation openings must be according to local codes.
- Control of the heating system shall enable the specified designed indoor temperatures to be achieved under the specified variation of internal loads and external climate and, protect building and equipment against frost and moisture damage when normal comfort temperature level is not required.
- It is essential that an appropriate pump is fitted in the circulation system which must be kept in automatic operation (above condensation temperature) at all the times when the boiler in use. The energy created by the boiler must be transferred out of boiler continuously up to end of combustion process.
- The filling and make up water must be according to the specifications given in this manual. Long term water treatment is essential to the economic operation and life of both new and refurbished heating systems.
- All electrical connections must be according to current standards and wiring diagrams are given in this manual. Please pay special attention to earth connections to all electrical items in the boiler room. Never use fuel or water pipes as an earth connection.
- After the installation of the boiler all the water and valves must be controlled for leakage.
- A load valve EG: Laddomat or similar items shall be installed for anti-condensation so that the return temperature will be never be below the limited temperature 60°C.
- During wood gasifying, tar and condensates (acids) are created, and this process is much worse if the return water the boiler temperature is less than 60°C. If the wood log humidity is higher than 20%, higher than 60°C of return temperature can be needed.
- Feed water temperature of the boiler must be adjusted to 75-85°C.
- The boiler must not be operated lower than 60 % output for a long time.
- We recommend installing the boiler with hot water storage tanks (buffer tank) and load valve group which guarantees economy in fuel and longer service life of the boiler as well as comfortable attendance.
- You can examine the electrical connections from following visual. Make sure no power cord comes in contact with a hot surface.



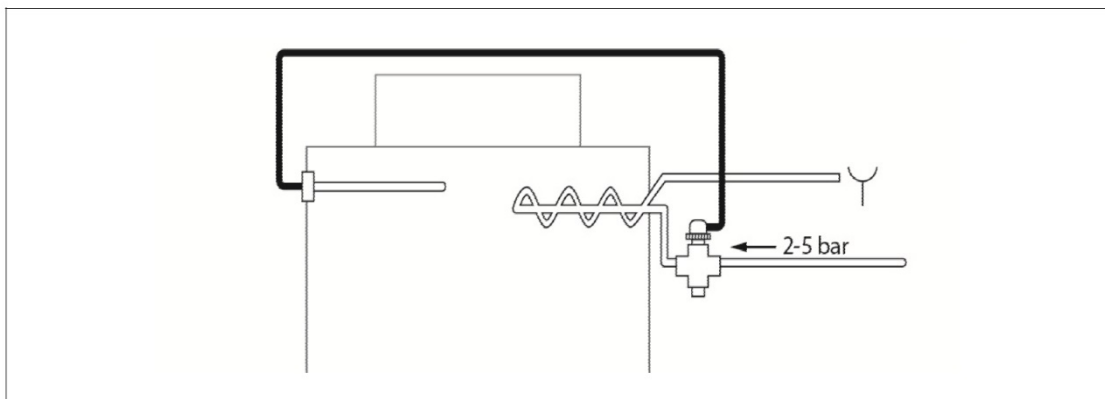
- During the mode with decreased output (summer mode and water heating) it is necessary to have a buffer tank.
- Fuel must be used only dried with min. 15% and max. 20 % moisture content (with a higher moisture content up 45% can burn without any guarantee and note that with high humidity boiler power and efficiency is reduced and also tar problem occurs)

➤ The choice of the right boiler size, that is its heating output, is a very important condition for economic operation and right function of the boiler. The boiler must be chosen so that its nominal output responds to heat loss of the heated volume.

I. SAFETY ARRANGEMENTS

Heating system safety arrangements shall be designed in accordance with the type of heating system, energy source, and the way which the heat supply is provided to the heating system, i.e. automatically controlled or manually operated. Minimum required safety arrangement other than the present systems on boiler is under the responsibility of the installer and must be according to local codes and/or EN 12828. This is a manual running solid fuel boiler so special attention must be applied for correct installation and safety.

Ventum boilers has a special heat exchanger mechanism according to related standard. Be sure that it works with the correct pressure interval(examine the following visual).



II. FUELS

VG boilers can be fired with high quality wood especially logs; 25-75 cm long, Moisture 15.. 20 %, Never try to change fuel without qualified service approval.

Specified fuel is dried, hard, cut wood and logs of 60-120 mm diameter, with min. 15% and max. 20% moisture content and calorific value of 15-17 MJ/kg.

Note: Logs of bigger dimensions is necessary to cut into halves or quarters (because of the requirement of operation to nominal output). You can burn hard as well as soft wood. Wood must be dried!

WOOD	Energy for 1 kg of fuel		
	kcal	MJ	kWh
Spruce	3900	16,25	4,5
Pine	3800	15,80	4,4
Birch	3750	15,50	4,3
Oak	3600	15,10	4,2
Beech	3450	14,40	4,0

Chimney

Attachment of the appliance to the flue must be always done with approval of authorized chimney sweeping company. There must always be sufficient draft in the flue and flue gas must be draught to the atmosphere in all possible operation conditions. For the right operation of the boiler the independent flue must be dimensioned in the right way, the draught is influenced by the section of flue, height and roughness of the internal wall. In to the flue where the boiler is attached, no other appliance can be attached. Flue draught must have the specified values. But it must not be too high so as not to decrease the efficiency of boiler and interrupt burning. If the draught is too strong, install a draft regulator to the bottom part of chimney (60 cm below the boiler flue tube connection point).

Boiler Type	Chimney Height in m				
	Chimney Inner Diameter in mm				
	200	250	300	350	400
VG20	6	N.A			
VG30	7,5	6	N.A		
VG40	11	7	6		
VG60	N.A	10,5	8	7	
VG80	N.A	N.A	10,5	7	
VG100	N.A	N.A	14	7,5	

Exact dimensions of flue must be calculated according to local codes. Flue draught is specified in technical parameters. Exhaust pipe must have the outlet into the chimney. If the boiler can not be attached to the chimney directly, the exhaust pipe must be without heating surface and it must rise to the flue. Exhaust pipes must be tight and resistant against flue gas leakage and clean able from inside. Exhaust pipes must not come through home and utility spaces and the internal section of the exhaust pipe must not be narrowing to the flue. Using of 90° bens is not suitable. It is not advised the usage of chimney that has less than 200 mm in diameter.

Connecting the boiler to the mains net

The boiler is connected to the mains of 230V, 50Hz by a supply cord and plug. The voltage is of M type and when replaced, the same type must be used by a service organization. The appliance must be located in such a way that the plug was within the reach of the attendance.

III. FLUE GAS EXHAUST SYSTEM.

VG type boilers are B₂₃ type appliance so the flue gases must be connected to an adequate draught chimney, (-1 to -6 mmWC)(-0.1 to -0.6mbar) without any flue gas leakage to the boiler room.

IV. BOILER WATER AND MAKE UP WATER FOR HOT WATER BOILERS

According to EN 12953-10:2003 (Shell boilers: Requirements for feed water and boiler water quality).

Parameter	Unit	Make up Boiler Water	Boiler water
Operating pressure	Bar	Total range	
Appearance	-	Clear, free from suspended solids, no stable foam	
Direct conductivity at 25 °C	µS/cm	< 1500	
pH value at 25 °C	-	>7.0	9.0 to 11,5 ^a
Total hardness (Ca + Mg)	mmol/l	< 0,05	
Iron concentration	mg/l	< 0,2	
Composite alkalinity	mmol/l	-	<5
Oil/grease concentration	mg/l	<1	-
Organic substances (as TOC)	-	See footnote ^b	

^a If non-ferrous materials are present in the system, e.g aluminum, they may require lower pH value and direct conductivity, however, the protection of the boiler has priority.

^b Organic substances are generally a mixture of several different compounds. The composition of such mixtures and the behavior of their individual components under the conditions of boiler operation are difficult to predict. Organic substances may be decomposed to form carbonic acid or other acidic decomposition products which increase the acid conductivity and cause corrosion or deposits. They also may lead to foaming and/or priming which shall be kept as low as possible.

Note: During boiler economic life, the total make up water volume can not be more then 3 times of the total system water.

Guarantee will not be valid, if the boiler is out of service because of corrosion, sludge formation and deposits.

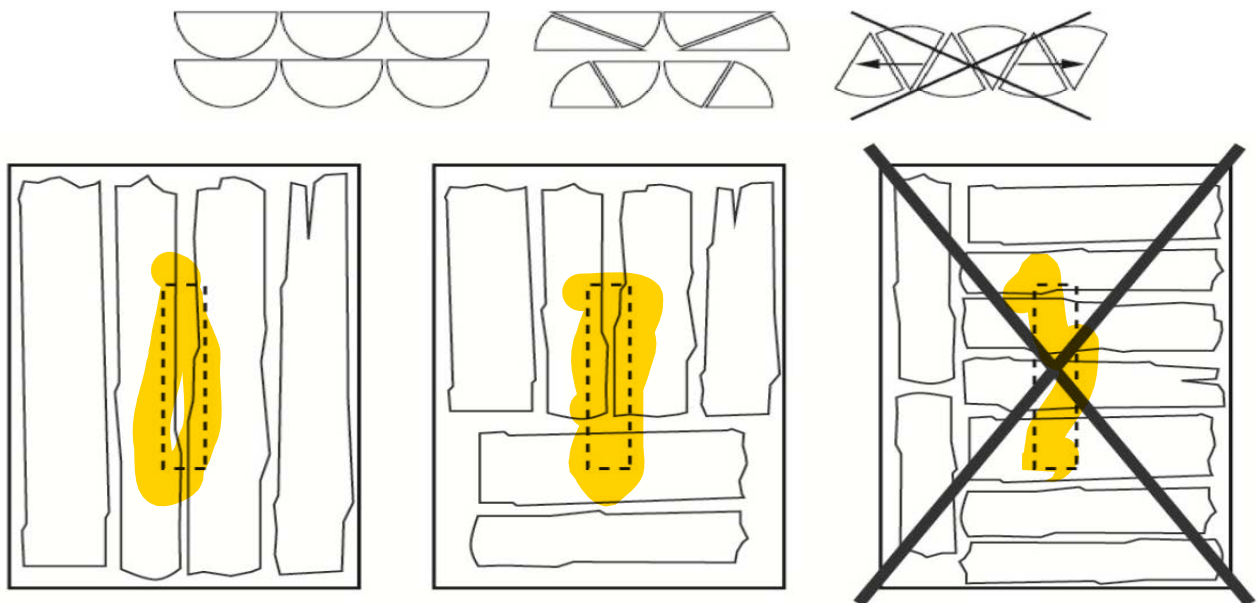
In order to prevent corrosion special care needed for oxygen infusion to the heating system water side. Possible points for oxygen infusion are from open vented cisterns, negative pressure points on the system and some gas permeable system items like plastic pipes.

V. ABOUT LOG PLACEMENT AND GASIFICATION



Gasification is a process that converts organic or fossil fuel based carbonaceous materials into carbon monoxide, hydrogen and carbon dioxide. This is achieved by reacting the material at high temperatures (>700 °C), without combustion, with a controlled amount of oxygen and/or steam. The resulting gas mixture is called syngas (from synthesis gas or synthetic gas) or producer gas and is itself a fuel. The power derived from gasification and combustion of the resultant gas is considered to be a source of renewable energy if the gasified compounds were obtained from biomass. The advantage of gasification is that using the syngas is potentially more efficient than direct combustion of the original fuel because it can be combusted at higher temperatures.

To achieve an efficient gasification, logs must be placed considering some rules. A random placement may adversely affect the wood gasification process. As a result, the combustion efficiency can drop in total. Following visuals shown you how it should be placed.



4. START UP PRE-CONTROLS

First start up work shall be carried out exclusively by fully trained, professionally qualified personnel. Please read the installation, operation, use and maintenance manuals before start up

Before first start up check that;

- There is a copy of the boiler and burner instructions in the boiler room.
- The boiler name plate and manual specifications and power supply network and other system need specifications correspond. (electric supply, fuel, water, boiler and burner output, system pressure, circulating pipes ...)
- The air inlet and outlet supply openings are correctly sized and free from obstacles.
- The flue gas exhaust system is correctly fitted and sized.

➤ All the system control and security devices are present and installed according to the current regulations and working properly.

➤ Control the boiler gas side seals are not damaged and fixed properly. (boiler front door, burner mounting plates, smoke box, flame monitoring glass)

In starting a new installation all the water pipes, boiler and all the other heating system items must be flushed and free from deposits.

- Open all the necessary valves for filling
- Fill the heating system with water (water specifications shall be according to boiler manuals) very slowly according to the air bleeding capacity of the components.
- In open vented systems fill the system up expansion cistern's proper level.
- Bleed all the air in the water side. Any air pockets have been eliminated.
- Run the circulating pumps and control that they are working properly.
- Control all the possible water leakage points.
- Check all security and operation items are working properly and set to system needs. If the safety valve is not factory adjusted, set it according to system need and be sure that it is working properly.
- Before firing be sure that system is full of water and all control items are set to desired value and working properly.
- After first running heat the system up to 80 - 85 °C and again bleed the air in the water side. After first heating most of the dissolved air in the system water will be free for bleeding.
- Control all the security and operation devices for proper operation and set values are according to system needs again. Especially check the manual limit thermostat and pressure safety valve.
- Call the owner or operator of the boiler house and give the necessary information for proper operation of the system and warn them about the possible dangers and limitations and what will they do in case of emergency.
- Check the emissions of the boiler after system is stabilized to ensure the adjustments are right.

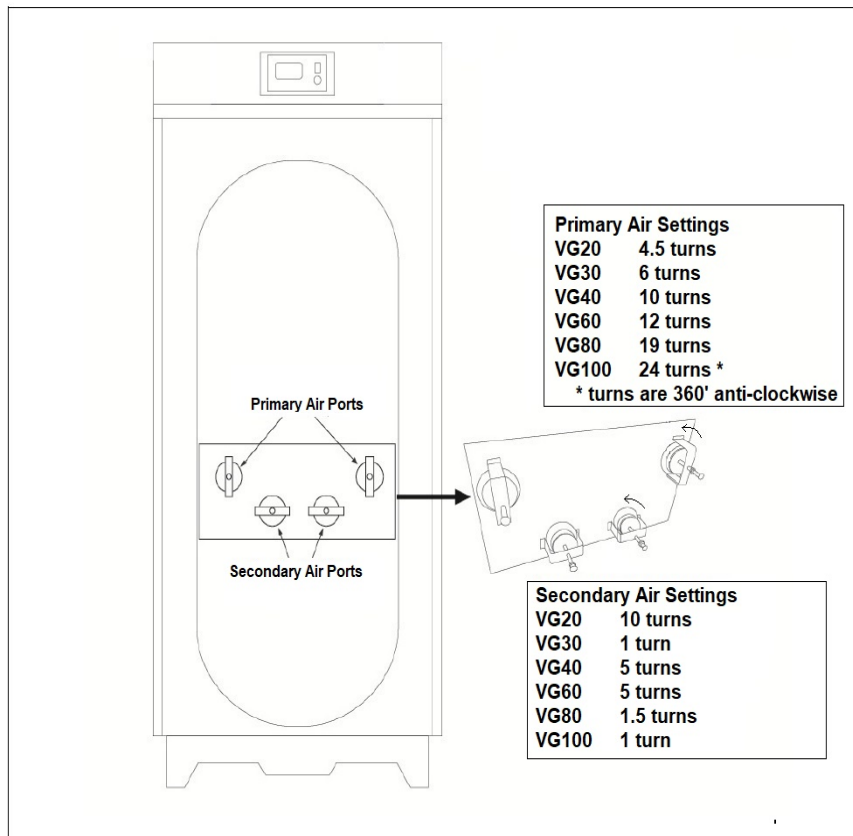
OPERATION and SHUT-DOWN

Please read operation, use and maintenance manuals before start up for economic and safe use. Wrong operation can cause a fire or explosion which may result property damage, personnel injury, or loss of life.

Preliminary checks before operating

Before operating,

- Check the system water level and pressure
- Check the ventilation openings are free from obstacles.
- Check the valve positions and be sure that all the water circulation valves are open
- Check all the cleaning and servicing parts are securely closed and tight
- Check all the sensors have in their correct position.
- Check the circulation pumps functioning and the direction of rotation.
- Check the presence of any kind of inflammable substance in boiler room
- The boiler can be operated only in accordance with these instructions in order to work properly.
- Check primary and secondary air holes as follows.








Some Hints for a trouble free operation;

Do not block the flame nozzle complete when you are filling the wood logs.

If you have a bridge problem and the wood logs are stay at top than try to use half length wood logs, eg: for 50 cm combustion chamber use 25 cm logs.

At first ignition keep the upper door open up to you have strong reverse flame

Heating up and start operation

1. Press the power switch button  of the panel to "on (1)" position.
2. Fill the wood filling volume up to bottom of the door line. Try to keep flame nozzle open.
3. Fire the woods.
4. Press the start button  on the panel.
5. Leave the upper wood filling door 4 to 10 cm opened up to you have a strong flame.
6. Fill the woods full or as much as you need.
7. Close the boiler door.
8. Press the function button  until to  figure seen right corner on the screen
9. Set desired boiler water temperature with the  buttons.
10. Do not set the boiler temperature below the 75 °C because of the condensation problem.

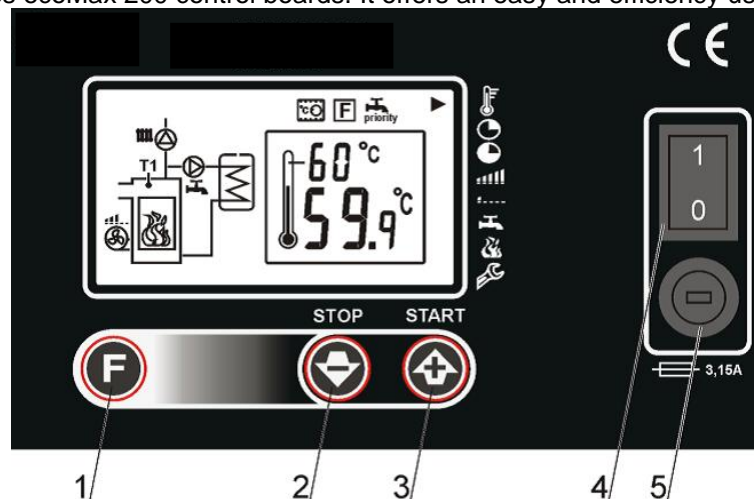
Shut Down

1. Never press the stop button when the boiler is in the running mode and if there is fuel in the combustion chamber. Always wait to no flame condition. This will cause stopping the vacuum fan, and the smoke can be leaked to the boiler room if the draught of the chimney is not sufficient.
2. Boiler controller is capable to detect fuel shortage. In that case the regulator will give an alarm code "AL1" when the boiler temperature drops below pump activation temperature.
3. After this alarm is on the screen, the fan will be disabled and the boiler will be stopped safely by the controller. There will be some red hot fuel for reigniting, so after AL1 you can fill some more fuel and the left ambers will be enough for ignition.

BOILER CONTROL PANEL



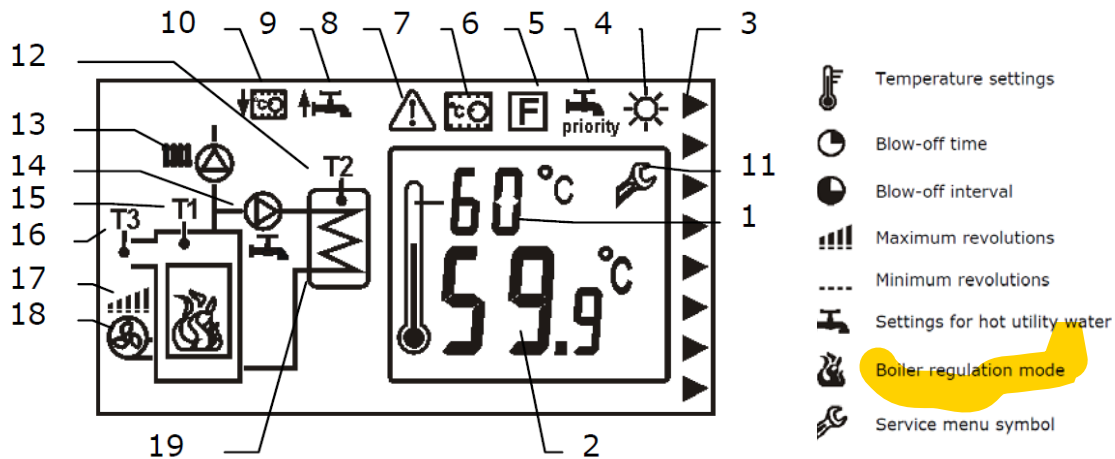
Ventum series uses ecoMax 200 control boards. It offers an easy and efficiency usage.



Legend:

1. Menu item change button
2. STOP button (and value decrease)
3. START button (and value increase)
4. Main On/Off switch
5. Fuse socket

After turning the regulator on, the START and STOP buttons are used to enable and disable airflow respectively.



Legend:

1. preset boiler or hot utility water tank temperature, or preset temperature of emission,
2. measured temperature of boiler, hot utility water tank, or stack gas (emission) temperature,
3. Arrow sign
4. SUMMER – hot utility water mode symbol
5. PRIORITY - hot utility water mode symbol
6. Boiler regulation mode – PID function,
7. Room thermostat – (this symbol lights up when the temperature inside the room reaches the preset value contacts are disconnected)
8. alarm symbol
9. signal of increasing the preset boiler temperature due to hot utility water heating,
10. signal decreasing the preset boiler temperature due to operation of the room thermostat,
11. service menu symbol
12. hot utility water temperature sensor,
13. central heating pump symbol
14. hot utility water pump symbol
15. boiler temperature sensor,
16. emission temperature sensor,
17. airflow power
18. fan symbol it this is not visible – regulation is off, it is visible – regulation is on, if it flashes – the regulator is in the SUPERVISION mode
19. hot utility water tank symbol
20. icons:

Note: The parameters of the regulator are all pre-programmed, do not change any parameter without the authorized service.

T1 – boiler temperature sensors (type CT4),

T2 – hot utility water temperature sensors (type CT4),

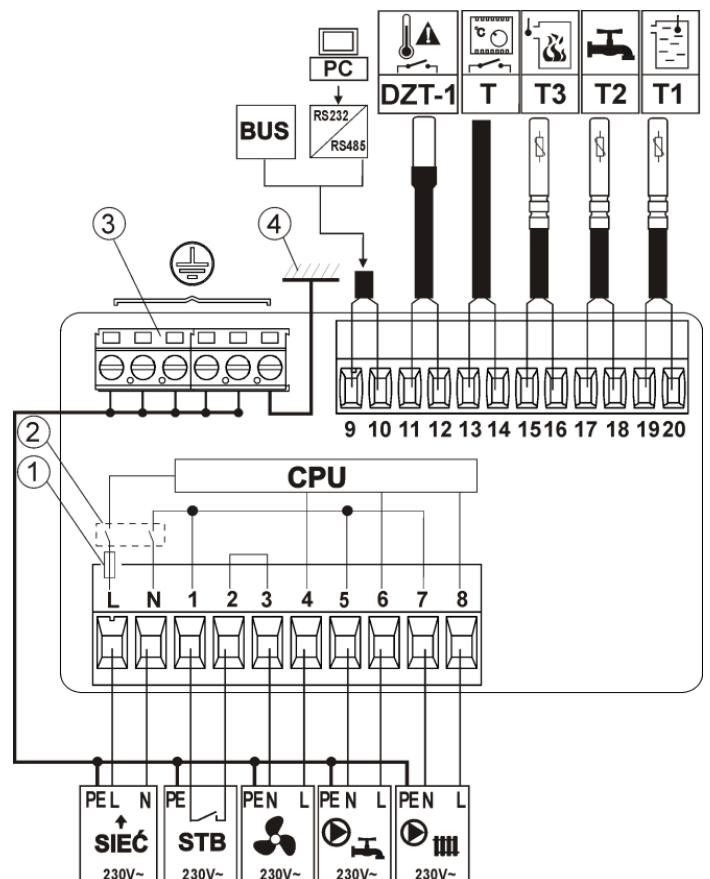
T3 – emission temperature sensors (type CT2s),

T – room thermostat,

DZT-1 – additional thermal safeguard (type DZT-1 85°C or 90°C),

RS232/RS485 – converter, BUS – connector for digital communication with a computer (optional),

1 – mains fuse in the regulator,



2 – mains switch in the regulator,
3 – protective terminals PE,
4 – metal enclosure of the regulator,
MAINS – mains lead,
STB – safety temperature limiter,

Enabling the SUMMER function

In order to enable the SUMMER function, which allows to heat the hot utility water tank in the summer without the need of warming the central heating system, set the parameter hot utility water mode = 3.

- Do not enable the SUMMER function if the hot utility water pump is disconnected.
- The SUMMER function cannot be enabled if the hot utility water sensor is disconnected.
- The SUMMER function can be enabled only after making sure that the boiler will not overheat. If the SUMMER function is enabled, the heat consumption is much lower, because the central heating pump is inactive. After filling the hot utility water tank and disabling the hot utility water pump, there is often a problem of boiler overheating. It occurs if the preset hot utility water temperature is higher than the preset boiler temperature. This problem is particularly common in the SUMMER mode of the hot utility water pump, when the central heating pump is disabled. In order to cool the boiler down, operation of the hot utility water pump can be extended by the time parameter r4 Extending hot utility water pump operation.

- Do not enable the SUMMER function in a hydraulic system with a thermal buffer tank
- We highly recommend, installing a thermal buffer tank for hot utility water heating in summer time, which is much more efficient and safe.

Connecting room thermostat

To make the boiler more economical and the temperature in the heated rooms more stable, install a room thermostat.

The regulator is compatible with a mechanical or electronic room thermostat, which disconnects its contact after a preset temperature has been reached. The thermostat should be connected in accordance with the upper drawing.

After installing a room thermostat, you must enable its support. To do so, set the service parameter Room thermostat (service parameter n8 = 1).

Description of alarms

No fuel AL1 :

When the fuel finished in the boiler AL1 message will appear on the display. No sound signal will be given.

Boiler temperature sensor damage AL2:

This alarm will be produced in the case of damage to the boiler sensor, and after exceeding its measuring range. The alarm signal will run the central heating and hot utility water pumps, in order to cool the boiler down. A sound signal is also activated.

The alarm is cancelled after returning to the sensor measurement range, and after disabling and enabling the regulator via the mains switch.

In such case, check the sensor, and replace it.

Exceeding the maximum boiler temperature AL3:

This alarm will occur after the boiler exceeds temperature determined by the factory parameter Boiler overheating alarm temperature P0. By default, this parameter is set to 90 °C. In such case, the fan is turned off, and the central heating and hot utility water pumps are activated. A sound signal is also activated. The hot utility water pump works only until the hot utility water tank exceeds the maximum temperature r3 service parameter). This protects the users against possible scalding.

After the boiler temperature drops, the regulator resumes normal operation.

It is suggested to set the P0 value below the safety temperature limiter actuation threshold. Thanks to this, a momentary exceeding of the boiler temperature will not cause stoppage of the boiler.

Exceeding maximum stack gas temperature

The regulator warns the user of a danger of stack gas (emission) temperature sensor damage if the emission temperature exceeds 450°C. Such situation can occur if the wrong regulator parameters are set, or if the boiler door is left open.

The alarm is signaled visually, by a warning triangle symbol, and with a sound – short warning signal.

Troubleshooting

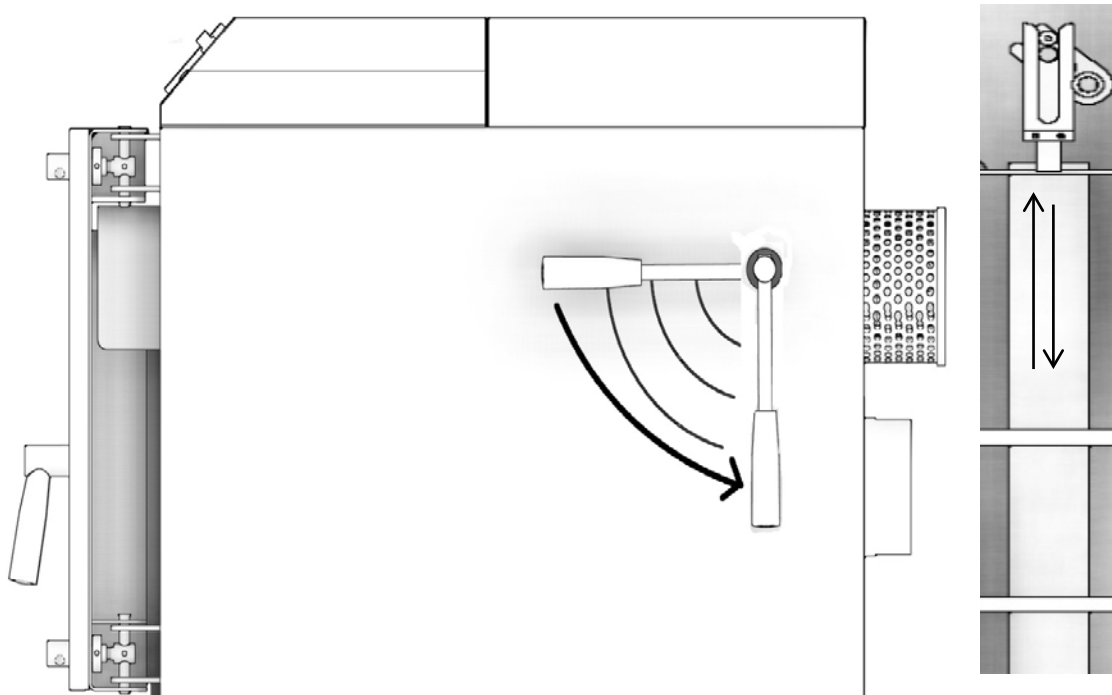
Signs of a fault	Hints
1. The display is blank despite connection to the supply network.	<ul style="list-style-type: none"> ▪ The main electric supply is off. Control the fuses.
2. Preset boiler temperature on the display is different than the programmed one	<ul style="list-style-type: none"> ▪ whether the hot utility water tank is filled at the time and the preset hot utility water temperature is higher than the boiler preset temperature; if so, the difference of readouts will disappear after the hot utility water is filled, or after decreasing the preset hot utility water temperature. ▪ whether the room thermostat is on – set the service parameter decreasing boiler preset temperature by thermostat r0 = 0
3. central heating pump is inoperative	<ul style="list-style-type: none"> ▪ whether the boiler exceeded the parameter Pump activation temperature (n0) – wait or decrease this parameter, ▪ if the room thermostat is not blocking the central heating pump - set the parameter central heating pump down-time (n8) to “0”. ▪ if the hot utility water priority, which blocks the central heating pump, is enabled – disable the priority by setting the hot utility water mode = 2 (Without priority), ▪ Whether the central heating pump is not damaged or clogged.
4. the fan is inoperative	<ul style="list-style-type: none"> ▪ check the value of the parameter Minimum airflow power (n2) ▪ check if the safety temperature limiter STB input jumper is on terminals 1-2 (the jumper should be placed only if no temperature limiter is connected). ▪ check if the additional thermal protection sensor input jumper is on terminals 11-12 (the jumper should be placed only if no DZT-01 sensor is connected) ▪ if the boiler manufacturer equipped it with a temperature limiter STB with manual return to the initial position; unlock it by removing the lid and pushing the button, in accordance with the documentation provided by the boiler manufacturer. ▪ check the fan and replace it if necessary
5. the temperature is measured incorrectly	<ul style="list-style-type: none"> ▪ Check if there is good thermal contact between the temperature sensor and the measured surface, ▪ whether the sensor lead is not placed too close to the mains cable, ▪ If the sensor is connected to the terminal ▪ Whether the sensor is not damaged.
6. in the hot utility water – SUMMER mode, the heaters are hot and the boiler overheats	<ul style="list-style-type: none"> ▪ Increase the parameter Extending hot utility water pump operation (r4) in order to cool down the boiler
7. the hot utility water pump is active even after the hot utility water tank has been filled	<ul style="list-style-type: none"> ▪ Set the parameter Extending hot utility water pump operation (r4= 0)
8. the boiler overheats despite enabled fan	<ul style="list-style-type: none"> ▪ The reason can be a constructional defect of the boiler, consisting in lack of protection against too high chimney draught (no back shutter in the fan, or damaged shutter), or the boiler is not tight.

MAINTENANCE AND SERVICING

Wait up to all the fuel finished in the boiler and the boiler temperature is less than 40 °C. Please stop all the system from control panel, disconnect the power supply and always wait until all the parts are cooled down before any cleaning and servicing operations.

Your boiler will cause some smoke and dust and in order to extend the lifetime and increase efficiency at every heating season or once a year please call your authorized service to;

Clean the boiler heat exchanger surfaces **BEFORE EACH NEW BURN** (especially clean the boiler tubes as follow) Check the combustion parameters



Cleaning period depends on plant features, fuel and combustion parameters so after first commissioning please clean the boiler heat exchange surfaces **once a month**, if they need any cleaning. After few controls you can decide the period of cleaning you will need.

Do not add any additional fuel and wait up to all the fuel finishes burning.

Wait for cooling the boiler (min 2-3 hour)

Stop the circulation pump

Disconnect the main power supply

Dismantle the back side **flue gas top door** [see 4.11 Pg 26] and clean all the flue pipes. **Dismantle the bottom back door** [see 7.1 Pg 29] and clean the flue box.

Open the upper front door and clean all the surfaces

Open the bottom front door and clean all the surfaces

Check the flue between boiler and chimney, clean if necessary. Control the chimney.

Put back all the dismantled part in its proper place in reverse order.

Connect the main power

And run the system.

Again min. once a year call your authorized service for checking the combustion parameters, security and operational devices.

Do not alter the security devices preset values

If the boiler door ceramic fiber packing gas seals in any part of the boiler is not proper and if there is a gas leak out of boiler, please call an authorized service for repair or replacement.

Check the water leaks from all heating system periodically to avoid the formation of scale and corrosion which initially reduces the system efficiency and in long term will permanently damage the boiler. Frequent make up water need must be repaired as soon as possible.

Periodically check the safety and operational equipments.

During the long shut off periods run the circulation pump(s) and anti-condensation pump 5 min/month in order to avoid pump shaft lock-out.

System water never fully drained if it is not necessary. Corrosion is very rapid in empty systems. New water filling means adding new scale and oxygen to the system. Both reasons cause to shorten the boiler service life and cause loss of efficiency.

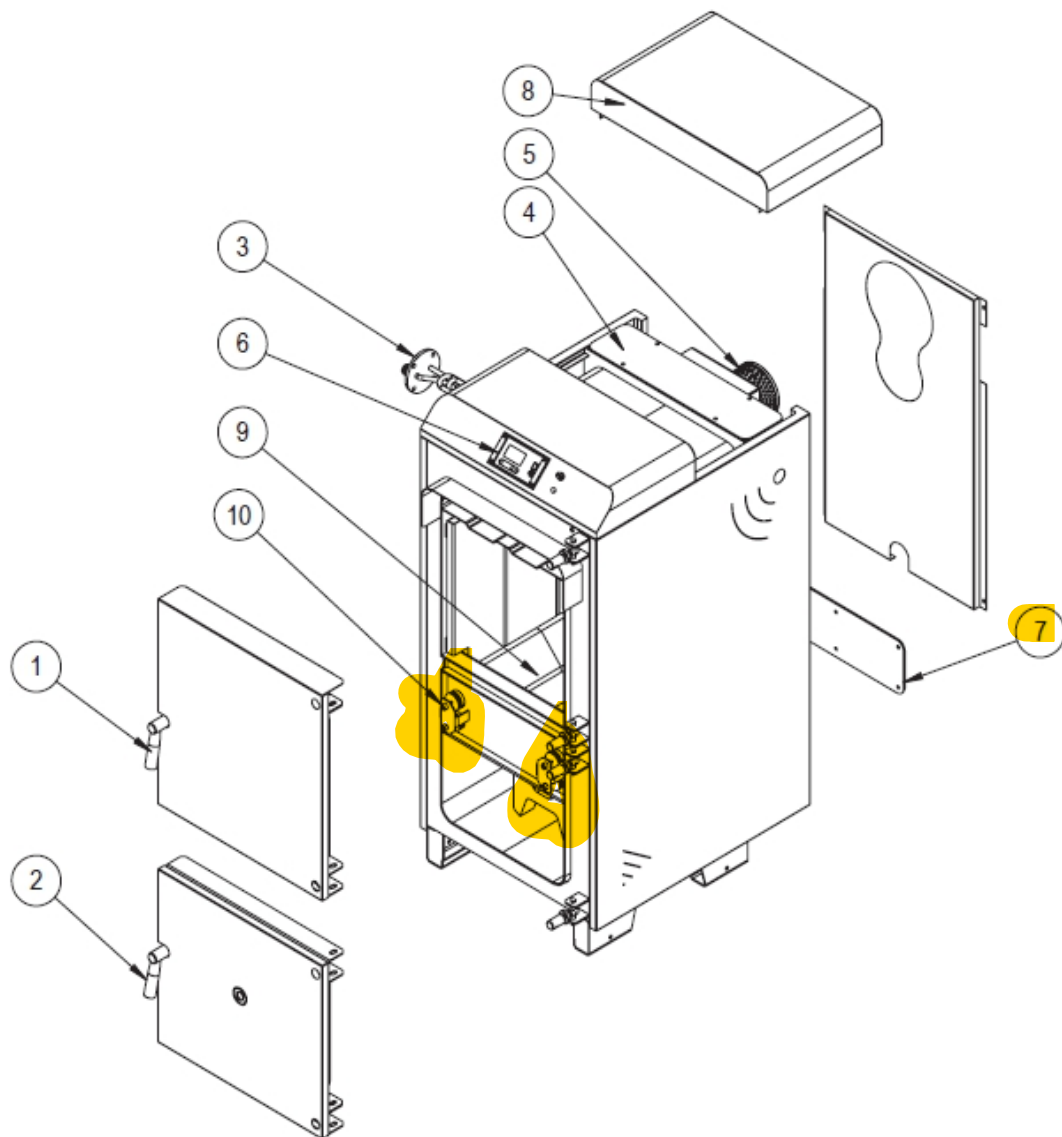
System water level or pressure must be checked minimum once a month. At the first installation it needs frequent regular checks because of air discharge from the system.

Chimney must be cleaned periodically according to the national regulations.

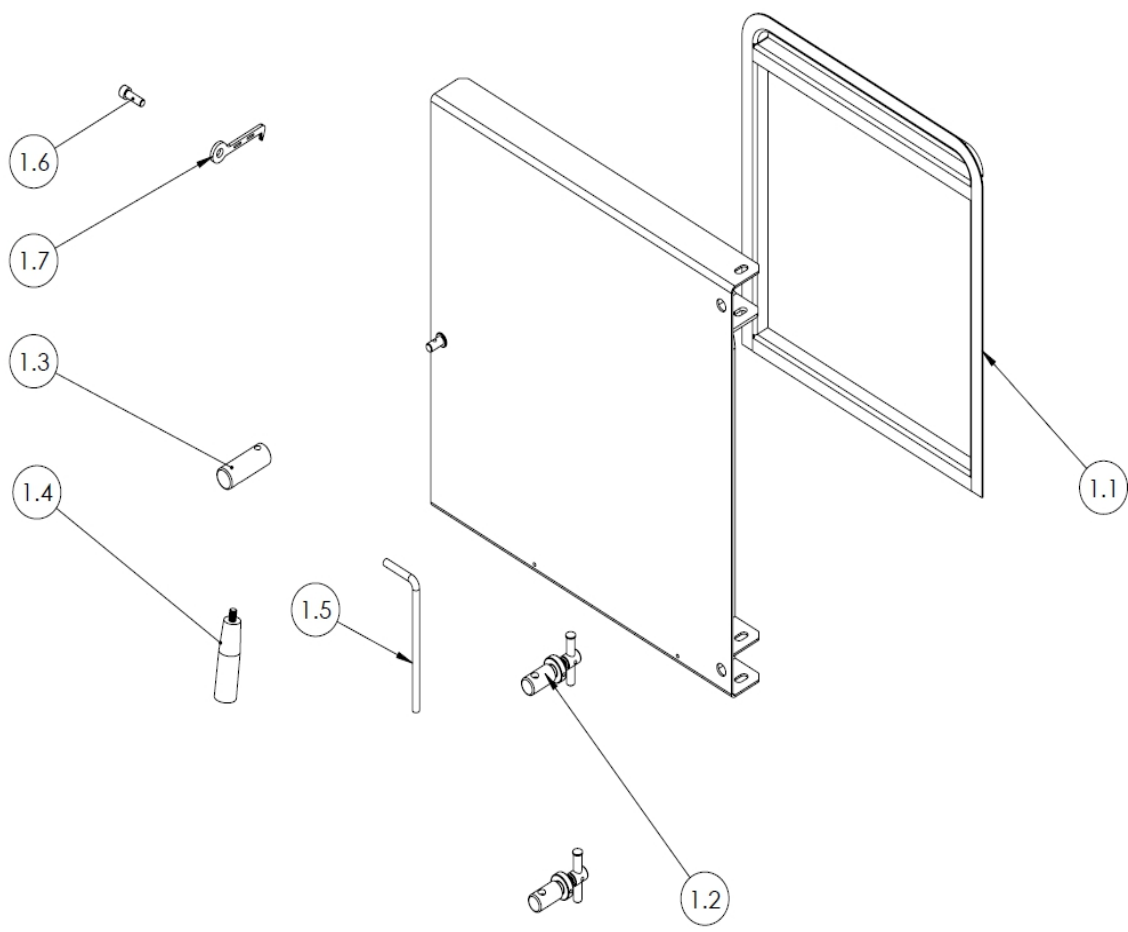
If the system will be shut off for long periods in winter time please take precautionary actions for freezing the system water.

Water filters shall be cleaned regularly according the system need.

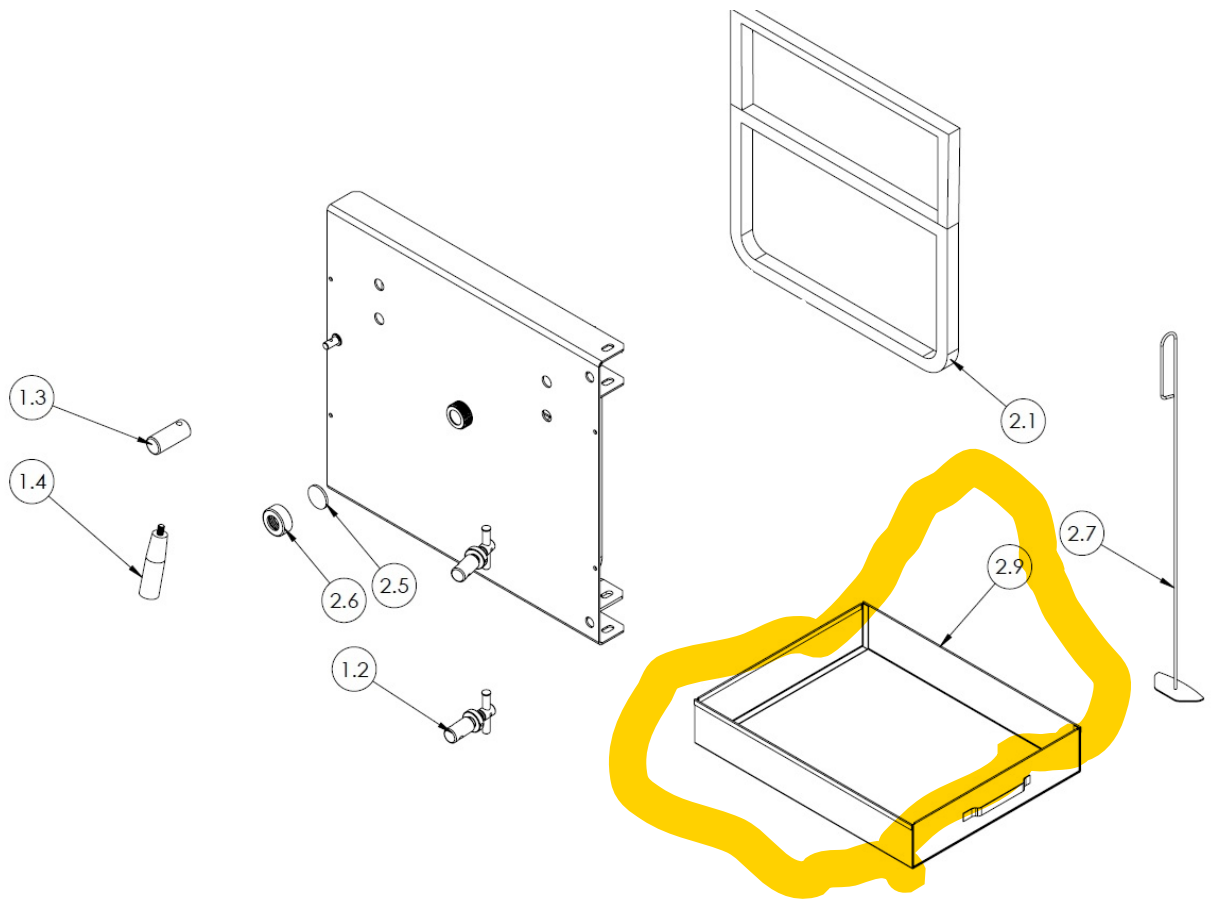
SPARE PARTS LIST



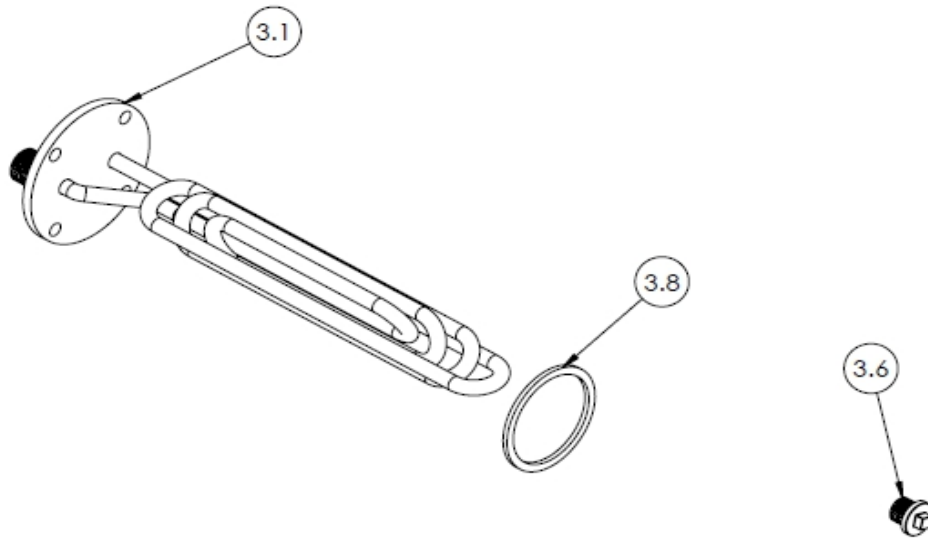
1	Upper Front Door
2	Lower Front Door
3	Heat Exchanger Group
4	Tube Cleaning Group
5	Fan Group
6	Electrical Panel
7	Back Door
8	Cover Plates
9	Refractories
10	Air Regulation Clape



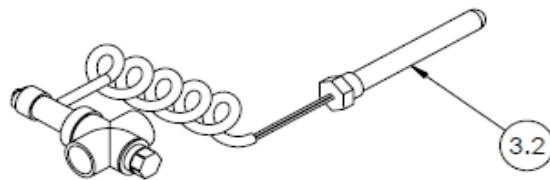
Part Number	Part Name	Quantity per Boiler
1.1	Door Gasket	1
1.2	Door Hinge Group	1
1.3	Door Handle Group	1
1.4	Bacalite Arm	1
1.5	Hinge Fastening Arm	1
1.6	Door Lock	1
1.7	Door Lock Pin	1



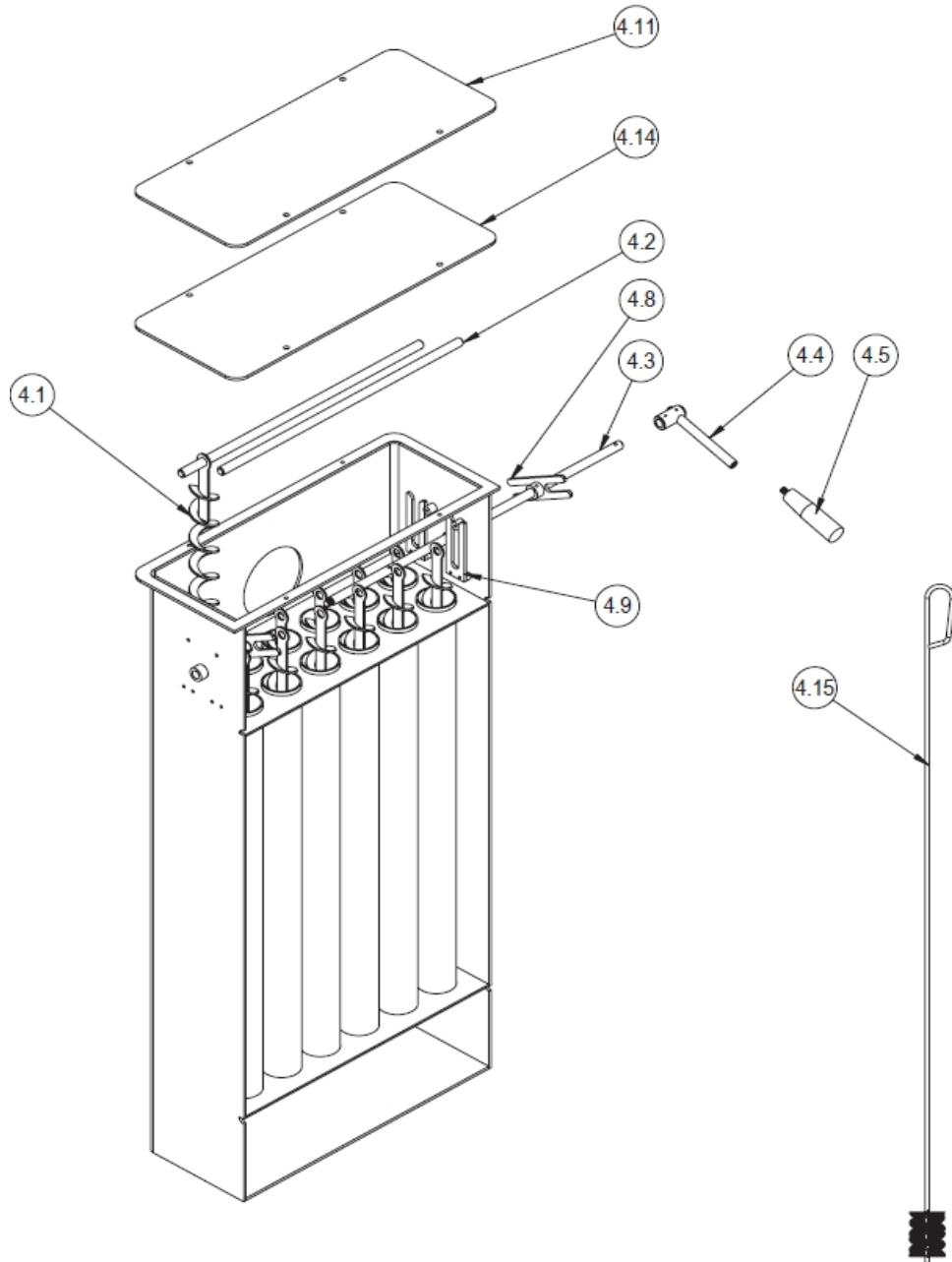
Part Number	Part Name	Quantity per Boiler
2.1	Door Gasget	1
2.5	Flame Monitoring Glass	1
2.6	Monitoring Glass Cap	1
2.7	Ash Rake	1
2.9	Ash Box	1



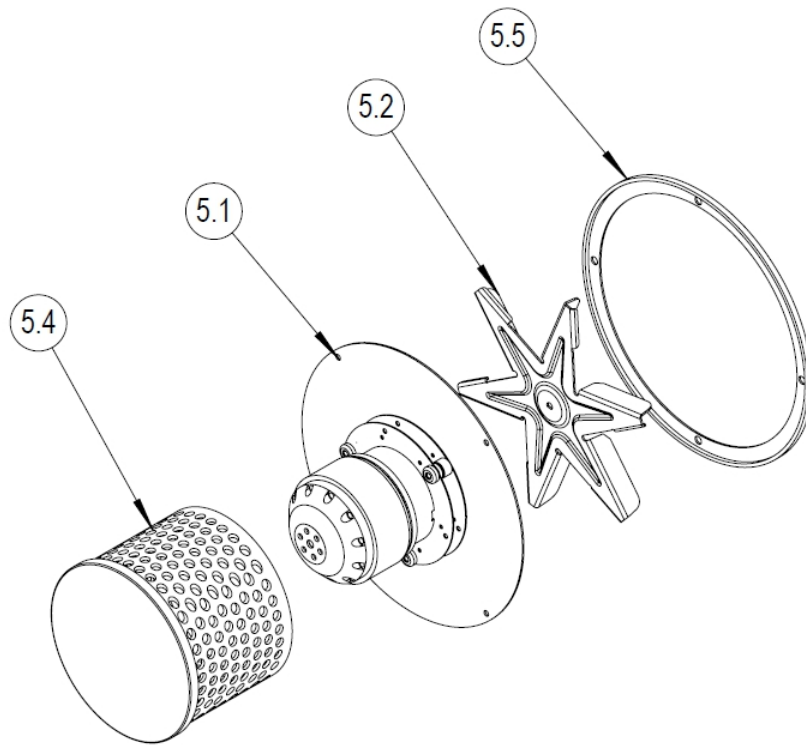
OPTIONAL



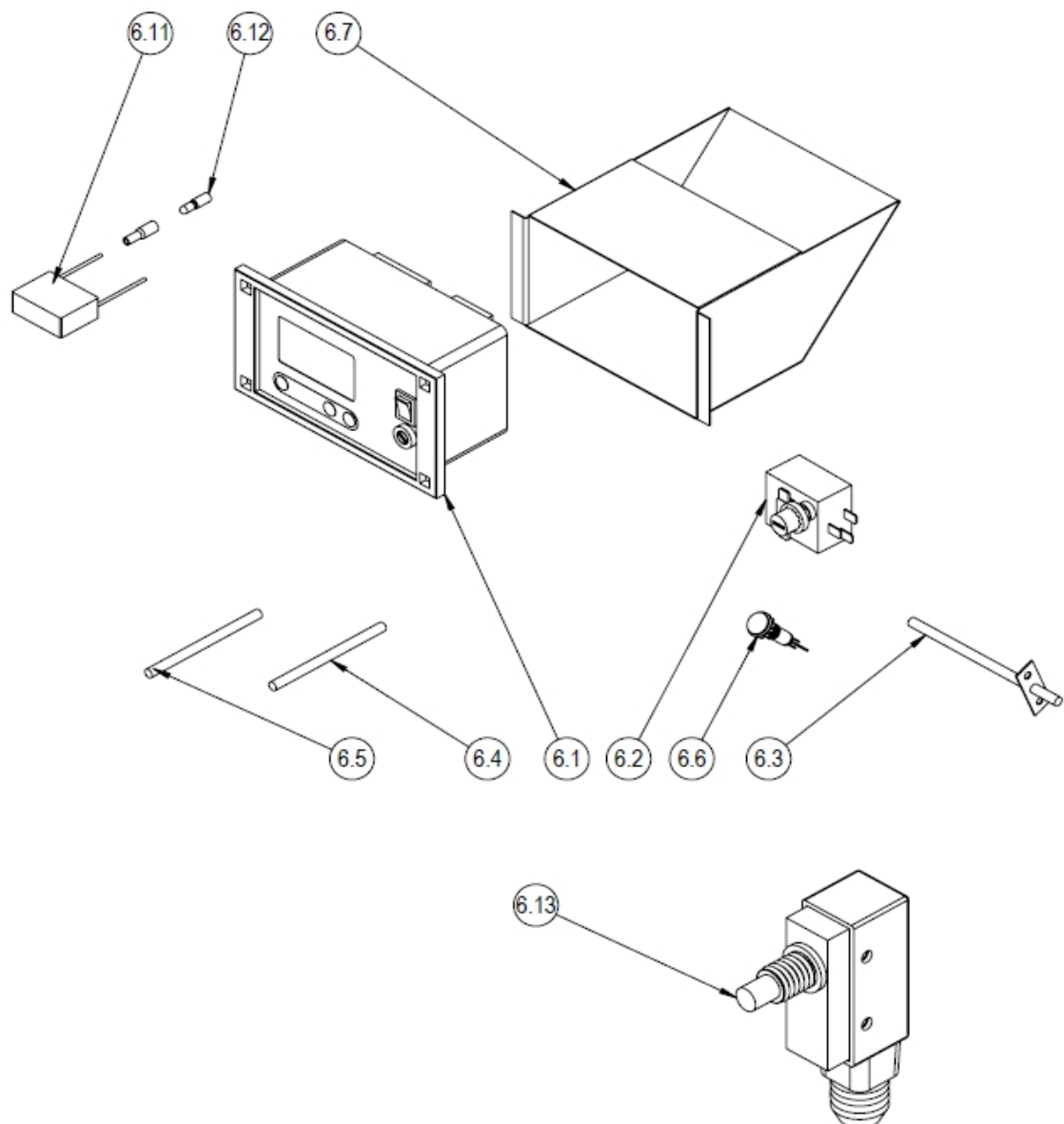
Part Number	Part Name	Quantity per Boiler
3.1	Heat Exchanger	1
3.2	Mechanical Thermos. Valve	1
3.6	Blind Plug	1
3.8	Gasket	



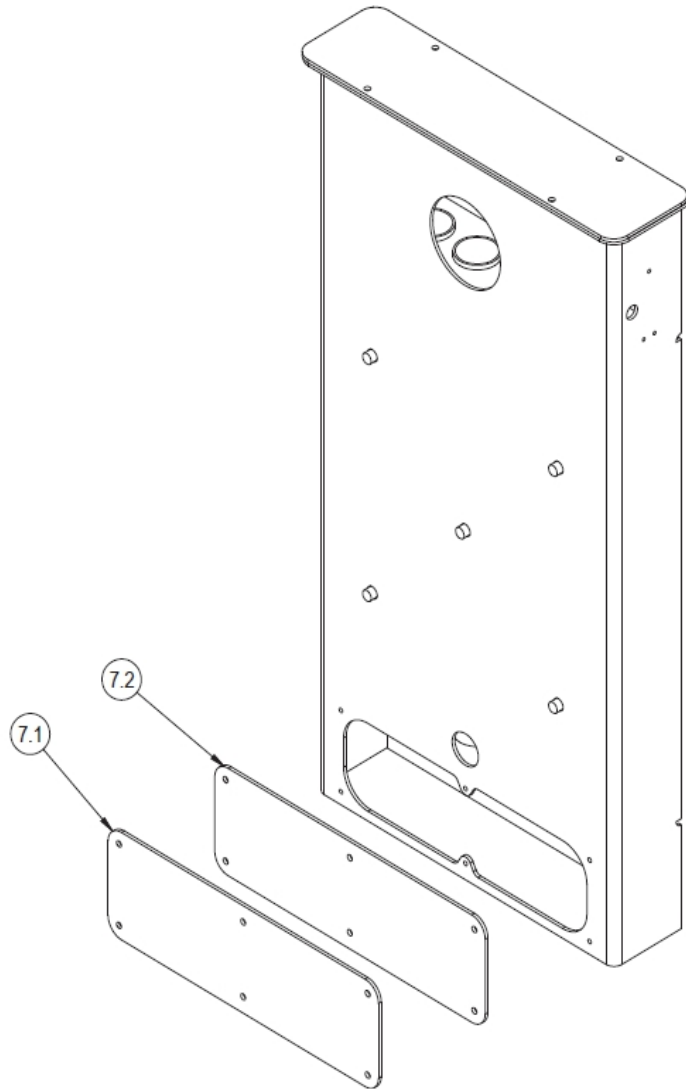
Part Number	Part Name	Quantity per Boiler
4.1	Turbulators	6 to 12
4.2	Turbulator Shaft	1 to 2
4.3	Turbulator Cleaning Shaft	1
4.4	Cleaning Arm	1
4.5	Cleaning Arm Handle	1
4.8	Turbulator Shaft Lifting Arm	2
4.9	Turbulator Shaft Bearing	2 to 4
4.11	Top Door	1
4.14	Top Door Ceramic Isolation	1
4.15	Tube Cleaning Brush	1



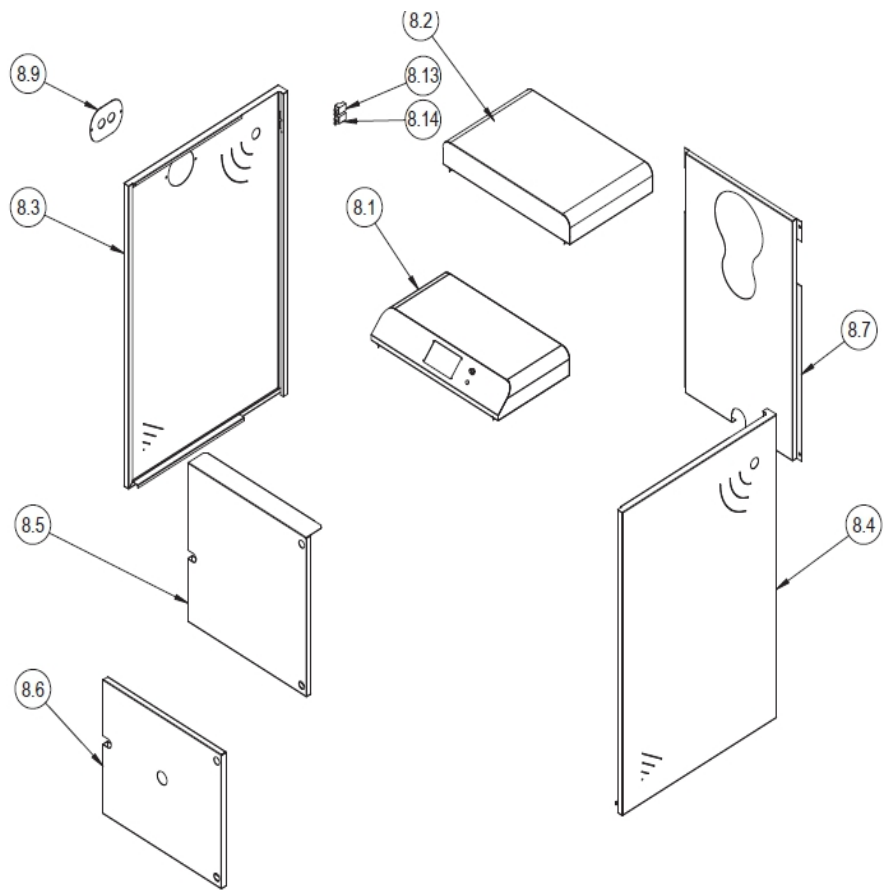
Part Number	Part Name	Quantity per Boiler
5.1	Fan	1
5.2	Propeller	1
5.4	Fan Cover Box	1
5.5	Fan Gasket	1



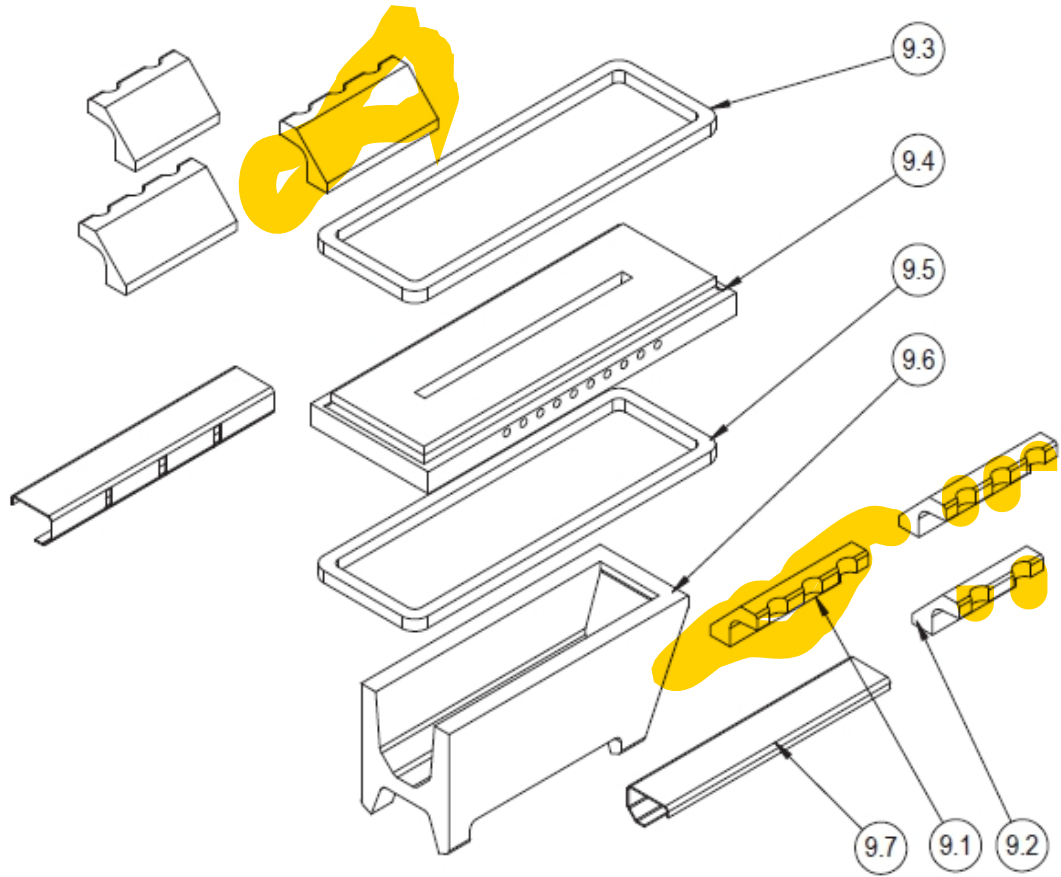
Part Number	Part Name	Quantity per Boiler
6.1	Controller	1
6.2	Limit Thermostat	1
6.3	Flue Gas Temperature Sensor	1
6.4	Boiler Temperature Sensor	1
6.5	Sanitary Water Temp. Sensor	1
6.6	Lamb	1
6.7	Panel Case	1
6.11	Capacitor	1
6.12	Crimp-on Snap Connector	2
6.13	Door Switch	1



Part Number	Part Name	Quantity per Boiler
7.1	Back Door	1
7.2	Back Door Insulation Board	1



Part Number	Part Name	Quantity per Boiler
8.1	Top Front Cover Plate	1
8.2	Top Back Cover Plate	1
8.3	Left Cover Plate	1
8.4	Right Cover Plate	1
8.5	Upper Front Door Cover Plate	1
8.6	Lower Front Door Cover Plate	1
8.7	Rear Cover Plate	1
8.9	Heat Exchanger Cover Plate	1
8.13-8.14	Connection Sockets	4



Part Number	Part Name	Quantity per Boiler
9.1	Upper Refractories	
9.2	Upper Middle Refractories	
9.3	Ceramic Fiber Isolation	
9.4	Middle Refractories	
9.5	Ceramic Fiber Isolation	
9.6	Bottom Refractories	
9.7		

BOILER NAME PLATE

COMMISSIONING DATE : / /

COMMISSIONED BY :

NAME :

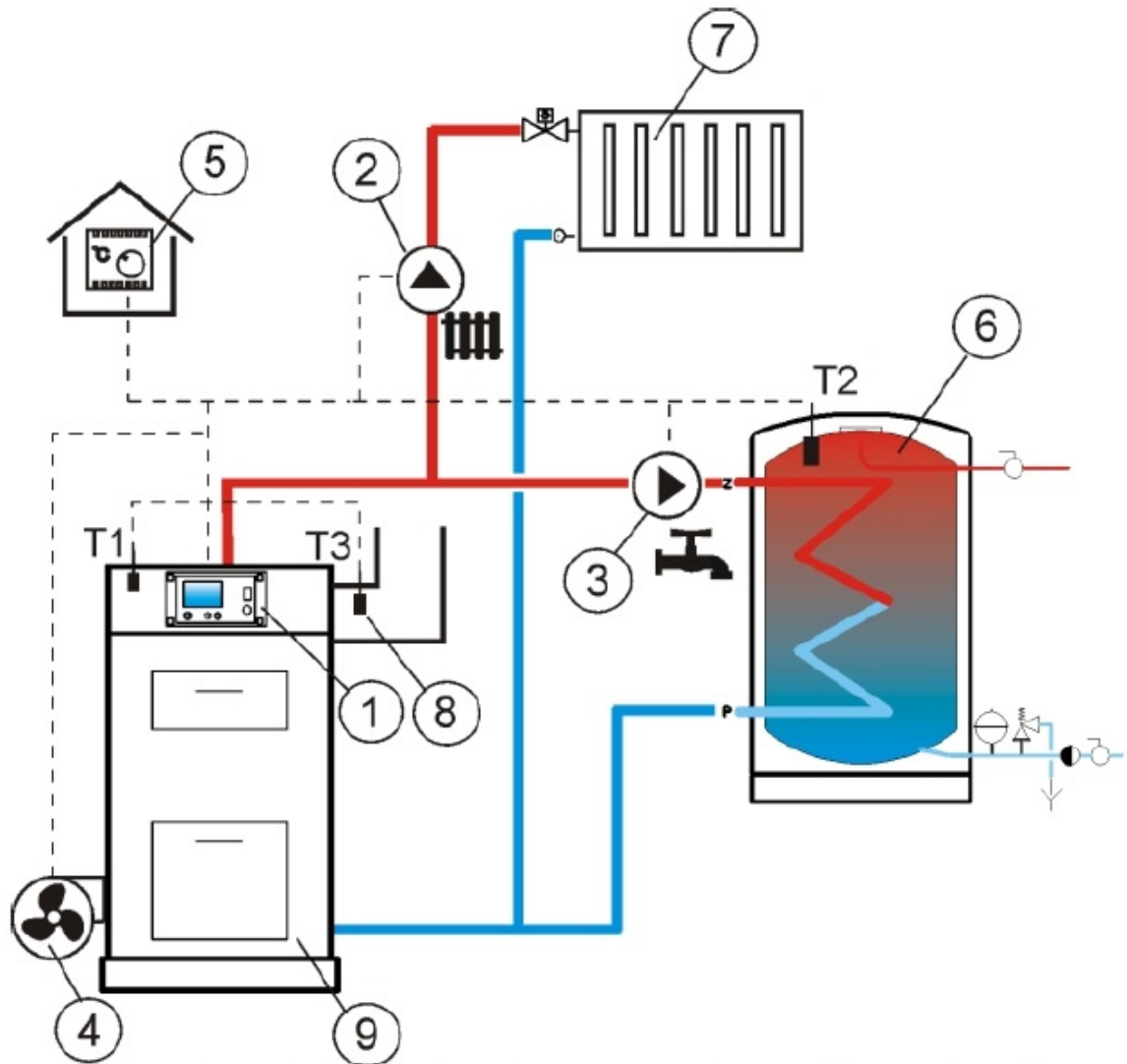
TEL :

INITIAL SET VALUES

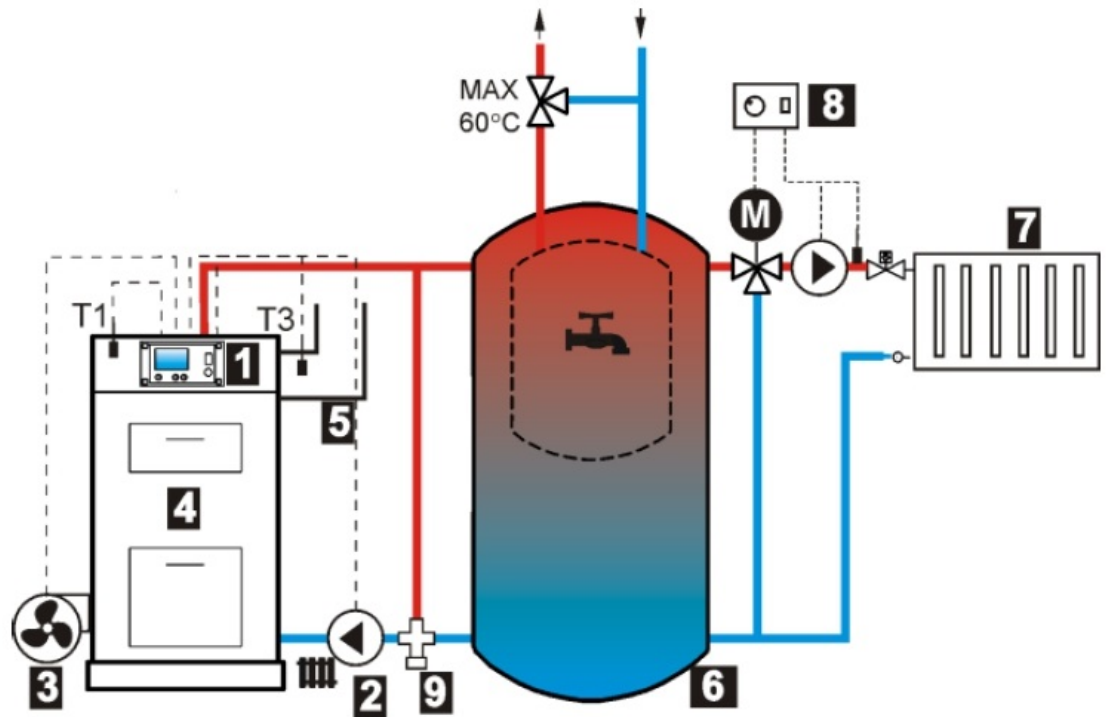
Fuel type:

System pressure: mbar

APPENDIX-1



Hydraulic diagram supported by the regulator, where: 1 – ecoMAX 200 regulator, 2 – central heating pump, 3 – hot utility water pump, 4 – fan, 5 – room thermostat 6 – hot utility water tank, 7 – central heating system, 8 – chimney duct, 9 – boiler, T1 – boiler temperature sensor, T2 – hot utility water temperature sensor, T3 – emission temperature sensor (optional, not required for normal operation).



Hydraulic diagram with a thermal buffer, where: 1 – ecoMAX 200 regulator, 2 – central heating pump, 3 – fan, 4 - boiler, 5 - chimney duct, 6 – thermal buffer with integrated hot utility water tank, 7 – central heating system, 8 – external regulator of heating cycle, 9 – thermostatic valve safeguarding the boiler return, T1 – boiler temperature sensor, T3 – emission temperature sensor.

APPENDIX-2

TECHNICAL SPECIFICATION OF VENTUM TYPE WOOD GASIFICATION BOILERS			Unit	BOILER TYPE						
				VG20	VG30	VG40	VG60	VG80	VG100	
CAPACITY	Nominal Heat Output		kW	20	30	40	60	80	100	
			kcal/h	17.200	25.800	34.400	51.600	68800	86000	
	Minimum Heat Output		kW	N.A / equal to Nomial Heat Output						
Direct Efficiency		%	90,1	90,4	91,2	91,7	91,5	91,3		
OPERATING CONDITIONS	Boiler Class		-	CLASS 5 acc. To EN 303-5						
	Safety Limit Temperature		°C	97						
	Setting Range of Operating Temperature		°C	85 - 55						
	Min. Water Return Temperature		°C	55						
	Operating Pressure		bar	3						
	Boiler Test Pressure		bar	4,5						
	Electrical Connection		-	230 V _{ac} , 50 Hz						
	Recommended Fuel Types		-	ø80x500 mm			ø80x700 mm	ø80x1000 mm 2xø80x500mm		
				Hard Wood, 15% < Humidity < 30% *						
	Minimum Required Stack Draught		Pa	10						
	Boiler Gas Side Resistance		Pa	125	110	140	230	240	250	
	Boiler Water Side Pressure Drop	ΔT = 20 °C	mbar	11,0	3,2	5,5	23,0	25,0	28,0	
	Fuel Filling Volume		lt	89	113	137	200	385		
			kg	30	40	50	70	135		
	Approximate Combustion Period		h	5						
Required Accumulation Tank Volume		lt	1000	1500	2000	3000	4500	5500		
Airborne Noise Level		dB	< 60 dB							
MAIN DIMENSIONS	Boiler Width, W ₁		mm	600				650		
	Total Width with Cover Plates, W ₂		mm	650				700		
	Boiler Length, L ₁		mm	1060			1360	1635	1805	
	Boiler Height, H ₁		mm	1060	1210	1310	1360	1610		
	Total Height, H ₂		mm	1165	1315	1415	1465	1715		
	Stack Diameter, ØD ₁ (inner-outer)		mm	125-130		146-150		176-180		
	Height of Stack Connection, H ₆		mm	715	865	955	1005	1225		
	Water Content		lt	90	104	114	168	285	345	
	Approx. Empty Weight		kg	385	425	450	600	810	910	
	Hot Water Outlet Connection		Diameter, ØD ₂	inch	1 1/2"				2"	
			Position, H ₃	mm	1137	1287	1387	1437	1766	
			Position, L ₂	mm	590			890	1147	1317
	Water Inlet Connection		Diameter, ØD ₂	inch	1 1/2"				2"	
			Position, H ₄	mm	380				435	
	Safety Cooling Heat Exchanger 15 °C, 2 bar cold water		Diameter, ØD ₃	inch	3/4"					
Position, H ₅			mm	975	1125	1225	1275	1525		
Filling & Drain Connection		Diameter, ØD ₄	mm	1/2"						
EMISSION RATES	Flue Gas Temperature		°C	145-165						
	Average Mass Flow Rate of Solid Pollutants (dust)		g/h	1,8	2,3	2,9	4,6	9	10	
	CO		mg/m ³	< 700						
POWER CONSUMPTIONS	Average Electricity Consumption		W	3						
				in stand-by	57	64	70	79	85	90
		in full load, 100%								

