



Installation and User Manual



ECCO – BURN F

Dear Customer

Thank you for purchasing ECO-BURN F solid fuel boiler. This instruction manual is intended to help you install and operate the product safely, properly and economically. Please read this manual carefully before installation and operation of your product, and keep it during the whole operation life. Do not touch or interfere any part of the product other than those allowed. The installation, maintenance and service of this boiler requires skilled technicians. For the installation of the boiler and proper room selection, installation of water circuit, chimney design, this manual and mandatory regulations must be considered.

Carry out maintenance and cleaning work recommended on your heating system at regular intervals. Details can be found later in the instruction manual. By doing this, you will not only be ensuring the operational reliability of your heating system but also its efficient and low-emission operation.

DECLARATION OF CONFORMITY

No. 0115

Type of the equipment : Hot water boilers for solid fuel (wood) with manual fuel supply
EN 303/5:2013

Trademark : **Thermasis**

Type designations : **ECOBURN EF28**
ECOBURN EF35
ECOBURN EF45
ECOBURN EF60
ECOBURN EF75
ECOBURN EF100
ECOBURN EF125

Manufacturer : **BOYSIS MAKINE TAAHHUT SANAYI ve TICARET A.Ş.**
Şerifali Mahallesi Hüsrev Sokak No.2 Erişkenler Plaza
Kat 3, 34775, İstanbul/TURKIYE

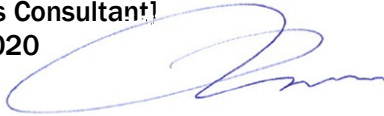
The following harmonised standards or regulations which comply with good engineering practice in safety matters in force within the EU have been applied:

EN 303/5 : 2013
EN 60335-1 : 2012
EN 60335-2-102 : 2016
2014 / 68 / EU
2015 / 1187 / EU

As manufacture and/or authorised representative within EU, we declare under our sole responsibility that the equipments follow the essential requirements foreseen by the above mentioned regulations

Signed for and on behalf of the manufacturer by:

Murat Gedik [Sales Consultant]
Bursa, May 4th, 2020



1 INTRODUCTION AND DELIVERY

Eco-burn is a welded steel boiler for solid fuels which is constructed in advanced four-pass horizontal flue gas circulation principle. It is designed for hot water heating systems, therefore should not be used for direct sanitary water supply. Eco-burn fires your fuel with very high water efficiency, saving on your fuel cost. As it can hold high amount of fuel, and the heat exchanger is integrated with horizontal water buffers, it can maintain sufficient outlet water temperatures until all fuel in the combustion chamber is consumed. Combustion is enriched by a fan at the air inlet driven by a stylish electronic control panel with integrated PCB, and user friendly LCD display, unique to your boiler. An air inlet box with damper is supplied with the boiler. When this item is installed on the fan, air inlet to combustion chamber is prevented when the fan switched off, thus the fuel consumption is lowered.

Your boiler can be used either in forced or natural water circulation systems thanks to its large waterways inside the boiler and medium sized delivery and return connections. You can fire different solid fuels whose specifications are given further in this manual. As calorific values of solid fuel types differ from each other, the output power of the boiler will vary between a maximum and a minimum range specified.

Delivery term: Ecoburn boiler is delivered as fully assembled in one wooden box:

1. Boiler: Fully assembled, doors attached, insulation wrapped, external jackets installed, data label attached.
2. Accessories: Control panel, fan, fan-hood (fan air inlet/damper box), user manual, cleaning brush and fuel shaker arm are delivered in the combustion chamber of boiler

Optional accessory: A safety heat exchanger kitted against overheating should be purchased. This kit holds a copper heat exchanger against excessive heat accumulation inside the boiler, a safety valve to activate the heating system at high water temperatures, and auxiliary accessories for installation. Whether the hydraulic circuit is open vented or pressurised, this safety heat exchanger system should be utilized for meeting the regulations of related European standard for this product, as well as safety of whole heating installation and boiler itself.

2 SAFETY WARNINGS

2.1 Basic safety instructions

- Never get yourself into danger; give own safety the utmost priority.
- Keep children away from the boiler room and fuel storage room.
- Observe all instructions related to operation, maintenance, servicing and cleaning.
- Heating system and boiler should only be installed and started up for the first time by an authorised installer. Professional installation and start-up are essential for safe and economical operation.
- Never make any changes to the heating system or flue gas system.
- Never close or remove safety valves.

ESSENTIAL WARNING

THIS APPLIANCE MUST BE EARTHED !

2.2 Warning signs

DANGER - Risk of poisoning

- Make sure that the boiler is supplied with sufficient combustion air. The openings in the combustion air inlet must never be partially or completely closed.
- Ventilation systems, central vacuum cleaning systems, extractor fans, air conditioning systems, flue gas blowers, dryers or similar equipment must never be allowed to draw air from the boiler room
- The boiler must be connected tight to the chimney using a flue gas tube.
- Clean the chimney and the flue gas tube at regular intervals.
- Boiler room must be sufficiently supplied with air and ventilated.

DANGER - Risk of electric shock

- Switch off any component on the system before performing work on the boiler.
- ALL ELECTRICAL APPLIANCES ON HEATING SYSTEM MUST BE EARTHED !

DANGER - Risk of explosion

- Never burn petrol, diesel, engine oil or other explosive materials in the boiler or storage room
- Never use liquids or chemicals to ignite the fuel
- Switch off the heating system before any work on boiler or heating system

DANGER - Risk of fire

- Do not store any flammable materials in the boiler room.
- Do not hang out any washing in the boiler room.
- Always keep all boiler doors closed during operation
- Store fuels in another room, or leave a minimum distance of 80 cm between boiler and fuel pile.

WARNING - Risk of burns

- Do not touch the flue spigot or the flue gas tube.
- Do not touch boiler hot surfaces (front upper and front door when boiler is hot. Use only door handles. Use gloves for performing all work and fuel loading
- Do not open ash door reach into the ash chamber.
- Do not clean the boiler until it has been allowed to cool down.

NOTICE - Damage to property

- Do not feed cold water directly to the boiler overheated by any reason. This may result in noise production in the system and/or permanent damage on boiler body.
- Do not drain water in hydraulic circuit unless in case of maintenance or risk of freezing
- Heat the boiler using fuels that comply with the specifications below
- Do not use the heating system if it, or any of its components, come into contact with water.
- If any damage occurs, have the heating system checked by your authorised service staff or approved technicians, and have any damaged parts replaced in case needed.

2.3. What to do in an emergency

What to do in the event of a fire

- Switch off the heating system, call the fire brigade
- Use approved fire extinguishers.

What to do if you smell smoke

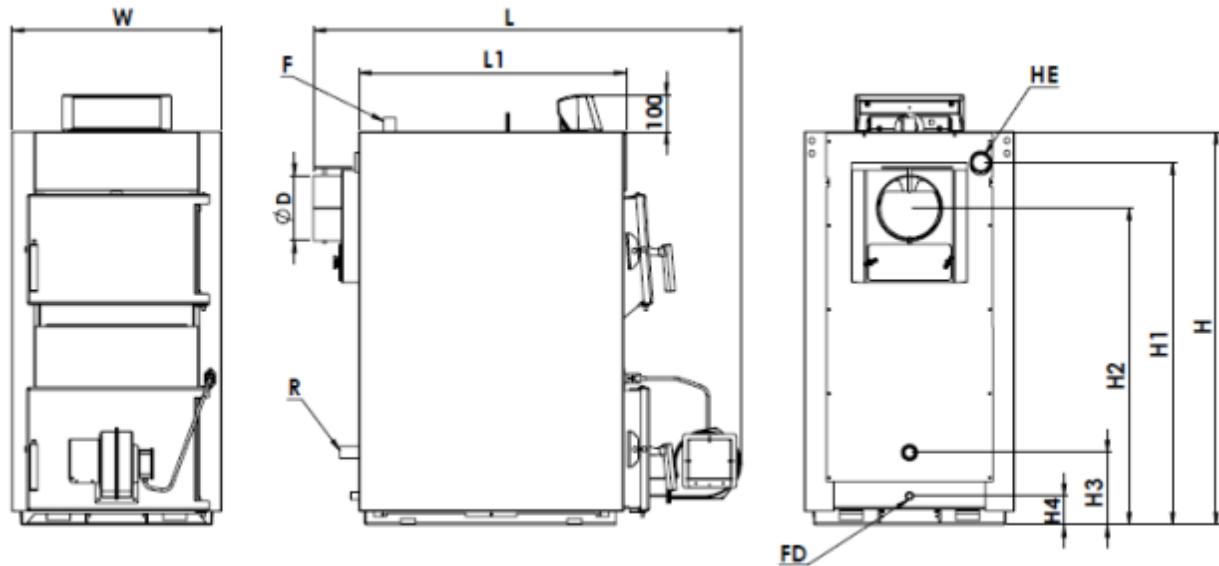
- Switch off the heating system.
- Close the doors leading to living areas.
- Ventilate the boiler room.

3 TECHNICAL DATA

Model		ECO-BURN F				
Types		EF 28	EF 35	EF 45	EF 60	EF 75
Description of boiler		Manually stocked, steel boilers, for solid fuels in 4pass flue circulation principle, (fanned flue)				
Output (wood, hard coal, lignite)	kW	28	35	45	60	75
Water content	lt	70	80	90	108	124
Net weight	kg	225	250	275	320	375
Total heating surface	m ²	2,6	3,1	3,6	4,1	4,9
Combustion chamber dimensions						
	Height	475				
	Width	330	420		480	
	Length	500		600		740
Combustion chamber volume	dm ³	78,0	100,0	120,0	137,0	169
Fuel loading clearance	mmxmm	330 x 215	420 x 250		480 X 305	
Maximum fuel loading height	mm	400				
Boiler body construction		Steel welded (S 235 JR)				
Boiler bottom grade construction		Cast iron (EN G.JL 200)				
Fuel loading		Manual				
Flue circulation principle		Horizontal 4-pass				
Control		Electronic with additional mechanical safety limiter				
Requested draught in chimney	Pa	12-16	14-18	16-22	20-30	25-35
	mbar	0,12-0,16	0,14-0,18	0,16-0,22	0,20-0,30	0,25-0,35
Temperature control range	C	50 - 90				
Maximum operating temperature	C	100				
Minimum return temperature	C	50 (recommended)				
Safety system activated at	C	95				
Maximum operating pressure	bar	2,5				
Flow/return connections (F/R)	R	1"			1 1/4"	
Connection for cooling loop (HE)	R	1 1/2"				
Filling / draining connection (FD)	R	1/2"				
External dimensions						
	H	1090			1180	
	H1	1000			1105	
	H2	875			980	
	H3	200				
	H4	80				
	W	490	580		640	
	L	1082		1182	1192	1310
	L1	640		740	740	880
	Flue outlet diameter (C)	160	180			
Electrical supply		232 V - 50 Hz				
Power consumption	W	82			88	

Fuel type		Wood				
Maximum fuel charge	kg	26	34	41	50	61
Requested fuel parameters		Maximum water content 20% Maximum cross section 10 cm x 10 cm Average calorific value 17.000 - 20.000 kJ/kg				
Flue gas mass flow	g/s	23,6	33,0	42,4	51,8	66

Fuel type		Hard coal, lignite				
Maximum fuel charge	kg	35	45	55	67	80
Requested fuel parameters		Maximum water content 15% Average size between 30 to 60 mm Average calorific value 26.000 - 30.000 kJ/kg				
Flue gas mass flow	g/s	35,4	49,5	63,6	77,7	99



4 BEFORE INSTALLATION

4.1. Handling the product

Eco-burn is a heavy product, and care should be taken when carrying the boiler to the room where it is going to be installed. The total weight of each boiler is indicated in Technical data section. Carrying equipments must be of enough capacity to support that weight.

4.2. Room selection

Eco-burn boiler must be installed in an individual boiler room particularly organized for heating. The boiler room should be of enough volume for installation, firing, and maintenance of the boiler. There should be enough fresh air circulation for combustion, the chimney design must ensure an adequate draught for related boiler type, and must comply with construction criteria given further in this manual and in mandatory regulations. Your boiler must never be installed in open spaces or balconies, in spaces occupied by people like kitchen, living room, bathroom, bedroom, in spaces where there are explosive and combustible materials.

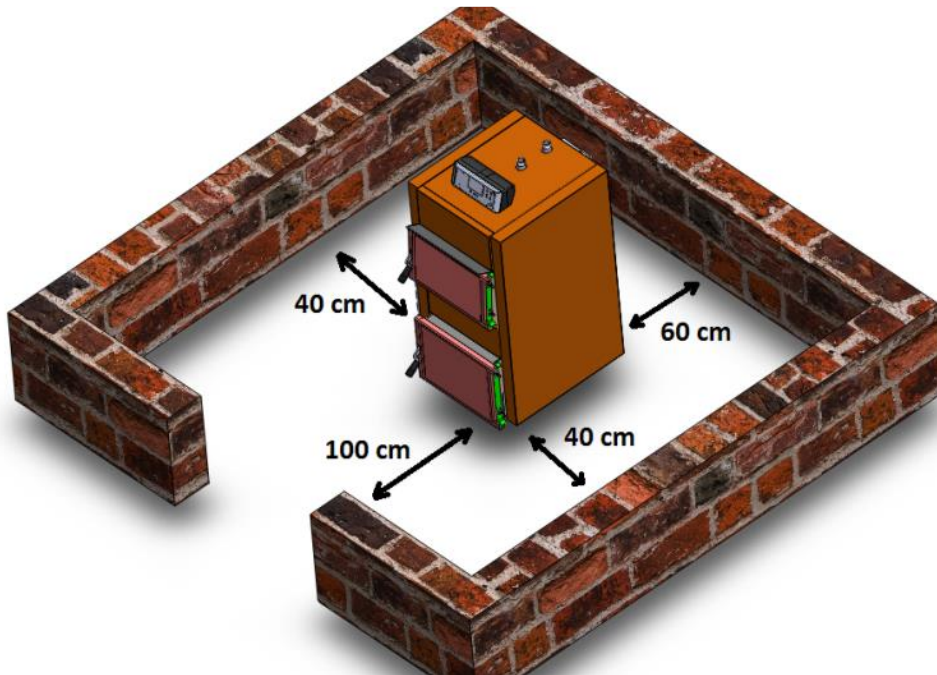
The boiler room should have air ventilation holes through outside to let fresh air in. One air ventilation hole must be built maximum 40 cm below the level of room ceiling, the other must be built maximum 50 cm above the floor level. These ventilation holes should always be kept open. The upper hole should be at least 40x40 cm in size, the lower hole at least 30x30 cm.

All hydraulic and electrical circuits must be arranged by authorized staff in accordance with mandatory regulations specified by legal organizations. Solid fuels should be stored by keeping minimum 800 mm distance from the boiler. We recommend you to keep the solid fuel in another room. Boiler should be installed on a concrete plinth made of a fireproof material. For minimum sizes of the plinth following table should be referred

Model	EF 28	EF 35	EF 45	EF 60	EF 75
Plinth height (mm)	50				
Plinth width (mm)	490	580		640	
Plinth length (mm)	650	650	750	750	900

4.3. Clearances around boiler

At least the following clearances should be achieved around the boiler:



4.4. Circulation pump

We recommend building a forced water circulation system accompanied with a sufficient pump. To size the pump, refer the boiler water side resistance level given in Technical data section, taking the other resistances created by the hydraulic circuit into account. Refer to the system diagrams given further in this manual to find the right position of the pump within the hydraulic circuit.

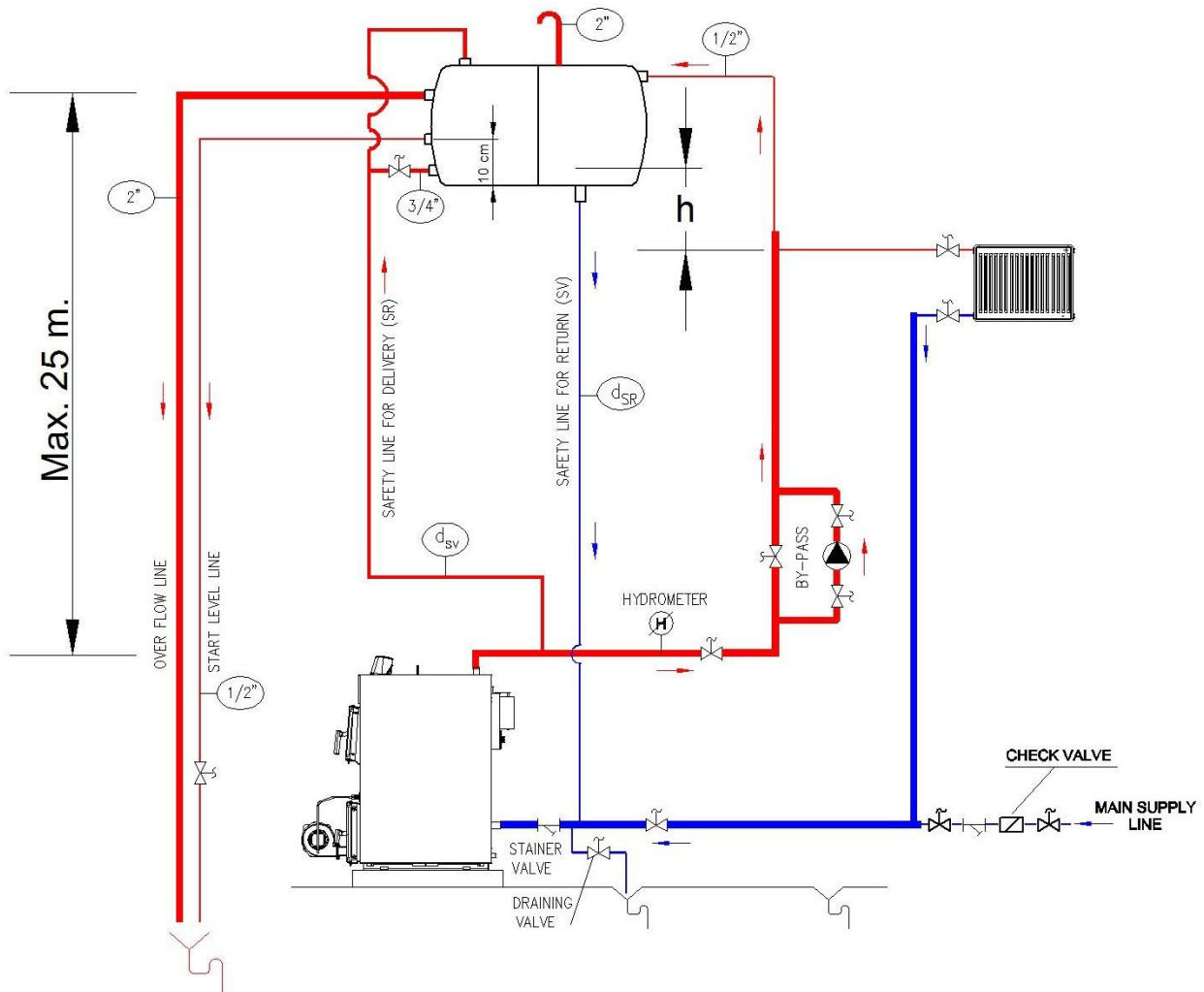
NOTICE

- Your boiler automatically switches the pump on and off according the program stored in its PCB. That is why heating circuit pump must be driven by the control panel. Wiring to the pump is supplied within control panel with indications. So, attach this wire to terminals of the heating circuit pump.
- The pump will automatically start when boiler outlet water exceeds 40 C., and will automatically swtich off when temperature falls below 40 C. This feature will help prevent boiler from condensation in flue.

5 INSTALLATION

5.1. Open vented hydraulic circuit

Kappa boilers are preferred to be installed in a hydraulic circuit with an open type expansion tank in accordance with the following schemes. The circulation pump may be installed on either delivery or return line of the boiler



Open type expansion tank must be installed at the highest level of whole hydraulic system. No globe valves must be installed on delivery and return safety lines between boiler and expansion tank. Safety lines should be attached to inlet and outlet lines of boiler at points as close as possible to boiler, using the shortest possible vertical way between expansion tank and boiler. If the circulation pump is installed on return line, and the head of pump at maximum speed is "h", the vertical distance (h) given in above scheme must be achieved within the system design (h, being the vertical distance between the top radiator of the circuit and bottom level of open expansion tank). If h is not achieved in such system, there will be air suction on radiators at highest level of circuit. In this case, the pump must be installed on delivery line from boiler.

A hydrometer must be installed on the delivery line to monitor the pressure level and to check if there is any leakage. The hydrometer should be purchased separately, and should be installed at the same level with the boiler outlet. A by-pass line should be installed between inlet and outlet connections of circulation pump in order to allow maximum water delivery when circulation pump is switched off and there is fuel fired in boiler, particularly during sudden electricity cuts off.

NOTICE

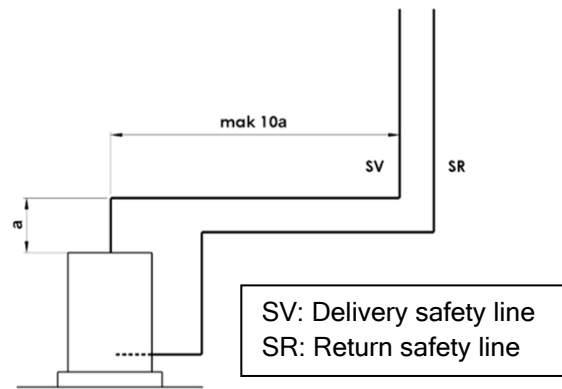
- The optional safety heat exchanger kit is highly recommended to be used with the boiler, even in the case of open vented systems to protect the boiler and the whole heating circuit against excessive heat accumulation. For installation of this kit, please refer to the next section.

NOTICE

- When water temperature in hydraulic circuit is relatively low, particularly when solid fuel is just fired, it is quite normal for water vapour in flue gases to condense. Condensation rarely creates a problem for boiler, as it will stop when boiler becomes hot. However, the boiler should not be operated in fully condensing mode. When you open loading door, if chamber walls are wet, it means that there is condensation in flue gases. Continuous condensation does not only creates massive soot on chamber heating surfaces, but also has effect on boiler lifetime. For this reason, we recommend you to set desired boiler outlet temperature not less than 60 C at all times.

5.2. Design parameters for open expansion tank

Expansion tank protects hydraulic circuit from excessive temperatures by allowing free volume for expanding water and keeping the water pressure from exceeding the static pressure. Expansion tank may be built in rectangular prism or cylindrical shape, may be installed in horizontal or vertical position in the system. Safety lines between boiler and expansion tank should be installed by an increasing slope up to tank. Following scheme shows the maximum vertical distances between safety lines and boiler:



The size of expansion tank can easily be calculated regarding the total expanding water contained in whole system. If the total volume of water in the system is V_s ; the volume of expansion tank should be:

$$V_g = 8 \cdot V_s / 100 \text{ (in litres)}$$

In more practical way, just using the nominal heat output of boiler (Q_k) in terms of kW, the volume of expansion tank can be calculated as;

$$V_g = 2,15 \cdot Q_k \text{ (in litres)}$$

Size of the safety line for delivery (in mm)

$$d_{SV} = 15 + 1,5 \cdot \sqrt{Q_k}$$

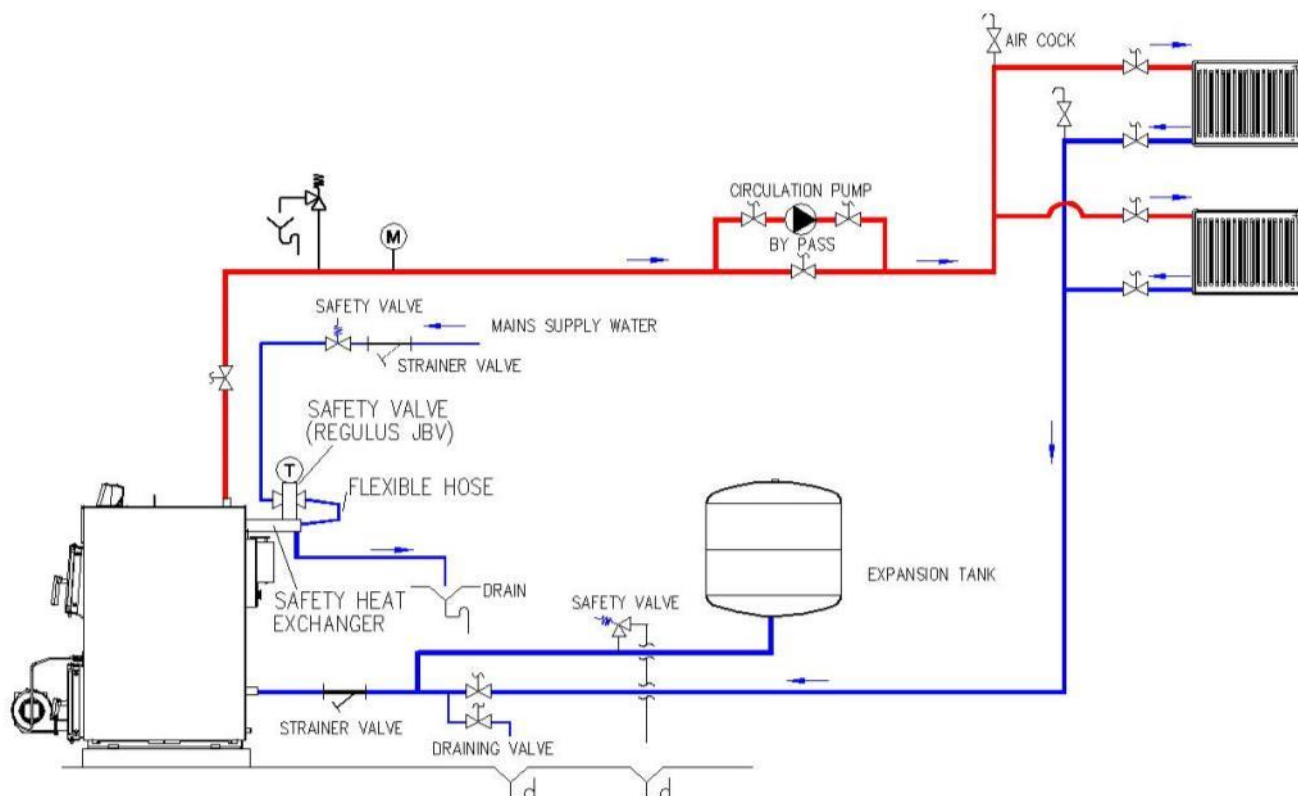
Size of the safety line for return

$$d_{SR} = 15 + \sqrt{Q_k}$$

where Q_k is the boiler output in kW.

5.3. Pressurized hydraulic circuit

Your boiler can be installed in a pressurised heating system if following scheme is referred with addition of the safety heat exchanger kit which is supplied as a separate accessory.



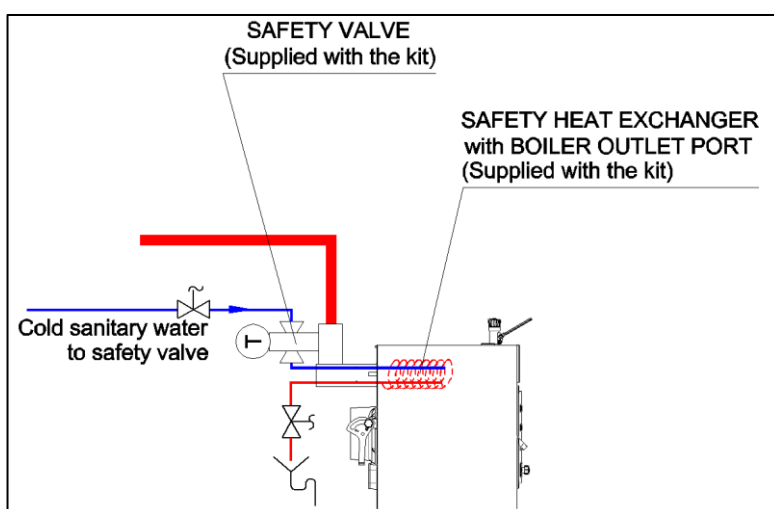
NOTICE – Safety of heating circuit

- Install a ½” safety valve with a maximum relief pressure of 2,5 bars.
- Install a manometer to follow and check water pressure in the system. When water is cold, system pressure should be set at 1 - 1,5 bars.

5.4. Additional safety against over-heating

To ensure safety against high temperatures on boiler and heating system, a cooling loop (safety heat exchanger) with activating valve must be installed. Safety heat exchanger includes the following items:

1. Safety heat exchanger (copper serpentine integrated with outlet stub pipe)
2. Safety valve
3. Auxiliary fittings / flexible hose



If the boiler water temperature exceeds 95 °C, thermostat of the safety valve lets cold sanitary water flows through the serpentine of the safety heat exchanger. Serpentine with cold water circulating inside cools down the boiler water temperature. When the boiler temperature decreases below the safe degree, safety valve shuts the cold sanitary water circulation, and the boiler goes back to normal operation.

NOTICE

- The valves on the sanitary connections of safety heat exchanger must always be kept open.
- Boiler can only be used with original safety heat exchanger kit which is tested and approved for each boiler model. The safety valve could be purchased separately if it is not included in the kit.
- Cold water must never be delivered directly to boiler inlet in order to solve overheating problems as this will result in serious damage on boiler body. That application will end the warranty of the boiler.

5.5. Warning on water level in system

After first water make-up in the system, minimum water level must be marked on hydrometer for open vented circuits, minimum water pressure level must be marked on manometer for pressurized circuits. Water level or pressure should be checked daily, and water should added to circuit if they are below the minimum value. During first water make-up, oxygen must be fully discharged from the system. Generally, oxidation will not be a problem, if all measures are taken into account during first water make-up. Oxidation will take place because of fresh water addition to the system during operation of the boiler. The main reasons are as follows:

1. In case of open vented systems, oxygen will be added as expansion tank is open to atmosphere. That is why, open expansion tank sizes, its position in the system, safety connections to and from, are very important, and instructions given in this manual for open vented systems should be followed carefully. Pressurized heating system is therefore much more resistant to corrosion. Pressurized system can be preferred, but the optional safety kit against over-heating must be utilized within the system.
2. Leak points in a system will cause oxygen to be absorbed inside the heating water. For this reason, minimum water pressure in a pressurized heating circuit must be above atmospheric pressure. Besides, pressure level should always be checked periodically.

5.6. Precautions for new installations:

System should be sized and designed accordingly, in order to minimize fresh water addition. Make sure that no part of the system is made of material that is permeable to gases. The original system filling water and any topping-up water must always be filtered (using synthetic or metal mesh filters with a filtration rating of no less than 50 microns) to prevent sludge from forming and triggering deposit induced corrosion. Minimum water pressure in a pressurized heating circuit must always be kept above atmospheric pressure

5.7. Precautions for a new boiler installed in an old system:

In old systems used for a long time, a protective coating (black magnetite) has been built on all metal surfaces contact with water. This coating protects the system against further corrosion. When a new boiler is installed in such an old system, new parts with clean metal surfaces, particularly boiler surfaces will inevitably become sacrificial anode for the entire heating system, in other words, they come in the first place where corrosion starts. That is why, following precautions should be added to those given above, for a new boiler in an old system:

1. If the old system has an open expansion tank, this may be converted to pressurized system with all necessary safety measures.
2. The old system must be fully washed up from all substitutes and particules contained on the surfaces.
3. An air separator with manual vent should be installed at the highest level of the circuit.

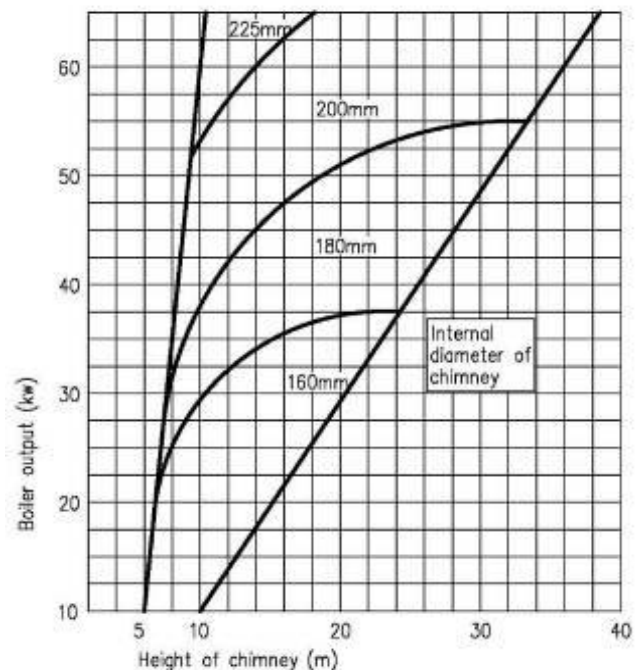
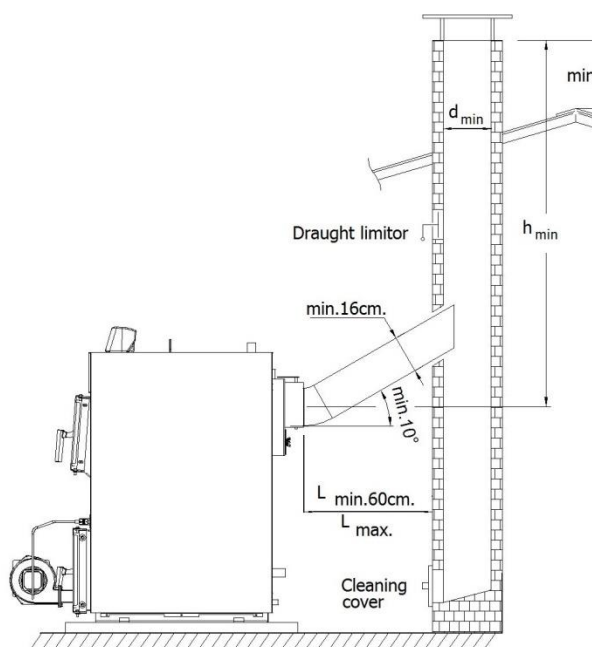
5.7. Chimney connection

Your boiler must be connected to an individual chimney that will provide at least the minimum draught requested. The flue canal between the boiler and the chimney should be insulated using a glass wool material. The flue canal to chimney and chimney must be made of steel or an equivalent material that can be used at temperatures around 400 °C.

All connections on flue system must be sealed in order to perform a good combustion and efficiency. The flue canal must be connected to the chimney using the shortest way possible and in accordance with the dimensions given in the following scheme. Horizontal connections and equipments that will increase the pressure loss such as elbows should be avoided

A vertical single steel piping should not be used as a chimney. Chimney must be made of one internal and one external surface. External surface may be made of steel or brick. For internal surface stainless steel chimney elements should be preferred against corrosion. The space between internal and external surfaces of the chimney should be insulated to prevent condensation in flue gasses.

At the lowest level of chimney, there should be a cleaning cover which is made of steel, and sealed for any leakage. The length of flue canal between the boiler and the chimney should not exceed $\frac{1}{4}$ height of chimney.

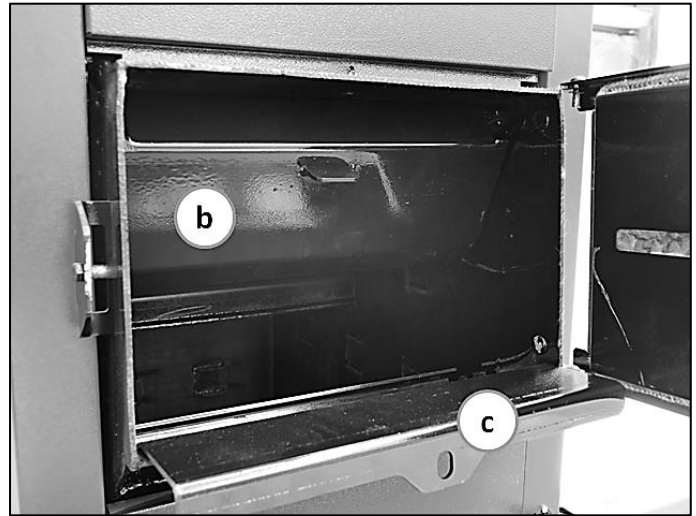
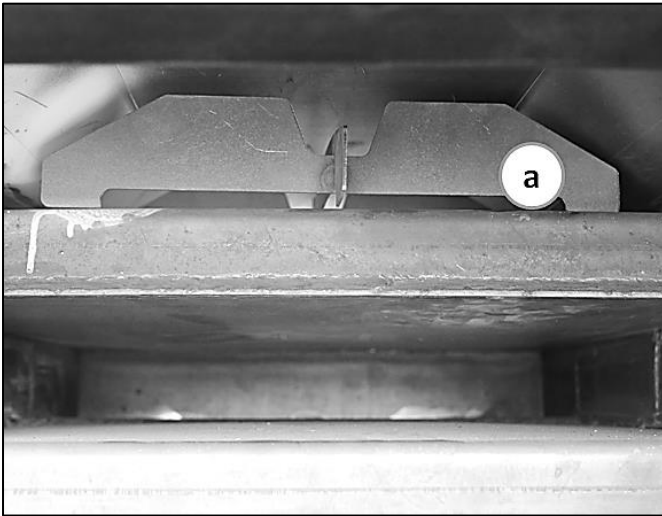


6 ASSEMBLY INSTRUCTIONS

6.1. Boiler accessories

Follow the instructions to finish the assembly of boiler accessories supplied together with the boiler

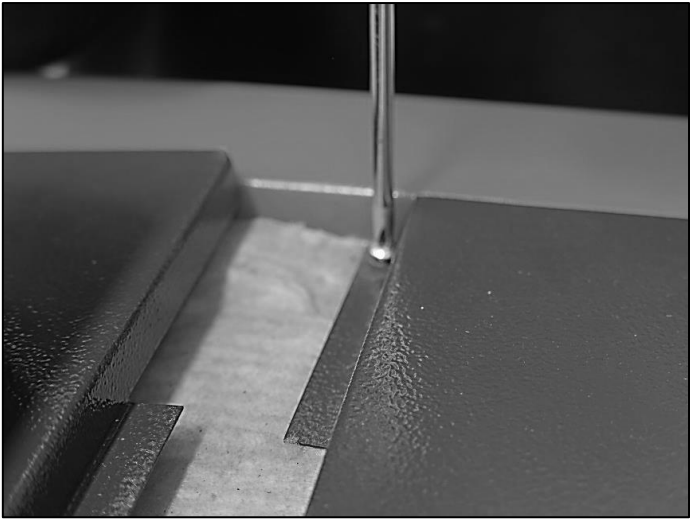
1. First check the following items of heat exchanger;
 - a. Position of flue retarder inside the 4th passage
 - b. Position and free movement of flue separator. When you open the loading door, this part freely move forward, keeping most of smoke inside the boiler.
 - c. Opening/closing of combustion chamber shield (this part seals the combustion chamber preventing flame moving toward the loading door, when there is flame in the boiler). Pull this shield forward prior to fuel loading.



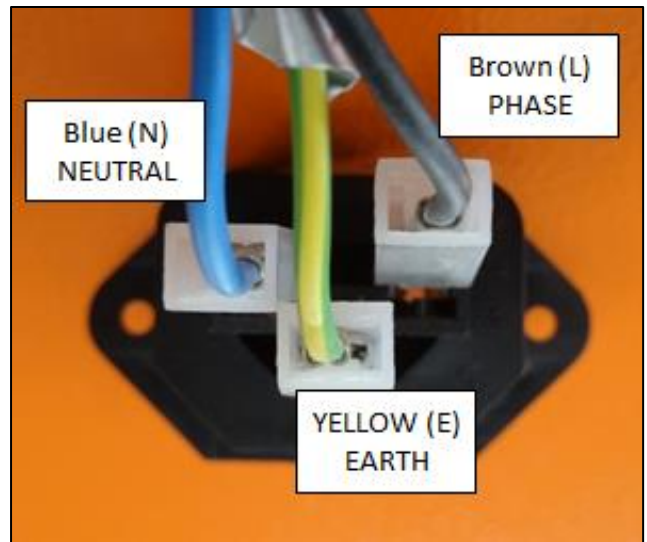
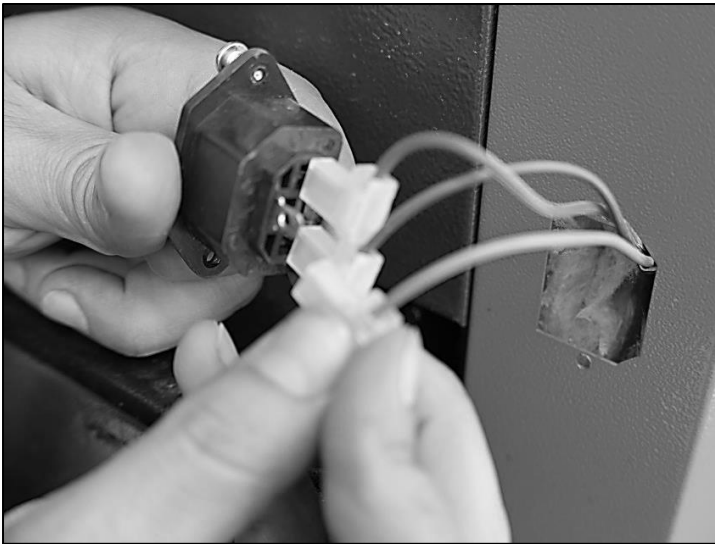
2. Loose self tapping screw that fix top panel front piece to boiler body, and pull this panel forward. Control panel has three sets of wiring for different equipments and sensors. Pass those three wiring sets through corresponding holes cut on the top panel as seen in the following pictures.



3. Loose self tapping screws that fix top panel to side and rear casings. Loose self tapping screws that fix the left hand side panel to boiler body, move this jacket a bit to lthe left to create space to work on wiring to the fan in the front. Draw the wiring to the fan, routing it around boiler insulation board, and passing it through the space for fan plug cut on bottom level of left hand side panel.

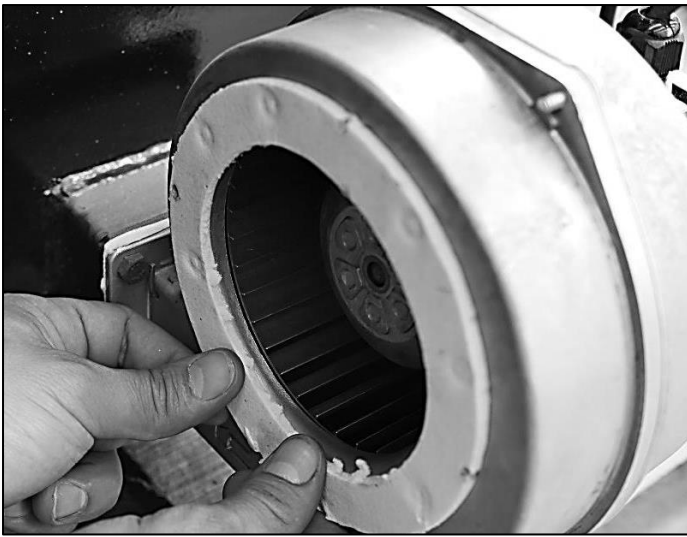


4. Attach isolated terminals of fan wiring to the female plug supplied together with the boiler package. Make sure that you are connecting the right wire to the right terminal on female plug. Follow the matching given in following picture. Fix female plug for fan wiring to the left hand side panel by self tapping screws supplied with accessory pack.



5. Fit the fan onto fan adaptor on lower front door placing a ceramic paper gasket supplied with accessory pack. Fix the fan with 4 pieces of M6 x 20 setscrews and M6 nuts. Attach the male power plug of the fan to the female plug on the left hand side panel. Fit fan air inlet box onto inlet section of the fan, placing the ceramic paper gasket between fan inlet section and air inlet box. Ensure that air flap inside the box freely moves up and down.





Notes for wiring:

Wiring type

- To the fan
- To the pump
- To the mains
- To bi-metal safety limiter
- External burner (pellet)
- Room thermostat

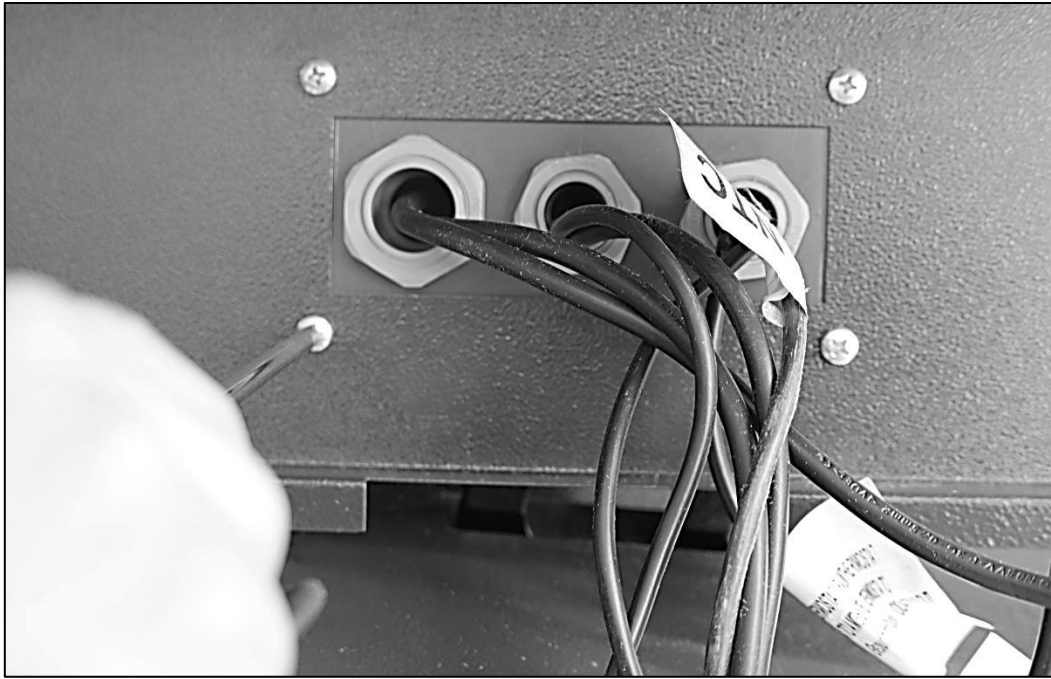
Identification at the end of the wire

- FAN / TO BLOWER FAN
- POMPA / TO PUMP
- BESLEME / TO MAINS
- EMNIYET / SAFETY LIMIT THERMOSTAT
- TO EXTERNAL BURNER
- ODA TERMOSTADI / ROOM THERMOSTAT

6. Insert NTC sensor into the pocket in front of outlet pipe. Attach two ends of wiring to bi-metal thermostat onto the two terminals on the thermostat as seen on the following picture. Draw wiring to mains and heating circuit pump through cable clips and secure the cable and clips together on the side panel of the boiler as shown on the following picture.



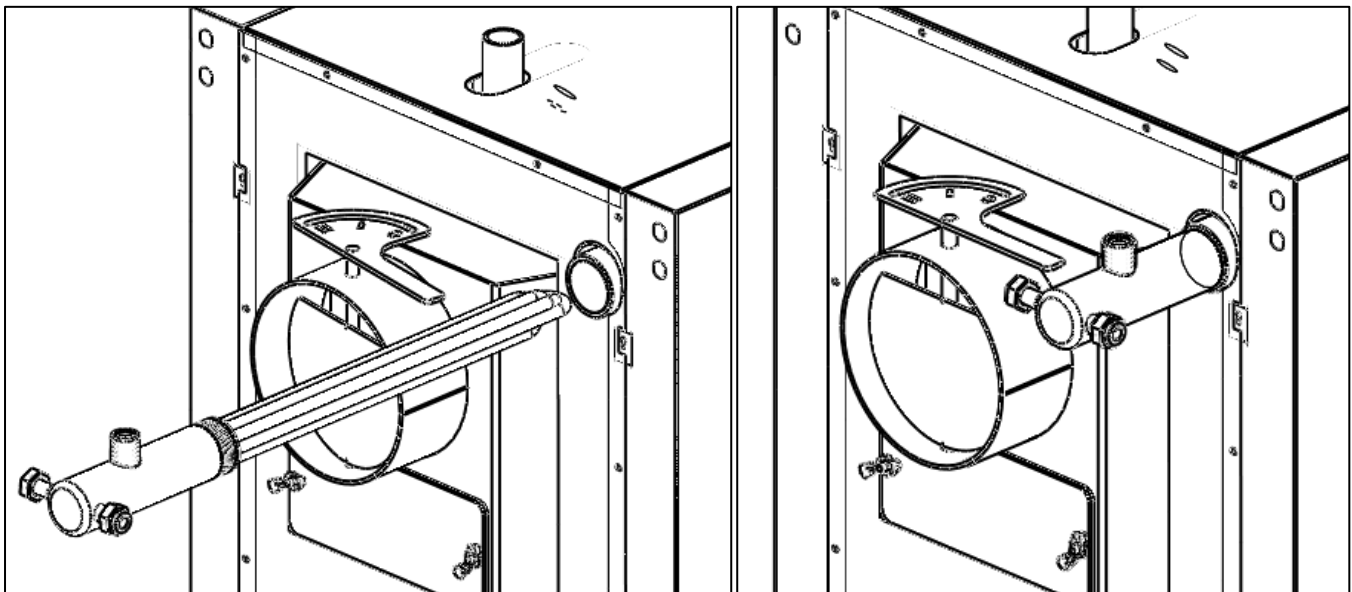
7. Fix control panel onto top external cabinet with supplied M5 setscrews. Re-fit all external cabinet back to their original positions



6.2. Safety exchanger

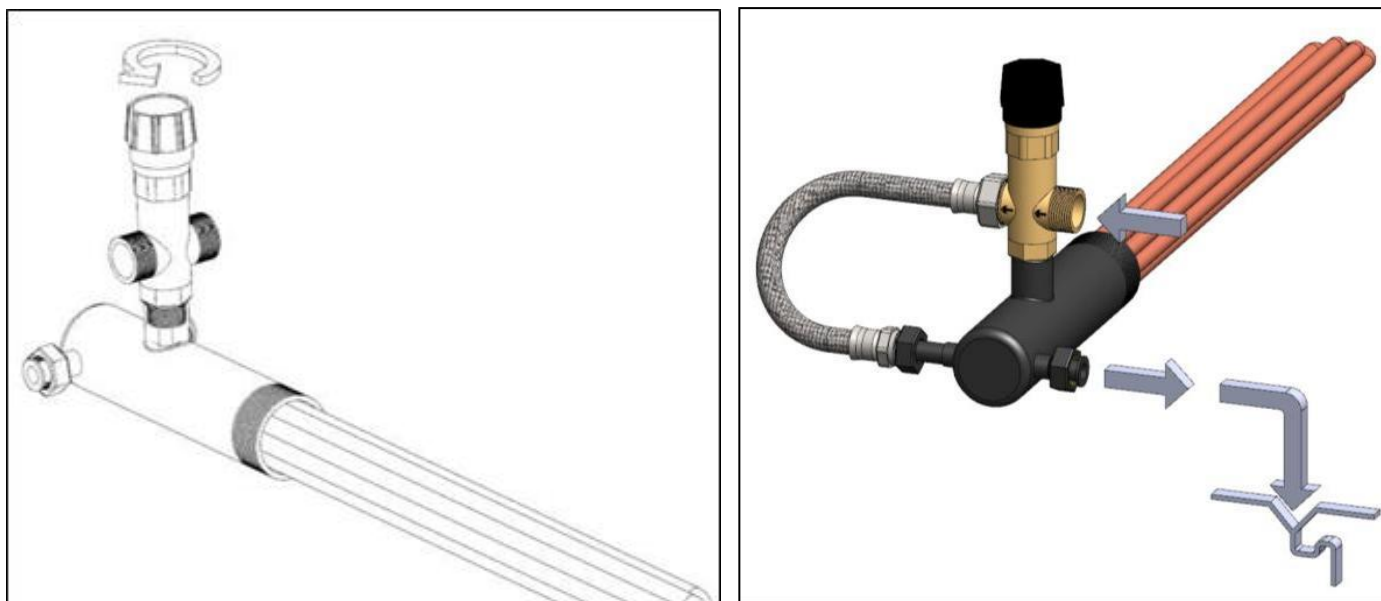
Safety heat exchanger is used to save the boiler in case of overheating. In case of electrical cutout, pump defect etc. boiler water temperature may be overheated. If the boiler water temperature exceeds 95 °C, thermostat of the safety valve lets cold sanitary water flows through the serpentine of the safety heat exchanger. Serpentine with cold water circulating inside cools down the boiler water temperature. When the boiler temperature decreases below the safe degree, safety valve shuts the cold sanitary water circulation, and the boiler goes back to normal operation. For installation of safety kit refer to following instructions:

1. Install the safety heat exchanger into the 1 1/2" port on upper right hand side at the back of the boiler. After the installation, 1/2" port of cooling loop which is going to be used for safety valve installation should be positioned at the top.
2. Install the Regulus JBV-1 safety valve into 1/2" port.



3. Attach the flexible connection hose supplied with the kit between outlet port of safety valve and one of ports of safety valve in respect with the flow direction shown on valve body.

4. Finally, attach cold water supply line to inlet port of safety valve, and drain the other port of the safety heat exchanger.



NOTICE – Electrical wiring

- The boiler is fed with 220 V. A regulator must be used in installations where the power supply is below 205 V or above 230 V.
- Control panel should be connected to a wall plug with an efficient ground system, which is placed not far more than 50 cm. to boiler with a circuit breaker which has at least 3 mm gap between contacts. For this reason, if a new electrical installation is required, 3x1,5 TTR cables must be used.
- All electrical installations must be carried out by authorized persons in accordance with mandatory regulations and codes of practise.

THIS APPLIANCE MUST BE EARTHED !

7 OPERATING INSTRUCTIONS

7.1. Pre-firing checks

Before first operation of boiler right after installation, hydraulic circuit must be ready for operation. To fill an open vented circuit, the valve on start level line from expansion tank is opened, and the circuit is filled with main supply water. During filling the system all valves and accessories on the lines must be checked for leakage. Filling is stopped, when water from start level line is observed, closing the valve on this line. Right after that, the hydraulic pressure is marked on screen of the hydrometer. This will make re-filling operations during heating season much easier, just feeding the system with fresh water until the hydraulic pressure on screen reaches the pre-marked value.

Before every firing make sure that;

- * Boiler and circuit are filled with water, and the hydraulic pressure is in the required range.
- * All valves on the line (except by-pass lines and start level line) are in open position.
- * There is enough draught in chimney.
- * There is electricity in front of the control panel inlet. Panel is in STAND-BY mode.

To fill a pressurised circuit, feed the fresh water from main supply line using either the filling/drilling tap connection on the boiler rear section, or the feeding line constructed within the circuit. To purge the air contained in the system, use air relief valves on the hydraulic circuit, on the radiators, and also spring pressure relief valve at boiler hot water outlet.

7.2. Firing

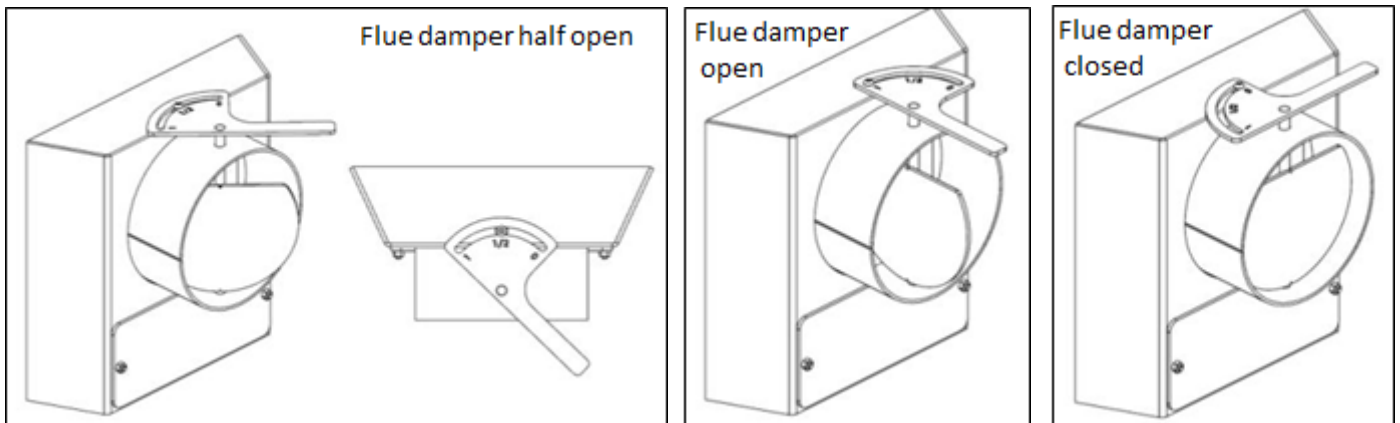
1. Set the kindling. Place fire starters, crumpled newspaper (3 or 4 sheets balled up fairly tightly) on the grate of the boiler. Place small kindling over the paper or starter. The more dry, small kindling you have - the easier and better the fire will start. Crisscross the kindling so there is plenty of air space in between each piece. Wood that is packed too tight will not burn properly. Set larger wood on top of the kindling, and continue to set larger and larger pieces on top until the fuel exceeds the 1/3 level of the filling chamber.
2. Ensure that the chimney damper is open. For air entrance, leave the lower front door open for a while. Then light the newspaper on the bottom.
3. After first ignition, turn on the control panel by pressing ON/OFF button. Follow the instructions in the next chapter given for control panel. Close the front lower door.
4. The fire should be well established within approximately 15 minutes, then filling chamber can be loaded completely but check to make sure that the firefighters have not been extinguished.
5. Keep the fire going always keep a "flame" on your fire - a smoking or smoldering fire is a cold and inefficient fire and also produces pollutants and creosote (tar in the chimney)

WARNING

- Never let the boiler water temperature reach high values sharply with leaving control panel switched off. In this case, instant cold water delivery to hot boiler may result in cracks on boiler body due to high thermal energy.

7.3. Chimney (flue gas) damper

Your boiler has fan assisted combustion. Air for combustion is forced to enter the combustion room. As the speed of the fan is controlled and modulated by control panel, the boiler itself adjusts the air flow. However, you can use the flap (or damper) on the boiler smokehood to adjust the draught at flue.



7.4. Control panel user interface

Control panel has following features:

- 1) Displays:
 - a) Actual boiler temperature
 - b) Set boiler temperature
 - c) Fan operation mode and speed
 - d) Circulation pump status
 - e) Warning and failure indications
 - f) Set parameters in sub-menus
 - g) Boiler operation function (manual, auto, ECO, Night-mode)

- 2) Allows adjustment of following parameters in "MENU" mode:
 - a) Boiler set temperature (between 60 to 90 °C with 2 °C intervals)
 - b) Fan speed in manual mode
 - c) Maximum fan speed in auto mode (if needed)
 - d) Night mode stop and run time re-set (if needed)
 - e) Fan safe over-run working parameter (if needed)

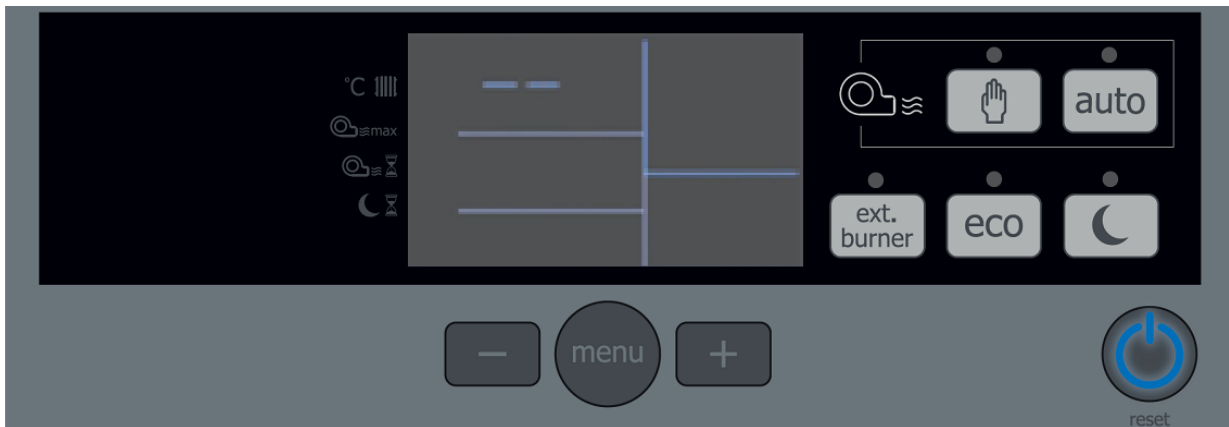
- 3) Controls:
 - a) Boiler temperature according to set value
 - b) Auto operation of CH pump
 - c) Modulation of fan speed for optimum efficiency (in "FAN AUTO" mode)
 - d) Room thermostat option
 - e) External burner (preferably as pellet burner) ON/OFF control

- 4) Safety features:
 - a) If boiler temperature reaches up to 100 C for any reason, fan is shut-off, CH pump is kept in operation. Panel warns the user by an audible buzzer alarm. If boiler temperature falls below 95°C again, buzzer alarms switches off, boiler switches back to its normal operation.
 - b) External safety bi-metal thermostat for additional safety which is activated if boiler temperature is over 110 °C. This thermostat is of manual reset type due to European regulations.
 - c) High current protection fuse, cut outboard on rear panel of the control box.
 - d) All settings are stored in the memory of electronic board even in case of electricity cut-off

- 5) Energy-saving functions:
 - a) Circulation pump is switched off below boiler temperatures of 40 °C. This will also protect the boiler against excessive condensation (this parameter can be re-set)
 - b) Fan speed modulation in respect with desired boiler temperature saves energy and fuel.
 - c) ECO mode automatically shifts set boiler temperature down to 50 C and saves fuel
 - d) NIGHT mode keeps the boiler in minimum flame without stopping during the times when there is no need for high temperatures. This will save energy and there will no need to re-fire the boiler in the morning.

7.5 Stand-by mode

When the mains is attached, the control panel has following view in STAND-BY mode. Boiler ON/OFF led is on, but no number is shown on the display:



7.6. Operation mode

When loading wood logs and starting fire, you can leave the control panel in STAND-BY mode. When you have continuous flame, switch the control panel on by pressing ON/OFF button.

7.7. Turning on the panel

By pressing "ON/OFF button" for three seconds, control panel is switched on. LCD display is lit and, actual boiler temperature is displayed. During first ignition, you can run the fan in manual mode. By pressing fan manual button, you can set fan speed at minimum level to help the fire become alive in short time.



7.8. Fan operation mode setting

You can set the speed of the fan manually at 5 steps, or you can leave fan in "AUTO" mode, in that case, fan speed is modulated by the electronic board in accordance with boiler set and actual temperature.



When control panel is switched on, fan will automatically work in the last mode left. By pressing FAN CONTROL buttons "manual" or "auto" you can select in which mode fan will operate.

Fan in manual mode: When this button is pressed, fan will continuously work at selected constant speed:

- If pressed once: Fan will be ON and speed will be minimum
- Twice: 2nd stage
- Third: 3rd stage
- Four times: 4th stage
- Five times: Maximum speed
- Six times: Fan will be OFF again

Fan in auto mode: When this button is pressed, other mode is cancelled, and fan starts to operate in modulated mode in respect with boiler outlet temperature by the help of written software.



7.9. Boiler outlet water temperature setting

You can set desired boiler outlet water temperature as follows:

- Press MENU button once
- The icon which points the setting parameter will blink
- You can increase or decrease the desired outlet water temperature by pressing the buttons on right or left side of the MENU button



NOTICE

Short-cut for thermostat setting:

You can just press (+) or (-) buttons to set the desired boiler outlet water temperature without entering the MENU.

Boiler outlet temperature can be set between 60 °C to 90 °C, with 2 °C intervals.

If you press MENU button once again, thermostat setting will be over, and the menu switches to the next set parameter sub-menu. Control panel leaves the MENU mode if you wait for 10 seconds without pressing any button, and goes back to normal operation

7.10. Fan maximum speed setting (for FAN AUTO mode only)



You can set the maximum speed of the fan if you choose "fan operation mode" as auto as described in the previous page. Control panel allows you to set the maximum speed in fan modulation mode. If you feel the air is too much for your chimney installation and fuel to be loaded, then you may decrease the maximum speed of fan. In this case, fan will be operated between minimum speed and the maximum new speed you set. This feature will help the boiler save on fuel consumption.



To re-set the maximum speed of fan:

1. Press MENU button twice
2. The icon which points the setting parameter will blink
3. You can increase or decrease the new maximum speed between 3 and 5 pressing the buttons on right or left side of the MENU button

If you press MENU button once again, thermostat setting will be over, and the menu switches to the next set parameter sub-menu. Control panel leaves the MENU mode if you wait for 10 seconds without pressing any button, and goes back to normal operation.

7.11. Auto fan switch-off feature



When power is turned on by ON/OFF button of control panel, fan will automatically start no matter what the boiler temperature is. Then, fan will be operated according to your adjustments, that is modulated by electronic board between a minimum speed and a maximum default or re-set speed by the user. Fan is automatically switched-off when desired boiler outlet temperature is reached.

If boiler outlet temperature falls below 40 °C, electronic board keeps on operating fan as long as a pre-set safety time is elapsed. If boiler temperature does not exceed 40 °C again during this safety time, then control panel assumes that there is no fuel in combustion chamber, and fan will be switched off. After this safety time, if boiler outlet temperature is over 40 °C again for any reason, fan will be switched on again. However, we recommend that you should reset the control panel by pressing ON/OFF button ONCE in that case.

Default value for safety time is 45 minutes. But you can re-adjust this safety time between 5 minutes to 90 minutes by 5 minutes intervals. To re-adjust safety time:



1. Press MENU button three times
2. The icon which points the setting parameter will blink
3. You can increase or decrease the new over-run time between 5 and 90 minutes pressing the buttons on right or left side of the MENU button

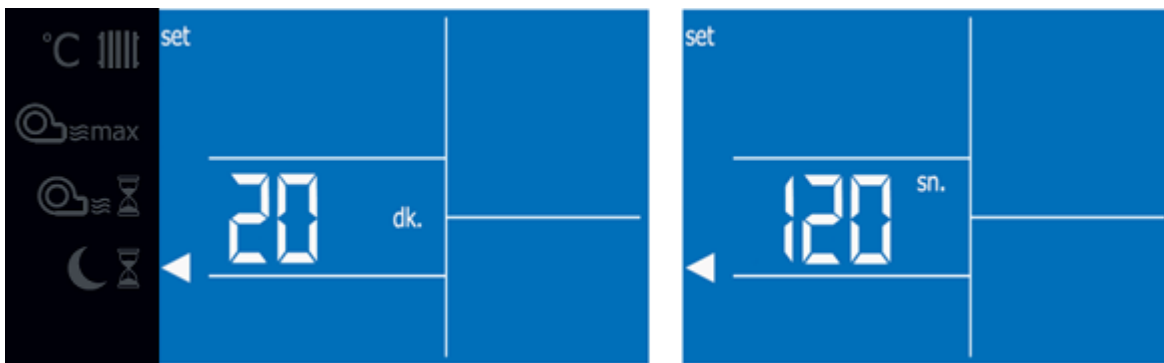
NOTICE

Pump will operate as long as boiler outlet temperature is above 40 C. Pump is always kept switched off when boiler temperature is below 40 C, in order to prevent condensation and save energy. Control panel does not allow re-set on pump start temperature.

7.12. Night (sleep) mode adjustments



You can use night mode if you do not need to warm the radiators and if you will not stop the boiler permanently. Using this feature you can have a small fire bed in combustion chamber, and you do not have to start-up the boiler from the very beginning. In this mode, fan is switched ON and OFF in respect with a pre-set duration so that it will only operate to maintain a minimum flame in the combustion chamber. According to factory set values, when this mode is activated, fan operates 120 seconds, and stops for 20 minutes. You can re-set this time intervals within the MENU. To re-set ON and OFF time intervals:



1. Press MENU button four times. The icon which points the setting parameter will blink
2. You can increase or decrease the OFF time between 10 and 40 minutes pressing the buttons on right or left side of the MENU button
3. Press MENU button again. The icon which points the setting parameter will blink
4. You can increase or decrease the ON time between 60 and 240 seconds pressing the buttons on right or left side of the MENU button

7.13. Slowdown the combustion

You can slowdown the combustion by:

1. Decreasing set value of boiler outlet temperature or switch control panel to ECO mode
2. Closing flue damper on smokehood to half closed or fully closed position (in case low fire bed)

You can combine the steps of 1 and 2, or if you do not want to warm your room you can set the control panel to NIGHT mode.

7.14. ECO mode



You can use ECO mode to shift boiler outlet temperature down to 50 C, if you do not need to much heat in your room instead of decreasing set temperature on the menu. If you want to leave ECO mode, and go back to standard operation just press ECO button once again.

7.15. NIGHT mode



If you want to activate NIGHT mode, just press NIGHT mode button on the control panel. When this mode is selected fan is switched to manual mode at the third speed level. As described above, we recommend you to activate this mode specially during night times when you do not need to heat up the radiators. If you want to leave NIGHT mode, and go back to standard operation just press NIGHT button once again.

7.16. External burner



You can install a pellet burner in respect with the information and recommendations given by your authorised re-seller in your territory. Only approved pellet burners for selected Caltherm F boiler models are allowed to use on this boiler. Manufacturer or re-seller do not hold any responsibility caused by improper application of any external burner.

A clear contact to switch pellet burner ON and OFF in respect with desired outlet temperature is supplied within the control panel. The burner will operate according to its own software when switched ON. Pellet burner is installed on lower front door of the boiler. You do not have to remove the combustion fan which is on the left hand side of the boiler. You can activate pellet burner just by pressing the EXT.BURNER button on the control panel, then the boiler will operate according to pellet fuel. To switch back to operation with wood or coal, just press FAN MANUEL of FAN AUTO buttons.

NOTICE

If you fire wood or coal we recommend you to remove pellet burner from the front door to prevent any damage on the burner

7.17. Safety shut-offs

If boiler temperature reaches up to 100 °C for any reason, fan is shut-off, CH pump is kept in operation. Panel warns the user by high temperature icon on LCD an audible buzzer alarm. If boiler temperature falls below 95 °C again, buzzer alarms switches off, boiler switches back to its normal operation.

If boiler temperature reaches 110 °C, it means that there is a problem on control panel's PCB or sensors. In that case, an additional safety thermostat stops the boiler operation for an external safety. Sensing bulb of safety thermostat is attached on the boiler hot water outlet pipe, under the top panel of the boiler, and its reset button is outboard on top panel under a plastic cap. If boiler temperature is above 110 °C, fan is switched OFF, but pump is kept ON in order to protect the system against very high temperatures. E1 failure code appears on LCD. In this case, we recommend you to call for a service agent to check the control panel and its associated equipments. The safety thermostat is of manual reset type, and therefore it must be manually reset right after the problem is solved. Then the control panel is reset by pressing ON/OFF button once.

7.18. Turning off the panel

Control panel is turned off by pressing ON/OFF button. Never turn off the control panel when there is fire in combustion chamber.

NOTICE

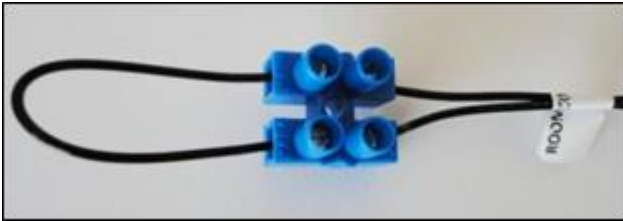
Before opening the front door for fuel addition in combustion chamber, we recommend you to switch off the fan by pressing FAN CONTROL button. After closing the front door, switch on the fan again.

NOTICE

After each combustion period, before loading combustion chamber and ignition, the control panel must be reset by pressing ON/OFF button.

7.19. Room thermostat

You can install a room thermostat between the short-cut terminals of room thermostat contact outboard the control panel. If you do not use a room thermostat, leave this wire bridge as it is. When requested room temperature by room thermostat is reached:



1. Fan and pump are switched off
2. In the meantime, if boiler temperature exceeds 75 C, pump will start and, be in operation until boiler temperature is below 70 C again

7.20. Warning on fuels

Different fuels require different fresh air volumes for combustion. That is why control panel has some features to adapt the fan speed for the fuel types used for boiler. For example, if you use wood logs as a fuel, boiler will require less air than it needs for combustion of black coal and lignite.

Fuels must comply with the specifications given in the technical data section. The manufacturer will not be held responsible for the problems due to lack of fuel specifications, use of fuels not suggested for this boiler.

7.21. Lack of chimney draught

If there is lack on chimney draught or there is no draught at the chimney (such as badly built, uninsulated, blocked etc) you may face combustion problems (no fire, excessive smoke, condensation due to cold flue gasses). In this case, we strictly recommend you to have your chimney controlled by an expert, and fix any irregularity.

7.22. Failure codes and indicators

<p>code E1: High temperature. Bi-metal safety thermostat stopped the boiler code E2: NTC sensor fail</p> <p> High temperature warning</p> <p> No fuel warning</p>	
---	--

8 HEALTH AND SAFETY INFORMATIONS

8.1. Control of substances hazardous to user health

For the type of material and where used in your boiler refer to the following chart

1. PAINTS:

General purpose black undercoat	NOT APPLICABLE
High temperature black coating	Boiler body Boiler doors
Powder coating	All external panels

2. INSULATION AND SEALS

Rock-wool insulation board	NOT APPLICABLE
Glass-wool insulation board	Boiler body Front and rear panels
Fibre-glass rope and tape	Front door
Ceramic-fibre board	Front door
CFC free polyurethane spray/foam	NOT APPLICABLE
Refractory brick	NOT APPLICABLE
Asbestos products	NOT APPLICABLE

3. SEALANTS

High temperature adhesive	Front doors
Fire cement	NOT APPLICABLE
Gas jointing compound	NOT APPLICABLE

NOTICE

Paints, sealants, ceramic-fibre boards

1. These materials contain organic solvents and should be used in well-ventilated area away from naked flames. Do not allow to come into contact with the skin, eyes, inhale or swallow.
3. Use barrier cream or gloves to protect the skin, and goggles to protect the eyes from accidental contact.
4. Small quantities can be removed from clothes or skin with a proprietary paint remover or hand cleaning product.
5. If inhaled, remove sufferer into fresh air, if swallowed clean mouth with and drink fresh water but do not induce vomiting. If in the eye, irrigate the eye with clean water and seek medical attention.

NOTICE

Devices under pressure

1. Avoid contact with the parts of heating system under pressure during operation of the boiler. These dangerous parts are:
 - Boiler body
 - Boiler inlet and outlet lines
 - Safety lines
 - Pressure relief devices installed on heating system
2. Never attempt to drain water from heating system when the boiler is being operated
3. Never feed the boiler directly with cold water to cool it down for any reason, when the boiler is hot.

WARNING on high temperature surfaces

Avoid contact with parts and surfaces having high temperatures (working surfaces) which will be hazardous for human such as:

1. Boiler front doors
2. Ash door
3. Water delivery and return lines (even if isolated), safety lines
4. Flue spigot
5. Connection between flue outlet and chimney
6. Circulator pumps, expansion vessels

NOTICE

Flue gases

1. There could be a little gas release from the front side of the boiler, when the front loading door is opened. Never breathe this gas flow.
2. When adding solid fuel when there is active fire bed inside the combustion chamber, protect your hands and face. If needed wear protective gloves.

NOTICE

Firing fuel

1. Do not take the firing fuel out from the combustion chamber while it is still burning
2. Do not try to put the firing fuel off using water or any other liquids.
3. Do not leave the front doors and fire door open when there is fire inside the combustion chamber
4. To slow down or stop the fire, switch off the control panel, and flue outlets..
5. Your boiler can only be fired with the solid fuels whose characteristics have been given in Technical data section. Never use any other solid fuel that would be harmful for boiler section design, any liquid or gaseous fuels.

9 MAINTENANCE AND CLEANING

9.1. Periodic inspections

- * Check the water level or pressure. The hydrometer must be marked after first filling of the boiler. So water level can be checked regularly. If the water level or pressure is under the level of static pressure or the system set-up, a water make-up is needed. The make-up water should be softened according the local regulations before feeding into the system to prevent corrosion inside the heating circuit and the boiler.
- * Front doors of the boiler should be checked for properly closing. Fibre-glass ropes must be replaced if necessary.
- * Check if there is flue gas leakage from the chimney connections of the boiler, and have it fixed if necessary.
- * Check the condition of refractory inside the front door. If it is damaged, you will have higher surface temperatures on front doors. In this case the door should be replaced to save energy and prevent further crack.
- * Check wiring to control panel, and wiring from control panel to heating circuit pump and fan.
- * Check gasket in front of the fan
- * Check gasket behind the rear cleaning cover.
- * Check opening and closing of air flap in air inlet box in front of the combustion fan.
- * Check the heat transfer surfaces of the boiler. The soot formation will change according to fuel type you use, and the combustion air amount. So if you feel that the outlet water temperature can not reach the usual values with the same conditions, heating surfaces therefore should be cleaned

9.2 Boiler cleaning

Before cleaning the boiler, switch off the control panel and other electrical appliances in boiler room off. Detach the control panel electrical supply from the mains. To clean the boiler:

- * Remove flue separator behind the upper loading door.
- * Remove flue gas retarder from 4th flue gas passage
- * Clean all heating surfaces using the brush supplied with the boiler.
- * Clean the air inlet passages of the bottom grate using fule shaker arm.
- * Collect all soot deposits inside the ash tray and the smokehood.
- * Remove the disposals.

9.3. Maintenance

Before each heating season we would recommend you to call for the contracted service agent to check the boiler, heating system, electrical connections, and chimney conditions. Do not attempt to carry any maintenance work without getting help from qualified people.

9.4. Safety heat exchanger

- *The valves on the sanitary connections of safety heat exchanger must always be kept open.
- *This boiler can only be used with original safety heat exchanger kit which is tested and approved for each boiler model.
- *Cold water must never be delivered directly to boiler inlet in order to solve overheating porblems as this will result in serious damage on boiler body. That application will end the warranty of the boiler.

START-UP / COMMISSIONING FORM

1/2

END-USER INFORMATION

NAME / SURNAME	:	_____
ADDRESS	:	_____
CITY / PROVINCE	:	_____
COUNTRY	:	_____
E-MAIL / GSM	:	_____
SIGNATURE	:	_____

PRODUCT INFORMATION

PRODUCT MODEL	:	_____
EXTRAS 1	:	_____
EXTRAS 2	:	_____
INVOICE DATE and NUMBER	:	_____
SERIAL NUMBER	:	_____

COMMISSIONING OF THE DEVICE

DATE OF COMMISSIONING	:	_____
AUTHORIZED COMPANY for COMMISSIONING	:	_____
ADDRESS	:	_____
E-MAIL / GSM	:	_____
SERVISER NAME / SURNAME	:	_____
SERVISER STAMP and SIGNATURE	:	_____

- Warranty period is 2 (two) years, and starts with signing of this document
- One copy of this document shall be handed to end-user
- General checks on next page should be completed for future reference

START-UP / COMMISSIONING FORM

2/2

General Checks	Check	Comments
Wall plug voltage measurement	_____ V (AC)	
There is no damage because of transportation		
Chimney is clean, functioning well and meets the requirements defined in manuals		
Outputs are tested before start-up and working correctly		
Plumbing plant installation is made according to manuals, and necessary sensors are installed		
Optimization for auger / chimney calibration (if needed) is made		
Purchased optional elements are installed correctly, and tested		

End-User Notification	Check	Comments
User is informed about boiler/stove cleaning and service cycles		
User is informed about errors and how to act when they are shown		
User is informed about combustion power selection and setting necessary thermostats		
User is informed about boiler/stove functioning, operating, fuel quality and warranty conditions		

REMARKS / DIFFERENCES