



*LIMES INNOVATION FOOD*

**Operating manual for  
Big Straw Boilers  
BSB300, BSB450 and BSB850**





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## 2 General terms

- This instruction is valid for Limes Innovation EOOD BSB300, BSB450 and BSB850 boilers.

### 2.1 Warranty

Immediately upon receipt, you should ensure whether there are any defects. If so, please contact Limes Innovation EOOD.

Please fill in the included warranty card and return to the address below.

**Limes Innovation EOOD**  
**Western industrial area**  
**7500 Silistra**  
**Bulgaria**  
**Phone no: +359 86 821 310**

The warranty does not cover general wear parts such as:

- Cleaning brush.
- Packing.
- Firebricks in the combustion chamber.

This system is functionally tested and the parts are inspected for damage and defects before shipment.

The boiler housing and the front door are individually tested and the test results are enclosed in annex 3 and annex 4.

The boiler is CE marked according to the following directives and their amendments:

- 2006/42/EEC (machinery)
- 2004/108/EEC (electromagnetic compatibility)
- 2006/95/EEC (electrical equipment designed for use within certain voltage limits)

The declaration of conformity is enclosed in annex 2.

Any complaints must be forwarded to Limes Innovation EOOD in writing.

Please find enclosed Warranty card in Annex 1

## 2.2 Responsibilities

The user is responsible for correct operation of the boiler and compliance with the instructions.

Circumvention of this manual may result in lower efficiency and higher environmental impact due to poor combustion of gas emissions.

Improper use can result in dangerous situations and a reduction of the boiler's life time.

## 2.3 Precautions

- The power supply for the boiler unit has to be 3 x 400 V – 32 A.
- All electrical connections must be carried out by authorized personnel.
- ALWAYS keep the area around the boiler cleared.
- REMOVE combustible liquids, materials and fuels in a suitable distance from the boiler in accordance with local legislation.
- Verify that the existing boiler is compliant with any local safety legislation.
- Verify that boiler room is compliant with the local fire authority's requirements.
- The boiler must ALWAYS be placed on the foundation.
- NEVER touch the flue gas pipes during operation.
- NEVER open the front door during operation as the flames in the combustion chamber can cause serious injuries.

The following sign is placed on the door:



- Water inlet temperature must ALWAYS be more than 65 °C because of the risk of corrosion. This is automatically controlled by the temperature sensor of the 3-way shunt valve.
- Only trained persons must operate the system.
- NEVER touch the stones in the combustion chamber, as they are fragile after the first heating.
- NEVER block the opening of the explosion hatch cover.
- NEVER look down the opening of the explosion hatch protection or put your hand over it, as flames from explosions in the combustion chamber can occur.

The following sign is placed at the cover opening:



- Firing must under no circumstances be done before the water temperature of the system has decreased to max. 90 °C.
- The boiler is designed and tested with "gray straw". Yellow straw is difficult to burn and is



# LIMES INNOVATION EOOD

not recommended.

- The moisture content in the straw can be up to 14 %. If the moisture content exceeds 14% the efficiency will decrease.
- Straw with a moisture content of more than 20 % moisture must not be used.
- Cleaning of the chimney must be done by an authorized chimney sweeper.
- The ash contains acid and can cause corrosion of the boiler.
- The noise level is tested according to:
  - ISO 11201:2010
  - ISO 3744:2010

and the level is up to 88 dB in the control room. Therefore ear protection is required during boiler operation.

The following sign will be placed at the entrance to the control room:



**Never** use gasoline or other liquid fuels during the start-up because of explosion danger!

**Please note:** If the above mentioned conditions are not kept and the local fire authority's requirements are not followed Limes Innovation EOOD declines all responsibility.

**The system is an OPEN system.** The boiler is not designed for operation with a closed system. Max. operating pressure is 0.5 Bar.

### 3 System description

The boiler is designed for manual firing with straw of different types. The system consists of a combustion chamber connected to a chimney. The chimney is integrated into an accumulation tank from which hot water is diverted to consumption of various types (heating, grain drying, etc.) The content in the accumulation tank is heated by circulating water through the front door and the casing around the combustion chamber.

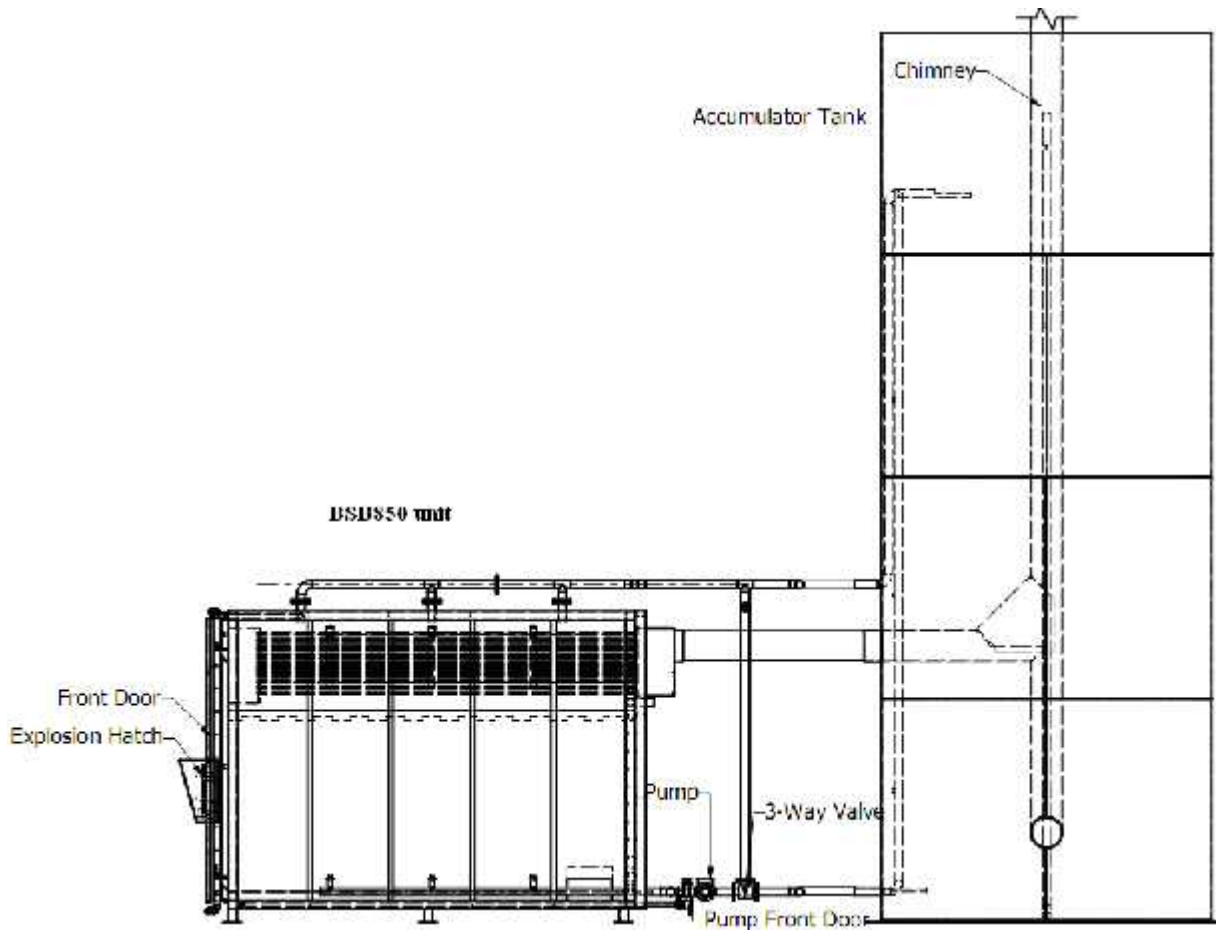
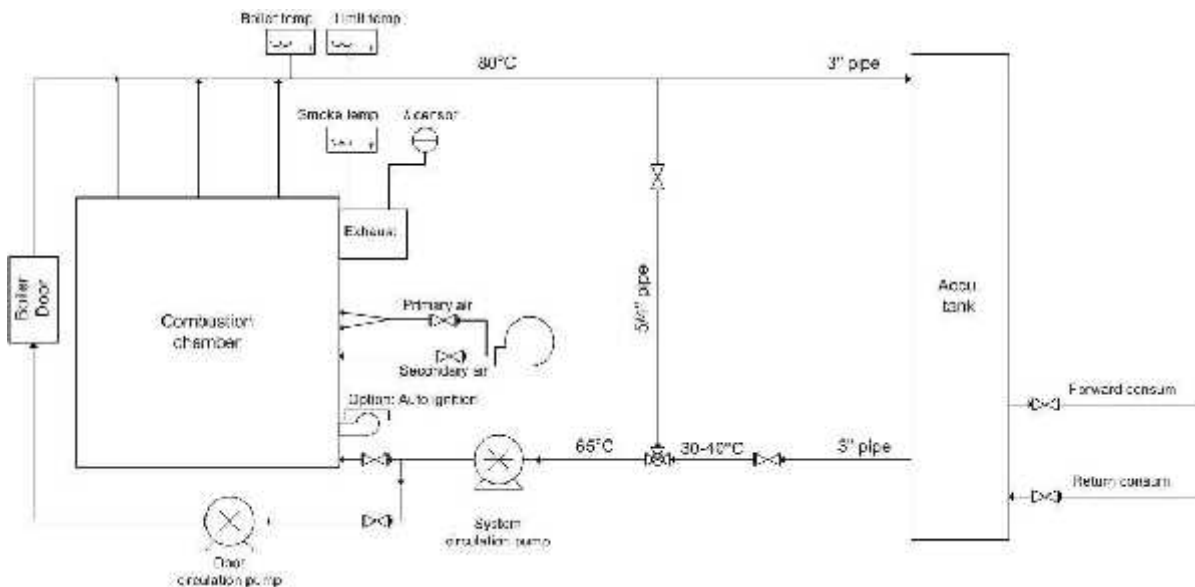


Figure 1: Cross section of the system.

In Figure 2 the P&I diagram of the system and its key features are shown.



**Figure 2: P&I diagram showing the components in the system.**

### **3.1 Automatic regulation**

The combustion is electronically controlled according to the percentage of oxygen in the exhaust, which is measured by the lambda sensor. This is done through regulation of the combustion air which can be switched between primary air at the top of the combustion chamber and secondary air at the bottom of the combustion chamber. This ensures a smoke- and smell-free combustion.

The optimal temperature of the water outlet is normally 85 °C and can be set in the control system within the range 60 – 90 °C. When the chosen temperature is reached, the combustion air fan is stopped and the dampers closed.

The optimal flue gas temperature is 200 – 250 °C. If temperatures outside this range are measured, the control system will adjust the supply of air to the combustion chamber.

The temperature of the water inlet must be at least 65 °C as lower temperatures can cause corrosion of the boiler. Therefore there is a shunt valve with hot water from the water outlet, which is controlled automatically by the shunt thermostat.

### **3.2 Sensors mounted on the boiler**

The sensors in Table 1 are used in the system. Their specifications and positions can be seen in the spare part list and the spare part drawings.



Sensor name	Sensor description	Remarks	Warnings
Oxygen sensor	Measures the oxygen content of the flue gas coming out of the combustion chamber.	It is important that the sensor is mounted correctly so it does not get false air from the mounting thread.	<b>The oxygen sensor is very hot during operation</b>
Flue gas temperature	Measures the temperature of the flue gas coming out of the combustion chamber	This sensor is placed in the smoke box of the boiler	<b>The cable is not suited for temperatures above 200 °C and must not be exposed to direct contact with hot surfaces</b>
Water outlet temperature	Measures the temperature of the water coming out of the boiler	This sensor is placed in the sensor pocket near the boiler water	<b>The cable is not suited for temperatures above 200 °C and must not be exposed to direct contact with hot surfaces</b>
Boiler limit temperature (safety temperature sensor)	Measures the temperature of the water coming out of the boiler	It has a thin copper wire that ends in a bulb where it measures the temperature	<b>If the boiler temperature has exceeded 96 °C the sensor must be reset. Press the white pin on the sensor control box to do so.</b>
Water inlet temperature	Measures the temperature of the water inlet	The sensor is connected to the valve that regulates the temperature of the water inlet	-
Outdoor temperature	Measures the outdoor temperature	-	<b>The sensor must be placed in the open, so that the correct outdoor temperature can be measured</b>

**Table 1: Sensor description and locations**





### 3.3 Explosion hatch

During the combustion, small explosions can occur in the combustion chamber. For safety reasons, an explosion hatch is installed in the door to the combustion chamber.

The opening of the explosion hatch cover must never be blocked and it is strictly forbidden to look down the opening of the explosion hatch protection or put your hand over it, as flames from explosions in the combustion chamber can occur.

The combustion can be inspected through the sight glass next to the explosion hatch.

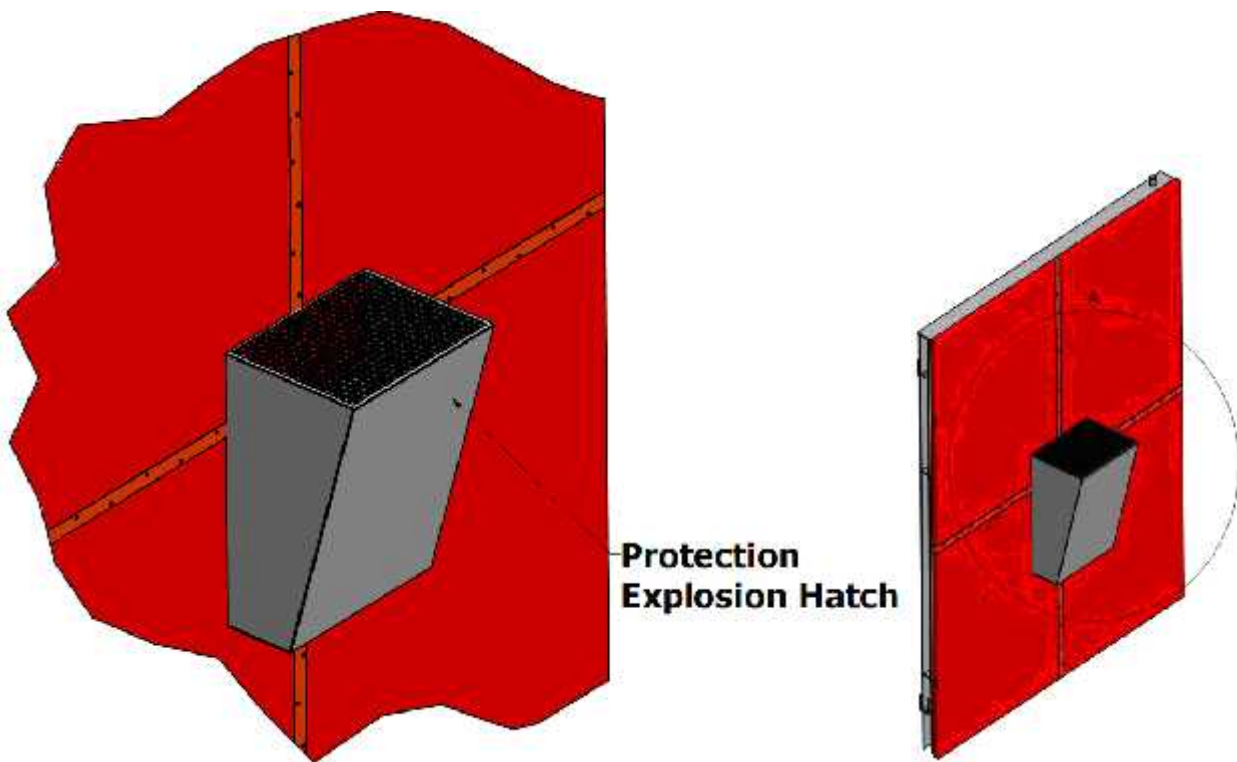


Figure 3: Explosion hatch.

### 3.4 Materials

Unless otherwise agreed, the following components are included in the scope of delivery:

- Pipes between boiler and accumulation tank.
- Pipes between boiler and stack.
- Cleaning brush.
- Operating manual.
- Warranty card.

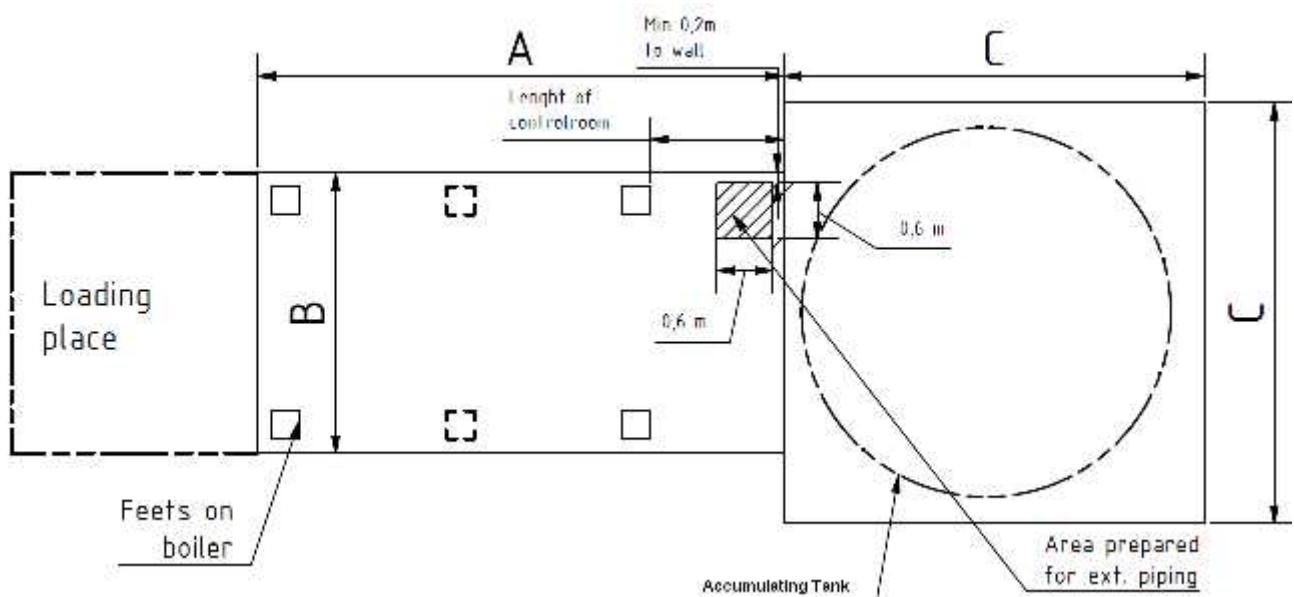
## 4 Installation

### 4.1 Transport and lifting devices

During transport, the boiler must be placed in an upright position.

The boiler must be lifted in the lifting eyes placed on the top of the boiler or with a forklift with extended forks (forks longer than the width of the boiler).

### 4.2 Foundation



Boiler unit	BSB300	BSB 450	BSB 850
Length (mm) - (A)	5800	6300	7300
Width (mm) - (B)	2600	2600	3000
Weight w/ water (kg)	6350	7500	22000
No. of legs	4	6	6
Max weight per leg (kg) - (Point load 100x100 mm)	1900	2300	6600
Minimum thickness of foundation (mm)	300	300	400
Length of control room	2000	2000	2500
Acc. tank	30 000 M <sup>3</sup>	50.000 M <sup>3</sup>	100.000 M <sup>3</sup>
Length/width (mm) - (C)	3100	3400	4500
Dimension of piping	Ø60,3	Ø60,3	Ø88,9

Figure 4: Technical information about the size of the boilers and tanks.

If the dimensions in Figure 4 are followed, the control room will be 2 m wide, which is sufficient, if no ESP-filter is included in the system. If the control room is to be of a different size than the dimensions in Figure 4, all standard piping must be adapted.

It is recommended that the loading place has a foundation to ensure that the truck delivering the straw can do this securely.

The foundation must be made in accordance with any local legislation and the calculations must be based on the dimensions and weight mentioned in Figure 4.

### ***4.3 Installing the system***

The system must be installed according to the requirements of the local authorities.

The boiler must be installed on a leveled concrete floor and there must be a free space of minimum 50 cm around the boiler due to cleaning. In front of the front door of the boiler there must be minimum 2 m free working space.

All heated pipes and surfaces must be insulated for safety reasons.

Electrical installations of the system must have a ground connection. All electrical connections must be carried out by authorized personnel.

### ***4.4 Draft in the chimney***

Pressure in the combustion chamber must be 2 mm vacuum. If this is not possible, an exhaust fan must be installed in the chimney. The top of the chimney must be minimum 300 mm above the roof of accumulation tank. If there are any buildings, installations or trees nearby this must also be taken into consideration as this can have a negative impact on the draft in the chimney. Installation of an exhaust fan will in many cases solve these problems.

## 5 Operation

### 5.1 Starting up the system

Before firing up for the first time, the system must be 100 % filled with water and all tanks and pipes must be checked for leakages.

When firing in a cold system, condensation will occur. Condensation will occur in the combustion chamber and out of the accumulation tank, due to low surface temperatures of both boiler and accumulation tank. It is normal and occurs only if the boiler temperature is below 40 °C when firing.

### 5.2 Firing

The straw bales are placed in the middle of the combustion chamber, with little free space at both ends and top. If there is ash in the combustion chamber, the bales must be lifted above the ash layer when inserted, in order not to push the ash towards the end of the chamber.

The recommended sizes of the straw bales for the boilers are as follows:

Model	Number of bales	Sizes (mm)	Weight (kg per pcs)
<b>BSB300</b>	2 round	Ø 1700	App. 600 kg/pc
<b>BSB450</b>	3 round	Ø 1700	App. 600 kg/pc
<b>BSB850</b>	3 round	Ø 2000	App. 600 kg/pc

**Table 2: Bales information.**

Before ignition, a tuft of loose straw is pulled out and placed on top or at the side of the straw bale. When the straw tuft is ignited, the door is closed. The automatic combustion control starts up when the fire has taken hold. This is recognized by the lambda sensor which reads the decreasing oxygen level of the air in the combustion chamber.

When the straw has burned out, the fan stops automatically. It can occur that the fan starts again briefly after 10 minutes if there are embers left.

All straw must be burned out and the system must be "cold" before the next firing, which means the system temperature has decreased to app. 50 - 55 °C. Firing must under no circumstances be done at a temperature higher than 90 °C.

If firing before the temperature has decreased to 50 - 55 °C, the water in the accumulation

tank cannot absorb the produced heat. This may lead to gas explosions in the combustion chamber, and the explosion hatch in the door will then open. Firing too early will also cause an automatic stop of the fan, which will limit the combustion. This is to avoid overheating of the water in the system. The overall efficiency of the system will be significantly lower.

To achieve the most economic combustion, it is important that the boiler is producing as much heat as possible in the combustion period (approximately 3 hours). Hereby the highest efficiency is gained.

The highest efficiency is obtained by using gray straw (moisture content of 14 %), e.g. straw which is washed by rain and dried again before pressing.

### **5.3 Cleaning and manual ash removal**

The ash must be removed before every firing and the temperature of the ash must be less than 70 °C (same temperature as the boiler). After removing the ash, the flues and the sealing of the door must be cleaned as well.

The ashes contain acid which can cause corrosion of the boiler.

The stones of the combustion chamber must never be touched as they are fragile. Cleaning of chimney and exhaust pipe must be carried out by an authorized chimney sweeper.



**Figure 5: Combustion chamber.**

## 6 Functional description of the control box

### 6.1 General

All electrical documentation is in the information sheet in the control box:

*The controller makes three independent adjustments:*

- Adjustment of oxygen content in the flue gas.
- Adjustment of the boiler temperature.
- Adjustment of the flue gas temperature.

### 6.2 Operating mode

In the first 30 minutes (selectable range) after ignition is recognized, the control box gradually raises the oxygen content in the flue gas relative to the selected oxygen content. Immediately after ignition, the control box raises the oxygen content of 7 %. Ignition is recognized by the lambda sensor, as oxygen consumption of the combustion will lower the oxygen content in the exhaust.

In the first 10 minutes (selectable range) the oxygen content is reduced with 0.5 % per minute and in the next 20 minutes the oxygen content is reduced with 0.1 % per minute so that the oxygen content is corresponding to the selected oxygen after 30 minutes. This is done to reduce smoke in the initial phase.

Oxygen content in the flue gas is adjusted by 2 dampers:

- Primary damper.
- Secondary dampers.

When oxygen levels are less than selected, the primary damper is closed slightly and opened slightly in the secondary.

When oxygen levels are higher than selected, the primary fan opens slightly and closes slightly in the secondary. The larger the deviation between the selected and the actual oxygen content is, the more the fan settings (proportional control) are changed.

The boiler temperature is controlled by starting and stopping the dampers so that the dampers starts when the actual boiler temperature falls below the selected temperature and stopped when the actual boiler temperature reaches above the selected temperature.

The flue gas temperature is monitored and is trying to be kept in the scale from 200 to 250°C. This can be done by opening a little of both air dampers / and increase combustion if the temperature gets too low and to close both air dampers (and thereby reduce the burning), if the temperature gets too high.

The flue gas temperature is continuously displayed in the left display window.



### **6.3 Additional information**

- Stand-by mode: In this mode, both dampers are closing and the fan stops.
- The default boiler temperature after start-up is 85 °C.
- The default oxygen level in the flue gas is 7 %.
- Calibration of the oxygen sensor: The box does it manually but it is possible to do this manually.

### **6.4 Temperature limit sensor**

The boiler temperature is constantly monitored by a temperature sensor for safety reasons.

If the boiler temperature reaches 96 °C the control system will stop the fan and close the dampers, so that the oxygen supply to the combustion will be limited.

When the boiler temperature has dropped, the sensor must be reset manually. This is done by pressing the white peg on the sensor control box. The system can then be started at the system control box.

## **7 Troubleshooting**

For troubleshooting on BSB-series, the following table should help with the most common questions.

In the column “FAULT” you will find that specific fault, which is registered on BSB-series.

The “REASON” column lists several possible causes for this error. These reasons are set out as a priority number followed by the most probable cause first.

The column “REMEDY” includes a variety of options to remedy the error. The sequence of these actions is prioritized so that the action most likely to remedy the error mentioned earlier.

The table is available on the following pages:





FAULT	REASON	REMEDY
<p><b>The burning has been completed but the fans do not stop</b></p>	<p>It is less than the 15 min. since the burning ended (oxygen &gt; 18 %).</p>	<p>Wait until the 15 min. have passed and the measured oxygen content increases to 18%.</p>
	<p>The oxygen sensor is not measuring correct.</p>	<ul style="list-style-type: none"> <li>➤ Make sure that its air tight around the oxygen sensor in flues.</li> <li>➤ Check the calibration of the oxygen sensor.</li> <li>➤ Check if the oxygen sensor is dirty (remember to seal the sensor by re- mounting in exhaust flues with pasta).</li> <li>➤ Replace the oxygen sensor (life expectancy at least 8000 hours of operation).</li> </ul>
<p><b>The fan motor is thermally disconnected</b></p>	<p>The motor has used too much power.</p>	<ul style="list-style-type: none"> <li>➤ Open the control box and reset the relay.</li> </ul>
	<p>Lacking of e.g. a phase.</p>	<ul style="list-style-type: none"> <li>➤ Open the control box and reset the relay.</li> </ul>
	<p>The fuse has blown in the house installation.</p>	<ul style="list-style-type: none"> <li>➤ Open the control box and reset the relay.</li> </ul>
<p><b>The fan will not start after the ignition</b></p>	<p>There is no fire in the straw.</p>	<ul style="list-style-type: none"> <li>➤ Ignite the straw again. (Be careful when opening the door and explosion limb on the door. Flashovers can occur when oxygen is added).</li> </ul>
	<p>The oxygen sensor is not measuring correct.</p>	<ul style="list-style-type: none"> <li>➤ Make sure that its air tight around the oxygen sensor in flues.</li> <li>➤ Check the calibration of the oxygen sensor.</li> <li>➤ Check if the oxygen sensor is grimy (remember to seal the sensor by re- mounting in exhaust flues with pasta).</li> <li>➤ Replace the oxygen sensor (life</li> </ul>





		expectancy at least 8000 hours of operation).
	Priming sensor is disconnected.	➤ Press the white pin on the sensor box when the boiler temperature is below 90 °C.
	The actual boiler temperature is higher than the selected boiler temperature.	<ul style="list-style-type: none"> <li>➤ Increase the selected boiler temperature.</li> <li>➤ Wait for the boiler temperature to fall.</li> </ul>
	Temperature sensor for boiler measures incorrect.	<ul style="list-style-type: none"> <li>➤ Check the cable connection to the temperature sensor.</li> <li>➤ Measure the electrical resistance of the sensor, without power on the control box (must be from 1000 to 1400 Ohm).</li> </ul>
<b>Poor combustion/lot of smoke and fans are running</b>	The oxygen sensor is not measuring correct.	<ul style="list-style-type: none"> <li>➤ Make sure that its air tight around the oxygen sensor in flues.</li> <li>➤ Check the calibration of the oxygen sensor.</li> <li>➤ Check if the oxygen sensor is grimy (remember to seal the sensor by re- mounting in exhaust flues with pasta).</li> <li>➤ Replace the oxygen sensor (life expectancy at least 8000 hours of operation).</li> </ul>
<b>No lights on the display</b>	No power for the control box.	<ul style="list-style-type: none"> <li>➤ Check the power switch on the control box.</li> <li>➤ Check the earth leak circuit breaker in the control box (external installation).</li> <li>➤ Check if the power group in control panel is switched off (external installation).</li> <li>➤ Check the circuit breaker in control panel (external installation).</li> </ul>
<b>The boiler is stain boiling</b>	Poor circulation due to pump faulty.	<ul style="list-style-type: none"> <li>➤ Clean the pump.</li> <li>➤ Replace the pump.</li> </ul>
	The temperature sensor for water outlet is not working	➤ Change the sensor or start the pump manually.



	correctly.	
	The system is in lack of water.	➤ Re-fill the system with water.
	Incorrectly adjusted valves.	<ul style="list-style-type: none"> <li>➤ Close the return valve for the boiler gradually.</li> <li>➤ Close the shunt water valve gradually.</li> <li>➤ Ensure that the tank valves are fully open.</li> <li>➤ Valves to the door must be fully opened.</li> </ul>
	The water inlet is too hot.	➤ The acc. tank is already close to 100 % capacity. Stop the new firing.
	The door hoses are frozen.	➤ Mount an electronic pump starter to deliver running signal 2 seconds each hour.
<b>Flue gas comes out of the boiler door</b>	The draft in the boiler is not sufficient.	<ul style="list-style-type: none"> <li>➤ Clean the boiler and the flue gas pipes.</li> <li>➤ Replace gaskets in the door.</li> <li>➤ Extend the chimney.</li> <li>➤ Mount an exhauster fan.</li> </ul>
	The chimney is partially closed.	➤ Clean the chimney.
<b>Shortly after start-up the boiler is interval-firing</b>	Poor circulation due to pump faulty.	<ul style="list-style-type: none"> <li>➤ Replace pump.</li> <li>➤ Clean the pump.</li> </ul>
	The temperature sensor for water outlet is not working correctly.	➤ Replace the sensor or start the pump on manual.
	The system is in lack of water.	➤ Re-fill the water on the plant.
<b>The flue gas temperature is too high</b>	The heating surface within the boiler is diminished.	➤ Clean the boiler and the flue gas pipes .

**Table 3: Troubleshooting questions and answers.**



## 8 Preventive maintenance

### 8.1 Monthly checks

- Make sure that the sealing of the front door is intact and smooth. If it is hard, it must be replaced.
- Make sure that the front door of the boiler is air tight and no smoke is coming out. Adjust the hinges and handle if necessary.
- Clean the gas flue box on the back of the boiler.
- Check the stones of the combustion chamber for damages.
- Check the hoses of the front door for cracks and replace them if there is any sign of damages.
- Lubricate the hinges of the front door.
- Clean the oxygen sensor.

### 8.2 Cleaning before firing

- Clean the boiler in the combustion chamber.
- Clean the flue gas pipes.
- Clean the sealing of the front door.

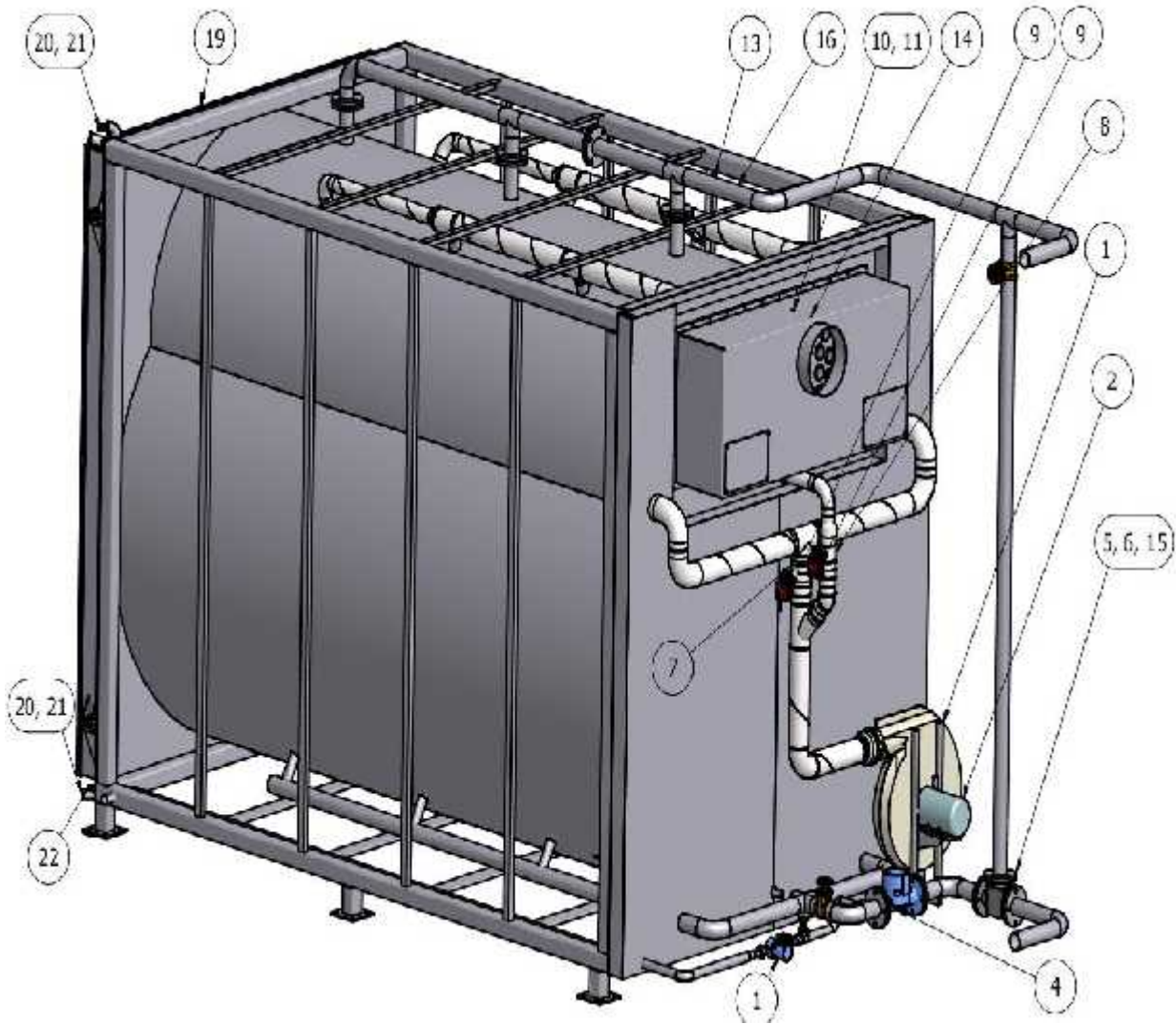
## 9 Technical Information

### 9.1 Technical data

Information	BSB300	BSB450	BSB850
Flue gas temperature at nominal output	200 - 250 °C	200 – 250 °C	200 – 250 °C
Nominal output	App. 300 kW	App. 450 kW	App. 850 kW
Straw consumption at output performance (13% water)	App. 90 kg/h	App. 130 kg/h	App. 250 kg/h
Combustion period by output	App. 8 hours	App. 8 hours	App. 8 hours
Diameter of flue gas pipe	Ø 350 mm	Ø 350 mm	Ø 350 mm
Required chimney draught	30 Pa	30 Pa	35 Pa
Water content in the boiler	2 400 L	3 600 L	7 200 L
Setting range for boiler thermostat	0-99 °C	0-99 °C	0-99 °C
Recommended size of the buffer tank (minimum)	30.000 L	50.000 L	100.000 L
Estimated power consumption of fan, controls and circulator pump	App. 250 Watt	App. 250 Watt	App. 400 Watt
Electrical connection	400 Volt	400 Volt	400 Volt
	3 Phase	3 Phase	3 Phase
	50 Hertz	50 Hertz	50 Hertz
	32 Amp	32 Amp	32 Amp

**Table 4: Technical information.**

**10 Spare parts**



**Figure 7: Spare parts location on a BSB850.**



Spare parts used in the system for BSB850:

Pos.	Item	Qty
1	Fan	1 pcs
2	Motor	1 pcs
3	Main Pump	1 pcs
4	Pump front door	1 pcs
5	Regulator	1 pcs
6	Shuntvalve	1 pcs
7	KRA 100	1 pcs
8	KRA 125	1 pcs
9	Actuator motor for air valve	2 pcs
10	Lambda sensor	1 pcs
11	Cable for lambda sensor	1 pcs
12	Temperature sensor	1 pcs
13	Temperature sensor	1 pcs
14	Temperature sensor	1 pcs
15	Temperature sensor	1 pcs
16	Limit Thermostat	1 pcs
17	Gas Springs	2 pcs
18	Connectors for springs	4 pcs
19	Sealing frontdoor	15 m
20	Hose	2 x 1,5 m
22	Check valve, frontdoor	1 pcs
23	Gate Valve	2 pcs
24	Refractory stones	1 set
25	Refractory stones	1 set
26	Refractory stones	1 set

**Table 7: Description of the spare parts for BSB850**

## 11 Annex

### 11.1 Annex 1: Warranty card explanation

Limes innovation EOOD provides guarantee for 2. Wearing parts and outside influences are excluded.

The warranty does not apply if fuels containing acid are used nor if the boiler is operated at a temperature lower than 55 °C.

Defect parts will be replaced without payment when returned (franko) Limes innovation EOOD. Labour requested by the costumer will be paid by the costumer if our technician finds that the boiler is in an operational condition.

The warranty is not valid if the boiler is not operated according to the operating manual. The warranty is not valid if the boiler is not installed according to the operating manual. The warranty does not include normal wear and tear.

Repair works will be carried out by an authorized Limes innovation EOOD distributor. Overdahl Energy ApS does not compensate for any operating loss.

The warranty applies one month after purchasing the boiler.

The next page has a list of information that we require before we will grant a guarantee. It must be filled out or copied and filled out and then sent to the following address within 8 days after the first firing:

Our address is:                               Limes Innovation EOOD  
  Western industrial area  
  7500 Silistra  
  Bulgaria

It is possible to mail the information instead:

[office@limesboilers.com](mailto:office@limesboilers.com)



## Warranty card

Date:	
Boiler type:	
CE-number:	
Buyer (user):	
Address:	
Postal Code:	
City:	
Phone Number:	
Dealer:	





## 11.2 Annex 2: Declaration of conformity

### DECLARATION OF CONFORMITY

**Manufacturer:** Limes Innovation EOOD  
**Address:** Western industrial area  
7500 Silistra  
Bulgaria

#### System description.

The boiler is designed for manual firing with straw of different types. The system consists of a combustion chamber connected to a chimney. The chimney is integrated into an accumulation tank from which hot water is diverted to consumption of various types (heating, grain drying, etc.) The accumulation tank content is heated by circulating water through the front door and the casing around the combustion chamber. A control system which controls flue gas temperature and oxygen content is installed on the boiler. The ash transport system and the ash container are connected via an air tight sealing and the system is monitored and controlled via the control system.

**Responsible for technical dossier:** Tichomir Borachev

Limes Innovation EOOD declares under our sole responsibility that the following product:

Boiler BSB850                      Production number: XXXX

Conforms to the provisions of the:

- Machinery Directive (MD) 2006/42/EC of 17<sup>th</sup> May 2006 on machinery, and amending Directive 95/16 EC (recast) and with national implementing legislation
- Low Voltage Directive (LVD) 2006/95/EC of 12<sup>th</sup> of December 2006 on the harmonisation of the laws of Member States relation to electrical equipment designed for use within certain voltage limits.

Provided that the product is used in accordance with our instructions.

Furthermore, Limes Innovation EOOD declares that the following (parts/clauses of) harmonised standards have been applied:

- EN ISO 11201:2010 Acoustics. Noise emitted by machinery and equipment. Determination of emission sound pressure levels at a work station



# LIMES INNOVATION EOOD

- EN/ISO 3746 Determination of sound power levels of noise sources using sound pressure.
- EN/ISO 12100-1 Safety of machinery. Basic concepts general principles for design, basic terminology, methodology
- EN/ISO 12100-2 Safety of machinery. Basic concepts general principles for design, technical principles
- EN/ISO 13849 Safety of machinery. Safety-related parts of control systems. General principles for design
- EN/ISO 13850 Safety of machinery. Emergency stop
- EN/ISO 14121 Safety of machinery. Risk assessment
- EN 60204-1 Safety of machinery. Electrical equipment of machines. General requirements

Authorised representative established in the Community, designated by the manufacturer

Title: CEO  
Name: Tihomir Borachev

Signature: \_\_\_\_\_  
Place / date: Silistra / xx-yy-2014

The technical file is kept at the above mentioned address.

**11.3 Annex 3: Pressure test certificate boiler housing**

**PRESSURE TEST CERTIFICATE**  
**/Boiler housing/**

**Customer:** XXX Ltd., Scotland,UK

**Boiler type:** BSB 850

**Production :** # 0001

**Date of production :** XX.XX.2014

**Date of pressure Test:** XX.XX.2014

**The Test was made under pressure of 2,1 bar**

**No leakage appeared, during the test.**

Chief engineer:

xx.xx.2014  
Silistra, Bulgaria

**11.4 Annex 4: Pressure test certificate boiler front door**

**PRESSURE TEST CERTIFICATE**

**/Boiler front door/**

**Customer:** XXX Ltd., Scotland,UK

**Front door of boiler :** BSB 850

**Production :** # 0001

**Date of production :** XX.XX.2014

**Date of pressure Test:** XX.XX.2014

**The Test was made under pressure of 2.3bar**

**No leakage appeared, during the test.**

Chief engineer:

xx.xx.2014  
Silistra, Bulgaria