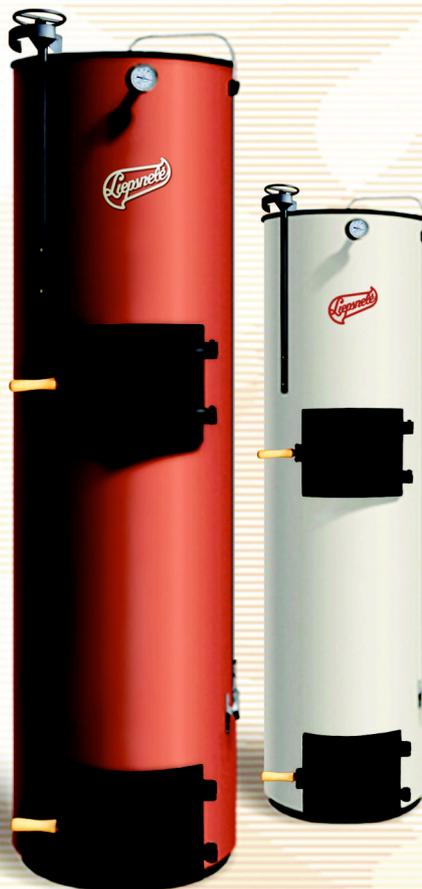




Liepsnelė L10   Liepsnelė L20   Liepsnelė L40  
Liepsnelė L10u   Liepsnelė L20u   Liepsnelė L40u



Domestic, solid fuel boilers

## ***INSTALLATION AND MAINTENANCE MANUAL***



vakaro rasa

Translated from:  
Lithuanian edition of „Installation and maintenance manual“ 2009

English Edition, 2015 in Spektrus EU, UAB  
Edition: VR-EN-2015 03 17(02)

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### 1. INTENDED USE

Solid fuel boilers LIEPSNELE are intended for heating residential, municipal and industrial facilities with installed central heating system.

The boilers are of 6 types:

L-10, L-20 and L40 are firewood, sawdust and briquette-fired boilers, while L10u, L20u and L40u are firewood, sawdust, briquette, peat and coal-fired boilers.

The following components can be connected to the heating system:

- Radiators;
- Boilers (for tap water heating);
- Heaters;
- Other types of boilers (diesel, gas or electric); - Heated floors.

The heating system may contain both natural and forced circulation, as well as open or closed.

In case of the closed heating system it is necessary to use a thermostatic cooling valve "Regulus DBV1" or thermostatic cooling valves of the same type and parameters produced by other manufacturers.

### 2. EQUIPMENT OF THE BOILER

1. Air damper (mounted in the upper part of the boiler or in a box).
2. Traction controller Honeywell (or similar).
3. Pressure safety valve is of 1.5 bar.
4. Thermometer.
5. Air inlet manifold (for all type boilers).
6. Cable for the air inlet manifold.
7. Tubular air supply distributor (for coal-fired and universal type boilers).
8. Furnace bars (for universal type boilers).
9. Technical certificate, instruction manual.
10. After unpacking the boiler, check whether all the components of the equipment are included.

***We recommend that you purchase a backup generator in case of power outages at home.***

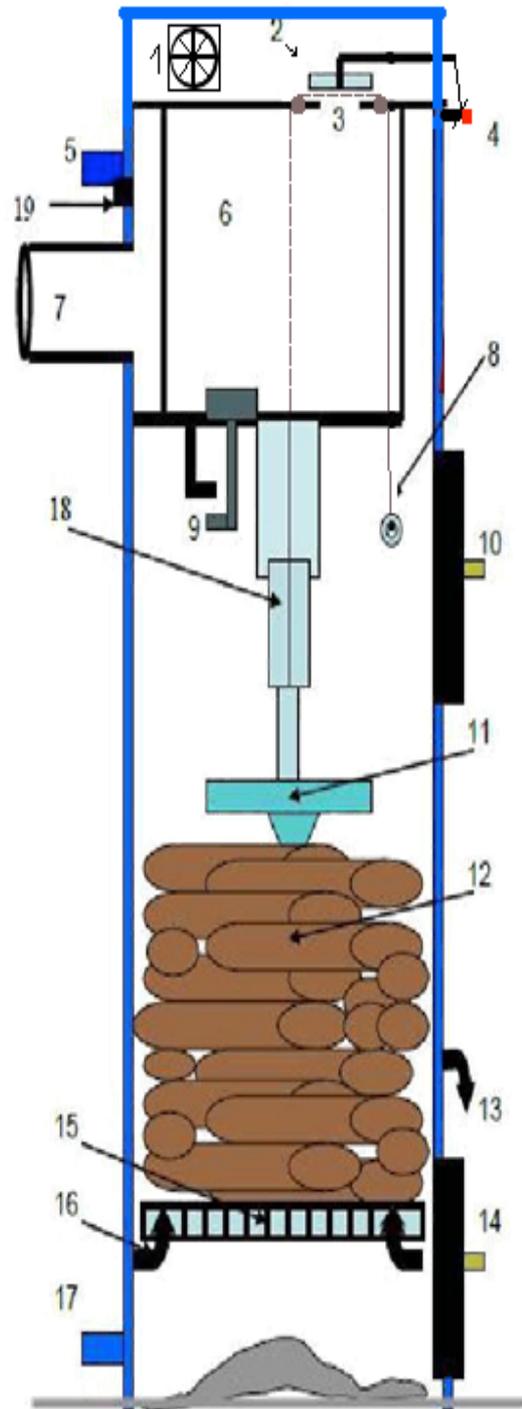
**CAUTION: Before installing the boiler, be sure to lubricate the lift cable, also the door hinges and closing hooks.**

### 3. TECHNICAL SPECIFICATIONS

BOILER MODEL	L-10	L-20	L-40	L-10u	L-20u	L-40u
Power (Kw)	10 kW	20 kW	40 kW	10 kW	20 kW	40 kW
Heated area (m <sup>2</sup> )	50-100	80-200	180-400	50-100	80-200	180-400
Fuel capacity (m <sup>3</sup> )	0,16	0,19	0,31	0,14	0,17	0,28
Holds Coal (kg)				70	125	210
Holds Firewood (kg)	25	48	75	25	48	75
Recommended log length (cm)	25-35	35-45	45-55	25-35	35-45	45-55
The amount of water in the boiler(l)	30	35	45	30	35	45
Duration of combustion of one load of firewood (h) min-max	6-31	6-31	6-31	6-31	6-31	6-31
Duration of combustion of one load of coal (days) min-max				3 – 7	3 – 7	3 – 7
Efficiency coefficient, to (%)	91	91	91	91	91	91
Maximum water pressure in the boiler (bar)	2	2	2	2	2	2
Pressure Protection valve (bar)	1,5	1,5	1,5	1,5	1,5	1,5
Maximum flow of the heated water (l/h)	250	600	1000	250	600	1000
Water temperature in the boiler (°C)	70	70	70	80	80	80
Dimensions of the fuel loading hole (mm)	260x220	260x220	280x240	260x220	260x220	280x240
Coupling for the supply water	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Coupling for the return water	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Distance from the bottom of the boiler to the flue (mm)	1280	1500	1500	1280	1500	1500
Diameter of the flue (mm)	160	180	180	160	180	180
Minimum width of diameter of the flue outlet (m <sup>2</sup> )	0,025	0,025	0,029	0,025	0,025	0,029
Dimensions (mm)						
Height	1700	1900	1900	1700	1900	1900
Diameter	560	560	680	560	560	680
Boiler weight (kg)	164	198	264	183	222	300

#### 4. THE BOILER CONSTRUCTION

1. Ventilator
2. Tube for the lift cable
3. Air damper
4. Thermal traction controller
5. Coupling for heated water
6. The air heating chamber
7. Smoke exhaust outlet
8. Lift cable for air supply distributor
9. Barrage (wood fire/coal) shift handle, installed behind the air intake tube
10. Fuel loading doors
11. Air distributor
12. Fuel
13. Cable mounting hook
14. Ash removal door
15. Furnace bars
16. Furnace bar mounting hooks
17. Coupling for return water
18. Air intake tube (telescopic)
19. Coupling for the safety valve



## **5. DESCRIPTION OF THE BOILER CONSTRUCTION**

Boiler is a steel cylinder surrounded by a steel cylinder of larger diameter including the complete heated construction. Heated water circulates between the both cylinders. The thermal controller is to be installed in the front side of the boiler (4). There is a fuel loading outlet (10), ash removal outlet (14) and the smoke exhaust outlet (7) installed in the construction. There are also a water supply and return pipes installed (5-17). There is the air heating chamber installed at the top of the boiler combustion chamber in order to improve the quality of fuel combustion and the heat transfer. There is the air intake switching valve (9) installed in the peat briquette and coal-burning boilers including furnace bars.

In order to extract as much heat from the combustion process as possible, there is gap between the heating chamber and the walls of the boiler, through which the smoke flows toward the smoke outlet. There is boiler the telescopic air supply pipe (18) installed in the combustion chamber with attached air distributor (11) at the end.

There is the air intake outlet located in the upper part of the combustion chamber also including the airflow control valve (3). There is a cable with the ring (12) for the lifting of the air supply system and the cable fastening hook (13) on the left side of the fuel loading door.

The purpose of the distributor is a correct distribution of heated air in the generation areas, located below and near the air distributor, as well as the combustion areas, situated above and near the air distributor. The air distributor borders to the fuel, situated on the edge, which does not become as hot as the fuel located in the centre at the time of the fuel combustion. At the time of the fuel combustion the air distributor is phased down, depending on the co-combustion of the fuel, pressing its weight down the unburned fuel.

It is not recommended to lift the air distributor out of its place at the time of the fuel combustion process, as when lifting and lowering the air distributor, it turns and sinks deeper into the combustion area. As a result, the boiler operation becomes uneconomic and parts of the air supply system wear out much faster. In case of emergency firefighting, the air distributor must be quickly lifted out from the combustion hearth to minimize the amount of intake of fresh air into the combustion zone.

## **6. BOILER INSTALLATION INSTRUCTIONS**

### **6.1. REQUIREMENTS FOR THE BOILER ROOM**

The boiler is to be installed in the premises which meet the state requirements for boiler installation rooms.

The room for the boiler installation must be at least 200 cm (78.7 in) in height. Floors of the must be made of concrete (at least at the point where the boiler is planned to be installed). The room size must be greater than 4 sq.m (43.0 sq. feet). The room must be isolated from the heated residential premises. The boiler installation room is required to have a fresh air ventilation channel installed (at least 10x10 cm - 100cm<sup>2</sup> or 3.9x3.9 in - 155000 sq.in) in size, or a window for the constant need of fresh air to enter. The boiler is to be placed on a concrete floor. The resulting gaps between the furnace wall and the concrete are to be filled with heat-resistant silicone on the outside and with fire clay or cement mortar on the inside.

A concrete floor located under the boiler performs the function of the bottom of the boiler; there is no open combustion on the bottom, as the operating principle of the boiler includes the upper combustion when the combustion process takes place from the top to down. Once the combustion process goes down to the lower part of the combustion chamber, there is already a layer of ash or slag on the bottom (depending on fuel type), which protects the concrete floor from direct heat.

If the closed heating system is used, it is necessary to use a thermostatic cooling valve "Regulus DBV1" or thermostatic cooling valves of the same type and parameters produced by other manufacturers. Therefore, there must be a sewer pipe installed in the boiler room for the excess hot water. Such valves also require the cold water supply.

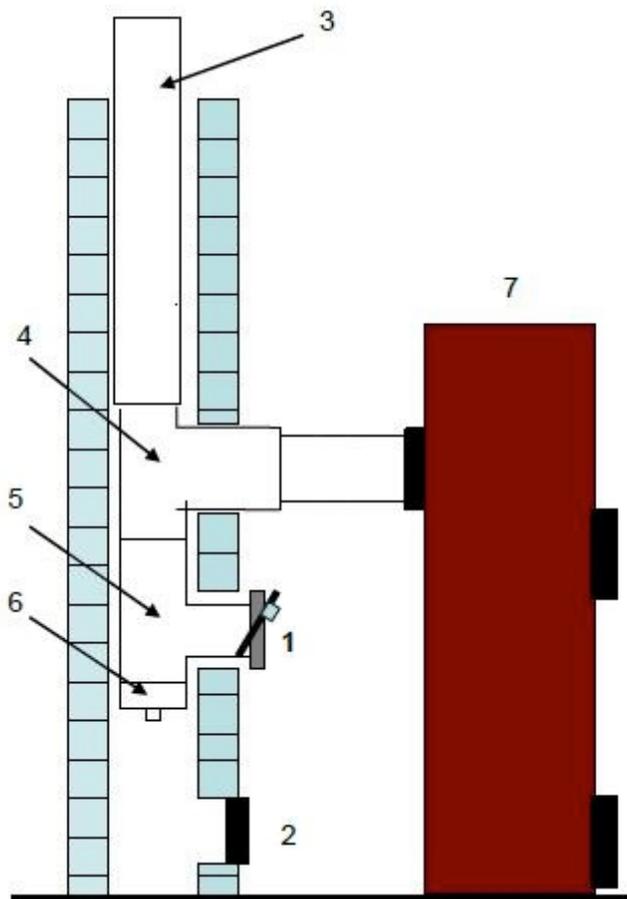
## 6.2. REQUIREMENTS FOR THE FLUE

If there is not enough traction for the fire wood-fired boiler, there has to be the air inlet manifold additionally installed. The air inlet manifold is included in the equipment of universal type boilers. The boiler requires a separate flue. The boiler flue must be in the horizontal position, no longer than 150 cm (59.0in), and not shorter than 20 cm (7.87 in) in size to prevent the resulting condensate flow from the flue to the boiler. The boiler flue must be well sealed at the joints. The flues should be cleaned on a regular basis according to the Fire Prevention Requirements.

The automatic traction controller is used for traction control and elimination of vibration (vibration is noticed when the traction of the flue is very strong). The automatic traction controller is not provided with the boiler. If there is a stainless steel insert to be placed in the brick flue, there is also an additional tee (5) to be attached with a traction controller 1 installed together (Fig. 2).

Fig. 2

1. Traction controller
2. Condensate removal door
3. Insert
4. The tee for the boiler flue link-up
5. The tee for the traction controller link-up
6. The condensate collector
7. Boiler



### 6.3. SETTINGS OF TRACTION CONTROLLER

Traction controller Honeywell (or similar) is screwed into the boiler (regulator thread must be sealed). Install a metal rod in to controller like in the Fig.3.

Fig. 3

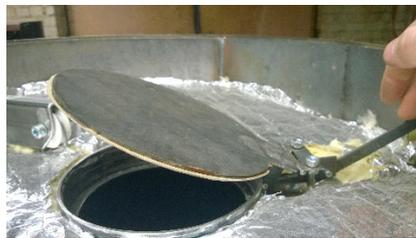


The air supply to the boiler damper position.



Damper closed

(air not enters into the boiler)



Opened damper

(air not enters into the boiler)



Damper valve is adjustable

by pulling the lever

#### Traction controller setting:

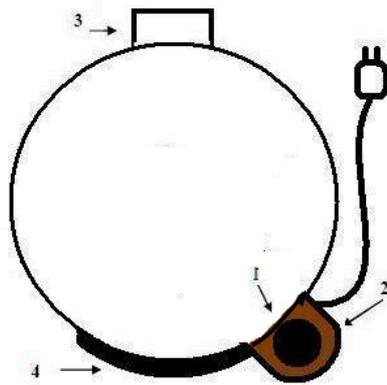
1. One end of chain must be fixed on damper leg.
2. Set the fire in the boiler. When thermometer reaches 70 °C, close the damper fully.
3. When temperature in the boiler reaches 70 °C turn traction controller till 70 °C mark. Fix metal rod in perpendicular position in to traction controller. Put the chain on the end metal rod, chain must be strained. Damper must be fully closed. Chain which is left must be cut off. When boiler will lost temperature traction controller automatically will open the damper.

#### Attention!

**In case of emergency firefighting, there is the urgent need to manually close the damper by turning the traction controller towards closing direction. This results in suspension of fresh air into the combustion hearth.**

## 6.4. INSTALLATION OF AIR FEED MANIFOLD

The mounting diagram of the manifold (top view).



1. The air feed manifold (mounted the fan pointing down).



2. Electric fan  
3. Flue  
4. Boiler doors

## 6.5. REQUIREMENTS FOR CONNECTING THE BOILER TO THE HEATING SYSTEM

The construction of our boiler is a bit different from construction of the previous boiler. Therefore, the boiler must be installed by qualified professionals who provide a guarantee for the work carried out, with full knowledge of the requirements of heating systems and their operating principles.

There are several key boiler installation rules!

Since the boiler is high and the combustion place inside is changing, **heating water must flow strictly to one direction and do not exceed the established rates (L-10 250l / h) (L-20 600l / h) (L-40 1000l / h)**. This is one of the most important rules.

### We recommend:

- To install three-way instead of four-way flow distribution valves.

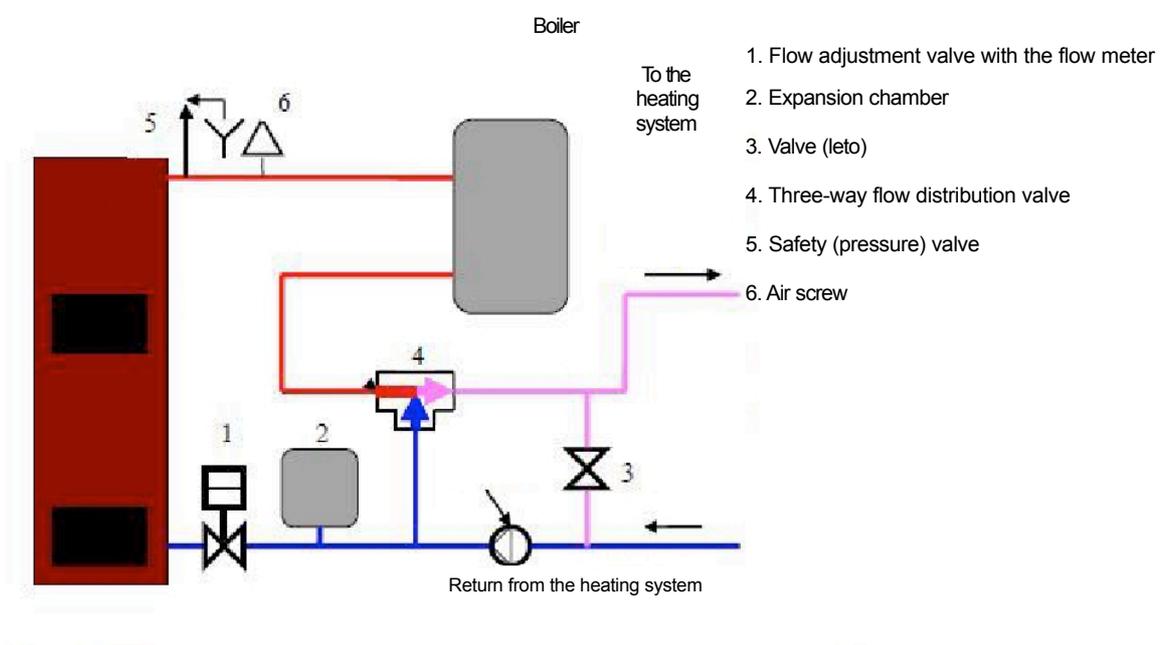
In order to avoid boiler bypass, mount the circulation pump to the big circle of the heating system, preferably on the return water pipe. Three-way mixing valves can be mechanical or electronic. It should be noted that the automatic flow distribution valves (of convergent distributed flows) may completely close the circulation of the water flow in the boiler at the time when the circulation pump stops and boiler overheats, therefore we recommend you install the sensitive capillary elements on the return water pipe and adjust the temperature by thermometers;

- Mount the balancing valve of 25mm (984 thou) in diameter to the very access of the boiler. We recommend the balancing valve with flow measurement function (SRV-IG DN 25, BP 1 by Watts or a similar type of valves of other manufacturers). This way you will be sure that your flow to the fully run heating system does not exceed the established rates;

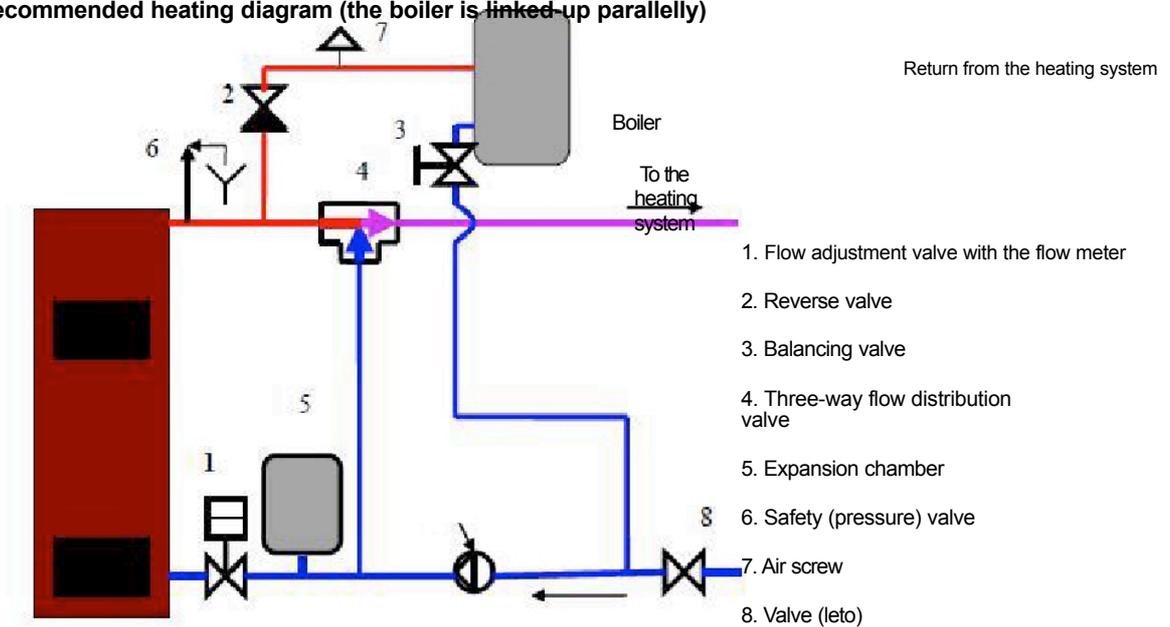
- Install as less of circular pumps as possible but if this is impossible to do, try to install them so that they do not damage the one-way circulation of the heating system. This can be done using a reverse-acting valves and flow control valves;

- In order to avoid excessive water circulation flow and noise in the heating system, calculate the power of the circulating pumps.  
 At the same time you avoid unnecessary energy costs;

**Fig. 5 The recommended heating diagram (the boiler is linked-up consistently) the best option**



**Fig. 4 The recommended heating diagram (the boiler is linked-up parallelly)**



- Adjust all the equipment linked-up to the heating system, such as radiators, coil-pipes, boilers, etc. Each piece of equipment must contain a regulatory mechanism. Even a single maladjusted piece of equipment may cause damage to the heating system and the boiler.

- In case of the closed heating system it is necessary to use a thermostatic cooling valve "Regulus DBV1" or thermostatic cooling valves of the same type and parameters produced by other manufacturers;
- There is no need to use thermostatic cooling valve in case of the open heating system.

#### **SHORT DESCRIPTION OF THE DIAGRAM IN FIG. 4**

When the boiler is consistently linked-up to the heating system, there is no need to adjust it to the heating system flow, and there is always plenty of hot water available. However, this sort of link-up is not always possible. The three-way flow distribution valve (4) may be mechanical, hydraulic or automatic. The entire heating system may be shut down by the valve (let) (3) and prepare only hot water in the boiler. Other valves are installed by professionals who perform the link-up, in order to be able to carry out repairs in the future by disconnecting the parts of the heating system.

#### **Steps to be taken after the boiler link-up:**

- It is necessary to adjust the flow of heated water in the boiler.

It is required to adjust such flows which do not exceed the maximum allowable rates (L-10 250l / h) (L-20 600l / h), L-40 1000l / h) using the flow control valve (1). The three-way flow distribution valve must be fully open, all of the equipment of the heating system have to be fully open as well, and the circulation pumps turned on at the time of the adjustment of the system;

- Fire up the boiler and adjust the desired temperature using the bi-regulator;
- Adjust all the equipment of the heating system.

#### **SHORT DESCRIPTION OF THE DIAGRAM IN FIG. 5**

All the procedures in this step are performed the same way as indicated in the diagram Fig.4, just before the start adjusting the heating system, the balancing valve (3) of the boiler must be open by ½ turn. If there is a shortage of water in the boiler after such an adjustment has been performed, slightly open the balancing valve. If there is enough hot water, slightly close the balancing valve. It has to be made sure a sufficient amount of hot water is in the boiler at the minimum flow of warm water.

#### **BOILER HEATING (Fig.1)**

At the time when the boiler is fire-wood fired, the valve (9) must be lowered (closed), and while the boiler is being coal-fired, it must be up (open). The air distributor (11) must be up while loading the fuel. This is to be performed by pulling the ring (8) attached to the cable. The cable is located on the right side of the door. When pulling, the ring must be placed on a hook (13). Use the air distributor shown in Fig.6 while the boiler is being firewood-fired. Place the firewood in a horizontal position by putting the longer ones in the middle and the shorter logs at the edges. Try not to get firewood in the upright position in the middle. It is advisable to fill the gaps between the fire wood in sawdust or wood waste.

When using coal and peat, it is necessary to use the furnace bars and keep in mind that the valve (9) must be open. Load the lump coal, and chop lumps larger than 10 cm (3.93 in) in diameter. Do not mix coal with other types of fuel, but place a bunch of dry chopped firewood of 2 kg (4.40 lbs.) on the top for fire up. Use the air distributor shown in Fig.6 while the boiler is being coal-fired. When the boiler is being fired-up using completely chopped coal, it operates on the mode lower by 50-70%, so use the coal on warmer days. When using peat briquettes as fuel, place larger briquettes at the bottom and smaller lumps on the top.

**After firewood has been loaded, fire up them right away so they do not get fired up by coal located below.**

Before firing up the boiler, it is required to get acquainted with the user manual of the air supply regulator and check whether the spike of the temperature adjusting screw is located in the hole, and whether the rise of the metal rod is in its hole as well. When turning the temperature setting screw, lift the air valve (3) 3-5cm (1.18-1.96 in) above the air intake output.

Place the firewood at the very top and partially close the door leave a gap of 2-5 cm (0.78-1.96 in). When firewood flames up, close the door completely, unhook the cable ring (8) off the hook (13) and lower the air distributor on the fuel. There can be flammable liquid intended for a fireplace and stove used for the boiler fire-up, but it is strictly forbidden to use it during the combustion process. **Never allow air to enter through the bottom ash removal door.**

When the boiler is heating up, there has to be a window or a duct open in the boiler room for the air supply to the boiler room, so the boiler gets sufficient amount of fresh air to support combustion.

It is forbidden to load the boiler with firewood at the time of boiler fire-up. **When the boiler has already fired up, it is already allowed to load fuel by placing firewood or large wood waste.**

If the boiler is being fired up using wet wood or other wood fuel, we recommend you use the air intake fan and fill gaps with dry firewood in order to assure the combustion stability. In there are to be coal or peat used for the boiler, it is required to use the air intake fan. All types of fuel are to be loaded through the upper door. **The air intake fan is switched on as soon as the boiler fires up, when the fuel loading door is already closed.**

Fig.6



Fig. 7



## 7. BOILER PERFORMANCE ASSESSMENT

- If the boiler operates well after it has been fired up, and then the power and traction goes down, this means that tightness of the flue has been breached. In this case make sure that the flue cleaning door is properly closed and check for open gaps in the smoke extraction system. The gaps must be sealed;

- If there is rhythmic noise to be heard in the boiler and smoke is to be exhausted too often at the time of combustion process, this means that the tractive force of the flue is too high, which results in the fact that when the boiler is being fired up, it fails to gain power and functions very uneconomically and inefficiently. In this case, let a larger quantity of air to get in to the flue using the traction controller;

- If the fuel burns well, but the temperature in the boiler rises slowly, and there is condensate flowing out of the flue, this means that the flow of water in the boiler exceeds the specified rates.

Switch the circulating pump to the lowest speed and reduce the flow of water into the heating equipment using the balancing valve. Keep decreasing the flow until the flow of condensation is stopped, and thermometer readings will rise to 70-80°C (158-176°C).

## 8. BOILER CLEANING AND MAINTENANCE

If there is to be firewood used for the boiler, ashes from the boiler should be removed 2-3 times a month. When using peat or coal, ashes should be removed prior to each fire up.

At the time when the traction has been reduced, it is necessary to check and clean the gap between the air heating chamber (6) (Fig. 1) and the wall of cylinder of the boiler. This can be done with a flexible brush through the fuel loading door or the flue outlet located on the other side of the boiler.

**If the heating and smoke extraction systems have been installed and linked-up correctly, and there is the user manual to be followed, the boiler does not clog.**

The descending air distributor may get ashes, therefore we recommended you occasionally check and the air inlet channels and clean if there is a need. If the gap between the two lower metal strips of the air distributor has narrowed or completely gone, it is necessary to remove and clean the air distributor, and adjust the gap between the strips (10mm - 393 thou).

In order to reduce wear of the lifting cable of the air inlet system and make it easy to lift, the cable should be lubricated.

We also recommend you lubricate the hinges on the door. It is advisable to regularly check the tightness of the door and the tightness between the boiler and a floor. In case of leaks, seal gaps using the above mentioned measures. It is required to replace the sealing tape in case of leaks in the door. The ash from the boiler is being removed only after the full combustion of the fuel inside the boiler. **IT IS STRICTLY PROHIBITED TO OPEN ASH REMOVAL DOOR DURING THE COMBUSTION PROCESS.** When wood is used for combustion, ash must be removed 2-3 times a month. If coal or peat briquettes are to be used, ash must be removed after each firing.

## 9. EMERGENCY COOLING AND EXTINCION

### 9.1. EMERGENCY COOLING SYSTEM

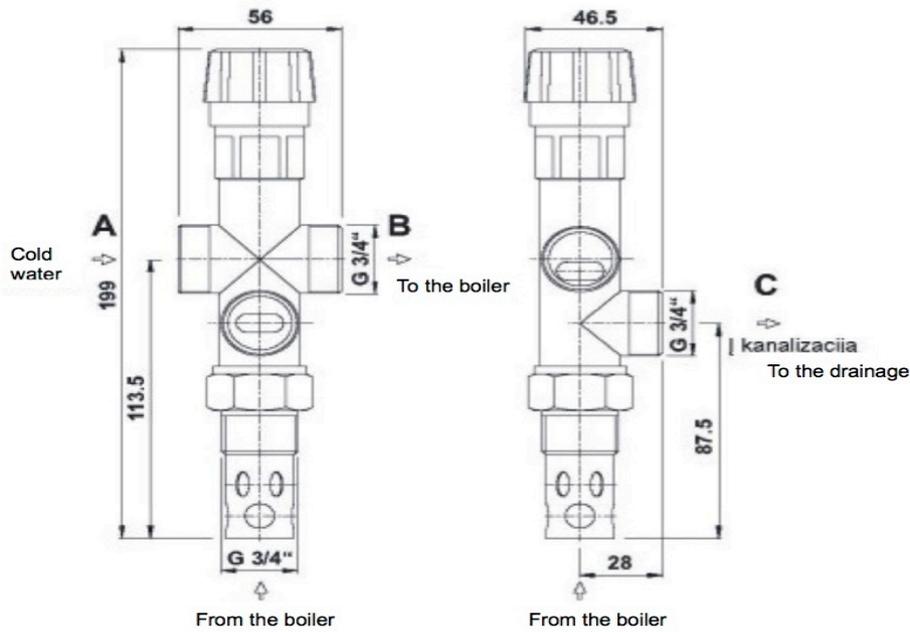
In order to avoid overheating of the boiler, it is necessary to install a thermostatic cooling valve in the heating system. We recommend that you mount S r. o. thermostatic cooling valve Regulus DBV1 produced by the Czech company REGULUS spol. Please follow the manual and diagram provided by the manufacturer, while installing the valve.

Technical parameters of the Regulus DBV1 thermostatic:

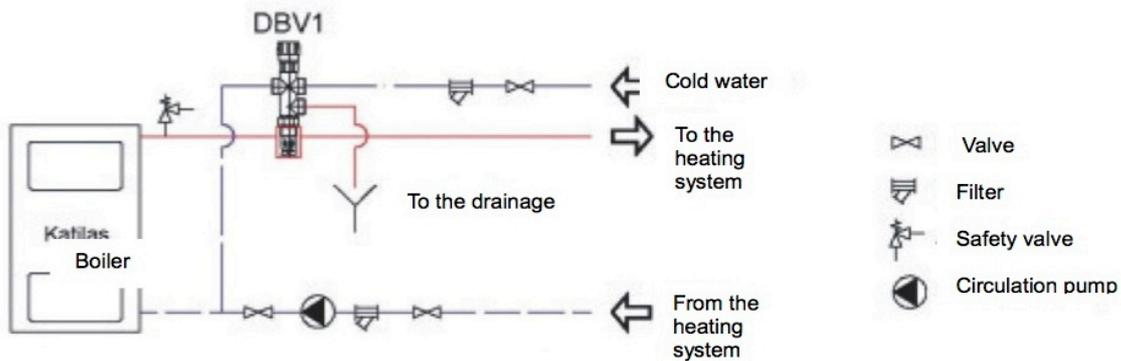
Opening temperature	- 100°C (212°F) (± 5°C - ± 41°C)
The maximum allowable temperature	- 120°C (248°C)
The maximum pressure on the side of the boiler	- 4bar (The boilers LIEPSNELE are sufficient with up to 1.5 bar)
The maximum pressure of the cold water	- 6bar
Side of the system	

The thermostatic cooling valve must be installed close to the branch pipe of the heated water supplied by the boiler. The valve can be mounted horizontally on the one or the other side of the branch pipe, as well as vertically with the adjustable head pointing up. It is strictly forbidden to mount the valve with the adjustable head pointing down.

Fig. 8



The cold water inlet pipe must be connected to the branch pipe (A) of the thermostat valve (see Fig. X). The pressure in the cold water supply system cannot be higher than 6bar, however, the recommended pressure in the heating system is about two times higher, but not less than 2bar. The branch pipe (B) is to be linked-up to connected to the return water pipe (see Fig. 8) When the temperature rises to a critical threshold and the thermostat cooling valve turns on, the heated water in the boiler will be cooled down by the supply of the cold water to the return water flow of the heating system, thus avoiding overheating of the boiler. The pressure excess will be removed through the branch pipe of the thermostatic cooling valve (see Fig. 8), this branch pipe must be directed to the drainage.



Manufacturer's recommended connection diagram. Connecting recommend by qualified professionals.

The safety valve is also used in the heating system. The number 19 in the BOILER CONSTRUCTION scheme (Section 4) refers to the coupling of the safety valve, and the above mentioned safety valve Honeywell SM110 - 1/2AA1.5 or the analogue that corresponds its parameters is installed in this coupling. For enhanced security, the separate coupling is installed into the safety valve in the boiler in case the specialist, who does connection works, would definitely install the indicated valve. If all the installation is done in the general system, the cases might occur where the safety valve is not installed. The usage of the safety valve in the heating system is strictly obligatory!

## 9.2. EMERGENCY FIRE FIGHTING

There are the following cases of usage of emergency firefighting:

- Failure in the heating system;
- Damage in the mechanical heating system;
- Incorrect adjustment of air supply to the boiler;
- Incorrect insertion of the air valve which controls and regulates the air supply;
- The temperature rising above the indicated normative beyond your knowledge;
- Ash removal door is left open, leading to an enormous combustion of the inserted fuel (THIS DOOR MUST ALWAYS BE CLOSED!);
- Portion of the smoke enters the boiler room because of the dirty chimney;
- In case of other events outside the manufacturer;
- In case of Force majeure, a decision to stop the operation of the boiler is to be taken.

If necessary, please quickly extinguish the boiler following these steps:

1. When using the thermostatic cooling valve "Regulus DBV1" in the closed heating system with the set temperature, the cooling valve is being automatically activated. Cold water from the water-cooling system valve helps to replace the hot water from the heating system by flowing it to the water pipe. This method is being used for possible suspension of overheating or boiling water.

2. Termination of intake of fresh air into the interior of the boiler:

- a) The air valve is closed;
- b) Immediately close the boiler door if it was left open.

3. Lift the air distributor using the lifting cable, so that even a minimum intake of fresh air to the boiler takes place away from the combustion hearth.

4. If the temperature is higher than a critical temperature of 100 °C and still there is active combustion process in the boiler, in order to terminate combustion as soon as possible, pour some sand into the combustion hearth inside the boiler.

5. If following steps 2 and 3, the temperature is not close to the critical limit, please wait until you notice that the temperature starts to fall, which means that the boiler goes out.

6. A circulating pump is being used as an auxiliary tool for cooling the boiler. If there is no power failure and the fault is not in the heating system, the hot water is being pushed out of the boiler and cold water is pushed in more quickly by speeding up the functioning of the boiler, thus making more time available for safe firefighting of the boiler by stopping an intake of fresh air into it.

All the mentioned firefighting or cooling techniques are used in heating systems which meet manufacturer's recommendations and the requirements. Therefore, it is necessary to get acquainted with the boiler operating instructions and pay significant attention to the instructions for use in case of potential hazards.

## 10. REQUIREMENTS FOR THE SAFETY EQUIPMENT

Boiler room is high-risk area. Irresponsible behaviour can lead to injuries, poisoning, fire, and damage to the boiler or failures of the entire heating system.

Safety requirements	Consequences of breach of the prohibition and measures
1. Do not boil water in the boiler	1. The boiled water will lead to overheating of the boiler and crack. If water in the boiler has boiled for the reasons unknown to you, the first thing you must do is to close the air inlet vent, then carefully open the fuel loading doors, keeping your face to a safe distance from them and pour water in the firebox.
2. Do not fire up the boiler with no water inside. Do not exceed the pressure in the system more than 1.5 bar. Do not freeze the water inside the heating system and the boiler.	2. Damage of equipment of the heating system and the boiler.
3. The boiler room must be supplied with the air from outside.	3. Danger of poisoning; if the boiler fails to operate, open the window in the boiler room or get air from outside using other methods.
4. Do not let air get through the ash removal door and do not load fuel through them.	4. Water will boil in the boiler.
5. Do not let air get through the ash removal door and do not load fuel through them.	5. When lowering the air distributor, the heated end may get deformed from the blow; it may also fall down into the heating centre and wear more quickly due to the high heat.
<b>The most frequent mistakes at the time of boiler installation</b>	
1. The boiler is being installed following the user manuals from other manufacturers, where there is the return of abundant amount of water to the return flow is being applied, as if it eliminated the negative influence of the condensate.	<p><b>Consequences</b> Large amount of water freezes the walls of the chamber and the walls of the small gap. It is sufficient for the humidity to emit on the walls. It, of course, dries out at the moment of the boiler heating, but the walls may get contaminated with combustion products, which leads to the recurrent clogging of the boiler and the flue.</p> <p><b>Elimination</b> Adjust the recommended flow, so the humidity will accumulate below the combustion hearth, and the smoke gaps will always remain clean.</p>
2. The circulation pump and the boiler are being linked-up to the outdated heating system with no controllers on the elements	<p><b>Consequences</b> 2. A large flow of cooled water leads to the large amount of condensate; the boiler room gets saturated with an unpleasant smell; the boiler operates in a very unefficient way and does not develop the required power.</p>
<b>The biggest boiler operating errors</b>	
1. The boiler is fired up when the flue traction is excessive.	2. There is an audible pulsation inside the boiler and occasionally jumping air valve. Boiler operation is very uneconomic, there is flowing condensate and the power supply is insufficient. The traction controller must be installed below the flue (as shown in the diagram). The traction controller will help to adjust the traction from the boiler so the boiler can operate in the usual way.
2. The lift cable of the distributor is not regularly lubricated.	2. The air distributor is difficult to lift. There is a noticeable wear of the cable.
3. The boiler is fired up using plastic, cardboard and other waste.	3. If the cardboard prevents the combustion process, please, do not use plastic and other construction packaging waste for firing up the boiler. There are gasses being generated at the moment of combustion process, so they fail to burn evenly and there is a surplus of gas being accumulated, which explodes inside the boiler or the flue, this way eroding joints of the flue.
4. The temperature inside the boiler is too low, lower than 60 °C.	4. Condensate clogs the boiler and the flue

## 11. RISK ASSESSMENT

### DANGER OF HEAT

Touching the hot parts of the boiler can cause burns. The surface of the boiler heats up more than 40°C (104°C); most parts of the boiler are insulated using heat-resistant and heat-retardant materials, but there are parts that cannot be isolated. The doors and the handles heat up a lot harder, and they cause danger. The hot water circulation pipes after the test on heating system are necessary to be isolated using heat-resistant materials before the construction of the boiler. There has to be an uninsulated part of 5 cm (196 in) for monitoring left on the waste water pipe. The pipe must be taken to drainage or a container, insulated with heat-resistant materials.

### DANGER OF PRESSURE

The increased pressure is possible when the circulating pump stops due to the power failure. The cooled water does not get from the boiler to the heating system; the temperature in the boiler may reach a critical threshold. Then the air supply regulator turns on; closes the air supply to the boiler, thus extinguishing the boiler. The temperature can still reach the critical range of 100°C (212°F) due to inertia, but the water does not boil thanks to the upper combustion principle when the burning only a small layer of fuel on the upper part does not get a sufficient amount of air and is being slowly extinguished. If the air supply valve is deformed or the other parts indicated in the user manual of the boiler (e.g. open ash removal door) are being damaged, the water in the boiler can simmer. Then the pressure increases up to 1.5 bar, the pressure safety valve which releases steam and does not allow for the pressure to rise in the boiler, turns on, at the same time allowing the cooled water from the heating system to flow into the boiler through the return water pipe and thus cooling down the water in there.

If thermostatic cooling valve "Regulus DBV1" is being used in closed heating systems, the cooling valve is activated automatically at the set temperature. Thanks to the cooling valve, cold water from the water-cooling system replaces the hot water from the heating system by flushing it down the sewage pipe. This way prevents possible overheating or boiling of water.

When the boiler is being incorrectly exploited, for instance, if the air continuously flows into the boiler through the lower ash removal door, there is the intensive combustion going on continuously in the boiler; the boiler then exceeds its capacity for several times; it may boil the water, overheat and crack.

The boiler may also crack from excessive pressure when there is a safety valve of higher pressure installed; pressure safety valve is installed in the wrong place in the system or it is clogged.

***The testing and practical use have proved that the boiler will never explode outwards. It cracks inside, and therefore does not endanger human health and life.***

### DANGER OF INTOXICATION

The boiling room may get saturated with carbon monoxide when the boiler flue gets clogged or cleaned, therefore there has to be a natural exhaust ventilation installed in the boiler room. In order for the natural exhaust ventilation to function, there must be the inflow ventilation or an open window located on the outer wall. The boiler would not function with no inflow ventilation present. So be sure to install the inflow ventilation. The doors of the boiler room must be tightly closed so the boiler operation stays stable and the dust or carbon monoxide do not get out of the boiler room to the residential premises when the forced ventilation facilities (e.g. sanitary conveniences and kitchen cooker hood) are turned on.

**12. CERTIFICATE OF PRODUCT WARRANTY**

**CERTIFICATE OF WARRANTY**

<b>Boiler name:</b>	LIEPSNELE	<b>model:</b>	
serial number:			
Organization - the manufacturer::	UAB „Vakaro rasa“		
Sale Date:	20__ y. _____	signature _____	stamp
Company name – Seller:			
Address and telephone number of the company:			
Sale Date:	20__ y. _____		
seller name and surname:			signature _____ stamp
Address where equipment was installed:			
Contact person:			
Phone:			
Company name, which installed the equipment:			
Date of commissioning:	20__ y. _____		
master's name and surname which makes installation and commissioning of the equipment:	_____		
	Position and signature		
I hereby certify that the equipment is put into operation, is working properly instructed in the rules of operation and safety produced. Warranty read and agree. Buyer's signature:			
_____ Signature			
<b>PERFORM WARRANTY WORK</b>			
Date	Name of works / replaced parts	Organization	Master signature

Warranty for the boiler heat exchanger - 5 (five) years.



# CERTIFICATE

**EC DESIGN-EXAMINATION**  
(certificate of conformity)  
acc. to Pressure Equipment Directive 97/23/EC

Certificate No.: 0897/1448/14

Name and address of  
manufacturer:

VAKARO RASA  
Taikos str. 18  
Trakiskis  
LT-38102 Panevezio raj, Lithuania

This is to certify, that the design of the pressure equipment listed below meets the requirements of the Pressure Equipment Directive 97/23/EC.

Examined acc. to Directive 97/23/EC	EC design-examination (module B1)
Examination Report No.:	0897/1448/14
Description of pressure equipment:	Hand stocked heating boilers, Models: Liepsnele L-10/ L-20/ L-40/ L-10u/ L-20u/ L-40u
Category:	----
Drawing No.:	VR 00.00 SB
	The approved drawing(s) is (are) attached.
Construction code:	EN 303-5: 2012

Arnstadt, 12.06.2014



(H. Prokopp)  
Certification Body for Pressure Equipment of  
TÜV Thüringen e.V.  
Notified Body 0090 97/23/EC

*Liepsnele*

SINCE 2006