



TOPLING

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Operating instructions for

BOILER "TT"

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1. Notes on these instruction

1.1 Introduction

These Operating instructions contains important information for proper and safe operation of the TT boiler. Following these instructions means that danger can be avoided, repair costs and breakdowns can be prevented, reliability can be maintained and that the operational life of the heating system can be increased.

These Operating instructions must be read and applied by everyone who operates or works on the TT boiler.

We continuously develop and improve our boilers. The information in this version was correct at the time of going to press.

All details in these instructions on standards, regulations and worksheets should be checked before use and should be compared with the regulations applying locally at the installation location.

We reserve the right to make changes which may then deviate from the technical details and illustrations in these Operating instructions.

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1.2 Structure of the Operating instructions

Chapter	Here you see, ...
1 Notes on these instructions	... how to use these Operating instructions.
2 Safety notes	... everything on the subject of safety that you should consider when using the heating system.
3 Functional description	... the structure and all of the features of the heating system
4 Instalation of the boiler	... how to install boiler on central heating system.
5 Putting in operation	... Overview of the controls and display components
6 Maintanance of the boiler	...maintanance periods
7 Possible problems in operation	... how you can remedy faults in the heating system.
8 Commissioning the heating system	... how the heating system is to be initially put into operation.
9 Notes on dismantling and disposal	... what has to be considered when dismantling and disposing of the heating system.
10 Guarantee	... what the terms and conditions of the guarantee are.

1.3 Glossary

Term	Explanation
Display	Display on the TT control unit
TT	Boiler to burn the wood
Automatic	Electronic control for the boiler
Sensor	This collects certain parameters (temperature) and passes them on to the control system for analysis

Table1

2 Safety notes

2.1 Proper use

BASIC PRINCIPLES FOR THE CONSTRUCTION OF THE SYSTEM

The heating system was built using state of the art technology and conforms to recognised safety regulations. However, its use can result in the injury or death of the user or a third party or in impairments to the heating system itself or to other material goods.

Have your specialist heating company provide you with a detailed explanation of the operation of the heating system.

USING THE HEATING SYSTEM

Only use the heating system when it is in perfect condition. Use it properly, as intended, staying aware of safety and of the dangers involved, following the Operation instructions. Have any faults which could impair safety immediately fixed.

RELIABLE AND UNRELIABLE MODES OF OPERATION

The heating system was designed to burn wood pellets.

Any other use is improper. The manufacturer will accept no responsibility for any damage resulting from improper use. The operator will bear sole responsibility. Proper use includes maintaining installation, operation and maintenance conditions specified by the manufacturer.

You may only enter or change the operating values specified in these instructions. Any other entries will affect the heating system's control programme and could lead to malfunction.

PERMISSIBLE FUEL

Only wood logs and briquet with water content up to 20% are permissible as fuel for the boiler.

2.2 Residual risk

Despite all precautions, the following residual risks remain:



Caution

Hot surface.

Contact with the hot surface of the boiler can lead to burns.

Wait until the boiler has cooled down before touching uninsulated components.



Warning

Danger of asphyxiation due to carbon monoxide.

If the boiler is operating, carbon monoxide can be emitted through the open ash Door.

Do not leave the ash door open any longer than necessary.

2.3 Warnings and safety symbols used

The following warnings and safety symbols are used in these Operating instructions:



Danger!

Danger from electrical current or voltage.

Work on areas marked with this symbol may only be done by a qualified electrician.



Warning!

Warning about a dangerous location. Work on areas marked with this symbol can lead to serious injuries or to extensive material damage.



Caution!

Hand injuries

Work on locations marked with this symbol can lead to hand injuries.



Hot surface

Work on locations marked with this symbol can lead to burns.



Danger of fire

Work on locations marked with this symbol can lead to a fire.



Frost danger

Work on locations marked with this symbol can lead to frost damage.



Notes on disposal.



Additional information for the operator.

2.4 Duty to inform

READING THE OPERATING INSTRUCTIONS

Everyone who works on the system must have read the Operating instructions before starting work and, in particular, have chapter "2 Safety notes"

This holds especially true for persons who only occasionally work on the system e.g. when cleaning or maintaining the heating system.

These Operating instructions must be kept ready to hand at the heating system's installation location.



Pay particular attention to the applicable local standards and guidelines.

3. Functional description

3.1. Overview

-The "TT-35" boiler has modern construction and design and it has been made of attested high quality materials.

-The boiler uses wood as fuel and it acts on the principle of dry pyrolytical wood distillation. When burning the fuel with limited air supply, the wood transforms into charcoal. This transformation is followed by the creation of gases which are led to the nozzles of the burner and in the lower combustion chamber they burn down in the form of gas flame. Such fuelling enables a very good utilization of wood as fuel, with a minimum share of CO₂ in smoke/flue gases.

-The fire-box of the boiler is composed of two parts: a fuelling chamber and a combustion chamber. The fuelling chamber serves to receive even bigger quantities of wood. The process of pyrolysis takes place on the bottom of this chamber.

-The combustion chamber serves for combustion of gases created by pyrolysis. It is made of quality fire-clay.

-The bearing of the boiler is under sub-pressure. The sub-pressure in the fire-box is created by the ventilator of flue gases placed in a smoke canal.

-Intake of air to the boiler is performed via a regulation flap which is placed in the chamber for regulation of air intake (Graph 1)

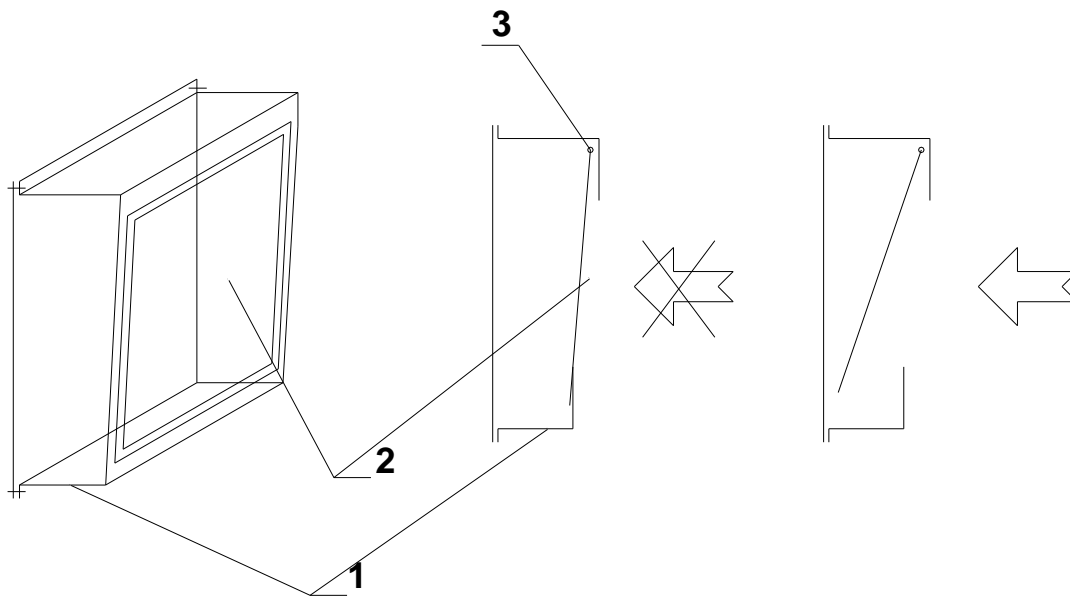


Illustration 1 Secondary air regulation flap

Legend

1-regulation flap box

2-regulation flap

3- pin/axis

When the boiler door closed and the ventilator switched on, the flap is in open position (as shown on the right side of Graph 1)

-At the moment of switching off the ventilator the flap must be closed.

-The fire-box is large enough to house the quantity of wood necessary for a continual work of up to 12 hours. How long one charge would last will depend on the energy required by the very object.

-The boiler is intended for burning of wood with moisture content of up to 25%

-Wood briquettes of at least 10cm length and 4 cm thickness can be used for fuelling. The wood originating from winter season cutting should age for at least 12 months, and the wood origination from summer season cutting at least 18 months. The best is to use the deciduous trees such as: beech, oak, birch. It is also possible to use coniferous trees, but because of its thickness such wood, despite the same volume, have lower heating value than the deciduous one. Also when fuelling the coniferous woods the furnace/stove parts become dirtier more quickly and more intensively.



Attention

-It is forbidden to use other sorts of fuel such as timber scrapings, timber sawdust, charcoal, coke, dark coal etc.

-Besides, materials such as plastic, rubber, paints, lacquer, inflammables, explosive material etc must not be burned in the boiler.

The "TT" boiler has modern construction and design; it has been made of attested high quality materials.

The construction of the boiler complies with European Directives 98/37/EC, 97/23/EC, 73/23/EEG, 89/336/EEG and European standards EN 303-5:1999; EN 60204-1 : 2006; EN 60335-1:2002;EN 60335-2-102; EN 61000-6-3:2001; EN ISO 12100-1:2003 EN ISO 12100-2:2003; EN 1050:1997, EN 287-1: 2004, EN 15614-1:2004+A1:2008;EN 10204:2004; EN ISO 7000 :2004;

Testing of the boiler has been done in accordance with EN 303-5 and EN 304 and it meets all the conditions for being connected to the central heating installation.

The heating boiler is intended for central heating of housing units, family houses, business premises and production units..

Handling of the boiler is very easy and it includes only switching it on via the main switch and adjustment of the desired temperature.

The firebox and convective parts of the boiler have been made of quality boiler thin metal plate by technology of welding.

The boiler is well insulated with hard-pressed mineral wool in a quality and proper thin metal plate paneling.

Air-flow and inflow of oxygen necessary for combustion is ensured by a ventilator which is thermally protected, and of small dimensions and small energy consumption.

Assembling and putting the boiler in operation are simple and the connections are of standard type.

The boiler is waterproof tested. The allowed working pressure is 2.5 bar

The boiler can be used if directly connected to the network but better effects are achieved when it is used with a heat accumulator on the principle of 50 liters of accumulator per 1kW of boiler power.

The boiler has been attested by the Faculty of Mechanical Engineering in Banja Luka.

3.2. Technical data

The boiler plate

Each heating boiler type "TT" have a data plate.
The boiler plate contain the following information



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Type	TT-	
Number/year of con.	/ 20	
Nom. heat (kW)		
Range (kW)		
Max.pressure (bar)	2.5	
Max.temperature(°C)	90	
Water content (l)		
Test pressure (bar)	5	
Class (EN 303-5)	3	
Electrical connexion		
voltage [V]	230	
frequency. [Hz]	50	
current [A]		
el.power [W]		

Illustration 2 Boiler plate

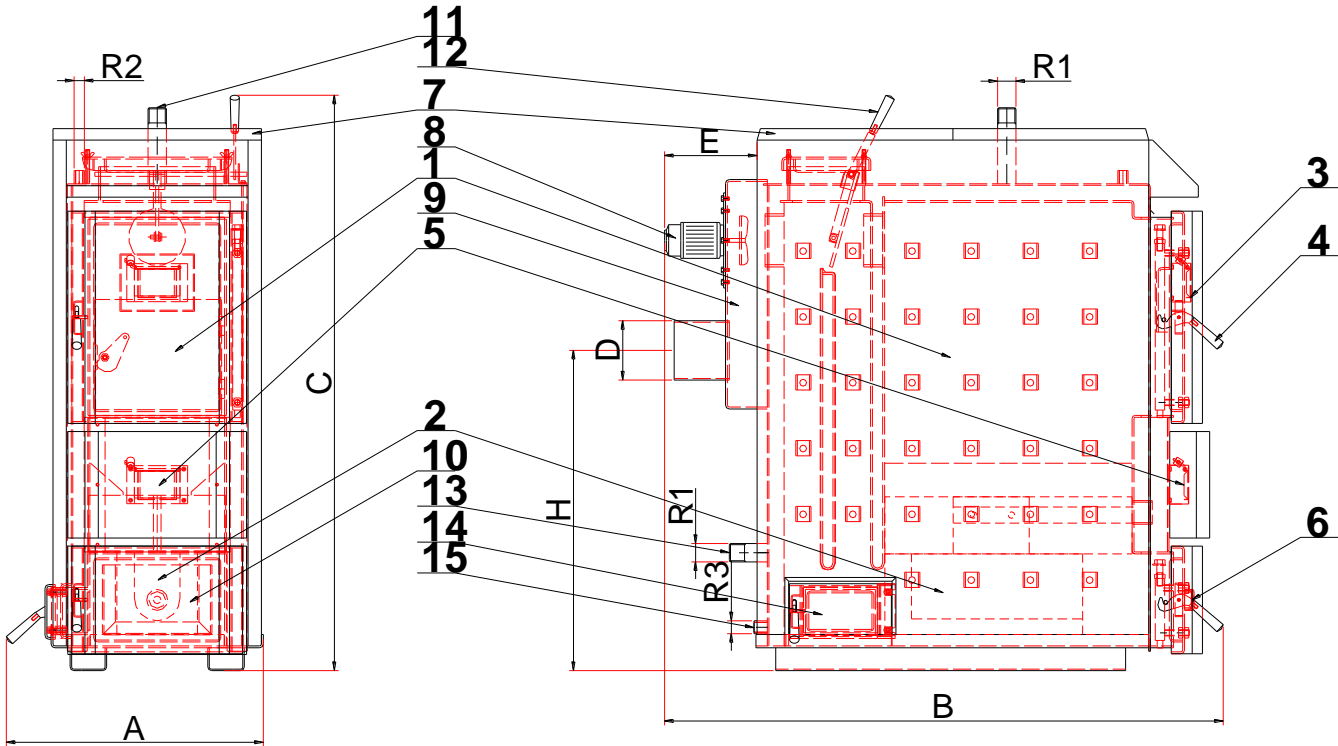


Illustration 3 - boiler TT

LEGEND

1. fuelling chamber
2. combustion chamber
3. furnace door for fuelling
4. door handle
5. opening for air access to furnace
6. lower door
7. boiler paneling
8. ventilator with electrical motor
9. flue gas canal
10. fire-clay inserted piece
11. outlet water pipe
12. flap for firing/pyrolysis
13. inlet water pipe
14. door for boiler cleaning
15. pipe for filling/discharging

TYPE	power [kW]	DIMENSIONS [mm]						CONNECTIONS [col]			draft [Pa]	weight [kg]	Water content [l]
		A	B	C	D	E	H	R1	R2	R3			
TT 15	15	558	1047	1178	140	250	660	5/4	1/2	3/4	18	250	70
TT 25	25	656	1076	1199	140	250	680	5/4	1/2	3/4	22	301	85
TT 35	35	676	1469	1513	160	244	842	5/4	1/2	3/4	25	530	135
TT 50	50	725	1632	1629	160	230	960	6/4	1/2	3/4	28	590	150
TT 75	75	850	1720	1715	200	220	1050	6/4	1/2	3/4	29	720	260
TT 125	125	1055	1810	1908	200	220	1196	DN65	1/2	3/4	30	940	461
TT 175	175	1205	2010	1908	230	220	1196	DN80	1/2	3/4	32	1310	690
TT 250	250	1320	2450	2050	250	220	1650	DN80	1/2	3/4	35	1520	851
TT 300	300	1413	2657	2187	250	600	1800	DN80	1/2	3/4	40	1920	972

Table 1

Type	TT 15	TT 25	TT 35	TT 50	TT 75	TT 125	TT 175	TT250	TT 300
Max power (kW)	15	25	35	50	75	125	175	250	300
Power range(kW)	7-15	12-25	17-35	25-50	35-75	60-125	80-175	120-250	150-300
Max. operating pressure(bar)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Max. allowable temperature(°)	90	90	90	90	90	90	90	90	90
Water temperature range(°C)	70-90	70-90	70-90	70-90	70-90	70-90	70-90	70-90	70-90
Class according to EN 303-5	3	3	3	3	3	3	3	3	3
Coefficient of efficiency(%)	91	91	91	91	91	91	91	91	91
Draught (Pa)	18	22	25	28	29	30	32	35	40
Smoke temperature-max. (°C)	250	250	250	250	250	250	250	250	250

Table 2

4. Installation of the boiler

4.1. Boiler installation on central heating system



The boiler installation on central heating system must be carried out only by a qualified persons.

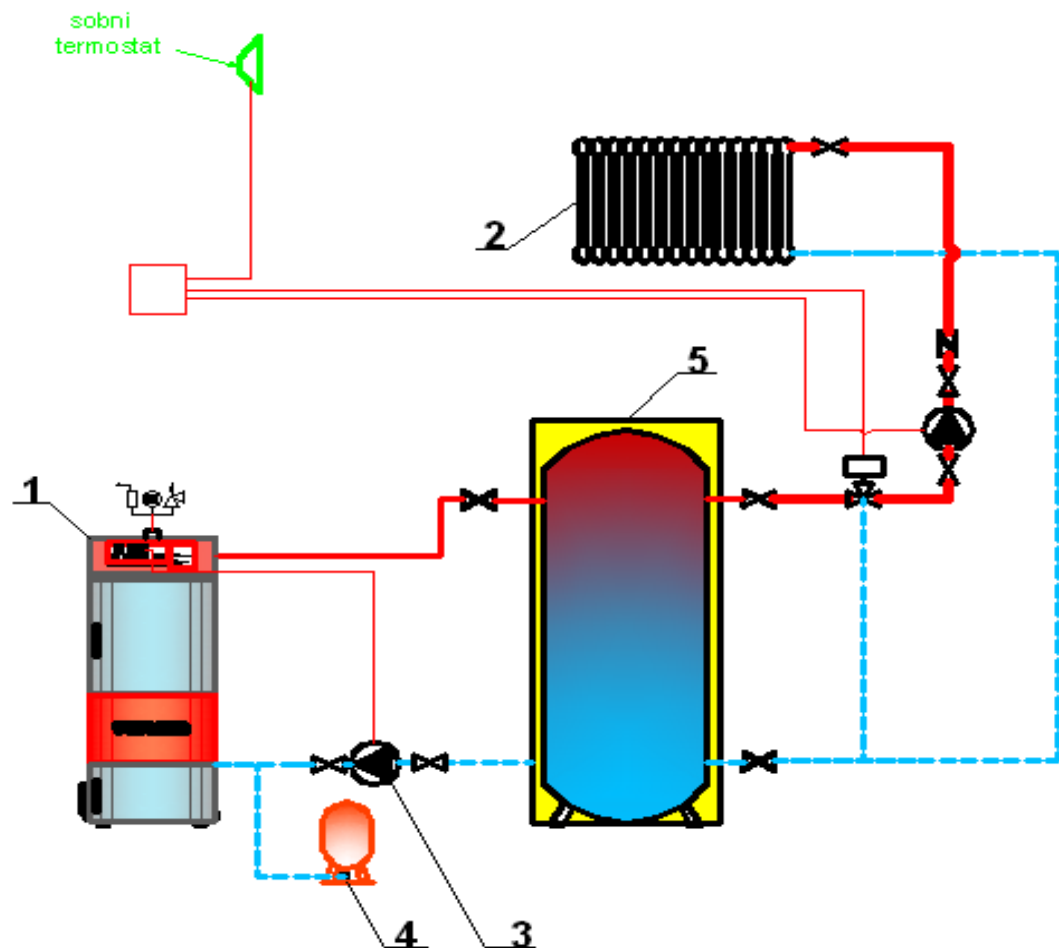


Illustration3 scheme of connecting the boiler to the installation with acumulation tank

- 1- Boiler
- 2- Radiator
- 3- Circulating pump
- 4- Expansion
- 5- Acumulation tank

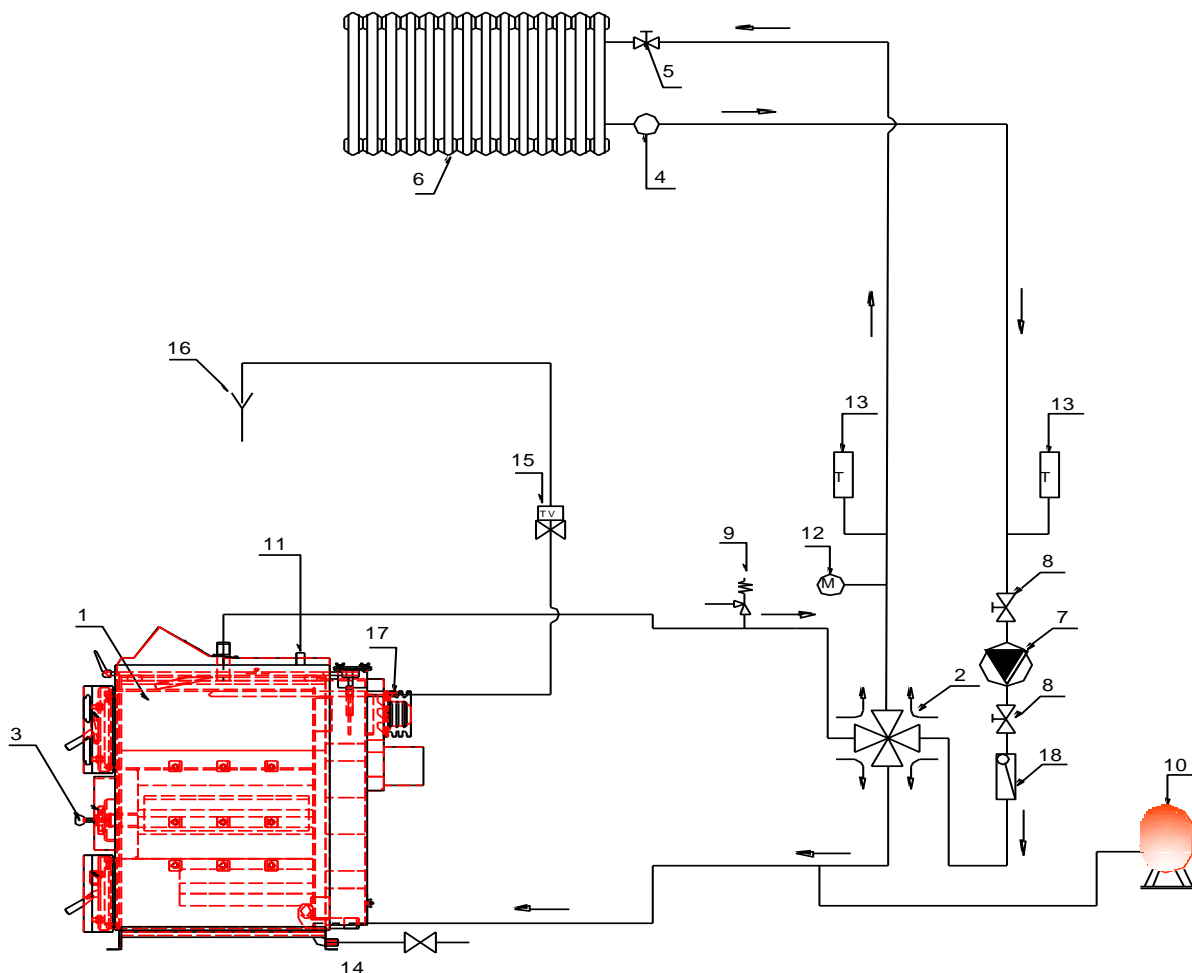


Illustration4 scheme of connecting the boiler to the installation without acumulation tank

1. Boiler
2. Mixing valve
3. Secundar air-inlet
4. Radiator valve
5. Radiator valve
6. Radiator
7. Pump
8. Valve
9. Safety valve
10. Expansion
11. Automatic vented valve
12. Manometer
13. Thermometer
14. Connection pipe for water filling
15. Thermo valve
16. Outlet of hot water
17. Thermal protection of boiler
18. Non return valve

The boiler should be placed as closest to the chimney as possible.

Free supply of air to the boiler should not be closed.



WARNING

- The boiler must be placed on a stable and flat floor. Placement and installation of the boiler must be carried out by a **competent technician**.
- The boiler room must contain connections from water supply network, a connection for possible water outflow, and a connection to power network with **obligatory earthing**.
- It is necessary to have natural airing of the boiler room which would ensure fresh air supply.
- The floor and the inside of the boiler room must be made of fireproof material.

It is recommendable not to have humidity in the room in order to avoid corrosion of metal parts of the boiler so as to ensure its longer lifetime

It is recommended to use softened water for filling the boiler from the system

The circulation pump is to be put in operation only after the heating system is filled with water and it is obligatory to ensure air exhaust of the system

When connecting the boiler with the chimney, the chimney is to be placed with a rise. All the connection must be tightly stuffed/joined.



The chimney must be dimensioned as shown on the diagram in **illustration 4 and 5**

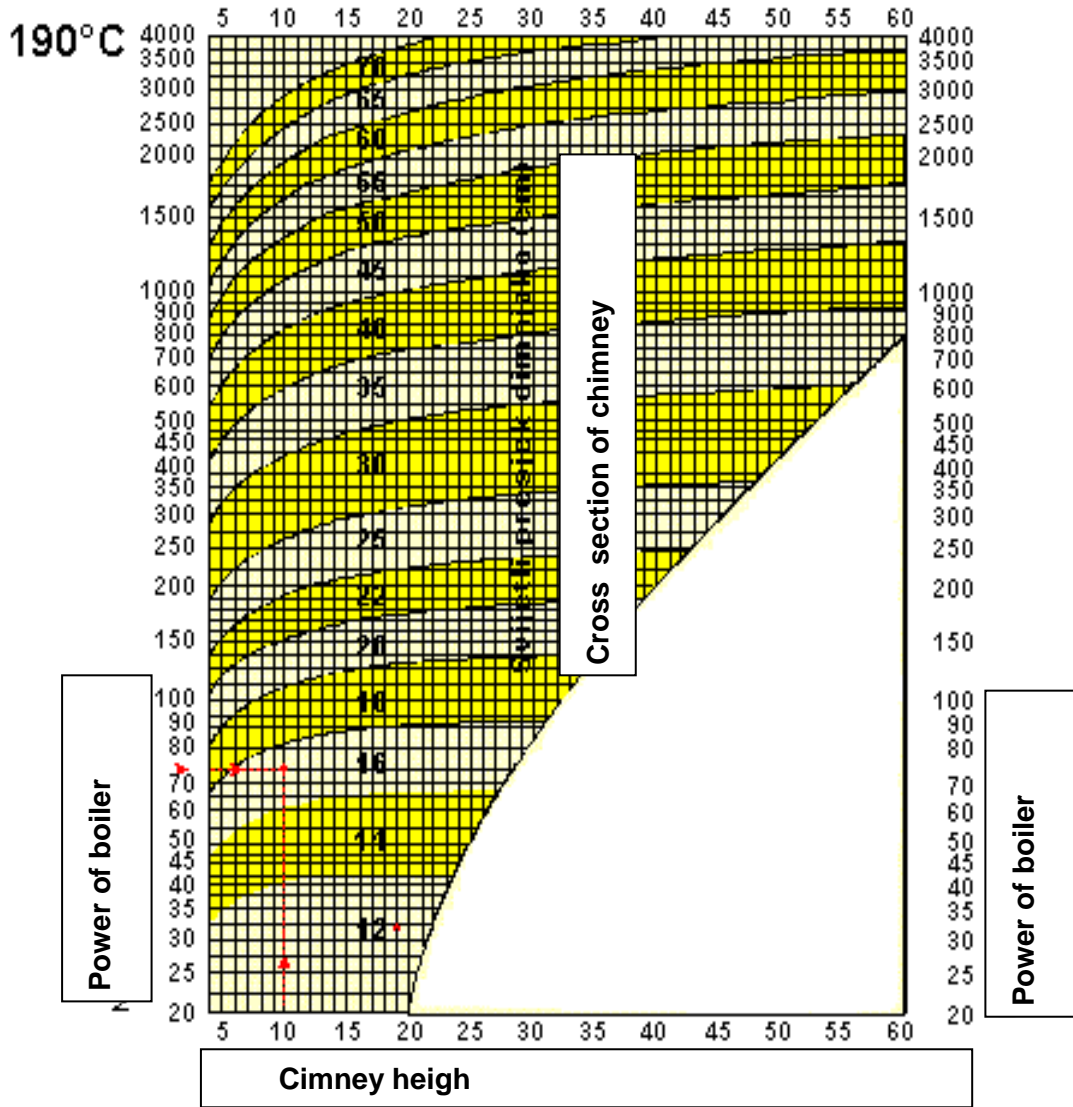


Illustration 4 choice of chimney for forced draft boilers (Schiedel)

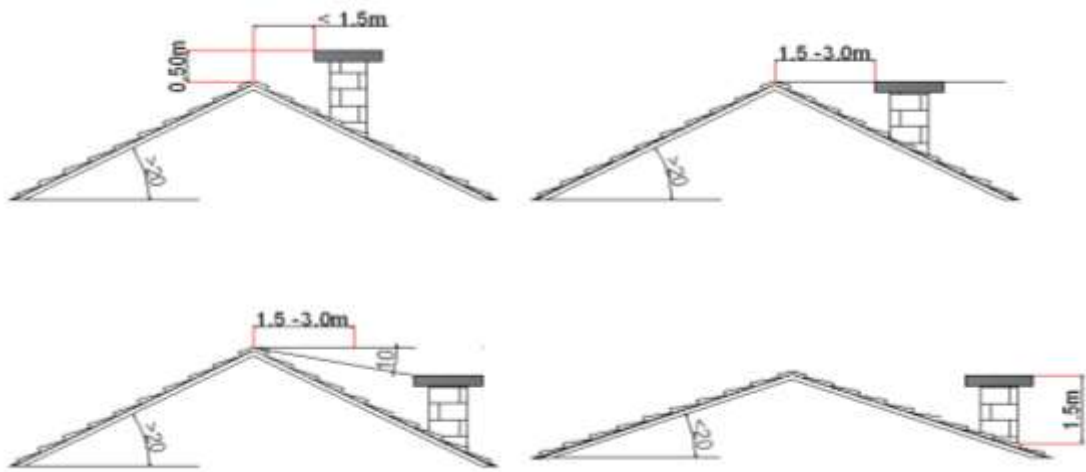


Illustration 5 Examples of appropriately placed and dimensioned chimneys

Before fuelling/lighting the fire it is obligatory to check:

- the pressure of water in the boiler and the installation
- when fuelling/lighting the fire it is necessary to place the flap of the flue gas canal in the "fuelling/lighting the fire regime" position
- the best option is to fuel/light the fire to the boiler with soft wood
- minimum time for fuelling/lighting the fire to the boiler is 20-25min
- upon completion of fuelling/lighting the fire, the firebox is to be fully filled up and the last flap is to be set to the "piroliza" regime
- circulation pump is to be switched on and the water from the boiler is to be released into installation only when the temperature of the water in the boiler reaches 60°C
- the circulation pump of the boiler must be connected via the armature.

In a closed heating system it is obligatory to install an attested safety valve with the opening pressure of 2.5 bar as well as to install an expansion tank. It is not allowed to install a hasp element between the safety valve and the expansion tank.

The twitter temperature in the boiler must not drop below 60°C because condensation will then appear.



If the boiler is not used during strong winters or low atmospheric temperatures it is necessary to release the water from the system or to fill it with anti-freeze liquid.

5. Putting in operation

5.1. Overview of the controls and display components



Illustration 10. Front side of the regulator

The regulator is intended for operating of the boiler TURBOTOPLING which uses dry wood as its fuel.

The regulator has the following abilities and characteristics.

- Measuring of the water temperature in the boiler.
- Measuring of the temperature of flue gases.
- Operating of the pump
- Possibility of the boiler operating with a room thermostat.
- Possibility of setting of all parameters.
- Power supply 230V/50Hz, relay outputs 250V/3A (opening and closing).
- Saving of the setting after turn off.

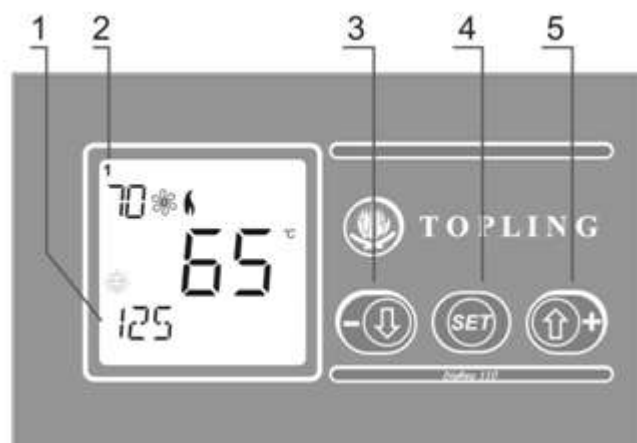


Illustration 11. Description of front side of regulator

1. LCD indicator
2. Foil front side
3. Button for decrease of the value of parameter (MINUS)
4. Button for start of set up (SET)
5. Button for increase of the value of parameter (PLUS)

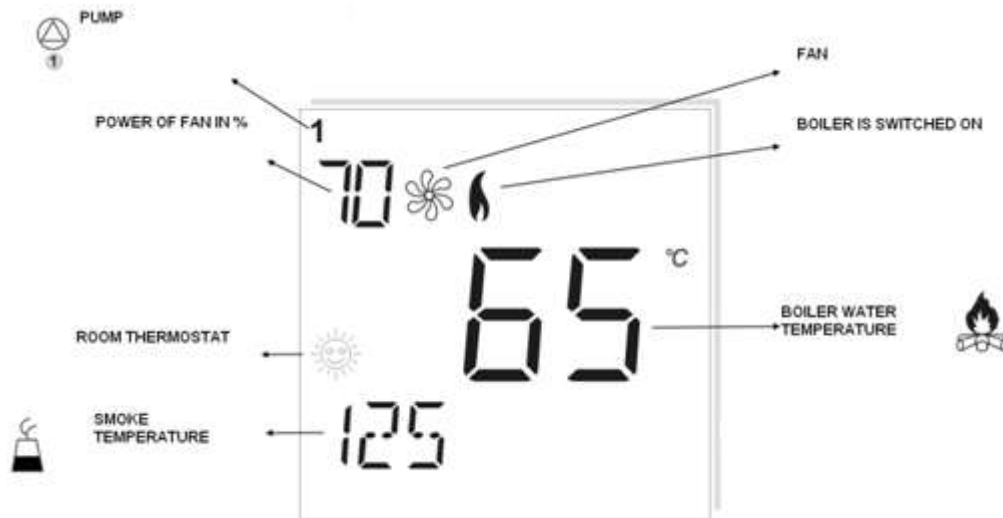


Illustration 12. LCD Description

On the display of the regulator there is data about the current state and data about the measured sizes. For example: the symbol which marks the operation of the fan blinks when the fan is turned on.

5.2. Setting of working parameters and start up of automatics

The boiler starts with START switch. Then turns on the fan flue gases (the rate determined with PAR 3). If the time defined by the PAR 102 flue gases temperature don't reaches a value defined by the PAR 101 boiler stops working (the fan is turned off). If there is a decrease in flue gases temperature (below PAR 101 minus PAR 103) operation of the boiler stops.

When the boiler temperature reaches the value defined by the PAR 1 boiler stops until the water temperature does not decrease the value of PAR 1 – PAR2. If the room thermostat is switched off the boiler stops working to re-inclusion room thermostat. The pump turns on at temperature defined with PAR 4, and turns off at temperature PAR 4 - PAR 100.

In the event that the water probe is invalid on the display is written ERR1.

In the event that the flue gases probe is invalid on the display is written ERR2.

Parameters are divided in two groups:

- USAGE parameters,
- SERVICE parameters.

Below are described user parameters:



PAR 1. Maximum operating temperature of the boiler.

We change the values with the keys + and -. When we set desired value, we press the key SET.



PAR 2. Difference for the operating temperature of the boiler.

We change the values with the keys + and -. When we set desired value, we press the key SET.



PAR 3. Operating speed fan.

We change the values with the keys + and -. When we set desired value, we press the key SET.



PAR 4. Temperature for the inclusion of pump.

We change the values with the keys + and -. When we set desired value, we press the key SET.

When we finish settings, we end with the parameter - END.



Exit from the program

We enter the service parameters by pressing the key SET and key PLUS (or MINUS) and keep it pressed for at least 5 seconds.

Instead of usage menu, the regulator displays service parameters which start with the index 100 to 103.

Index	Description of SERVICE parameters	JM
100	Temperature difference for the pump	°C
101	Required temperature flue gases	°C
102	Time to reach the set temperature flue gases	min
103	Hysteresis for flue gas	°C

Table 6. Description of service parameters

6. Maintenance of the boiler

6.1. Maintenance periods

To ensure fault-free operation, certain cleaning and maintenance work is necessary. These avoid expensive repair work, as long as you maintain the recommended intervals



The specified maintenance intervals are guidelines. Depending on the quality of the wood and the power used by the heating system (more frequent on/off operation) the intervals may be extended.



Turn off the control unit of boiler and the main switch before you go to perform operation describe in table below.

interval	component	how to do it
every three days	pipes in convective bundle	Cleaning is very simple and it is carried out by moving the cleaning handle on the mechanism intended for cleaning the convective bundle (illustration 1, position 15) in the front-back direction. The handle needs to be moved 5-6 times.
weekly	fire box	It is necessary to clean the fire-box from ash by pulling out the ash dish through the opening intended for cleaning (illustration 1, position 14). It is necessary to clean the fire-box of the boiler from layers of soot in order to ensure better exchange of heat from the fuel to the water which is circulating through the heating system.
every six months	control unit	perform it with dry cloth
annually	whole boiler	It is necessary to perform a thorough cleaning of the whole boiler

Table3

In maintenance of the boiler it is required to install original parts of the manufacturer, this being the only way to keep the factory guarantee.

While lighting the fire in order to simply regulate the water temperature in radiators and to keep it below 60°C it is recommended to install at least the simplest manual three-way mixing valve.

Remark

Upon completion of the heating season make sure to clean the boiler thoroughly in order to increase its lifetime.



When you perform cleaning operation by vacuum cleaner it is important to cooled off the ash to avoid possibility of fire to breik out.



Danger of burns from the hot surfaces

When operating, the boiler surfaces under the cladding are hot.

Even when turned off, they only cool down slowly.

Only touch the hot surfaces with the carrying grip or wait until the surfaces have cooled down before starting with the cleaning and maintenance work.



Danger of asphyxiation due to carbon monoxide.

If the boiler is operating, carbon monoxide can be emitted through the open ash door.

Do not leave the ash door open any longer then necessary.

7. Possible problems in operation

In the case of malfunction, the red lamp is flickering (illustration 9, position 9) and on display will be lay down the inscription.

Problem	Cause	Solution of the problem
Boiler does not achieve working temperature	Filthiness of boiler or suffocated chimney	Necessary to clean the boiler and the chimney
Boiler becomes wet	Temperature of water below 60°C	Necessary to check the chimney and the flue gas canal
		Necessary to check if the chimney dimensions are appropriately determined
There is no voltage in the automatics	No electrical supply	Necessary to check the fuses of electrical network
	Fuse out of order	Necessary to replace the fuse
	Mistake in electrical cable	Necessary to check the connection and the cable
	Automatics out of order	Necessary to ask for assistance of service engineer or to replace the automatics
Ventilator off / does not work*	Safety thermostat has been activated	Necessary to unscrew the cap on the control panel and to deactivate it with a pointed/sharpened device
	No voltage on ventilator	Necessary to check connecting contacts on the automatics and on the ventilator. If the automatics is out of order it is necessary to ask for assistance of service engineer or to replace it.
	Ventilator out of order	Necessary to ask for assistance of service engineer or to replace the ventilator
Ventilator too noisy during its work	Bearing of ventilator out of order	Necessary to ask for assistance of service engineer or to replace the ventilator
	Condenser out of order	Necessary to ask for assistance of service engineer or to replace the condenser
	A foreign object in the casing	Necessary to check and clean it
	Ventilator is not attached appropriately	Necessary to check and attach it
Ventilator works weakly	Dirty vanes/blades	Necessary to check and clean them
	Ventilator's lid dirty	Necessary to ask for assistance of service engineer or to replace it
Pump off/does not work	No voltage on the pump	Necessary to check connecting contacts on the automatics and the pump. If the automatics is out of order it is necessary to ask for assistance of service engineer or to replace it.
	Pump got stuck	Necessary to ask for assistance of service engineer or to replace the pump
	Safety thermostat has been activated	Necessary to unscrew the cap on control panel and to deactivate it with a pointed/sharpened device

Table 4

8. Commissioning the heating system

The heating system will initially be commissioned by specialists from "TOPLING" or from an authorised TOPLING partner.

The commissioning includes an introduction to the operation and maintenance of the heating system as well as the taking of measurements on the system for pollution and heating capacity.



Danger !

Material damage and injury due to incorrect commissioning.

Commissioning the system requires comprehensive specialist knowledge. If this commissioning is

done by an untrained person, the heating system can be damaged. Only allow authorised specialists

to do the commissioning

8.1. Conditions

The following conditions must be met before the system can be commissioned without faults.

SWITCH OFF THE MAIN SUPPLY

- Is the circuit breaker in the main supply to the heating system switched off?

CHECK THE MECHANICAL ASSEMBLY

- Have the system components been correctly installed?
- Have all the mechanical components been firmly screwed together?
- Have the combustion chamber and ignition fan been correctly assembled?

CHECK THE HYDRAULIC CONNECTIONS

- Have the return pump been correctly installed?
- Has the safety equipment been installed to conform to the applicable standards and guidelines?

Check all electrical connections



Danger !

There is a risk from electrical shock

9. Notes on dismantling and disposal

9.1. Dismantling



Danger !

Material damage and injury due to incorrect disassembly.
Dismantling the system requires comprehensive specialist knowledge. If the heating system is

dismantling by an untrained person, injuries are possible.
Only allow autorised specialists to dismantle the system

The heating system can be dismantled as follows

1. Switch the heating system off.
2. Allow the boiler to burn out the wood or coal .
3. Isolate the heating system from the electrical power supply.
4. Whilst maintaining the personal safety regulations, separate the boiler from the heating system.
5. Dimantle the boiler coverings
6. Separate the mineral insulation from bioler

9.2. Lay down the boiler

The following parts are made from steel, and you must deliver it to the company that collect waste material:

- Body of boiler
- Boiler coverings

You must separate electrical component and deliver it to company that colect electrical waste material

Fibre glass and plastic parts should be handed in to the waste disposal centres.



Oily or greasy components and capacitors may only be disposed of via a specialist waste disposal centre..

10. Guarantee

10.1. Scope

You receive a guarantee of two years on the body of the boiler.
For electrical and other component, the guarantee period is one year

10.2. Conditions

The heating system must be commissioned by our customer service department or by an authorised specialist company.

The heating system must be operated as specified in the Operating instructions.

The heating system must be installed to applicable rules, regulations and guidelines.

10.3. Exclusions from the guarantee

The guarantee does not cover damage due to improper use or installation, nor damage caused by inadequate maintenance or by the operation of the the system and the heating system in an impermissible way.

Damage caused by external influences (such as fire, water, lightning, excess voltage) and normal wear and tear (e.g. of seals etc.) are excluded from the guarantee.