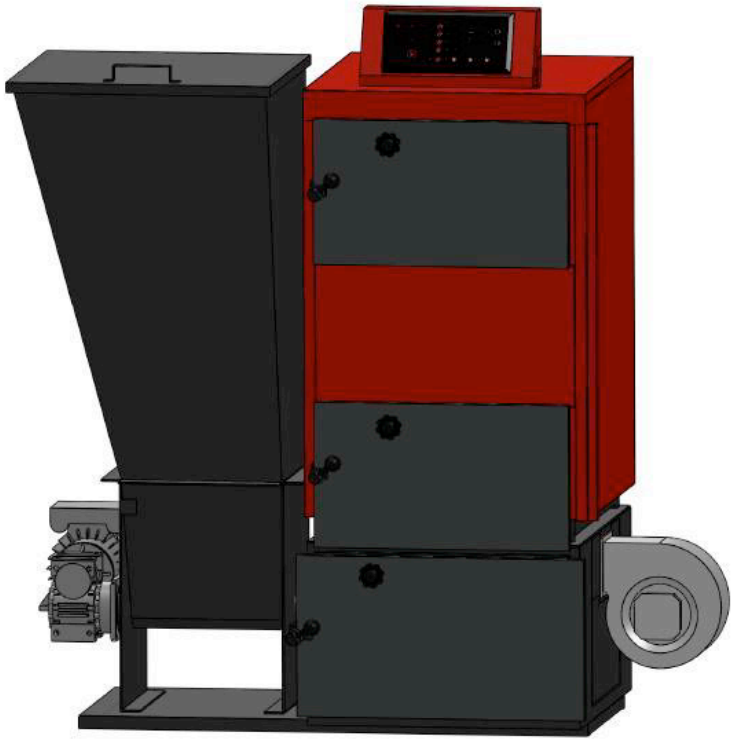
MAKTEK®

INSTALLATION USE AND MAINTAINENCE GUIDE FOR ELECTRONIC SOLID FUEL FIRED BOILER WITH STOCKER

25 MKK-S - 40 MKK-S - 60 MKK-S - 80 MKK-S - 100 MKK-S

125 MKK-S 150 MKK-S 200 MKK-S 250 MKK-S



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Please read.
Please keep.

CONTENT

PREFACE

MAKTEK is one the leading institutions in Turkey in heating industry since its foundation in 1976 . Inconsideration of monitoring technological developments

closely, MAKTEK takes the pride of presenting MAKTEK Solid Fuel Boilers in Turkey and World market.

Our company, which has acquired advanced technology and superior quality, stands on in accordance with these principles. This handbook is a helpful guide during operation and maintenance of the user boiler assembly. For malfunctions and maintenance, please contact our authorized service.

Our after sales service network is always at your service with abundant spare parts and widespread service organization.

MAKTEK GROUP COMPANIES

1.GENERAL WARNING BEFORE OPERATING THE UNIT

- Please check the conformity of waste gas , water and electric infrastucture of the area
- to the necessary technical parameters where the boiler will be installed.

- For safe use of electricity , make sure that the grounding of the installation is isolated and there is no phase.

- Your boiler is under guarantee for 2 years against component and production defects as long as it is used in line with the suggestions in this manual. Our company cannot be held liable for any misuse of the product.

- Please do not use the boiler out of its purpose. The boiler is designed to supply hot water (maximum 90 degrees) to your heating system.

- Clean air must always be provided in the area where the boiler is installed. Due to reasons of security, the installation of the boiler to closed areas with human presence is strictly forbidden.

- Please do not operate the boiler without water. Do not feed cold water to hot boiler. If,for any reason the boiler temprature is over 90 degrees, do not attempt to feed cold water to the boiler until the boiler temprature drops down to 40 degrees. The best solution for over heated boiler is to take out burning coal outside of the boiler

- Please do not drain the system water except repairing or during times of frost. Antifreeze material can be added to sytem water up to 15%

- During operation, the temprature difference between return and flow can be maximum 20
- degrees.

- Water with high calcer rate is extremely dangerous for boiler and installation. In this case, please use water softeners . Product failures as a result of blocked water passes is out of scope of factory guarantee

- Each year,before start of heating season,the boiler's chimney connection and internal parts
- must be checked and cleansed. This will enable efficient operation of the boiler.

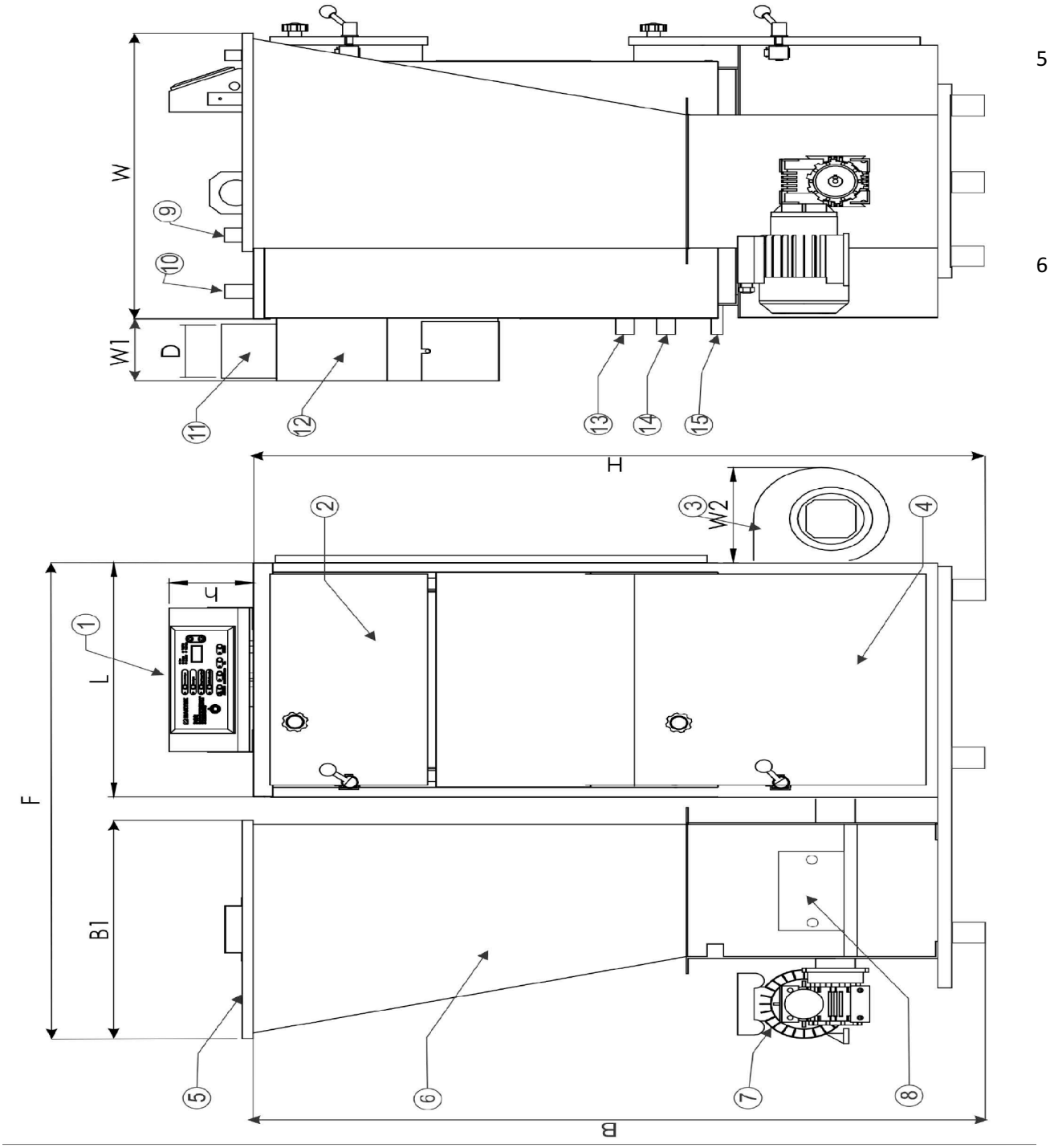
- Please do not take hot water out of the boiler for domestic use purposes

2. FEATURES OF THE BOILER

- Capacity between 25.000 kcal-250.000 kcal/h
- Burns the fuel which is up to 20mm diameter with high energy thanks to automatic fuel feeding.
- Heating with high efiiciency for coal and all solid fuels
- Monitoring of heating water on digital screen
- Electronic control panel
- Safe use with safety thermostat against overheating
- Energy saving thanks to special body design
- Burning air which comes from the hot bulb surface, ensures homogenous burning of the coal.
- Suited to use small coal, prina, nut shell as fuel
- Monitoring and setting feeding and waiting time on the electronic control panel
- Detoriations as a result of burning are minimised thanks to cast iron burning bunker
- Fan with quiet running cycle period and clap ensures maximum efficiency
- Automatic feeding enables ash to fall down in ash drawer.
- Wet rotor, 3 level circulation pump provides the intended circulation flow and energy saving
- When the fuel is totally used up in the fuel feeding tank and system temperature is under 25 degrees, the boiler shuts down automatically and extra running of the fan, pump and feeding engine stops.
- Thanks to its three pass combustion chamber design, the boiler uses the acquired heat from fuel at maximum level
- 2 years warranty
- CE Certificate
- Economic life cycle of the boiler is estimated to be 15 year

3. SECTIONS OF THE BOILER

*See techic table for dimensions stated with letters



SECTIONS OF THE BOILER

1. Control Panel
2. Top (cleaning) cover
3. Fan
4. Fuel Combustion Lid
5. Sifter
6. Stocker
7. Engine with Reductor
8. Stocker Fuel Disposal Lid
9. Circulation Flow
10. Safety Flow
11. Chimney Exhaust Pipe
12. Smoke Case
13. Circulation Return
14. Safety Return
15. Filling and Draining

4. INSTALLATION

* Boiler must be installed evenly and must be placed on 10 cm high place in boiler room installations.

*Boiler must be connected to a good drawing chimney and minimum number of elbows should be used between chimney and boiler.

*Boiler must be placed at a location with enough air intake for an efificient burning. It is required to use open expansion tank for the installation of MAKTEK Automatic Coal Boilers.

* Boiler- expansion tank return pipes must be absolutely isolated in extreme cold regions.
* Warning line should be installed for taking the overflow water from the expansion tank.
*There shouldn't be any valves, check valves on the pipes between boiler expansion tank
*Expansion tank volumes based on capacity are shown below:

MODEL	CAPACITY	EXPANSION TANK
25 MKK-S	25.000 kcal/h	50 lt
40 MKK-S	40.000 kcal/h	75 lt
60 MKK-S	60.000 kcal/h	100 lt
80 MKK-S	80.000 kcal/h	200 lt
100 MKK-S	100.000 kcal/h	250 lt
125 MKK-S	125.000 kcal/h	275 lt
150 MKK-S	150.000 kcal/h	300 lt
200 MKK-S	200.000 kcal/h	500 lt
250 MKK-S	250.000 kcal/h	600 lt

* At first operation of the boiler, installation pipes should be cleaned up before the connection. The most appropriate way is to flood water from one end of the pipes and to drain off at the other side.

*Circulation pump must be installed on boiler water return pipe.

*During installation, there must be enough working space left for technical service

intervention, boiler control, and fuel feeding

*Valve connection should be made on boiler water flow and return lines.

*Chimney connections should be leakproof, same diameter pipes without any narrowing sections should be used from the exit of boiler to the chimney hole.

*Grounding connections should be done, electricity connection of circulation pump should be done correctly. Only technical services are authorized at all electricity related breakdowns.

4.1 INSTALLATION AND WATER FLOOD

Please use open expansion tank for MAKTEK Solid Fuel Boilers. Closed expansion tank systems may trigger steaming of the boiler when there is an electric cut out or when the pump is not functioning.

Please connect open expansion tanks according to standarts.

No valve or similar materials must be installed on safety return or flow line of the open expansion tank.

In order to increase safety if the pump does not function,a by pass line must be secured between inlet and outlet spot of circulation pump as show in installation schema. The valve on by pass line should be kept closed during normal functioning . ıf there is an electricity cut and a risk of overheating appears, the valve must be open and the evacuation of hot water must be provided by natural circulation. The diameter of the pipe to be used at by pass line should be the same diameter size with the pipe used in installation at minimum.

As an extra security measure, an infinite power source may be used for electricty cut.
Please mount 3 bar security valve on the boiler for safety against over pressure in open expansion systems.

We suggest the mounting of the pump on return line in order to protect from over heating (steam).

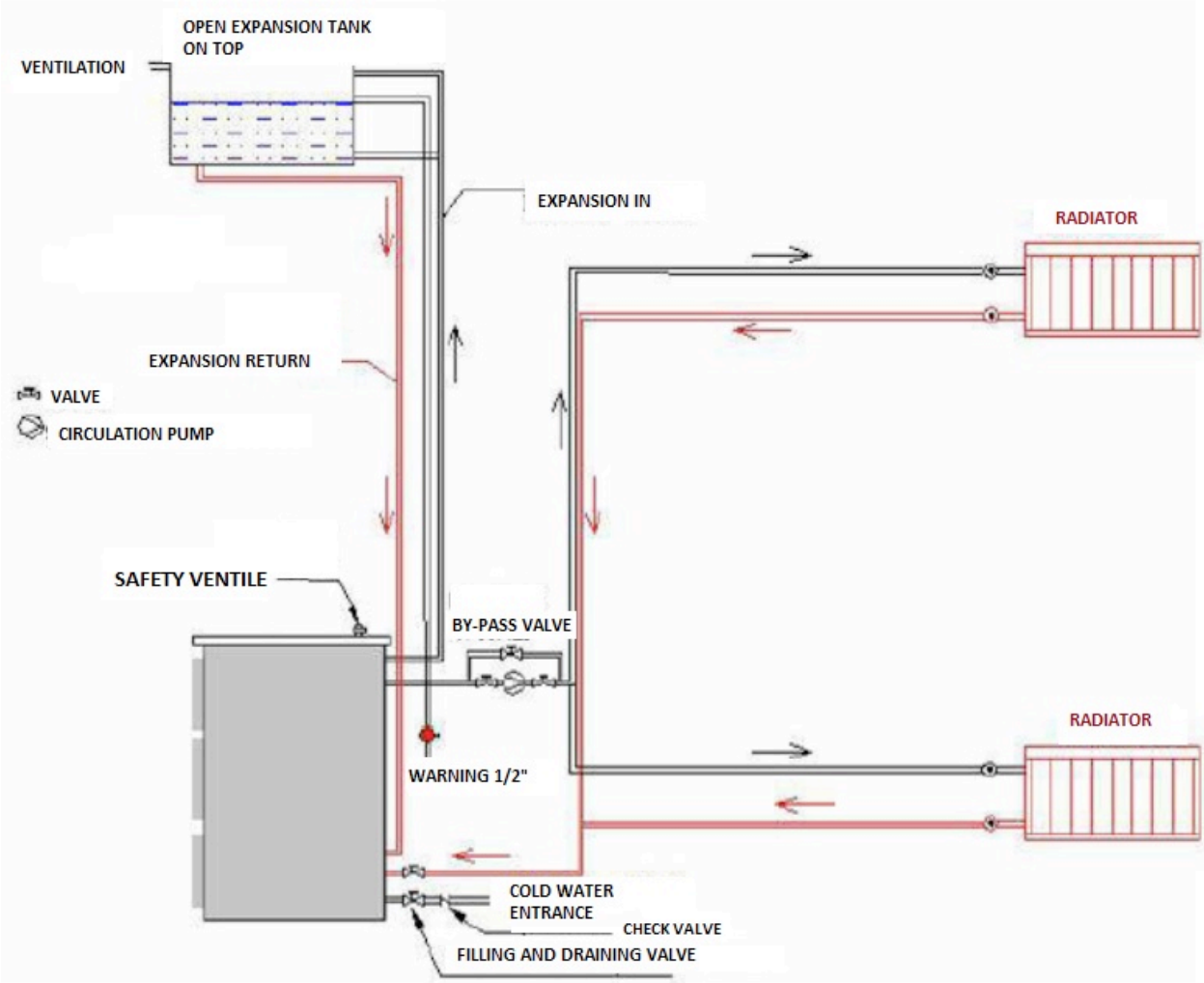
All connections and valve positions must be checked after the installation of the boiler is complete.

Operations like water flooding or evacuation must be done while the boiler is not working and cold.

Please flood water to the system until water comes out of warning pipe. Please close the valves when the filling is complete.

Please purge air in the system where necessary. Avoid any installation that might block air in the system, if any doubt, please use automatic purger.

BOILER INSTALLATION SCHEMA



4.2 AIR CONNECTION

The area where the boiler is installed must always be suppplied with fresh air by using a window or a duct. In order for a boiler to burn safely and efficiently, fresh air is required. Otherwise once the burning starts, the oxygen level will drop causing the burning to be inefficient. In turn, this will result in formation of soot in the boiler and chimney and will require frequent cleaning.

4.3 CHIMNEY

- The chimney that will be connected to the boiler must be independent. The chimney must be connected to provide minimum draught. A boiler without chimney connection should not be operated.

- Chimney connection pipe and pipe systematic should be installed and checked by authorized people only. May we remind you that the biggest factor in boiler efficiency is chimney design and draught.

- Proper chimney connection pipe should not smaller than the boilers chimney diameter, vertical length must not be shorter than 60 cm and longer than 2 meters and pipe must be connected to the chimney with minimum 10 degree of angle.

- We suggest not to use enamel stove pipes as it creates tar in chimney connection pipe or chimney system.

- In case of an elbow use in chimney connection, the elbows must be round with a wide angle. Quantity of an angle must be minimum 2 pieces.

- Chimney connection must be installed to allow demounting from the boiler and avoid gas leaking.

- Chimney connection pipe must not be extended to the outside and must be connected to a pipe.

- The contact of chimney connection pipe with flammable material must be avoided.

- Chimney connection pipe must not be pushed inside the chimney.

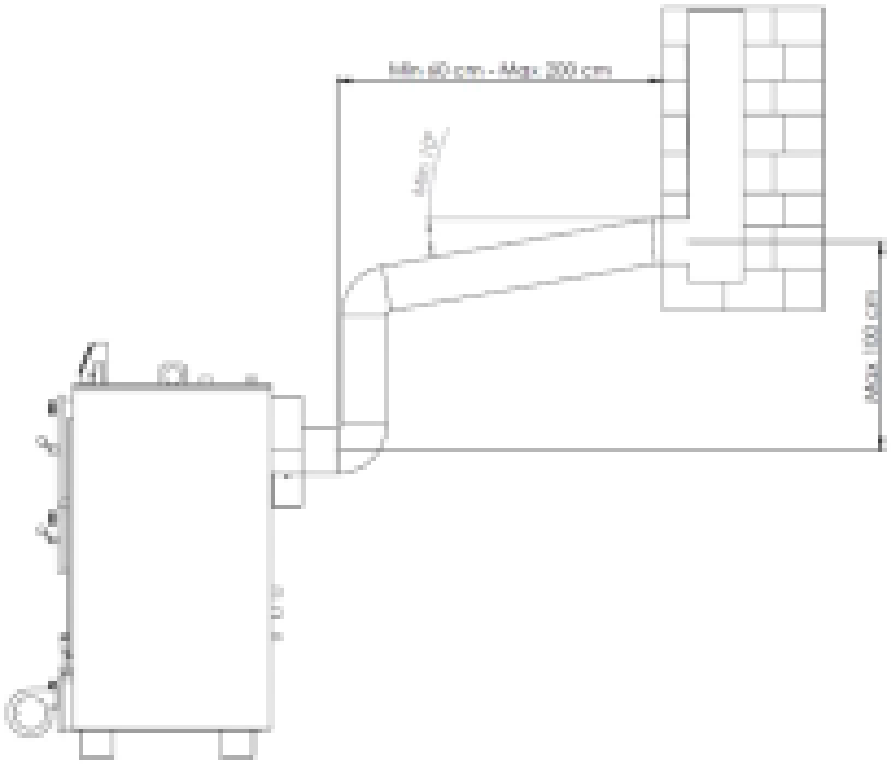
- The direction of the pipe should not be changed, should there is a need ,it must be positioned by 60 degrees.

- The chimney must be leak proof and air transperancy from inside and outside must be avoided.

- No other boiler or device must be connected to same chimney. This would decrease chimney draught and decrease boiler efficiency.
- Parallel chimneys should have no inter connection.

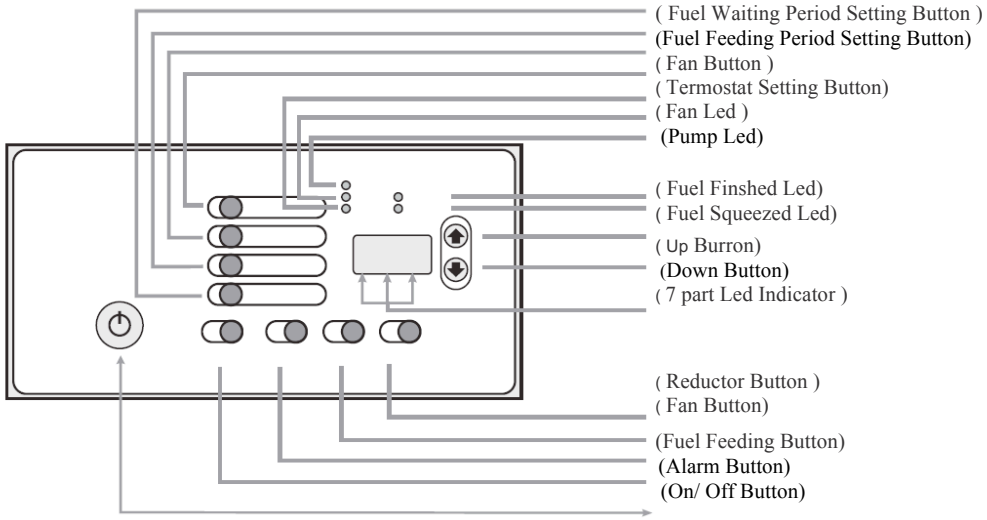
- There should be no sectional narrow down in any place of the chimney.
- Main walls of the building should never be used as chimney wall element. The chimney must be inside the building, if the chimney must pass from outside, the isolation must be done properly.
- The chimney must be frequently cleaned in order to avoid tar and soot and clogs.
- Please avoid foreign objects, cement or surface flow inside the chimney, as these will increase the risk of narrow chimney section and will result in decrease on chimney draught.

CHIMNEY CONNECTION SCHEMA



>>TECHNICAL SPECTS									
BOILER TYPE	**25 MKK-S**	**40 MKK-S**	**60 MKK-S**	**80 MKK-S**	**100 MKK-S**	**125 MKK-S**	**150 MKK-S**	**200 MKK-S**	**250 MKK-S**
Capacity (kcal/h)	25000	40000	60000	80000	100000	125000	150000	200000	250000
Heat Power (kW)	29	46	69	93	116	145	174	232	290
Weight (kg)	378	436	442	480	670	792	950	1200	1450
Working Pressure (bar)	3	3	3	3	3	3	3	3	3
Test Pressure (bar)	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5
H (mm)	1350	1400	1450	1590	1750	1750	2060	2060	2090
h (mm)	125	125	125	125	125	125	125	125	125
L (mm)	680	680	680	680	850	850	880	880	1120
W (mm)	660	825	880	800	1000	1200	1200	1700	1750
W1 (mm)	180	250	250	250	250	250	290	290	290
W2 (mm)	250	250	250	250	250	250	250	300	300
ØD (mm)	130	160	160	160	180	220	250	250	300
F (mm)	1300	1300	1360	1360	1530	1530	1560	1560	1820
B (mm)	1180	1180	1295	1395	1525	1625	1725	1725	1725
B1 (mm)	570	570	630	630	630	630	630	630	630
Circulation Flow- Return	1"	11/4"	11/2"	11/2"	2"	DN65	DN65	DN65	DN100
Safety Flow	1"	1"	11/4"	11/4"	11/4"	11/4"	11/2"	11/2"	11/2"
Safety Return	1"	1"	11/4"	11/4"	11/4"	11/4"	11/4"	11/4"	11/4"
Fiiling - Pouring	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
Boiler Setting Range (Min – Max) (°C)	35/90	35/90	35/90	35/90	35/90	35/90	35/90	35/90	35/90
Boiler Water Volume (lt)	46	81	117	174	187	235	380	665	890
Open Expansion (lt)	60	100	150	200	250	315	375	500	625
Voltage (V / Hz)	230/50	230/50	230/50	230/50	230/50	230/50	230/50	230/50	230/50
Power Max. (W)	910	938	845	845	845	975	975	1325	1325
Electric Isolation Degree (IP)	14A	14A	14A	14A	14A	14A	14A	14A	14A

6. BOILER WITH STOCKER CONTROL PANEL



Fuel Feed Button	Feeds the fuel manually when fuel feed button is pushed
Reductor Button	Reductor becomes ON or OFF when Reductor button is pushed.
Fan Button	Fan becomes ON or OFF when Fan button is pushed
On/ Off Button	System becomes ON or OFF (Button should be pushed 2 seconds for both position)
Alarm Button	Alarm stops
Increasing Button	Increases the value of the set function
Decreasing Button	Decreases the value of the set function
Lcd Screen	Shows the temperature in normal conditions. In setting condition, setting value is shown on screen.
Fuel waiting period setting button	Sets the waiting period after fuel loading (04-255 sec)
Fuel feeding period setting button	Sets fuel loading period. (04-60 sec)
Fan Setting Button	Sets speed level of fan (From 1 to 5)
Thermostat Setting Button	Adjust the intended temperature (from 35 °C' to to 90 °C)
Fan led	Shows fan activation
Pump led	Shows pump activation
Reductor led	Shows reductor activation.
No Fuel led	Shows lack of fuel
Fuel Congestion Led	Shows reductor is congested

Failure Codes

*** (H1) No Fuel**
*** (H2) Heating sensor is not connected or broken**
***(H3) Temperature of the boiler water is very high**
***(H4) Fuel is congested in reductor**

ATTENTION !!! Fuel loading and feeding value is in Table 1. Loading and feeding settings belongs to the fuel only It is necessary to do new settings when the fuel type is changed

SAFETY TERMOSTAT Safety termostat is placed behind the control panel and is active during a possible breakdown of boiler water setting thermostat to prevent the increase of boiler water temperature. Hence, ensures an extra safety and protects the boiler. Recommended to be set at 80 °C.

IMPORTANT!!!
Current boiler water temprature is shown on digital screen when adjustment settings is not in use

7. FIRST OPERATION AND USE

7.1 INITIAL BURNING

Before initial burning, system water must be full and system air must be purged.
Fuel loading must be done over the sifter. The sifter prevents the entrance of foreign objects, large size coal pieces inside the reductor and damage reductor and helezon. Also it enables the passing of the proper size of coal which will burn easily and efficiently
At initial burning, fan and reductor must be on and boiler water temprature must be previously set. The reductor must be manually operated and fuel must be loaded to the combustion chamber. For sufficient fuel loading,burnign pot must be loaded at the maximum level.

Small wood pieces must be ignited with gas and paper for burning the fuel in boiler. Then boiler lids must be closed and fan must be runned in low speed until the coal is completely combusted. If fan blows too much air, big slinders occurr because of the cooling effect of burning tank.

Make the fuel feeding and waiting settings according to boiler and fuel type from the Chart 1:

		25.000 kcal/h	**40.000 kcal/h**	**60.000 kcal/h**	**80.000 kcal/h**	**100.000 kcal/h**	**125.000 kcal/h**	**150.000 kcal/h**	**200.000 kcal/h**	**250.000 kcal/h**
Coal 5000 kcal/h	**Feeding /sec)**	4	6	9	12	15	19	24	32	40
	Waiting (sec)	106	110	116	116	122	130	138	156	174
Coal 7000 kcal/h	**Feeding /sec)**	4	5	9	9	11	14	18	25	32
	Waiting (sec)	110	116	122	122	126	130	138	156	174

When the ignition is complete, make the reductor button on and operate the boiler with the settings you did.
Increase the fan speed after ignition and provide the fuel efficiently.

It would be good to set the boiler water temperature at high degree (70°C) from control panel. Afterwards this temperature can be set to desired degree.

7.2 WARNINGS FOR USE

Circulation pump will start running when the burning continues and boiler water temperature comes to 35°C. This prevents extra electric cunsumption and heats boiler immediately so prevents damages from sweat of steam. Prevents water that is not properly heated to the raditaors.

Boiler water temperature decreases when the fuel is finished and when it is 30°C, circulation pump stops running. When the boiler water temperature decreases to 25°C all functions stops.

Fan automatically stops running when the boiler water temperature comes to set thermostat degree. Fan starts running when the boiler water decreases 5°C below set degree.

Running and stopping of circulation pump and fan can be monitored from flashing leds on digital indicator on control panel.

Circulation pump will run automatically for 3 seconds in every 25 hours unless the boiler is unplugged. This prevents the failures on pump uring long periods when the boiler is not in use.

CAUTION!!! If the electricity power goes off, the circulation pump will stop working so the high heat trapped in the boiler and it will increase the boiler water to the boiling point. In this case you should do as following;

1- Close the air inlet of the fan completely.
2- DO NOT open the lids of the boiler.
3- If there are by-pass valves installed in the system, open them.
4- When the power comes back, return to your previous adjustments. Follow the steps to start combustion to start burning in the boiler.

8. CLEANING AND MAINTAINENCE

Following instructions should be followed in order to keep boiler working safe and efficient for long time.
Quality of the fuel used, would effect the boiler cleaning time, consumption amount of fuel and efficiency of boiler.
Small coal is burned in boiler. Do not burn dust and coke coal. Ash drawers should be cleansed up every day.
High quality high calorie and dry coal should be used in order to get high efficiency.
Smoke pipes inner surface should be cleaned up with a brush and turbulators must be cleaned up with a tissue or cloth in every 15 days. Air inflow in burning pot air holes must be checked.
Holes which don't have air flow must be unclogged. Air holes must be cleaned up by turning on the fan for 15 minutes.
Electricity connection must be cut off before the maintainance. Please ventilate the area before cleaning the boiler.

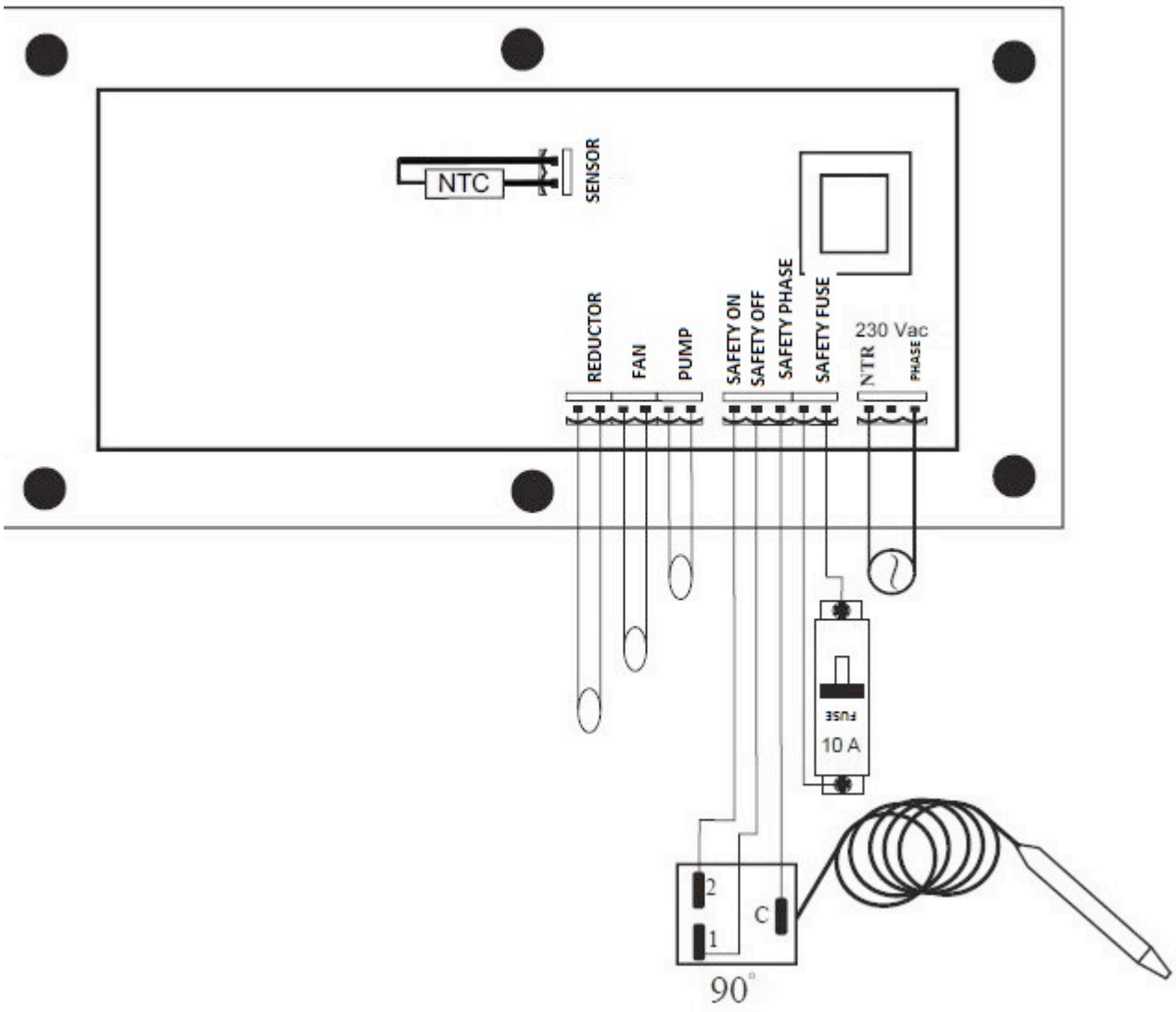
Electricity, chimney, installation connections should be done before winter time.

9. SUGGESTIONS FOR ECONOMIC USE

-In order to properly ventilate the premises, please open the windows for short period of time while the radiator valves are closed

- Pay attention not to heat up too much: room temprature must be kept at 20 degrees. Each degree makes a 6% economy on heating costs
- When the weather is dark, please close the shuttters if available
- Do not cover your radiators with objects
- Make use of special setting of the control panel, set the using water from control panel
- Consume hot water considerably. You will consume less water and energy during shower in comparison to taking a long bath.

10. ELECTRICITY SCHEMA



11. TROUBLE SHOOTING

Problem	Reason	Solution Offer
Reductor doesn't work There is **H4** warning on control panel digital screen	Electricity connection might be loose	Check the connection Tighten the klemens cables.
	Shaft from the reductors can be congested	Clean up the shaft bearing helezon entrance hole
	check the fuel congestion led.	If it doens't work call service. Push ON-OFF button 2 seconds.
	Motor can be broken	Call service.
Reductor runs but fuel can not reach to burning cell	Bunker – fuel tank connection can be blocked	Fuel should be pour from a siever and dry fuel should be burned.
Burning efficiency is low	Fuel is not well quality	Use high quality, dry and proper size fuel.
	Boiler settings are not made according to the fuel type.	Make the proper settings from table 1
	Chimney draught is weak.	Chimney should be cleaned up.
There is **H2 warning on control panel digital screen.**	Heat sensor or card can be broken.	Call service
Smoke comes from chimney connections	Air holes which are inside the boiler, can be blocked.	Clean up holes and smoke pipes regularly
	Boiler Chimney connections can be loosen	Check the boiler chimney exit and pipe connections.
	Chimney draught is weak.	Clean up the chimney.
Fan doesn't run	Set termostat temperature is achieved	Fan stops running when the boiler water catches up the set termostat temperature. When temperature decreases 5 degrees it starts running again.
	Fuel can be finished	Make fuel loading.
	Fan button can be off.	Open main fan button.
There is H3 warning on control panel digital screen.	Boiler water temperature is very high	* Check the water in boiler. If it is inadequate, complement. * Circulation pump is congested * Boiler valves can be off * There is air in system and there is no circulation. Purge the air.
H1 warning on control panel digital screen	No fuel or fuel might be congested.	*Check the fuel in stocker. Complete the fuel if it is inadequate and carry out the procedure in first use. * Fuel was wet when poured inside the stocker, it is now stucked and can not be loaded. Fuel is pumped down by applying pressure with an object.

12. CARRYING AND TRANSPORT

A) PLACING THE BOILER ON VEHICLE

*When the boiler is placed placed on vehicle, loading should be with crane.
* Gates of the vehicle should be opened previously.
* Make use of the supporting ring while loading boiler with crane.
* Pass the crane boom hook from the supporting ring.
*Make sure that hook pim is in safety mode.
*Uphold the crane boom and take the space.
*Slowly uphold the boiler that bottom level should be 30-40cm up from the ground.
*Keep away from sudden moves that would cause boiler to shake.
*Move the boiler next to vehicle in this way.
*Lift the boiler from 30-40 cm higher than the vehicle body and take it down on vehicle body correctly.
*Remove the hook from crane supporting ring.

Attention : Boiler must be carried in vertical position, make use of the supporting ring. When the boiler is lifted up with crane, there shouldn't any living being under the boiler. Boiler must be carried with its accessories installed on it.

B) CARRYING BOILER ON VEHICLE

When the boiler is carried with a vehicle, it should be tied to vehicle strictly, supporting stuff which would prevent slipping, should be put around. Boiler should not be carried with fragile, smashable and living beings. Top of the vehicle should be covered with canvas after placing boiler. Driver should keep away from sudden moves that would cause danger.

C) UNLOADING THE BOILER TO THE PLACE OF USE

Boiler should not be placed in work or residence places, should be placed in a seperate boiler room.
When unloading the boiler to boiler room, crane must be used again, points that are stated in Clause A, should be considered.
If the place of use is not appropriate for crane entrance, boiler should be unloaded in a proper place and carry with rollers to the place intended