



**INSTALLATION USE AND MAINTAINENCE GUIDE FOR
AUTOMATIC 4PASS AND DOUBLE FUEL BOILERS**

**25 MKB-S - 40 MKB-S - 60 MKB-S
25 MKBC - 40 MKBC - 60 MKBC**



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**Please read.
Please keep.**

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PREFACE

MAKTEK is one the leading institutions in Turkey in heating industry since its foundation in 1977. In consideration 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 A.Ş.

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°C) 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°C do not attempt to feed cold water to the boiler until the boiler temprature drops down to 40°C. 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 °C.

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.

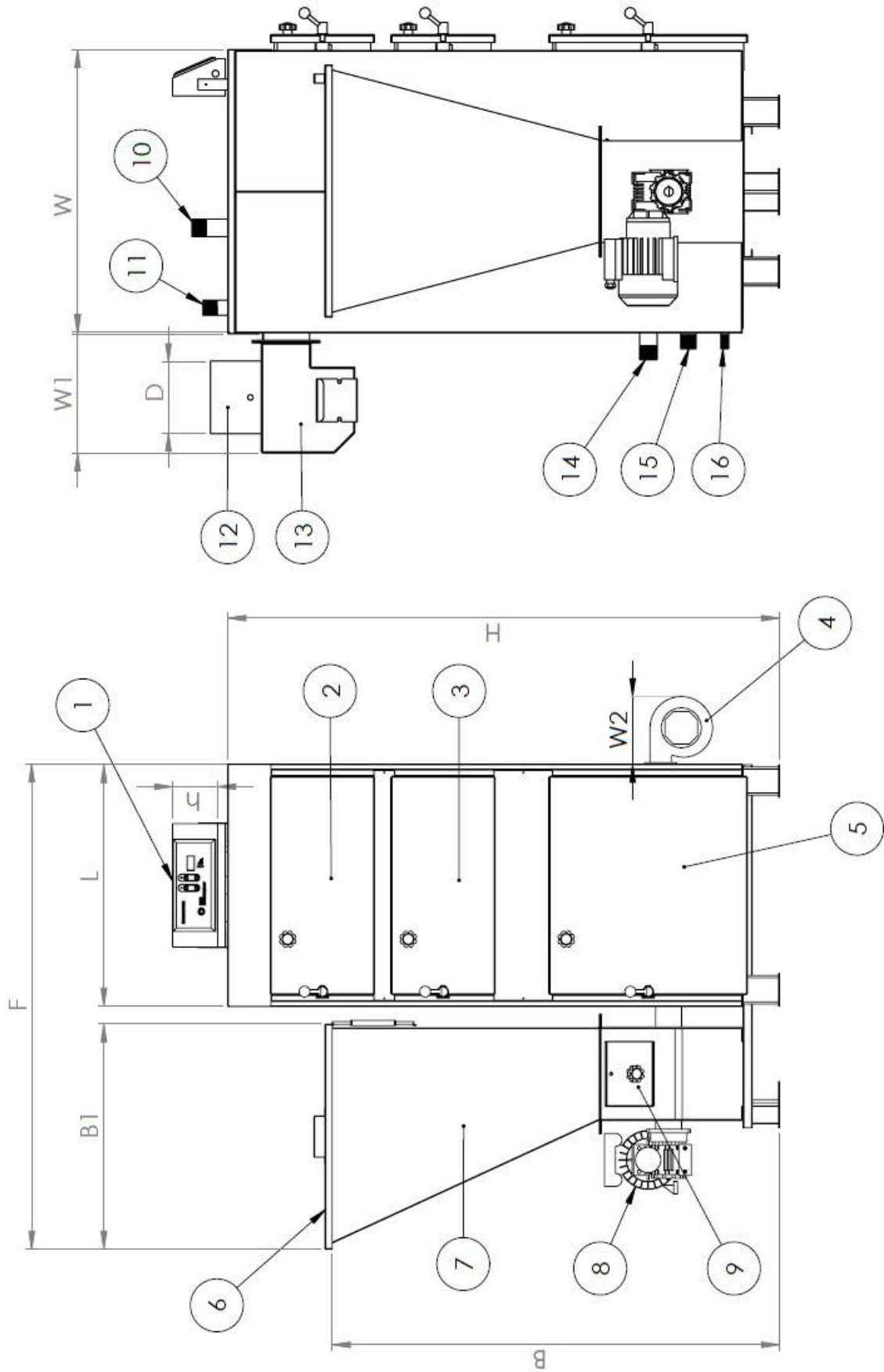
Please do not take hot water out of the boiler for domestic use purposes.

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 efficiency for coal and all solid fuels
- Opportunity for watching and setting the temperature of heating water on digital screen
- Electronic control panel
- Safe usage with safety thermostat against overheating
- Energy saving thanks to special body design
- Burning air which comes from the hot bulb surface, ensures homogeneous burning of the coal.
- Opportunity for using nut coal, prina, nut shell
- Elektronik kumanda panelinden yükleme ve bekleme sürelerini dijital ekrandan ayarlayarak izleme imkanı Opportunity for watching and setting feeding and waiting time on the electronic panel control.
- Detritions on heating are minimised with the cast burning bunker
- Fan with quiet running cycle period and clap ensures the maximum efficiency
- Automatic feeding makes ash to fall down in ash drawer.
- Wet rotor, 3 level circulation pump makes the intended circulation flow and energy saving provided.
- When the fuel totally finished in the fuel feeding tank and system temperature decreased under 25 degrees boiler shuts down automatically and extra running of the fan, pump and feeding engine stops.
- Boiler has three pass burning tank design and uses the acquired heat from fuel with high level, increases the boiler efficiency.
- 2 years warranty
- CE Certificate
- Economic life cycle of the boiler is estimated to be 15 years.

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. Bottom (ignition) cover
4. Fan
5. Burning Tank
6. Sieve
7. Bunker
8. Engine with Reductor
9. Shaft with Reductor and Helezon
10. Boiler Water In
11. Safety Water In
12. Chimney
13. Smoke Case
14. Boiler Water Out
15. Safety Water Out
16. 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 quantity elbows should be used between chimney and boiler.
- Boiler must be placed where has enough air for an efficient burning. It is required to use open expansion tank in installation MAKTEK MKK-S series 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, nonreturn valves on the pipes between boiler expansion tank
- Expansion tank volumes based on capacity are shown below:

TYPE	CAPACITY	EXPANSION TANK
25 MKBS	25.000 kcal/h	50 lt
40 MKBS	40.000 kcal/h	75 lt
60 MKBS	60.000 kcal/h	100 lt
25 MKBC	25.000 kcal/h	50 lt
40 MKBC	40.000 kcal/h	75 lt
60 MKBC	60.000 kcal/h	100 lt

- In first installation of the boiler, inside of the plant should be cleaned up before the connection. The most appropriate way is to send water with one of the pipes and to drain off other side.
- Circulation pump must be installed on boiler water return pipe.
- Attention should be paid to leave enough working space for service intervention, boiler control, and fuel feeding while installation.
- Valve connection should be made on boiler water entrance and return lines.
- Chimney connections should be leakproof, same diameter pipes without any tighten in sections should be used from the exit of boiler to chimney hole.
- Grounding connections should be done, electricity connection of circulation pump should be done correctly and authorized service should be called.

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 standards.

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 . If 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 electricity 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).

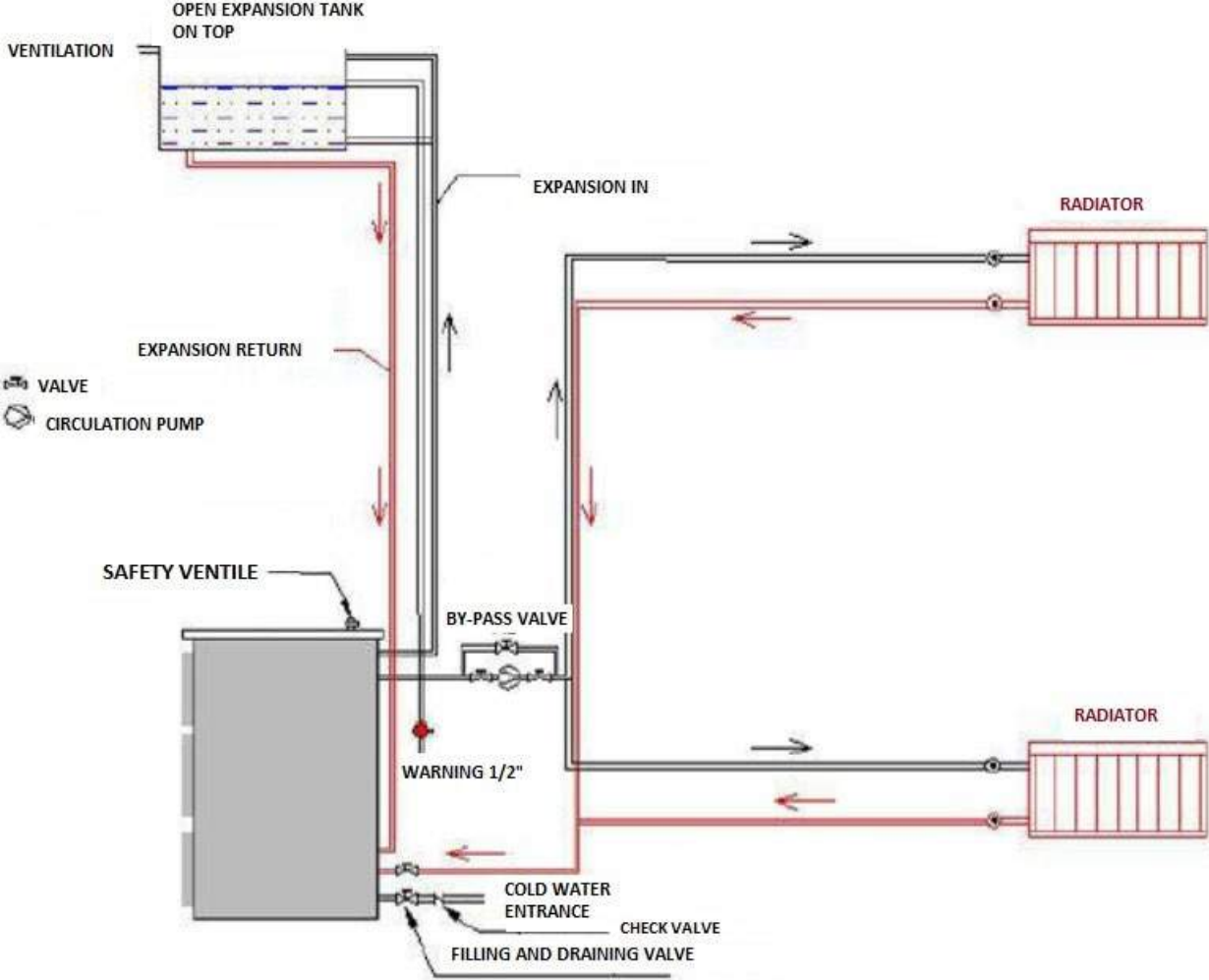
All connections and valve positions must be checked after the installation of the boiler is complete.

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 supplied 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 private. 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.

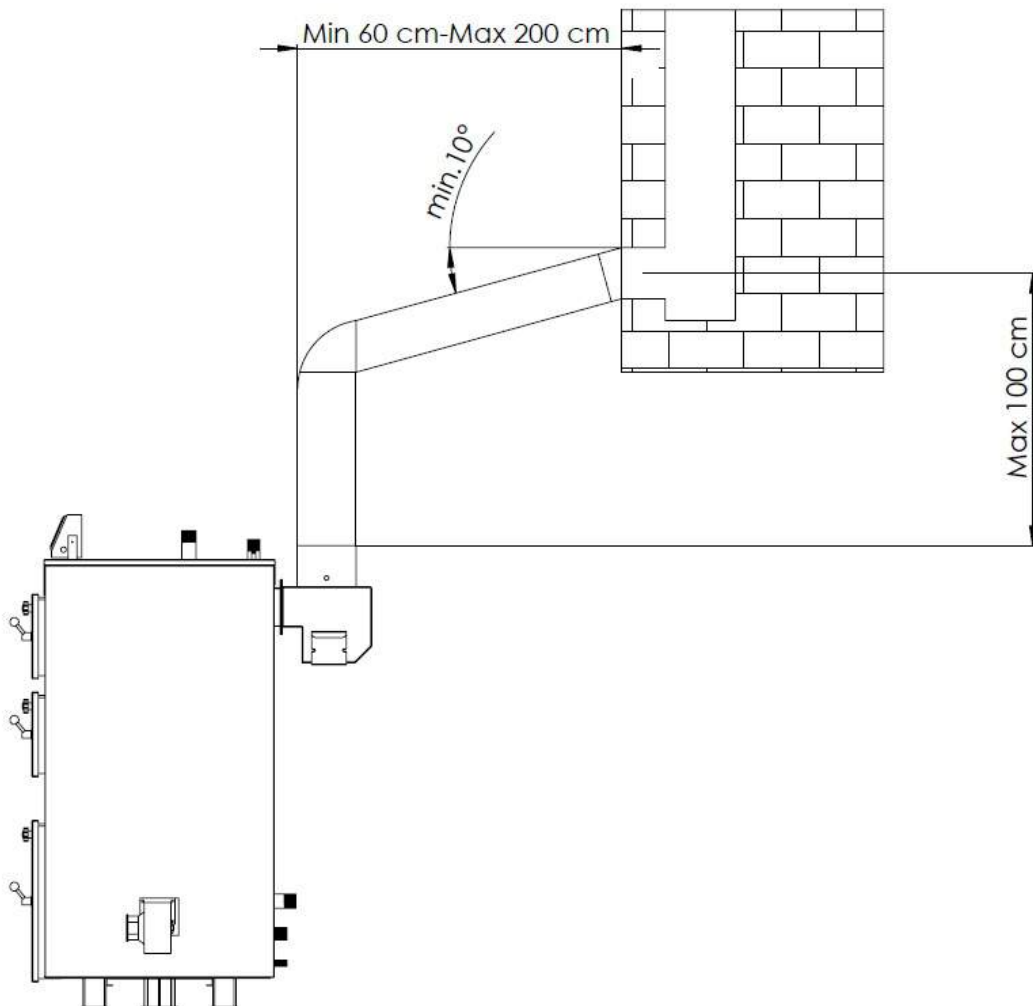
There should be no sectional narrow down in any place of the chimney.

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

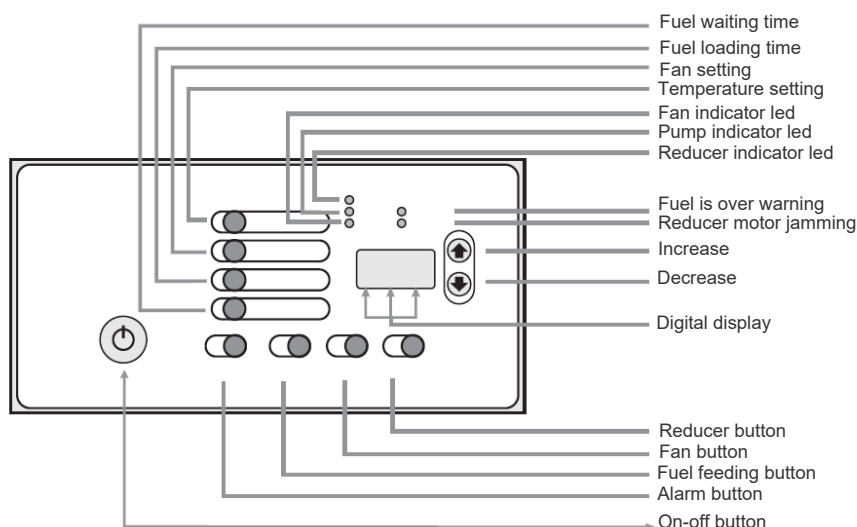


5. TECHNICAL SPECIFICATION

>> TECHNICAL SPECS

Boiler Type	25 MKB-C	40 MKB-C	60 MKB-C	25 MKB-S	40 MKB-S	60 MKB-S
Capacity (kcal/h)	25000	40000	60000	25000	40000	60000
Heating Power (kW)	29	46	69	29	46	69
Weight (kg)	377	420	500	345	385	463
Working Pressure (bar)	3	3	3	3	3	3
Test Pressure (bar)	4.5	4.5	4.5	4.5	4.5	4.5
H (mm)	1535	1575	1720	1415	1455	1600
h (mm)	155	155	155	155	155	155
L (mm)	550	580	660	550	580	660
W (mm)	1105	1105	1340	1105	1105	1340
W1 (mm)	225	225	310	225	225	310
W2 (mm)	250	250	250	250	250	250
ØD (mm)	160	160	200	160	160	200
F (mm)	1170	1200	1320	1170	1200	1320
B (mm)	1180	1180	1295	1180	1180	1295
B1 (mm)	570	570	610	570	570	610
Circulation Flow-Return	1"	1 1/4"	1 1/2"	1"	1 1/4"	1 1/2"
Safety Flow	1"	1"	1 1/4"	1"	1"	1 1/4"
Safety Return	1"	1"	1 1/4"	1"	1"	1 1/4"
Filling – Draining	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
Boiler Water Capacity (lt)	60	85	128	48	80	112
Expansion (lt)	50	75	100	50	75	100
Voltage (V / Hz)	230/50	230/50	230/50	230/50	230/50	230/50
Power max. (W)	943	943	943	943	943	943
Electric Isolation Degree (IP)	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 becomes closed when button is pushed while it is ringing.
Increasing Button	Enter the menu that is wanted to change and increase the value (firstly push the button of the position which will be used)
Decreasing Button	Enter the menu that is wanted to change and decrease the value (firstly push the button of the position which will be used)
Digital Display	Shows the temperature measured in normal conditions. In setting condition, setting value is shown in screen.
Fuel Waiting time setting button	Sets the waiting period after fuel loading (04-255 sec)
Fuel feeding Time setting button	Sets fuel loading period. (04-60 sec)
Fan Setting Button	Sets speed level of fan (From 1' to 5)
Temperature Setting Button	Adjust the intended temperature (from 35 °C' to to 90 °C)
Fan led	Shows fan activation
Pump led	Shows pump activation
Reducer led	Shows reductor activation.
Fuel is over warning led	Shows lack of fuel
Reductor motor jamming led	Shows reductor jamming

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 jammed in reductor

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

SAFETY THERMOSTAT Safety thermostat is placed behind the control panel and steps in breakdown of boiler water setting thermostat and prevents the increase of boiler water temperature. Ensures secondary safety and protects the boiler. Recommended to be set at 80 °C.

IMPORTANT!!!

When any adjustment is not being made on digital display, it shows the boiler water temperature at that time.

7. FIRST OPERATION AND USE

7.1 First Burning

In first burning, system water must be full and system air must be vented.

Fuel loading must be done over the grate. Grate prevents entrance of foreign materials, big sized coal pieces inside the bunker and prevents damage to the reducer and loading spiral. Also passes the proper size of coal which will burn easily and efficiently into the bunker.

Small wood pieces must be ignited with gas and paper for burning the fuel in boiler. Then boiler gates must be closed and fan must be runned in low speed till full ignition of coal. If fan blows too much air, slagging of the fuel occurs because of the cooling affect of the combustion chamber.

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

		25.000 kcal/h	40.000 kcal/h	60.000 kcal/h
Coal Type 5.000 kcal/h	Feeding (sn)	4	6	9
	Waiting (sn)	106	110	116
Coal Type 7.000 kcal/h	Feeding (sn)	4	5	7
	Waiting (sn)	110	116	118

When the ignition is complete, make the reductor button on and make the boiler run with settings you desire.

Increase the fan speed after ignition and provide the fuel efficiently.

It would be good to set the boiler water temperature at a 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 consumption and heats boiler immediately so prevents damages from sweat of steam. Prevents sending water, which wasn't heated completely, to the radiator.

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 stop.

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 followed by blinking LEDs on digital display on control panel.

Circulation pump will run automatically 3 seconds in every 24 hours as long as boiler unplugged. This prevents the failures on pump that can be occurred from long time unuse.

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 on 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.

Nut coal is burned in boiler. Do not burn Dust and coke coal. Ash drawers should be cleaned up every day.

High quality, with 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 should be cleaned up with a fabric in every 15 days. Air inflow in burning pot air holes, should be checked.

Holes which don't have air flow should be opened. Air holes should be cleaned up by running fan free.

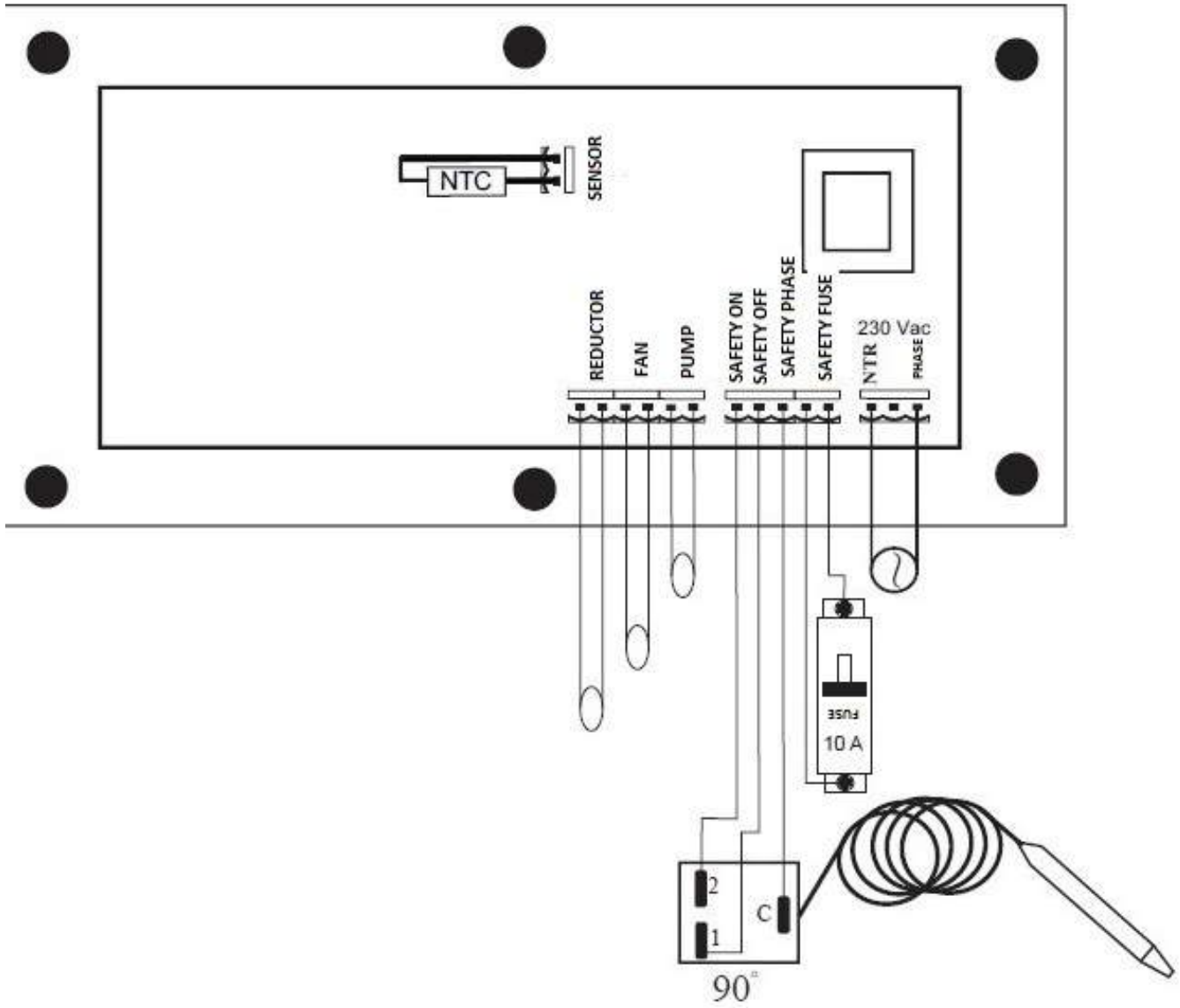
Electricity connection shoud be cut off before the maintainance.

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

9. OFFERS FOR ECONOMIC USE

- In order to properly air the residence, 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 1 degree less 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 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 can be loosen	Check the connection. Tighten the klemens cables.
	Shaft comes from the reducers can be squeezed.	Clean up the shaft bearing helezon entrance hole
	Check the fuel squeezed led.	If it doesn't work call service. Push ON-OFF button 2 seconds.
	Engine 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 thermostat temperature is caught up.	Fan stops running when the boiler water catches up the thermostat temperature. When set 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.	<ul style="list-style-type: none"> • Check the water boiler.If it is lack, complete. • Circulation pump is squeezed. • Boiler valves can be off. • There is air in system and there is no circulation.Get the air.
H1 warning on control panel digital screen.	Fuel can be finished or squeezed.	<ul style="list-style-type: none"> • Check the fuel in bunker. Complete the fuel if it is lack and carry out the procedure in first use. • If the fuel wet spilled, 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 places 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 pin is in safety.
- *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 30-40cm higher than the vehicle body and 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 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 carrying with vehicle, it should be tied to vehicle strictly, supporting stuff which would prevent slipping, should be put around. Boiler should not carry with fragile, smashable and living beings. Top of the vehicle should be covered with canvas after placing boiler. Driver should keep away from the 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 separate boiler room.

When unloading the boiler to boiler room, crane must be used again, points that stated in Clause A, should be considered.

If the place of use is not appropriate for crane entrance, boiler should be unload in a proper place and carry with rollers to the place intended.

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