



*Liquid/gas fuel fired (NA R)
central heating boiler
operating and maintenance instruction manual*



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**ATLANTIC
BOILERS**



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MAKE SURE THE BOILER PERSONNEL READS THIS MAINTENANCE PROCEDURE!

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FEATURES OF BOILERS

- By virtue of pressurized combustion, the flame is reversed within the combustion chamber.
- Gases and half-burned fuel particles that meet the flame a second time are re-burned and converted to heat and flue gases are annihilated totally.
- The heat of bright flame formed in the combustion chamber by means of the double pass concentrated combustion is transferred from the combustion chamber to the water via radiation heat transfer.
- Flue gas turbulators increase the speed of the smoke and gases in the flame tubes and enable the maintenance of an optimal-level convection heat transfer.

STANDARDS APPLIED TO MANUFACTURING AND TESTING

NAR 60 – NAR 800 RANGE BOILERS

TS EN 303-1

TS EN 303-2

TS EN 303-3

TS EN 304

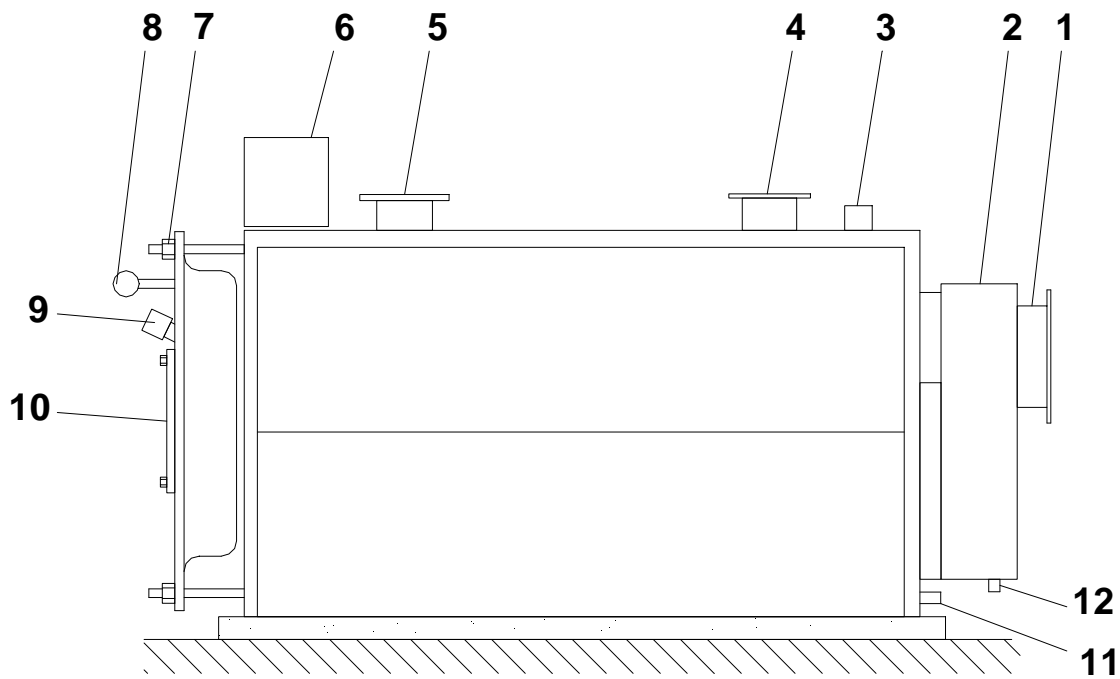
NAR 1000 – NAR 2500 RANGE BOILERS

TS 497

TS 4040

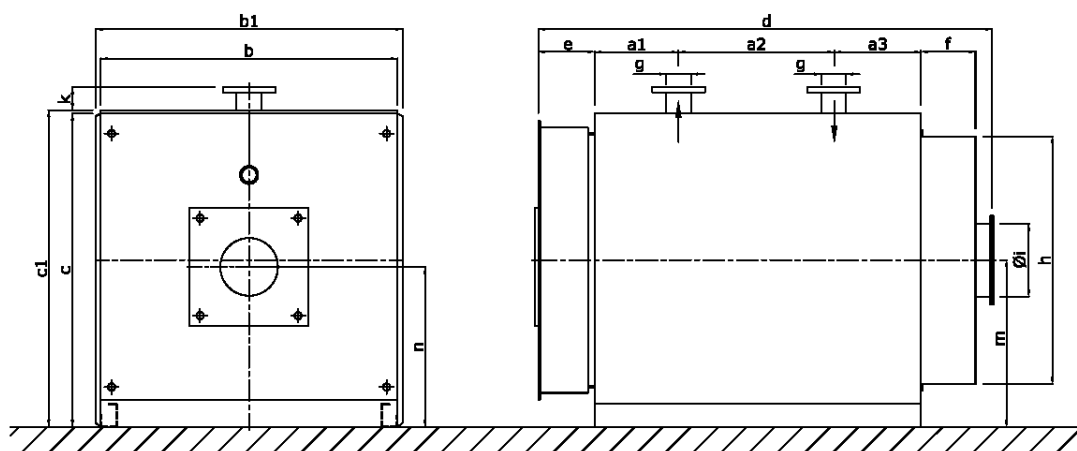
TS 4041

INTRODUCTION



1. Chimney duct outlet
2. Smoke box
3. Expansion line
4. Cold water return
5. Hot water outlet
6. Control panel
7. Door hinge
8. Handle
9. Observation port
10. Burner adapter flange
11. Drain/filling nozzle
12. Condensate drain nozzle

BOILER DIMENSION



Type	NA R	60	80	100	130	160	200	250	320	400	500	640	800	1.000	1.250	1.600	2.000	2.500
Output	[kcal/h]	60.000	80.000	100.000	130.000	160.000	200.000	250.000	320.000	400.000	500.000	640.000	800.000	1.000.000	1.250.000	1.600.000	2.000.000	2.500.000
Output	[kW]	70	93	116	151	186	233	291	372	465	581	744	930	1.163	1.453	1.860	2.326	2.907
Output	[%]	93,5	93,0	92,5	92,6	92,7	92,8	92,3	91,5	90,6	90,5	90,3	90,1	91,0	92,0	93,5	93,8	94,1
Flue Gas Pressure Drop	mbar	0,2	0,6	1	1,1	1,2	1,6	1,8	2	2,5	3,2	4,4	5,4	6,2	6,7	7	9	12
Water Pressure Drop	mbar	10	10	10	10	10	10	15	20	25	30	35	38	45	50,0	57	62	71
Approx Empty Weight	[kg]	335	340	415	440	530	560	655	855	1.075	1210	1710	2085	2.510	2.930	3.840	4.605	5.535
Water Volume	[l]	122	120	175	179	234	233	282	305	381	447	841	942	1.361	1.572	2.403	2.828	3.221
Burner Head Min. Projection	[mm]	185	185	185	225	225	225	240	240	242	240	245	245	281	281	301	301	306
a1	[mm]	210	210	275	255	275	275	300	300	360	360	360	380	400	400	450	450	525
a2	[mm]	350	350	485	515	470	470	695	840	921	1.135	1.240	1.617	1.600	1.830	1.990	2.000	2.235
a3	[mm]	195	195	230	230	260	260	260	260	312	312	400	417	410	435	510	510	550
b1	[mm]	900	900	900	920	1.050	1.050	1.060	1.090	1.150	1.150	1.370	1.370	1.520	1.605	1.730	1.865	2.020
b	[mm]	780	780	780	800	930	930	940	970	1.030	1.030	1.250	1.250	1.400	1.485	1.610	1.745	1.900
c1	[mm]	860	860	860	880	970	970	970	1.030	1.130	1.130	1.280	1.380	1.490	1.545	1.780	1.815	1.980
c	[mm]	840	840	840	860	950	950	950	1.010	1.110	1.110	1.260	1.360	1.470	1.525	1.760	1.795	1.960
d	[mm]	1.070	1.070	1.305	1.370	1.385	1.385	1.665	1.810	2.036	2.247	2.497	2.910	2.945	3.206	3.525	3.545	3.915
e	[mm]	130	130	130	170	170	170	185	185	185	185	190	210	246	246	266	266	271
f	[mm]	155	155	155	170	180	180	195	195	218	215	267	260	270	250	290	300	320
Øg	DN	50	50	50	50	65	65	65	65	80	80	100	100	125	125	150	150	200
h	[mm]	610	610	640	660	750	750	770	810	870	870	1.070	1.090	1.240	1.295	1.460	1.550	1.680
Øi	[mm]	150	150	150	150	150	150	150	150	200	200	250	300	300	300	350	400	450
k	[mm]	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
m	[mm]	465	465	458	460	505	505	490	530	600	600	650	740	770	797	950	938	1.035
n	[mm]	445	445	438	440	485	485	470	510	580	580	631	720	750	777	930	918	1.015

BOILER OPERATING PERSONNEL

Boiler operating personnel (boiler operator) should have a knowledge of general boiler failures and repair, and also must know very well the tasks and working principles of all the measurement, adjustment, control and safety devices existing at the installation.

The boiler operator should have an official document (boiler operator certificate) showing that he is qualified on the points described above.



MAKE SURE THE BOILER PERSONNEL HAVE BOILER OPERATING CERTIFICATES!

TRANSPORTATION AND TEMPORARY STORAGE:

- The boiler should be transported, dismantling the top insulation sheet and using appropriate equipment utilizing the lifting and transportation points on it.
- For horizontal movement; where it is not possible to utilize a crane, horizontal displacement is possible through controlled sliding on pipes.
- The boiler should be protected against mechanical blows and collisions during loading, transportation and unloading.
- It must be protected against damages resulting from moisture and external mechanical factors that may arise during temporary storage before transportation and installation.

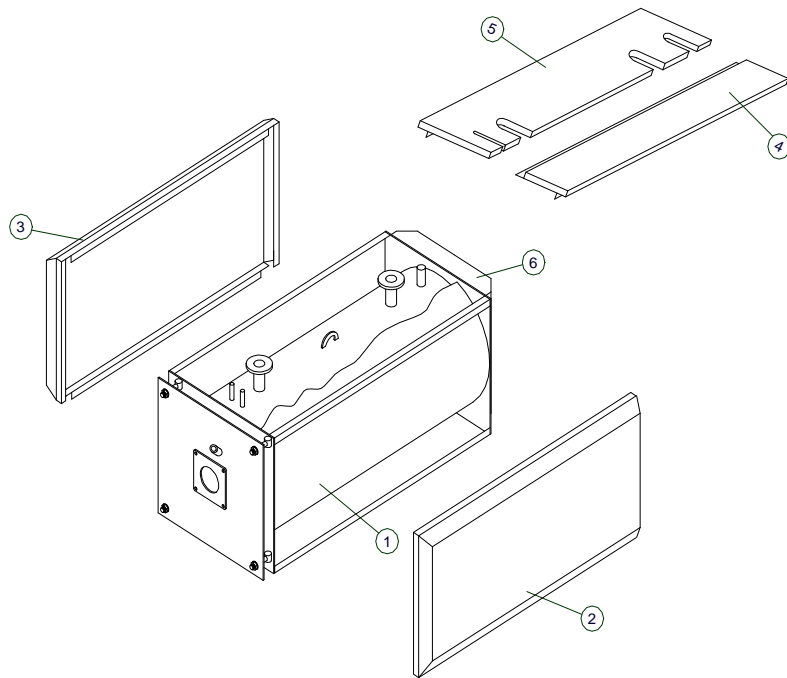


USE THE BOILER IN COMPLIANCE WITH THE WARNINGS AND RECOMMENDATIONS IN THIS MANUAL !

BOILER INSTALLATION

- Install the boiler in the boiler room at the installation site on a foundation elevated from the floor.
- Make the boiler mechanical connections as per the piping circuit diagram.
- Boiler installation site should conform to related local standards and regulations. It must have a door opening towards the outside, a fresh air inlet duct at floor level and a polluted air discharge chimney duct at ceiling level (apart from the boiler chimney). The door and the window frames must be of non-flammable material.
- The burner, the boiler control panel (if any) and the pre-heater connections should be performed by eligible technical personnel in compliance with the burner user manual and vendor installation diagram.
- The boiler should be used with the boiler control panel. (We recommend a thermometer to be mounted on the boiler return collector or on the return pipe.) A hydrometer (open expansion) or manometer (closed expansion) must be mounted on the boiler outlet pipe or collector.
- The boiler may be used in open or closed expansion system. If used in closed expansion system; closed expansion tank must be used, suitable for the total boiler and central heating system water volume, at building static water height pressure with gas side pressure adjusted. The closed expansion tank must be connected to the safety pipe directly on the boiler or to the main boiler outlet or return line pipe on condition of non-existence of a closure valve. Boiler operation pressure * Safety valve with 1,05 bar pressure must be used.
- More than one boiler should not be connected to the same chimney.

INSULATION CASSETTE INSTALLATION



- Install the side insulation cassettes, numbers 2 and 3, on the boiler. Make sure the skirts on the side cassettes sit well into their sockets.
- Mount the top insulation cassette, number 4, so that the lower skirt sits perfectly into the socket.
- After mounting cassette number 4, mount top insulation cassette number 5 the same way.

BURNER SELECTION AND INSTALLATION

To achieve efficient combustion, the burner to be attached to the boiler should be selected in compliance with the combustion chamber defined in the boiler technical specifications section.

During the installation of the burner, care should be shown to match the nozzle axis with the combustion chamber axis.

To prevent entry of excess air into the combustion chamber from outside, the burner installation should be performed carefully to prevent leakage.

The fuel used for operating should comply with burner manufacturer recommendations.

Select a suitable burner conforming to Nominal power of the boiler, meeting the counter pressure of the boiler (at nominal capacity). When ordering a boiler, inform the related sales personnel about the burner selected, to ensure that the boiler door and connection flange are designed in compliance with the burner.

FUEL SELECTION AND STORAGE:

- Fuel complying with the characteristics indicated in the burner user manual or burner vendor catalogues should be obtained.
- Fuel transfer lines should conform to current technical specifications, regulations and standards. The fuel tank-burner axis levels should not exceed figures specified in the burner user manual.
- Fuel tanks should conform to standards. A wall must exist between the fuel tank and the boiler.
- If fuel oil is being used (especially of a heavier group), the necessary arrangements and heating installation should be prepared for flow of fuel from the tank to the burner.



BEFORE OPENING THE FRONT DOOR, STOP THE FAN AND SHUT DOWN FAN PANEL POWER!

FILLING THE SYSTEM WITH WATER

The boiler should be filled with water before operation. The boiler should not be operated before it is filled with water.

To fill the boiler with water, the main distribution and collection pipes, the boiler feeding pipes, installation column valves should be opened fully, water should be let in from the filling/discharge tap and it should be filled slowly until water starts coming from the monitor pipe of the Expansion Tank. In closed expansion systems, during water filling from boiler filling/discharge tap, the air discharge tube valves and mechanical air vents should be opened and then closed when it is observed that the incoming water does not have bubbles. When the air tube at the top most level of the installation or at the roof is completely filled with water, filling will be completed.

The circulation pump should not be operated during the filling process.

The expansion tank connections should conform to the installation circuit diagram.



DO NOT OPERATE BOILER WITHOUT WATER!

PREPARATION OF BOILER FOR OPERATION

The boiler room must be designed to meet the combustion air requirements of the boiler.

The boilers should be completely cleaned from internal and external dust, soot, etc.

The smoke channel, smoke pipe and chimney cleaning doors should be checked and leakages should be prevented.

The fuel heaters (in liquid fuel boilers) should be checked for soundness.

The fuel filters should be cleaned, heater thermostats should be set to correct value, fuel valves should be set fully open.

The fuel combustion system should be reviewed with respect to the system's working principles and each element should be controlled for proper operation.

The boiler explosion door should be checked for proper operation.

Boiler safety devices (manometer, hydrometer, safety valve, visual and sound warning system etc.) should be reviewed to ensure proper operation.

SAFETY RULES

- Do not use the boiler for any other than outside hot water production for closed circuit heating system.
- Use the boiler complying with warnings and recommendations in this procedure.
- Have the heating system installed by authorized personnel.
- Have the boiler electrical connections made by authorized personnel.
- Do not operate boiler without water.

- When opening the front door, shut off the burner and shut down burner electricity.
- Make sure the boiler personnel are certified boiler operators.
- Do not use hard water in heater circuit.
- Boiler water temperature is designed for 90-70⁰C. Install a safety system to prevent water the temperature from exceeding 100⁰C.
- Perform the inspection and maintenance activities of the boiler thoroughly.
- The boiler chimney should be built in compliance with chimney building rules. Air brick and briquette should not be used in boiler chimneys.
- In closed expansion systems, the expansion tank gas pressure should be checked to be equal to that of the building static water height and the operation of the safety valve should be tested at opening pressure.
- Have the initial operation of the burner performed by authorized service of related burner company. The burner capacity adjustment should be made as per the label capacity of the boiler and the boiler efficiency value stated by the manufacturer firm for the boiler. A burner adjustment above the boiler label value should not be allowed.
- If abnormal noises are heard from the boiler or the installation, the burner should be stopped immediately and the fuel inlet should be closed. The investigation and repair of the malfunction should then be made.
- If leakage and seepage is observed in the burner fuel connection and transfer lines, the burner must be stopped immediately and lines valves must be closed. If natural gas and LPG is used, use a leakage detecting device in the boiler room and a system that will stop fuel transfer from the main inlet.

- If LPG is used, when icing and dew is observed on the fuel pipes due to the liquidizing of residual gas in fuel pipes from the previous night especially on cold days, the burner should absolutely not be switched on. The LPG should be carefully discharged from the drain tap. (Liquidizing may also form at normal times due to a problem in the gasification level control or line regulator.)
- In cold climate regions, measures should be taken to prevent the installation water temperature from falling to freezing temperature. Circulation pump should be operated continuously at workplaces that are closed at night and during weekends. If heating is to be stopped for a long period of time, the boiler and system water should be discharged. Antifreeze should not be used. (Antifreeze causes corrosion and a decrease in water thermal capacity.)
- If the burner malfunctions, burner computer reset button should not be pressed more than two times. If the burner still does not work, the related authorized service should be called.

PUTTING BOILER IN OPERATION

- Before the liquid/gas fuel hot water boiler is operated, the existence of the following conditions should be controlled:
- The liquid fuel in main fuel tank or the daily fuel tank should be heated to the required temperature turning on the heater circuit.
- The valves on the liquid fuel circuit should not be opened fully.
- Burner nozzle should be selected to suit burner and boiler capacity.
- The pre-heater on the burner should be filled with liquid fuel and any air in it should be discharged.
- The boiler thermostat should be adjusted to the suitable value.
- It should be made sure that the heating system is filled with water.
- The system should be filled with water and all the valves (except stand-by circulation pump and the by-pass valve) should be checked to be open. Air should be discharged from the air valves and air vents in the system. Circulation pump should not be operated during air discharge.

- Circulation pump should be started.
- The burner should be started from the switch on burner power panel.
- After the burner is running, nozzle pressure should be adjusted to burner and boiler capacity.
- When the boiler is in steady state (1-1.5 hours after the burner has started), burner air adjustment should be made using the flue gas analyser device.
- In the case of gas fuel burner, fuel cut-off valves are opened and the burner is started. In fuel-oil usage, the burner is started after the fuel is heated in the pre-heater tank.
- Fuel quantity per hour is calculated with the formula $B=Qk/(Hu*\eta)$.
B Fuel quantity per hour [kg/h],[Nm³/h]
Qk: Boiler capacity kcal/h,
Hu: Fuel lower thermal value [kcal/kg],[kcal/Nm³]
 η : Efficiency
- If the boiler water is overheated, the circulation pump should be checked. (It may be turning in reverse due to misplaced connectors.) If that does not bring a solution, the burner should be stopped and the installation should be checked.
- Open the boiler door carefully.
- Protect the front door and the combustion chamber bottom pipe refractory surface from collusion with hard objects (skewer, brush arm, turbulence makers, etc.).
- During the initial firing of the boiler after manufacturing, run it at a 25-30% capacity setting for about 2 hours to let the moisture in the cover refractory be disposed of in a healthy manner.
- Use a burner barrel of suitable length in your boiler.



HAVE THE INSTALLATION OF THE HEATING SYSTEM DONE BY AUTHORIZED PERSONNEL!

HEATING SYSTEM ADJUSTMENTS:

The boiler circulation pump should be checked for proper selection and adjustment.

a- Pump flow ;

Q_p : Pump flow.

Must be calculated with the formula $Q_p = Q_k / [C_p * (t_g - t_d)]$ [lt/h].

Q_k : Boiler capacity kcal/h

C_p : Water specific heat 1 kcal/kg

is taken as $t_g - t_d = 20$ °C (in 90/70 °C system)

b- Pump pressure ;

$H_p = mSS$. It must be greater than the critical circuit pressure of the building.

The pump selection should be approved by the (Mech. Eng.) responsible for the building project and the technical application. Where a project and calculations do not exist or are not available, regulations can be made by placing thermometers, one each, on the boiler flow and return lines, a manometer to the circulation pump exit and by adjustments with the help of the related pump curve, through the circulation pump valves so that the water temperature difference between flow and return lines is 20⁰C. In the case of big pump selection, the outflow-return temperature difference will stay below 20⁰ C and boiler outflow temperature may not rise, and in the case of small pump selection, the flow and return temperature difference will be over 20⁰ C and the high and remote radiators may not function efficiently enough.

Every morning, the water level and pressure should be checked from the hydrometer or manometer on the boiler. If it is below the normal value, water should be added while the boiler is cool. If it is a closed expansion system, the closed expansion tank gas pressure should be checked to be equal to the static water height of the building. This control should be done on the expansion tank manometer if it is present, if not, it should be done from the gas side nozzle with a air pressure tester.

If the pressure is excessive, it should be discharged from the related nozzle, if it is insufficient, nitrogen gas should be added by the expansion tank authorized service.

If water comes out from the valve during the check instead of gas or air, this means the tank diaphragm is torn and it should be changed by contacting an authorized service.

DISCHARGE OF BOILER WATER

- After a season's utilization, the boilers should be cleared of gasket remains, mud and residue in the heating system.
- The blind flanges at the lowest level of the main distribution and collection reservoir and the boiler filling-discharge tap are removed and the system and boiler water is rapidly flushed out.
- The emptied boiler water surface (internal surface of boiler) is cleaned with pressurized water.
- After the cleaning operation (as explained in the article **filling of the system with water** at page 13) the installation must be filled with water.
- The boiler water should not be discharged at any time except pre-operation cleaning and water should not be added to the boiler except for the purpose of compensating any depletion in the expansion tank.

TAKING BOILER OUT OF OPERATION

The taking of boiler out of operation should be as follows:

- The burner is stopped and boiler surfaces are cooled.
- The soot and smut in the boiler (the cover, smoke chest and the smoke pipes) should be cleaned.
- The cleaned surfaces should be checked under strong light to detect damages like leakages, oozing, cracks, etc. If such damages exist, the authorized services are notified and the necessary repairs are done.
- The liquid fuel between the burner and the main fuel tank should be discharged and the fuel system should be cleaned with kerosene, diesel oil.
- Active lime should be sprinkled into the combustion chamber, smoke pipes and smoke channels.
- The chimney cleaning flap should be brought to fully open position.
- The damaged heat insulation should be repaired.

- The burner maintenance should be done as per manufacturer recommendations.
- During non-operational period, the boiler room temperature should be kept at min. +5° C.
- The boiler and system water should not be discharged if not necessary. At the end of season, hydrazine residual or similar protective chemical additive should be added to system water, to prevent negative effects of the oxygen in water on the metal surfaces.



PERFORM FULL CONTROL AND MAINTENANCE OF THE BOILER!

PREVENTION OF LOW TEMPERATURE CORROSION:

- The boiler pipes should not be allowed to burst due to low temperature corrosion formation. To prevent this:
- Liquid fuel with low sulphur content should be used.
- To prevent condensation of the gasses that pass from the boiler surfaces and the smoke pipes, boiler water outlet temperature should not drop below 60° C and smoke gas temperature below 70° C.
- 3-way or 4-way Valves must be used in the heating system.
- Soot and lampblack collection must not be allowed on boiler heating surfaces (furnace, smoke pipes, smoke box), cleaning should be done as frequently as possible.
- The burner should not be stopped and started frequently.
- Combustion should be controlled and ensured to be efficient. The burner settings should be done by the authorized service and if a re-setting is required, the related burner service should be contacted.

INSPECTION AND MAINTENANCE OF BOILER

1. General Maintenance

Heating system boilers should be subjected to general maintenance at least once a year. The following points should be checked during general maintenance.

- The operation of boiler armatures (thermostat, thermometer, hydrometer / manometer) should be observed continuously and in case of malfunction the required controls should be done and if needed, they should be changed. Heat transfer should be improved by filling the thermometer wells with thin lubricant.
- All connections in the system should be controlled for proper insulation, leakages and oozing should be repaired and if needed, the valve gaskets should be reinforced.
- The boiler front big door and the rear smoke chest insulation elements should be checked continuously; if leakage exists, the tightening elements and nuts should be tightened in balance; if leakage is not stopped, gasket/sealant should be changed or our authorized services should be contacted. Grease the bolt screws and nuts of tightening elements.
- Perform the cleaning of the boiler combustion chamber, smoke pipes and smoke chest at least every 15 days in the case of liquid fuel usage, and at least every 60 days in the case of gas fuel usage. The turbulators should be taken out and all pipes should be cleaned with a suitable mop. Turbulators should be reinstalled after cleaning. For full boiler efficiency, all turbulators should be installed.
- At the end of season, the boiler should be cleaned fully, as in periodical cleaning. Boiler heating metallic surfaces should be protected against oxidation by applying transformer oil or a thin metallic lubricant.
- The boiler and system water should not be discharged if it is not a necessity. At the end of season, hydrazine residual or similar chemical protective additive should be added to system water, to prevent negative effects of the oxygen in water on the metal surfaces.
- Temperature gauges are compared to a calibrated thermometer.

- Safety elements, outlet and return safety pipes and safety valves are checked for proper operation.
- The mud and residuals at bottom of liquid fuel tanks are cleaned.
- The controls described in article on taking boiler out of operation, are performed.

2. Hydraulic Test

Boiler parts such as the smoke pipe, nozzle, tube-sheet should pass a hydraulic test under an authorized mechanical engineer's supervision, when replaced or every 5 years for control purposes.

For boilers under 1000kW:

- Close all outlets and inlets with blind flanges except one outlet/return pipe left open.
- Let water into the boiler from the filling/discharge tap until water comes from the vent left open.
- Also plug the open vent with a blind flange.
- Pressure the boiler to 1.3 times the design pressure. Wait 20 minutes and then check for drop in pressure, leakage, oozing and permanent form changes.

For boilers over 1000kW:

The procedures described above are applied; test pressure is taken as 1.5 times the design pressure.

GENERAL BOILER MALFUNCTIONS

Malfunction Symptom	Reason	Solution
No firing	<ul style="list-style-type: none"> • Burner malfunction 	<ul style="list-style-type: none"> • Follow burner manufacturer recommendations.
Dark black smoke from chimney	<ul style="list-style-type: none"> • Excess air coefficient is low • Circuit voltage low 	<ul style="list-style-type: none"> • Check the fresh air entering the boiler room or burner air setting. • Voltage drop will cause motor revolutions to drop and result with a low fuel-air mixture.
Drumming noise in boiler water compartment	<ul style="list-style-type: none"> • Air in system. 	<ul style="list-style-type: none"> • Discharge the air.
Overheating in boiler water	<ul style="list-style-type: none"> • Circulation pump malfunction. • Thermostat malfunction 	<ul style="list-style-type: none"> • Check circulation pump for reverse turning. • Check boiler thermometer for proper operation.

For malfunctions listed above, boiler operator personnel intervention is sufficient. For malfunctions apart from these, contact our authorized services.

Malfunction Symptom	Reason	Solution
Boiler outlet water temperature not rising	<ul style="list-style-type: none"> Water speed is high 	<ul style="list-style-type: none"> Reducing turning speed if the circulation pump speed is adjustable, if it is constant speed flow must be regulated by lowering valve or replaced with a suitable valve.
Water collection in smoke chest or leakage	<ul style="list-style-type: none"> Condensing of steam in smoke gas 	<ul style="list-style-type: none"> Boiler must not be run at low temperature, smoke gas temperature at boiler outlet must be dropped to less than 70°C, 3 or 4-way valves must be used, boiler thermostat adjustments must be high. The condensed water must be drained with a pipe from the lowest level of the smoke chest.
Paint burn on front door, deformation of refractory brick and turbulator	<ul style="list-style-type: none"> wrong burner choice and high adjustment 	<ul style="list-style-type: none"> Burner replacement, a change for suitable barrel size and burner adjustment is required. With liquid fuel, leakage to furnace and collection must be prevented.
Chimney gas temperature rising	<ul style="list-style-type: none"> Operation without turbulator or deficient turbulator, incorrect burner adjustment and choice 	<ul style="list-style-type: none"> Turbulator installation and completion of deficiencies, making normal burner adjustment and supplying suitable burner is required.



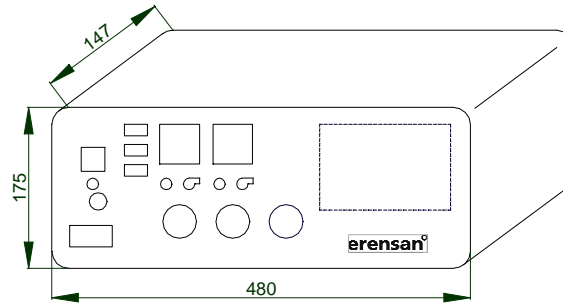
HAVE BOILER ELECTRICAL CONNECTIONS MADE BY AUTHORIZED PERSONNEL!

BOILER CONTROL PANEL INSTALLATION INSTRUCTIONS

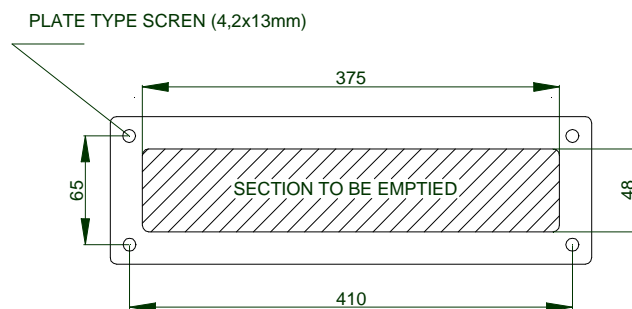
- Flax the ½” brass wells supplied with the KP (1 for KP1, 2 for KP2 3 for KP3) and install them on the sleeves on the boiler with proper insulation. Stop the empty sleeves with ½” blind plugs.
- Disassemble the KP body into two pieces, removing the 4 connection screws. Cut and remove the marked 375x48 mm section at the base. Pass the thermometer and thermostat sensors through this gap and place them (at most 2 each) in the wells.
- Adjust KP lower body so that it centers the boiler outlet pipes axially and so that it will not pass end of KP front isolator sheet, drill the screw points marked on 410 x 65mm axis measures with a 4mm tip, concurrently with the upper insulation sheet.
- Make the electrical connection between the KP exit contact and burner contact, complying with the wiring diagram (with the number of connections) with 0.75mm² cable. Open enough positions in the cross sectional area behind the KP for cable pass-through.
- Securely screw the KP lower body onto the upper isolator sheet of the boiler with 4 4.2x13mm metal sheet screws.
- Put the upper body of the KP in place and close it by tightening with 4 screws.
- Ask the operating personnel to fill the boiler and system with water. When the boiler and system is filled with water, expansion system is controlled, the circulation pump is seen to be operational, you may power the control panel.
- Make the sequential controls on the KP and declare that the burner may be started by the authorized service technician. Supervise the operation of the burner by the related technician and make the functional controls of the KP elements.
- When no adverse situations arise as a result of the functional controls and KP elements are observed to perform their tasks, you can set the KP operational.
- For problems and complaints related to the KP contact Atlantic 2000

CONTROL PANEL DIMENSIONS

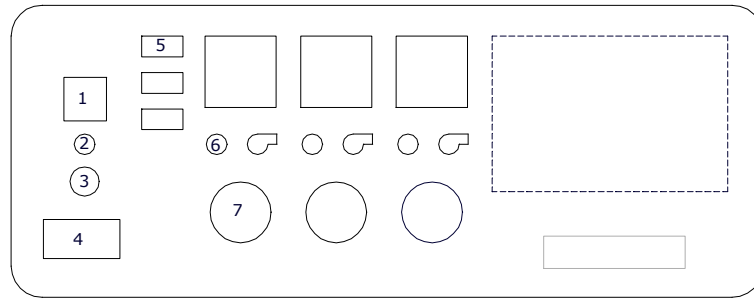
Control panel external dimensions



Control panel lower base installation dimensions

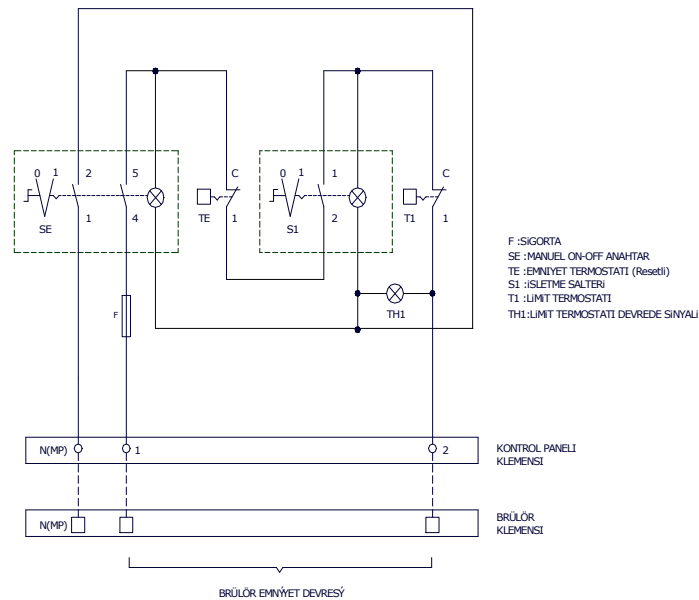


KP-1 control panel display

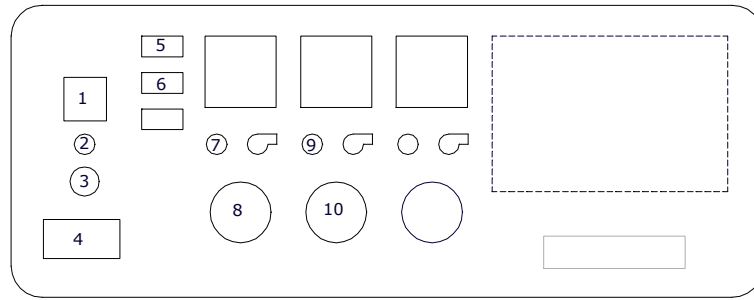


1. Manual on-off switch
2. Fuse (6A)
3. Safety thermostat (with manual reset)
4. Boiler water thermometer
5. Burner ON-OFF switch (1. Stage)
6. Thermostat in circuit signal
7. Limit thermostat

KP-1 ELECTRICAL WIRING DIAGRAMME

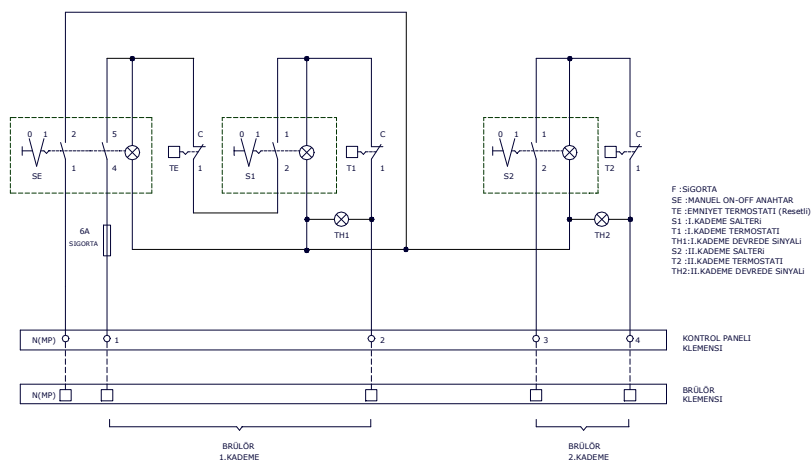


KP-2 control panel display

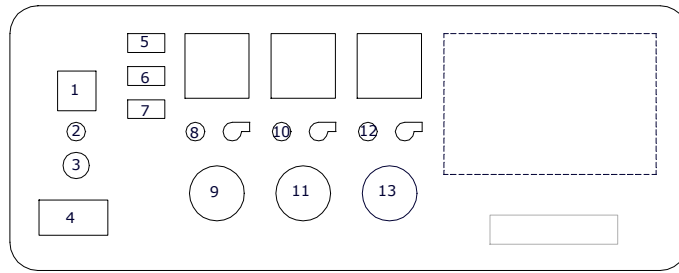


1. Manual on-off switch
2. Fuse (6A)
3. Safety thermostat (with manual reset)
4. Boiler water thermometer
5. Burner ON-OFF switch (1. Stage)
6. Burner ON-OFF switch (2. Stage)
7. I. Stage in circuit signal
8. Ii Stage thermostat
9. II. Stage in circuit signal
10. II. Stage thermostat

KP-2 ELECTRICAL WIRING DIAGRAMME

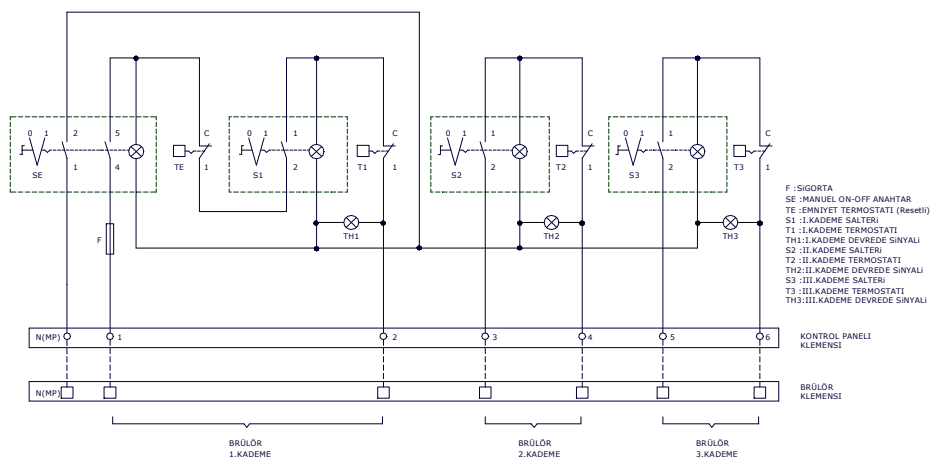


KP-3 control panel display

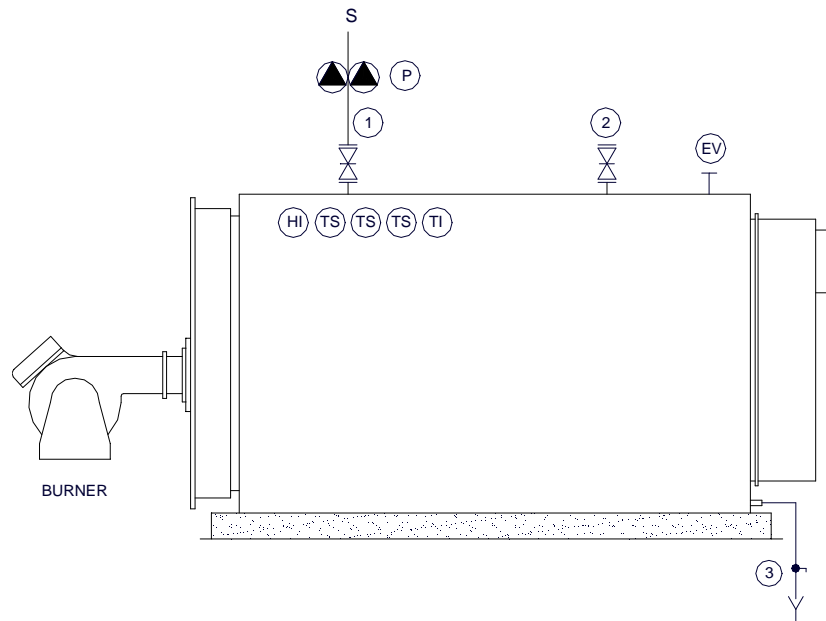


1. Manual on-off switch
2. Fuse (6A)
3. Safety thermostat (with manual reset)
4. Boiler water thermometer
5. Burner ON-OFF switch (1. Stage)
6. Burner ON-OFF switch (2. Stage)
7. Burner ON-OFF switch (3. Stage)
8. I. Stage in circuit signal
9. II Stage thermostat
10. II. Stage in circuit signal
11. II. Stage thermostat
12. III. Stage in circuit signal
13. II. Stage thermostat

KP-3 ELECTRICAL WIRING DIAGRAMME



SAMPLE PIPING & INSTRUMENTATION DIAGRAMME



HI Hydrometer

TS Thermostat 30-90 °C

TI Thermometer 0-120 °C

EV Expansion tank connection nozzle

P Pump

S Supplying to the system

1. Supplying to the installation

2. Returning from the installation

3. Draining

BOILER FEED WATER AND BOILER WATER CHEMICAL CHARACTERISTICS

Water to be used in Hot Water boilers must comply with the table values indicated below.

To operate a productive and economic boiler, boiler feed water and boiler water must be continuously controlled and it must be ensured that the chemical conditions required for water are provided.

FEEDWATER FOR HOT WATER BOILERS

Parameter	Unit	Make-up water for hot water & superheated water boilers
Operating Pressure	bar	total range
	MPa	total range
Appearance	-	clear, free from suspended solids
Conductivity at 25 °C	µS/cm	< 1500
pH value at 25 °C ¹⁾	-	> 7,0
Total hardness (Ca + Mg)	mgl/liter(ppm)	< 5 [=0,5 Fr.H]
Iron (Fe)	mgl/liter(ppm)	< 0,2
Copper (Cu)	mgl/liter(ppm)	< 0,1
Silica (SiO ₂)	mgl/liter(ppm)	-
Oxygen (O ₂)	mgl/liter(ppm)	-
Oil/grease	mgl/liter(ppm)	< 1
Organic substances	-	See clause 5
¹⁾ With copper alloys in the system the pH value shall be maintained in the range 8,7 to 9,2		
²⁾		
³⁾		
⁴⁾ If non-ferrous materials are present in the system, e.g. Aluminium, they may require lower pH value and conductivity, however, the protection of the boiler has priority.		
⁵⁾ If Phosphate is used; considering all other values higher PO ₄ -concentrations are acceptable, for instance with balanced or coordinated phosphate treatment (see also clause 4).		

Parameter	Unit	Boiler water for hot water & superheated water boilers
Operating Pressure	bar	total range
	MPa	total range
Appearance	-	clear, no stable foam
Conductivity at 25 °C	µS/cm	< 1500
pH value at 25 °C	-	9,0 to 11,5 ⁴⁾
Acid Capacity up to pH 8,2	mmol/liter	< 5
Silica (SiO ₂)	mg/liter	-
Phosphate (PO ₄) ⁵⁾	mg/liter	-
Organic substances	-	-
1)		
2)		
3)		
4) If non-ferrous materials are present in the system, e.g. Aluminium, they may require lower pH value and conductivity, however, the protection of the boiler has priority.		
5) If Phosphate is used; considering all other values higher PO ₄ -concentrations are acceptable, for instance with balanced or coordinated phosphate treatment (see also clause 4).		

Ref : prEN 12953-10, Table 5-1, 5-2; 1998

BOILER LIFE SPAN

The economic life span of hot water boilers has been determined as 10 years. With **erensan**^o brand boilers, it is possible to go well over the life span stated by the Ministry when the boilers are used in compliance with operating and maintenance instructions. Therefore, **ensure that this operating and maintenance procedure is read and fully applied by operating personnel.**

When the boiler has reached unusable state, remove the junk from usage area in compliance with environmental procedures.



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