

NBR Series Stainless Steel Condensing Hot Water Boiler

Installation Instructions

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Part 1. Overview

In order to better adapt to market demand and the requirements of national energy and environmental protection policies , and pursue a win-win situation of economic and social benefits , we have launched an optimized ultra-low nitrogen stainless steel fully condensing boiler and atmospheric pressure hot water boiler.

1. Structure Introduction

Ultra-low nitrogen stainless steel fully condensing boiler atmospheric pressure hot water boiler adopts horizontal three-pass stainless steel condensing heat exchanger structure , the radiation heating surface is a large diameter furnace , the front furnace door and the flame contact surface are made of 310S high temperature resistant stainless steel plate, and the high temperature flue gas enters the front smoke box through the smoke pipe. The third return convection heating surface is a stainless steel condensing heat exchanger, in which the condensing heat exchanger is made of 316L material, so that the flue gas can flow evenly in each heat exchanger, achieving the effect of full heat exchange, and the flue gas releases condensation heat in the middle and lower part of the heat exchanger. The exhaust temperature is about 40 °C , which fully absorbs the condensation waste heat, and the boiler thermal efficiency can reach about 105-109% . The front and rear smoke boxes are all made of high temperature resistant and corrosion resistant stainless steel plates .

2. Main parameters of boiler :

Power: 0.35~7MW/h

Thermal efficiency 98%~109%

Temperature : 9 5/70 Exhaust temperature: \leq return water temperature + 1 0 °C

3. Performance characteristics :

- ① The pre -premix burner is a long metal mesh burner head with flameless combustion, ensuring that the boiler NOx emission is less than 30mg/m³ , meeting the environmental protection low emission standards .
- ② The radiation heating surface is a large-diameter furnace , and the front furnace door and flame contact surface are made of 310S high-temperature resistant stainless steel plate. The convection heating surface is a stainless steel condensation heat exchanger 316L, so that

the flue gas can flow evenly in each heat exchanger, achieving a full heat exchange effect.

- ③ The flue gas releases condensation heat in the middle and lower part of the heat exchanger, and the exhaust temperature is about 40 °C . It fully absorbs the waste heat of condensation, which can ensure the overall output of the boiler and reduce the exhaust temperature . The flue gas resistance is small and the heat exchange effect is good . It can effectively improve the thermal efficiency, reduce fuel consumption , and have obvious energy-saving effects .

Part 2. Boiler Installation Instructions :

1. Precautions before installing normal pressure hot water boiler

Notes

- ① It is strictly forbidden to use normal pressure hot water boilers under pressure.normal pressure hot water boilers under pressure .
- ② Natural gas or city gas must be used as fuel , gasoline or diesel can't be used . The power supply voltage is 200V or 380± 5V.
- ③ The machine should be grounded reliably when installed , and it is better to cut off the power supply when there is thunderstorm .
- ④ Volatile substances such as gasoline and sodium carbonate around the boiler .
- ⑤ Boiler room should always be kept dry and clean to prevent the control system from getting wet .
- ⑥ When piping the boiler , an expansion water tank must be installed , and the tank should be about 1m away from the top of the boiler.
- ⑦ Valves cannot be installed on the boiler's atmosphere connecting pipe and expansion pipe .
- ⑧ Use a circulating water pump with appropriate flow and head .
- ⑨ When installing the circulating water pump, the bottom should be stable to prevent vibration and noise .
- ⑩ The pipes should be well insulated and fire-proof materials should be used as much as possible to prevent heat loss and fire .

- ⑪ The connections should be tight to prevent water leakage .
- ⑫ The boiler 's water supply must be from the expansion tank and cannot be directly connected to the tap water pipe .

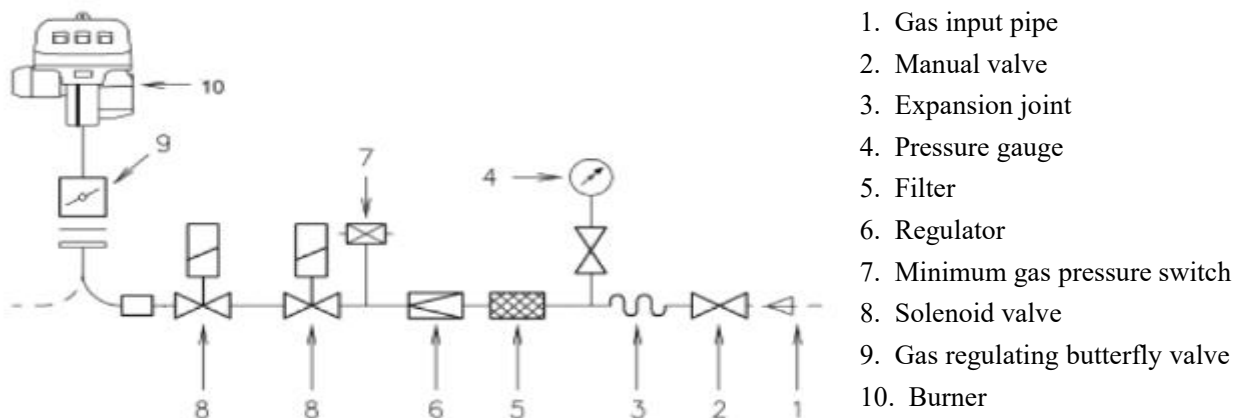
2. Basic requirements :

- ① Before installation and use , carefully read and understand the burner installation and operating instructions provided with the machine .
- ② Strengthen the inspection of gas pipes , especially the solenoid valves , to prevent leakage to avoid explosions and fires .
- ③ The foundation must meet the load-bearing requirements . Before the boiler is in place, the ground must be calibrated with a level . After the boiler is in place , the left and right inclination should be less than 5mm, and the front end of the boiler is naturally 20mm higher than the rear end to facilitate sewage discharge .

3. Installation Requirements

1) Installation of gas supply pipeline

- ① There is an air inlet flange interface on the burner , just connect the air inlet flange with the burner flange ;
- ② burner installation, please refer to the burner installation and operating instructions ;
- ③ Before the gas enters the burner , please install necessary valves and detection systems;
- ④ Manual and automatic gas shut-off devices must be installed ;
- ⑤ The following system is recommended for the gas pipeline entering the burner :



2) Chimney installation

A large amount of water vapor will be generated in the combustion products of gas boilers . When encountering cold air and low-temperature metal walls , a large amount of condensed water will be generated . Condensed water cannot be stored in the boiler for a long time and should be discharged outside the furnace. The front and rear smoke boxes of this series of boilers of our company are equipped with condensed water discharge ports . When working normally , the discharge valve is always open to discharge condensed water at any time . The flue should also pay attention to the discharge of condensed water . The horizontal section should have a certain slope to facilitate the discharge of condensed water . The condensed water discharge device should be equipped with a return water elbow to prevent smoke from being discharged .

3) Water tank configuration

A. Hot water tank

- ① Use corrosion-resistant materials ;
- ② Galvanized sheet or stainless steel sheet should be used ;
- ③ The hot water tank should be able to withstand temperatures above 100°C ;
- ④ hot water tank should be equipped with a drain valve ;
- ⑤ Closed hot water tanks should be equipped with expansion pipes or safety valves .

B. Expansion tank

- ① Should be able to withstand temperatures above 100°C ;
- ② Calculation of effective volume of water tank :

the heating system is 85-60 °C, $V = 0.031V_e$

Where V_e - effective volume of expansion tank L

V_e . water volume in the system L

4) Installation of electrical wiring

- ① Connect the power cord of the control cabinet and the instrument pipeline , and connect the ground wire . Check whether the wiring of the burner , water pump, instrument and other control cabinets is correct according to the diagram ;
- ② Control system, please refer to the " Controller User Manual " and the wiring diagram of

the fuel Oil (gas) normal pressure hot water boiler .

Part 3. Boiler operation instructions (including debugging):

Please read the boiler control manual, burner manual, and other auxiliary machine manuals carefully before installing and using the boiler .

This type of boiler is designed for full automatic control and has a complete protection system , it still requires that the boiler operator must be a qualified boiler operator and should strictly follow the post responsibility system and boiler operating procedures to ensure the normal operation of the equipment to ensure the safety and economy of the boiler unit .

1. Pre- startup checks :

- ① Check whether the sealing surfaces of the boiler are tight ;
- ② Check whether the line voltage meets the requirements and whether various switches are in normal state ;
- ③ Check whether each electric regulating valve is normal .

2. Preparation before starting :

① Before start to use, you must be familiar with the equipment , carefully read the "Control User Manual " and the gas atmospheric pressure hot water boiler wiring diagram , and carefully read the installation and operating instructions of the selected burner .

② Check whether the line voltage meets the requirements and whether the positions of various switches are normal . Start the water pump , burner and various auxiliary machines to check whether they are normal .

③ When the boiler is started with a cold furnace , it burns stably under the minimum load . The purpose is to control the heating rate to reduce the thermal stress of the boiler and ensure the free expansion of all parts of the boiler . This ensures the safe and stable operation of the boiler and extends its service life . After the cold furnace start of the boiler is completed , it begins to work normally . The operating sequence should refer to the "Computer Control Instructions " and the gas pressure hot water boiler wiring diagram .

- ④ Inspection of safety protection devices

- (1) There is always a connecting pipe on the upper surface of the body that is connected to the atmosphere , and the gauge pressure at the top of the boiler body is zero .
- (2) Check the safety protection and alarm devices of the automatic control system.

2. Boiler operation (debugging)

- ① Boiler water quality should comply with GB /T 1576 "Industrial Boiler Water Quality "
- ② After the boiler is installed , open the vent valve of the pipeline or radiator , and then input water into the pipeline and the furnace body through the expansion tank until water comes out of the exhaust valve . When the boiler is full of water , close the exhaust valves and check whether there is any leakage at each connection .
- ③ Confirm that the furnace body is full of water and remains full of water , start the circulating water pump , circulate the water , and confirm that all operating equipment is operating normally and the circulation is good . When the water level in the expansion water tank is too low , water is automatically replenished through the float valve and solenoid valve . When the water level drops to the low water level protection state , the burner power will be cut off and a buzzer alarm will sound .
- ④ Turn on the power of the control cabinet , check whether all components of the control cabinet are normal , check the reliability of protection, etc. , and set the boiler water temperature or the start-up temperature and shutdown temperature as needed .
- ⑤ Start the burner and check whether the ignition and rotation parts are normal . At this time, you can adjust the air volume through the peephole and smoke output until no black smoke is emitted .
- ⑥ Hot water mode : When the boiler water temperature reaches the set value , the burner stops and the circulating water pump starts , until the boiler water temperature is lower than the set value, the circulating water pump stops running and the burner starts again , and this cycle is repeated .
- ⑦ Heating mode : The circulating water pump circulates , the burner is started when the temperature is lower than the set temperature , and the burner is stopped when the temperature reaches the set temperature .
- ⑧ Antifreeze mode : The circulating water pump circulates , and the burner starts when the

boiler water temperature is lower than 5 °C , and stops when it reaches 15 °C (or 20 °C) .

- ⑨ When the boiler is not needed to work , please cut off the power supply to the boiler .
- ⑩ If the boiler is operating in " antifreeze control " , do not disconnect the power supply .
- ⑪ For specific operation methods of the boiler , please refer to the burner instruction manual that comes with the machine .

Part 4. Maintenance of atmospheric pressure gas boiler

1、 Water quality should be tested regularly to ensure that it meets the standards and prevent scaling .

Item	Feed water	Boiler water
Turbidity / FTU	≤5.0	
Hardness/ (mmol/L)	≤0.60	
PH value (25°C)	7.0-11.0	9.0-11.0
Dissolved oxygen /(mg/L)	≤0.10	
Oil (mg/L)	≤2.0	
Total iron (mg/L)	≤0.30	
Phosphate / (mg/L)	-	5.0-50.0

2、 Quarterly repairs

- ① For the burner , please refer to the burner installation and operating instructions .
- ② Check whether the circuits of electrical instruments are loose and clean up the accumulated dust .
- ③ Check that all boiler valves are in good condition and clean them .
- ④ Clean the water pump inlet filter or oil and air filter .

3、 Annual repair

- ① Clean the carbon or ash deposits in the smoke pipe and the furnace , and check the condition of the flame retardant sheet . If it is burned , replace it according to the size .
- ② the burner , please refer to the burner installation and operating instructions .
- ③ Check the corrosion of the boiler and pipelines , and replace those that are severely rusted or corroded .

- ④ Check the insulation condition of motors , electrical appliances and circuits .
- ⑤ Check the registration form for correctness .

4、 Boiler maintenance

Boiler shutdown protection can be roughly divided into two categories: full water protection and dry protection . Full water protection includes hydrazine , nitrogen liquid method , water supply pressure maintenance method , steam pressure maintenance method , alkali solution method , trisodium phosphate and sodium nitrate mixed solution protection method ; dry protection method includes drying method , nitrogen filling method and desiccant method . The desiccant method is more commonly used for low-pressure boilers .

The desiccant method uses a desiccant with a strong moisture absorption capacity to keep the boiler water vapor system dry and prevent corrosion. The method is : after the boiler is shut down , when the boiler water temperature drops to about 40 °C , the water in each part of the boiler is completely drained , and the metal surface is dried by using the boiler waste heat or using the ignition equipment to bake at a low fire in the furnace. Remove the scale and slag deposited in the pot , then put the desiccant in the pot and close the valve of the boiler tightly to prevent outside air from entering .

Commonly used desiccants include : anhydrous calcium chloride (particle size is about 10-15 mm), quicklime or silica gel (silica gel needs to be dried at 120-140 °C). The dosage can be calculated according to the following indicators based on the boiler volume : industrial anhydrous calcium chloride CaCl_2 __ 1-2 kg/m³ , quicklime CaO 2__2-3kg /m³ , silica gel __ 1-2 kg/m³.

Method of placing desiccant : Place the medicines separately in several sugar porcelain plates (to prevent the medicines from deliquescing into a thin mud . But silica gel can be placed in a cloth bag and can be reused) and arrange them evenly in the drum along the length of the drum . Check the condition of the desiccant after 7-10 days . If it expires , replace it with a new one immediately . After that, check and replace the expired medicine at regular intervals (usually 1 month) .

Part 5. Boiler cleaning methods and precautions

- ① Cut off the power supply to the boiler and wait until the boiler temperature has completely cooled down before repairing or cleaning it .
- ② Remove the boiler burner , boiler end cover , smoke box door , fire box inspection hole , etc. Clean the heat exchanger with a wire brush (preferably with high-temperature steam), flush the bottom of the boiler water jacket with micro-pressure water after the boiler is discharged, flush the bottom sediment, and restore the inspection doors .
- ③ Check the burner to see if any parts are damaged or loose, etc. , and replace damaged components .
- ④ Clean the boiler 1 to 2 times a year can extend its life, improve thermal efficiency and save a lot of fuel costs .
- ⑤ The boiler should be discharged regularly at least once a month .

Part 6. Fault inspection and troubleshooting

① Sensor failure

When the temperature sensors of the water outlet, return water, flue, etc. are short-circuited or open-circuited, an alarm will be output, a fault prompt will be given on the screen, all controlled equipment will be shut down, the sensor will be replaced, and the system will manually reset the fault after it is eliminated.

② Water outlet temperature is too high

During system operation, when the outlet water temperature exceeds the outlet water over-temperature alarm point, an alarm is output, a fault prompt is displayed on the screen, the combustion equipment is shut down, and a manual reset is performed after the fault is eliminated.

③ Flue temperature is too high

During system operation, when the boiler exhaust temperature exceeds the flue over-temperature alarm point, an alarm will be output, a fault prompt will be displayed on the screen, and all controlled devices will be shut down in a chain reaction. The system will be manually reset after the fault is eliminated.

④ Boiler water level is extremely low

When the water level in the pot is lower than the warning low water level, an alarm is output, a fault prompt is given on the screen, all controlled devices are shut down, and a manual reset is performed after the fault is eliminated.

⑤ Abnormal gas pressure failure

When the gas supply pressure is lower than the normal working pressure of the burner, an alarm will be output, a fault prompt will be displayed on the screen, the burner will be shut down, and it will automatically reset after the fault is eliminated.

⑥ Gas leakage failure

When a gas leak occurs, an alarm will be output, a fault prompt will be given on the screen, all equipment will be shut down, and a manual reset will be performed after the fault is eliminated.

⑦ Flame out failure

If the burner fails to ignite or burn correctly due to various reasons, an alarm will be output, a fault prompt will be given on the screen, the combustion equipment will be shut down, and the machine will be manually reset after the fault is eliminated.

⑧ Power failure protection

During system operation, if power outage occurs, the system will automatically cut off the output device. When power is supplied again, the controller will automatically go off duty to ensure safe operation of the system.