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HIGH-EFFICIENCY INTELLIGENT HEAT EXCHANGER

Operation and Maintenance Instruction Manual

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1. Equipment Overview

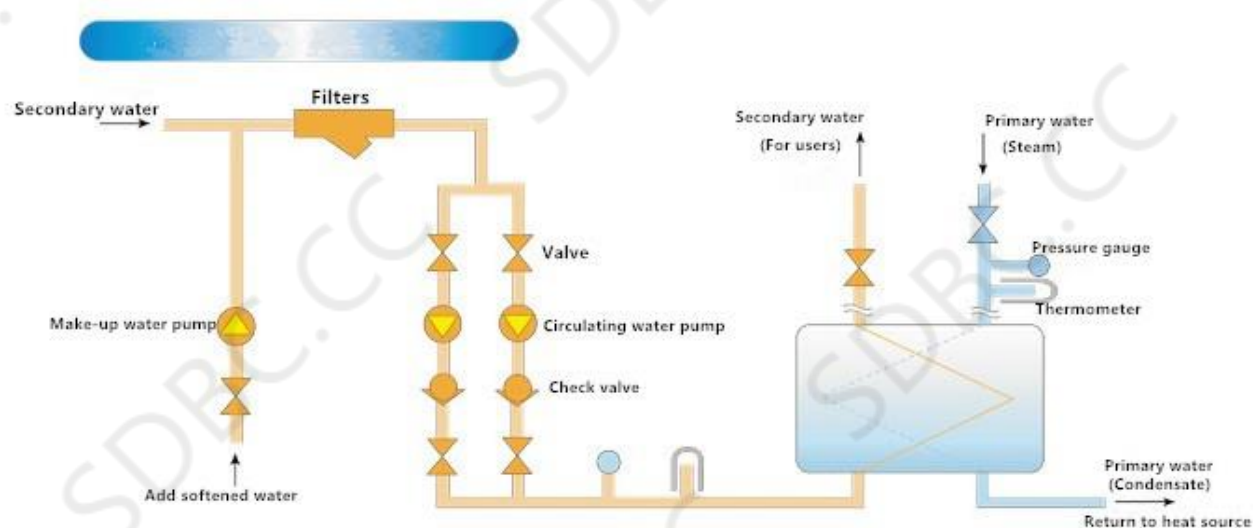
1.1 Purpose and Principle

1.1.1 Purpose:

The efficient intelligent heat exchange unit is a complete heat exchange system that is organically combined. It can perform heat exchange between various media such as steam-water, water-water, and oil-water. Users only need to connect the pipes and power supply to use it. This series of units is widely used in heating and cooling systems in industrial, residential, governmental, educational, manufacturing, hospital, and hotel settings.

1.1.2 Working Principle:

Heat Exchange Unit



The return water from the secondary network passes through the dirt separator and flows into the secondary network circulation pump (when there are two circulation pumps, one works while the other is on standby; with three

circulation pumps, two work while one is on standby). After being pressurized, the water enters the plate heat exchanger or tubular heat exchanger, where it exchanges heat with the heat source or cold source from the primary network. When the pressure in the secondary water system exceeds the rated value, the safety valve opens to discharge the expansion water into the water tank (or trench). When the system pressure drops, the electric control cabinet regulates the replenishing pump using frequency control to replenish water and automatically stabilize the pressure.

1.2 Structural Features

1.2.1 Intelligent control of outlet water temperature: The outlet water temperature can be programmed to change according to the outdoor environmental temperature, standard room temperature, and time, ensuring high heating quality and achieving energy savings.

1.2.2 The system can display, store, and print various operational parameters via a computer, including: heat medium flow rate, heat medium temperature, heat medium pressure, heating capacity, outdoor temperature, standard room temperature, water supply temperature, condensate temperature, circulation water pressure, etc.

1.2.3 In steam-water heat exchange, a condensate heat exchange section and outlet water temperature control can be set to fully utilize the heat from the condensate.

1.2.4 The system uses frequency control for water replenishment, enabling automatic water replenishment and pressure stabilization.

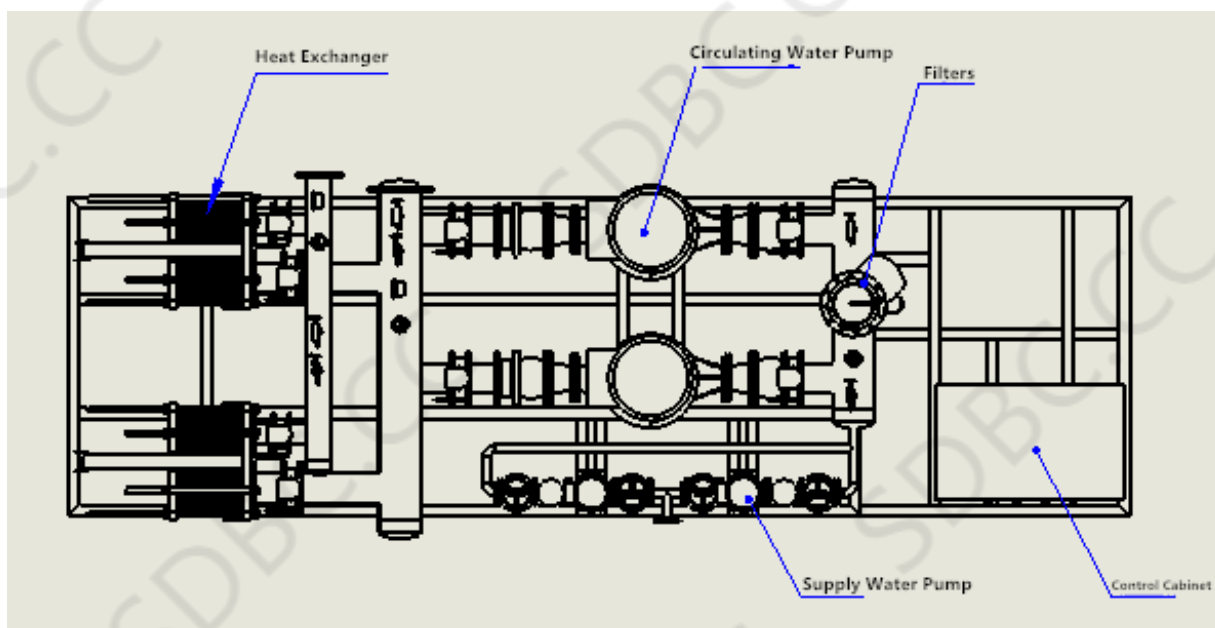
1.2.5 The heat exchanger adopts a highly efficient plate heat exchanger or tubular heat exchanger, making the unit compact and requiring minimal floor space.

1.2.6 The unit is designed with a standard modular structure, allowing flexible selection of control options based on user needs, thus reducing investment costs.

1.3 Equipment Parameters

Please refer to the 'Technical Specification Table' in the accompanying drawings.

1.4 Equipment Diagram



2. Equipment Description

2.1 Structural Layout Description

The high-efficiency intelligent heat exchange unit is composed of a heat exchanger, a voltage stabilizer, a circulating pump, a water supply pump, a

decontaminant, a control cabinet, etc. Some require a condensate tank or a water supply tank and a soft water device. Its function is equivalent to a heat exchange station. All thermal projects that require a heat exchange station can be replaced by intelligent heat exchange units.

2.2 Factory information

- a. Product certificate;
- b. Quality certificate;
- c. Completion drawing;
- d. Installation, operation, maintenance, and operating instructions;
- e. Delivery list.

3. Installation

3.1 Inspection before installation

3.3.1 When assembling, unloading or transporting, please do not invert or tilt; during on-site construction, it is strictly forbidden to use the unit as a welding machine grounding wire.

3.1.2 The unit can be placed horizontally directly on the indoor concrete foundation (100 mm above the ground) and fixed with anchor bolts. Large units must be pre-buried, and secondary grouting is required if necessary.

3.1.3 When placing the unit, pay attention to the direction of the pipe and make it easy to operate. Leave 500 mm of operating space around it.

3.1.4 When the unit is placed on the floor, check the bearing capacity of the

floor.

3.1.5 Before installation, check whether the primary and secondary side pipes and power supply meet the design requirements. And the pipes connected to the unit should be purged, flushed and pressure tested. After acceptance, they can be connected to the unit.

3.1.6 The heat exchanger configured for the heat exchanger unit does not participate in the test of the overall pipeline system. The heat exchanger should be isolated when doing the overall pipeline test.

3.1.7 The control cabinet should be moisture-proof. When connecting the power supply, pay attention to whether the motor direction and marking are consistent.

3.2 Site and foundation

3.2.1 According to the structural form of the equipment, sufficient space should be left at both ends after installation to meet the needs of disassembly, assembly and maintenance.

3.2.2 The foundation size should be compatible with the support size. The foundation can be cast with concrete or steel structure. When a concrete foundation is used, a foundation pad should be embedded on the foundation surface of the movable support. The foundation pad must be kept flat and smooth.

3.3 Equipment hoisting

3.3.1 Equipment hoisting must strictly comply with on-site operating

specifications.

3.3.2 When hoisting equipment, pay attention to the center of gravity of the equipment.

3.3.3 When there is a lifting lug for the equipment, use the lifting lug for hoisting.

If there is no lifting lug for the equipment, the equipment body or other safe methods must be used. At no time shall the equipment be hoisted by the component lifting lug or equipment pipe.

3.4 Equipment installation

3.4.1 The unit can be placed horizontally on the indoor concrete foundation (100mm above the ground) and fixed with anchor bolts.

3.4.2 When placing the unit, pay attention to the direction of the pipe and facilitate operation, leaving 500mm of operating space around.

3.4.3 When two or more units are used in parallel, a check valve must be installed on the outlet pipe of each unit.

3.4.4 When the unit is installed upstairs, it is only necessary to check the bearing capacity of the floor.

3.4.5 All interfaces of the unit must be cleaned before connection.

4. Commissioning and precautions

4.1 Preparation for commissioning of efficient and intelligent heat exchanger

4.1.1. Before operation, check whether all pipes have been tightened to ensure that the system parameters will not exceed the allowable working pressure and

temperature values on the manufacturing label.

4.1.2. Before use, perform a water pressure test at 1.25 times the operating pressure, and keep the pressure for 20 minutes without leakage before it can be put into production.

4.1.3. Before using the heat exchanger, use tap water to circulate and clean for about 20 minutes.

4.1.4. There should be an air vent valve in the pipeline system of the heat exchanger. After opening, the air in the equipment should be discharged to prevent the air from staying in the equipment and reducing the heat transfer effect.

4.1. 5. The installation of the cold and hot medium inlet and outlet pipes should be strictly connected in the direction specified on the factory nameplate. Otherwise, the heat exchanger cannot perform at its best.

4.2 Commissioning of efficient and intelligent heat exchanger

4.2.1 Open the water pump inlet valve, turn the control cabinet power to the “working” state, press the water pump start button, and then gradually open the water pump outlet valve, and pay attention to whether the starting current exceeds the rated value. Observe whether there are any abnormal phenomena, check the shaft seal leakage, and if there is any abnormality, shut down and deal with it in time.

4.2.2 Debug each water pump in accordance with step (1).

4.2.3 When the secondary system pressure tends to be stable, open the primary outlet valve, and then slowly open the primary inlet valve.

4.2.4 Observe whether the system flow, pressure, temperature and water pump operation are normal.

4.2.5 During commissioning, the temperature, pressure, current, voltage and other parameters at each point should be recorded regularly.

4.3 Shutdown of efficient and intelligent heat exchanger

4.3.1 Before shutting down, the primary inlet and outlet valves of the heat exchanger must be closed and wait for 10 minutes.

4.3.2 Turn the circulating pump knob to the stop position on the control cabinet door, stop the circulating pump, close the circulating pump inlet and outlet valves, and close the secondary side inlet and return valves of the heat exchanger.

4.3.3 Turn the water supply pump knob to the stop position on the control cabinet door, stop the water supply pump, close the water supply pump inlet and outlet valves, and close the secondary side inlet and return valves of the system.

4.3.4 After stopping the equipment, inspect the heat exchanger unit for abnormal phenomena, confirm the closed state of each valve, and cut off the power supply of the entire unit.

5. Operation and maintenance

5.1 Operation

In normal use, first turn on the control cabinet power supply, start the circulating water pump, wait for the secondary side circulating water pressure to stabilize, open the primary side inlet valve, and heat or cool the medium in the system to the set temperature.

When the temperature is higher or lower than the set value, the temperature control system is installed, the temperature sensor transmits the signal to the temperature control valve, and the actuator automatically adjusts the valve opening to change the flow of the heat source. If the temperature control system is not installed, the on-duty personnel shall manually adjust the valve opening of the primary inlet or outlet to change the flow of the heat source or cold source.

5.2 Shutdown

5.2.1 First close the primary inlet valve, then turn off the circulating water pump, secondary outlet valve, secondary inlet valve, and control cabinet power supply in turn.

5.2.2 If the ambient temperature is below 0°C or the unit is shut down for a long time, please drain the water in the unit. Open the drain ball valve to drain the accumulated water in the heat exchanger, and open the drain valve on the lower side of the water pump to drain the water in the water pump.

5.2.3 When re-using, start according to steps 2 and 3.

5.3 Maintenance

5.3.1 Try to keep the machine room dry and ventilated to prevent the unit

components from aging too quickly.

5.3.2 During operation, the circulating water system should be filled with water, and the pressure and temperature at each point, as well as the calibration of the safety valve, the operation of the water pump, the current, and the voltage should be checked regularly. Any unexpected situation should be handled in a timely manner.

5.3.3 When the efficiency of the heat exchanger decreases, it should be descaled in time.

5.3.4 When the pressure drop on both sides of the filter exceeds the preset value, the filter should be cleaned in time. When the filter is damaged, please replace it in time.

5.3.5 When the unit is not used for a long time, the system water should be drained, all interface valves should be closed, and the filter and heat exchanger should be regularly maintained and cleaned.

5.3.6 The control cabinet should be checked regularly, recommended once every two weeks, and once a month at the latest.

a) Check all wiring terminals in the circuit to see if they are loose, and make sure the contacts are tight.

b) Control and observe whether the contactor operates normally.

c) Disconnect the three-phase circuit breaker of the electrical component, only close the two-pole circuit breaker (i.e. control power supply), and observe

whether the contactor operates normally.

d) Dust in the control cabinet should be removed regularly.

6. Precautions

6.1 Operating instructions

All those engaged in the installation and maintenance of the heat exchanger unit must read this manual carefully and fully understand the requirements.

Please pay special attention to "safety".

6.2 Safety Instructions

The heat exchanger is a heat exchange device that is often used to process high-temperature or low-temperature fluids and operates under a certain pressure.

Therefore, safety must be the first priority when operating the heat exchanger!

To ensure safety, please follow the instructions below:

- a) Operate the equipment in full accordance with the environment planned when selecting the equipment.
- b) Do not operate the equipment alone before all necessary protective devices are installed.
- c) The unit can only be maintained and repaired and disassembled when the equipment is in a pressure-free state, the power supply and heat source of the unit are turned off, and the temperature is between 10°C and 40°C.
- d) Prevent unauthorized persons from contacting the equipment without authorization.

e) Keep the space around the equipment clean and hygienic.

6.3 It is strictly forbidden to operate the equipment under conditions that exceed the design parameters such as over-temperature and over-pressure.

6.4 Inspection content:

6.4.1 Check whether the environment in the station is normal and whether there are any leaks in the pipelines and instruments.

6.4.2 Check whether the display parameters of the on-site instruments and remote control instruments are normal.

6.4.3 Check the control cabinet operating environment, whether the temperature inside the control cabinet is too high, and perform necessary ventilation and heat dissipation.

6.4.4 Check the water level in the water tank to ensure that the water level is at a high level to prevent the system from being short of water due to too low a water level.

6.4.5 Check whether there are any abnormal sounds from the water supply pump, circulation pump, etc., and whether the temperature of the motor and pump body is normal.

6.4.6 Prepare a unit operation data sheet.

7. Common accidents and solutions

7.1 How to determine whether the heat exchanger is blocked?

If the primary side supply and return water pressure difference or the secondary

side heat exchanger inlet and outlet pressure difference exceeds 0.15MPa, and the secondary water supply temperature is not hot, please check whether the heat exchanger is blocked. The inspection method is to disassemble and clean the heat exchanger.

7.2 What are the reasons why the system is not hot? How should it be analyzed?

The secondary water supply temperature is low and not hot. The analysis has the following reasons:

The primary side water supply flow is insufficient:

Check whether all valves of the primary side water supply and return water pipelines are fully opened.

Check whether the primary water supply filter is blocked.

If all valves are open, determine the pressure difference of the primary supply and return water. If the pressure difference is less than 0.05MPa, ask the heating company to increase the flow rate. If the pressure difference of the primary supply and return water is greater than 0.15MPa, please clean the heat exchanger.

7.3The system has pressure, but the pressure gauge shows zero, What's going on?

If the needle valve of the pressure gauge is in the closed state, the pressure gauge always shows 0. During the operation of the system, ensure that all the needle valves of the pressure gauge are in the fully open state.

7.4 What's the matter with the secondary side overpressure? What should I do if there is overpressure? How to prevent overpressure in the secondary system?

When the system is initially operated, the secondary temperature is relatively low.

After the water replenishment reaches the fixed pressure value, as the temperature continues to rise, the pressure of the secondary system will also rise.

At this time, one is to exhaust more air, and the other is to drain water. When draining water, just open the drain valve of the secondary return water pipeline.

After the system temperature stabilizes, the pressure will not rise again.

7.5 How to determine whether the filter is blocked?

If the temperature difference between the primary water supply temperature and the primary return water temperature is large, the high temperature water exceeds 45 degrees, the low temperature water exceeds 30 degrees, and the secondary water supply is not hot, please check whether the filter at the primary water supply is blocked.

If the temperature difference between the secondary water supply temperature and the secondary return water temperature is large, the floor heating temperature difference exceeds 15 degrees, the radiator heating temperature difference exceeds 30 degrees, and the pressure difference is small, please check whether the filter at the secondary return water is blocked.

7.6 The unit fault indicator light is on, that is, the red buzzer on the control cabinet flashes and alarms, what should I do?

The fault indicator light indicates that the corresponding water pump is overloaded, the motor current exceeds the rated current, and the thermal relay plays a protective role. The solution is to press the reset button on the thermal relay to reset it. Note that it must be reset after the thermal relay cools down, otherwise the reset is invalid.

7.7 Why can't the system replenish water? The replenishment pump keeps turning, but the pressure does not rise.

If the replenishment pump is running all the time, but the pressure never reaches the set value, please exhaust the system. Poor replenishment is mostly caused by system gas accumulation.

7.8 Why does the inverter not start when the variable frequency water replenishment is not automatic?

Check whether the conversion switch is in the variable frequency or automatic position. The inverter can only work normally when it is in the variable frequency or automatic position.

Check whether the start button of the water replenishment pump is in operation.

The inverter can only work normally when the green indicator light of the water replenishment pump is on.

Check whether there is an alarm code on the operation panel of the inverter.

After the fault code appears, the inverter must be reset before the inverter can continue to work. If a fault code appears, please press the reset button in the upper left corner of the inverter operation screen.

The above three conditions must be normal for the variable frequency water replenishment to work normally.

7.9 What to do when the secondary water supply temperature is too high?

If the user feels that the water supply temperature is too high and the room is too hot, the best way is to turn down the primary water supply valve. Please note that the primary water supply valve must be turned down and the return water valve is in full open state.

7.10. What's the matter with the excessive noise of the water pump?

When the unit is running for one or two heating periods, the noise will become louder due to mechanical wear. Check whether the fan cover is loose and exhaust the pump. The water pump must be maintained regularly, add lubricating oil, replace wearing parts, etc.

7.11 Why does the water replenishment pump frequently replenish water and the pressure drop rapidly after stopping?

If the unit has been operating normally for a long time and there is frequent water replenishment, please do the following inspections:

Check whether there is any pipeline or valve leakage in the secondary side system, etc.

Check whether the check valve in front of the water replenishment pump is not tight and backflow water. The inspection method is to stop the water replenishment pump first, close the water replenishment pump inlet valve, and then open the exhaust valve at the outlet of the water replenishment pump. If water is discharged, it means that the check valve in front of the water replenishment pump is not tight and needs to be replaced.

7.12. The start-up indicator light of the pump is on, but the pump is not running. What's the matter?

Check the circuit breaker in the control cabinet and put the circuit breaker in the suction and state.

7.13 The pressure difference between the inlet and outlet of the circulating pump exceeds the head of the circulating pump. What's the matter?

The pressure difference between the inlet and outlet of the circulating pump indicates the resistance value of the entire system. For example, if the inlet pressure of the circulating pump is 0.25MPa and the outlet pressure of the circulating pump is 0.55MPa, it means that the resistance of the entire system is 0.3MPa, which includes the resistance of the unit itself. If the pressure difference between the inlet and outlet of the circulating pump exceeds the head of the circulating pump, it means that the secondary water supply pipeline is seriously blocked, resulting in excessive secondary water supply pressure. It is normal that the inlet and outlet pressure of the circulating pump cannot exceed the head of

the circulating pump.

7.14 What happens if the temperature difference between the supply water temperature and the return water temperature exceeds the rated value?

The smaller the temperature difference between the supply water temperature and the return water temperature, the greater the flow rate of the system and the smoother the system. On the contrary, if the temperature difference between the supply water temperature and the return water temperature is greater (exceeding the rated value), it means that the flow rate of the system is small and the system circulation is not smooth enough. At this time, check whether the filter, heat exchanger and corresponding valves of the pipeline are blocked.