HEATAWAY

9th GENERATION STAINLESS STEEL EVAPORATIVE CONDENSERS

OPERATION AND MAINTENANCE

- MAINTENANCE INSTRUCTION
- INITIAL AND SEASONAL START-UP CHECKLIST
- ROUTINE MAINTENANCE CHECKLIST
- SEASONAL SHUTDOWN CHECKLIST

MAINTENANCE INSTRUCTION

Water Quality Monitoring

An evaporative condenser operates by circulating water that is sprayed from the top, flowing down across the surface of the condenser tubes. While the circulating water evaporates during this process, the dissolved substances in the water do not evaporate along with it. As a result, the concentration of these dissolved substances gradually increases and may exceed the allowable limits, as shown in the table below. In addition to this, contaminants from the air drawn into the system also mix with the recirculating water in the basin, further increasing the concentration of impurities. If these dissolved substances or contaminants are not properly or effectively controlled, they can lead to scale formation and corrosion. These issues can reduce the cooling efficiency and cause damage to the equipment.

Re-circulating water properties

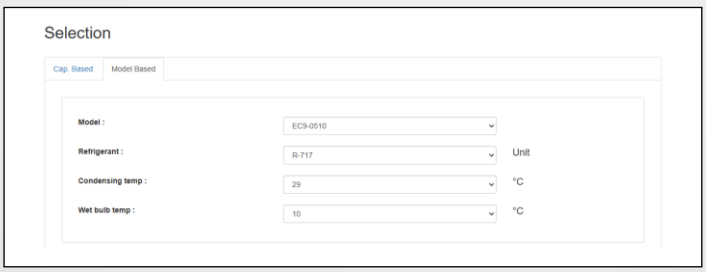
properties	Specified values
pH	6.5 - 8.5
Hardness as $CaCO_3$	Less than 600 ppm
Alkalinity as $CaCO_3$	Less than 300 ppm
Chlorides as Cl	Less than 500 ppm
Total dissolved solids	Less than 1800 ppm
Sulfates	Less than 250 ppm
Silica	Less than 150 ppm

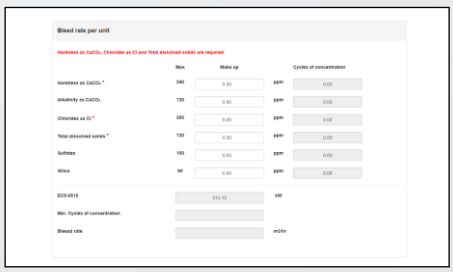
Note:
Water samples for testing must be collected before cleaning the unit or replacing the water. This ensures that the test results reflect the actual quality of the circulating water during operation. Samples must be taken only from the water in the basin. If the tested water quality exceeds the specified limits in the table above, please contact your distributor or Heat Away Co., Ltd. immediately. The company reserves the right to void the warranty if the quality of the circulating water does not meet the specified standards.

Monitoring of Make-up Water Quality and Bleed off

The quality of make-up water directly affects the volume of bleed-off. If the concentration of dissolved substances in the make-up water is high, the appropriate bleed-off volume must also increase accordingly, in order to maintain the concentration of dissolved substances in the circulating water within specified limits.

Since the appropriate bleed-off volume depends on the size of each unit and the operating conditions, it can be calculated using the following link:
https://www.heataway.net/EvapCapacility/Selection.php
In the "Model Based" tab, the bleed-off rate per unit can be calculated at the bottom of the page.





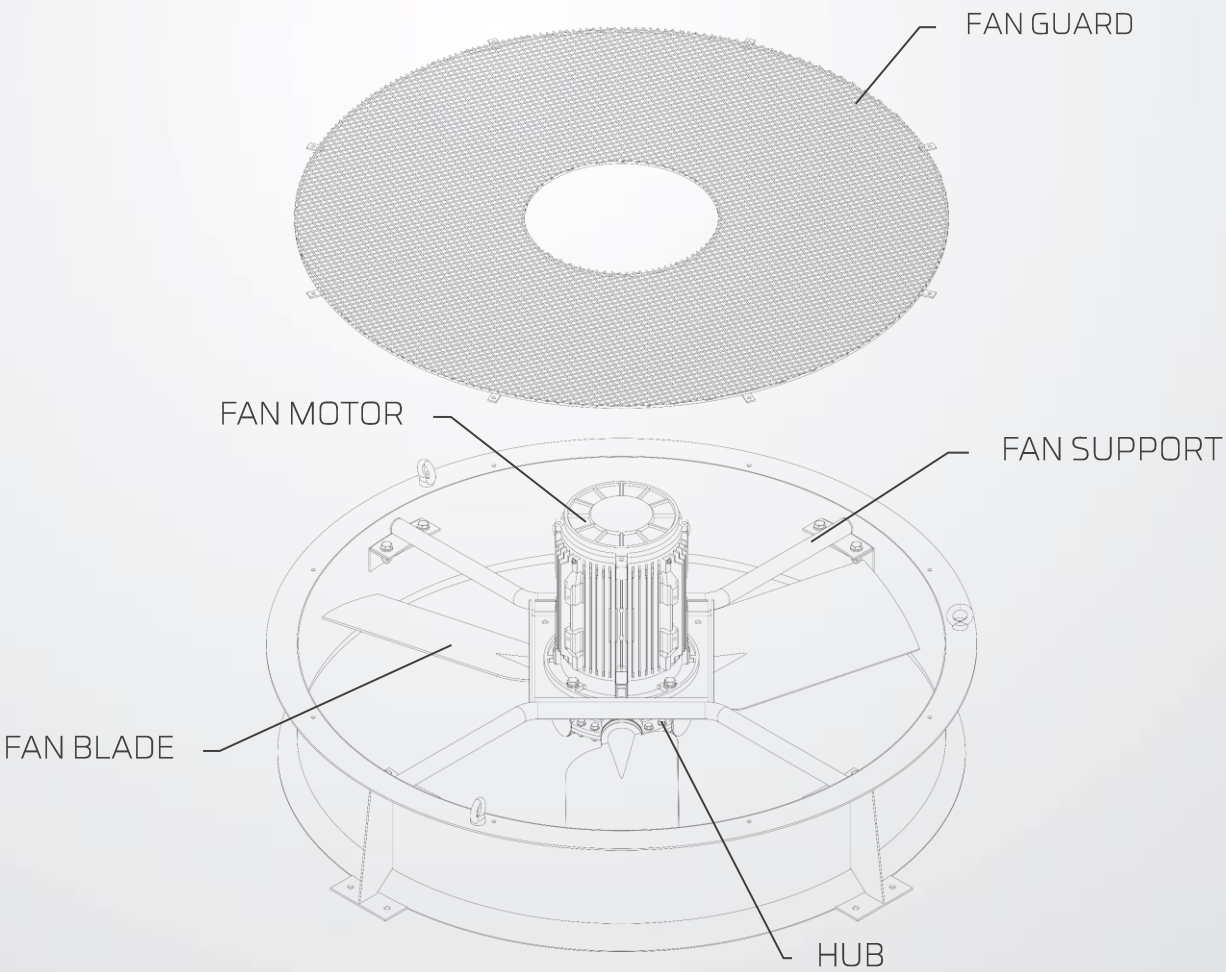
Note: Samples of make-up water for testing must be taken only from the make-up water valve. The recommended bleed-off valve opening settings are intended solely as a guideline for determining the appropriate bleed-off volume. Regular monitoring of the circulating water quality is still necessary.

FAN ASSEMBLY INSPECTION

The fan assembly is a critical component for heat dissipation. If it becomes damaged, the unit and the cooling system may fail to operate properly. Therefore, it must be inspected regularly, and certain parts should be replaced before the assembly is damaged beyond functional use. If any of the following signs or abnormalities are observed, please contact your distributor or Heat Away Co., Ltd. immediately:

- Abnormal vibration of the fan assembly
- Unusual noise from the fan motor
- Cracks or fractures on the fan blades or hub
- Cracks or fractures on the fan base or fan guard

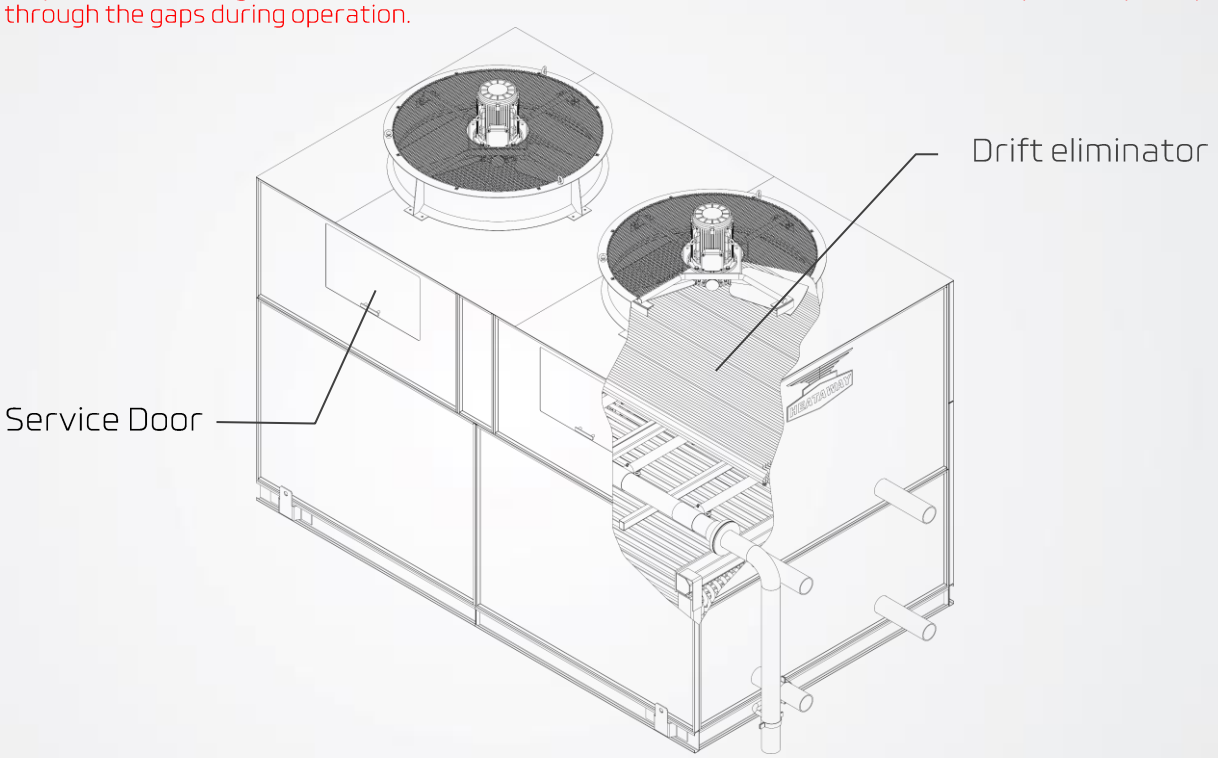
These issues may pose safety risks to both life and property. Any damaged components must be repaired or replaced as soon as possible. Details of the relevant parts can be found in the image below.



CLEANING THE DRIFT ELIMINATOR

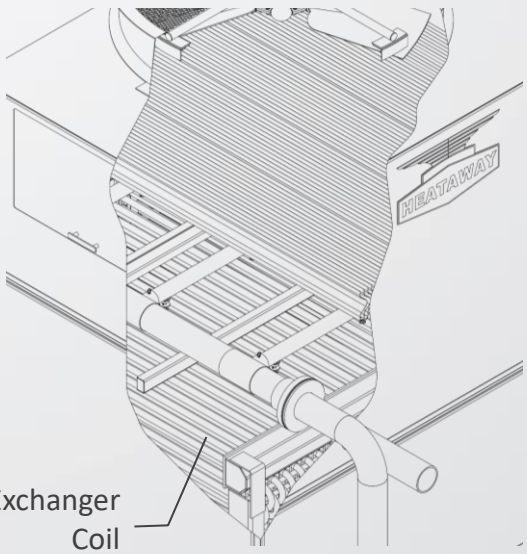
The drift eliminator serves to prevent water droplets from being carried out of the unit by the fan's suction force. After prolonged use, the drift eliminator may become clogged with debris and dirt, restricting airflow and directly reducing the cooling efficiency of the system. Therefore, it must be cleaned regularly. The drift eliminator can be removed through the access door and cleaned externally as shown in the image below.

Note: After cleaning the drift eliminator, reinstall it in its original position. Ensure that the drift eliminator fully covers the designated area as before. If it does not cover the entire area, water droplets may escape through the gaps during operation.



Inspection of Heat Exchanger Condition

The heat exchanger contains refrigerant and operates under high pressure; therefore, it must be inspected regularly. Damage to the heat exchanger can pose serious risks to both life and property.
A common issue is the accumulation of scale on the surface of the tubes, which directly reduces cooling efficiency. You can contact Heat Away Co., Ltd. or a specialist for scale removal. In case any leaks are detected on the heat exchanger, please contact your distributor or Heat Away Co., Ltd. immediately.

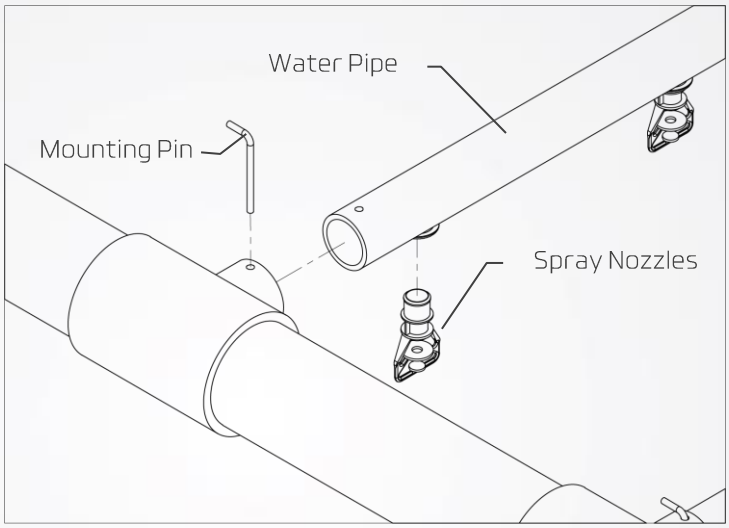


Note: When using chemicals to prevent or remove scale, please ensure that the chemicals do not damage the stainless steel. The company reserves the right to void the warranty in such cases of damage.

CLEANING OF WATER PIPES AND SPRAY NOZZLES

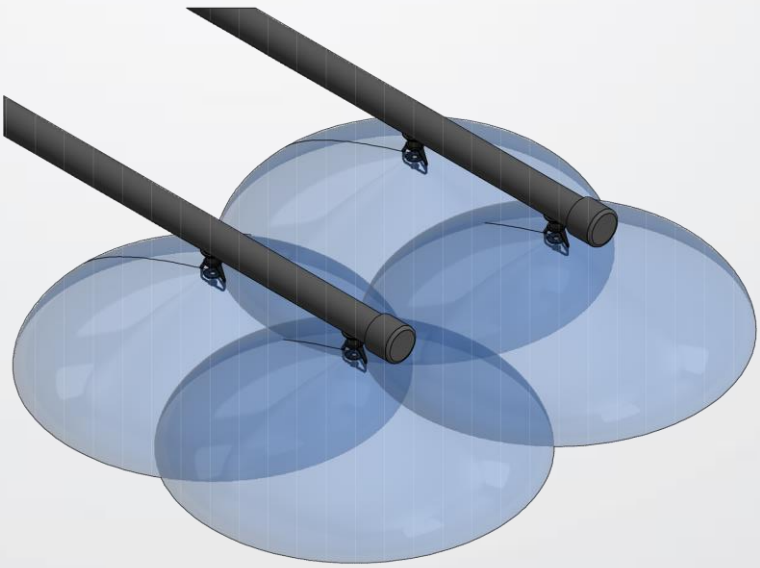
Water pipes and spray nozzles are important components for the operation of the unit. If they become clogged, the cooling efficiency will decrease. Detailed instructions for disassembling and assembling the water pipes and spray nozzles can be found in the image below.

Note: Clogged nozzles can cause damage to the heat exchanger coils, potentially leading to leaks. Therefore, regular inspection of the nozzles is essential. The company reserves the right to void the warranty in cases of nozzle blockage.



Spray pattern

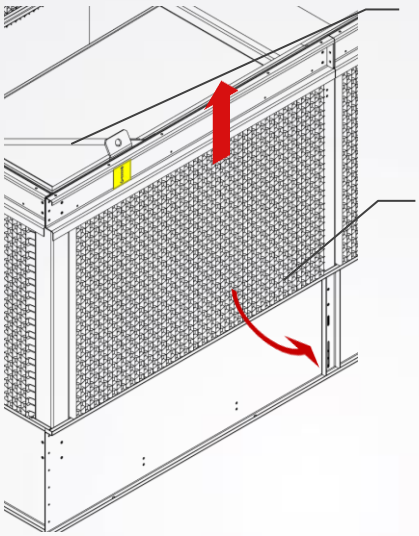
The water sprayed from the nozzle must follow the spray pattern shown in the image below. If the spray does not match the specified pattern, it may indicate that the nozzle is damaged and needs to be replaced.



Spray pattern

CLEANING OF INLET LOUVER

Inspect and clean the inlet louver to remove paper debris or other contaminants that may obstruct airflow, which can reduce the unit's efficiency. Such debris may also enter the unit and increase the risk of nozzle clogging. To clean the louver, lift it upward and pull out the lower section, as shown in the illustration below.

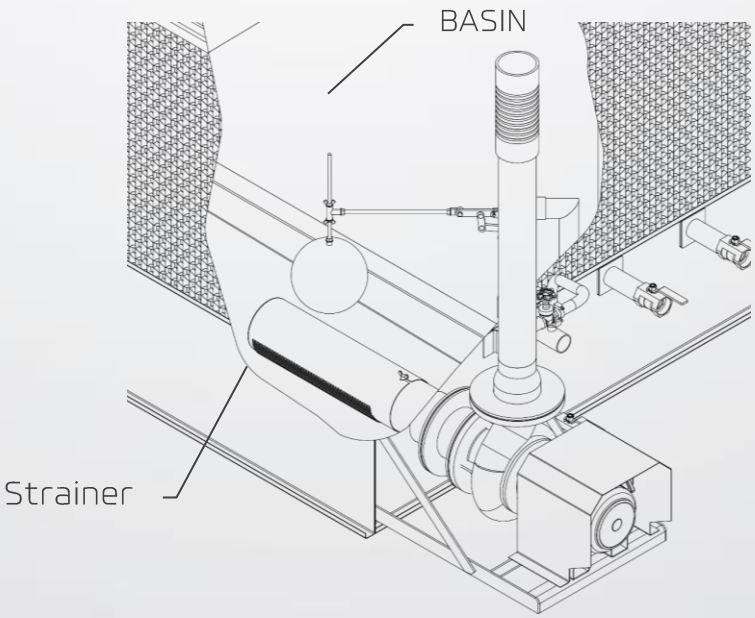


1. Lift the louver upward.

2. Pull out the lower section

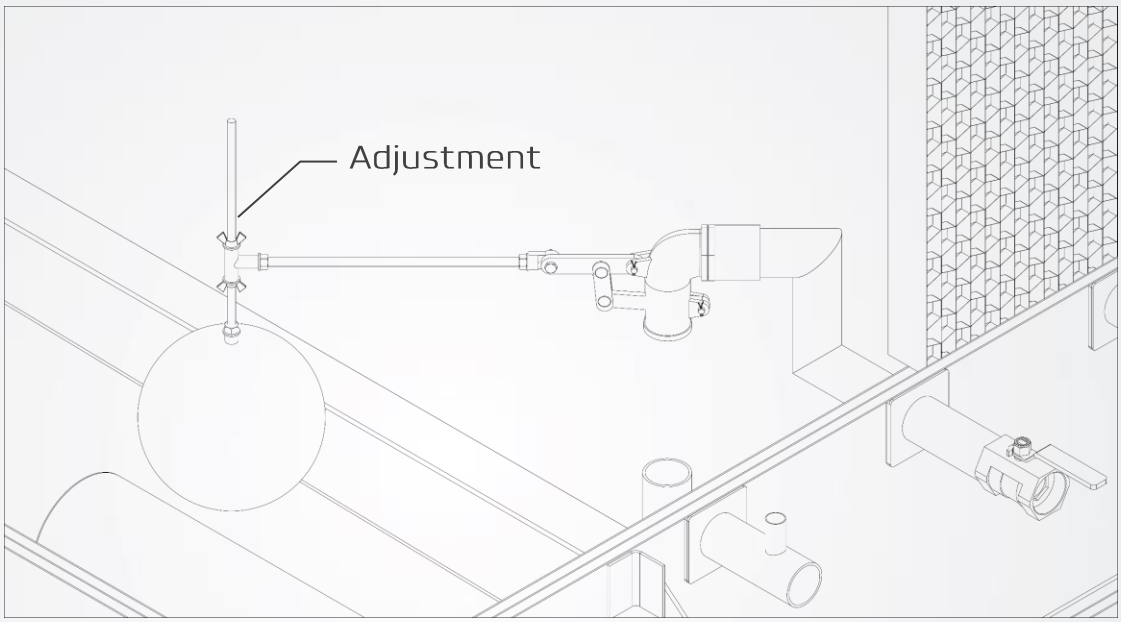
CLEANING THE WATER BASIN AND PUMP STRAINER

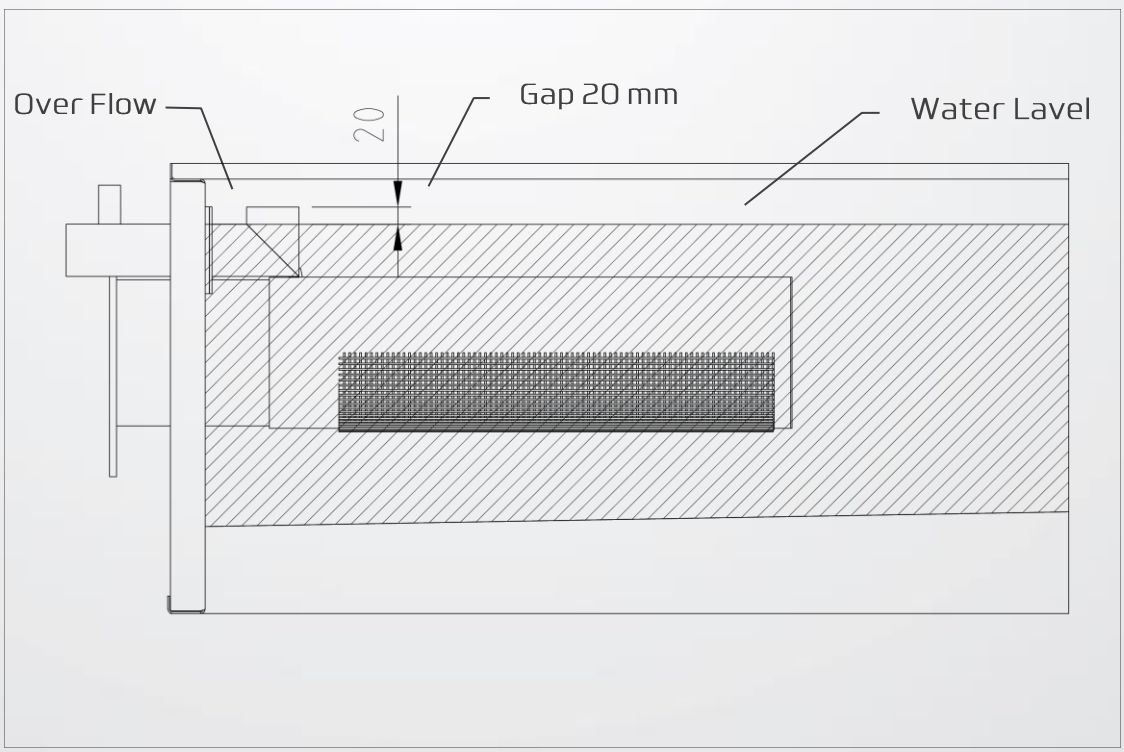
Inspect and clean the water basin to prevent dirt or scale debris from entering the nozzles, which could lead to clogging. During cleaning, do not remove the pump strainer under any circumstances, as it helps prevent large debris from entering the spray system. Allowing such debris to enter could damage the unit or specific components.



FLOAT VALVE ADJUSTMENT AND WATER LEVEL SETTING

The float valve of the make-up water system can be adjusted at two points: a fine adjustment and a coarse adjustment, as shown in the image below. The make-up water valve must be completely closed when the water level is within the specified range. The water level should be approximately 20 mm below the overflow pipe, as detailed in the image below.

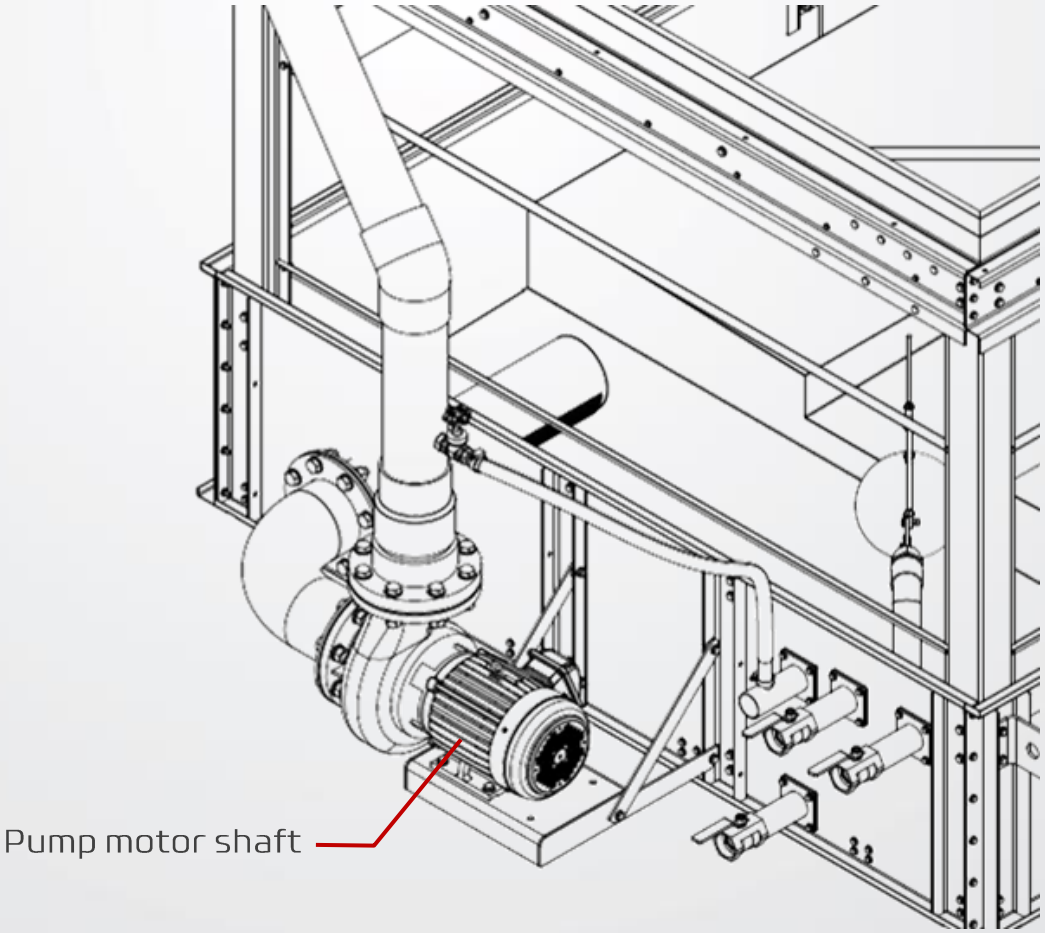




WATER PUMP INSPECTION

Water pump inspection must be performed while the pump is running. Before starting the pump, ensure that no one is inside the unit and that all components have been properly reassembled. Also, verify that the water level in the basin is within the specified range to prevent dry running, which could damage the pump seals. If any of the following symptoms or abnormalities are observed during inspection, please contact your distributor or Heat Away Co., Ltd. immediately.

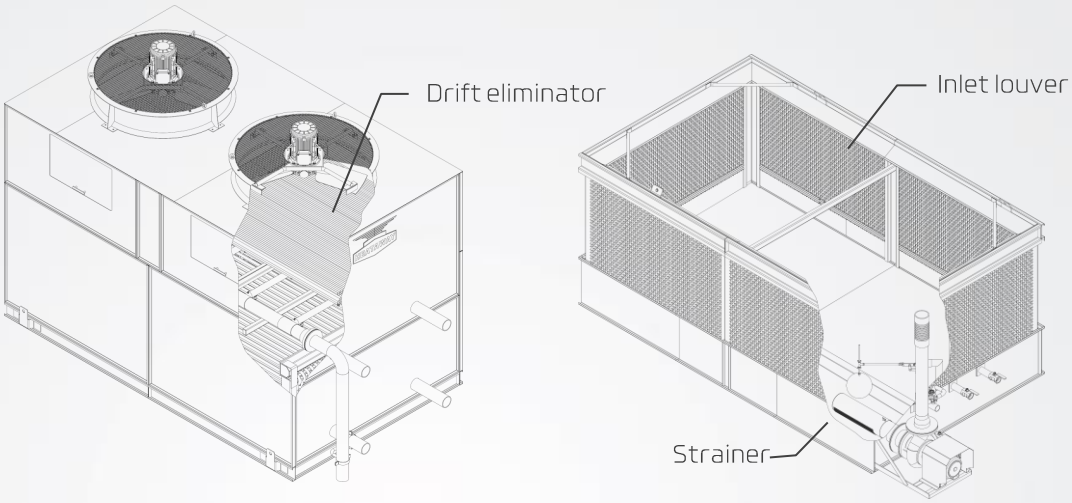
- Abnormal vibration of the water pump
- Unusual noise from the water pump
- Water leakage around the pump motor shaft seal



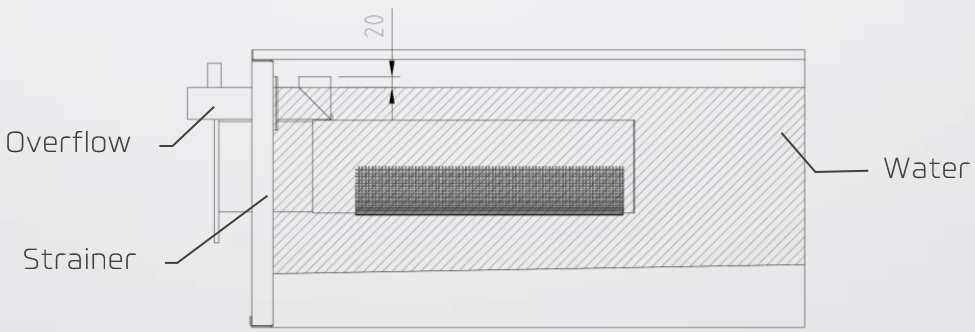
INITIAL AND SEASONAL START-UP CHECKLIST

Before START-UP

Precaution : Ensure that the machine is turned off and that no electrical power is supplied to it. The machine must be properly locked out and tagged to prevent others from turning it on during maintenance or servicing.



- ❑ Check that the drift eliminator is securely installed and fully covers the designated area.
- ❑ Ensure that the fan blades are firmly mounted to the fan hub, and the fan hub is securely attached to the fan motor.
- ❑ Manually rotate the fan to confirm that there are no obstructions preventing free movement.
- ❑ Verify that the fan guard and fan motor are firmly secured to the fan support and fan stack.
- ❑ Clean and remove debris from the inlet louver.
- ❑ Flush the basin to remove dirt and debris. Do not remove the pump strainer during this process.
- ❑ Remove the pump strainer, clean it thoroughly, and reinstall it properly.
- ❑ Manually rotate the pump to ensure there are no obstructions.
- ❑ Check that the make-up water float valve operates normally and is not obstructed.
- ❑ Fill the water basin until the water level is 20 mm below the overflow pipe and adjust the float valve to shut off completely at this water level.



Note: If you encounter any problems or have any questions, please contact the machine supplier or Heat Away Co., Ltd.

ROUTINE MAINTENANCE CHECKLIST

	PROCEDURE	DETAIL IN PAGE	FREQUENCY	MONTH												REMARK
				1	2	3	4	5	6	7	8	9	10	11	12	
While the unit is operating																
1	Check the quality of recirculated water.	Page 1	Monthly													
2	Check the quality of make-up water.	Page 1	Monthly													
3	Check the bleed rate.	Page 1	Monthly													
While the unit is turned off		BE CERTAIN THAT THE POWER IS TURNED OFF AND THE UNIT IS PROPERLY LOCKED AND TAGGED OUT!														
4	Check the fan blades for cracks, missing balancing weights.	Page 2	Monthly													
5	Clean drift eliminator.	Page 3	Quarterly													
6	Clean spray branches and nozzles.	Page 4	Monthly													
7	Inspect heat exchanged coil.	Page 5	Monthly													
8	Clean inlet louvers	Page 5	Quarterly													
9	Clean and flush the basin (Do not remove the strainer)	Page 5	Monthly													
10	Clean the strainer.	Page 5	Monthly													
11	Make up the water and check the float valve is operative.	Page 6	Monthly													
12	Check and adjust the water level	Page 6	Monthly													
TURNING WATER PUMP ON		BE CERTAIN THAT ALL PARTS ARE PUT BACK AND THE WATER IS AT THE PROPER LEVEL BEFORE TURNING WATER PUMP ON.														
13	Inspect the nozzles operate properly.	Page 4	Monthly													
14	Check the unusual sound or vibration of water pump.	Page 7	Monthly													
15	Check the leakage of water pump.	Page 7	Monthly													
TURNING WATER PUMP AND FAN ON		BE CERTAIN THAT NO ONE IS WORKING INSIDE THE UNIT AND ALL PARTS ARE PUT BACK BEFORE TURNING FAN ON.														
16	Check the unusual sound or vibration of fan.	Page 2	Monthly													

REMARK : If there are any problems or inquiries, please contact our sales representative or HEATAWAY Co., LTD..

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SEASONAL SHUTDOWN CHECKLIST

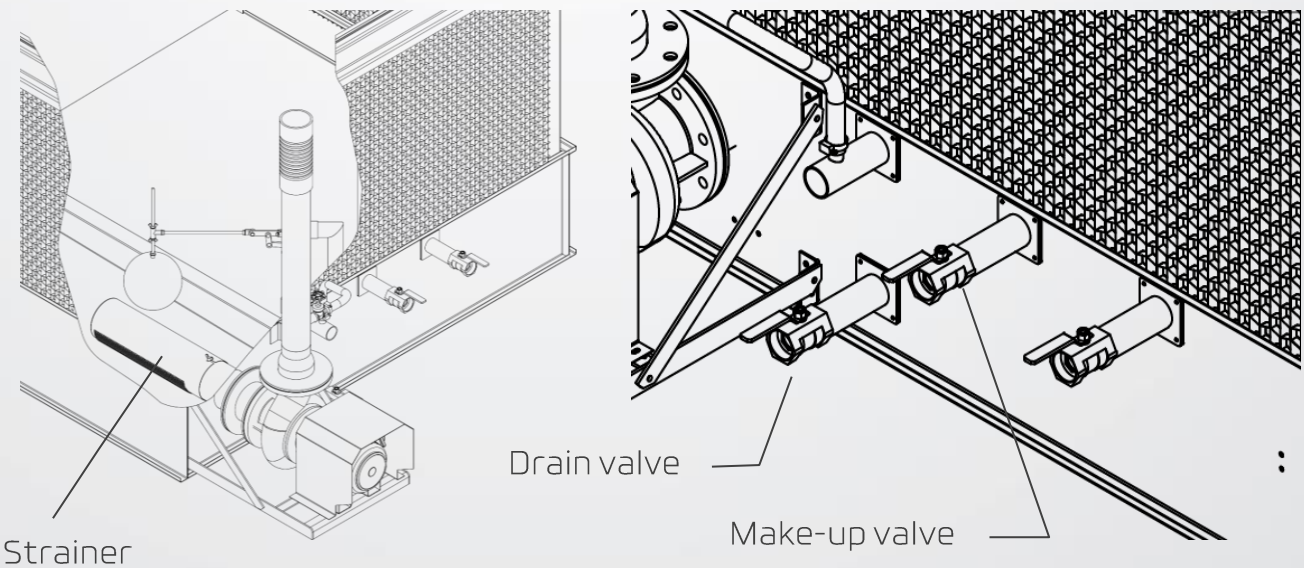
Turn off the machine for more than 3 days

CAUTION : Make sure that the machine is off, no electricity running to the machine, and the machine must be locked out, together with a sign to prevent others from turning it on during the process.

- ❑ 1. Clean the outside and inside of the machine of fouling, dust, or leaves.
- ❑ 2. Drain water out of the basin.
- ❑ 3. Clean the basin of fouling and other debris without removing the strainer.
- ❑ 4. Remove and clean the strainer before reinstalling it.
- ❑ 5. Open the drain valve to prevent water in the basin.
- ❑ 6. Close the make-up valve to stop the float from working.

IN CASE THE MACHINE HAS BEEN TURNED OFF FOR MORE THAN A MONTH

- ❑ 7. Turn the water pump by hand for at least 10 rounds per time for 1 time a month to prevent the motor from being locked up with fouling.
- ❑ 8. Turn on the fan once a month for 2 hours each time to dehumidify the motor and prevent the motor from being locked up with fouling.



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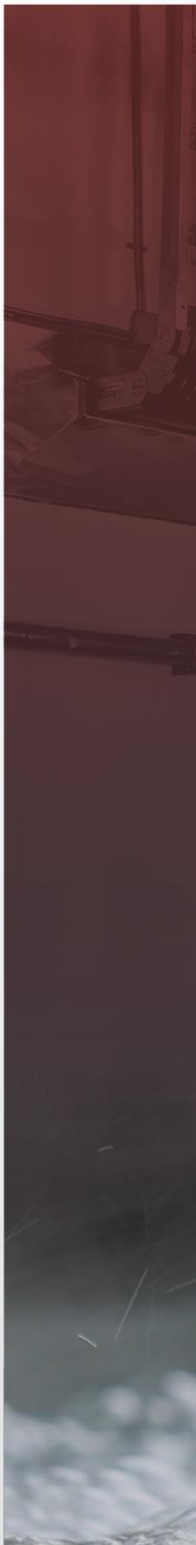

HEATAWAY

WORLD CLASS QUALITY

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