Chapter 5 Checks and maintenance

This chapter explains equipment checks and maintenance.
To keep the chamber in good working condition, perform checks and maintenance periodically.

5.1 Door lock function (open-close) check

To prevent individuals from being trapped inside the chamber, check that the door can be opened from both the inside and outside.
Perform this check every time before someone enters the chamber.

Reference

If the emergency exit device is not tighten enough, door lock cannot operate normally. It may cause trouble of open/close or steam and cooling air leakage. Turn the handle of the emergency exit device to the right direction, and make sure to tighten it.

5.2 Main power supply breaker trip test

■For 200V AC, 50/60 Hz or 220V AC, 60 Hz

A leakage breaker is used as the main power breaker.

It is necessary to check the breaker is working properly. Be sure to conduct an operation test of the leakage breaker before starting operation.

Reference

When the main power supply breaker trips, the switch's lever falls halfway between the ON and OFF positions. To turn power back ON again, first set the switch to the OFF position and then to the ON position.

First turn OFF the power supply on the operation panel and turn ON the main power breaker. Then slightly press the test button. The main power breaker immediately turns OFF, and the trip button pops up.

The first thing to do if the breaker does not trip as described above is to check that the primary power line is properly connected.

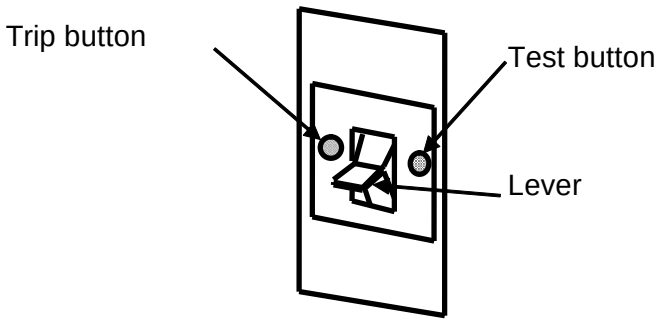


Fig. 5.1 Leakage break trip test

■For 380V AC, 50 Hz or 400 AC, 50 Hz

A leakage breaker is used as the main power breaker.

It is necessary to check the breaker is working properly. Be sure to conduct an operation test of the leakage breaker before starting operation.

Reference

- ·When the main power switch (breaker) trips, the switch's lever falls halfway between the ON and OFF positions. To turn power back ON again, first set the switch to the OFF position and then to the ON position.
- ·Position of trip button may be changed by the circuit breaker model.

First turn OFF the power supply on the operation panel and turn ON the main power breaker. Then slightly press the test button. The main power breaker immediately turns OFF, and the trip button pops up.

The first thing to do if the breaker does not trip as described above is to check that the primary power line is properly connected.. Contact the place you purchased or ESPEC.

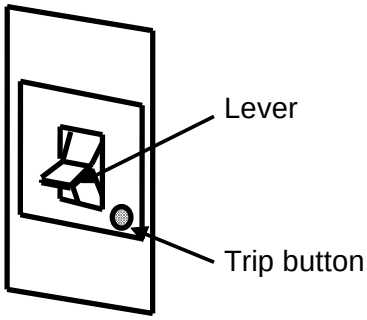


Fig. 5.2 Leakage break trip test

5.3 Ventilation check

To prevent accidents resulting from oxygen deficiency, be sure to follow the steps below to confirm that the ventilation fan operates properly when entering the chamber.

Procedure

1. Remove the two caps (for the air supply and exhaust ports) attached to the front side air conditioner (insdie the chamber).

2. Turn ON the ventilation fan switch on the instrumentation panel.

3. Confirm that the air is supplied and exhausted through the ventilation fan on the chamber side.

5.4 Overheat protector trip test

Before every test, test trip of the overheat protector is necessary
The overheat protector is fixed on the instrumentation panel.

Procedure

1. Set the temperature on the overheat protector to a temperature lower than the inside of the chamber.
   Set the desired temperature using the △(UP) or ▽(DOWN) key.
   Press the [UP] or [DOWN] key on the setting screen.
   The current alarm settings are displayed, and the "A" appears on the display.
   Set the desired temperature using the [UP] or [DOWN] key.
   With a key entry of approx. 0.5 seconds, the setting shown on the display is incremented (or decremented) by 1 (one). With a key entry of approx. 2 seconds or longer, the setting shown on the display is incremented (or decremented) by 10 after the lowest digit is reset to 0, if it shows a number other than 0.
   If no key entry is made (for approx. 5 seconds or longer), the setting is written. After writing of the setting is complete, the display returns to the setting mode screen.

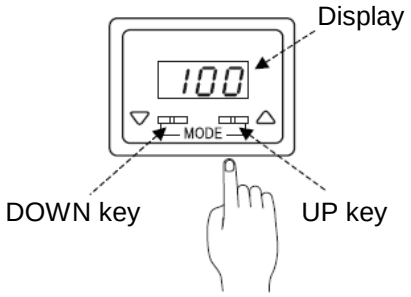


Fig. 5.3 Overheat protector

2. If the overheat protector is working properly, a buzzer will sound and the Alarm screen will pop up when temperature inside the test area reaches the overheat protector setting.
   If no alarm triggers, something is wrong with the equipment. Contact the place of purchase or ESPEC CORP.

3. To clear the alarm, press [Stop Beep] on the instrumentation screen. When the beeping sound stops, press the power key on the operaton panel to turn OFF the instrumentation power supply. Then, return the overheat protector to its usual setting.

4. Press the power key to turn ON the instrumentation. Normal status will be restored.

5.5 Water circuit leak check

Check once a day if water is leaking from the water circuit.

Check humidifier water supply circuit, refrigerator cooling water circuit, and connections of the water supply and drainage of the water purifier (option) for looseness or cracks.

The main parts to be checked are as follows:

Humidifier water supply circuit (machinery compartment and water supply pipes surroundings)

Refrigerator cooling water circuit (machinery compartment and water supply and drain pipes surroundings)

Area surrounding water purifier (Option)

Area surrounding humidifier drainage pipes

Area surrounding natural drainage pipes

If any leakage is found, immediately stop the water supply on the primary side and contact the place of purchase or ESPEC CORP.

5.6 Humidifier cleaning

As you use the humidifier, scale may accumulate inside the humidifying heater and cylinder. To keep the humidifier in good working conditions, scale needs to be removed. Clean the humidifier every 3 months as a standard maintenance or when “HUM. SCALE BUILDUP WARNING” is displayed on the monitor.

Reference

For humidifier cleaning procedures, see the label attached to the unit and refer to this manual at the same time.
Please note that the humidifier cleaning frequency depends on the quality of water.

Clean the humidifier while the chamber is stopped or running a temperature-only test. If you try cleaning it while a humidity-based test is on process, the “CHECK HUMIDIFIER SWITCH” warning will be generated.
If the above alarm is generated due to your attempt to clean it during a humidity-based test, press [Stop Beep], and then after cleaning is complete, press [CLR]. If [CLR] is pressed during cleaning, water supply to the humidifier will start.
Also, cleaning should be done while the main power breaker is ON. When power is OFF, water inside the humidifier cannot be drained.

(1) Drainage

Set the humidifier ON/OFF switch on the front side of the unit to OFF. This will turn OFF the humidifying heater, start the drain pump and drain the water.

⚠CAUTION

Wait approximately sixty minutes for temperature to drop before cleaning the unit. The steam hose spigot is particularly HOT, therefore cool with a wet towel or other reasonable means.

The humidifier is HOT shortly after humidity testing.

(2) Remove the cleaning parts

■ In the case of 4kW type

Procedure

1. Remove the following parts from the top of the humidifier: the steam hose spigot, humidifier plug socket, thermal fuse connector and six winged nuts. Then, lift the top cover off together with the heater and packing from the steam cylinder.

2. Disconnect the supply and drain hose spigots and remove the cylinder from the humidifier housing.

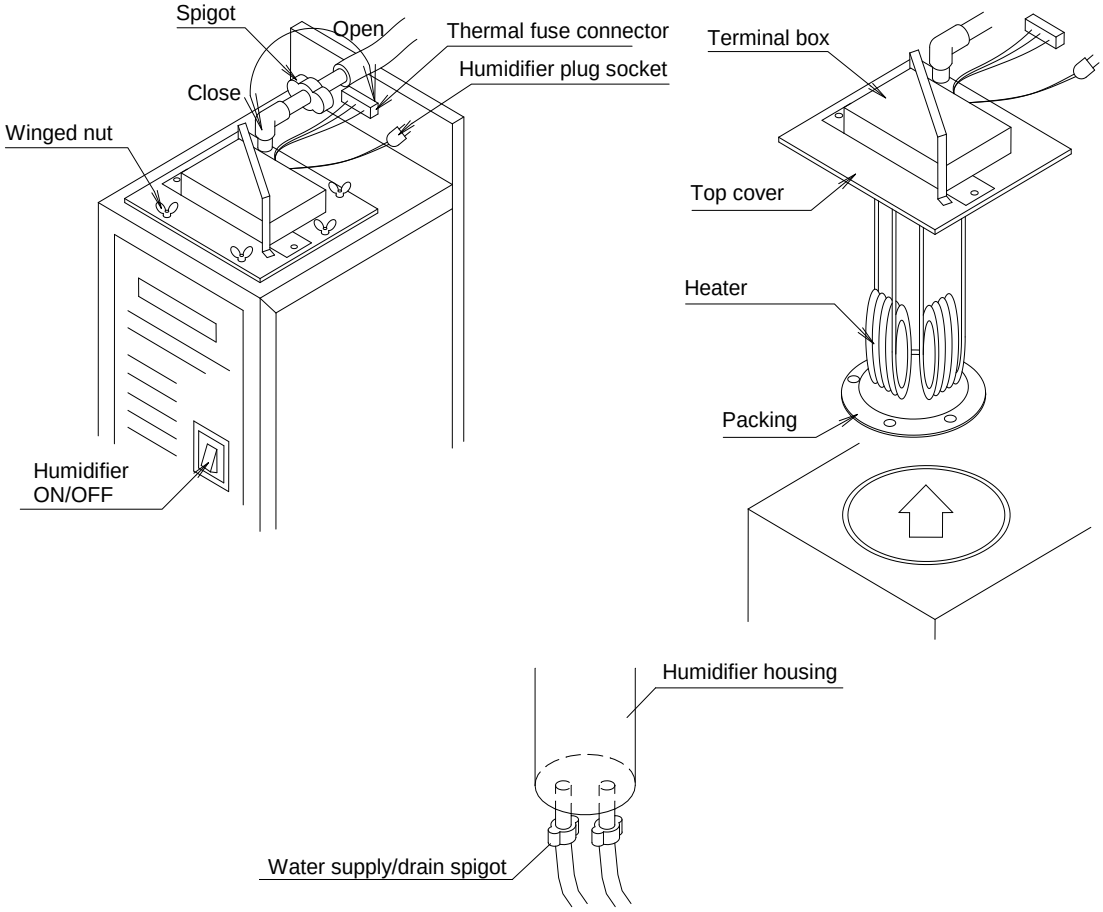


Fig. 5.4 Remove the cleaning parts (In the case of 4kW type)

■ **In the case of 6-18kW type**

Procedure

1. Remove the winged screw of the hose coupling on the top of the humidifier terminal cover and detach both the steam hose and the coupling.

2. Remove two humidifier sockets, two temperature fuse connector, and two spigots of the cylinder bottom. Lift the main body of the humidifier 4-5 cm high, and take it out to the front.

3. Remove the winged nut and pull out the humidification heater. Clean both the humidification heater and the cylinder.

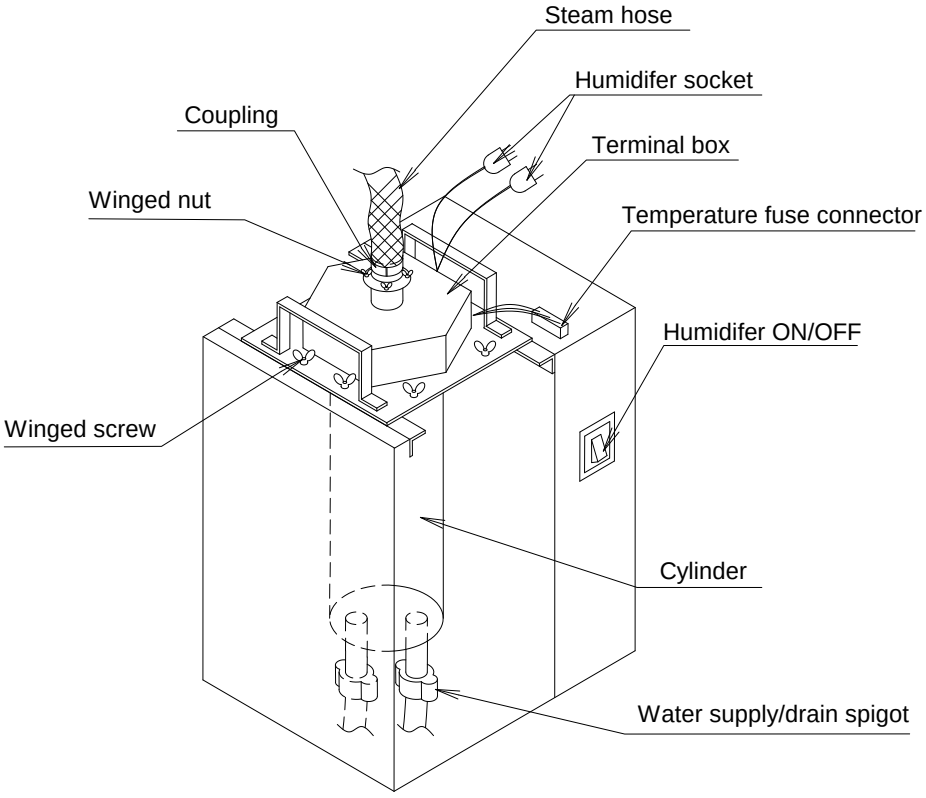


Fig. 5.5 Removing the cleaning parts (In the case of 6-18kW type)

(3) Steam cylinder cleaning

Take the baffle and filters (x2) out of the steam cylinder and remove any scale or foreign matter with a brush or similar means.
Remove the scales without fail. If any scale remains in the baffle and filters, the water supply and drainage will be disturbed.

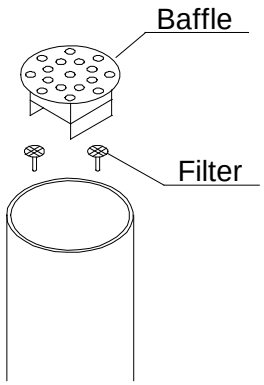


Fig. 5.6 Steam cylinder cleaning

(4) Heater cleaning

If you find scale or foreign matter adhering to the heater element, clean it with a brush or similar means, but be particularly careful not to scratch the surface.

⚠CAUTION

Prevent water from entering the terminal box on the top of heater or water to splash over the drain pump at the bottom of the humidifier unit.

Penetrating water may cause leakage current when the heater is charged, therefore carefully dry the parts before using again.

(5) Reassembling parts after cleaning

Reassemble parts following steps (1) through (4) in reverse. Securely tighten the top cover of the humidifier to ensure steam and water do not leak. When finished, be sure to set the humidifier ON/OFF switch to ON.

5.7 Humidifying water strainer cleaning

To ensure proper water supply to the humidifier, the strainer's filter element needs to be cleaned every 3 months as a standard maintenance, or when "HUM. WATER SUPPLY WARNING" is displayed on the monitor.
The strainer is at the lower side of the humidifier. Clean the strainer while the chamber is stopped or running a temperature-only test. If you try cleaning it while a humidity-based test is on process, the "HUM. WATER SUPPLY ALARM" warning will be generated.

Reference

When the chamber is installed, some dirt is trapped inside the line when rigging pipes. Therefore, it is recommended to perform a first cleaning cycle soon after set up.
Please note that the filter element of the humidifying water strainer cleaning frequency depends on the quality of water.

Procedure

1. Close the water supply valve.

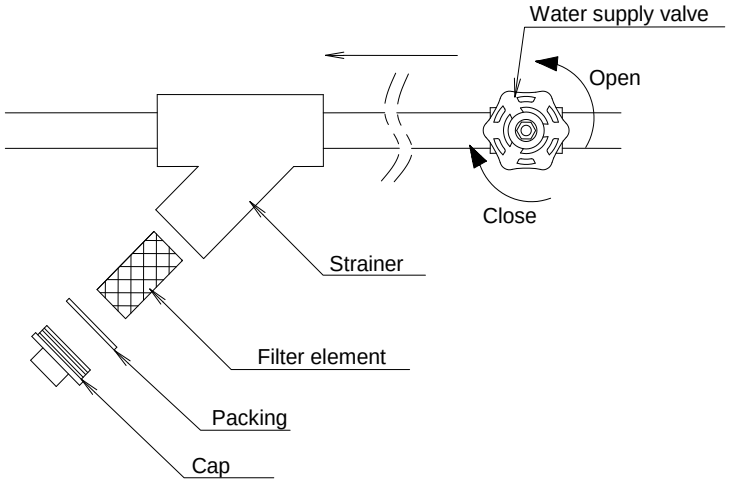
2. Turn the cap by hand until removed.
   (Water inside pipes will come pouring out, so prepare rags, buckets or similar means as necessary.)

3. Take out the filter element.

4. Rinse the filter element with water.

5. After cleaning, reassemble with strainer in its original position.
   Make sure to place the packing inside.

6. Open the water supply valve.
   Make sure water does not leak from the strainer when the valve is opened. If the valve is not reopened, the "HUM. WATER SUPPLY ALARM" will be generated when starting the next humidity test.



Fig, 5.7 Humidifying water strainer cleaning

5.8 Machinery compartment filter cleaning (For indoor air-cooled unit)

Clean dust and dirt from the condenser fin for outdoor refrigerator with a vacuum cleaner or any other suitable way, once every month.

Reference

Be aware that cleaning cycle for the chamber filter may be shortened, depending on the ambient environment.

5.9 Condenser fin cleaning (For outdoor/ remote air-cooled unit)

⚠CAUTION

Be sure to wear gloves for your safety.

The condenser fin contains sharp edges. Take care not to cut your skin on them.

Clean dust and dirt from the machinery compartment filter with a vacuum cleaner or any other suitable way, once every month as a standard maintenance. Please note that the maintenance cycle may vary depending on the air cleanliness of the chamber's place of installation.

Reference

The cleaning cycle for the condenser fin may be shortened, depending on the ambient environment.

5.10 Suction port filter cleaning

The air conditioner's suction port filter's cleaning is required once every 3 months. During extended use, dust will clog the filter, making it harder for air to circulate.

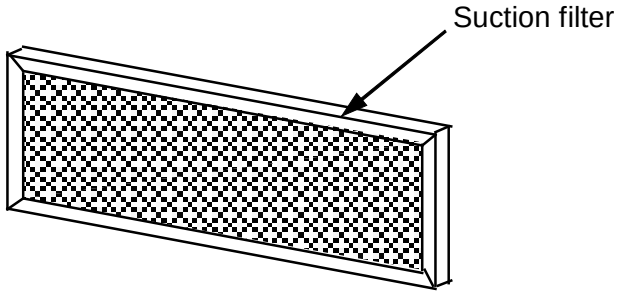


Fig. 5.8 Suction port filter cleaning

Reference The cleaning cycle for the suction port filter may be shortened, depending on the ambient environment.

5.11 Air conditioner drain cleaning

⚠CAUTION

Be sure to wear gloves for your safety.

The evaporator above the drain port contains sharp edges. Be careful not to cut your skin on them.

Clean the drain port approximately every 3 months.
The drain port is located at the bottom center of the air conditioner. To clean it, first remove the air intake filter on the lower part of the air conditioner.
If the drain port is clogged, water inside the air conditioner may overflow into the chamber.

Reference

The cleaning cycle for the air conditioner drain may be shortened, depending on the ambient environment.

5.12 Cooling water strainer cleaning (For water-cooled spec. only)

To keep the refrigerator in good working condition, it is necessary to clean the cooling water strainer once every 3 months as a standard maintenance. The strainer is located near the refrigerator's cooling water line connection. Clean the strainer while the chamber is stopped. If you try cleaning it while a test is on process, the "REFRIG.: COOLING WATER FAILURE" alarm will be generated.

Reference

When the chamber is installed, some dirt is trapped inside the line when rigging pipes. It will eventually accumulate on the strainer, thus cleaning will be required sooner than expected.
The cleaning cycle for the cooling water strainer element may be shortened, depending on the water quality.

Procedure

1. Close both the water supply and drain valves (not within ESPEC CORP's sphere of work).

2. Using a wrench, take off the strainer's cap.
   (Water inside pipes will come pouring out, so prepare rags, buckets or similar means as necessary.)

3. Remove the strainer element.

4. Rinse the element with water. If ineffective in removing scale, use a wire brush.

5. When cleaning is complete, reassemble parts as before and be sure to reopen the water supply and drain valves. If you forget to open the valves, the "REFRIG.: COOLING WATER FAILURE" alarm will be generated when starting the next test.

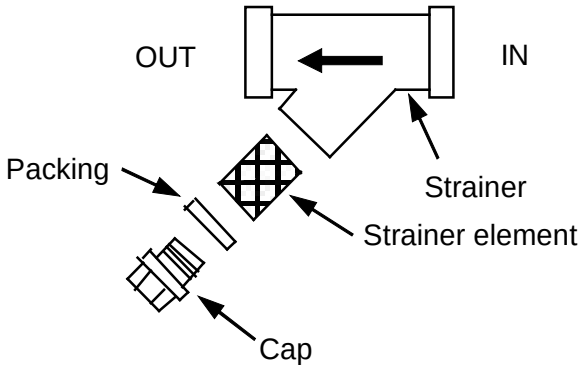


Fig. 5.9 Cooling water strainer cleaning

5.13 Wet-bulb wick replacement (For dry/wet-bulb sensor spec.)

⚠CAUTION

When replacing the wick, take care not to cut your skin on the fixed plates.

◆ **Note** ◆

If the wet-bulb wick contains bacteria, the bacteria can propagate during testing, reducing water absorption.
Clean your hands by washing with soap before handling the wet-bulb wick.

The wet-bulb wick is a consumable part of the chamber.
Change it once a month as a standard maintenance or before starting long run operations.
For equipment manufactured with high-temperature specifications (option), the wet-bulb wick tends to dry after temperature operation of 100°C or higher. Replace after such operation.

How to change

1. Pull the wick out of the wet-bulb sensor and set a new one. Round the end of the wick and slide it along the wick pan arm until inserted in the wet-bulb sensor. If you accidentally insert the wick into the dry-bulb sensor, temperature and humidity control will be disabled.

2. When changing the wick, if you detect scale on the wet-bulb sensor, clean the sensor with a wire brush to keep control from destabilizing later on.

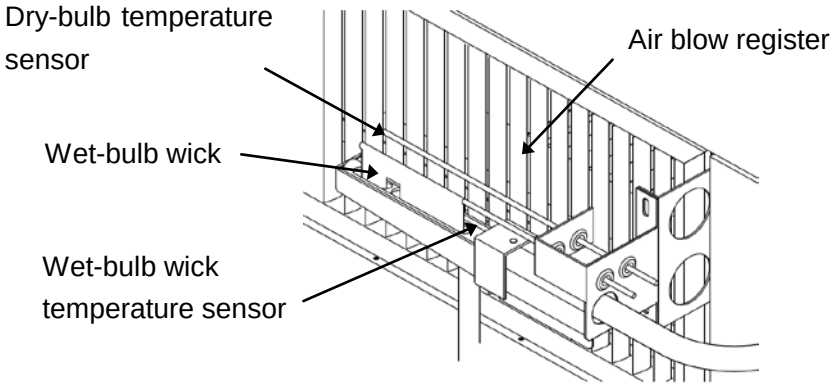


Fig. 5.10 Changing the wet-bulb wick (For dry/wet-bulb sensor spec.)

◆ Note ◆

Insert the wet-bulb wick all the way to the end of the wet-bulb temperature sensor.
If it is not inserted correctly or the sensor is in the incorrect position, control may be uneven.

Reference

The wick is easily soiled and will require changing sooner than expected if the supplied water is of poor quality or if low humidity tests are often run.
When using a water purifier, chlorine ions are removed, and bacteria tends to proliferate, wet-bulb wick tends to dry. An antibacterial blotter is provided to prevent bacteria proliferation .
If the wick dries out quickly, change the blotter and the wick:, roll the blotter up until small enough to fit inside the wick pan arm and insert it inside the arm.
If the water purifier used works as an auxiliary humidifier (ultrasonic humidifier), the wet-bulb wick is not supplied with pure water, therefore antibacterial blotter is not provided.
Poor water quality can deteriorate the wick requiring more frequent replacements.

5.14 Wick pan water supplier (container) cleaning (For dry/wet-bulb sensor spec.)

⚠CAUTION

The wick pan water supplier is located behind several components such as the humidifier. While cleaning the water supplier, be careful not to cut yourself on these components.

The wick pan water supplier requires cleaning once every 3 months as a standard maintenance. The water supplier is inside the mechanical parts compartment, towards the top.

How to clean

1. Remove the winged screw and drain water from the container with the drain line.
2. Reattach the winged screw and fill the container with water from the supply line.
3. Repeat steps (1) and (2) until clean.

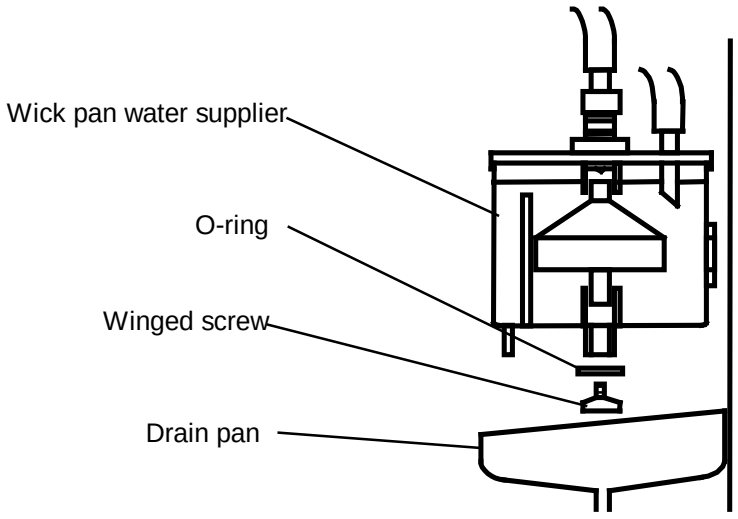


Fig. 5.11 Wick pan water supplier (container) cleaning (For dry/wet-bulb sensor spec.)

Reference

For the location of the water supplier, see “3.4 Machinery compartment”.
Poor water quality can deteriorate the wick, requiring more frequent replacements.

5.15 Light check

⚠WARNING

Be careful when working at a high place.

Tasks involving climbing, such as changing the light bulb in the chamber could result in turning over or falling.

Keep the main power switch OFF while working.

If the inside of the chamber is dark during work, use a flashlight or any other sufficient light source to maintain sufficient luminance.

Check the chamber lamp for broken LEDs and discolored or cracked covers (about once a month).

If a deteriorated lamp is left, the luminance is reduced and the lighting is also uneconomical. A broken cover may allow steam into the lamp unit, which can cause electric leakage and could result in an accident.

Power consumption of the LED light fluctuates depending on the ambient temperature and luminance but this is normal.

At low temperature, the inside of the light unit may mist over, but this is normal. As the temperature rises, the lamp will demist.

The service life of the LED light depends on the ambient temperature. If the ambient temperature rises 10°C, the service life will be reduced by half.

Reference

- If an ambient temperature of 20°C is assumed as standard, the luminance will be reduced by about 10% and the power consumption will increase by about 7% in the range -40°C to 80°C.
- The service life of the lamp is 30,000 hours or longer. (Continuous lighting hours at a chamber temperature of +20°C)
  However, this is only a life goal and is not guaranteed.
  * Here, a service life is defined as the total lighting hours before the total flux decreases to 70% of the initial value at the beginning of its life.

5.16 Water purifier (ion-exchange type) check and cleaning (Option)

The water purifier requires periodical check and clean.
Do so according to the cycles specified below and before starting long-run operations.

Reference

When the chamber is installed, some dirt is trapped inside the line when rigging pipes. Dirt will eventually accumulate on the strainer, thus cleaning will be required sooner than expected.
Please note that the cleaning cycle for the strainer element decompression valve may be shortened, depending on the water quality.

Decompression valve (internal strainer) cleaning (once/ month as standard)

Close the main valve of the water supply. Remove the strainer cap with a wrench. (Have a cloth and a wash bowl, etc. ready to catch any water that may drip from the pipe.)
Take out the internal strainer element and wash it with water.

Safety valves and pressure operation check (once every 3 months)

Pull the operation lever of the safety valve and check the water flows correctly at the piping exit of the safety valve (clear tube). Then put back the operation lever and check that the pressure gauge indicates under 0.08 MPa (Gauge) [under approx. 0.8kg/cm^{2}G].

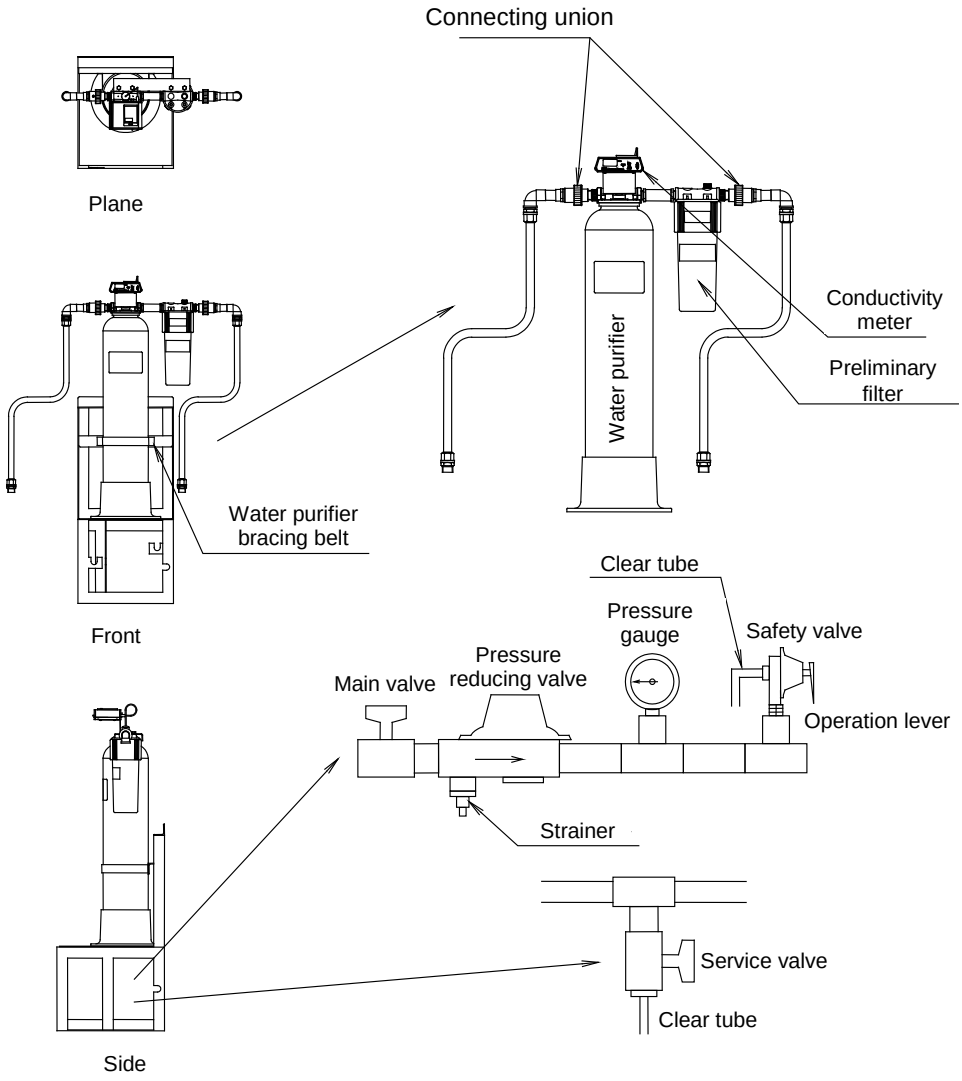


Fig. 5.12 Water purifier (ion-exchange type) check and cleaning

Water quality check (Once/ month)

Set the switch of the conductivity meter on the top of water purifier unit in the MEAS position to check if conductivity is lower than 10.0 μS/cm.

Note that if the water purifier is not used for a long time, conductivity can become high. Measurement should therefore be taken again after about 50cm^3 of water has been drained from the service valve on the lower part of the water purifying unit.

Reference

- When conductivity is above 2.0 μS/cm the useful life of the water is near its end and therefore the inspection cycle should be kept short. (Once every 2 weeks)
- Until the switch of the conductivity meter is set in the "MEAS" position, the display on the conductivity meter will show "OFF".

Water purifier replacement

If the results of a water quality check show 10.0 µS/cm or higher, the ion-exchange resin has come to the end of its service life. The water purifier shall be replaced.

Reference

- Please refer to the water purifier manual for further details.
- Water conductivity rises above 10.0 µS/cm after approximately 2000 hours-operation at 30°C/80%rh without specimen. Please note that it changes depending on the operation conditions.
- When the water supply conductivity is 200 µS/cm,
  G-10: Approx. 1900 liters
  G-20: Approx. 3800 liters
  can be extracted.
- The length of the cycle varies according to the quality (amount of iron particles etc.) of the primary water supply.
- Weight of the water purifier
  G-10: Approx. 20 kg
  G-20: Approx. 40 kg
  Please proceed with caution when transferring the water purifier.
- The ion exchange resin of the water purifier is recyclable. Send the unit back to the manufacturer when no longer necessary, in its original container; therefore conserve packaging materials.

Procedure

1. Close the main valve of the water supply.
2. Lift the safety valve operating lever, and reduce the pressure inside the pipe to nearly 0 MPa (Gauge). (Once the pressure is reduced, put the operating lever back to its original position.)
3. Remove the connecting unions at the inlet and outlet of the water purifier. (Prevent splashing of water still remaining in the hose by wrapping a piece of cloth around each union.)
4. Remove the water purifier bracing belt. (Attached by screw.)
5. Replace the water purifier with a new unit.
6. Attach the water purifier bracing belt to secure the water purifier.
7. Fit the connectors.
   (Connect the connector securely at both inlet and outlet.)
8. Open the water supply valve.
   (Remove the water purifier and the air inside the hose from the service valve.)
9. Check to make sure that there is no water leakage.

Preliminary filter replacement

Reference As a guide, replace the preliminary filter on the same timing than the water purifier.

Procedure

1. Close the main valve of the water supply.
2. Lift the safety valve operating lever, and reduce the pressure inside the pipe to nearly 0 MPa (Gauge).
   Once the pressure is reduced, put the operating lever back to its original position.
3. Remove the filter cap by hand by turning it a little at a time.
   Be careful not to let any water leak from inside the cap.
4. Change the inside filter (5 μm) .
5. Put the filter cap on.
6. Open the water supply valve.
7. Check to make sure that there is no water leakage.

5.17 Dehumidifier check and cleaning (Option)

The dehumidifier requires periodical check and clean. Do so according to the cycles specified below and before starting long-run operations.

Suction port filter cleaning (Once/ month as standard)

Remove the filter from the air intake port and rinse with water. During extended use, dust will clog the filter, making air circulation difficult, and possibly leading to overheat protector tripping on the recycling circuit intake.

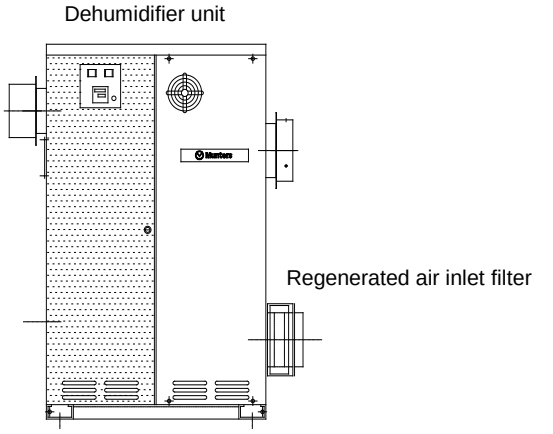
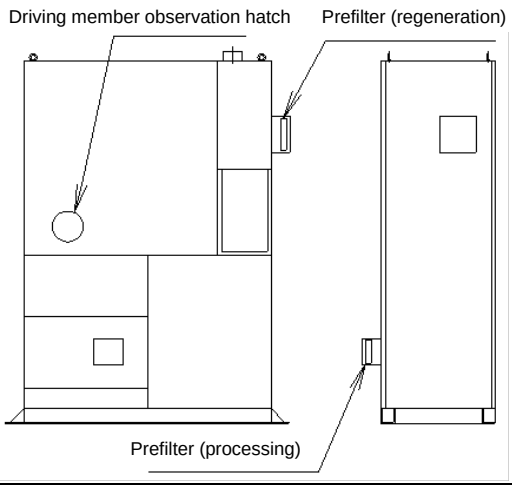
<table>
<tr><td>BX series</td><td>ESP series</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td></td><td>Checking of the rotation of the dehumidification rotor (Once in six months)
While the dehumidifier is in operation, check whether or not the rotor inside is rotating smoothly by a visual inspection through the observation hatch of the driving member.
The rotor is rotating at a low speed (less than several tens of revolutions per hour) by chains and sproclets.</td></tr>
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Fig. 5.13 Dehumidifier check and cleaning (Option)

Reference Please note that the cleaning cycle of the dehumidifier filter can be shorter depending on the surrounding conditions.

5.18 Maintenance and Inspection of the Humidity Sensor (Option)

Dry operation of the humidity sensor

When condensation occurs on the detector of the humidity sensor so that dew condensation water adheres to the detector, the indication of humidity can be 100%rh, or there is a difference between the indicated value and the measured value. When this phenomenon has occurred, carry out a dry operation (with the refrigerator turned off, for about two to three hours at the maximum temperature of the specification).

Calibration of the Humidity Sensor (standard frequency: once a year)

To maintain the measurement accuracy of the humidity sensor, it is recommended to perform a scheduled calibration once a year. Please contact Espec for the details of scheduled calibrations.
When the product is operated at a high temperature and high humidity for a long time, the calibration frequency may have to be shortened.

5.19 Periodic maintenance service and full check

To maintain product quality and performance and use it safely for an extended period of time, please consider having your chamber following a periodic maintenance service provided by either ESPEC CORP. or the place of purchase. This remains under the customer's own responsibility.

Periodic maintenance service (for a fee)

Please have your chamber following a yearly periodic maintenance service without fail to maintain the quality and performance of the equipment over an extended period of time
If the humidity control operation is run frequently, shorten the interval between periodic servicing.

Request for periodic maintenance servicing

Please contact ESPEC CORP. or the place of purchase when the time for periodic maintenance servicing approaches.

Periodic maintenance servicing guide list

Major service items

Maintenance item	Contents
Visual inspection of appearance	Deformation, discoloring
Deterioration/wear severity check	Steam hose, lock mechanism, gasket, tubes
Inspection of the degree of electric insulation	Electric leakage, loosened connection of terminals
Operating sound check	Rotating mechanism (including compressors and motors)
Behavior check	Behavior of respective equipment
Safety action check	Behavior of safety circuits
Leakage check	Refrigerant, water, hot air, cold air, steam
Rating measurement	Operating voltage, current value
Performance check	Confirmation of temperature pull down
Care	Cleaning, adjustment, retightening, forced drain

Optional equipment check	Recorder, dehumidifier, water purifier, etc.

Overview of other inspection service items performed at the customer's request (for a fee)

Maintenance item	Contents
Pipe route cleansing (Cooling water route for refrigerators)	Cleansing of the water supply pipes and drain pipes with a chemical agent
Calibration	Temperature/humidity regulator, recorder, sensors (temperature sensor, humidity sensor, gas concentration sensor), temperature measurement, humidity measurement

Periodic parts replacement (for a fee)

⚠WARNING

Be sure to replace the door lock of which the replacement date is overdue with a new one.

If a worn-out door lock continues to be used, a worker may become locked in the chamber.

The service life of sensors (oxygen sensor/controlled-potential electrolysis sensor) is one year. Replace them without fail.

Continued use of a sensor which end of service life has passed may lead to a serious choking accident involving workers in the chamber.

Parts in the table below require periodic replacement because their use vary or they become worn over time. If they are not replaced, it may cause a malfunction. ESPEC CORP. or the place of purchase will submit a quotation at the time periodic maintenance servicing is due.
For those parts requiring replacement during daily maintenance, refer to "Daily maintenance and check".

Spare parts	Component	Replacement cycle
Door lock mechanism (including that inside of chamber) Note1	Door	Closing action 50,000 times
Wick pan float Water supply solenoid valve, pressure reduction valve Steam hose	Water circuit	12,000 hours 12,000 hours 2 years or when 10,000 hours have elapsed
Humidifier thermal fuse Cooling fan motor in the operation panel	Electricity	12,000 hours 18,000 hours
Water purifier Note 2 Gas alarm sensor Note 3	Option	6,000 - 12,000 hours 1 year

Note 1: 50,000 times door closing action is equal to about five years on the assumption that the chamber is entered 20 times a day and is in operation for 240 days per year.

Note 2: If the chamber is frequently operated in a high-temperature, high-humidity mode and with use of low quality water, the cartridge of the ion-exchange resin must be replaced more often. Check carefully the conductivity meter on top of the water purifier and request a replacement as necessary.

Note 3: The service life of sensors (oxygen sensor/controlled-potential electrolysis sensor) is one year.

Full check (overhaul cycle)

Even if the daily check, maintenance and periodic maintenance servicing at specified intervals is performed, the life cycle of respective parts and units is limited.
For those parts and units which service live are relatively short, have them replaced at each periodic maintenance service.
In addition to periodic servicing, an overhaul is required at certain intervals.
The standard overhaul cycle for this equipment is 24,000 operating hours. When this is reached, request ESPEC CORP. or the place of purchase for a full check and have the necessary overhauls performed.
In an overhaul servicing those items checked during normal periodic maintenance service are performed but a specific focus is placed on the following:

- Full replacement of the ventilation fan unit
- Replacement of all sensors
- Replacement of the humidifying heater and heating heater
- Replacement of refrigerator unit parts

  (Compressor, electronic expansion valve, dryer, condenser fan motor)
- Replacement of the water supply and drain hoses
- Replacement of the water circuit unit
- Replacement of the wick pan arm
- Replacement of the steam hose
- Inspection of the evaporator
- Cleansing or replacement of the inside of the water supply and drain pipes for the refrigerating circuit