Chapter 5 Inspection and maintenance

This chapter describes how to perform regular inspection and maintenance to ensure the long operating life of the chamber.

5.1 List of consumables

The following parts must be replaced regularly. Replace the parts as soon as the replacement period is reached.
You can also use the ESPEC maintenance and inspection service.
To request a part, contact your distributor or ESPEC.

Table 5.1 List of consumables

Component name	Replacement period	Replacement method
Wet-bulb wick	After humidity control operation or 1 month	See "*4.6 Checking the wet-bulb wick (SH only)*".

* The operating life of the humidifying heater depends on the temperature and humidity control operation time, and the water quality.
  Using water with high conductivity can reduce the operating life.
  To extend the operating life of the heater, replace the water in the humidifying tray before a temperature and humidity control operation, and regularly clean the inside of the test area. (See "*5.4 Maintenance*".)
* Lithium battery
  Chamber instrumentation is equipped with a lithium battery that, under normal use, will not become depleted and does not require replacement by you. (The designed operating life is at least 10 years.)

■ Notification function

The inspection and maintenance periods can be set from the instrumentation.
For details, see the Controller guide.

5.2 Inspection and maintenance items

WARNING

Use appropriate methods to periodically clean parts of the chamber such as the electrical compartment and humidifying tray.
Failing to do so can result in burns and electric shock.

■ Inspection items

For a description of each item, see "*5.3 Inspection*".
If the inspection items listed below do not operate properly, contact your distributor or ESPEC.

Table 5.2 Inspection items

Operation inspection item	Inspection period
Testing breaker operation	• Once per month • Before long-time continuous operation
Testing overheat protector operation	• Before starting operation
Checking the water level of the humidifying tray and humidifying tray water level controller	• Once every 3 months • Whenever the chamber is moved
Checking the operation of the air circulator for air flow inside the chamber	• Once per month • Before long-time continuous operation

■ Maintenance items

For a description of each item, see "*5.4 Maintenance*".

Table 5.3 Maintenance items

Maintenance item	Maintenance period
Cleaning the water supply tank (SH only)	Once a month
Cleaning the water supply pump filter (SH only)	Once a month
Cleaning the humidifying tray	Once a month
Cleaning the test area	Before starting operation
Preparations before an extended period of non-use	When not used for an extended period
Cleaning the filter for the optional water supply circuit	Once a month

5.3 Inspection

Testing breaker operation

WARNING

Perform an operation test on the leakage breaker and check that it is operating normally before starting chamber operation.
Failing to do so can result in electric shock.

Test the breaker operation once a month or before starting long-term continuous operation.
Gently press the test button with the breaker on. When the test button is pressed, the breaker lever should lower.

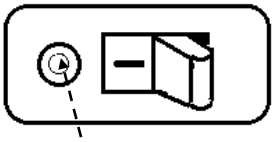

Fig 5.1 Test button

◆ Reference ◆

When the breaker lever lowers, it stops at a point halfway between on and off. To turn on the power, lower the lever to off and then raise it to on.

Testing overheat protector operation

WARNING

Before starting chamber operation, check that the overheat protector is operating normally.
Failing to do so can result in fire.

Before starting chamber operation, test the operation of the overheat protector.

<Procedure>

1) Check that the breaker is in the ON position.

2) Press the power switch to turn on the power of the instrumentation.
A menu appears.

3) Set the constant values and start constant operation.
Set the temperature close to room temperature or the current monitor temperature, and turn off the humidity setting.

4) Configure the overheat temperature to a setting 5°C less than the temperature of the test area.
If the overheat protector is operating normally, a buzzer sounds and an alarm appears on the screen of instrumentation. All digits of the display on the setter flash.
If the buzzer does not sound, there is an error. Contact your distributor or ESPEC.

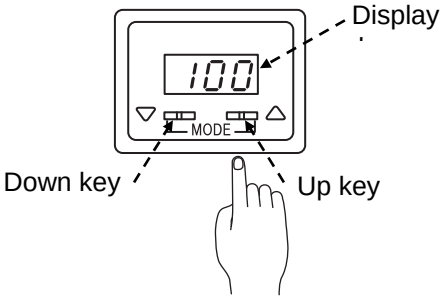

Fig 5.2 Overheat protector

5) Stop the buzzer, press the [Stop Beep] key on the alert screen.
The setting of the overheat protector returns to the original setting.

Checking the operation of the air circulator for air flow inside the chamber

Check the operation of the air circulator for air flow inside the chamber once a month or before starting long-term continuous operation.

<Procedure>

1) Check that the main power switch is in the on position.

2) Press the POWER key to turn on the instrumentation.
   The current test area temperature and humidity are displayed.

3) Check that the alarm wait time is set to 180 seconds.
   For details about setting the function, see "5.11.2 Setting the operation when the chamber is running" in the Controller guide.

4) Set the chamber air temperature to 20°C and turn off the refrigeration control.
   For details on setting the temperature, see "3.2 Entering the temperature and humidity". For details on setting the refrigeration capacity, see "3.3.1 Setting refrigeration ".

5) Start constant operation.
   The chamber starts operating.

6) Open the test area door, and check that the air circulator for air flow inside the chamber is not vibrating abnormally.

7) Close the door, and check that the air circulator for air flow inside the chamber is not producing abnormal sound.

If the fan is vibrating abnormally or abnormal sound is being produced, the air circulator or the fan may be malfunctioning.
Contact your distributor or ESPEC.

◆ Reference ◆

While checking the operation, if the door is left open for 180 seconds, a door open alarm is displayed in the instrumentation screen and the air circulator stops. This is not an error. Press the [Stop Beep] key to stop the buzzer.
Next, close the door, clear the alarm, and then open the door again to resume the check procedure of the air circulator.

5.4 Maintenance

Cleaning the water tank (SH only)

If water is left in the water tank for more than one month, the water may become contaminated. Continued use can reduce the operating life of the humidifying heater and wet-bulb wick.
Clean the water tank and filter element once a month.

◆ Note ◆

- Stop chamber operation before cleaning. Add water to the humidifying tray after cleaning.
  Adding water removes air from the water circuit automatically, keeping the water supply to an appropriate level.
- All parts that were removed to perform cleaning must be returned to their original locations after cleaning.
- Open and close the water tank drawer slowly and securely.
  Opening and closing with force can break the water supply tank drawer.
- Clean your hands and the cleaning cloth beforehand to prevent propagation of bacteria in the water tank.

<Procedure>

1) Remove the water supply tank from the water circuit box.

2) Open the water supply port cap, fill approximately 500 cc of pure water through the water supply port, and close the cap.

3) Shake the water supply tank vertically and horizontally to clean the inside of the tank.

Notice

Keep the wires of the test area (both inside and outside) slack and in a U-shape.
If condensation forms on a wire, it can run into a specimen or terminal and cause damage.

4) Open the water supply port cap, and drain the water.

5) Repeat steps 2 to 4 two or three times.

6) Attach the water tank in its original condition.

Cleaning the humidifying tray (SH only)

CAUTION

For your safety, be sure to use gloves.

The test area has protruding parts and sharp parts, so be careful of cuts.

Allow the test area to return to near room temperature before cleaning the humidifying tray.

Failing to do so can result in burns and frostbite.

Be sure the breaker is off.

Operating with the power on can result in electric shock.

During operation, debris and impurities adhere to the humidifying tray and humidifying heater. These should be cleaned once a month to extend their operating life. Discharging the water from the humidifying tray after each test is completed can prevent adhering of debris and impurities.

<Procedure>

1) Open the test area door.

2) Remove the two screws holding the protection panel, and remove the plate.

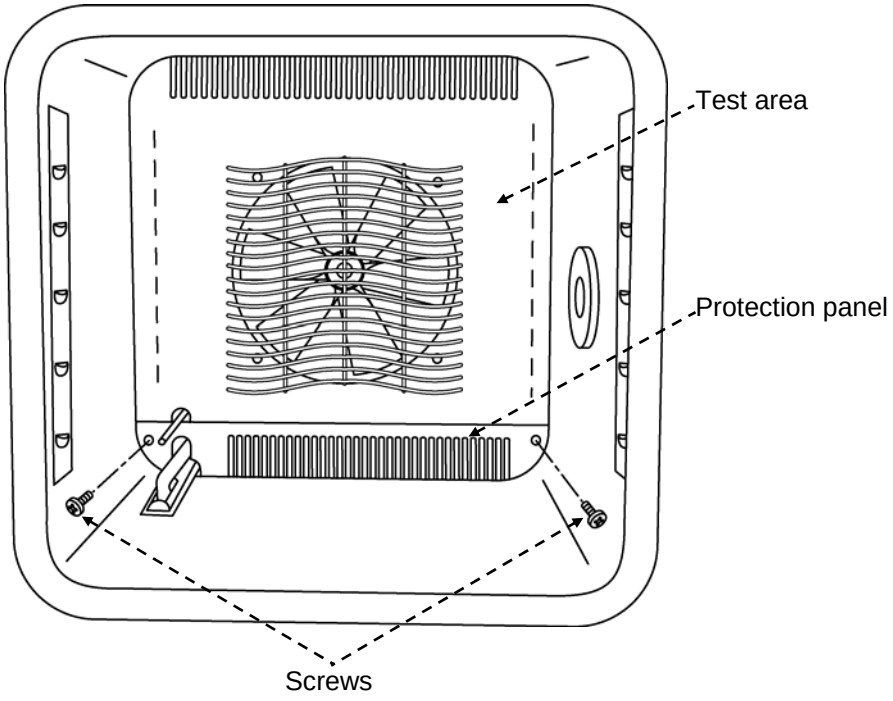

Fig. 5.3 Removing the protection panel

3) Use a brush to clean the surfaces of the humidifying tray and humidifying heater.

4) Reversing the procedure of step 2, install the protection panel and close the test area door.

Cleaning the inside of the test area

The adhering of dust and impurities to the inside of the chamber can prevent accurate test results. Clean the test area before starting operation.

<Procedure>

1）Open the test area door.

2) Use a soft cloth to wipe the test area.

3) Close the test area door.

Checking the water supply pump filter (SH only)

Notice

- **Stop chamber operation before inspection and cleaning.**
- **Before inspection and cleaning, drain the humidifying tray and the water level sensor container of the water supply tank.**

  Cleaning without draining will result in water leakage. (For details on draining water, see "Preparations before an extended period of non-use" in "6. drainage work".
- **Before inspection and cleaning, remove the water supply tank from the water circuit box.**

  Cleaning without removing the water supply tank will result in water leakage.
- **After cleaning, supply water and drain the humidifying tray and the water level sensor container of the water supply tank two or three times to drain debris and foreign objects from the piping.**

Debris accumulating in the water supply pump filter in the water level sensor container of the water supply tank can hinder the water supply. Inspect it once every six months.

<Procedure>

1) Check to make sure that the breaker is turned off.

2) Remove the water supply tank from the water circuit box.

3) Using a Phillips screwdriver, remove the four screws holding the water circuit box rear panel, and remove the panel.
   * You can remove the rear panel easily by pull the top of rear panel toward you and move it up.

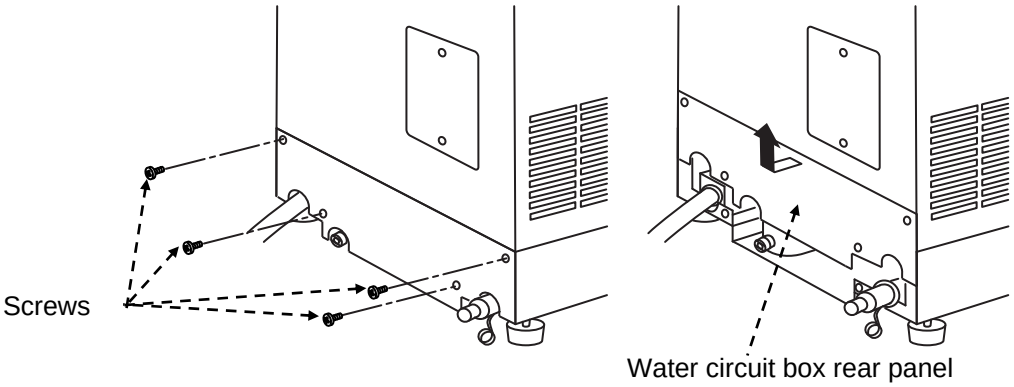

Fig. 5.4 Removing the water circuit box rear panel

4) Connect the supplied humidifying tray drain hose to the humidifying tray drain plug on the back of the chamber, and drain the water.

5) Connect the supplied drain hose for the water level sensor container of the water tank to the corresponding socket, and drain the water.

6) Check whether the water supply pump filter in the water level sensor container of the water tank is dirty. If there is enough debris to clog the filter, make a service call, or clean the filter by following the procedure below.

Cleaning the water supply pump filter (SH only)

<Procedure>

1) Using a Phillips screwdriver, remove the two screws holding the water level sensor container of the water tank.

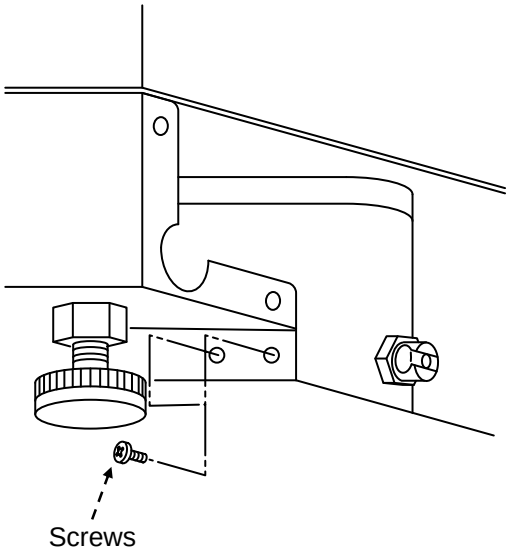

Fig. 5.5 Removing the screws holding the water level sensor container of the water tank

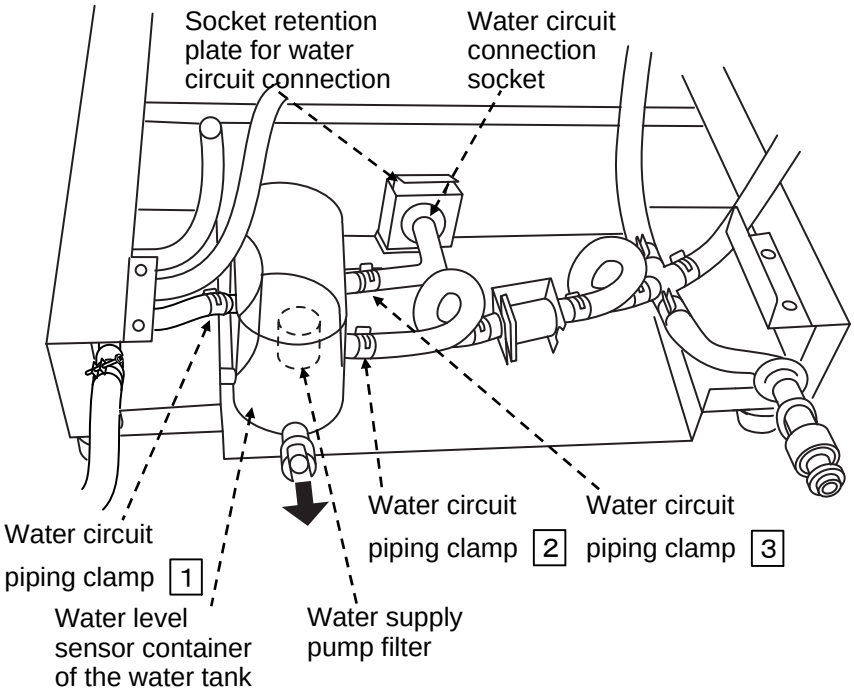

Fig. 5.6 Cleaning the water supply pump filter

2) Using pliers, loosen the water circuit piping clamp 1 2 3, and separate the part from the line tube.

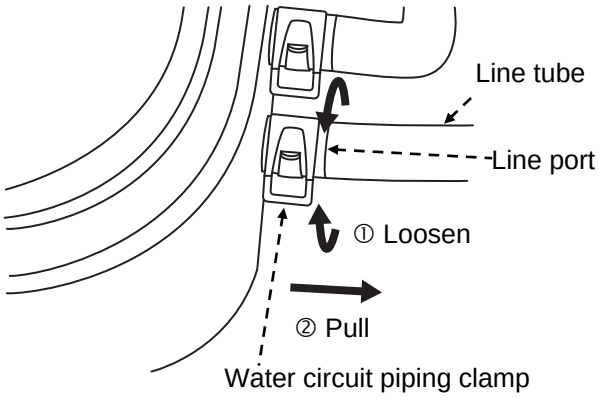

Fig. 5.7 Cleaning the water supply pump filter

3) Pull the water level sensor container of the water tank toward you, and remove the cover and spacer from the container.

4) Remove the water supply pump filter from the water level sensor container of the water tank.

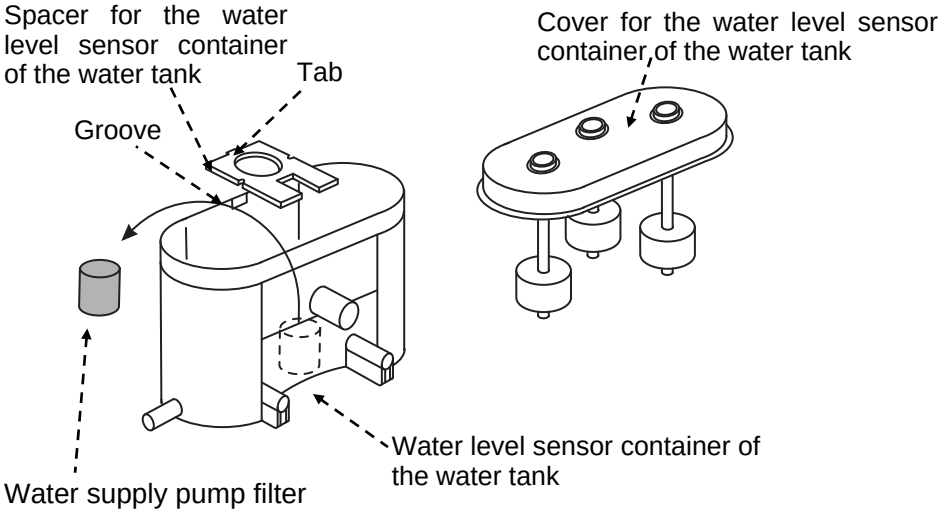

Fig. 5.8 Cleaning the water supply pump filter

5) Rinse any debris from the filter with water.

6) Reassemble by reversing the procedure.
Make sure that the tab of the spacer for the water level sensor container of the water tank fits in the groove of the water level sensor container. Make sure that the tab is not slanted.

Preparations before an extended period of non-use

If the chamber will not be used for an extended period of time, perform the steps below. Failure to do so may result in inaccurate testing and reduce the operating life of the chamber.

- Change the water in the water circuit chamber (SH only).
- Drain the water (SH only)
- Perform a dry operation.
- Turn off the breaker.

■ Change the water in the water circuit chamber (SH only).

Set the temperature of the test area to 70°C and the humidity to 90%RH, and operate the chamber in constant mode for approximately 10 minutes.

<Procedure>

1) Check that the breaker is in the ON position.

2) Set the temperature of the test area to a constant setting of 70°C and the humidity to a constant setting of 90%RH.

3) On the operation control screen, start operation.

4) Operate for approximately 10 minutes with the test area door closed.

◆ Energy Saving Advice ◆

IMPORTANT Turn off the instrumentation power switch and the breaker on the chamber.

Reduce the standby power.
If the chamber will not be used for an extended period of time, turn off the breaker to reduce the standby power.

Turn on the breaker one hour before using the chamber.
(At ambient temperature of 20°C)

■ Draining the water (SH only)

Drain the water from the wick pan, humidifying tray, water supply tank, and water level sensor container of the water tank.

<Procedure>

1) Connect the drain pipe on the rear of the chamber to a drainage facility or drain to a drainage container.
   * The inner diameter of the drain pipe is 12 mm.
   Before performing inspection or maintenance on the chamber or temperature operation, connect the appropriate drain hose and drain the water.
   (When connecting the drain hose, push in until you hear a click.)

CAUTION

Be careful of the hot water when draining the humidifying tray.

Hot water is drained immediately after operation and can result in burns.

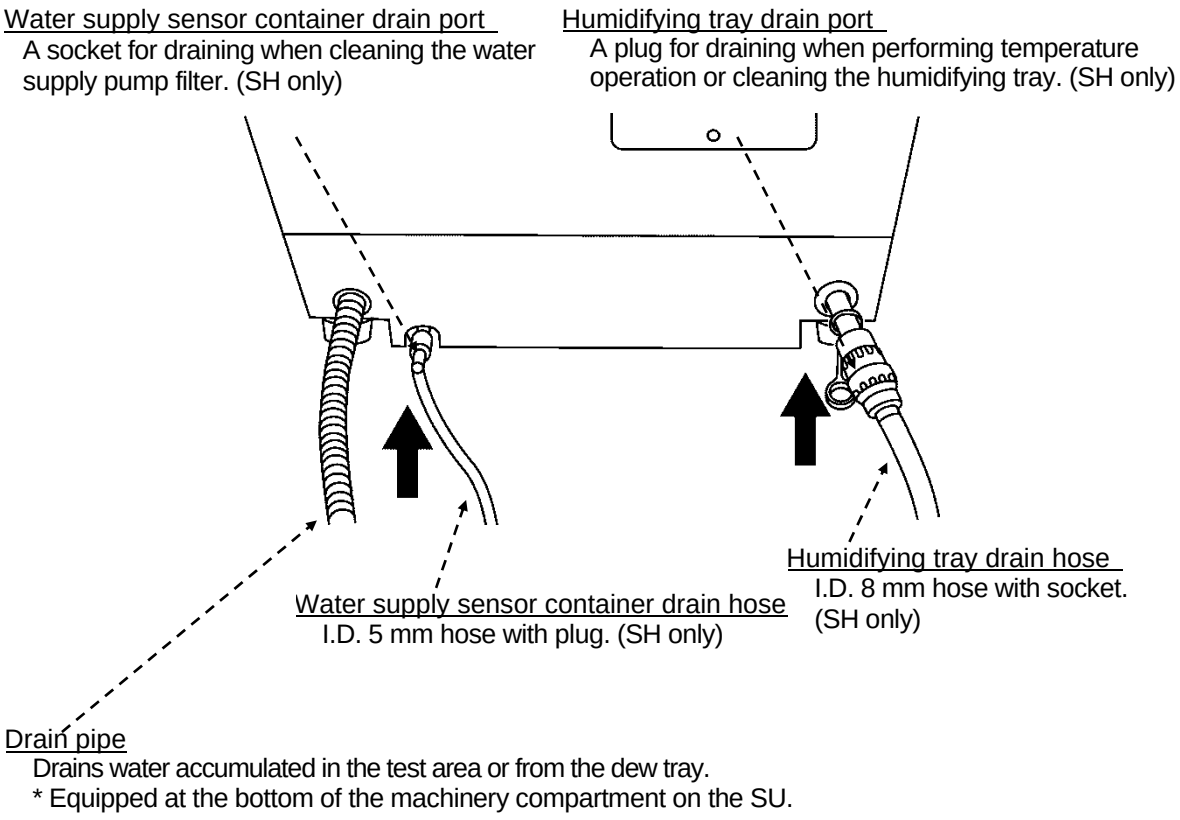

Fig. 5.9 Draining

■ Performing a dry operation

◆ Note ◆

Under certain ambient conditions, suddenly stopping operation following low-temperature operation can cause condensation to form on the chamber surface. In some cases, this can result in water leakage in the chamber installation location.
Return the temperature in the test area to room temperature before stopping operation.

To dry out the test area, perform a dry operation.
In the case of a temperature-only chamber, stop the refrigerator, and then perform a constant operation for about 60 minutes at a temperature of at least 70°C with the humidifier setting off. After operation is completed, open the test door slightly and operate in constant mode for approximately 15 minutes using the same setting.

<Procedure>

1) Check that the breaker is in the ON position.

2) Press [Details] on the Constant Setup screen. Press [OFF] in the refrigeration setting.

3) Because the chamber is operated with the door ajar, change the settings so that operation is not interrupted and an alarm does not occur.
In [Operation Process] of [Configuration] in [Chamber Setup], set [Door Open Cond] to Off.
Set [TM to Open War] to Off.

4) Set the temperature of the test area to a constant setting of 70°C or more.

5) Press the OPER./STOP key to start constant operation.
Operate for approximately 60 minutes with the test area door closed. Then, stop operation, open the test area door, and leave it for approximately 30 minutes.

6) Check that there is no water on the test area door, close the door, and remove the humidifying tray drain hose.

■ Turn the power OFF

Turn the breaker off, and then turn off the primary power supply.