

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 and regular replacement parts

The following parts must be replaced regularly. Replace the parts as soon as the replacement period is reached.

ESPEC also provides inspection and maintenance services.

To request a part, contact your distributor or ESPEC.

Table 5.1 List of consumables

Part	Recommended replacement period	Replacement method
Wet-bulb wick	After temperature control operation or one month	☞ See "4.3 Checking the wet-bulb wick (not available on temperature-only chambers)".
Chamber lamp	6,000 hours or when the bulb-type fluorescent lamp goes out	☞ See "6.7 Maintenance".

Table 5.2 List of regular replacement parts

Part	Recommended replacement period	Replacement method
Door packing (inside/outside)	Once every seven years	Contact your distributor or ESPEC.
Humidifying heater (temperature and humidity type only)		Contact your distributor or ESPEC.

* 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".)

* About the battery (lithium battery)

The chamber's controller is equipped with a lithium battery as a backup.

If power is not supplied to the chamber (the breaker is off) for a long time the lithium battery will die, and the chamber will not be able to start. The operating life of the lithium battery is approximately 10 years, although this varies depending on the chamber's storage environment. If you expect that the battery has died, contact ESPEC.

■ Reminder 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, water circuit box, and humidifying tray.

Failing to do so can result in burns, electric shock, and other injuries.

■ 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
Primary breaker trip test	<ul style="list-style-type: none"> • Once a month • Before long-time continuous operation
Overheat protector trip test	<ul style="list-style-type: none"> • Before starting operation
Checking the water level of the humidifying tray and humidifying tray water level controller	<ul style="list-style-type: none"> • Once every three months • Whenever the chamber is moved

■ Maintenance items


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

Table 5.3 Maintenance items

Maintenance item	Maintenance period
Wet-bulb wick check	When the chamber humidity gradually rises past the setting or when water cannot be absorbed
Cleaning the condenser filter	Once a month
Cleaning the water tank (not for temperature-only chambers)	Once a month
Cleaning the water supply pump filter element (not for temperature-only chambers)	Once a month
Cleaning the humidifying tray	Once a month
Cleaning inside the test area	Before starting operation
Cleaning the electrical compartment and water circuit box (heat exhaust chamber)	Once a year
Preparations before an extended period of non-use	Before an extended period of non-use
Cleaning the dehumidifier's air filter (PDL/PDR only)	Before starting low-humidity control operation
Draining the clean meter circuit (PCR only)	Once every three months
HEPA filter mold prevention (PCR only)	Once every two months

5.3 Inspection

Primary breaker trip test

 **WARNING**

! Perform a trip 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.

With the breaker on, gently press the test button. Pressing the test button should cause the breaker lever to lower.

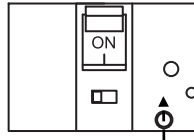




Fig. 5.1 Test button

◆ 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 the off position, and then raise it to the on position.

Overheat protector trip test

 **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, perform a trip test on the overheat protector.

<Procedure>

- 1) Check that the breaker is in the on position.
- 2) Press the instrumentation power switch to turn on the chamber.
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 then turn off the humidity setting.
- 4) Set the overheat protector to a temperature that is approximately 5°C lower than the test area temperature.
If the overheat protector is operating normally, a buzzer will sound and an alarm will appear on the instrumentation screen. All digits of the adjuster display will flash.
If the buzzer does not sound, it means an error has occurred. Contact your distributor or ESPEC.

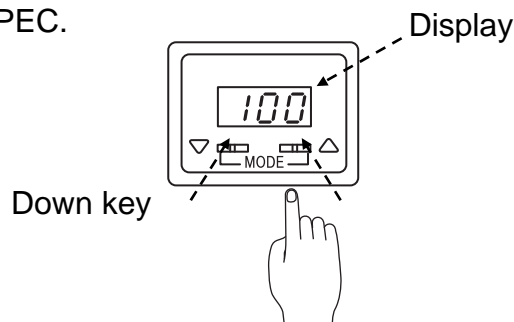


Fig 5.2 Overheat protector

- 5) To stop the buzzer, press Stop Beep on the alarm screen.
This will cause the overheat protector setting to return to its original value.

Periodic inspection related to the Fluorocarbon Emissions Control Law

(Japan only)

This chamber is not subject to these periodic inspections.

As stipulated by the Fluorocarbon Emissions Control Law, products having a rated compressor motor output of 7.5kW or more must undergo periodic inspections at least once a year and have records of these inspections maintained. These inspections must be carried out by an individual with sufficient knowledge of the properties and handling methods of fluorocarbons as well as of the construction and operating methods of freezers and refrigerators.

Simple inspection related to the Fluorocarbon Emissions Control Law

(Japan only)

The parts included in this chamber's refrigerator are Class-1 Specified Equipment. As stipulated by the Fluorocarbon Emissions Control Law, a simple inspection of these parts at least once every three months and a record of these inspections are both required with the purpose of early detection of leaking fluorocarbons. Perform a simple inspection by following the procedure shown below and keep a record of the results of this inspection. Note that ESPEC can also perform these simple inspections. Contact your distributor or ESPEC.

Keep separate records of each product and manage these records by recording the product's history such as inspections, repair, refrigerant collection, and refrigerant filling until you dispose of the product. There is no set style for the records. You can keep the records either on digital media or paper.

You can download simple inspection sheets from Test Navi, ESPEC's reliability website for engineers. Use these sheets as an example. (Only Japanese)

<http://www.test-navi.com/jp/index.html>

■ Simple inspection details

You have to perform a simple inspection of the chamber once every three months regardless of whether the chamber is in operation or stopped.

Even if the chamber has been stopped for 3 months or longer, you still have to perform the simple inspection.

The details of the simple inspection are those recommended by ESPEC. Add and remove inspection details according to the judgment of the chamber's administrator.

For details on the Fluorocarbon Emissions Control Law, see the website of Japan's Department of the Environment. <http://www.env.go.jp/earth/>

<Procedure>

- 1) Check the set temperature and the internal chamber temperature.

On the Monitor screen, check whether the test area temperature (humidity) has been controlled to the set temperature (humidity) and is stable. Record the result of this check. If, once 20 minutes or more have elapsed after the set temperature (humidity) was reached, the test area temperature (humidity) cannot be controlled to a value within $\pm 5\text{C}/5\%\text{rh}$ of the set temperature (humidity) or is unstable, fluorocarbons may be leaking.

If the chamber is not in use when it is time for its inspection, you may omit this procedure.

- 2) Check for abnormal vibrations and operating noises.
Check for chamber vibrations and operating noises.
Check the chamber's outer panel for vibrations and the chamber's vicinity for noises such as chattering noises. Record the result of this check. If vibrations or noises that you have not detected before are present, fluorocarbons may be leaking.
If the chamber is not in use when it is time for its inspection, you may omit this check.
- 3) Check the chamber's vicinity for oil leaks.
Check the chamber's vicinity for oil leaks. Record the result of this check.
If oil leaks are present, fluorocarbons may be leaking.

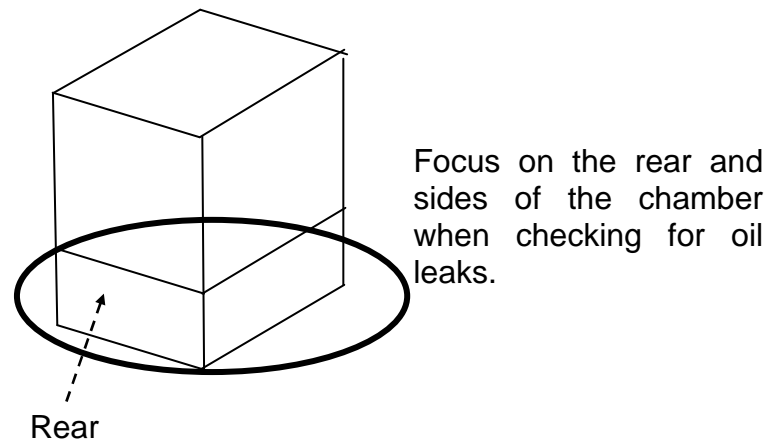


Fig. 5.3 Checking for oil leaks

- 4) Check the chamber's appearance for damage, corrosion, and rust.
Check the chamber's appearance for damage, corrosion, and rust. Record the result of this check.
If damage, corrosion, or rust is present on the chamber's appearance, fluorocarbons may be leaking.

The simple inspection is limited to cases in which it can be performed safely, easily, and visually. If you cannot guarantee user safety or the chamber's continued performance due to the carrying out of the inspection or if each of the details of the inspection indicate the possibility of fluorocarbons leaking, contact your distributor or ESPEC.

5.4 Maintenance

Wet-bulb wick check

The wet-bulb wick is used during humidity control operation.

For details such as the installation and replacement procedures, see "4.3 Checking the wet-bulb wick (not available on temperature-only chambers)".

Cleaning the condenser filter

Clean the condenser filter, which keeps the condenser from becoming dusty.

<Procedure>

- 1) Remove the condenser filter.

Remove it from the left side of the chamber, as shown below.

The condenser filter of the dehumidifier (PDL/PDR only) is held in place by a magnet.

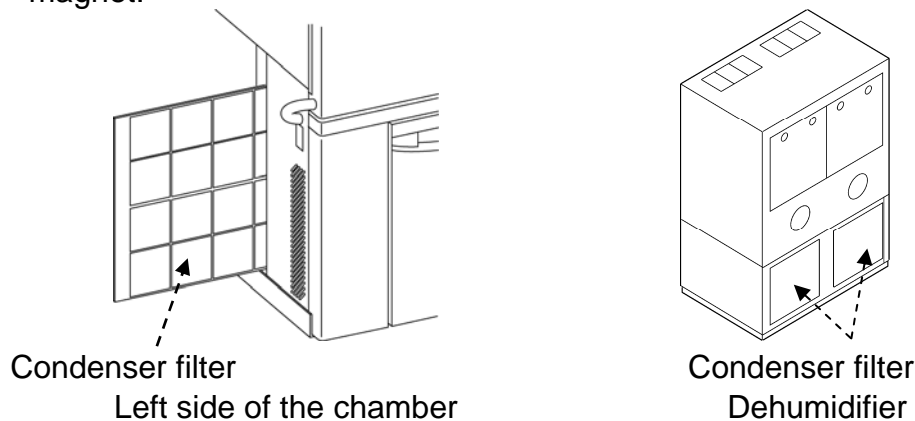


Fig 5.4 Removing the condenser filter

- 2) Rinse the filter with water to remove dust and debris.

- 3) After rinsing the filter with water, dry it in the shade.

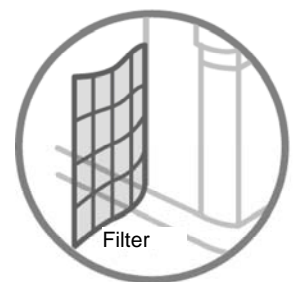
The condenser filter is made of resin material. It may be deformed if subjected to direct sunlight.

- 4) Return the condenser filter to its original location.

◆ Energy Saving Advice ◆

IMPORTANT Clean the condenser filter and fins once a month.

The condenser is equipped with a condenser filter and fins to prevent the accumulation of dust. Regular cleaning of the filter and fins can prevent lower refrigeration capacity and reduce the load on the exhaust fan.



Cleaning the water tank and water supply pump filter element

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 water supply pump 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 at 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 the water tank drawer with force can break it.
- **Clean your hands and the cleaning cloth beforehand to prevent propagation of bacteria in the water tank.**

<Procedure>

- 1) Slowly pull out the water tank drawer and open the tank.
- 2) Remove the water tank upper cap (with the water intake and sensor unit) and the water filling filter.
- 3) Remove the water tank from the drawer.
- 4) Use a nylon brush or cloth to clean the inside of the water tank, and then wipe away any remaining water with a cloth.
- 5) Rinse any debris from the water supply pump filter element with water.
- 6) Return the water tank upper cap (with water intake and sensor unit) and water filling filter to their original positions on the water tank.
- 7) Slowly close the water tank drawer.

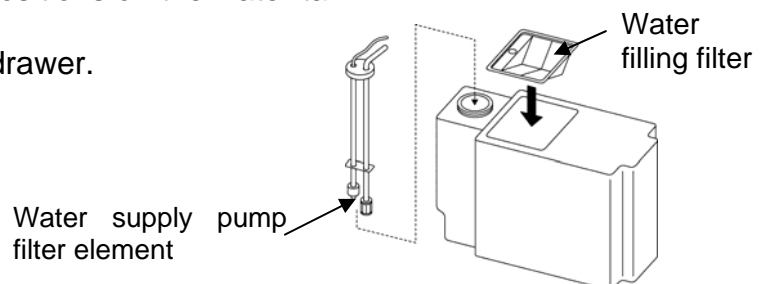



Fig. 5.5 Cleaning the water

Cleaning the humidifying tray

 **CAUTION**

! **For your safety, be sure to wear gloves.**
The test area has protruding parts and sharp parts, so be careful of cuts.

! **Allow the test area to sufficiently cool down before cleaning the humidifying tray.**
Immediately after operation, the test area may be hot and humid.

During operation, debris and impurities adhere to the humidifying tray and humidifying heater. These should be cleaned once a month to extend the operating life of each part. Discharging the water from the humidifying tray after each test is completed can prevent the adhering of debris and impurities. The automatic humidifying tray switching function is useful for this.

<Procedure>

- 1) Open the test area door.
- 2) Pull the bottom of the protective grille toward you and then lift up to remove it.

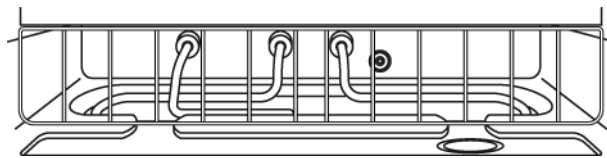


Fig. 5.6 Removing the protective grille

- 3) Use a brush to clean the surfaces of the humidifying tray and humidifying heater.
- 4) Install the protective grille and close the test area door.

◆ Energy Saving Advice ◆

IMPORTANT Clean the humidifying heater and humidifying tray once a month.

Removing scale adhering to the humidifying heater can improve heating efficiency and reduce the load on the humidifying heater.

Cleaning inside 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.

Cleaning the electrical compartment and water circuit box (heat exhaust chamber)

The collection of dust in the electrical compartment and water circuit box (heat exhaust chamber) can lead to malfunction. Clean the electrical compartment and water circuit box (heat exhaust chamber) once a year.

<Procedure>

- 1) Check that the breaker is turned off.
- 2) Open the electrical compartment door and the water circuit box door (heat exhaust chamber door).
- 3) Use a vacuum cleaner to remove any dust in the electrical compartment and water circuit box (heat exhaust chamber).
- 4) Close the electrical compartment door and the water circuit box door (heat exhaust chamber door).




WARNING



Be sure to turn off the breaker before cleaning.

A safety device protects against electric shock by turning off the breaker with a door switch on the electrical compartment; however, be sure to turn off the breaker without relying on the safety device. Failing to do so can result in electric shock.

Cleaning the viewing window glass

 **CAUTION**

! **Make sure the glass of the viewing window is at room temperature before cleaning.**
The temperature of the glass may be extremely hot or cold during operation and immediately after high- or low-temperature control operation.

! **Support the viewing window glass with your hand when removing the screws.**
The viewing window glass is secured with two screws at the top. When the screws are removed, the glass may fall out toward you.

<Procedure>

- 1) Use a Phillips screwdriver to loosen the screws, and then remove the screws and washers.
- 2) Remove the viewing window glass by lifting it up slightly.
- 3) Clean the viewing window glass with alcohol and a soft cloth.

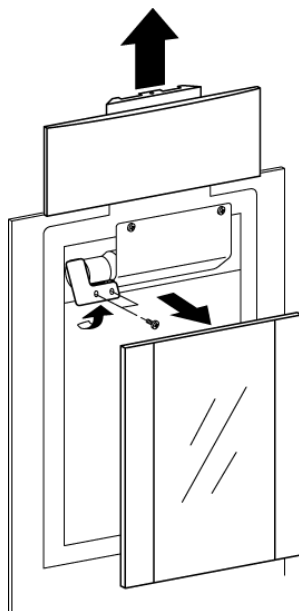


Fig. 5.7 Cleaning the viewing window

- 5) Replace the viewing window glass, and then tighten the screws.

Preparations before an extended period of non-use

If the chamber will not be used for an extended period of time, be sure to perform the steps shown 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 (not for temperature-only chambers).
- Drain the water from the wick pan and humidifying tray (not for temperature-only chambers).
- Perform a dry operation.
- Turn off the breaker.
- Clean the dehumidifier air filter (PDL/PDR only).

■ Changing the water in the water circuit (not for temperature-only chambers)

Set the temperature of the test area to 70°C and the humidity to 90%rh, and then 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) Start operation from the operation control screen.
- 4) Perform operation 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.
(When the ambient temperature is 20°C.)

■Draining the water (not for temperature-only chambers)**<Procedure>**

- 1) Check that the breaker is in the ON position.
- 2) Press the instrumentation power switch to turn on the chamber.
- 3) Press the ACCESSORY icon.
Press [EXEC] next to Manu Drain under Set Drain.
To stop water drainage, press [STOP].
- 4) In the case of a PDL or PDR chamber, you also need to drain the water from the compact humidifier.
Open the water drain cock of the compact humidifier protection box and drain the water.
Close the drain cock after draining the water.

■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.

Dry out the test area according to the Controller guide “Chapter 5 Dry operation”.

■Cleaning the dehumidifier air filter (PDL/PDR only)

Use the procedure below to clean the heater box and cooler box air filters.

<Procedure>

- 1) Perform the dehumidifier connection procedure in reverse to remove the dehumidifier from the chamber.
- 2) Remove the inspection door on the right side of the dehumidifier, and then remove the filter.

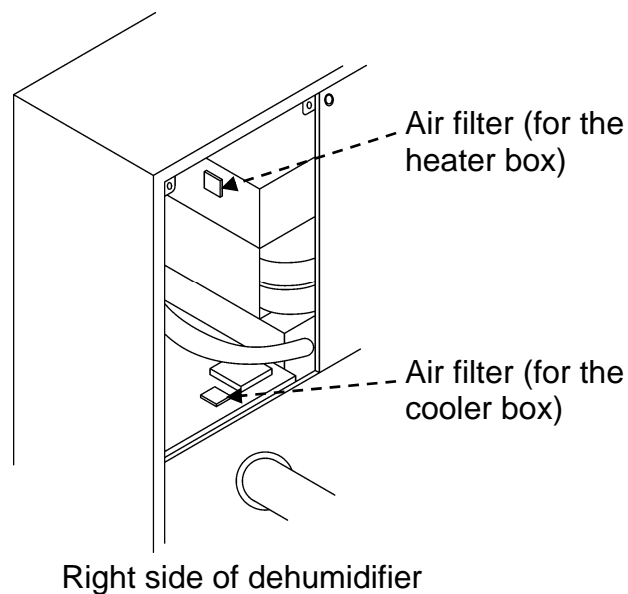


Fig. 5.8 Removing the air filters

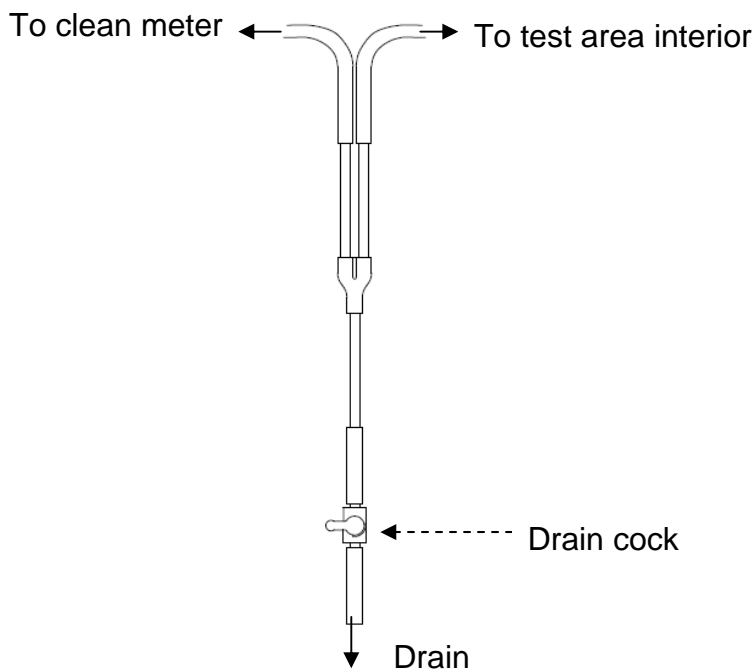
- 3) Rinse the filters with water to remove dust and debris.

■Draining the clean meter circuit (PCR only)

Condensed water accumulates inside the clean meter circuit. Drain the circuit once every three months.

<Procedure>

- 1) Check that the breaker is turned off.
- 2) Open the water circuit box door.
- 3) Open the clean meter circuit drain cock and drain the water.
- 4) Close the drain cock, and then close the water circuit box door.

**■HEPA filter mold prevention (PCR only)**

To prevent mold from forming on the HEPA filter, be sure to perform dry operation periodically (once every two months) and after you finish using the chamber in temperature and humidity control operation.

The HEPA filter used by this chamber has not been treated to protect against mold formation from the matter picked up by the filter. Therefore, if you leave the chamber in temperature and humidity control operation, it is easy for mold to develop in the filter and the chamber. The same information applies to the case in which you will not use the chamber for a long time.

If you will stop using the chamber after performing temperature and humidity control operation, be sure to drain the water from the humidifying tray, perform dry operation at 100°C for approximately 30 minutes, and then stop using the chamber.

