Chapter 7 Checks and Maintenance

7.1 Check and Maintenance Lists

7.1.1 Check list

For an explanation on each check item, see below Table 7.1.
If any of the following checks result bad, contact the place of purchase or ESPEC CORP.

Table 7.1 Check list

Check item	When to check
Main power switch (leakage breaker) trip test	• Once monthly • Before long test runs
Overheat protector trip test	Before every test

7.1.2 Maintenance list

For an explanation on each maintenance item, see below Table 7.2.

Table 7.2 Maintenance list

Maintenance item	When to perform
Cleaning Inside the Chamber	After every test
Cleaning the Exhaust Damper	Once every 2 or 3 months
Electric parts compartment cleaning	Once every 2 or 3 months
Cleaning Inside the Exhaust Duct	Once every 2 or 3 months
Take-Down Before Long Periods of Disuse	Before long periods of disuse
Replacing Cartridge Fuses	Whenever a cartridge fuse blows
HEPA Filter Replacement	Once every 3 to 5 years
Lock Catch Replacement	3 years
Door Hinge Washer Replacement	3 years

7.2 Main Power Switch (Leakage Breaker) Trip Test

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.

Once a month and before long test runs, test-trip the main power switch (leakage breaker).
With the main power switch in the ON position, press the test button.
If the switch's lever falls to the middle position, the breaker is working properly.

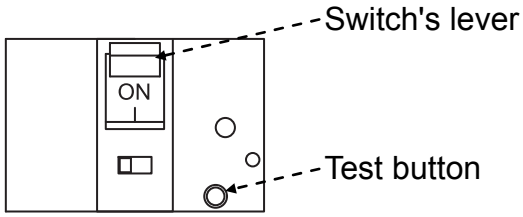

Fig. 7.1 Test button

◆ Note ◆

If the main power switch (leakage breaker) trips, the lever stops inbetween 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.

7.3 Overheat Protector Trip Test

WARNING

Before starting chamber operation, correctly set the safety device for overheat protection and check that this device is operating normally.

Failing to do so can result in fire.

Before starting operation, test the overheat protector for proper tripping.

<Procedure>

1) Check the main power switch (leakage breaker) is in the ON position.
2) Press OPER. START/STOP key.

3) Set the overheat protector temperature below the actual chamber temperature.

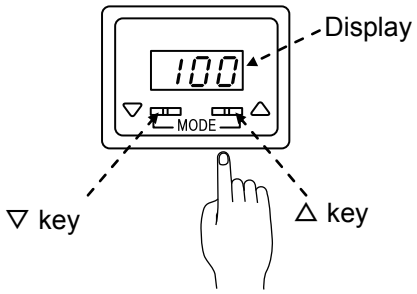

Fig. 7.2 Overheat Protector

4) If the overheat protector is functioning properly, an alarm will be generated: a fault indication lamp will light up and the buzzer will sound.
If an alarm is not generated, there is something wrong with the overheat protector. Contact the place of purchase or ESPEC CORP.

ALARM !	03／10
E06 OVER HEAT	

5) Reset the overheat protector.
To clear the alarm, press the OPER. START/STOP key to shut OFF power to the chamber.

7.4 Cleaning Inside the Chamber

Dirt and foreign matter inside the test area can throw test results off.
Clean the test area after every test.

CAUTION

Immediately after operation ends, the chamber is hot on the inside (specimens, shelf, door gasket and test area walls). Therefore, allow it to cool sufficiently before cleaning inside.

<Procedure>

1) Open the chamber door.
2) Wipe walls and parts clean with a soft cloth.
3) Close the door.

7.5 Cleaning the Exhaust Damper

If specimens release vapor, clean the exhaust damper about every 2 to 3 months.

WARNING

Turn OFF the power switch (leakage breaker), and wear rubber or leather gloves before cleaning the exhaust damper. Do not contact parts other than the exhaust damper.

These safeguards serve to prevent injuries.

<Procedure>

1) Open the door.
2) Remove the screws that lock the exhaust damper maintenance port cover to the test area ceiling, and detach the cover. This will require a Phillips screwdriver.

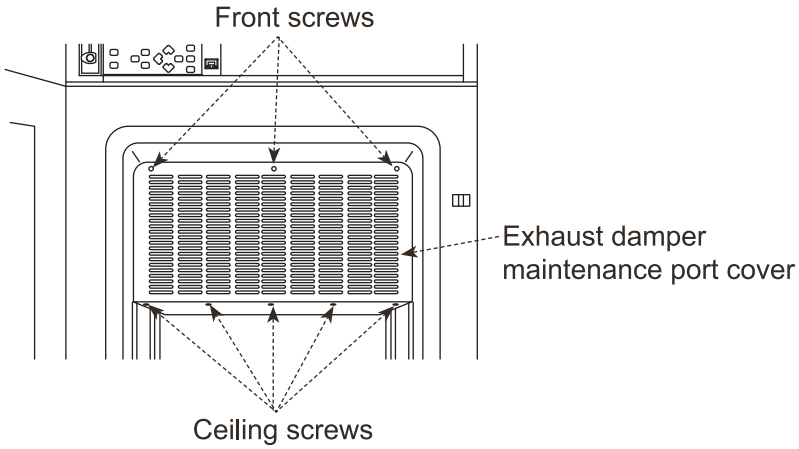

Fig. 7.3 Detaching the exhaust damper maintenance port cover

3) Wipe the exhaust damper with a soft piece of cloth, etc.

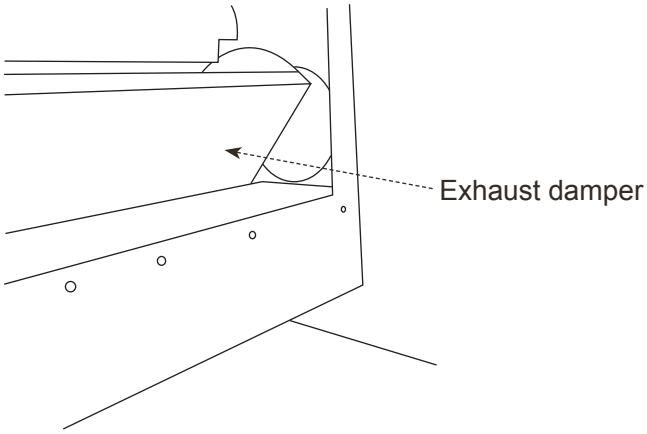

Fig. 7.4 Cleaning the exhaust damper

4) Reattach the exhaust damper and the exhaust damper maintenance port cover as before.

7.6 Electric Parts Compartment Cleaning

Because the electric compartment is ventilated, dust easily accumulates inside. Dust accumulation may cause leakage and faulty contacts.
Clean inside the electrical compartment once every 2 or 3 months with a vacuum cleaner.

⚠ WARNING

ELECTRIC SHOCK! Shut OFF primary power supply BEFORE cleaning the electric parts compartment.

Cleaning it while power is ON runs the risk of electric shock.

<Procedure>

1) Check the main power switch is in the OFF position.
2) Loosen the screws that lock down the electric parts compartment cover and detach the cover.
3) Clean dirt from the compartment with a vacuum cleaner or by other means.
4) Reattach the compartment cover.

7.7 Cleaning Inside the Exhaust Duct

⚠ WARNING

Be sure to clean inside he exhaust duct, whether of our manufacture or installed by you, once every 2 or 3 months.

The vapor from specimens or airborne substances may settle inside the exhaust duct as sludge. Accumulated sludge may be ignited by the hot air of the exhaust.

<Procedure>

1) Detach the exhaust duct from exhaust port.
2) Wipe inside the exhaust dust clean with waste cloth.
3) Reattach the exhaust duct.

7.8 Take-Down Before Long Periods of Disuse

■Shut OFF power supply
Set the main power switch (leakage breaker) in the OFF position and shut OFF primary power supply.

7.9 Replacing Cartridge Fuses

WARNING

Use appropriate methods to replace and inspect the fuse.

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

Over prolonged testing, cartridge fuses can weaken and blow. When a fuse blows, replace it as explained below.
Check the capacity of the blown fuse and replace it with one of the same capacity.

◆ Note ◆

If a new fuse blows as soon power is turned back ON, contact the place of purchase or ESPEC CORP.

<Procedure>

1) Check the main power switch (leakage breaker) is in the OFF position.
2) Loosen the screws that lock down the electric parts compartment cover and detach the cover.
3) Replace the blown cartridge fuse with a new one.
4) Reattach the electric parts compartment cover as before.

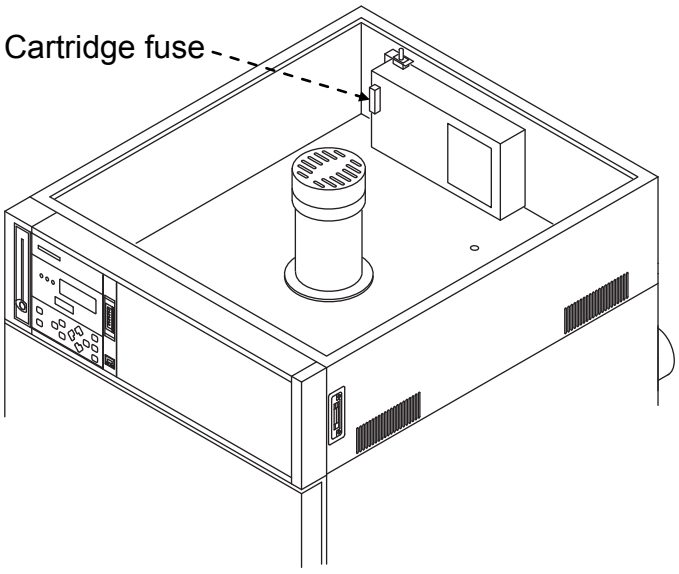

Fig. 7.5 Replacing cartridge fuse

Table 7.3 Fuse capacity

	F1
200V AC specification	3A
220V AC specification	3A

7.10 HEPA Filter Replacement

Air flow through the HEPA filter slows as dust accumulates inside the filter, causing wind speed and air volume to drop. If the needle on the clean meter is near 0.6 kPa, the filter is at the end of its service-life, therefore replace it.
The HEPA filter needs replacing every 3 to 5 years.

Fig. 7.6 Clean meter

Replace the HEPA filter in a well-ventilated place outside of the clean room because a large quantity of dust is generated and the filter is baked.

<Procedure>

1) Detach the HEPA filter protective panel.
The protective panel is hooked on, therefore lifting it slightly easily detaches it.
(With the PVC-212 and PVHC-212, the temperature sensor gets in the way, therefore detach the temperature sensor panel on the oven's left side and pull the temperature sensor back to the test area wall.)
(With the High Performance Clean Oven MS Series, detach the temperature sensor panel on the oven's left side, loosen the nut that locks the temperature sensor in place on the test area side, and pull the temperature sensor out from the left side of the oven. To tighten the sensor, turn the nut by hand until snug.)

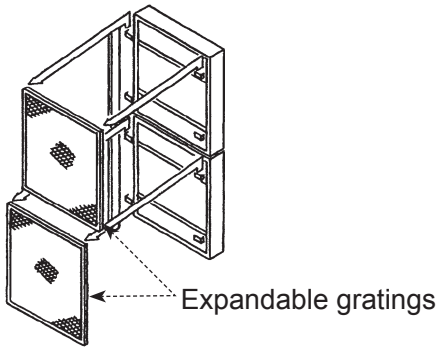

Fig. 7.7 Expandable gratings

2) Release the latches (4 on each left and right of filter) that hold the filter in place. The filter can be easily removed once the latches are open.
(For PV[H]C-212/232 and 332)

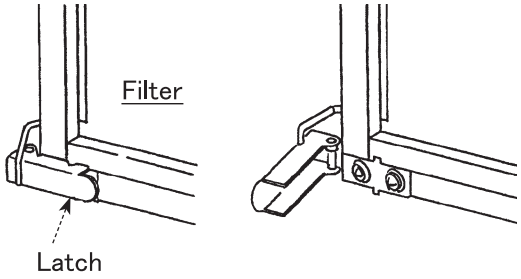

Fig. 7.8 HEPA filter latch

3) Remove the hexagon nuts (14) that lock the filter in place.
The filter can be removed by detaching the retainer that holds it in place.
(For the High Performance Clean Oven MS Series)

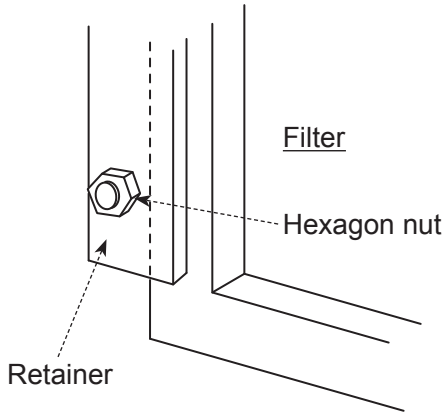

Fig. 7.9 Hexagon nut of HEPA filter retainer

4) Bake the HEPA filter. (For the High Performance Clean Oven MS Series)
Run the below operation pattern to remove oil adhering to the HEPA filter and test area. Because the HEPA filter packing will shrink when baked, retighten the HEPA filter nuts two times. Fully open the damper during temperature pull-down.
Touching the test area with bare hands leaves hand oil adhering to parts. Then, when temperature rises oil bakes in the form of your hand. Handprints cannot be removed once formed, therefore remove oil with alcohol, etc. before raising the temperature.

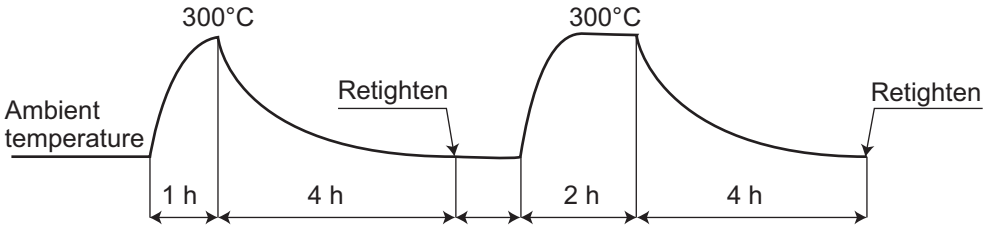

Fig. 7.10 Operation pattern

◆ Note ◆

After replacing the HEPA filter, a slight odor and white smoke may be detected when the test area is heated to high temperature, but there is nothing wrong with the equipment. Ventilate the test area several times.
Both the odor and white smoke will disappear in time.
HEPA filter replacement is related to clean factor, therefore contact the place of purchase or ESPEC CORP. when it is time to replace it.

7.11 Lock Catch Replacement

The lock catch roller is made of heat-resistant resin. (Consumable part)
Often opening and closing the door wears the roller down. Replace the roller if worn. The service-life of the lock catch is about 3 years. (Contact the place of purchase or ESPEC CORP. if the roller is worn.)

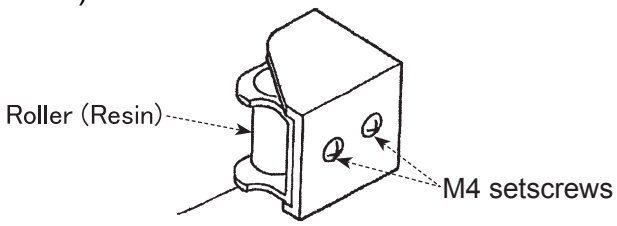

Fig. 7.11 Lock catch

Remove the M4 setscrews that lock the lock catch in place and replace the lock catch with a new one. When installing the lock catch, coat the M4 setscrews with locking agent to anchor in place.

7.12 Door Hinge Washer Replacement

The door hinge washer is made of resin. (Consumable part) Often opening and closing the door wears the washer down. Replace the washer if worn. (Contact the place of purchase or ESPEC CORP. if the washer is worn.)

<Procedure>

1) Detach the hinge covers from the oven and door. This will require a screwdriver.
2) Remove the bolts that lock the hinge in place. This will require an M5 box head driver. Work in twos or more so that someone can support the door to keep it from dropping when detaching the hinges.

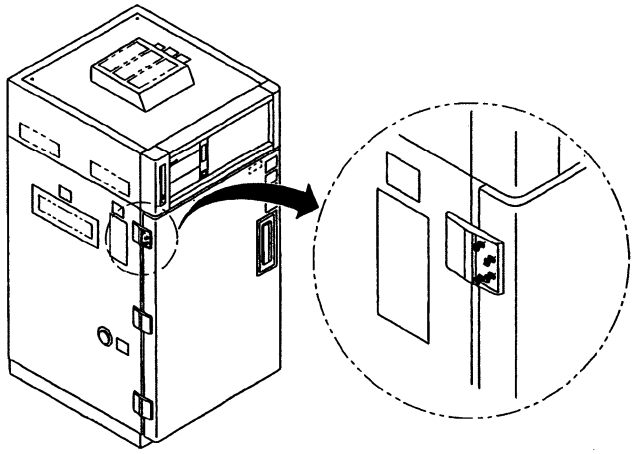

Fig. 7.12 Door hinges

3) Remove the hexagon recessed head setscrews that lock the hinge pin in place.

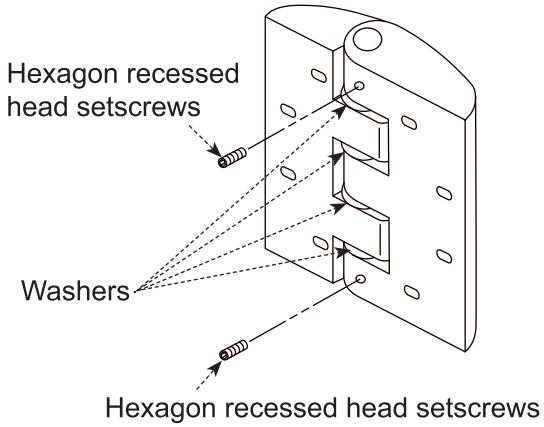

Fig. 7.13 Removing hexagon recessed head setscrews

4) Pull out the hinge pin.

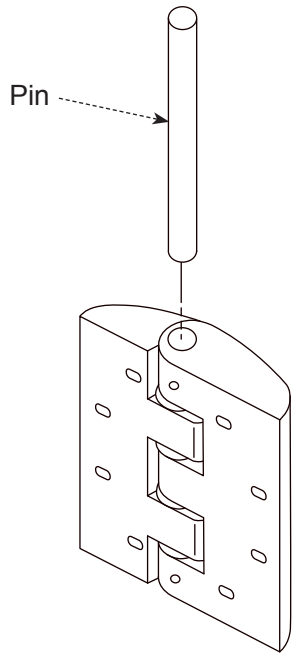

Fig. 7.14 Pulling out the hinge pin

5) The hinge separates into two parts when the pin is removed, therefore replace the washers.
6) Reassemble parts in the opposite order in which they were detached.