

5 Maintenance

5.1 Care and Maintenance

5.1.1 Overview

5.1.1.1 NOTE

This chapter describes only the recommended maintenance processes.

5.1.1.2 Tools, measuring devices and consumables

Table 5–1 Tools and measuring devices

Tool or Measuring Device	Quantity	Remarks
Plastic or resin container	1	Used to store the saline, and can accommodate two ultrasound probes.
Soft brush	1	Its size is similar to that of a toothbrush, and it has a soft head.
Small plastic basin	1	Used to store the soapy water.
Safety tester	1	Used when conducting electrical safety tests.

Table 5–2 Tools and measuring devices

Consumables	Quantity	Remarks
Aluminum foil	About 1 m	/
Normal saline solution	About 1000 ml	At least half of the container should be filled with the solution so that the probe can be submerged by the solution. (concentration 0.85 □ 0.95%)
Mild soapy water	About 400ml	/
Dry soft cloth or cotton cloth	About 5 pcs	/

5.1.1.3 Regular maintenance items

Table 5–3 Maintenance items and maintenance frequency

S/N	Item	Recom- mended Frequency	Operator		Method
			Terminal users	Engineer	
1	Clean the dust-proof net.	1 time per month	•	•	For details, see 5.1.2.1 Cleaning Process
2	Clean the display.	1 time per month	•	•	
3	Clean the trackball.	1 time per month	•	•	
4	Clean the control panel.	1 time per month	•	•	
5	Clean the probe (acoustic head part).	After each use	•	•	
6	Clean the probe cable and connector housing.	1 time per month	•	•	
7	Clean the holders (including the probe holder and medical ultrasound couplant holder).	1 time per month	•	•	
8	Clean the cover.	1 time per month	•	•	
9	Clean peripherals.	1 time per month	•	•	
10	Check the probe surface.	1 time/day	•	•	For details, see 5.1.4.1

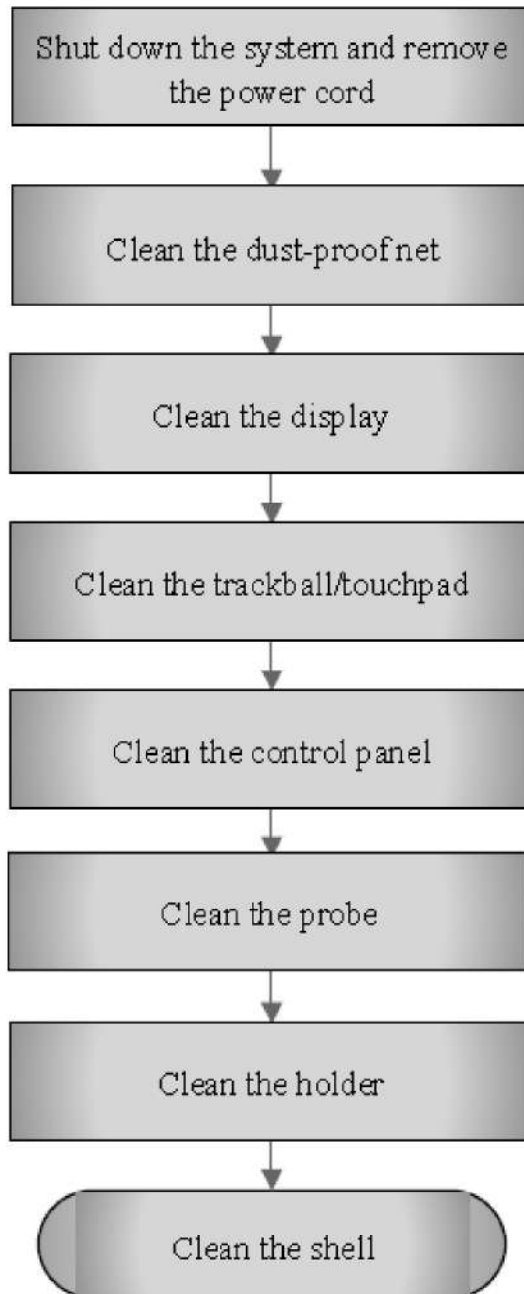
Table 5–3 Maintenance items and maintenance frequency(continued)

S/N	Item	Recom- mended Frequency	Operator		Method
			Terminal users	Engineer	
11	Check the power cord and plug.	1 time per month	•	•	Common Inspections
12	Check the battery.	1 time per 3–6 months	•	•	
13	Check the functions of peripherals and optional accessories.	1 time per year	•	•	
14	Check the mechanical safety.	1 time per year	•	•	
15	Check the electrical safety.	1 time per year		•	

5.1.2 System Cleaning

5.1.2.1 Cleaning Process

Figure5–1 Cleaning Process



NOTICE

Before cleaning the machine, power off the machine and unplug the power cable. Cleaning the device in the power-on state may result in electric shock.

5.1.2.2 Clean the dust-proof net

Dust net of the main unit

- Tool: soft brush
- Method:

1. Before cleaning, remove the dust-proof net. Remove the front cover assembly and the dust-proof net as shown below.

1) Lift the front cover outward from the groove.

2) Locate the dust-proof net handle on the upper part of the cover and pull out the dust-proof net.



2. Clean the dust-proof net: Gently brush off the dust from dust-proof net with a soft brush.

3. Install the dust-proof net: Install the dust-proof net by performing operations in reverse order of the dust-proof net removal procedure, and reinstall the front cover assembly back to the cover.

CAUTION

Clean all the dust-proof nets of the machine regularly (once a month), otherwise it is easy to cause damage to the machine. When the machine is used outdoors or in other dusty places, increase the cleaning frequency.

5.1.2.3 Cleaning the display

- Tools: dry soft cloth, water or mild soapsuds
- Method: Directly use a dry soft cloth to clean the surface of the display and touch screen. If there is still a stain, dip a dry soft cloth with a little water or mild soapsuds to wipe and then air dry the display.

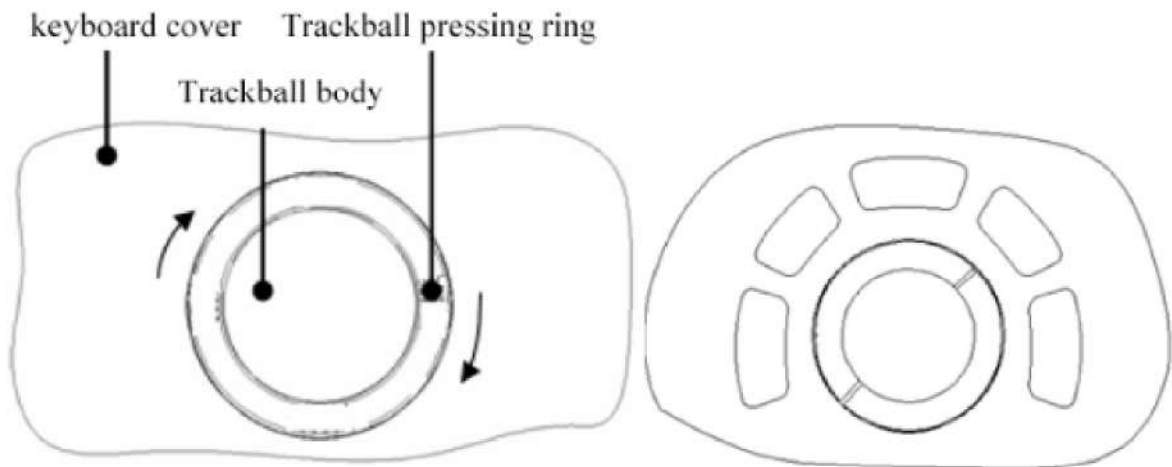
5.1.2.4 Cleaning the Trackball

The trackball is a human-computer interaction component. It is easy for the trackball to bring dust from the outside into the module during use. Therefore, regular maintenance is needed to ensure the system performance. When the cursor control is not flexible, it may be caused by dust pollution inside the trackball. In this case, remove the trackball and clean the dust inside.

- Tools: paper tissue, dry soft cloth, and mild soapsuds
- Method:

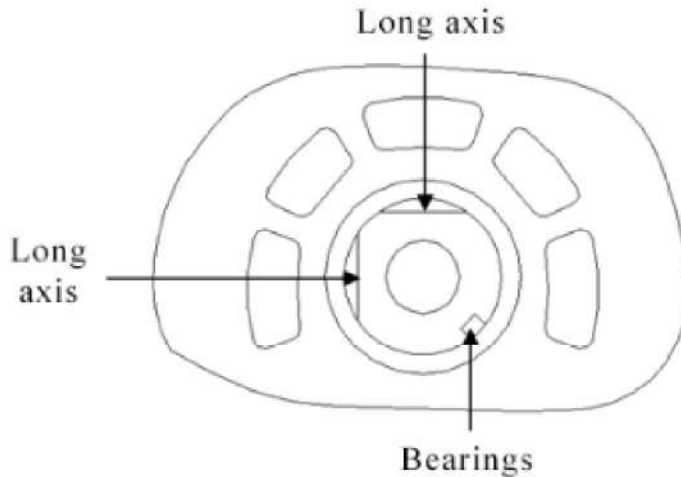
1. Remove the trackball:

Press the bulges on the clamping ring by both hands and turn the ring about 45° clockwise until it lifts. Take out the ring and the rotary ball. Be careful not to drop the ball. See the figure below:



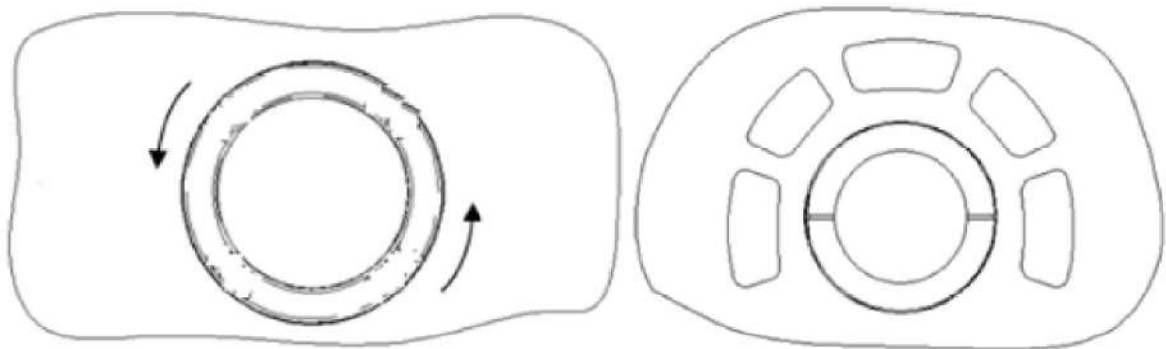
2. Cleaning:

Use a clean soft cloth or dry paper tissue to clean the two main shafts inside the trackball, bearings, plastic housing, and inner part of the pressure ring, as shown below. Meanwhile, clean the ball.



3. Re-installing:

Put the ball in. Then, put the pressure ring in (the convex strip on the pressure ring is about 15 degrees from the horizontal), and rotate counterclockwise until the convex strip on the pressure ring is horizontal. Then, the buckle is locked. At this time, the pressure ring can no longer be rotated, indicating that the pressure ring has been installed in place. See the figure below.



5.1.2.5 Cleaning the control panel

- Tools: mild soapsuds, and dry soft cloth
- Method: Use a dry soft cloth to wipe the dust from the surface of the control panel (including keys and encoder). Or, dip a soft cloth with a small amount of mild soapsuds to scrub away stubborn stains, and then use another soft cloth to dry or air dry the control panel. If it is difficult to clean the control panel, remove the encoder cap and clean the control panel with mild soapsuds.

NOTICE

Clean the control panel and keyboard regularly; otherwise the dirt in the gaps between keys will jam the keys, causing long beeping of the buzzer and malfunction of keys.

5.1.2.6 Cleaning the probe

- Tools: mild soapsuds, and dry soft cloth
- Method:
 1. Use a dry soft cloth to wipe off the dust on the head of the probe, connector housing, and cable.
 2. Use a soft brush to generally remove the dust on the probe connector terminal.
 3. If there are still stubborn stains, dip a dry soft cloth with a little mild soapsuds to wipe off dust or stains on the surface of the probe cable or connector housing, and then air dry them.

NOTICE

Do not wipe the probe connector using a wet cloth.

5.1.2.7 Cleaning the Holder

- Tools: mild soapsuds, dry soft cloth, and soft brush
- Method:
 1. Use a dry soft cloth to wipe the dust inside and outside the probe/medical ultrasound couplant holder and the gap of the holder. For the small cavity probe holder or gap, use a soft brush to gently brush off the dust and stains from the inner layer.
 2. If there are still stubborn stains, you can remove the holder, dip a dry soft cloth with a small amount of mild soapsuds to wipe off the stains attached to the external or internal layer of the holder, air dry the holder, and then install the holder.
 3. Medical ultrasonic couplant heating cup: Disconnect the power cord of medical ultrasonic couplant heating cup, remove the heating cup, dip a dry soft cloth with a small amount of soapy water to clean the inside and outside of the heating cup, use a soft brush to clean the dust in the holes at the bottom, dip a dry soft cloth with a small amount of soapy water to remove the residual stains, air dry the heating cup, and then install it.

5.1.2.8 Cleaning the ultrasound gel warmer

- Tools: mild soapsuds, dry soft cloth, and soft brush
- Method:
 1. Disconnect the power cord of the coupler heater and remove the heater from its bracket.



2. Press the snap-fits of the bottom arm in the directions indicated by the arrows to remove the bottom cover.
3. Use a soft cloth dipped in soapy water or water to gently wipe the heater surface and the connection cable.
4. Remove the bottom cover for cleaning.

NOTICE

Avoid liquid flowing into the gap of the heater. Do not use organic solvent to scrub the heater. Turn on and use the heater only after its surface is fully dried. Do not use strong solvent such as acetone. It is prohibited to use rough materials (such as steel velvet) to clean the surface of the heater. Clean the bottom cover of the heater regularly. Remove the bottom cover during cleaning. After cleaning, re-install the bottom cover at the bottom of the heater after its surface is dried.

5.1.2.9 Cleaning the machine shell

- Tools: mild soapsuds, and dry soft cloth

- Method: Use a dry soft cloth to wipe the dirt off the machine shell (the exposed part). Or, use with a dry soft cloth dipped in a small amount of mild soapsuds to remove stains, and air dry the shell.

NOTICE

Use a soft brush to gently remove the dust from naked interfaces or sockets (such as probe sockets, IO panels, and power panels). Do not use a water cloth.

5.1.3 Cleaning Peripherals

5.1.3.1 Cleaning the peripherals

Clean peripherals according to the actual conditions of the optional peripherals, and omit items that are not configured.

Table 5–4 Peripherals to be cleaned

Item	Content	Method
1.	Color or black and white video printer	Use a dry soft cloth to wipe off the dust or stains on the outer shell of the printer, and then open the outer shell to clean the inside of the printer. Make sure to follow instructions of the printer for cleaning and maintenance.
2	Graphic/text printer	Use a dry soft cloth to wipe off the dust or stains on the shell of the printer, and then open the shell to clean the inside of the printer. Make sure to follow instructions of the printer for cleaning and maintenance.
3	Footswitch	Use a dry soft cloth dipped with an appropriate amount of mild soapsuds to wipe off the dust and stains on the keys and cables of the footswitch.

Table 5–4 Peripherals to be cleaned(continued)

Item	Content	Method
4	Barcode scanner	Use a dry soft cloth to wipe the glass plate of the scanning window, and then wipe of the dust or stains on the cable and bracket. For special cleaning, make sure to follow the instructions of the scanner.
5	Workstation cartographer	Use a dry soft cloth dipped with an appropriate amount of mild soapsuds to remove dirt and stains from the cable.