



DQ-40/DQ-80

Ultrasonic Scaler

(Ultrasonic Periodontal Therapy Device)

OPERATION MANUAL

Guilin Veirun Medical Technology Co., Ltd.

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Statement

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Congratulations on becoming a respected customer of Guilin Veirun Medical Technology Co.,Ltd. and welcome to use the ultrasonic scaler DQ-40/DQ-80, which will bring you a new experience and convenience. This Operation Manual includes the latest information up to the time of its printing. Guilin Veirun Medical Technology Co.,Ltd. is solely responsible for the revision and interpretation of simplified English version of this Operation Manual, and reserves the right to make alterations without notice after printing. Some schematic diagrams listed in this Operation Manual are for reference only. If the picture is inconsistent with the real object, the real object shall prevail.

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The use of the product must comply with the requirements of relevant operating procedures and relevant regulations of the medical department, and can only be used by trained doctors or technicians.

Please carefully read this Operation Manual before use and properly keep it for future reference.

All operations must be carried out in strict accordance with the operating instructions of this Operation Manual. Otherwise, Guilin Veirun Medical Technology Co.,Ltd. will not be responsible for

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1. Product instruction

1.1. Overview

DQ-40/DQ-80 Ultrasonic Scaler has both ultrasound system and air polishing system. It is suitable for scaling, periodontal treatment, air polishing and root canal irrigation. It has the following characteristics:

- Automatically identify the ultrasonic/air polishing working mode according to the handpiece selected.
- DQ-40 panel adopts intelligent multi-touch to intelligently control the periodontal treatment power of dental cleaning, and adopts imported pressure regulator to accurately adjust.
- DQ-80 panel adopts seven-inch touch LCD screen for function selection, concise working status.
- Titanium alloy tips have circular vibration trajectory, small amplitude of tips can achieve painless treatment.
- In the automatic water supply mode, special chemical solutions such as hydrogen peroxide, sodium hypochlorite and chlorhexidine can be used to improve the clinical treatment effect.
- Detachable ultrasonic handpiece and air polishing handpiece can be sterilized under high temperature of 134°C and high pressure of 0.22MPa.

- The evolutionary wireless foot switch removes the main unit, and the wired foot switch can also be selected according to user's needs.

- Soft LED lighting for improving clinical operation efficiency.

- The working process is fully automatic controlled by microcomputer, which is convenient and simple to operate and high efficiency.

1.2. Structure and composition

The ultrasonic scaler is composed of functional control circuit, powder tank, air circuit, liquid circuit, handpiece, sand blasting nozzle, ultrasonic scaler tips and foot switch (wired or wireless), power supply and wrench.

1.3. Intended use

This device is intended use for periodontal treatment in oral clinical treatment, air polishing and remove dental calculus, dental plaque and stains, etc. on the surface of tooth. Remove the dental calculus and plaque in the periodontal pockets. Clean and wash the root canal.

1.4. Working principle

Use the high-frequency and high-energy vibration generated by ultrasonic wave to smash the surface of tooth, calculus and dental stain in the periodontal pockets through the smooth working head of

the ultrasonic scaler, and then wash away the gravel and plaque through the water mist generated by the scaler;

Use compressed air to transport powder such as sodium bicarbonate and fine quartz from the powder tank to the surface of tooth, and use its mechanical and chemical effects to remove residual dental calculus and pigment on the teeth, so as to achieve the effect of polishing the tooth surface.

1.5. Contraindications

- Patients with hemophiliacs.
- Patients with cardiac pacemakers.
- Doctors with cardiac pacemakers.
- Patients with heart disease, pregnant and young children.
- Patients with asthma, chronic bronchitis and other respiratory diseases.

1.6. Main technical specifications

- Input Voltage: 230 V~, 50/60 Hz 0.3A (DQ-40) 0.5A (DQ-80)
- Supply Voltage: 25V~, 50Hz 1.3A (DQ-40) 25V~, 50Hz 2.8A (DQ-80)
- Input Power: 35 VA (DQ-40) 100VA (DQ-80)
- Wireless foot switch battery: AA batteries x 2
- Tip amplitude: Minimum: 1 μm ; deviation -50%. Maximum: 100 μm ; deviation +50%

- Output half-excursion force: Minimum: 0.1 N; deviation -50%. Maximum: 5 N; deviation +50%
- Tip vibrating frequency: 30 kHz \pm 5 KHz
- Tip output power: 3 W~20 W
- Intake Pressure: 5 bar~6 bar (0.5 MPa~0.6 MPa)
- Water temperature of powder spray system: 0°C~45°C
- Requirement of powder: Only applicable to powder approved by Guilin Veirun Medical Technology Co., Ltd.
- Fuse: T2AH250V (DQ-40) T5AH250V (DQ-80)
- Fuse of Voltage:T1AL250V
- Weight of Main Unit: 2.1 kg (DQ-40) 2.43kg (DQ-80) Net Weight: 5kg (DQ-40) 6.5kg (DQ-80)
- Weight of Power Supply: 0.9kg (DQ-40) 2.0kg (DQ-80)
- Dimension of Main uni (H×M×D) :310mm×370mm×170mm(DQ-40)
310mm×370mm×200mm(DQ-80)
- Receiving Sensitivity: -114 dB(in accordance with China National Telecommunication Law),
Receiving frequency: 2.4G-2.5G
- Wireless foot switch: transmission frequency: 2.412GHz-2.462GHz, modulation type: GFSK, Max.
Radiation power: 12dbm
- Software Version: V1

1.7. Security Classification of Device

- Operating mode: continuous operation
- Type of protection against electric shock: Class I equipment
- Degree of protection against electric shock: Type B applied part
- Degree of protection against ingress of water: main unit (IPX0), wired foot switch (IPX1), wireless foot switch (IPX4)
- Degree of safety of application in the presence of a Flammable Anesthetic Mixture with air, Oxygen or Nitrous Oxide: devices of Non-AP, APG type

1.8. Working environment

- a) Ambient temperature: 5°C~40°C
- b) Relative humidity: ≤80%
- c) Atmospheric pressure: 70kPa~106kPa
- d) Temperature of Cooling liquid: 5°C~25°C

1.9. Side effects, adverse events and measures

If any unexpected action occurs to the device when it is used, please cut off the power switch of the device immediately to stop the device to ensure safety. Pay attention to that the tip needs enough water to dissipate heat when using device, otherwise it may be burns. Please stop using the device

immediately and make corresponding diagnosis and treatment in case of burns.

2. Production Installation

2.1. Main Unit Front & Rear Schematic Diagram of DQ-40

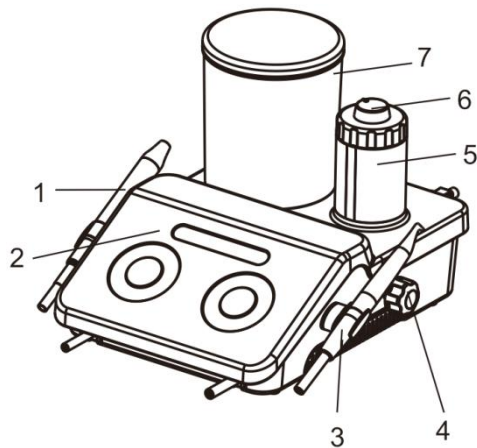


Figure 1 Front Schematic Diagram (DQ-40)

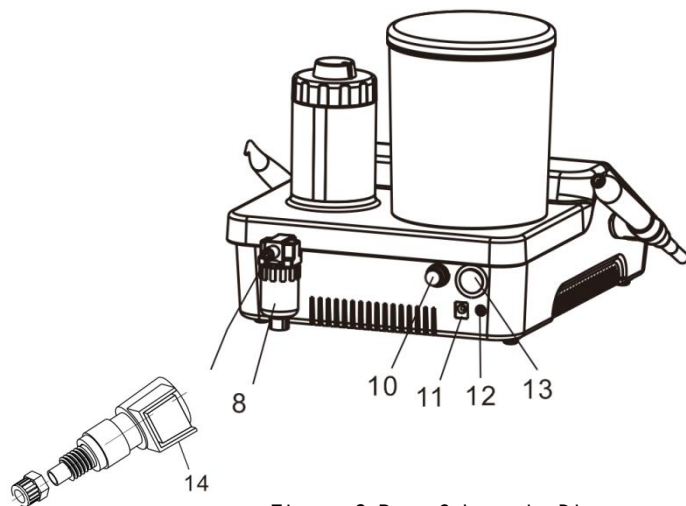


Figure 2 Rear Schematic Diagram
(DQ-40)

- 1、 Ultrasonic handpiece
- 2、 Operation panel
- 3、 Air polishing handpiece
- 4、 Air pressure control knob: adjust the air pressure under air polishing mode
- 5、 Powder tank
- 6、 Powder flow control knob
- 7、 Water bottle
- 8、 Air/Water separator
- 9、 Air intake
- 10、 Fuse
- 11、 Socket for DC power adapter
- 12、 Wired foot switch socket
- 13、 Power switch
- 14、 Check valve quick coupling

2.2. Operation Panel of DQ-40

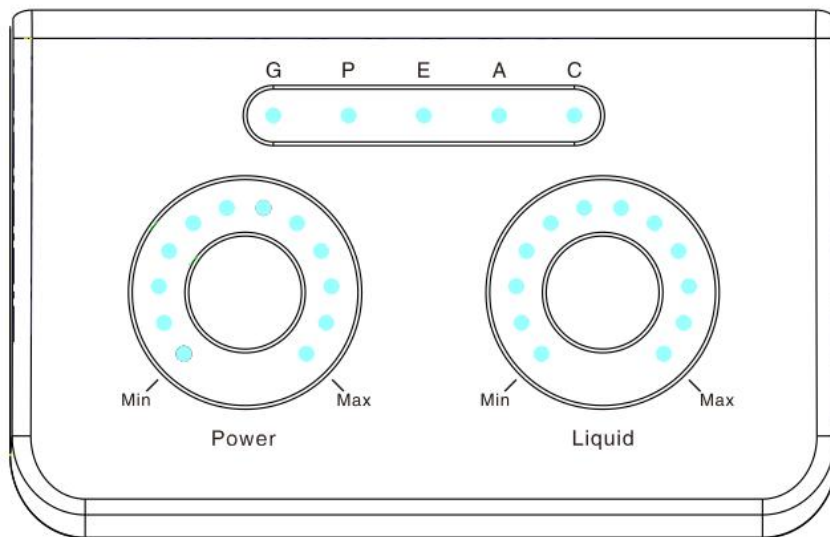


Figure 3 Operation Panel of Main unit (DQ-40)

- a) POWER: power slider, under the mode of cleaning: slide it for setting power;
under the mode of powder spray: slide it for setting air pressure.
- b) Liquid: water volume adjustment slider
- c) Mode selection area:
 - G: Scaling
 - P: Periodontal treatment
 - E: Root canal irrigation
 - A: Air polishing
(Intelligent recognition after taking the air polishing handpiece, no need for manual selection)
 - C: Air polishing pipe cleaning

2.3. Main Unit Front & Rear Schematic Diagram of DQ-80

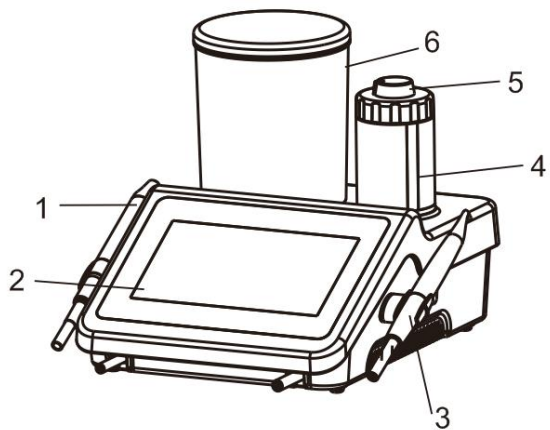


Figure 4 Front Schematic Diagram(DQ-80)

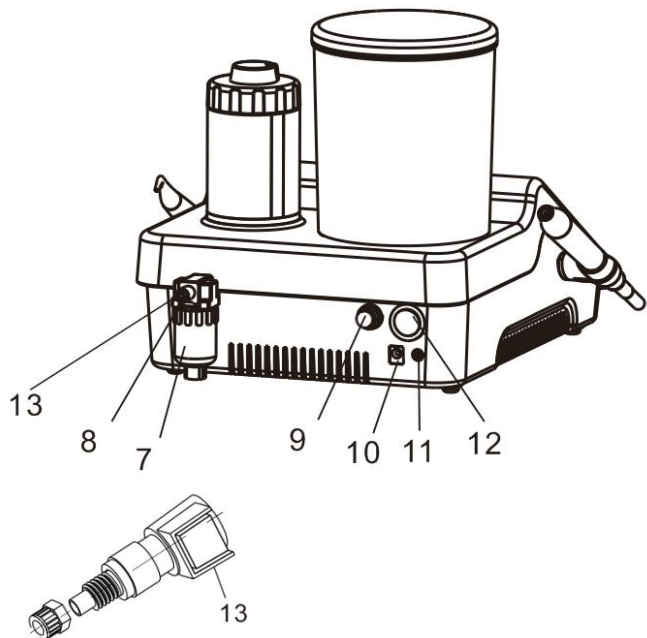


Figure 5 Rear Schematic Diagram(DQ-80)

- 1、 Ultrasonic handpiece
- 2、 Display panel
- 3、 Air polishing handpiece
- 4、 Powder tank
- 5、 Powder flow control knob
- 6、 Water bottle
- 7、 Air/Water separator
- 8、 Air intake
- 9、 Fuse
- 10、 DC power supply socket
- 11、 Wired foot switch socket
- 12、 Power switch
- 13、 Check valve quick coupling

2.4. Touch Panel (DQ-80)



Figure 6 Ultrasound system main interface (DQ-80)



Figure 7 Air polishing system main interface (DQ-80)



:Ultrasonic Scaling

G: Scaling

P: Periodontal treatment

E: Root canal irrigation



: Air polishing

A: Air polishing



: Pipe cleaning



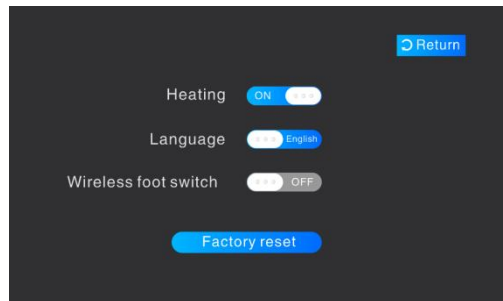
: Turn down water volume/power/air pressure



: Turn up water volume/power/air pressure



: Setting



Heating: Turn on/off the heating function of
air polishing system

Language: Chinese or English

Wireless Foot Switch: Wireless foot switch matching

Factory reset: Factory reset

2.5. Schematic diagram of tip and handpiece installation

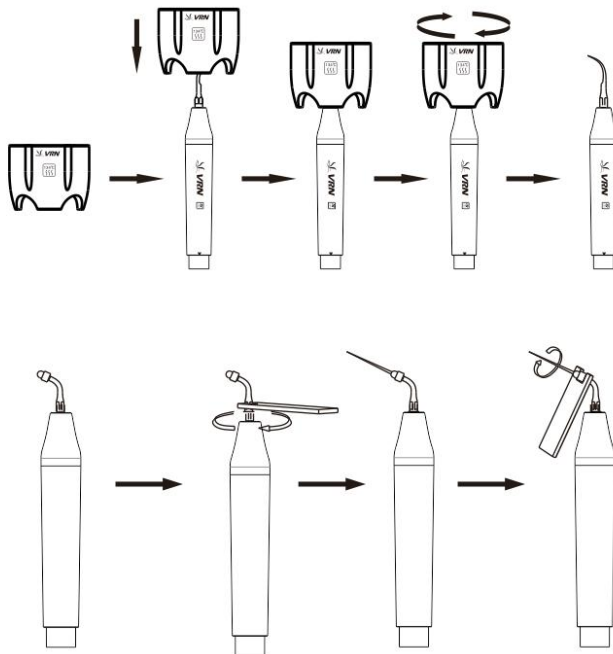


Figure 9 Installation diagram of tip and Endo file

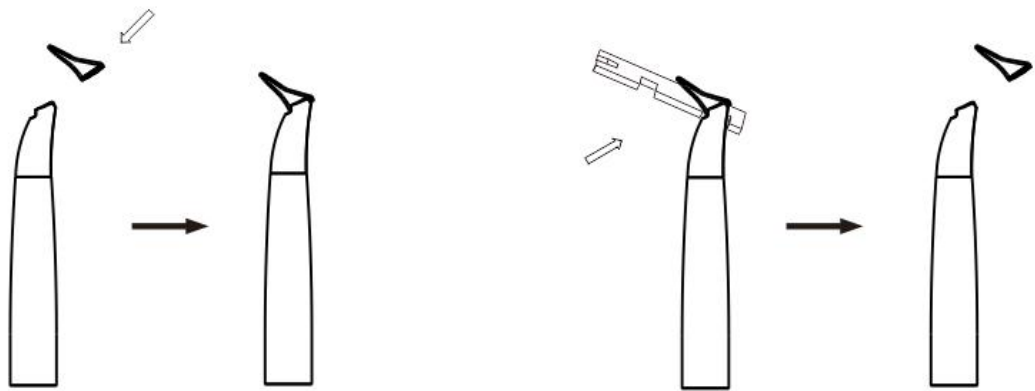


Figure 10 Installation diagram of sand blasting nozzle

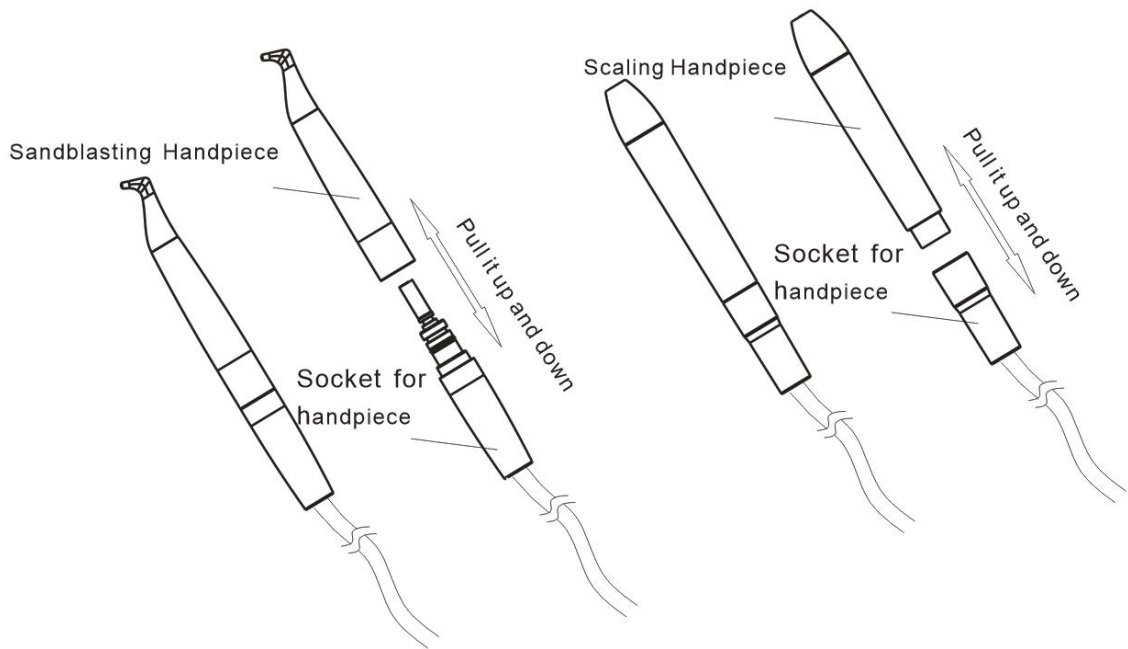
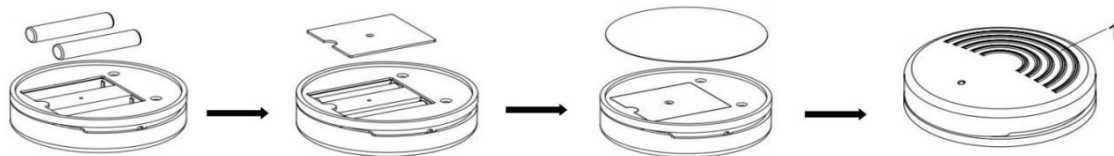


Figure 11 Installation diagram of handpiece

2.6. Wireless foot switch matching

a) Installation diagram for the battery of DQ-40 wireless foot switch:

Take off the sticker, and stick the waterproof rubber on the bottom.



Button "1", start the device

Figure 12

Installation diagram for the battery of DQ-80 wireless foot switch:

Take off the sticker, and stick the waterproof rubber on the bottom.

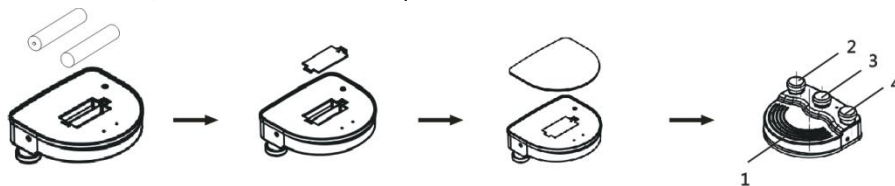


Figure 13

b) DQ-40 wireless foot switch matching:

1) In the power-on state, press and hold the "G", "P", "E" buttons at the same time until the water volume slider indicator starts to flash slowly;

2) Keep the foot switch pressed and insert two AA batteries (operate when the water volume slider indicator starts to flash slowly) so that the foot switch enters the pairing state, the foot switch is pressed down for 3 seconds after power-on;

3) Release the foot switch and restart the device, then wireless foot switch can control the device;

4) Press and hold the three buttons of "G" "P" "E" at the same time when the power gear of the three modes of GPE is 12 gears, keep the foot switch pressed and remove the AA battery to undo matching;

c) DQ-80 wireless foot switch matching:

1) In the power-on state: main interface--setting--wireless foot switch--turn on matching;

2) Keep the foot switch pressed and insert two AA batteries, the foot switch is pressed down for 3 seconds after power-on;

3) Release the foot switch and restart the device, then wireless foot switch can control the device;

4) In the power-on state: main interface--setting--wireless foot switch--turn off matching, keep the foot switch pressed and remove the AA battery to undo all matching.

Note: Press and hold the "G" "P" "E" buttons at the same time when gear of the water volume is 12, the main unit will enter the water volume calibration mode, do not enter this mode under normal circumstances, if necessary, please contact the dealer or manufacturer.

2.7. Air Intake and power supply sockets

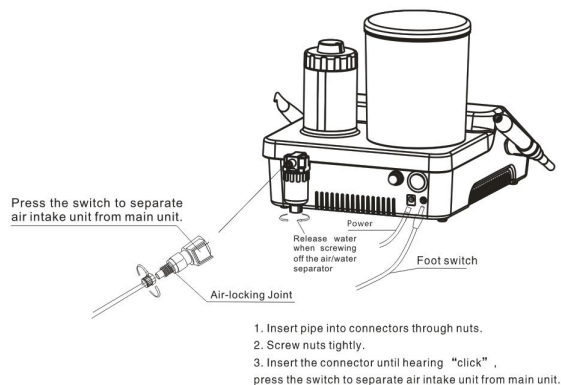
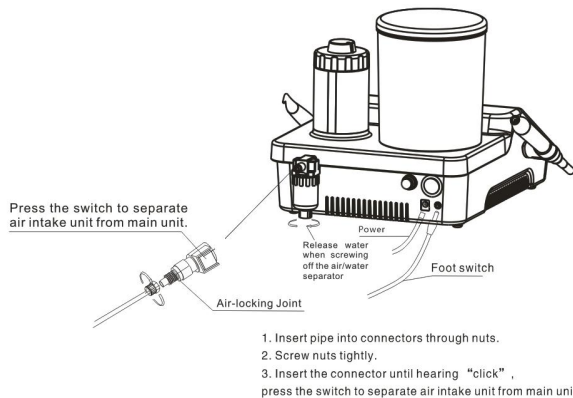


Figure 14 Air Intake and power supply sockets of DQ-40/DQ-80 are the same

2.8. Adjustment of DQ-40 water volume and powder flow

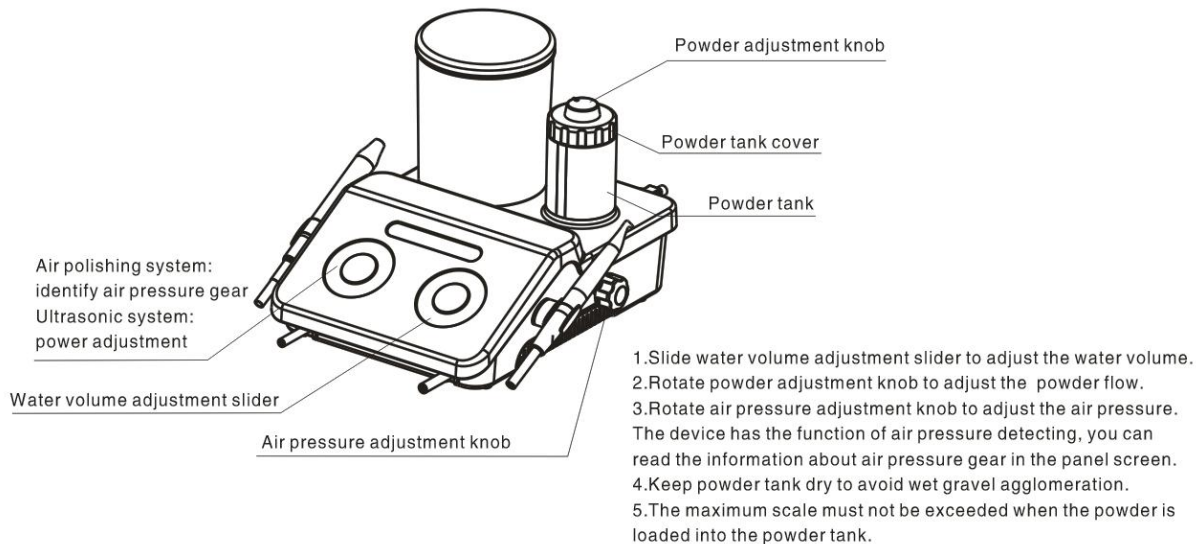


Figure 15 DQ-40

2.9. Adjustment of DQ-80 water volume and powder flow

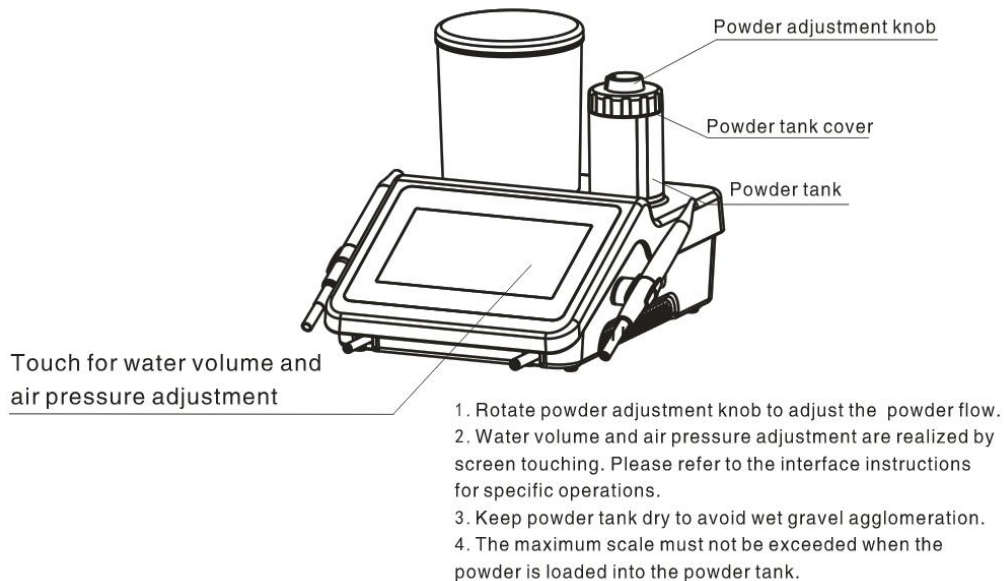


Figure 16 DQ-80

2.10. Product Installation Steps

- 1、Open the package, check whether all items of the device are complete according to the packing list, and place the main unit on a stable plane facing the operator.
- 2、Insert the external air pipe (black) connector into the air intake connector on the back of the main unit: press the snap ring first and then insert the air inlet connector as shown in Figure 14. Insert the powder tank into the position of powder tank above the main unit (Figure 15, Figure 16).
- 3、Fill a proper amount of water into the transparent water bottle, and insert the water bottle into the sink seat above the main unit (Figure 15, Figure 16).
- 4、Insert the wired foot switch plug into the wired foot switch socket; See Figure 12 and 13 for details of wireless foot switch.
- 5、Insert the ultrasonic handpiece and air polishing handpiece into the corresponding handpiece tail wire, and place the ultrasonic handpiece on the left bracket of the main unit, and place the air polishing handpiece on the right bracket.
- 6、Turn off the power switch on the main unit, then insert the output plug of the power adapter into the DC power supply socket on the back of the main unit, and insert the input plug of the power adapter into the $\sim 220V$ network power supply.



Warning 1: The protective ground must be connected when the power adapter is connected to the network power.

Warning 2: Do not place or install the device in which is difficult to disconnect the network power when the power adapter is connected to the network power.

3. Product Functions and Operations

3.1. Ultrasonic System

3.1.1. Scaling mode and operation

① Turn on the power switch on the main unit and pick up the ultrasonic handpiece. At this time, the panel will automatically jump into the ultrasonic scaling working state. Click the "G" button on the panel to enter the scaling mode.

② Screw the suitable tip as required on the handpiece with torque wrench.

③ Step on the foot switch 1, the tip vibrates and the LED at the head of the handpiece lights up, and the cooling water shoots out (it takes several seconds for water to come out at the first time after the device is switched on). After the foot switch is released, the vibration and the water flow

stops, and the LED light continues to light for 10 seconds and then goes out.

④ Generally, the handpiece is held in the pen holding position.

⑤ The frequency during the normal working state is extremely high. Ensure that the tip vibrates normally and water atomizes normally, only light touch by the side of tip and reciprocating movement at a certain speed can eliminate tartar, and the tip has no obvious feeling of heating. Do not exert too much force or stay too long in the local area when cleaning tooth.

Vibration intensity: adjust the vibration intensity as required, and adjust the vibration intensity at any time during the clinical process according to the patient's sensitivity of teeth and the hardness of the calculus.

⑦ Water volume: if the device is DQ-40, slide to adjust the water volume by touching water volume adjustment slider on the panel; if the device is DQ-80, adjust the water volume by pressing the "+" or "-" button on the touch panel. Step on the foot switch, and the tip will vibrate, adjust the water volume to form water mist to cool the tip and clean the tooth surface.

⑧ Please keep the side of the tip in contact with the tooth surface at zero angle during clinical scaling, let the tip vibrate freely without exerting pressure.

⑨ After finishing operation, keep the device working for 30 seconds on the water supply condition in order to clean the handpiece and the tip. Then remove the tip for sterilization.

3.1.2. Periodontal treatment mode and operation

① Screw the tip tightly on the ultrasonic handpiece by torque wrench. Click the "P" button on the panel to enter the periodontal treatment mode.

② The other operation and adjustment methods are similar to the ultrasonic scaling mode.

3.1.3. Endodontics treatment mode and operation

① Screw the file to the ultrasonic handpiece by Endo wrench.

② Click the "E" button on the panel to switch to endodontics treatment mode.

③ The default power is 1 gear after the device switch to endodontics treatment mode. Adjust the power according to the actual situation during clinical treatment.

④ Select a suitable file and slowly put it into the root canal of the patient's teeth. Step on "A" button of the foot switch to perform root canal irrigation or other endodontics treatment functions.

⑤ The file should not be compressed too tightly in the root canal during clinical scaling.

⑥ The file must be put into the root canal to activate the foot switch.

⑦ The power range of root canal irrigation is recommended to be between 1-5 gears.

3.1.4.Torque wrench operation (See figure 9)

The structure of torque wrench is designed in a special way which can control the strength of the scaling tip' s installation properly and correctly. It also can guarantee the operator screw or unscrew the tip effectively and keep the operator's hands away from being scratched during the use process.

Operation Steps:

1)Put the tip into the torque wrench and hold the handpiece tightly, rotate the tip in a clockwise direction till the tip does not turnround anymore, and then it is installed.

2)Unscrew tip: hold the handpiece tightly and rotate the tip in a counter-clockwise direction by torque wrench to remove the tip.

3)Please sterilize the torque wrench after each using.



Notices:

1) It must be tightened when installing the Endo file clamp holder.

2) It must be tightened when installing the nut.

3) Do not press heavily during the root canal irrigation.

4) Do not step on the foot switch if the Endo file be not put into the root canal.

5) It is recommended that the power adjustment be slow from 1 gear to the appropriate gear during the root canal irrigation.

6) The operator must be a trained doctor or technician. Do a necessary protection according to the requirements of the hospital when scaling patients.

3.2. Air polishing system

① Add an appropriate amount of powder into the powder tank (the amount of powder added should be controlled between "Max" and "0" marked on the surface of the powder tank), then tighten the cover of the powder tank, and insert the powder tank into the powder tank seat directly above the main unit.

② Pick up the air polishing handpiece, then the panel will automatically jump into air polishing mode.

③ If the device is DQ-40, adjust the air pressure knob by sliding the water volume adjustment slider (see Figure 15 for details). If the device is DQ-80, adjust the water volume by clicking the "+" or "-" button of water volume on the touch panel, adjust the air pressure by clicking the "+" or "-" button of power. Align the nozzle with the pool, step on the "1" button of foot switch, then confirm that the nozzle can normally spray gas, sand powder and water mist before use.

④ Please wear goggles and gauze on the face shield for the patient before sandblasting treatment. Users should wear goggles or protective masks.

⑤ Generally, the handpiece is held in the pen holding position.

⑥ Adjust the water volume and air pressure to the appropriate gear. The recommended water volume and air pressure starts from 5 gears. Adjust the water volume and air pressure at any time during the clinical process according to the sensitivity of patients' teeth and dental plaque. Increasing the air pressure will enhance the cleaning effect, but will weaken the polishing effect; Increasing the amount of water will enhance the polishing effect, but will weaken the cleaning effect.

⑦ The nozzle shall be aligned with the tooth surface during scaling, but avoid to contact directly. The distance between the nozzle and the tooth surface shall be 3-5 mm, and the angle shall be 30° - 60° . The smaller the angle, the larger the cleaning area. Please conduct a small range of circular movement on the tooth surface during scaling.

⑧ Use the high-speed evacuation device on the dental comprehensive treatment machine to absorb the air/ powder mixture reflected from the tooth surface during treatment.

⑨ Adjust the water volume to the maximum gear and polish all tooth surfaces after treatment.



Notices:

1) Doctors should wear special goggles when sandblasting and polishing, and the rest are protected according to hospital requirements.

2) Patient should be protected according to the requirements of the hospital when air

polishing.

3.3. Cleaning Mode

It is recommended to flush and disinfect the pipeline of the device every day. The cleaning mode allows the pipeline to be cleaned and disinfected to reduce the accumulation of crystals and bacteria in the pipeline.

① Put distilled water or demineralised water into the water bottle;

② Pick up the ultrasonic handpiece and aim at the pool. If the device is DQ-40, click the "C" button on the interface to start cleaning the pipeline; If the device is DQ-80, click the "Clean" button on the interface to start cleaning the pipeline;

③ The device will automatically stop the cleaning mode after 60 seconds of cleaning. Click "G", "P", "E" (DQ-40) or "Cancel" (DQ-80) on the screen to stop cleaning in the cleaning mode;

④ Put the ultrasonic handpiece back on the bracket after cleaning. Pick up the air polishing handpiece and aim the nozzle at the pool, click the "Clean" button again, and the device will automatically blow out the residual sand powder in the pipeline and release the high-pressure gas in the powder tank.

⑤ The device will automatically exit the cleaning mode. In the cleaning mode after 15 seconds

of cleaning, click "A" (DQ-40) or "Cancel" (DQ-80) on the panel to stop cleaning.

3.4. Setting (not available for DQ-40)

① Click the "Setting" in the lower right corner of the screen to enter the "Function Setting" interface. See Figure 8 for details.

② Select to turn on/off the heating function as required (the heating function is only effective for the air polishing mode, and the outlet water temperature varies according to the actual water volume).

③ The device supports "Chinese" and "English", select suitable language as required.

④ Please enable wireless foot switch pairing if you choose to use it. (It has been paired before leaving the factory and does not need to be set. If the wireless foot switch is replaced, see the wireless foot switch code pairing operation on page 22 for details).

⑤ Restore factory setting: All system parameters will be restored to the factory setting of the device after clicking "Restore factory setting".

3.5. Multifunctional foot switch-- not available for DQ-40

Button	Working mode	Function	
		Ultrasonic System	Air polishing System
1	Start Working	Tip vibrate + water	Air spray , powder+water outlet

		outlet	
2	Waterless Mode	Tip vibrate	Air spray
3	Enhancement mode (+1)	Power increased by 3 gears	Air pressure increased by 3 gears
4	Cleaning Mode	Water outlet	Air outlet+water outlet

Note: The power/air pressure is increased by 3 gears from the original gear in the enhancement mode, up to 12 gears, and automatically returns to the previously set gear after releasing 3 button.



Notices:

Do not pull out the handpiece when stepping on the foot switch and the device vibrates.

Please remove the battery if the wireless foot switch is not used for a long time.

3.6. Precautions

- 1) Keep the device clean before and after using.
- 2) Please let the device work for 10 seconds under the condition of water to remove the residual water in the pipe before each clinical operation.
- 3) Operators shall be equipped with adequate protection (such as goggles, masks, etc.) to prevent cross infection.

4) The use of the product must comply with the requirements of the relevant operating specifications and relevant laws and regulations of the medical department, and it is only used by trained doctors or technicians.

5) Please disinfect the ultrasonic handpiece, air polishing handpiece, tips, wrench and other accessories before using.

6) Do not unscrew the tip when stepping on the foot switch or the handpiece vibrates.

7) Do not step on the foot switch when the tail line of the air polishing handpiece has been removed from the main unit.

8) Make sure that the tail plug of the air polishing handpiece is correctly placed on the handpiece bracket before using the ultrasonic handpiece; Similarly, make sure that the ultrasonic handpiece tail plug is correctly placed on the ultrasonic handpiece bracket before using the air polishing handpiece.

9) The tips must be tightened.

10) If the tip is damaged or worn seriously, the vibration intensity will decrease. The operator should replace the tip timely according to the clinical situation. Use the attached wear comparison card of the tip for comparison. The tip of the corresponding model is worn beyond the green line, its power is basically unchanged. When the wear is between the green line and the red line, the power

is as low as 80%. It is recommended to replace the tip if the power is low and wear to within the red line scale

11) Do not bend or grind the tip.

12) Prohibit pointing the nozzle of air polishing handpiece at people in any case.

13) It may cause eye damage if the sand powder is accidentally sprayed into the eyes. So, we strongly recommend that all personnel (including doctors, nurses and patients) wear goggles during the sandblasting treatment.

14) In the process of air polishing and scaling, please click on the "cleaning" mode first if you need to add powder to the powder tank, remove the powder tank from the device after the internal pressure of the powder tank is released, and then add an appropriate amount of powder.

15) Before replacing the air polishing handpiece or nozzle, please use a three-way gun to dry the water at the interfaces of both ends (especially the air circuit interface) to prevent the water from entering the air circuit and prevent the powder from crystallizing in the pipeline and causing blockage.

16) Make sure that the air vent and water outlet are not blocked.

17) Check whether the gasket in the powder tank cover is in good condition. Please replace and install the gasket in time if it is deformed or falls off.

- 18) Please rotate the powder tank cover to the specified position to seal the powder tank.
- 19) Please clean the connector of the water bottle before using.
- 20) When changing the liquid category of the water bottle after using, please adjust the water volume to the maximum and make it work in the automatic water supply mode for 30 seconds to keep the current liquid and liquid circuit clean.
- 21) Please replenish the liquid in time to keep the liquid circuit unblocked when the liquid in the water bottle is lower than the lower limit, . Do not use unclean water.
- 22) Please clean the powder tank to remove the residual powder after using.
- 23) Do not pull the tail wire forcibly during the use of the device to avoid damage to it.
- 24) Do not knock or scratch the handpiece.
- 25) Turn off the power switch and unplug the power cord plug of the power adapter after using the device.
- 26) Our company specializes in the production of medical devices. We are responsible for its safety only when the maintenance, repair and modification of the device are carried out by our company or the dealer authorized by our company, the replaced accessories are our company's accessories and operated according to the operation manual.

27) Please use the corresponding tip of our company. The internal thread of the tip produced by another manufacturers is rough, rusty, cracked or uses other standard threads, which are easy to be damaged and slip when used in combination with the external thread of the handpiece, so as to cause irreparable damage to the ultrasonic periodontal therapy device.

4. Cleaning, Disinfection and Sterilization

High temperature and high pressure environment is 134 ° C/2.2 bar for 4 minutes.

4.1. Handpiece

4.1.1. Soak a piece of clean dry gauze with 70% ~ 80% (volume ratio) ethanol disinfectant when using alcohol disinfection, and then wipe the surface of the part to be disinfected with this gauze twice for 3min. Air dry naturally or with a clean, dry cloth to dry any remaining disinfectant.

4.1.2. Sterilization in High temperature and high pressure environment

- 1) Keep 134 ° C, 2.2bar (0.22MPa) for 4 minutes when sterilizing with a sterilizer.
- 2) Pull out the handpiece and remove the tip after using.
- 3) Wrap the handpiece with a disinfectant pad or bag.
- 4) The handpiece needs to cool naturally before it can be used again to avoid scalding after

the disinfection is completed.



Notices:

- 1) Please use compressed air to blow off the cleaning liquid remaining in the handpiece before disinfection.
- 2) Ensure to remove the tip from handpiece, and do not mix with other instruments for disinfection;
- 3) Please pay attention to whether the handpiece is externally damaged during the use of disinfection. It is strictly forbidden to apply any protective oil to the surface of the handpiece;
- 4) Sterilization parts can be sterilized at least 250 times;
- 5) There is a waterproof O-ring at the end of the handpiece. Because of the need for repeated sterilization and unplugging, dental lubricants should be used to waterproof O-ring to extend service life. Once damaged or excessively worn, the waterproof O-ring should be replaced in time.
- 6) It is strictly forbidden to disinfect the handpiece in the following ways:

- Steam the handpiece in the solution
- Soak the handpiece with iodine, alcohol, glutaraldehyde and other disinfectant water
- Bake in the oven or microwave on high heat

4.2. Tip

The tip can be sterilized in a high-temperature and high-pressure environment.

4.3. Wrench

1) Torque wrench and Endo wrench can be sterilized in a high-temperature and high-pressure environment.

2) It is strictly forbidden to disinfect in the following ways:

- Steam in the solution
- Soak with iodine, alcohol, glutaraldehyde and other disinfectant water
- Bake in the oven or microwave on high heat



Notices:

We will not be responsible for any damage to Torque wrench and Endo wrench directly or indirectly caused by the use of the above improper methods.

4.4. Cleaning of Tips, Torque wrench and Endo wrench

Tips, Torque wrench and Endo wrench can be cleaned in ultrasonic cleaner.

5. Troubleshooting

5.1. Troubleshooting

Fault	Possible cause	Solutions
The device can not run	The power cord is not plugged in properly	Check the power plug
	The fuse in the power supply is broken	Replace the fuse (Replace the T1AL 250 V under the guidance of the manufacturer's designated person)
	The battery of foot switch battery is drained	Replace the battery
	The foot switch fails	Refer to the wireless foot switch code pairing method in section 2.6 to re-code the code
	Poor connection of foot switch (wired)	Plug in the foot switch

No ultrasonic vibration	The tip hasn't been screwed on to the handpiece tightly	Screw the tip on the handpiece tightly by wrench
	The tail wire is loose from the board connector	Contact local dealer or our company
	Handpiece failure	Pull out handpiece and contact us or authorized dealers
	Tail wire failure	Contact local dealer or our company
The tip vibrates but does not atomize	The amount of water volume is too little	Adjust the water volume to a higher grade
	The power is too little	Turn up the power
The handpiece still comes out of water after the power is turned off	Electromagnetic valve failure	Contact local dealer or our company

Heating handpiece	The amount of water volume is too little	Adjust the water volume to a higher grade
Heating handpiece seriously	Handpiece failure	Pull out handpiece and contact local dealer or our company
The amount of water volume is too little	The amount of water volume is too little	Adjust the water volume to a higher grade
	Waterways are blocked	Unblock waterways with three-purpose guns
The tip vibrates weakly	The tip is loose	Screw the tip tightly
	The connection between the handpiece and the tail wire socket is not dry	Dry the connection between the handpiece and the tail wire with hot air
	Excessive wear of the tip [Note 1]	Replace the tip

Water seeps from the connection between the handpiece and the tail wire socket	The waterproof O-ring is damaged	Replace the waterproof O-ring
File can not vibrate	Loose Clamping nut is loose	Screw the nut tightly
	The root canal clamp holder is damaged	Replace the root canal clamp holder
Leakage of liquids/gases under the device	The inner tube is broken	Contact local dealer or our company
Air polishing without powder, air or water	No air or water	Contact local dealer or our company

	The handpiece or nozzle is clogged	Pull out the handpiece and check the sandblasting tail wire for air or sand spray. If sand powder, air and water can be sprayed, please use a steel wire to unclog the handpiece and put it in a washing machine for cleaning.
No powder and water, but air spray	No powder	Check if there is too much or too little powder in the powder tank
	No water	Check if there is water in the water bottle
	The powder is damp	Empty and dry the powder tank, then refill it with dry powder



Note: Please contact local dealer or our company if the fault is still not resolved.

5.2 .Annotation

[Note 1]

In the case of ensuring that the tip has been tightened and has been sprayed with water mist, the tip is deemed to have been damaged by the following phenomena:

- 1) The vibrating strength and water atomization degree of the tip are obviously weakened.

2) Abnormal noise of "buzzing" is sound when the tip works.

5.3 Maintenance of air polishing System

1) Touch the gear adjustment button to make the device automatically activate the air path cleaning for 5 seconds after each use of air polishing.

2) Pay attention to the gas-water separation valve behind the device before use, rotate the knob at the bottom of the gas-water separation valve to drain the liquid inside if there is liquid inside it. See figure 14

6. Storage, Maintenance, Transportation

6.1. Storage and Maintenance

- Product shall be carefully placed far away from the hypo-center, and shall be installed at a cool, dry, and ventilated place.

- When storing, do not put it together with toxic, corrosive, inflammable and explosive articles.

- In case the product is not used for a long time, it should be electrified once a month, and each time lasts for 5 minutes and clean the air polishing pipeline.

- The product shall be stored at the location as follow:

- ① Temperature: $-20^{\circ}\text{C} \sim 55^{\circ}\text{C}$,

- ② Relative humidity: $\leq 90\%$,

- ③ Atmospheric pressure: 70 kPa ~ 106 kPa.

6.2. Transportation

- During transportation, it shall not be packed with dangerous goods.
- During transportation, excessive shock and vibration shall be prevented, and carefully place, do not place it upside down.
- Protect the product from direct sunlight, rain, or snow during transportation.

6.3. Gas/water Separation

1) Open the knob at the bottom of the filter counterclockwise to let the stagnant water drain when there is stagnant water in the filter, then tighten the knob clockwise.

2) Replace the filter element: use the filter wrench to unscrew the transparent shell of the air filter, and then use the wrench to continue to unscrew the black nut at the lower end of the filter element. Take out the white filter element and discard it to the trash can, replace a new filter element, and reinstall the black nut and transparent shell. It is recommended to replace the filter every 24 months. Spare filter elements are included in the included accessories.

7. Maintenance Checklist

No.	Name	Specification/Model	Maintenance Ways
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1	Mainboard	/	/
2	Tail cord	/	/
3	Ultrasonic handpiece	/	See Chapter 2.5 for replacement methods
4	Air polishing handpiece	/	See Chapter 2.5 for replacement methods
5	Tips	/	See Chapter 2.5 for replacement methods
6	Torque wrench	/	/
7	Endo wrench	/	/
8	Fuse	T2AH250V (DQ-40) T5AH250V (DQ-80)	/
9	Root canal tip	/	See Chapter 2.5 for replacement
10	Airway pipe	4mm×6mm	/
11	Power supply	/	/
12	Electromagnetic	/	/
13	Wireless foot	/	/
14	Wired foot switch	/	/






15	Two-way and three-way adapters	/	/
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Note: This manual does not list the accessories specifications of ultrasonic scaler device in detail, please refer to the attached information and packing list.



8. Warranty

Since the date of sale, the warranty of this product is effective with its warranty card, and we are responsible for life-long maintenance. For the non-repairable damage caused by the maintenance of any non-designated and dedicated maintenance personnel is not covered by the free warranty.

9. Symbols

	Manufacturer's logo		Caution!		Device of Type II		Type B applied part		Do not dispose of the product into the ordinary
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	Sterilizable at up to 134°C in the steam sterilizer (autoclave) at temperature specified		Manufacturer		Refer to instruction manual/ booklet		Serial number		Keep dry
	Temperature limit		Atmospheric pressure limitation		Fragile, handle with care		Humidity limitation		Date of manufacture
	Use-by date		This way up	 Gas 0.5Mpa-0.6Mpa	Inlet Pressure 0.5-0.6 Mpa		Foot switch		Fuse
	"OFF" (power)		"ON" (power)	 Liquid POWER	Water volume adjustment slider	 Power LIQUID	Power adjustment slider	 IP1	Degree of protection against
	Do not roll		Stacking limit by number	 AA battery	AA battery	 -	Power input	 A	Air polishing Mode

Min	Minimum power	Max	Maximum power	G	Scaling Mode	P	Periodontal Mode	E	Endodontic Mode
	For indoor use only	C 	Cleaning Mode						

10. Environmental Protection

Name of Components	Hazardous substances					
	Plumbum (Pb)	hydrargyrum (Hg)	cadmium (Cd)	Hexavalent chromium (Cr (VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Handpieces Components	0	0	0	0	0	0
Valve Components	0	0	0	0	0	0
Plastic housing	0	0	0	0	0	0
Liquid pipes and fittings	0	0	0	0	0	0

Name of Components	Hazardous substances					
	Plumbum (Pb)	hydrargyrum (Hg)	cadmium (Cd)	Hexavalent chromium (Cr (VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Circuit board	0	0	0	0	0	0
Sheet metal parts	0	0	0	X	0	0
Switch	0	0	0	0	0	0
Wire	0	0	0	0	0	0
Tip	0	0	0	0	0	0
Foot switch	0	0	0	0	0	0

○: Indicates that the content of the toxic substance in all homogeneous materials of the part is below the limit requirement stipulated in SJ/T-11363-2006 Limit Requirements for Toxic and Hazardous Substances in Electronic Information Products.

×: indicates that the content of the toxic substance in at least one of the homogeneous materials of the part exceeds the limit requirement specified in SJ/T-11363-2006.

Please dispose according to the local laws or consult with dealer from whom you purchased it about waste disposal.

Harmful substances will not leak and mutate during the environmental protection service life, and will not cause pollution and harm to the environment and people.

11. Manufacturer's rights

We reserves the right to modify the design, technology, accessories, description and packing list of the products without prior notice at any time. In case of any difference, the actual product shall prevail.

12. Electromagnetic compatibility



- (1) The ME EQUIPMENT or ME SYSTEM is suitable for hospital or professional dental clinic environment
- (2) Don't near active HF surgical equipment and the RF shielded room of an ME system for magnetic resonance imaging, where the intensity of EM disturbances is high.
- (3) Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.
- (4) Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

(5) Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the equipment, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

(6) Electric rapid transient pulse group test may occur due to endodontic function indicator and periodontal function indicator interference flashing, which does not affect normal use, and can recover after the test can be completed, have consulting clinicians with professional training experience and field, including using special equipment or system, to determine, the risk is acceptable.

12.1. Requirements for cable installation

Cable name	Cable type	Cable length
Power input cable	Unshielded parallel cables	2 m
Input cable of foot switch	Unshielded parallel cables	2.5 m
Handpiece cable	Unshielded parallel cables	2 m

12.2. components of electromagnetic compatibility

The key components of electromagnetic compatibility of the product are the motherboard chip, IC chip, transformer, power cord, capacitor of the scaler. In the case of using or replacing non-original accessories, cables, transducers will lead to a significant reduction in electromagnetic compatibility emission and immunity performance. Do not replace machine parts without authorization.

12.3. Guidance and manufacturer' s declaration – Electromagnetic Emissions

Guidance and manufacturer' s declaration – electromagnetic emissions		
The ultrasonic scaler DQ-40/DQ-80 is expected to be used in the electromagnetic environment specified below. The purchaser or user shall ensure that it is used in such electromagnetic environment.		
Emission test	Conformity	Electromagnetic environment-Guideline
RF emissions GB 4824	Group 1	The ultrasonic scaler DQ-40/DQ-80 only uses RF energy for its internal functions. Therefore, its radio frequency is low, and the possibility of interference to nearby electronic devices is small.

RF emissions GB 4824	Class B	The ultrasonic scaler DQ-40/DQ-80 is suitable for use in all installations, including household installations and the public low voltage supply grid directly connected to the home.
Harmonic emissions GB 17625.1	Not applicable	
Voltage fluctuations/ flicker emissions GB 17625.2	Comply	

12.4. Guidance and manufacturer's declaration–Electromagnetic Immunity

Guidance and manufacturer's declaration–electromagnetic Immunity			
The ultrasonic scaler DQ-40/DQ-80 is expected to be used in the electromagnetic environment specified below. The purchaser or user shall ensure that it is used in such electromagnetic environment.			
Immunity test	IEC 60601 test level	Satisfy	Electromagnetic environment – Guideline


<p>Electrostatic discharge (ESD) GB/T 17626.2</p>	<p>$\pm 6\text{kV}$ contact $\pm 8\text{kV}$ air</p>	<p>$\pm 6\text{kV}$ contact $\pm 8\text{kV}$ air</p>	<p>The ground shall be wood, concrete or tile; if the ground is covered with synthetic material, the relative humidity shall be at least 30%.</p>
<p>Electrical fast transient/burst GB/T 17626.4</p>	<p>$\pm 2\text{kV}$ for power supply lines $\pm 1\text{kV}$ for input/output lines</p>	<p>$\pm 2\text{kV}$ for power supply lines $\pm 1\text{kV}$ for connecting cables</p>	<p>The power supply from the grid shall have the quality to be used in typical commercial or hospital environment.</p>
<p>Surge GB/T 17626.5</p>	<p>$\pm 1\text{kV}$ differential mode $\pm 2\text{kV}$ common mode</p>	<p>$\pm 1\text{kV}$ differential mode</p>	<p>The power supply from the grid shall have the quality to be used in typical commercial place or hospital environment.</p>

<p>Voltage dips, short interruptions and voltage variations on power supply input lines GB/T 17626.11</p>	<p>$<5\%U_t$, last for 0.5cycle (On U_t, $> 95\%$suspension) $40\%U_t$, last for 5cycle (On U_t, $> 60\%$suspension) $70\%U_t$, last for 25cycle (On U_t, $> 30\%$suspension) $<5\%U_t$, last for 5s (On U_t, $> 95\%$suspension)</p>	<p>$<5\%U_t$, last for 0.5cycle (On U_t, $> 95\%$suspension) $40\%U_t$, last for 5 cycle (On U_t, $> 60\%$suspension) $70\%U_t$, last for 25 cycle (On U_t, $> 30\%$suspension) $<5\%U_t$, last for 5s (On U_t, $> 95\%$suspension)</p>	<p>The power supply from the grid shall have the quality to be used in typical commercial place or hospital environment. The power supply from the grid shall have the quality to be used in hospital environment. If the user of the ultrasonic scaler DQ-40/DQ-80 needs to operate continuously during power failure, it is recommended that the ultrasonic scaler DQ-40/DQ-80 be powered by an uninterruptible power supply (UPS) or the battery.</p>
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Power frequency magnetic field (50/60Hz) GB/T 17626.8	3A/m	3A/m	The PFMF shall have the PFMF level characteristics of a typical commercial place or hospital environment.
Note: U_1 is the a.c. mains voltage prior to application of the test level.			

12.5. Guidelines and manufacturer's declarations --- Electromagnetic Immunity

Guidance and manufacturer' s declarations-electromagnetic Immunity			
The ultrasonic scaler DQ-40/DQ-80 is expected to be used in the electromagnetic environment specified below. The purchaser or user shall ensure that it is used in such electromagnetic environment.			
Immunity test	IEC 60601 test level	Satisfy	Electromagnetic environment-Guideline

<p>Conducted RF GB/T 17626. 6</p> <p>Radiation RF GB/T 17626. 3</p>	<p>3Vrms 150kHz~80MHz</p> <p>3V/m 80MHz~2. 5GHz</p>	<p>3Vrms</p> <p>3V/m</p>	<p>Portable and mobile RF communication equipment should not be used closer to any part of the ultrasonic scaler DQ-40/DQ-80, including cables than the recommended isolation distance. This distance should be calculated by the formula corresponding to the transmitter frequency.</p> <p>Recommended isolation distance</p> $d = \left[\frac{3.5}{V1} \right] \sqrt{P}$ $d = \left[\frac{3.5}{E1} \right] \sqrt{P} \text{ } 80\text{MHz} \sim 80\text{MHz}$ $d = \left[\frac{7}{E1} \right] \sqrt{P} \text{ } 800\text{MHz} \sim 2.5\text{GHz}$ <p>P is the maximum output power rating of the transmitter provided by the transmitter manufacturer in watts (W) and d is the recommended isolation distance in meters (m). The field strength of a stationary RF transmitter is determined by surveying the electromagnetic site a and should be lower than the corresponding voltage in each frequency range.</p> <p>It may be interference near devices marked with the following symbols.</p> 
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Note 1: formulas for higher frequency range are used at frequencies of 80MHz and 800 MHz.

Note2: these guidelines may not be appropriate for all situations, the electromagnetic transmission is affected by the absorption and emission of buildings, objects and human bodies.

a. Fixed transmission field strength, such as: wireless (cellular/cordless) telephone and terrestrial mobile radio base stations, amateur radio, AM (amplitude modulation) and FM (frequency modulation) radio broadcasting, television broadcasting, etc., its field strength is theoretically not accurately predictable. In order to evaluate the electromagnetic environment of a fixed RF transmitter, the survey of electromagnetic sites should be considered. If the field strength of the ultrasonic scaler DQ-40/DQ-80 is higher than the RF compliance level of the above application, the ultrasonic scaler DQ-40/DQ-80 should be observed to verify its normal operation. If abnormal performance is observed, additional measures such as reorientation or positioning of the ultrasonic scaler DQ-40/DQ-80 may be necessary. In the entire frequency range of 150kHz~80MHz, the field strength should be lower than 3V/m.

12.6. Recommended isolation distance between portable and mobile RF communication devices and the ultrasonic scaler DQ-40/DQ-80

Recommended isolation distance between portable and mobile RF communication devices and the ultrasonic scaler DQ-40/DQ-80

The ultrasonic scaler DQ-40/DQ-80 is expected to be used in the electromagnetic environment where radiation RF disturbances are controlled. According to the maximum output power of the communication device, the purchaser or user may prevent electromagnetic interference by maintaining the minimum distance (as recommended below) between the portable and mobile RF communication device (transmitter) and the ultrasonic scaler DQ-40/DQ-80.

Rated maximum output power/W of transmitter	Isolation distance/m corresponding to different frequencies of the transmitter		
	150kHz~80MHz $d = \left[\frac{3.5}{V1} \right] \sqrt{P}$	80MHz~800MHz $d = \left[\frac{3.5}{E1} \right] \sqrt{P}$	800MHz~2.5GHz $d = \left[\frac{7}{E1} \right] \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For the rated maximum output power of transmitter not listed (if any) in above Table, the recommended isolation distanced (d), in meters (m), can be determined by using the formula in the corresponding transmitter frequency column, where P is the maximum output power of transmitter provided by the transmitter manufacturer, the unit shall be Watts (W).

Note 1: formulas for higher frequency range are used at frequencies of 80MHz and 800 MHz.

Note2: these guidelines may not be appropriate for all situations, the electromagnetic transmission is affected by the absorption and emission of buildings, objects and human bodies.

The ultrasonic scaler DQ-40/DQ-80 has passed the test according to the requirements of IEC 60601-1-2:2004; however, it does not guarantee in any way that it is not affected by electromagnetic interference. The ultrasonic scaler DQ-40/DQ-80 shall not be used in high electromagnetic environment.

13. Attachment: Power table of ultrasonic scaler tips

Supra-gum scaling		
Model	Grade	Water volume
G1	1-12 (G)	Yes
G5	1-12 (G)	Yes

Subgingival scaling		
Model	Grade	Water Volume
P1	1-12 (P)	Yes
P11	1-12 (P)	Yes
P12	1-12 (P)	Yes
P12L	1-12 (P)	Yes
P12R	1-12 (P)	Yes
P16	1-12 (P)	Yes
IM1	1-12 (P)	Yes

Endo irrigation		
Model	Grade	Water Volume
E1	1-5 (E)	Yes