



Standard 1000 Series

Instruction Manual

(Technical Instruction)

- **Thank you for choosing our product.**
- **It is designed for users to safely and effectively use this equipment. Please carefully read the product instruction manual before installation and debugging as well as operation and maintenance, and properly keep it for future use.**
- **Properly keep the product quality maintenance card, product instruction manual as well as installation and maintenance accessories provided with product.**
- **Please strictly follow the operation instruction when using and properly maintain it.**
- **Any problems arise during using, please contact with local distributor or our company, and we will provide you with excellent service and help.**
- **Commitment: when handling failure, if necessary, we commit to provide users with necessary and more specific technical data.**

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I. General

The manual is divided two sections: the first one is addressed to the end-user, the second section one is addressed to the technicians.

The meaning of signs used in the instruction manual is as follows: Attention, Caution and Warning.

Attention: important content is included that deserves attention.

Caution: it comes before some particular operations. The equipment can be damaged once these provisions are violated.

Warning: it comes before some particular operations. The equipment can be damaged and operator can be injured once these provisions are violated.

Warning:

To guarantee the safe and normal operation, this machine shall not be placed in the environment of mixture of the inflammable anesthesia gas with air or oxygen or nitrous oxide.

This unit is IPX0, Class I, Type B APPLIED PART.

Operation method: Continuous operation with intermittent loading. Operation/ interval time: 2min/18min.

The equipment does not cause electromagnetic or other influences at other equipment. It is not susceptible of such influences by other equipment, as it complies with Electro-Magnetic Compatibility Directive 89/336/EEC, emended by 92/68/EEC and 93/68/EEC directives, and it satisfies the requirements of the EN60601-1-2 harmonized standard.

The units is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage supply network that supplies buildings used for domestic purposes.

Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%.

Mains power quality should be that of a typical commercial or hospital environment.

Attention:

- **Air source provided by industrial compressor is strongly prohibited to use.**
- **No load running and over-pressure start of the handpiece is strongly forbidden.**
- **Clean or replace the core of the water filter timely.**

- No touch of the reflecting mirror is allowed when the operating light is running, in case of the scald.
- The dental chair is the continuous running of interval loading, and its running/interval time is 2min/18min.
- The operation of heater under dry condition is strictly prohibited.
- Adjust the position of the head rest and make sure that it has been locked before using.
- Cut off the power before replacing the safety fuse.
- No tangible thing shall be placed within the operational stroke of this machine.
- The plastic membrane used for packing shall be disposed properly due to its harm to human body and environment.

II. Transportation and storage

The product can be transported or stored since it has been properly packed. Under the following ambient conditions; it can be placed fifteen weeks at most:

- a) Environment temperature: - 40°C~+55°C.
- b) Relative humidity: <= 93%
- c) Range of the atmospheric pressure: 500 hPa~1060 hPa
- d) In well-ventilated room without erosive gasses.

III. Environmental safety

1. Disposal of packing material

All packing material does no harm to the environment and can be completely recycled.

- Wooden base plate
- Carton
- Polyethylene bag

The collection and recycling of packing material are good for saving raw material and disposing substantial waste. Please place the packing material in the specified deposit site of recycle material.

2. Disposal of equipment

The equipment mustn't be used if it reaches its operation life. In view of this, please cut off the power first.

The disposal of equipment won't cause any danger.













To protect the environment, please place the equipment that can't be used any more in the specified deposit site of recycle and non-recycle material.

Warning: the manufacturer is responsible for the safety, reliability and performance of equipment only under the following circumstances:

- The installation and any repair or modification is carried out by qualified technician.
- The electric wiring of operational site must meet all the effective provisions of installation.
- Operate according to operating instruction.

Section one (For end user)

IV. Illustrations

	B-type Equipment		Automatic
	Attention! Read Attachment File		Bend Forward
	A/C		Bend Backward
	Protective Grounding		Chair Rising
	Spittoon		Chair Descending
	Mouth Rinsing	0	Reset
	Set	1	Preset position 1
2	Preset position 2	3	Preset position 3

V. Profile

AM2060A type chair-mounted dental unit is suitable for the treatment and operation on oral disease. AM2060A is a fully computer controlled system treatment equipment designed by our company according to ergonomics principle with complete function. As for its operation of complete machine, its fully automatic operation is all controlled by the function key of microcomputer. It is composed of multifunction dental complex treatment unit, electric dental chair and dentist chair. It adopts low voltage DC motor and features with simple structure and convenient operation.

- It is suitable for the diagnosis, treatment and operation of oral disease.
- It is class I and B-type ordinary equipment.
- It is fixed mount equipment.

VI. Structure of complete machine



- | | | |
|----------------------------------|-------------------------------|----------------------------------|
| 1. Dentist chair | 2. Air-controlled feet switch | 3. Assistant control assembly |
| 4. Electric dental patient chair | 5. Spittoon assembly | 6. Dental complex treatment unit |
| 7. Instrument tray | 8. Operating light | 9. Instrument arm assembly |

Fig.1 Structure diagram of complete machine

VII. Working Conditions

To ensure its normal use, the technical requirements on air, water, electricity and environment are as follows:

a) Power supply: voltage ~110V or 220V±10% frequency 50Hz±2%

b) Air source: without oil, water and impurity

Air pressure: 0.55~0.80Mpa flow≥50L/min

c) Water source: hydraulic pressure 0.2~0.4MPa flow≥10L/min

d) Environment: temperature 5~40°C relative humidity≤80%

Atmospheric pressure range:860hPa~1060hPa

e) Color of water pipe used in the product: blue, transparent, orange

Color of air pipe: Black

VIII. Main technical parameters

Dental chair	Minimum height between seat cushion and floor	≤480mm
	Maximum height between seat cushion and floor	≥780mm
	Backward angle of backrest	≥65°
	Up and down sliding stroke of head rest	120mm
	Maximum load	135kg
Treatment unit	High torque turbine Rotation speed(standard type)	≥300000 r/min
	Torque(standard type)	≥0.06 N·cm
	Air motor handpiece Rotation speed	≥14000 r/min
	Torque	≥1 N·cm
	Operating light Illumination	8000Lux~15000Lux

	Color temperature	3000K~6500K
	Negative pressure of Saliva ejector	$\geq 27\text{kPa}$
	Negative pressure of high vacuum aspirator	$\geq 20\text{kPa}$

IX. External dimension of equipment

To ensure its normal operation, please refer to Fig. 2 and keep enough space for clinical use within its safe movement stroke.

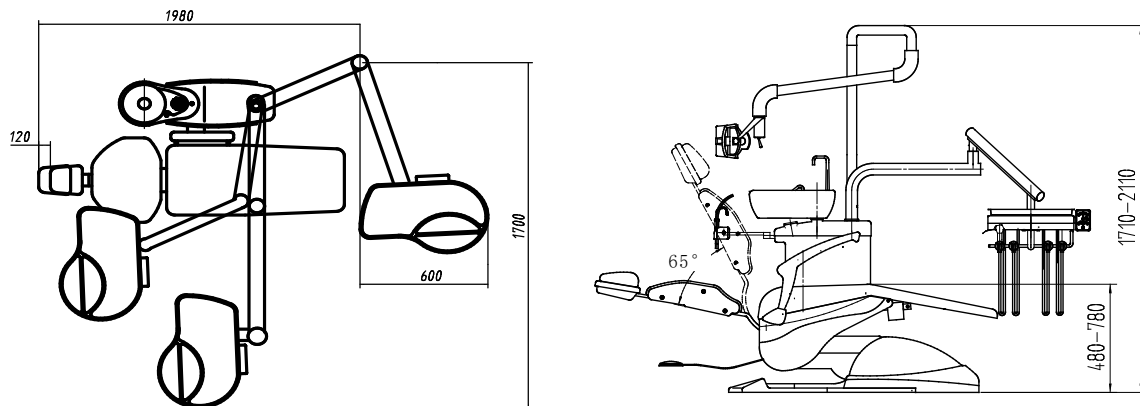


Fig.2 Movement range diagram of the unit

Attention: it will generate a weight of 450 kg in its fixed mount position (Include the load limit).

X. Operation

1. Invoke power switch

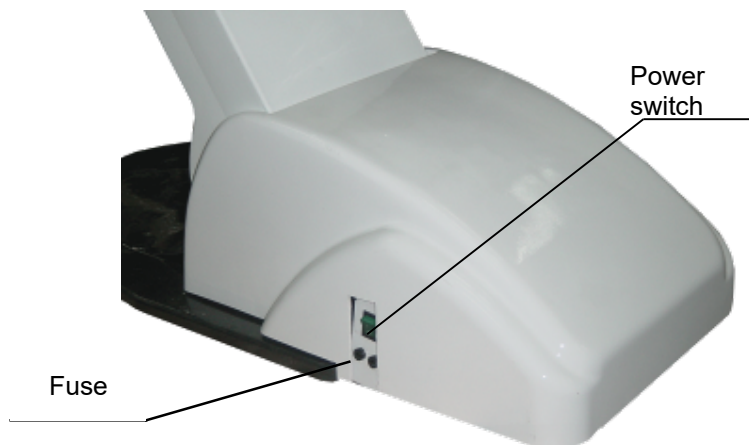


Fig.3 Power switch

2. Master Water and air switch (Option) & master water switch

When you choice this function, you can use main air/water switch to control air and water.

Turn on the Master air and water switch which in the dentist element, the unit will have air and water.





After turn on the master water/air switch, you still could control the water on or off throw Master water switch. It means if the Master air/water switch is on, and the master switch is off, then after spring out the left water inside the tube, there would be have no water supply.

Attention:In order to make sure the total unit have no water, so after you turn off the master air/water switch, pls clean the cuspidor, so release all the water in the tube.

3. Heating of rinsing water

The unit has the automatic isothermal water heater. Please operate as the following to get hot water.

Press the heating button of water heater, the indicating light beside button  will be on, and then the water heater will heat automatically till the isothermal state. To close this system, please press this button again, and the indicating light beside button  will be off.


Attention: it is heating if indicating light flickers; it has reached preset water temperature if indicating light is on without flicker.

4. Water supply of rinsing

Press rinsing water supply button  to supply water and it will be closed automatically when it reaches preset water amount.




Attention: during automatic water supply, press this button again will stop water supply.

5. Water supply of spittoon washing

Press water supply button  of spittoon washing to supply water automatically and it will be closed automatically when it reaches preset time of water supply.

Attention: during automatic water supply, press this button again will stop water supply.

6. Operating light and X-ray viewer

The button  has two functions. Press  once, the operating light is on; Press  twice shortly, the x-ray viewer is on ; press once again, it is off.

7. Installation of handpiece

- Align four holes of joint core with relevant connection pipe of handpiece.
- Align adaptor sleeve with screw mouth of handpiece, gently screw it in, moderately screw it tight until it won't leak.



Fig.5 Installation of handpiece

Attention: No load running or over-pressure start of the handpiece is strongly forbidden.

8. Handpiece operation

Take up turbine handpiece from rack and stamp on air control feet switch to start it when the turbine handpiece rotates.

Adopting four-hole handpiece, the unit has blow gas and air return function. Stamp on the button on upper-right corner of air control feet switch to use blow gas separately. Stamp on to open and stamp off to close it. The switch on upper-left corner of air control feet switch is the control switch of cooling water. Shift this switch to control cooling water. When shifter lever inclines to red mark, it indicates the state of using cooling water; otherwise it indicates the state of closing cooling water.

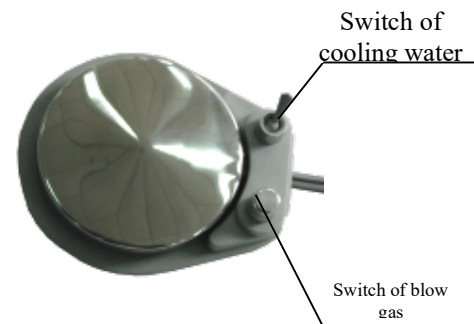


Fig.6 Feet switch

9. Air and water pressure adjustment of handpiece

There are air and water regulating valves (Fig. 7) used for adjusting the water vapor of three-way syringe, driven air, cooling air and cooling water of handpiece on the reverse of instrument tray bottom.

If the adjustment of air and water pressure of handpiece is needed, relevant air and water regulating valves can be adjusted. Rotate clockwise to adjust down the pressure and counter clockwise to adjust up the pressure. Careful and slow adjustment is needed during adjustment.

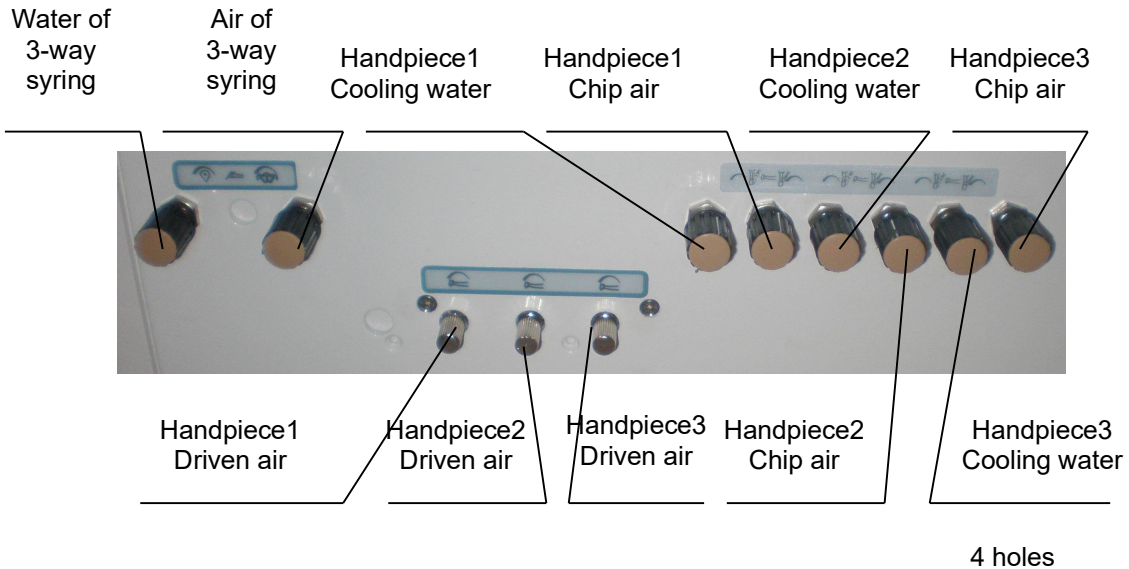


Fig.7 Pressure adjustment of water and air

10. Installation of three-way syringe

- Abut three-way syringe barrel with joint below instrument tray, and screw it tightly.
- Press down spigot ring, then insert nozzle, the nozzle will be locked when the spigot ring resets. (Fig. 8)

Attention: distinguish waterway and airway (the left one is waterway and right one is airway), check if the water and air injected by three-way syringe match with the pattern on the button of three-way syringe.

11. Three-way syringe



Press down air-out button  and water-out button  respectively, mist will be sprayed out if these two buttons are pressed at the same time. Check if the sprayed water, vapor and mist are suitable. If adjustment is needed, the air and water regulating knob on the bottom reverse of instrument tray can be adjusted (Fig. 8) with the same method as above.



Fig.8 Installation of three-way syringe

12. Saliva ejector and high vacuum suction

The unit has two aspirators including saliva ejector and strong aspirator. Take up saliva ejector or strong aspirator from rack to operate aspirator.

After using strong aspirator, impurities will leave inside filter screen cover; therefore the impurities should be taken out and cleared to prevent the obstruction of strong sucker.

The method of taking out the screen cover is as follows:

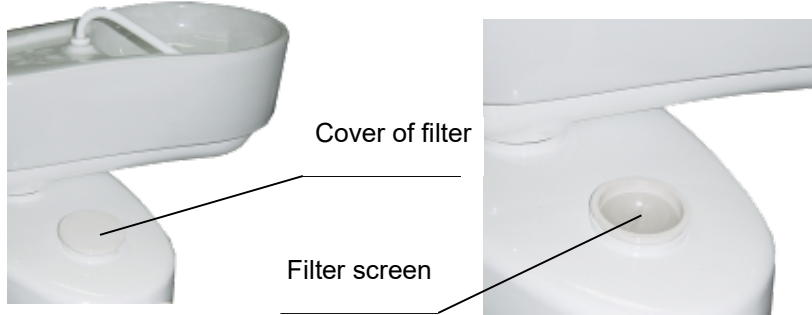


Fig.9 High vacuum filter

a) Rotate spittoon in 90 degree to see filter.

b) Pull out filter screen after rotating filter cover, throw away the impurities and put it back after remounting. Make sure to plug it into the bottom to prevent air leaking, and then mount the filter cover.

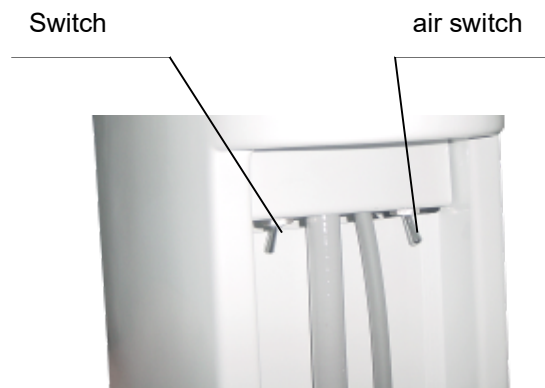


Fig.10 Water purification system

13. Water purification system

The unit has water purification system. Handpiece and all other instruments on instrument tray could use external connection water as well as the water of water purification bottle. Uncontaminated water or medical distilled water must be filled in timely when using the water of water purification bottle.

Shift diverter switch to switch external connection water and the water of water purification bottle.

Uncontaminated water or medical distilled water must be filled in when the water of water purification bottle is used out. The specific method of filling water is as follows:

a) Close air check valve, see (Fig.10),

b) Screw off water purification bottle clockwise when the airflow sound can't be heard on the position of air check valve.

c) After filling up the water, counterclockwise screw water purification bottle tightly and open air check valve to use it.

Attention: As for the first water filling of newly bought equipment or the reuse of equipment after long-time stand-by, please make sure if the water purification bottle is clean before filling water.

14. Operation of electric chair

There is spherical feet switch on the base plate of chair. Press the switch according to the direction of arrow to complete movements such as rising, descending, backrest forward and backward, and stop the movement of dental chair by resetting to middle position. Shift it to right, the backrest will bend forward; shift it to left, the backrest will bend backward; shift it forward, the chair will rise; shift it backward, the chair will descend. Simplex function isn't related to the preset position of computer casing originally set and each movement will stop automatically when it comes to extreme position. See Fig.11.

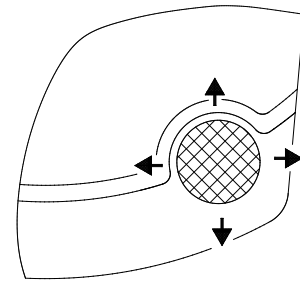




Fig.11 Spherical feet switch

Main control operation board and auxiliary control operation board also have function key of simplex movement of chair. Press the key to start and undo to stop.



15. Operation of preset position of electric chair

Press auto key  once, indicating light will on, then press  that corresponds to button 1. No matter where the seat board and backrest of dental chair are, they will surely move to the appropriate memory position of dental chair I . When they come to the preset position of chair, the indicating light is off and the chair stop moving.

Repeat the above operation to get into another preset position.

16. Reset button

After patient sitting on the electric chair or after consulting, doctor could press reset button to lower the seat to minimum position and enable the backrest to bend forward to extreme position so that patient can move freely. The specific operation is as follows: press auto button

 once, indicating light will be on and press  corresponds to button 0. The indicating light will be off and the chair will stop operating when it comes to this position.

Attention: during operation process, no tangible thing shall be placed within the operational stroke of the unit.

17. Head rest

Adjusting button of headrest: press button 1 to adjust the required position of headrest freely and undo button 1 to automatically lock it. (Fig. 12)

Adjusting button of head holder: press button 2 to adjust the inserter of head holder up and down freely to the required position and undo button 2 to automatically lock it. (Fig. 12)

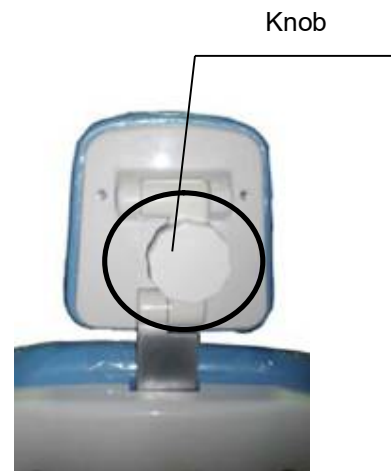


Fig.12

Attention: it is not supposed to be used before the confirmation of locking of head holder after adjusting to prevent accident.

18. Hand rest

Lift right hand rest about 20mm, rotate it to the right, and then the patient can take his place. Press it downward about 20mm from the original place to reset it to the original place.

Attention: when taking seat, the patient shall sit in the seat frame first, and shall not sit on the foot plate in case of damage on the chair. The hand rest shall not be rotated before being lifted 20mm upward in case of damage.

19. Dentist Stool

If it is necessary to lift the seat, the seat can be lifted to appropriate height through up-lifting of air-driven-spring operation handle by the physician with feet support the ground and slight moving-off the seat cushion, and loose the handle to automatically lock the air-driven-spring.

If it is necessary to descend the seat, the physician lifts the operating handle upwards and had better slightly raise feet, and then the seat cushion will immediately descend. Loose the handle until it descend to appropriate position and it will be locked automatically.

XI. Cleaning and sterilization

After a period of using, it is necessary to clean and sterilize the equipment regularly.

1. Handpiece

Please refer to the enclosed instruction manual of handpiece for its sterilization.

- a) Clean the surface of dental drill with alcohol cotton.
- b) Blow it with clean lubricating oil for 2-3s.
- c) Wrap it with sterilization package.
- d) High-temperature steam sterilization (135°, 15min, 220KPa).

2. Other instruments

- a) High-temperature steam sterilization (135°C, 15min, 220KPa) should be used for three-way syringe.
- b) Disposable suction nozzle should be equipped with saliva ejector. Throw away the suction nozzle after treating each patient and replace with a new one before the treatment of next patient.
- c) Put the high vacuum suction nozzle in high temperature sterilization box of 134°C to sterilize it for four minutes.

3. Exterior accessories

- a) Spittoon: wash it with clear water first, then sterilize it with alcohol.
- b) Instrument tray: wash it with clear water first, then sterilize it with alcohol.
- c) Dental chair: clean and sterilize it with leather detergent and medical alcohol.

Section Two (for technicians)

XII. Equipment installation

1. Preparation before installation

According to the layout of consulting room, the lighting conditions and the convenience for use, confirm the position of the ground box and the position of the whole equipment in accordance with Fig. 13 and the form of ground box.

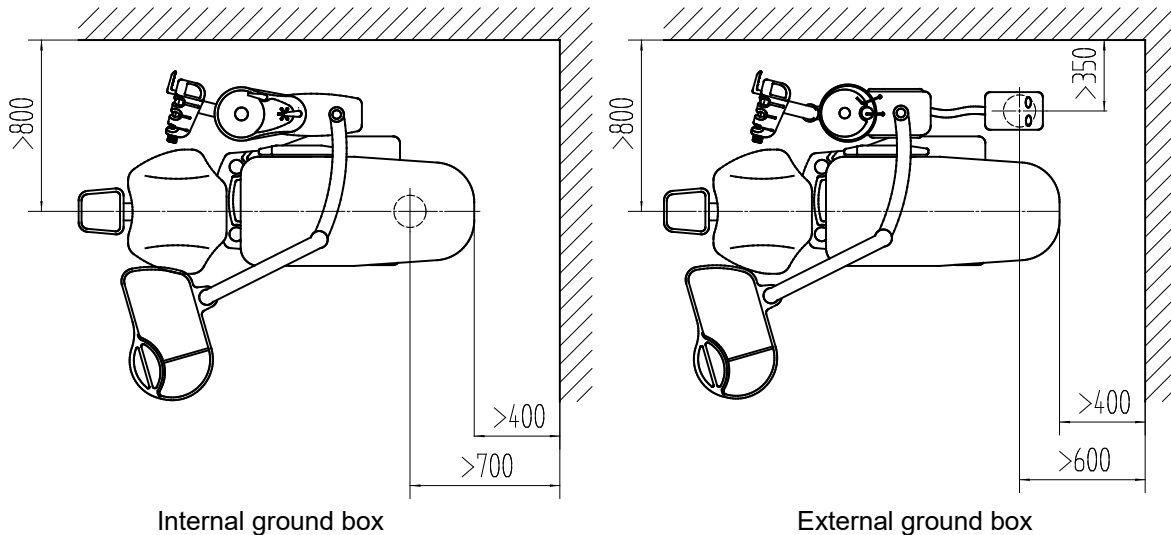


Fig.13 Layout of whole unit

Attention: the following items should be noted during equipment installation.

- If there is interference between equipment motion part and environment arrangement (other equipments).
- The impact on structure and use caused by direct sunshine should be prevented.
- The placement of equipment should take the rationality of pipeline layout and personnel passing into consideration.
- The placement of equipment should meet the environmental requirements on cleaning, dryness and ventilation.
- The ground that the equipment contacts during installation should be flattened, smooth and firm.

2. Pipeline layout

The pipeline layout can be started after the determination of equipment placement position. Generally speaking, one-piece dental treatment equipment usually adopts the installation mode of geosynclines type that could conceal pipeline at present. According

to different floors, the construction of pipeline could adopt floor laying (pay attention to the sealing with peripheral floor), preformed geosynclines and lower isolated layer piping.

Within 200×200mm around the position of the ground box, preset the gas inlet pipe, the water inlet pipe and 1.5mm² 3-core shielded wires, and connect the ground protection. See Fig.14.

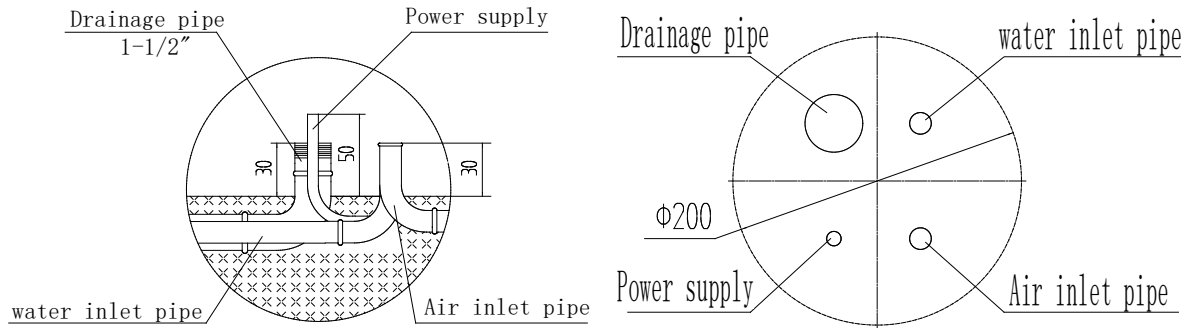


Fig.14 Reference diagram of pipeline

Specification and above ground level of water pipe, air pipe and power cord pipe:

Name	Specification	Above ground level	Remark
Water inlet pipe	Φ15mm(1/2 ")PPR pipe	30mm	Orifice screw-threadG ^{1/2} "
Air inlet pipe	Φ15mm(1/2 ") aluminum plastic pipe	30mm	Orifice screw-threadG ^{1/2} "
Drainpipe	Φ40mm(1 1/2 ")PPR pipe	50mm	
Power cord pipe	Φ15mm(1/2 ")PPR pipe	50mm	

The power cord should be 3-core shield patchcord of 2mm² and the length of bare power cord pipe should be 400mm.

3. Installation step

1) Uncase examination

Before opening the box, please examine the upper and lower side as well as the surrounding of box-plate to see if there is damage due to collision and drench due to rain, then open the box and check parts and accessories by referring to "packing list" to see if it is in good condition. Any queries, please contact with the distribution unit immediately or enquire with our company.

Caution: The opening process of external packing should be properly and orderly to avoid injury to equipment and personnel.

2) Placement of dental chair

Properly place dental chair according to the preset position. (The ground used for placing dental chair should be smooth, firm and neat, because its design doesn't adopt foundation setscrew in view of the stability of complete machine. If the ground isn't smooth, the usability will be affected or even cause accident.)

If the ground isn't sooth, adjust six screws on the base plate of chair to make the equipment in proper condition.

3) Connection of pipeline and circuit

Connection of air pipe and water pipe (Fig.15)

Properly connect valve, straight-through joint and ($\Phi 8 \times 1$) PU pipe with water (air) inlet pipeline. (Pay attention to sealing and strictly prevent leaking.)

Circuit connection

As showed in "electric wiring diagram", properly connect power cord and protective ground. Properly connect the power connector and control line connector between treatment unit pipe and dental chair, which must be tight and firm.

4) Seat cushion installation

- Switch on the power and open the backrest of dental chair to backward position.
- Align two screws on the front lower part of seat cushion with two holes on the chair before inserting.
- Use the screw on the back lower part of seat cushion to fix with dental chair.

5) Installation of operating light

- Insert the wire on the lamp arm into lamp post first and then properly connect them.
- Abut the wire connector on lamp arm with the connector inside the post of treatment unit body, and put it into the post.
- Thrust lamp post into post and properly install lamp arm. Don't damage wire.
- Dismount screw on cold light operating light and abut the wire connector on lamp arm with the connector inside cold light operating light (connect firmly).

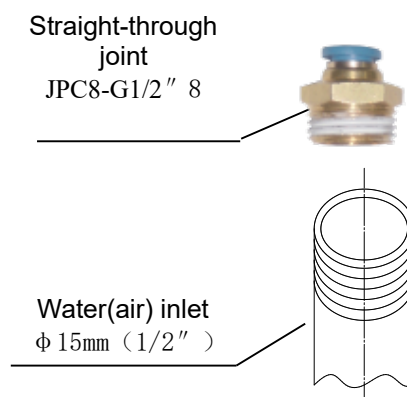


Fig 15

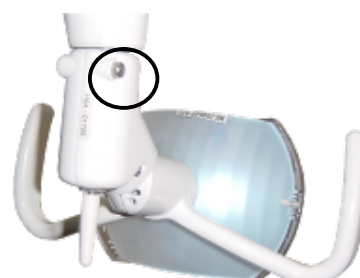


Fig.16 Installation of operating light

- Insert operating light into lamp arm and fix with screw.

6) Installation of cup fill spout and bowl rinse spout

Insert the cup fill spout and bowl rinse spout into the relevant holes shown as the picture. (Fig 17)

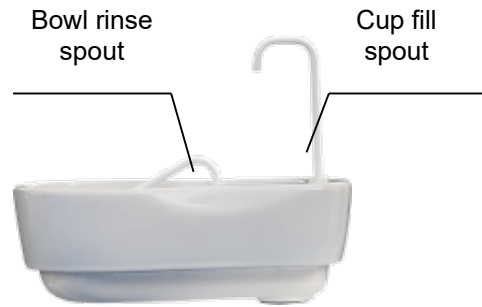


Fig. 17 Installation of cup fill spout and bowl rinse spout

XIII. Function debugging

1. Adjustment of filter relief valve

Check the inlet pressure gauge inside the front ground box of dental chair and its value should be 0.5MPa. The pressure has been properly adjusted before release and the following methods can be used to tune it into 0.5MPa if any discrepancy arises.

Open the cover of ground box first, pull up the spindle on top of filter relief valve about 10mm (Fig.18), then rotate the spindle. Rotate clockwise to adjust the pressure upwards and counter clockwise to adjust the pressure downwards. After adjustment, press down spindle.

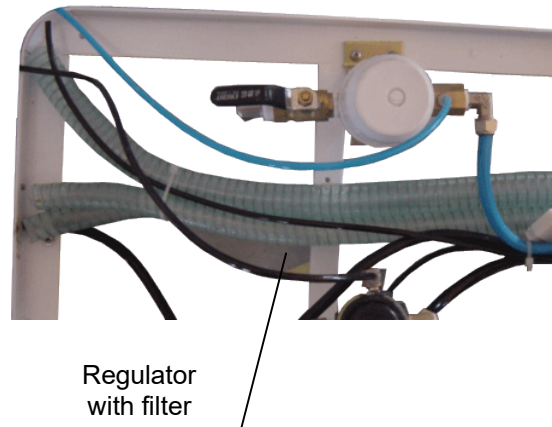


Fig 18 Filter relief valve

2. Main controlling board

Debug low speed air motor and high speed air turbine handpiece in turn.

Attention:

Before debugging handpiece, read instruction manual of handpiece first and understand operation air pressure of each handpiece. (Refer to the following enclosed list)

Dental bur or test bar must be inserted during debugging. No load running or over pressure start-up is strictly prohibited.

Fill clean lubricant into handpiece before debugging.

Before using, the handpiece must be adjusted within specified air pressure range. Otherwise, over-low pressure will cause invalid operation and over-high pressure will damage handpiece.

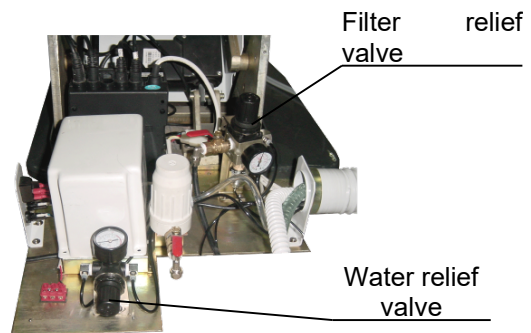


Fig.19 Filter relief valve

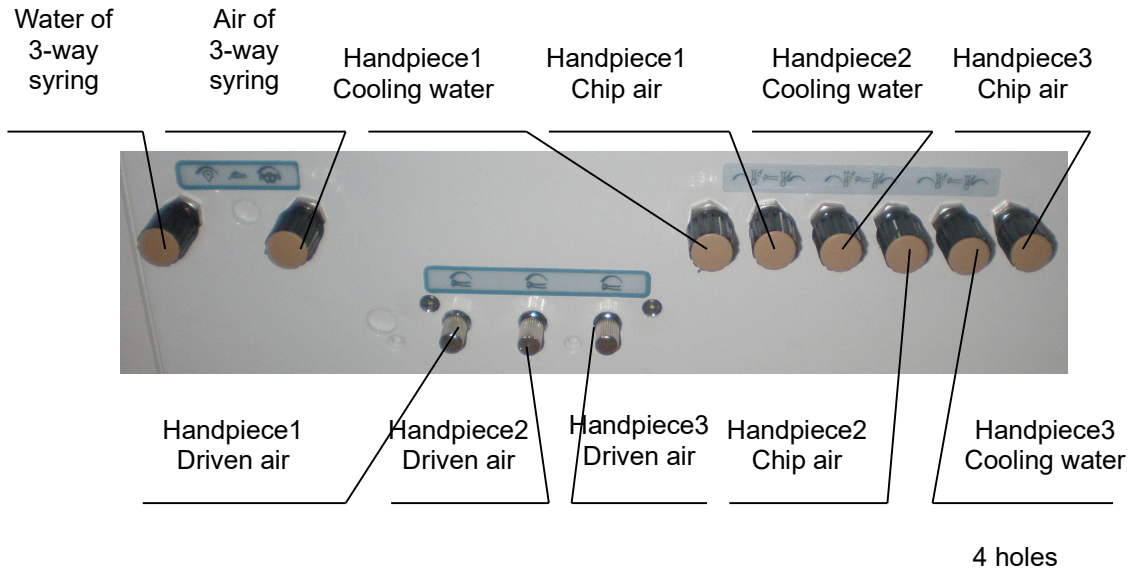


Fig.20 Pressure adjustment of water and air

Our ordinary products adopt underneath type instrument tray with rectangle pressure gauge on it. Owing to the pressure loss during transport process of compressed air, indicated value on the gauge is supposed to be higher than the value on the instruction manual of handpiece.



	Pressure range of rectangle gauge	
Handpiece name	High speed air turbine handpiece	Low speed air motor handpiece
Japanese NSK four holes	0.23MPa~ 0.26MPa	0.30MPa~ 0.32MPa

Air and water pressure adjustment of handpiece

There are air and water regulating valves (Fig. 20) used for adjusting the water vapor of three-way syringe, driven air, cooling air and cooling water of handpiece on the reverse of instrument tray bottom.

If the adjustment of air and water pressure of handpiece is needed, relevant air and water regulating valves can be adjusted. Rotate clockwise to adjust down the pressure and counter clockwise to adjust up the pressure. Careful and slow adjustment is needed during adjustment.

Three-way syringe

Press down air-out button  and water-out button  respectively, mist will be sprayed out if these two buttons are pressed at the same time. Check if the sprayed water, vapor and mist are suitable. If adjustment is needed, the air and water regulating knob on the bottom reverse of instrument tray can be adjusted (Fig. 20) with the same method as above.

Operation of assistant work frame

Place the strong aspirator and the saliva ejector from left to right in turns.


(1) Insert saliva ejector head reliably on saliva ejector, get moderate clear water and observe if the water suction is smooth (abstraction rate should be ≥ 400 ml/min when hydraulic pressure is 200kPa).


(2) Refer to saliva ejector for high vacuum suction aspirator.

3. Setup of the automatic control

There are different automatic set-up function keys on main controlling board, please refer to Illustration to set the following operations.

1) Water supply setting of rinsing water

a) Press down set button , gently press down "SET", the setting state starts when the indicating light is on.

b) Press rinsing water button , the indicating light is on and starts to supply water, stop pressing when the water in measuring cup reaches anticipated water level, then the indicating light is off and stops supplying water.


c) Press set button again, indicating light is off, setting is over, computer will memorize and store, therefore, once press the rinsing water button, it will automatically supply water with such amount when it is used in the future.



Attention: if the tap water pressure changes suddenly and greatly or the dimension of cup changes, please readjust the water supply according to the above steps.

2) Setting of in commonly used chair position

Three (1, 2, 3) memory positions have been set before release. If three (1, 2, 3) memory positions need to be set individually, please operate as the following steps:


a) Move the seat board and backrest of dental chair to the desired position (a memory position).

b) Press set button  first, indicating light will be on and setting state will start.

c) Press  that corresponds to button 1 again, then press button , indicating light will be off and a desired position will be set in the memory position of 1.

d) Repeat the step of a) and b), press  that corresponds to button 2 again, then

press button **SET**, indicating light will be off and a desired position will be set in the memory position of 2.

e) Repeat the step of a) and b), press  that corresponds to button 3 again, then press button **SET**, indicating light will be off and a desired position will be set in the memory position of 3.

Attention:


During automatic operation of electric chair, press any function key to stop operating immediately;

All the set parameters could automatically store when the power is off.

If the EPS is power off and then resumed, no danger on safety will be caused except the preset function stops. If you want to continue to operate, please restart the machine.

3) Setting of upper limit position

a) Press set button **SET** lightly about 6s until the cue tone is “Beep”, release the **SET**

b) Press Up button  until the chair reach the limit position.

c) Press Backforward button  until the backrest reach limit position.

d) Press the set button **SET**, finish setting the upper limit position.

4. Setting of instrument arm

The instrument arm have been set befor release. If there are too many things upon the instrument tray to make the instrument arm could not be balanced by itself, or after a long time the spring was letdown. It is necessary to set the spring in the instrument arm. please operate as the following steps:

- Open the cover in the back of the instrument arm
- Setting the spring with the relevant inner six angle



Fig. 21 Setting of instrument arm

spanner, contrarotate make it strong, contrarily make it decrease.

XIV. Maintenance

1. Handpiece

Handpiece is a delicate device, so it shall not be pounded or dropped. It shall be cleaned and lubricated with special detergent and lubricant every day. As for the specific method, refer to the instruction manual of handpiece.

The cleaning and sterilization methods shall be based on the recommended methods by manufacturer of handpiece. Oil spray lubrication shall be conducted before high temperature sterilization.

2. Water filter

The unit has water filter to ensure its normal use. After serving a certain time, the dirt will block the filter core and affect the water flow, therefore, it is necessary to clean and replace the filter core. The filter core shall be cleaned and replaced under any of the following conditions:

- It has been used for over half a year. (Depend on the local water quality)
- The hydraulic pressure loss after filtering is above 0.1MPa.
- Filter core is contaminated.
- The extracted water becomes turbid suddenly.

The specific cleaning method is as follows: open the ground box cover first, counterclockwise rotate and dismount water filter cover to remove filter core. Clean it with the ultrasonic or neutral detergent, wash it with tap water thoroughly after cleaning and then mount water filter cover.

3. Relief valve of air filtration

After the filtration through the air-filtration relief valve, moisture content and impurity will be reserved in the filter cup, which must be removed; otherwise, they will seriously affect the curative effect. Usually, it is necessary to discharge filtration relief valve under any of the following conditions:

- It has been used over one week.

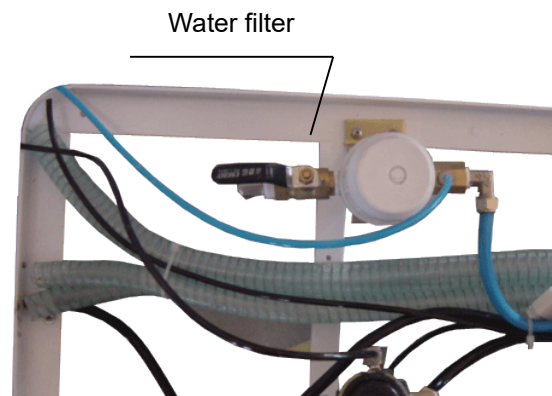


Fig 22 Water Filter

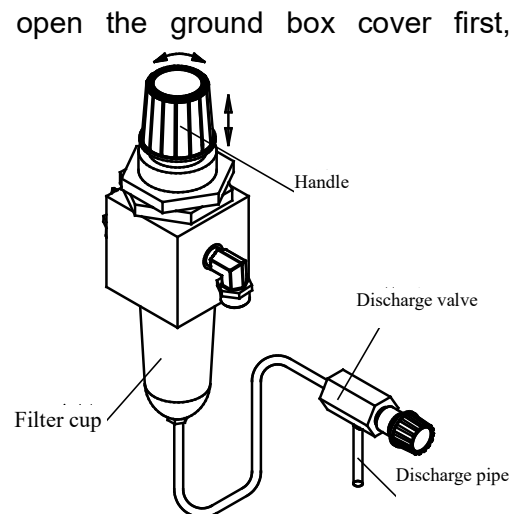


Fig.23 Relieve valve assembly of air filtration

- The water in filter cup accounts for three-quarter of volume.
- The color of water in filter cup changes (it isn't transparent).

The specific method of discharging filtration relief valve is as follows: unscrew drainage valve.

4. Saliva ejector and suction

Besides the maintenance of their exterior cleanness, the cleanness of interior pipeline system of saliva ejector and suction still need to be maintained. The method of cleaning pipe system is as follows: regularly pump clear water or special sterilized water about 30s with recommended 1 or 2 times every day.

5. Suction filter

Regularly clean the sediment in the filter of saliva ejector. As showed in Fig.8, when cleaning, take out filter, clean it with small brush, rinse it out and then mount it in turn according to the diagram.

6. Operating light

The operating light needs to be maintained regularly. The light housing and mirror surface need to be cleaned.

a) Light housing: unscrew the setscrew of light housing and take it down to clean it thoroughly.

b) Mirror surface: dip a little anhydrous alcohol with soft absorbent gauze, slightly wipe and clean interior paraboloid; blow way the dust on exterior paraboloid with compressed air.

c) Replacement of bulb: close operating light, take down the light housing and heat shield after the lamp is fully cold, then replace with a new bulb; reverse the above order, mount the heat shield and light housing reliably.

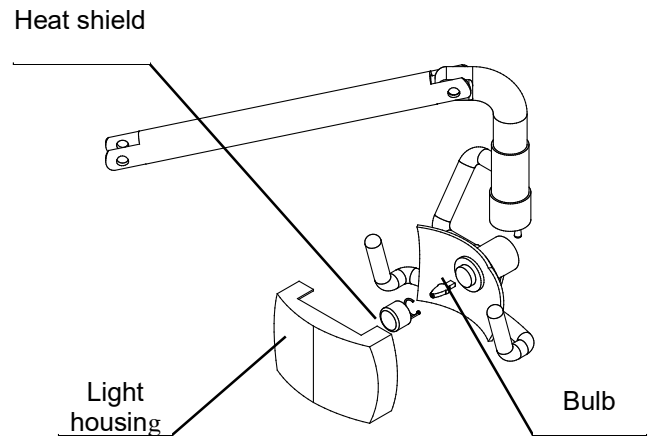


Fig.24 Operating light

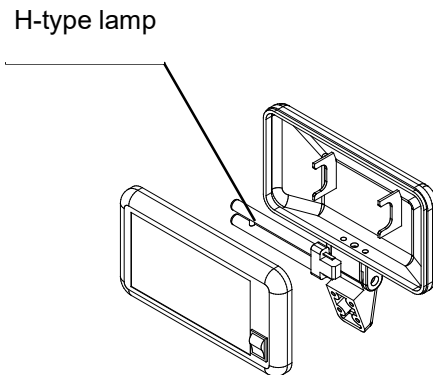


Fig.25 x-ray viewer

7. X-ray viewer

The bulb of the x-ray viewer is H-type lamp of 220V / 7W. To replace the bulb, cut off the power first, then dismount the screw and open the front cover to take down the lamp. See Fig. 25. (First power on to test and then close the front cover when replacing)

8. Fuse

The fuse is in the ground box of dental chair (Fig.3). The method of replacing fuse is as

follows: cut off the power, counterclockwise screw off the fuse holder to take out the fuse and replace with a new one, then clockwise screw it up.

XV. Failure diagnosis

No.	Symptom	Cause	Solution
1	When it is used frequently, the dental chair doesn't operate suddenly, while the control system is under normal operation.	The motor is overheated and stops operating.	After stopping for a while, it could continue to operate properly.
2	The saliva ejector or high vacuum aspirator could operate only by opening general air valve.	The mounting position of rack valve changes.	Open the rear cover of rack, adjust the front and back mounting position of rack valve until it stops when putting down the instrument and operates when taking up the instrument.
3	The suction of saliva ejector and high vacuum aspirator is small or without suction.	<ol style="list-style-type: none"> 1. The pressure of tap water is too low. 2. The water filter is blocked. 3. Pressure of supply gas is too low. 4. Negative pressure generator is blocked. 5. The pipeline and joint leak. 	<ol style="list-style-type: none"> 1. Install supercharge water pump if the water pressure is too low. 2. Clean the water filter and replace filter core. 3. Adjust supply gas pressure to 0.5MPa. 4. Dismount and wash negative pressure generator, remove the blocking. 5. Check the pipeline and joint.
4	No water in handpiece.	<ol style="list-style-type: none"> 1. The jet hole of handpiece is blocked. 2. The water filling switch of foot control air switch isn't open. 3. The water regulating valve of 	<ol style="list-style-type: none"> 1. Dredge the jet hole of handpiece. 2. Shift the water filling switch of foot control air switch to the right. 3. Open the water regulating valve of handpiece and adjust it properly.

No.	Symptom	Cause	Solution
		handpiece isn't open.	
5	The handpiece isn't powerful or doesn't operate.	<ol style="list-style-type: none"> 1. The operation air pressure of handpiece is too low. 2. The bearing of handpiece is damaged. 3. The dental bur is worn or isn't clamped tightly. 4. The pipeline of handpiece is blocked. 5. The air pipe inside handpiece leaks. 	<ol style="list-style-type: none"> 1. Adjust the operation air pressure of handpiece according to instruction manual. 2. Replace the bearing of handpiece. 3. Replace with a new dental bur and then clamp the dental bur tightly. 4. Dismount bearing assembly and dredge the pipeline of handpiece. 5. Replace the housing of handpiece.
6	The button of three-way syringe leaks.	O-ring is worn or aging.	Replace O-ring and add silicon grease oil to lubricate.
7	The three-way syringe doesn't sufficiently spray vapor.	<ol style="list-style-type: none"> 1. The water-pipe and air-pipe of three-way syringe is connected oppositely. 2. The water of three-way syringe is too strong or the air is too weak. 	<ol style="list-style-type: none"> 1. Exchange the water-pipe with the air-pipe of three-way syringe. 2. Adjust the water and air of three-way syringe.
8	Rinsing water and spittoon washing water are too few or without water.	<ol style="list-style-type: none"> 1. The water pressure is too low. 2. The water filter is blocked. 3. Pressure of supply gas is too low. 4. Electromagnetic valve doesn't 	<ol style="list-style-type: none"> 1. Install supercharge water pump if the water pressure is too low. 2. Clean the water filter and replace filter core. 3. Adjust supply gas pressure to 0.5MPa. 4. Replace the damaged

No.	Symptom	Cause	Solution
		<p>work.</p> <p>5. The connecting wire and connector don't contact properly.</p> <p>6. The circuit board breaks down.</p> <p>7. The control keyboard doesn't contact properly.</p>	<p>electromagnetic valve.</p> <p>5. Find out the contact failure position of connecting wire and reconnect it.</p> <p>6. Replace defective circuit board.</p> <p>7. Replace control keyboard.</p>
9	The treatment unit doesn't operate.	<p>1. The power plug isn't properly plugged or doesn't properly contact.</p> <p>2. The power fuse is blow-out.</p> <p>3. The transformer of ground box is damaged.</p> <p>4. The power switch is broken.</p>	<p>1. Replace power plug or outlet.</p> <p>2. Find out the reason of blow-out first and replace power fuse.</p> <p>3. Replace the transformer of ground box.</p> <p>4. Replace power switch.</p>
10	No water in treatment unit.	<p>The water filter is blocked.</p> <p>Water pipe is pinched.</p>	<p>Clean filter core.</p> <p>Remove the pinching source.</p>
11	There is water spraying out from the air.	<p>1. The joint of handpiece isn't screwed tightly.</p> <p>2. The filter relief valve is full of water.</p>	<p>1. Screw the joint of handpiece tightly.</p> <p>2. Discharge the accumulated water inside filter relief valve.</p>
12	The operating light isn't on.	<p>1. The bulb of operating light is broken.</p> <p>2. The connecting wire of operating light doesn't properly contact.</p>	<p>1. Replace a new bulb.</p> <p>2. Find out the defective connection position.</p> <p>3. Replace the switch of operating light.</p> <p>4. Reconnect the lead</p>

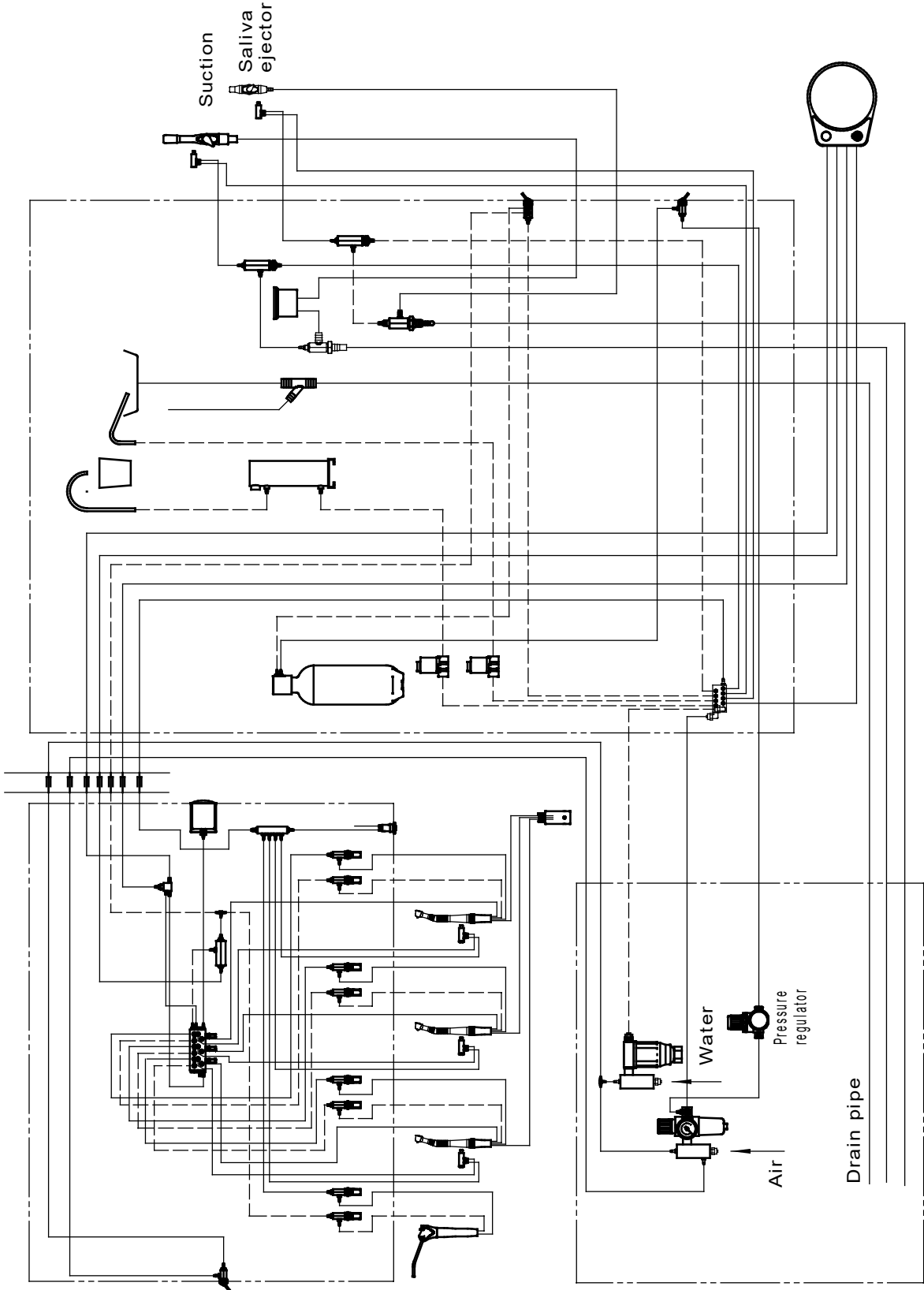
No.	Symptom	Cause	Solution
		<p>3. The switch of operating light doesn't properly contact.</p> <p>4. The lead wire of ground box transformer doesn't properly contact.</p>	wire of ground box transformer or replace the transformer of ground box.
13	The chair doesn't operate, while its sound indication is normal and other buttons are under normal operation.	<p>1. The relay contact doesn't contact properly or the coil is broken.</p> <p>2. The motor is broken or the connecting wire is disconnected.</p>	<p>1. Clean the relay contact or replace a new relay.</p> <p>2. Find out the disconnection position, reconnect or replace the motor.</p>
14	The x-ray viewer isn't on.	<p>1. The fuse is blow-out.</p> <p>2. The lamp is broken.</p> <p>3. The amperite is broken.</p> <p>4. The connecting wire doesn't contact properly.</p>	<p>1. Replace the fuse.</p> <p>2. Replace the lamp.</p> <p>3. Replace the amperite.</p> <p>4. Repair the contact failure position of the connecting wire.</p>

Attention: If it is necessary for the user to repair this unit, we could provide detailed information on the components.

XVI. Others

1. Warranty of this unit: under the premise of abiding by the regulations on transportation, storage and use, the user is entitled to one -year free after-sale service from the date of purchasing this unit.
2. Target users of the unit: the target users (patients) of the unit shall have basic behavior constraint and judgment ability.
3. The installation and use of the unit must be on the basis of relevant laws, regulations and ethics accepted by most people.
4. We reserve the final right to interpret on this product under the *Regulation on the Supervision and Administration of Medical Devices*.

XVII. Diagram of the air and water pipes of the system



XVIII. Electric wiring diagram

