

USER MANUAL

Piezoelectric Scaler

Thank you for choosing the ART P-2 piezoelectric scaler. Before using the scaler, please carefully read this User Manual since it contains important information, including installation procedures and operating suggestions about the scaler. Especially, refer to the section "Cleaning and Sterilization" to sterilize the scaler before using with your patients.

Warnings

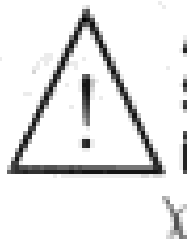
Important Notes!

The equipment is only to be used by a qualified doctor, dentist, hygienist or other qualified personnel.

A patient with a pacemaker cannot be treated with the equipment.

A shielded AC power cord must be used with this equipment.

This Piezoelectric Ultrasonic Scaler should be powered from a separate wall outlet with a grounding point.



Attention!

Avoid use of this machine around Pacemakers

It has been shown that electronic appliances including razors, hair dryers, microwave ovens, TV receptors, and some electronic medical equipment may interfere with the normal operation of pacemakers. It is suggested that patients who have pacemakers avoid treatment with this scaler. For further readings on the subject, please refer to:

- "Advances in Cardiac Pacemaker", The New York Academy of Sciences, Vol. 167, Article 2, pp. 515-1075.

- "Electromagnetic Radiation Interference with Cardiac Pacemaker", U.S. Department of Health, Education and Welfare.

- "The Individual with a Pacemaker in the Dental Environment" Journal of the American Dental Association, Vol. 91, No. 6 pp. 1224-1229.

Operator Safety

Read this page carefully before installation and use of the instrument.

The instrument described in this manual is designed to be used by properly trained personnel only. Only qualified personnel shall carry out adjustment, maintenance and repair of the equipment.

NOTE, CAUTION AND WARNING STATEMENTS

CAUTION: Is used to indicate correct operating or maintenance procedures in order to prevent damage to, or destruction of the equipment or other property.

WARNING: Calls attention to a potential danger that requires correct procedures or practices in order to prevent personal injury.

Symbols



This "BF" Symbol, a caution symbol, indicates the machine was manufactured according to the degree of protection against electric shock for this type of BF equipment.



Grounding Terminal



Attention! Read the Instructions

Notes before using:

The electric power used must be grounded. If this requirement is not met, it could cause damage to the scaler and more importantly, to the user.

The machine should not be placed in a dusty environment.
Direct contact with water should be avoided.
Do not use the machine in the presence of flammable gases.

The machine should be placed on a steady and stable platform or table. Placing the machine on an unstable, tilted table may degrade the performance and/or may accidentally cause damage to the system.

Do not dismantle the machine on your own or by uncertified technicians.
Violation of this requirement may cause harm to the user and/or damage to the machine.

For electrical safety, the power cord should not be placed under heavy objects, and should also avoid high temperature heat sources.

If you observe any abnormal situations while the machine is in use, unplug the power cord.

Preface

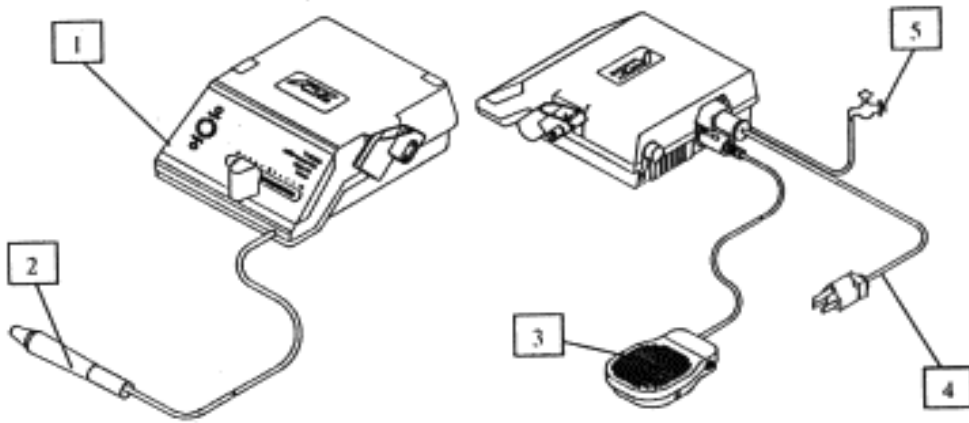
The Piezo Scaler was developed to take advantage of the principle that piezoelectric ultrasonic waves which are generated in the handpiece by 4 ceramic piezoelectric plates that are subjected to a high frequency alternating current. The tip vibrates back and forth at high speed to remove tooth calculus and/or tartar. The high speed vibrating tip can remove the toughest calculus and tartar easily in conjunction with a syringe or saliva ejector. The scaler can conveniently and quickly clean teeth, and importantly it is proven to be electrically safe. The electric-mechanical efficiency of this piezoelectric system is much greater than that of traditional magnetostrictive systems. There is very little heat released, and it is possible to work with very little water. It ensures excellent cavitation but is more comfortable for both the patient and the clinician. The unit is a very powerful apparatus. There are linear scales of power adjustment for removing prostheses and condensing guttapercha. This allows for very fine adjustment to suit each clinical situation. With a large range of tips, the unit is suitable for different kinds of work.

Special notes to doctor:

Since the tip of the scaler is made of stainless steel, avoid direct contact to patient's teeth; it may damage the enamel of the teeth. To better utilize all the functions and maximize the performance of the scaler, it is suggested that before using on patients, doctors should practice on models/aluminum plates to familiarize themselves with the usage of the scaler tips and the subtle motion and force of the insert, etc.

Contents

Title Page	I
Operator safety	II
Notes	III
Preface	IV
Contents	1
I. Descriptions and Functionality of Components	2
1. Description of Components	
2. Description of Control Panel	
II. Installation Guide	4
1. Unpacking	
2. Storage	
3. Safety Instructions	
4. Setting Up	
III. Preparation and Practice before the First Use	6
IV. Operation Procedures	8
1. When preparing to treat a patient	
2. When treating a patient	
V. Maintenance	10
1. Daily start-up	
2. Daily shut-off	
3. Preparing to treat a patient	
4. Trouble shooting	
VI. Cleaning and Sterilization	11
1. Handpiece	
2. Tip	
3. Main Unit	
VII. Accessory	13
1. Accessories	
2. Optional Accessories	
VIII. Specifications	14
1. Standard list	
2. Function List	
3. Specifications	
4. Environment	



I. Description and Functionality of Components

1. Description of Components

A. Main Unit

This is the heart of the scaler. Functionally, the main unit generates the needed 29KHz operation signal and passes it onto the handpiece, and thus induces power to vibrate the tip inside the handpiece accordingly. And, due to pressure variations, a signal from the handpiece will be fed back to the main unit so that the main unit can track the variation of the pressure and adjust the intensity of the controlling signal accordingly.

B. Handpiece

The handpiece consists of vibrator and a tip. The vibrator is composed of four piezoelectric plates. The vibrator will move the Tip back and forth at high speed based on the waveform change of the controlling signal. In addition, the movement of the Tip will induce current on the feedback circuit and the induced signal is then fed back to the Main Unit to complete the control loop. In accordance with the movement of the tip, a powerful water stream (working like a syringe) will also come out to (a) wash away the tooth calculus and tartar, and (b) cool down the temperature of the tip (heat generated from the vibration of the tip).

CAUTION: Make sure that new Tip is fully seated.

C. Footswitch

The convenient footswitch helps doctors to easily turn on/off the scaler without interrupting the cleaning process at hand.

D. AC Plug

E. Water In Connector

2. Description of Control Panel

The function of each button or knob on the control panel is detailed here.

1. Main Power Switch (On the side of the unit)

When pushed, the AC power is sent to the Main Unit, and the power indicator (LED) will be lit up. If pushed again, the power is then turned off and the power indicator is extinguished.

Caution: Before turning the unit on, be sure the footswitch is in the "OFF" position.

2. Scaling Mode Change Button (On the front of the unit)

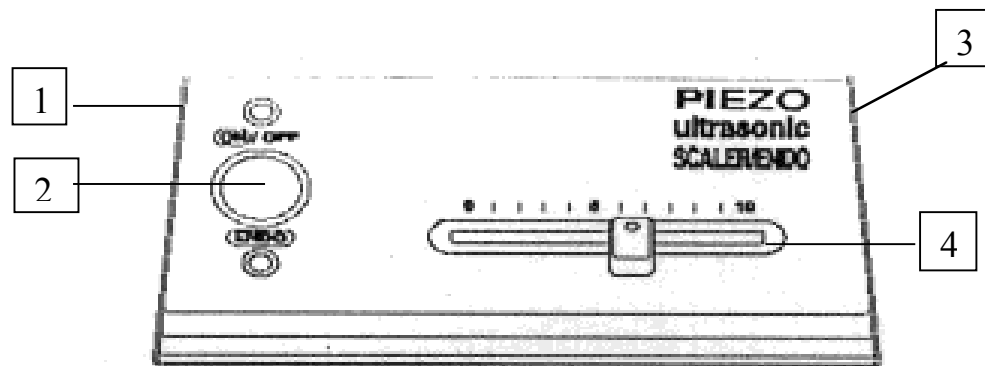
When pushed, the Main Unit will be operated under the Endo/Perio mode, and the Endo/Perio indicator (LED) will be lit up. Under the Endo/Perio mode, the output power range of the scaler will be decreased, making the cleaning easier. If pushed again, the Main Station will switch back to the normal operating mode (i.e. scaling mode) and the Endo/Perio indicator (LED) will be extinguished.

3. Water Volume Control Knob (On the back of the unit)

When turned clockwise, the water volume coming out of the handpiece will be smaller. On the other hand, if turned counter clockwise, the water volume will increase. With this water volume control knob, doctors can conveniently adjust water volume based on the operation needs. It is noted that not only washing away the debris left from the calculus and/or tartar, water here is also used to cool down the temperature of the tip to avoid over heating. Adjustment of the water flow rate controls water temperature. The greater the water flows, the cooler the water temperature.

4. Power Intensity Control Slide (On the front of the unit)

When moved to the left, the output power intensity will be smaller. On the other hand, when turned counter clockwise, the output power intensity will increase. This power intensity control knob gives doctors the flexibility to adjust the output power intensity based on the difficulty of the cleaning job.



II. Installation Guide

1. Unpacking

When unpacking the box, check the unit for any damage. If damaged, please contact your dealer or HSP immediately. Enter the unit serial number on your warranty card and mail it to HSP within ten (10) days after setting up the machine.

2. Storage

A. Environment

The unit should be stored in a clean, dry environment. The following environmental limitations apply to both storage and shipping:

Temperature:	0 C to 60 C
Humidity:	10% - 90% (at 40 C)
Atmospheric Pressure:	860 - 1060 hPa

B. Labels

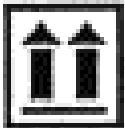
The meaning of labels printed on the outside of the package box are listed below.



KEEP AWAY FROM WATER



DO NOT HOOK



THIS SIDE UP

3. Safety Instructions

Grounding:

Before any connection to the output connectors is made, the unit must be grounded. The main plug shall be inserted only into a wall socket provided with a protective ground.

NOTE: The unit must be positioned so that the plug is accessible.

Main Voltage Range and Fuse:

Before inserting the main plug into the wall socket, make sure that the scaler is compatible with the local main voltage.

WARNING: The scaler shall be disconnected from all voltage sources when a fuse is to be replaced.

The main line fuseholder is located on the rear panel in the main line input socket. When the main line fuse needs replacement, proceed as follows:

- Disconnect the unit from the line.
- Remove the cover of the fuseholder by means of a small screwdriver.
- Fit a new fuse of the correct rating and refit the cover of the fuseholder. The rate and type of the fuse is shown on the label and PCB(Piezo Circuit Board).

4. Setting Up

It is fairly simple to install the Scaler. Just unpack the Scaler and connect the components as shown in figure 1,2, & 3.

1. Check machine and make sure both power and power indicator are off when the switch is off.
2. Plug the scaler into a grounded AC power outlet.
3. Choose the correct scaler Tip for desired procedure, and insert it into the handpiece. Make sure the tip insertion is complete, then tighten the tip into the handpiece with the TORQUE WRENCH turning it clockwise.

CAUTION: When screwing the Tip into the handpiece, DO NOT FORCE.

The tip and handpiece should be connected firmly.

When pulling the handpiece out of the cord socket, DO NOT PULL THE CORD.

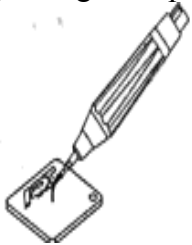
4. Make sure the water PU tube is connected well.

Several installation suggestions are listed below:

- * Because patients may experience some tissue trauma during the treatment, it is suggested that the operator use purified or distilled water. This will significantly reduce the possibility of infection.
- * After installation, any extra length of the power cord should be neatly arranged to avoid tripping or accidents.
- * The footswitch should be firmly placed at a position where the users can easily access it. Any extra cord to the footswitch should also be neatly arranged to avoid any tripping or accidents.

III. Preparation and Practice Before the First Use

To better utilize all the functions and maximize the performance of the ART-P2 Scaler, it is suggested that before treating patients, users/doctors should practice on models/aluminum plates to familiarize themselves with the system. Maneuver the head of the Tip to make gentle touches on an aluminum plate. Familiarize yourself and observe the subtleties of the force strengths under different Tips' head angles, positions, etc. Closely examine the scratches left on the aluminum plate after each practice session and try to match each scratch to its originating head position and angle.



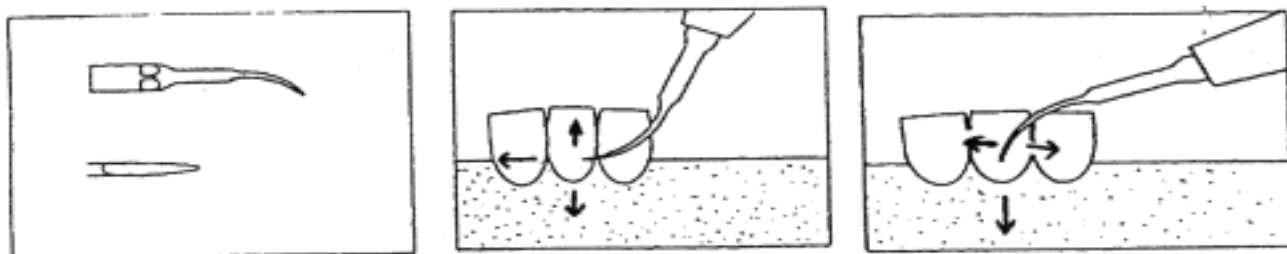
In addition, adjust the output power intensity by sliding the power control. Familiarize yourself with the differences when changing the output power intensity. Finally, adjust the water volume by turning the water volume control knob. Familiarize yourself and observe the subtleties among different water volume situations. Observe the temperature of the handpiece when changing the water volume. Do not overheat the handpiece. Perform the above practice procedures several times to prepare yourself for treating patients.

Below are some illustrations showing ultrasonic movement of the tip:



A: Tangential Application Using E5 Tip

1. Do not apply the E5 tip directly on the tooth, it may damage the enamel. Apply the tip firmly, but without pressure.
2. Let the handpiece follow a slow and regular back and forth movement.

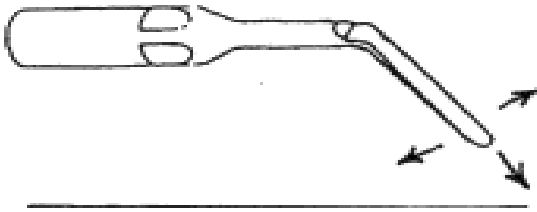
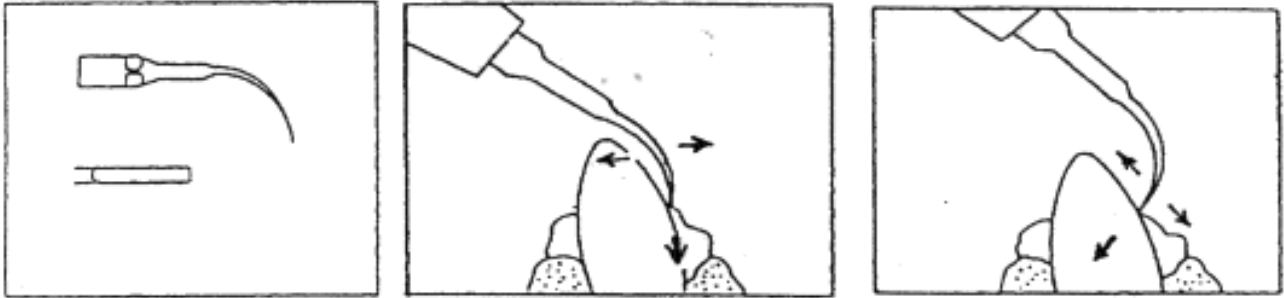




11.

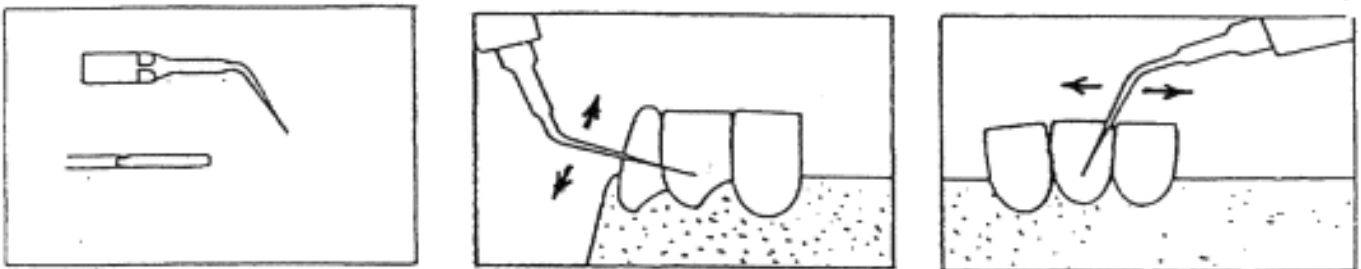
B. Frontal application using E2 Tip

1. Put the tip of insert against the tartar, but not directly against the tooth.
2. Put slight pressure and use a back and forth movement.



C. Tangential Application Using E3 Tip

1. Contact on the enamel with the round tip, without pressure and with back and forth movement.



IV. Operation Procedures

1. When preparing to treat a patient

Step 1: Push the POWER SWITCH to light the ON indicator (LED).

Step 2: Check the water.

Step 3: Select the needed tip, make sure it is fully tightened or seated in the handpiece.

Step 4: Set the POWER CONTROL SLIDE to the suitable level for the insert.

Step 5: Hold the Handpiece with the Tip end pointing, up over a suitable drain. Step on the foot control and allow water to run from the handpiece for a few seconds until it flows without spurting.

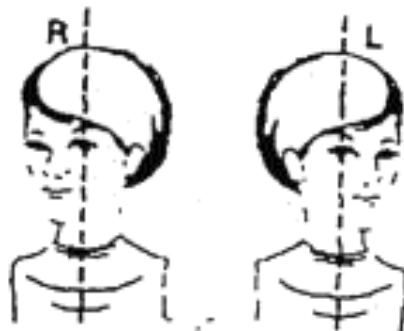
CAUTION: The above procedures should be repeated each time a Tip is placed into the handpiece.

CAUTION: Make sure that the water spray is at the desired temperature and is reaching the working edge of the tip.

Step 6: Place the tip into the patient's mouth and use the foot control to activate the handpiece and water flow.

2. When treating a patient

1. First position the patient comfortably on the patient chair. Adjust the chair angle and/or position so that you can easily access the patient's oral cavity.
2. Put the saliva ejector into patient's mouth to evacuate excessive saliva and debris.
3. Gently rotate patient's head so that the oral cavity can be easily accessed with good direct vision, as shown in the figure below.



3. Tip placement and patient sensitivity.

During the treatment, keep the angle between patient's tooth surface and the handpiece tip as close to 15 degrees as possible. If the patient is not comfortable during the treatment, try the following steps:

- A. When treating places where the patient is very sensitive, try to increase the handpiece movement speed on the surface.
- B. Treat less sensitive places first, returning to more sensitive areas later.
- C. If these problems persists, reduce the output power intensity of the handpiece.

4. Controlling the handpiece with the foot control.

The Foot control is designed to control the functions of the handpiece in two ways:

- A. With the foot held down on the foot control, the handpiece is activated and water flows from the handpiece.
- B. With the foot control released, both handpiece and water flow are shut off.

5. Water and temperature control.

The Water Knob controls the volume of water flowing from the handpiece by turning the Water Knob clockwise or counterwise until the desired rate of flow is obtained.

NOTE: The greater the water flow, the lower the temperature, and vice versa.

CAUTION: When operating, a continuous flow of water is required to keep the Handpiece cool.

V. Maintenance

The scaler does not need special maintenance routines but it does need to be regularly and thoroughly cleaned and sterilized (as described in next section).

1. Daily start-up

When starting the unit at the beginning of the day:

- * Open the water supply shut-off valve.
- * Push the MAIN POWER SWITCH to light the on indicator (LED).

NOTE: If no water comes out, please check the water supply

NOTE: If power LED does not light, please contact local authorized agent.

2. Daily shut-off

When stopping the unit at the end of the day:

- * Push the POWER SWITCH to turn the unit off.
- * Turn off the water supply shut-off valve.

3. Preparing to treat a patient

- * Make sure the insert Tip has been sterilized.

The following suggestions are also useful in extending the product life of the scaler:

- * Place the Main Unit in an open area where air can flow freely around it.
- * If you need to move the main unit, handle with care.
- * Before leaving the operatory, check to be sure the AC power is turned off and the water faucet is tightly closed.
- * After six months or if you find the output power of the Hand piece is not enough to perform treatment, it is very possible that the tip is worn out. If the tip is worn out, replace it with a new one, otherwise, have your authorized agent service the system.
- * Customer Service: If service is needed, please contact local authorized agent.

4. Trouble Shooting

Products requiring any maintenance should be returned to the customer service department or authorized service facility. HSP will repair or replace any product under warranty at no charge.

VI. Cleaning and Sterilization

In this section we describe the procedures to clean and sterilize the scaler. * It is important to follow these procedures before using the machine, otherwise, patients and/or doctors may have the possibility of getting an infection. It is mandatory that clinicians wear sterile gloves during these procedures at all times to avoid any possibility of incomplete sterilization and/or infection. Below we detail the infection control procedures for the care of the handpiece, the tip, and the Main Unit, respectively.

1. Handpiece

Before cleaning, remove the tip from the handpiece. Let the handpiece run for a couple of seconds to drain out the water and any possible contamination left inside the handpiece. The outer surface of the handpiece should be cleaned with antiseptic soap or solution, rinsed off with water and wiped or sprayed with a chemical disinfectant* that is compatible with the handpiece material. A sterile insert or tip is then attached to the handpiece in preparation for the next patient.

WARNING: Do not put the Handpiece in the autoclave sterilizer or directly into the sterilize chemical. Any such chemical left inside the machine will interfere with the normal operations of the system.

At the end of the day with the tip removed, the handpiece and cable should be scrubbed with an antiseptic soap or solution and rinsed off with water. The handpiece should be scrubbed a second time with an antiseptic soap or solution and rinsed off with water.

WARNING: The chemical disinfectant should not be allowed to remain on the surface longer than the recommended time or material damage may result.

NOTE: Components inside the handpiece are highly sensitive so don 't try to open or hit it, this may shorten its life or damage it.

NOTE: Cleaning of the handpiece is suggested after each patient use.

*Contact HSP (1-800-237-5794) for manufacturer's recommended surface disinfectant

2. Tip

After each usage, there will be saliva and/or blood or other debris left on the Tip; consequently, it is necessary to clean the Tip with a cleaner first. This can be done manually by scrubbing with a brush or by use of an ultrasonic cleaner with a solution of detergent and water. After scrubbing, the Tip should be rinsed thoroughly with water to remove all detergent and then dried. Dry the rinsed Tip, and finally, put the Tip in a bag and then put it into a medical-equipment autoclave and sterilize the Tips at 260 degrees F (127 degrees C) for 30 minutes or as recommended by the manufacturer of the particular sterilizer used. An alternative, but less desirable method of sterilization is the use of a compatible chemical sterilant. In this method the Tip is immersed at room temperature in the disinfectant at appropriate strength recommended by the manufacturer for the recommended period of time. Then thoroughly rinsed with sterile water and completely dried.

WARNING: High room temperature conditions, improper dilutions, or excessive immersion time in a chemical sterilant can result in damage to the plastic and elastomeric materials of the Tips.

2. Tip (cont.)

CAUTION: The use of a dry heat oven, incompatible chemical vapor type sterilizers or quaternary ammonium compounds must be avoided as damage can result to the plastic and elastomeric materials.

WARNING: Don't try to change the shape or weight of tip, it may weaken the power output.

NOTE: If the tip is damaged or worn and the power is weak, replace it.

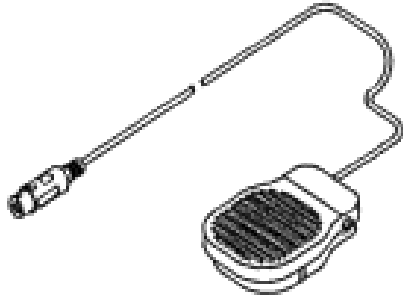
3. Main Unit

Since the Main Unit does not have direct contact with the patients, the cleaning is simple. Just carefully wipe the Main Unit with isopropyl alcohol disinfectant*, and keep it away from dust. (If other disinfectant is used, choose one that will have no chemical effects on the surface of the plastic case of the Main Unit. If not sure, please try it out first or ask your dealer).

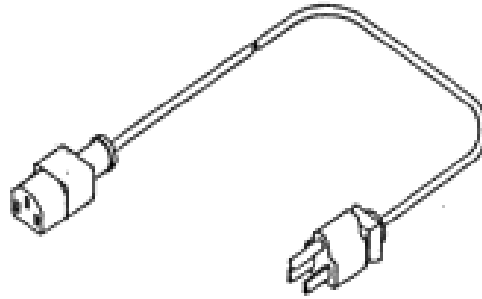
*Contact HSP (1-800-237-5794) for manufacturer's recommended disinfectant

VII. Accessories

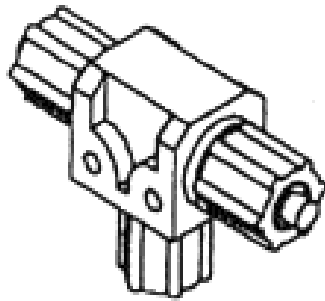
(1) Footswitch x1



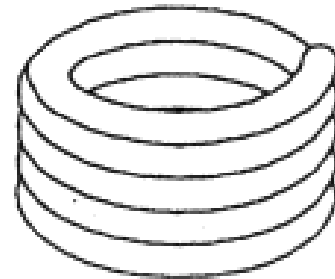
(2) AC Power Line x1



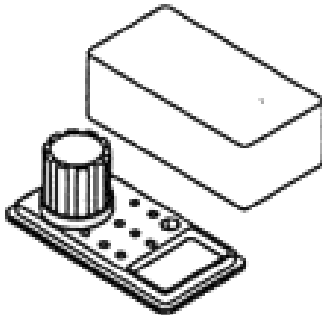
(3) Three-way switch x1



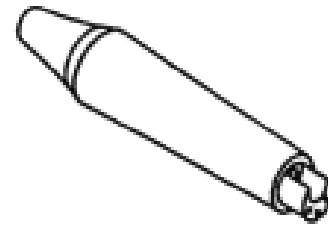
(4) PU Tube x1



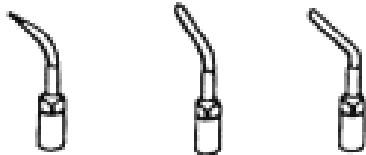
(5) Torque wrench set box x1



(6) Piezo Handpiece x1



(7) E5 E2 E3 TIP x1



(8) Aluminum plate x1



Note: The above standard outfit is subject to change depending upon country or area

VIII. Specifications

HSP Piezoelectric Ultrasonic scaler is designed and manufactured to meet the most demanding environment. It's specifications are listed below:

1. Standard List

Emission:	EN55011 Class B	EN60555-2 Class A	EN60555-3
Immunity:	IEC 1000-4-2 IEC 801-3	IEC1000-4-4 ENV50141	IEC 1000-4-5
Safety:	IEC 60601-1	EN1640	

2. Function List

- * Scaler Power Control
- * Water Flow Control
- * Footswitch Control

3. Specifications

Power Supply	110-115 V/50-60 Hz-0.3A, 220-230 V/50-60 Hz-0.145A
Frequency	29-30 Khz
Water Pressure	1-5 Bar
Handpiece Cable	250 CM
Footswitch Cable	250 CM
Dimension	20*15*7CM
Weight	3 KG

4. Environment

Temperature

Operation:	14F - 95F
Storage:	32F - 144F

Humidity

Operation:	20% - 80% non-condensing
Storage:	10% - 90% non-condensing

Pressure

Atmospheric Pressure:	860-1060 hPa
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Classification

Class I	Type BF	IP40
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TROUBLE SHOOTING GUIDE

HSP Piezo Scaler

Problem	Cause	Test	Correction
Piezo Scaler unit will not work	Chair must be plugged into 110V outlet	Visual	Plug chair power cord into 110V outlet
	Master switch on dental unit must be in "on" position	Visual	Turn switch to "on" position
	Tip is loose in Handpiece	Visual	Tighten tip with wrench provided
	Handpiece with tip must be out of holder, and foot control must be depressed	Visual	Take handpiece out of holder and depress foot control
	Air-Electric switch inside dental unit is not working	Visual - use jumper wire to bypass air-electric switch to test	Replace air/electric switch
Piezo scaler unit has no tip movement (no)	Defective circuit board	Visual	Replace circuit board
	Defective handpiece (if the circuit board has a 24V output, then the handpiece would be defective)	Test with voltmeter	Replace scaler handpiece
No electrical power 24V to input connection of circuit board	Broken electrical wire from transformer to circuit board	Visual	Repair or replace wire
	Defective transformer (located in front of HSP chair base)	Check with voltmeter (110V in and 24V out)	Replace transformer
	Chair is not plugged into 110V outlet	Visual	Plug chair power cord into 110V electrical outlet, usually located in dental unit junction box