

# ***DELMARVA 2000™***

## **Veterinary Scaler with Focused LED Illuminated Hand Piece**

Model DE-2L

# **Owner's Manual**



**CONTAINS IMPORTANT SAFETY INFORMATION! READ BEFORE USE**

Federal Law restricts the sale of this device to, or on the order of, a licensed Veterinary physician.

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# **DELMARVA 2000™**

## Veterinary Scaler

### Specifications

Power Requirement:	120V +/- 10%, 60Hz 200W max
Water Requirement:	Cold Drinkable Water @ 20 PSI min, 50 PSI max
Temperature:	40 <sup>0</sup> F to 90 <sup>0</sup> F (storage 35 <sup>0</sup> F to 95 <sup>0</sup> F)
Dimensions:	2.5" (63.5 mm) H, 8.0" (203 mm) W, 6.25" (159 mm) D, (excluding knobs and jacks)
Weight:	5 lbs (2.3 kg), shipping weight 9 lbs (4 kg)
Operating Frequency:	25 KHz +/- 15 %
Motion:	.001"/.003" elliptical pattern
Tuning:	self tuning (automatic)
Protection Class	BF
Foot Pedal	rust proof type, IP20

## **DELMARVA 2000™**

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**SAFETY PRECAUTIONS     *MUST READ BEFORE USE!***

**WARNING!**

**ALWAYS** sterilize or disinfect handpieces, inserts, and attachments before use

Use only clean, drinkable, **COLD** water for lavage

**ALWAYS** place handpiece in the side bracket after use and **NEVER** leave on the patient

**ALWAYS** use only as much power as necessary when scaling and **NEVER** use high power with perio tips or the feline urethral catheter

Avoid keeping the insert tip in one place too long

**CAUTION!**

**NEVER** operate the scaler without lavage flow

**NEVER** autoclave the handpieces

**NEVER** soak the handpieces or inserts

**NEVER** wind the cord around the scaler handpiece

Place the unit away from heat and with adequate ventilation

Be careful moving the unit due to risk of damage from dropping

**NOTE!**

**ALWAYS** turn off water supply and disconnect the water line overnight

**PACEMAKERS**

Although the use of ultrasound scaling is normally considered safe around pacemakers, never the less it is advisable to keep the scaler cord as far away as possible from the pacemaker leads. This advice is applicable to all implanted active devices including cochlear implants, Parkinson's stimulators, insulin pumps, etc.

## UNIT SET UP

### UNPACKING

Verify that all items are accounted for and undamaged:

- Veterinary Scaler unit with integral foot pedal
- Ultrasonic Scaler hand piece
- TFI#3 Scaling Insert
- Quick Release Valve water connection
- Water Line with Filter installed

### Water Supply

Install the ¼" male iron pipe thread coupler body into a source of **cold** drinkable water with a pressure of no less than 20 PSI and no more than 50 PSI. If pressure exceeds 50 PSI a regulator will be required. **It is necessary to have a shut off valve in series with the coupler body.** The internal water stop in the coupler body is not meant to act in lieu of a shutoff.

**CAUTION!** *The water itself must conform to CDC standards* in order to be free of potential bacterial contamination and be relatively soft. Excess mineral content will ultimately degrade the water system in the 2000 Plus unit, requiring repair. *All plumbing work must comply with local building and plumbing codes.* It is strongly advised that a licensed plumber be employed to install the coupling body and shutoff valve into the building water system.

Flush the newly installed quick release coupler via the water hose thoroughly before connecting to the filter in order to clear out any debris remaining from the plumbing work. Connect the water supply hose going into the unit to the filter via the Luer Lock fitting. Connect the water line to the filter via the Luer Lock and then into water supply through the quick disconnect coupling using the thumb lever release. **IMPORTANT! REPLACE THE FILTER EVERY 30 DAYS.**

**NOTE!** Although the flushing instruction given above is meant for one time use on new installations, *it should be repeated if any repair work is done to the building plumbing system or if building water pressure is lost.* **Verify that cold water is present after building plumbing work.**

## OPERATING INSTRUCTIONS

The **Veterinary Scaler** is a finely engineered instrument, designed to provide years of trouble free service. The following instructions will help you operate and maintain the unit at optimal performance.

### ELECTRICAL POWER CONNECTION

Plug the electrical cord into the appliance entry on the rear of the 2000 Plus unit. Be sure that it is fully inserted. Plug the cord into a 120V 60HZ *grounded* outlet. The

#### **On/Off**

selector switch is located on the lower right side of the control panel.



### POWER CONTROL KNOB

Adjusting the **Power** control knob from left to right will vary the power output from low (left) to high (right). The **Specialty** area identifies the power setting used by the Feline Urethral Catheter and Cavitron® Slimline™, FSI™, or Modified Periodontal inserts. Refer to “Setting Power” on page 7 for appropriate power settings on various scaler inserts.



### SCALER HANDPIECE CONNECTION

The handpiece is shipped non-sterile. **Disinfect the handpiece before use.** See pages 5 and 6. Insert the plug into the circular jack on the right front of the unit. Be sure to seat the plug fully. Turn the locking ring clockwise to tighten the plug securely, but avoid cross-threading, forcing, or over tightening the plastic threads. Purge the water system prior to use. See page 6. See page 7 for more detailed information on the scaler inserts.



**NOTE: Scaler should not be operated unless there is a Magnetostrictive Insert properly installed in the handpiece and there is proper water pressure.**

### ADJUSTING LAVAGE WATER PRESSURE/FLOW

Turning the **Water** knob in a clockwise direction increases the flow of water and, conversely, the opposite direction produces a reduction in water flow. Note this control knob will turn about 2 or 3 turns in either direction. Once you feel resistance do not turn past that point.



The red **Low Pressure** light next to the water knob comes on when the water flow/pressure drops below the safety point. **IMPORTANT!** Do not operate the Scaler until you have corrected the condition, and adequate supply water is again available. See pages 5 and 6 for further information. Lavage is active only in the Scaler mode.

## USING THE SCALER

Tap at the calculus to start then use slow strokes with light pressure in an apical or oblique direction with the tip *parallel* to the tooth surface beginning at the coronal edge of the calculus. Do not stroke laterally at the calculus with the side of the tip as you would with a curette as this tends to burnish heavy calculus instead of removing. *Note that burnishing can also occur if power is set too low or the tip is worn down.* Allow the lavage cavitation to do the work, do not stroke too quickly. It is highly recommended to use manual curettage in conjunction with ultrasonic scaling because manual follow up will reveal any residual calculus and provide tactile feed back of surface smoothness. The thin perio tips used at low power are excellent for plaque bio-film removal but need to be used at medium power for hard calculus. For especially heavy calculus use a general purpose tip. Use only as much POWER as necessary to remove the calculus. Use normal septic precautions with respect to the water lavage spray due to microbial material lifted during scaling.

**Do not use the tip as a retractor.** Because the tip becomes hot due to friction, use as a retractor has significant risk of burn.

**Be sure that the lavage is flowing adequately.** The lavage water also serves to cool the magnetostrictive insert. *The scaler insert will fail in less than one minute due to overheating if there is inadequate water flow.*

**Ultrasonic magnetostrictive inserts wear at the tip.** They will wear out in due course with normal use and become ineffective. Because of the internal mechanical advantage, a little visible wear has a relatively large effect on performance. Check the tips for wear regularly, preferably at every ten autoclaves. The periodontal insert should be checked at every five autoclaves because it is subject to more rapid wear due to size. See page 7 for more information and alternate inspection schedule.

## STERILIZING AND DISINFECTING

### SCALER MAGNETOSTRICTIVE INSERTS

Wipe and clean using warm water prior to autoclave. Use a toothbrush as needed. Do not clean in an ultrasonic cleaner. Place the insert in an appropriate autoclave bag. Steam autoclave at 135<sup>0</sup> C and 215kPa (275<sup>0</sup> F and 30 PSI) for a minimum of 12 minutes followed by 20 to 30 minutes drying time. Do not use dry heat.

### SCALER

Clean the Scaler handpiece thoroughly to remove any detritus or saliva. Wipe down with an appropriate topical disinfectant. Do not allow fluid to enter the handpiece. Shake off fluid and allow to dry.

## STERILIZING AND DISINFECTING (CON'T)

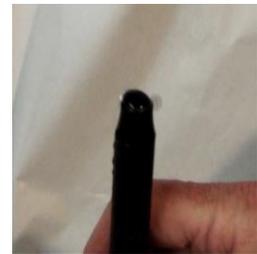
The autoclaving parameters given reflect the recommendations of our component vendors. These recommendations are not intended to supersede routine spore testing in accordance with your state and local health department regulations, where required. It is highly recommended that a spore test be done in any case to verify your autoclave at the parameters cited.

### **CAUTION! Scaler handpiece is NOT autoclavable.**

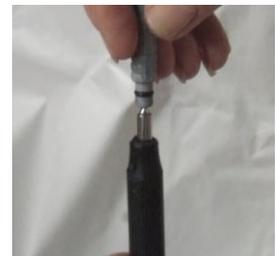
Disinfect these items by wiping off any detritus or fluid and then wiping down with an appropriate topical disinfectant. **NEVER soak these items.**

## PURGING THE WATER SYSTEM

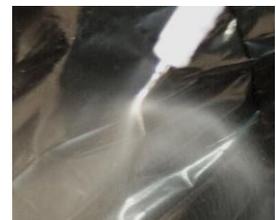
Purging the water system is done each day after the water is turned on and each time an insert is changed. It is necessary to clear the water system of air before operating the Scaler because entrapped air can cause the insert to overheat and to make a high pitched squealing sound. Proceed by turning on the water, turning on the unit and without the insert in place. Hold the handpiece vertically with the insert end up and step on the pedal allowing water to flow. Continue until the water flow is free of bubbles. Note the mushroom shaped meniscus on the water as it leaves the handpiece.



With the handpiece still vertical and the system free of air, release the foot pedal and slowly lower the insert into the handpiece. When the insert is about 3/8" (10 mm) from being fully inserted, push it the final distance with a twisting motion. The twisting motion serves to lubricate and seat the "O" ring water seal. Be sure that the insert is all the way in (fully seated).



When the system is purged and the insert is oscillating, the resulting lavage flow forms a fine, fan shaped mist pattern as the water stream is dispersed by the oscillating tip.



**NOTE:** Lavage flow from the insert depends on the procedure. The range is from 18 cc/minute to 40 cc/minute. Remember that lavage flow is necessary to cool the insert and the tooth.

## INSERT WEAR, CARE, and SELECTION

Inserts wear out with normal use. Compare your insert against the full size illustration on page 8 to gauge how much wear has occurred. A monthly check is appropriate for the DE-5 and DE-6, however the finer DE-6A should be checked bi-weekly.

When the tip reaches back to the blue line, efficiency is reduced by 25%. When the tip reaches back to the red line efficiency is reduced by 50% and the insert should be discarded. If the tip is bent or damaged, discard the insert. Note that only 1mm of wear can reduce power by 50% due to the mechanical advantage inherent within the internal coupling between the magnetostrictive stack and the tip.

Be careful to avoid damage to the magnetostrictive stack (the metal laminations behind the plastic portion). If broken laminations are evident, discard the insert.

**Do not clean with an ultrasound cleaner. Never soak the insert. Never allow to run dry.**

## SETTING POWER

The correct power setting is primarily a function of the tip type. **Perio tips and the feline urethral catheter tips require low power.** Using “normal” power with the fine tips may easily break them. Use the following chart as a guide. Always use the lowest power setting possible to accomplish the desired result.

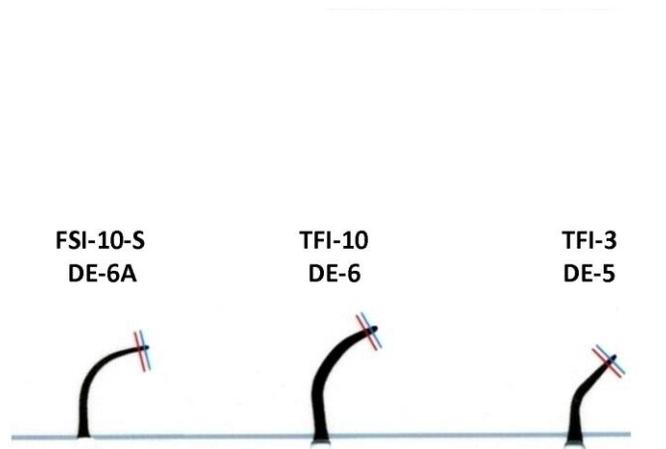
NOTE: “Thru-flow” types are generally for supra-gingival use while “Focused spray” types are for periodontal and sub-gingival use. Lavage terminates immediately when the foot pedal is released with “Thru-flow” types whereas the “Focused-spray” types produce a stream of water for a short time after the pedal is released in order to give a full flush of loose detritus.

DE-5 TFI #3	Extrinsic stain and heavy calculus removal Thru-flow type, commonly called “Beaver tail”	Any low to high power setting as appropriate
DE-5A FSI #3	Extrinsic stain and heavy calculus removal Focused spray type, commonly called “Beaver tail”	Any low to high power setting as appropriate
DE-6 TFI #10	Light to moderate calculus removal Thru-flow type, also called “Straight” or “Universal”	Any low to high power setting as appropriate
DE-6A FSI-10-S	Light deposit removal and deplaquing pockets <4mm Focused spray type, also for perio maintenance	<b>Low power only</b> Use “Specialty” setting
DE-6B FSI #10	Light to moderate calculus removal Focused spray type, also called “Straight”	Any low to high power setting as appropriate
DE-7	Feline urethral catheter Cavitron® Slimline™, FSI™, or Modified Periodontal inserts <b>WARNING! Excess power will injure patient!</b>	<b>Low power only</b> Use “Specialty” setting

**NOTE:** Use the 30% power boost for *brief* periods of time to loosen stubborn calculus. Keep the tip moving to avoid over heating a small area. **NEVER use power boost with perio inserts or with the DE-7.**

## WEAR GUIDE

Hold tip up against page and align root with illustration to measure wear.



## TROUBLE SHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
Unit will not come on (no lights)	Cord loose at outlet	Plug in firmly
	Cord loose at unit	Plug in firmly
	Faulty outlet	Use another outlet or else correct the fault
	Unit internal failure	Call Delmarva 2000™ Technical support
No water flow, first use of the day with the insert out. <i>Using building water supply</i>	The water supply turned off or else the quick release is disconnected	Turn on, connect
	Water adjustment set too low	Set for proper flow
	Clogged filter	Examine; replace if clogged
	Clogged line	Flush as per page 2
Water flow stops sometime during the day <i>Using building water supply</i>	Water adjustment set too low	Set for proper flow
	Clogged filter	Examine; replace if clogged
	Clogged insert	Use another insert
	Building water supply low or lost pressure	Check pressure/flow at a fixture on the same supply line; correct as required
No water flow. <i>Using portable water supply</i>	No or low pressure in tank	Pump up to normal
	No or low water in tank	Refill and pump up
	Clogged filter or insert	See above
Cannot resolve water flow problem with above solutions	Clog is internal to unit	Call Delmarva 2000™ Technical support
No scaler action when pedal is pressed, has water flow	Wrong power setting for insert	Set power for proper operation
	Insert not pushed in fully	Re-seat (see page 6)
	Faulty insert	Substitute a known good insert
	Faulty handpiece	Replace
No scaler action, no water flow, but lights are lit	Faulty foot pedal	Call Delmarva 2000™ Tech Support
“Low Pressure” light is on but some water flows	Water knob set too low	Adjust higher
	Clog or restriction	See Part 1; check filter
“Low Pressure” light is on and no water flows	Water supply is off; DE-4 tank is empty or has no pressure	Turn on supply; fill and pump up tank
	Clog	See Part 1; clear the clog
Scaler handpiece gets hot	Insufficient water flow	Set water knob higher
	POWER set too high	See page 7; set POWER lower
	Air in the water system	See page 6; purge the system
	Broken insert laminations	Replace insert
Insert pops out of handpiece	Worn or faulty “O” ring	Replace insert
Poor ultrasonic vibration	Power is set too low	See page 7; Increase setting
	Insert not fully seated	See page 6; re-seat the insert
	Insert is bent or worn out	Replace the insert
Screeching noise during scaling	Air in water system	See page 6; purge the system
Poor scale removal, tip seems to cavitate OK	Improper technique	See page 5; use proper technique
	Wrong tip for task	See page 7; select correct insert
	Worn out tip	See page 7; replace insert

## PORTABLE WATER SUPPLY (DE-4)



The optional DE-4 water tank allows the 2000 Plus Scaler Motor Pack Combo to be used anywhere that 120V 60Hz electrical power is available.

The DE-4 tank is fitted with a hose terminated by the same quick release coupler normally shipped with the 2000 Plus allowing very rapid change over from fixed to portable use without tools.

It is imperative for antiseptic reasons to **fill the DE-4 tank only with clean, drinkable, cold water**. See page 1. Distilled water is desirable because it has the additional advantage of being mineral free.

Anti-microbial agents per se added into the water do not harm the DE-4 tank or the 2000 Plus water system. However, over time and with continual use, deposits will form in the tubing and in the water system. Depending on concentration, deposits in the 2000 Plus water system could eventually become severe enough to restrict water flow to the point where the unit will have to be returned to Delmarva 2000™ for service. The same is true for hard water.

### USING THE DE-4

Remove the top of the DE-4 by turning counter-clockwise. Each day fill with clean, drinkable, **COLD** water. **Do not use hot water**. Replace the top by turning clockwise. Using the handle, pump up the pressure until the yellow ring is visible. Connect the water line from the 2000 Plus unit via the quick disconnect. See page 6 for purging the system. NOTE: Under typical conditions, it is expected that the water in the DE-4 will eventually reach room temperature. This is normal and the 2000 Plus should operate as intended.



At the end of each day's use, release pressure from the tank by pulling out the button on the side of the DE-4 tank. Uncouple the quick disconnect. Note that the button may be rotated ¼ turn counterclockwise and will stay open until turned back clockwise.

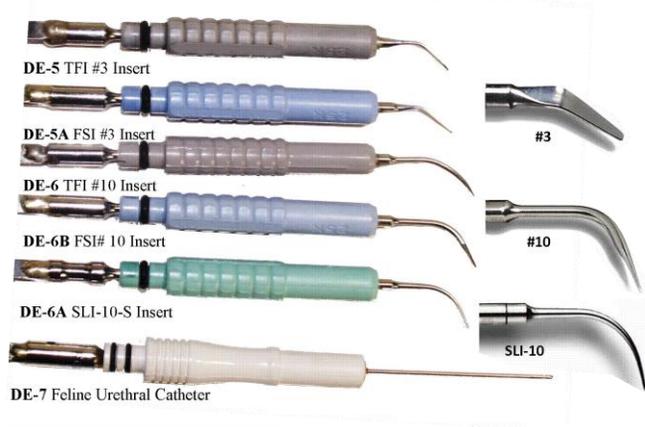
To insure cleanliness of the DE-4, it is advisable to periodically rinse it out with a suitable anti-microbial solution. Be sure to drain and rinse thoroughly before use with the 2000 Plus unit.

Drain and refill regularly. Do not allow water to become stale. Be sure to drain the DE-4 completely if storing or transporting in freezing conditions.

## Accessories

### Item# Description

- DE-5 TFI #3 Insert - 25k (Thru Flow Insert) Included with all dental units. "Beaver Tail" for heavy calculus
- DE-5A FSI #3 Insert - 25k (Focus Spray Insert) "Beaver Tail" for heavy calculus
- DE-6 TFI #10 Insert - 25k (Thru Flow Insert) "Universal" straight for light to moderate calculus
- DE-6A SLI-10-S Insert - Periodontal - 25k (Focus Spray Slim Line Insert) Perio (low power)
- DE-6B FSI #10 Insert - 25k (Focus Spray Insert) "Universal" straight for light to moderate calculus
- DE-7 Feline Urethral Catheter. Use low power "Specialty" setting



- DE-16B Replacement Water Filters (10 pack)



- DE-17 Replacement Scaler Handpiece



- DE-4 Portable Water Supply



## VETERINARY SCALER WARRANTY

**DELMARVA 2000™, LTD.** (hereinafter referred to as DELMARVA), subject to the terms/conditions herein below expressly set forth in Paragraphs (1) through (4), **HEREBY WARRANTS** that it will repair any part of the enclosed DELMARVA **2000 VETERINARY SCALER** which proves defective by reason of improper workmanship and/or material for a period of **THREE YEARS** from the date of **ORIGINAL** purchase without charge for parts or labor.

1. **THREE YEAR** parts and labor coverage on the entire unit excludes the following components:
  - a. Scaler handpiece assembly (two (2) year warranty) not warranted if subjected to abuse from excessive pulling/stretching, debris and/or chemical accumulations from water supplies.
  - b. Foot pedal is covered for two (2) years parts and labor.
  - c. All ancillary items (i.e. Scaler Inserts, Prophylaxis Angle, Contra Angle, etc.) have a 90-day warranty. These items are consumable and need periodic replacement. Replacement time varies with usage.
2. **ORIGINAL PURCHASER:** This warranty is limited to the original purchaser of the unit. The warranty card must be postmarked and returned to DELMARVA within 30 days of purchase date to validate warranty.
3. **PROPER DELIVERY:** To render the services provided hereunder, the unit must be shipped Freight Prepaid or delivered to DELMARVA in either its original package or a similar package affording equal degree of protection. Warranty does not include shipping and handling back to the customer. In the event a loaner is needed, it is the user's responsibility to return the unit, prepaid.
4. **UNAUTHORIZED REPAIR, ABUSE, ETC.:** The unit must not have been previously altered, repaired or serviced by anyone other than a service facility authorized by DELMARVA. To render such service, the serial number on the unit must not have been altered or removed. The unit must not have been subject to accident, misuse, or abuse or operated contrary to the operating instructions. Debris and/or chemical accumulations from water supplies. Water system is not warranted by failure due to debris, and/or chemical deposits from water supplies. Foot pedal is not warranted by failure due to operation or storage in a wet environment.

**EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, NO OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS UNIT. UNDER NO CIRCUMSTANCES SHALL DELMARVA BE LIABLE FOR CONSEQUENTIAL DAMAGES SUSTAINED IN CONNECTION WITH THE SAID UNIT, AND DELMARVA NEITHER ASSUMES, NOR AUTHORIZES ANY REPRESENTATIVE OR OTHER PERSON TO ASSUME FOR IT, ANY OBLIGATION FOR LIABILITY OTHER THAN SUCH AS EXPRESSLY SET FORTH HEREIN.**

### ***Shipping Policy***

**Warranty Work** – To render the services provided hereunder, the unit must be shipped in either its original package or a similar package affording equal degree of protection. It is the customer's responsibility to ship equipment in need of repair to DELMARVA. It is also the customer's responsibility to return any "loaner" equipment to DELMARVA when repairs are completed. Shipping charges to return repaired equipment will be applied to the final bill.

**Non-Warranty Work** - It is the customer's responsibility to ship equipment in need of repair to DELMARVA, in the same manner as above. It is also the customer's responsibility to return any rental equipment to DELMARVA when repairs are completed. Shipping charges to return repaired equipment will be applied to the final bill.

**UPS Ground Service is used for all shipping. Upgrade service will be quoted to customer at time of service.**