Rev. 13

cvdentus

INSTRUCTION MANUAL

DentSurg PRO

This User's Guide contains the information necessary for correctly handling the **DentSurg Pro** ultrasound equipment.

Manufacturer

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Registration of the Product with the Brazilian Health Department

Technical name: DentSurg Pro
Trade name: DentSurg Pro
ANVISA/MS Registration number: 80179329001

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Preface

The **DentSurg Pro** equipment was designed to achieve maximum performance of the handpiece along with high precision mechanical elements, causing the insert to vibrate axially to the handpiece.

The high frequency to which the insert is subjected enables the more resistant calculus to be removed more easily.

DentSurg Pro can conveniently and quickly clean your teeth, and it is electrically safe.

The electromechanical efficiency of this piezoelectric system is much higher than that of traditional magnetostrictor systems. Piezoelectric systems release reduced amounts of heat, making it possible to work with lower volumes of water for cooling, ensuring excellent cavitation, resulting in a more comfortable use for both the patient and the dentist.

The equipment enables control over the power and water flow operation modes. There are 3 operation modes: a constant frequency, suitable for Endodontic procedures; another suitable for Periodontics and Cavity Preparation; and, finally, one with intermittent power, suitable for bone cutting processes. This allows a very fine adjustment for each clinical procedure.

The **DentSurg Pro** configuration is especially appropriate for the use of clinical and surgical **CVDentus** tips. The circuit operates in a self-tuning frequency mode, which always provides the required power for each insert. Never apply too much pressure because the best protection and best cutting and wear efficiency come from the vibration of the tips.

Introduction

The **DentSurg Pro** equipment, along with the **CVDentus** tips, are intended for dental treatments using ultrasound. It enables a wide range of dental interventions with ultrasound, including procedures in Endodontics, Periodontics, Dentistry, Cavitary Preparation, besides small bone cuts.

DentSurg Pro includes two handpieces that enable self-tuning in a range of 27 to 32KHz. Along with the **CVDentus** ultrasonic tip technology, it has the following advantages:

- Eliminates the noise of the traditional high-speed motor, improving the dentist’s working condition and inhibiting the patient's most common fear;
- It is a painless treatment, eliminating the need for anesthesia in most dental treatments, and ensuring greater precision, protecting the original structure of the tooth;
- Because it enables dental treatment without pain, a larger portion of the population might seek preventive treatments;
- It does not cut the soft tissue, that is, it enables subgingival treatment without anesthesia and without bleeding;
- Better finish with a single tip. There is no need for frequently changing the tips;
- Enables access to hard-to-reach regions when compared to conventional high-rotation tips, or any other techniques;
- Enables better visibility during treatment, guaranteeing a procedure with lower risks, preserving healthy tissue;

- Much greater durability (if used correctly), because it is a single diamond stone chemically bonded to the metal rod;
- Brand-new bone-cutting mode allows bone windows to be made without affecting adjacent tissues, such as the sinus membrane, nerves, and blood vessels.

Application

- **Indication:**
  Procedures:
  - Endodontics
  - Periodontics
  - Cavity Preparation
  - Small bone cuts

- **Intended Population (Patients):** Patients of all ages. Because it does not cut soft tissue and does not require anesthesia in most procedures, it can be used in children, special patients and patients who have some type of allergic reaction to anesthetics.

- **Contraindications:** It is suggested that patients that have pacemakers avoid treatment with the **DentSurg Pro** equipment.

- **Body part:** Used in the oral cavity for dental treatment.

- **Characteristics of the intended patient:** The **DentSurg Pro** equipment must be operated exclusively by a dental professional, familiar with the risks and benefits currently known for the use of electromedical equipment in dental offices. No specific training is required. Reading the manual is mandatory before use.

- **Intended conditions for use: DentSurg Pro** should be used in dental offices that follow the ANVISA sanitary standards. The office must have adequate electrical installations of the right size and equipped with a ground rod. The office must follow the requirements for hygiene and sterilization as well as its furniture, utensils and other equipment. The lighting, ventilation and temperature must meet the health requirements of a dental office.
  The equipment is **NOT** intended for use in an oxygen-rich environment.

Principle of operation of DentSurg Pro

DentSurg Pro is a piezoelectric ultrasound equipment for use in dental treatments. Inside the handpieces are piezoelectric pads that, with an electric stimulus, vibrate at an ultrasonic frequency (between 27 and 32 kHz). This vibration is amplified by the handpiece and transmitted to the insert, which vibrates with high intensity. Ultrasonic vibration is used for various endodontic and periodontal cleaning and disinfection procedures. With the addition of **CVDentus** tips made of CVD diamond, this vibration is used for cutting hard materials such as dentin, enamel, bone material and dental restorative materials.

WARNING

The **DentSurg Pro** equipment may cause electromagnetic interference to other equipment or electronic devices.

WARNING: This equipment is not suitable for use in the presence of anesthetic mixtures that are flammable when in contact with air, oxygen or nitrous oxide.

The equipment must be connected to the power network from an individual outlet with grounding plug (third prong).

WARNING

Do not dispose of the equipment along with household waste. Use the appropriate disposal system, following the laws of your country.

If not disposed of properly, electrical equipment poses a serious threat to the health of nature and humans.

At http://www.e-lixo.org/, collection and recycling points can be found all over Brazil. If you prefer, please contact CVD Vale.

WARNING – ULTRASOUND ENERGY NOISE:

Prolonged exposure to the noise can cause physiological effects such as stress, loss of concentration and hearing loss.

The use of earplugs is recommended.

Classification of the equipment

The **DentSurg Pro** ultrasound equipment and its parts, including the APPLIED PARTS, are classified as follows.

Technical Specifications:

- **PROTECTION AGAINST ELECTRIC SHOCKS:**
  - Electromedical Equipment (CLASS I).

- **MAIN UNIT:**
  - Input: 100 – 240V ~ 50/60Hz 52VA – 61VA;
  - Source protected by fuses (not accessible to the user);
  - Power cable length: 2 meters;
  - Maximum ultrasound power: 20W; at 60Hz (cortical mode) and 30Hz (medullary mode);
  - Dimension: width = 200 mm, height = 210 mm, and depth = 250 mm;

- Weight: 2,5 kg;
- Microprocessor circuit with PWM power controller;
- Hardware version: 2.0 (Oct/2017) / Software version: 2.1 (Oct/2017).
- Initial search of the resonance frequency from 27 to 32 Khz and with auto-power adjustment under normal operating conditions.
- Automatic power limiter for power control in case of excessive pressure on the active tip.

- **ACTIVATION PEDAL:**
  - Microswitch activation pedal with standard opening, that is, it closes contact when it is activated;
  - Cable length: 2 meters;
  - Dimensions: 75 x 75 x 30 mm;
  - Weight: 0.075 kg.

- **SURGICAL HANDPIECE:**
  - Piezoelectric with 6 PZT ceramic pads;
  - Insulation for 3000V;
  - Rated frequency: 32 Khz;
  - Approximate length: 114 mm;
  - Maximum diameter: 20 mm; approximate weight: 20 g.
  - Autoclavable.

- **CLINICAL HANDPIECE:**
  - Piezoelectric with 5 PZT ceramic pads;
  - Insulation for 3000V;
  - Rated frequency: 27 Khz;
  - Approximate length: 114 mm;
  - Maximum diameter: 20 mm; approximate weight: 20 g.
  - Autoclavable.

- **PROTECTION AGAINST HARMFUL PENETRATION OF WATER OR PARTICLES:**
  - Main unit - degree of protection: IP21;
  - Activation pedal - degree of protection: IP21;

- **STERILIZING METHODS:**
  - Moist heat sterilization (autoclave), temperature of 134°.
  - Check procedure: Cleaning and Sterilization.

WARNING: Must not be performed in Oven.

- **OPERATION MODE:**
  - Non-continuous operation: “On” 10min / “Off” 5min;

- **ENVIRONMENTAL CONDITIONS:**
  - Temperature - Operation: +10°C to +30ºC. Storage: +10°C to +40ºC;
  - Humidity - Operation: 30% - 80% without condensation;
  - Storage: 10% - 90% without condensation.
  - Atmospheric Pressure – Storage: 860-1060 hPa.
    Operation/ use: 860-1060 hPa
    Transport: 860-1060 hPa

- **EQUIPMENT WITH TYPE B APPLIED PARTS.**

This equipment is **NOT** intended for use in an oxygen-rich environment.

Contraindications for use

Note that electronic devices and electromedical equipment may interfere with the normal operation of pacemaker devices. It is suggested that patients with pacemakers avoid treatment with the **DentSurg Pro** equipment.

WARNING: Cardiac pacemaker patients must not be treated with **DentSurg Pro**, or even approach the equipment when it is in operation.

For additional literature on the subject, please see:

- *"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.*

IMPORTANT

DentSurg Pro must be operated exclusively by dental professionals, familiar with the risks and benefits currently known for the use of electromedical equipment in dental offices. No specific training is required. Reading the User's Guide is mandatory before use.

We advise the dental professional to instruct their patients or others with access to the equipment regarding care during handling.

Do not attempt to repair or assemble defective or inoperative components or replace with parts from other appliances. The original technical specifications and the safety of the appliance can be guaranteed only with the use of original parts.

To ensure the electrical safety of the unit during its lifetime, we recommend that the equipment be checked by authorized service personnel at regular intervals of at least once a year.

There are no other contraindications, however, there is the possibility of people being sensitive to the use of ultrasound in dental treatments. The professional should always observe the patient's reactions on the first use and assess their applicability.

Notes before use

1. Electrical outlets must have grounding prongs. Failure to meet this requirement may result in damage to the equipment and, in particular, to the patient.
2. The equipment must NOT be placed in a dusty environment.
3. Direct contact with water should be avoided.
4. Do not use the equipment in the presence of flammable gases.
5. The equipment should be placed on a constant and stable platform or table. Placing the equipment on an unstable and/or inclined table may degrade performance and/or accidentally cause damage to the system.
6. The equipment may only be disassembled by certified technicians. Violation of this requirement will cause immediate loss of warranty, harm to the user and/or damage to the equipment.
7. For electrical safety, equipment cables should not be placed under heavy objects, and should also avoid high-temperature heat sources.

If you notice any abnormal occurrences when the equipment is in use, unplug the power cord from the wall outlet.

Note to the dental surgeon

For a better use of all functions and to maximize the performance of the **DentSurg Pro** equipment, it is suggested that before using on patients, dental surgeons should practice on artificial models to become familiar with the use of the tips, with the movement and the ideal force to be applied to the inserts.

Details of the ultrasonic motion of the insert

A piezoelectric handpiece, such as the **DentSurg Pro**, causes an anteroposterior vibration movement at the end of the insert. This movement, despite the low amplitude, has a high

speed, which causes a strong impact on the front, back and top of the insert. Due to the high precision of the movement, the impact is much smaller on the sides of the insert. This characteristic movement defines the use of the insert.

For the **CVDentus** tips, the strong impact is very useful, since it cuts the dental structure during a Cavity Preparation, however, for other applications with calculus-removal inserts, periodontal inserts and endodontic inserts, great care must be taken to avoid direct impact of the insert on the tooth to avoid cracking and fissures.

There are two forms of use for removing calculus:

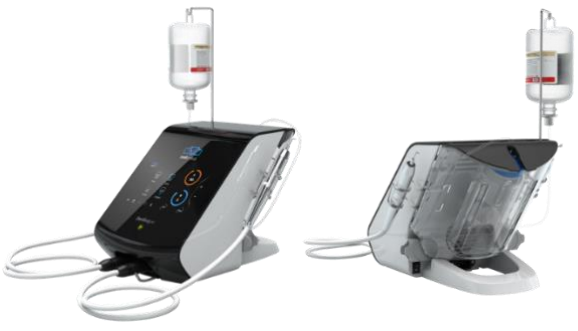
- **Tangential application -** touch the side of the insert to the tooth, so the impact of the anterior and posterior parts is directly on the calculus and not on the tooth. Apply the tip firmly, but without pressure. Let the handpiece follow a "forward" and "backward" movement, slow and regular.
- **Frontal application** – touch the front or back of the insert directly to the calculus, but never directly against the tooth. This situation is only recommended when the layer of calculus is thick and resistant, so that there is no risk of acting directly on the tooth. Whenever the thickest and most resistant calculus is removed, proceed to the tangential application. Press lightly and use a "forward" and "backward" movement, slow and regular.

For application in periodontics and endodontics, in addition to these procedures, low and safe potencies, recommended for the technique and for the power of each insert, should be used. More details about these applications are available in the material sent along with the inserts **CVDentus**, website (www.cvdentus.com.br) or contact the customer service (+55 (12) 3944-1126, asking for more information).

Description of the components

Figure 1 shows the main components of the **DentSurg Pro** equipment, identified by letters A, B, C, D, E and F .

A



*saline not included

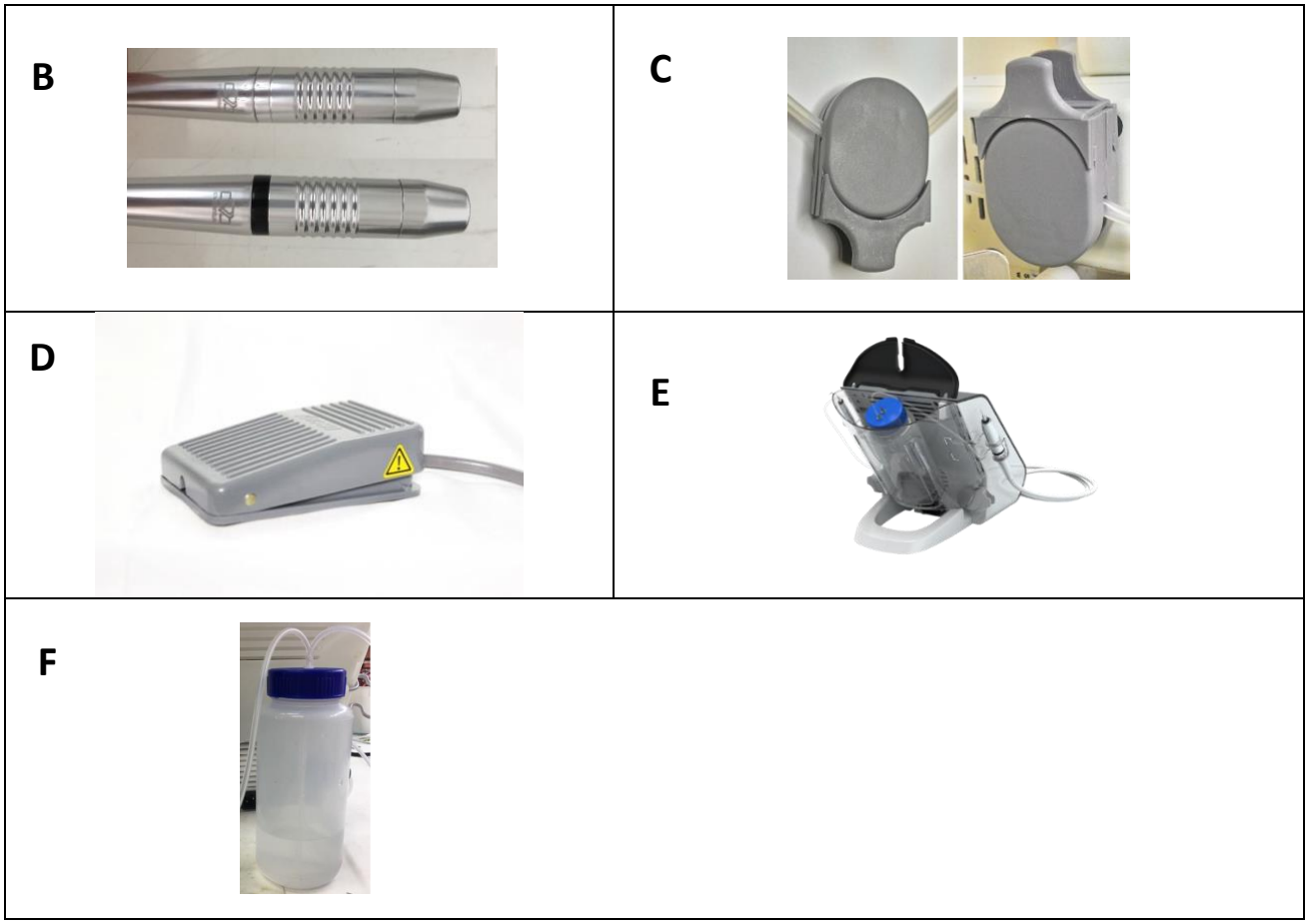


Figure 1: Components of the **DentSurg Pro** equipment: A- Main Unit, B- Handpiece, C- Peristaltic pump, D- Activation pedal, E- Holder, F- Bottle.

A – Main Unit

Functionally, the main unit sends the necessary signal for operation around 32kHz and transmits it to the handpiece, inducing enough power to excite the piezoelectric ceramics inside. This action vibrates the end of the insert at an ultrasound frequency.

Its state-of-the-art circuit detects variations in the resonance frequency of the handpiece with different shapes and folds of the work inserts, adjusting so that the handpiece always operates at an optimum condition between 27 and 32 kHz.

The high efficiency of the circuit resulted in a compact, lightweight, ergonomic and low power consumption equipment.

The main unit also controls the water flow to the handpiece by directly controlling the peristaltic pump. All controls are digital and shown on a liquid crystal display.

B – Handpiece

The handpiece consists of an ultrasonic actuator and insert. The ultrasonic actuator is composed of piezoelectric elements that, when excited, move the tip "forward" and "back" in

the axial direction at high speed, based on the change of control signal waveform from the main unit. According to the movement of the insert, there is a flow of water leaving it, which is necessary for, for example:

(a) Washing the calculus and tartar of the tooth;
(b) Cooling the insert (heat generated by the vibration of the insert);
(c) Washing the waste from the cavity preparation;
(d) Cooling the area undergoing treatment.
(e) This handpiece enables exclusive use of **CVDentus** tips.

The handpieces are connected to the main unit through an electrical connector, as shown in Fig. 1.

Figur1e 1: Detail of the electrical connector of the handpiece.

The connectors are planned to couple with the handpiece, making it impossible to use it incorrectly.

CVDentus handpieces are completely autoclavable at 134ºC, including the cable and the electrical connector.

WARNING

It is recommended that the handpiece be sent for revision/inspection every 12 months or whenever the operator notices a reduction in cutting speed.

C – Peristaltic Pump

The **DentSurg Pro** equipment has two independent peristaltic pumps for supplying water to each of the two handpieces. The peristaltic pumps are easily accessible through the back of the main unit. **It is not necessary to remove the peristaltic pumps attached to the appliance.** It has a "locking" part that can be disengaged to release the silicone tube. The goal of easy access and water connections in a simple way is to allow the disassembly and assembly of the entire water circuit for autoclaving.

The water circuit of the **DentSurg Pro** is entirely external and is fully autoclavable, including the water bottles, hoses and fittings.

WARNING: Only the items that make up the cooling circuit (bottle, silicone tube and handpiece) can be autoclaved.

The autoclave temperature must not exceed 134°C.

Ovens must not be used.

INSTRUCTIONS FOR USING THE PERISTALTIC PUMPS:

The peristaltic pump head is attached to the device; therefore, **it does not need to be removed.** The peristaltic pump is composed of the pump head, attached to the device; a silicone tube that can be removed, substituted and/or replaced whenever it is necessary; and a locking part, responsible for keeping the silicone tube attached to the pump. See Figure 2.

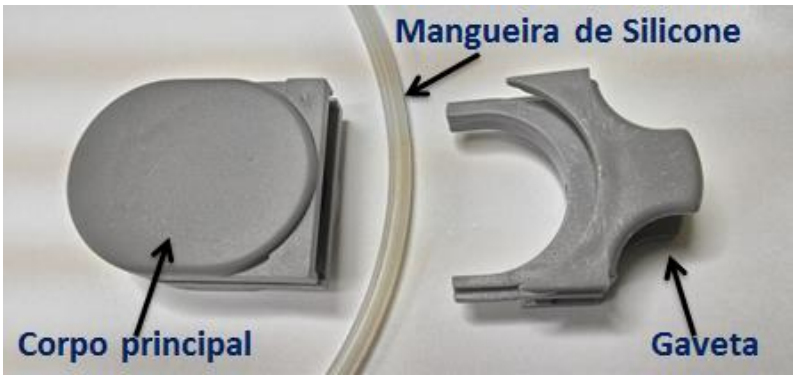


Figure 2: Items that compose the peristaltic pump.

The following figure shows the assembled peristaltic pumps.

Figure 3: Peristaltic pump assembled to the **DentSurg Pro** equipment

To remove the silicone tube, simply remove the peristaltic pump lock and release it, as described in Figure 4.

Figure 4: Press the tabs located on the locking part (one against the other) and pull them, removing the lock and allowing free access to the silicone tube.

After the silicone tube is removed, it can be autoclaved or simply replaced, if necessary.

⚠	**WARNING:** The silicone tube should be loosened and cleaned before each procedure so that no debris build up during continuous use for a long period.

To replace the silicone tube, simply replace it inside the pump head and press the tabs on the locking part again. Push it until it is rests against the head of peristaltic pump, as shown in Figure 5.

Figure 5: Reposition the silicone tube, press the tabs of the locking part and push it towards the pump head, until it reaches the ideal fit.

IMPORTANT CONSIDERATIONS:

- When switching on your appliance after cleaning (autoclaving) the cooling system, ensure that the initial flow is adjusted to the maximum (100%) during the first 10 to 30 seconds. This parameter is important so the motor delivers more power to the pump and breaks the initial post-assembly inertia.
- Wait for the coolant to reach the tip used in the handpiece, and, as soon as it starts operating, adjust the flow according to the use of each tip and/or to the procedure.
- If the pump does not rotate initially, remove the locking part and check that the silicone tube is clean and unobstructed; then, reassemble the system and continue the normal procedure for use.
- Make sure that the silicone hose spigot is connected above the peristaltic pump, i.e. between the pump and the bottle.
- Make sure that the tip on the handpiece that is going to be used is firmly attached.
- Check if the water flow in your equipment is not turned off.

- Do not make any changes or exchanges by any product that is not supplied by the manufacturer.
- The autoclave temperature **must not exceed 134°C**.
- The hoses should be exchanged after 10 autoclaving processes.

D – Activation pedal

The pedal activates the **DentSurg Pro** equipment without interrupting the ongoing treatment. The activation pedal:

(a) energizes the handpiece, causing the insert to vibrate;
(b) activates the peristaltic pump by releasing a cooling flow to the handpiece and the insert.

E – Holder for the water bottle.

In the rear part of the main unit there is a compartment for positioning the bottle that is coupled and protected by the cover-holder. This compartment must not be autoclaved.

Figure 6: Bottle holder.

F – Bottles

Two high-quality, completely non-toxic and autoclavable polypropylene bottles accompany the **DentSurg Pro** equipment.

Figure 7: Bottle

Installation guide

1. Removing the packaging

When unpacking, check the unit for any damage. If damaged, please contact the dealer or manufacturer immediately. When sending the product to the authorized technical assistance, send it inside the packaging, protected and with a copy of the invoice.

2. Storage

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

- Temperature: +10ºC to +40ºC;
- Humidity: from 10% to 90% without condensation;
- Atmospheric pressure: 860 to 1060 hPa.

SAFETY INSTRUCTION: Before anything is connected to the equipment (main unit), make sure that the local power network is properly grounded. The power plug can only be plugged into a wall socket if the ground prong is connected.

3. List of Materials and Accessories

Inside the package, you will find:

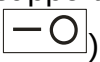
- 01 Main unit (CVDentus)
- 02 Peristaltic pumps (attached to the rear panel) (CVDentus – Model BP1)
- 02 Handpieces (clinical and surgical) (CVDentus – Handpiece model PM and cover COM)
- 01 Activation pedal (CVDentus)
- 01 Bottle holder
- 01 Bottle
- 02 Silicon hose
- 01 ratchet (CVDentus – Model CT4)
- 01 Saline holder
- 01 Power cable (Linetek – Model HO3VV-F)

Other accessories:

- **CVDentus** Inserts (Check our website www.cvdentus.com.br or call our consultants on +55 (12) 3944-1126 and ask for a catalogue, to get to know our models available for use on the **DentSurg Pro**);

4. Installation

After unpacking, note that the handpieces are disconnected from the main unit, and that the peristaltic pumps are in place, but disconnected from the water circuit. The activation pedal is permanently connected to the main unit. To perform the installation, follow these steps:

a. Place the main unit in the position that is most convenient for use. It is small, so it will be easily integrated to your office, and should be installed as close as possible to where it will be used, firmly supported or fixed;
b. Check if the “on-off” switch () is turned off (switch turned to (O);
c. Install the handpieces in their respective connectors (H);
d. Install the water tubes (silicone tubes), connecting the peristaltic pumps output to the water connector of the handpiece. Connect the water input of the peristaltic pumps to the output connector of the bottles to use the clinical handpiece, or connect the saline output to use the surgical handpiece.
e. Unwind the pedal wire and place it on the floor in a convenient position for its activation while using the **DentSurg Pro**;
f. Unwind the power cord and connect the plug. Check for a socket with a grounding pin within reach of the length of the power cord. It is not necessary to check the voltage, since the power supply is automatic bivolt;
g. Run the “Clean” procedure without attaching the insert to the handpiece, pressing the key for 3 seconds and waiting for up to 10 seconds until it automatically stops, thus clearing the hose, the irrigation speed and avoiding breaking the insert due to excessive heat.
h. Place a **CVDentus** tip on the handpiece;
i. With the aid of a ratchet, tighten the chosen **CVDentus** tip;
j. Turn on the main unit, moving the “on-off” switch  to the position (I) and watch the touchscreen display be activated and show the **CVDentus** logo.
k. Choose a procedure;
l. Before engaging the pedal, turn the handpiece towards a sink;
m. Engage the pedal so the **CVDentus** tip vibrates in the ultrasound frequency;
n. Adjust the water flow if needed, through the corresponding command on the touchscreen display. Engage the pedal again and observe the flow. Repeat this procedure until reaching the desired flow;
o. There you go, the machine is up and running.

5. Special Recommendations for the installation

Since patients may experience some tissue trauma during treatment, it is suggested that the operator use purified or distilled water. This will significantly reduce the possibility of infection. In some procedures, the use of a sterile liquid, such as saline, for example, may be desirable.

After installation, the entire extra length of the power cable must be arranged neatly to avoid accidents.

The activation pedal should be placed in a position where operators can easily reach it. All extra cable of the activation pedal must also be arranged neatly to avoid any kind of accidents.

Before the first use

To better use all functions and maximize the performance of your **DentSurg Pro**, we suggest that, before treating patients, operators/dentists should practice on models/plaques to become familiar with the system. For standard tartar-removal tips, use an aluminum plate. For the others**,** whose objective is to test the diamond cut of the active tip, it is recommended that a hard material be used, which can be a piece of ceramic floor type CP1, CP2 or CP3. In either case, maneuver the tip with gentle touches on the test material. Familiarize yourself and observe the subtleties of the application of pressure under the different angles of the tips, the main working positions etc. Look closely at the scratches left on the aluminum plate after each session and try to combine each scratch with the angles and positions that caused it.

Additionally, adjust the ultrasonic power intensity using the corresponding keys. Familiarize yourself with the differences when the intensity of ultrasound power is changed. Finally, adjust the water flow using the water flow control key in the display. Familiarize yourself and observe the subtleties between different water flow situations. Observe the change in temperature of the handpiece according to the water flow. Do not overheat the handpiece. Perform the above training procedures several times to prepare for treating patients.

Expected distances

The **DentSurg Pro** equipment has some symbols and important information on the main unit, moveable parts and accessories. The operator's distance is important so they can read the signals. From all signals, reading the symbols marked on the handpiece and the handpiece cover depends on the position of the operator, as shown below:

Figure 08: For a perfect readability, the recommended distance is approximately 30cm, as shown in the figure.

The handpiece must be at approximately 10cm from the patient’s ear.

Other distances must be observed for the safety of the operator (distance considered up to the operator’s ear):

- Minimum distance between the equipment and the operator (≥ 30 cm);
- Minimum distance between the handpiece and the operator (≥ 30 cm).

Period of contact

Below are the specified periods for contact with the cabinet parts and applied parts:

- Cabinet parts: 1 s ≤ t < 10 s;
- Applied parts: t < 1 min.

Instructions for use and operation

FREQUENTLY USED FUNCTIONS

- Connecting the equipment to the power network;
- Turning the equipment power switch on;
- Emptying and filling the bottles with coolant;
- Placing and removing the CVDentus tips (applied parts);
- Selecting the handpiece;
- Reading the display and the LEDs;
- Cleaning;
- Handling/holding the handpiece;
- Turning off the power.

FUNCTIONS RELATED TO PRODUCT SAFETY

- Selecting the proper function and power for the **CVDentus** tips (applied parts);
- Correctly attaching the **CVDentus** tips (applied parts);
- Cleaning and disinfecting the parts that come in contact with the patient;
- Cleaning the equipment;
- Always make sure there is coolant inside the bottles. Ensure irrigation.

Control panel and main unit connectors

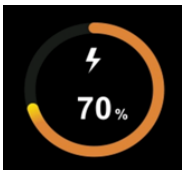
The functions of the touchscreen display on the main unit are detailed here, according to the following figures.

1- **Touchscreen Display:**

Figure 09: Language selection screen

1.1 Initial display:

Figure 10: Main screen of the **DentSurg Pro** ultrasound equipment

	Selection key for the specialty SURGERY		Selection key for the specialty PERIO
	Selection key for the specialty ENDO		Selection key for the specialty CAVITY
	Indicator for adjusted power		Indicator for adjusted irrigation intensity
	Selector of intensity of power and irrigation		
	Activates the LED function of the pen and the intensity can be disabled or changed in up to 3 stages.		Go back to the main menu
	Favorite procedures		Settings

1.2 Surgery Display:

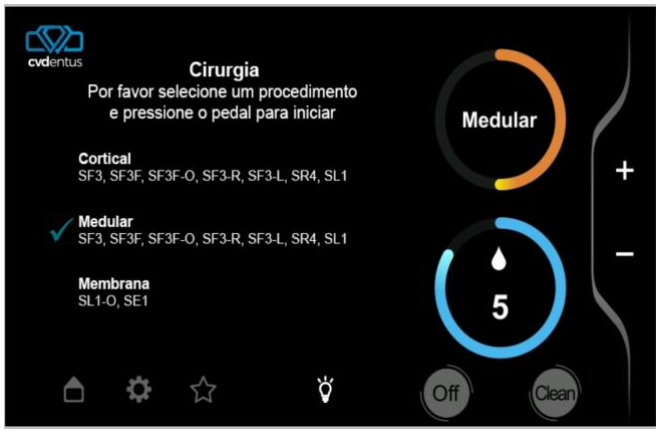


Figure 11: Screen of the surgery specialty on **DentSurg Pro**

	Indication of the selected mode		Selection of irrigation intensity

1.3 PERIO Display:

Figure 12: Screen 1 for the PERIO specialty.

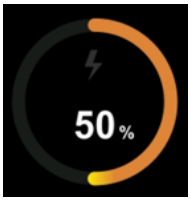
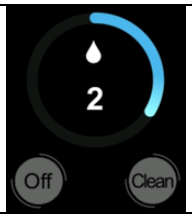
	Indication of the selected power		Selection of irrigation intensity

Figure 13: Screen 2 of the PERIO specialty.

Figure 14: Screen 3 of the PERIO specialty.

1.4 ENDO Display:

Figure 15: Screen 1 of the ENDO specialty.

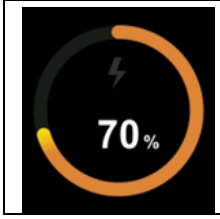
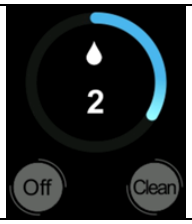
	Indication of the adjusted power		Selection of irrigation intensity

Figure 16: Screen 2 of the ENDO specialty.

Figure 17: Screen 3 of the ENDO specialty.

1.5 CAVITY Display:

Figure 18: Screen 1 of the CAVITY specialty.

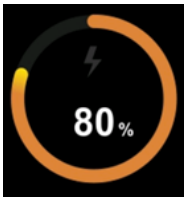
	Indication of the adjusted power		Selection of irrigation intensity

Figure 19: Screen 2 of the CAVITY specialty.

Figure 20: Screen 3 of the CAVITY specialty.

1.6 FAVORITES Display:

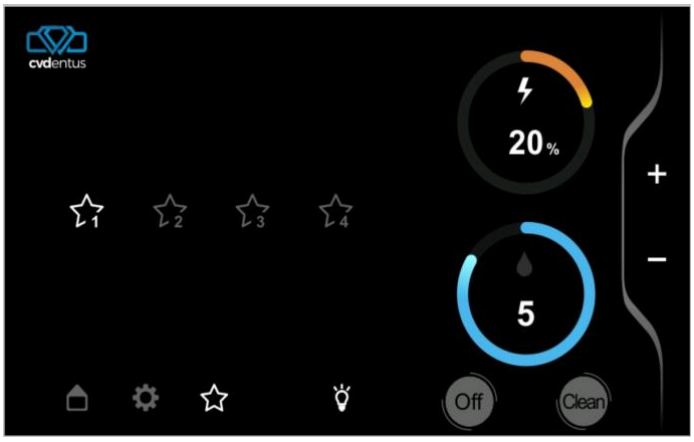


Figure 21: The screen above is intended for selecting 4 sequences of Favorites. The blank icon indicates that there are stored procedures in this favorite sequence. The gray icon indicates that there is no stored procedure.

Figure 22: Favorites Screen - 1: Four memorized procedures and one not memorized.

Figure 23: Screen with the procedure “30% Power” saved in the available position shown in the previous figure

Identification of the applied part

Figure 24: Intermediate screen in the process of deleting a memory procedure.

Figure 25: Favorite screen 1 after deleting the procedure stored in the second position.

WARNING

Do not use the equipment if the display shows "static" or confusing characters. In this case, the equipment must be sent to the technical service.

Before connecting the main unit, make sure that all other components are connected, that the power plug is plugged into an electrical outlet, and that the activation pedal is not pressed.

	Figure 11: The **CVDentus** insert comes into contact with the patient for the device to perform its function. The handpiece activates the ultrasonic vibration of this tip. The insert is considered an applied part.

WARNING: In case of emergency for isolating the equipment from the power network, remove the power plug. Removing the plug from the outlet is considered a means of total insulation from the electrical network. Do not obstruct access to the socket; in case of emergency this procedure should be easy and quick.

Figures 26 (A) and (B): Filling the bottle with liquid

A	B
	

Hold the bottle and remove the cap by turning it counterclockwise (A). Remove the cap (B) and place the liquid inside the bottle. Close the bottle by turning the cap clockwise.
Note: Before each use, clean the bottle. Never leave liquid inside the bottle if the equipment is not in use.

Figures 27 (A) and (B): Connecting and disconnecting the tube from the bottle

A	B
	

Figure (A): The operator must hold the bottle with the cap on and place the tube of the peristaltic pump in the connector located on the cap. Gently insert the tube to the end, as shown in figure (B). To remove: Hold the hose in the same position as figure (A) and gently pull the hose.

Figure 28: Connecting and disconnecting the tube from the handpiece

Hold the handpiece cord connector and engage the hose end of the peristaltic pump as shown in the figure. With gentle force place the hose to the end of the connector. To remove: hold the hose and gently pull the hose.

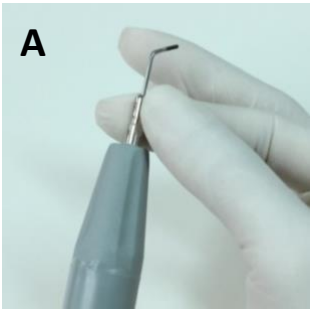
Connecting and disconnecting the handpiece cable from the main unit

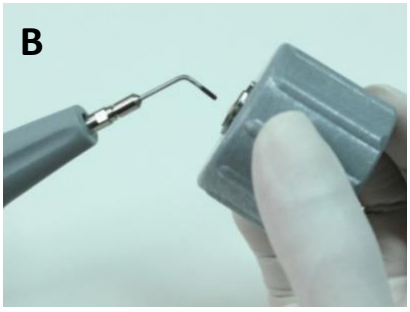
A

B

Hold the connector of the handpiece cable (A). Attach the handpiece to the front connector of the equipment. Press for completely attaching. In picture (B) the connector is fully attached to the main unit. To disconnect, grasp the connector and pull in the direction opposite the connector.

Figures 30 (A), (B) and (C): Connecting and disconnecting the CVDentus inserts





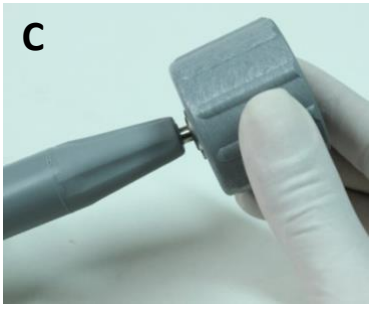


Figure (A): Hold the handpiece and, with the other hand, screw the CVDentus tip clockwise until it is securely tightened. To finish tightening, use the ratchet (B) by inserting the tip into the hole until it touches the unit, as shown in figure (C).

Finish the tightening by turning the ratchet clockwise. When you hear a ratchet sound and the key turns for nothing, it is a sign that the tip is completely locked. Remove the ratchet carefully.

To remove the tip, repeat the procedure from (C) to (A), but turning counterclockwise.

Figure 31: Connecting and disconnecting the power cable from the main unit

Hold the power cord connector following the figure and fit into the back of the main unit. Use your other hand to support the main unit. Make sure that the cable is fully connected as shown in the figure. The other end of the cable should be plugged into the outlet.

To remove the cable, make sure that the equipment is turned off and the other end of the cable is unplugged from the outlet. Hold the connector near its end and pull it out.

Operation procedures

WARNING: To prevent the tip from becoming loose or breaking, avoid the following procedures:

- Leverage (incorrect use);
- Excessive pressure;
- Inadequate assembly;
- Accidental mechanic shock (fall).

This damage can cause intrabuccal or bodily injury, at the risk of the patient swallowing the loose part.

1. PREPARING TO TREAT A PATIENT

a) Turn the “on-off” switch ( ) on to light up the green LED indicator of power on the front panel of the main unit.

b) Check the water level.

c) Select one of the handpieces.

d) Run the “Clean” function so the irrigation will be ready for the procedure;

e) Select the necessary tip, making sure it is completely tightened to the selected handpiece.

f) Choose a procedure and/or adjust the power to the appropriate level for the insert or tip being used.

g) Hold the handpiece with the end of the insert turned towards a sink. Engage the pedal and allow water to come out of the handpiece for a few seconds until it flows without interruptions.

h) Place a tip in the patient’s mouth and use the pedal to activate the handpiece and the water flow.

2. APPLYING THE TIP AND PATIENT’S SENSITIVITY

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

a) When treating the places where the patient has a lot of sensitivity, try to increase the speed of movement of the handpiece on the surface of the tooth.

b) Treat less sensitive places first, returning to more sensitive areas later.

c) If these problems persist, reduce the intensity of ultrasound power of the handpiece.

3. CONTROLLING THE HANDPIECE USING THE PEDAL

The pedal was designed to control the functions of the handpiece in two ways:

1 – With the foot engaging the pedal, the handpiece and the water flow are activated.
2 – When the foot releases the pedal, the handpiece and the water flow are turned off.

4. CONTROLLING THE WATER FLOW AND THE TEMPERATURE

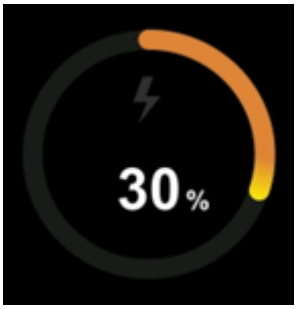
	The water flow key has six defined flow positions, equivalent to 16%, 33%, 50%, 66%, 83% and 100%. Depending on the operating power, a minimum water flow is defined.

NOTE: The stronger the water flow, the lower the handpiece temperature, and vice-versa.

WARNING

Avoid using the handpiece without water flow. This is only possible in some specific ENDO procedures.

5. PROCEDURE CONTROL AND POWER ADJUSTMENT

	Once the program is selected, check the procedure and operating power before activating the pedal. If this is not the condition you want to work with, and you choose to change the power manually, click the "Home" icon and select "-" or "+" to increase or decrease the power, which can be adjusted at the following levels: 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90 and 100%. The maximum power limits indicated for each insert must be observed.

Preventive maintenance and inspection

DentSurg Pro does not require special maintenance routines, but it needs to be cleaned and sterilized regularly and thoroughly. You must also constantly observe the integrity of its components.

1. DAILY START UP

a. Check that the equipment and its parts are all intact, properly installed, and properly connected.

b. Check the integrity of the power cord.

c. Connect the power plug to the outlet.

d. Activate the “on-off” switch () to turn on the equipment and light up the green LED power indicator.

e. Select a handpiece and check the procedure, power, and water flow shown on the display.

f. Check that the water tank has enough water.

g. Engage the Activation Pedal.

NOTE 1: Wait a few seconds until the water flows out of the handpiece.

NOTE 2: If the LED power indicator does not light up, check if the power plug is correctly connected**.**

2. DAILY SHUTDOWN

a. Activate the “on-off” switch () to turn off the unit and the LED power indicator.

b. Remove the power plug from the outlet.

WARNING

Removing the power plug from the wall outlet at the end of the work day avoids damages and prolongs the life of the equipment.

3. PREPARING TO TREAT A PATIENT

Make sure that all parts that need sterilization are autoclaved and available for use. **CVDentus** inserts need to be autoclaved with each use. In some cases, it is absolutely necessary to autoclave the entire handpiece, the entire water circuit, including the water reservoir. At the discretion of the dental surgeon, in the case of non-invasive treatments, it is possible that only the insert that is going to be used with the handpiece and the cover be autoclaved.

4. MAINTENANCE OF THE WATER CIRCUIT AND THE PERISTALTIC PUMP

The external water circuit – consisting of the bottle, peristaltic pump and its tube – is fully autoclavable at a maximum temperature of **134ºC**. There are no limits to the number of bottle sterilizations. The peristaltic pump and the tube are worn by use and by autoclaving and should be replaced when wear and tear compromise their operation. It is always advisable to have additional silicone tubes for replacement every 10 autoclaving cycles.

Extending equipment life

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. Never leave the equipment directly under the sun.

Before leaving the office, make sure that the power plug is disconnected.

After six months – or whenever you realize that the ultrasonic power of the handpiece is not enough to perform treatments –, it is very possible that the insert is worn. In this case, replace it with a new one; if it is not the case, direct your authorized servicer to service the system.

Customer Service: If service is required, please contact your local authorized agent or manufacturer.

Cleaning and sterilization

It is important to follow these procedures before starting to use the equipment, because without them patients and/or doctors could be infected. It is imperative that dentists wear sterile gloves during ALL the procedures to avoid any possibility of incomplete sterilization and/or infection. Below are detailed the infection control procedures for the handpiece, insert and main unit, respectively

WARNING: The use of cleaning and sterilization methods authorized by current legislation is recommended.

The use of acids in the cleaning process is prohibited.

1. HANDPIECE

	**Before cleaning, remove the insert from the handpiece.** Press the "Clean" command to drain the water and all possible contamination from inside the handpiece. The cleaning action will remain on for up to 10 seconds automatically after your selection.

Clean and disinfect the outside surface of the handpiece, using 70%* alcohol, scrubbing for 60 seconds, with a towel of sterile cloth. The application of alcohol 70% should be repeated three times. Do this all over the exposed part of the handpiece, including the handle. Pay attention and remove all potentially contaminated residues from the metal part of the handpiece. Never subject the handpiece to ultrasonic cleaning and never soak it in any substance.

After each use, there will be saliva and/or blood or other residues left on the handpiece. Therefore, it is necessary to clean it with a solution of detergent and water. After, rinse thoroughly with water to remove all detergent, and then dry it. Place it in a sterilization bag and then place it inside the autoclave and sterilize at 134°C for 10 minutes, or as recommended by the autoclave manufacturer, always observing the maximum temperature of 134°C.

After disinfecting the handpiece, attach a sterile insert to it, in preparation for the next patient.

NOTES: The components inside the handpiece are highly sensitive so do not try to open or knock it. This may shorten its life or damage it. Never subject the handpiece to an ultrasonic cleaning. The handpiece should be changed whenever the operator notices a reduction in cutting speed.

2. PERISTALTIC PUMPS AND WATER CIRCUIT

Whenever necessary, disassemble the cooling circuit and sterilize the components in an autoclave. The bottles, their caps, the silicone tubes and their connectors must be packed in sterilization bags, together or separately. Autoclave at 134°C for 10 minutes, or as recommended by the autoclave manufacturer, always observing the maximum temperature of 134°C.

WARNINGS

- The handpieces, the bottles and their covers, in addition to the irrigation system (except for the peristaltic pump, which is attached to the equipment console), are autoclavable at a maximum temperature of 134ºC.
- Autoclaving is always recommended to minimize cross-infection problems.
- It is always advisable to have an additional sterile water circuit available.
- The handpiece should be autoclaved after use on each patient.

3. INSERTS AND TIPS

After each use, there will be saliva and/or blood or other residues left on the inserts and tips; therefore, it is necessary to first clean the inserts with a cleaning liquid. This can be done by rubbing them with a solution of detergent and water. After, rinse thoroughly with water to remove all detergent, and then dry it. Place it in a sterilization bag and then place it inside the autoclave and sterilize at 134°C for 10 minutes, or as recommended by the autoclave manufacturer, always observing the maximum temperature of 134°C. Ovens should not be used.

WARNINGS

- High room temperature conditions, improper dilutions, or excessive immersion time in a chemical sterilizer can result in damage to plastic and elastomeric materials.
- The use of a dry oven, or of an incompatible chemical sterilizer steam, or of ammonium quaternary compound, should be avoided as this may result in damage to the plastic and elastomeric materials.
- Do not attempt to change the shape or weight of the tip or insert, as this may decrease the ultrasound power.

4. MAIN UNIT

Since the main unit does not come into direct contact with patients, cleaning is simple. Just gently wipe the main unit using a 70% alcohol disinfectant, and keep it free of dust. If another deodorizer is used, choose one that has no chemical effect on the surface of the ABS plastic of the main unit. If you are not sure about this, test it before use or consult your supplier.

Essential performance

The essential performance is the primordial performance, and its lack or degradation results in an unacceptable risk. Thus, the equipment must always be refrigerated, that is, have a constant flow of liquid throughout the cooling circuit (bottle, peristaltic pump, handpiece and CVDentus "applied part").

Electromagnetic compatibility

CAUTION: The facilities where DentSurg Pro will be operated must comply with the guidelines listed in Tables 2, 3, 4, and 5. The use of accessories other than those specified by the manufacturer may result in increased emissions and decreased immunity in relation to EMC (Electromagnetic Compatibility).

STATEMENT

RF (Radio Frequency) communication equipment can affect the proper operation of the DentSurg Pro ultrasound.

IMPORTANT: Cell phones or personal communication systems, transceiver radios and cordless phones must be completely disconnected (off) in the dental office area.

STATEMENT

The DentSurg Pro ultrasound equipment is suitable for use within the public power supply (127 to 220 V ~ 50/60Hz).

The power cord, handpiece, peristaltic pump and tips follow the electromagnetic compatibility.

1. ELECTROMAGNETIC RADIATION

DentSurg Pro Ultrasound is intended for use in the electromagnetic environment specified below. The owner or user should ensure that it is being used in such an environment .

Radiation Tests	Conformity	Electromagnetic environment - guidelines
RF Radiation CISPR 11	Group 1	DentSurg Pro dental equipment does not use RF energy for its internal functions.
RF Radiation CISPR 11	Class B	The DentSurg Pro equipment is suitable for use in all establishments, including households and those directly connected to the public low-voltage power network that feeds buildings used as households.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuation/scintillation emission IEC 61000-3-3	In accordance	

Table 1 - Guidelines and statement – electromagnetic radiation

CAUTION: The DentSurg Pro ultrasonic equipment should not be used while stacked or too close to other equipment.

2. ELECTROMAGNETIC IMMUNITY

IMMUNITY Test	IEC 60601 Test level	Compliance level	Electromagnetic environment - guidelines
Electrostatic Discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air There is no loss of essential performance, only the information shown in the display is corrupted.	The floors must be made of wood, concrete or ceramic. If they are covered by synthetic material, the relative humidity should be at least 30%. In the rare event of rapid electrical transients that corrupt the information shown on the display, simply release the pedal to update the information. If the pedal is not engaged, the information is updated periodically.
Rapid electric transient/safe IEC 61000-4-4	± 2 kV for electric power lines ± 1 kV for input/output lines	There is no loss of essential performance, only the information shown in the display is corrupted.	The quality of the power network must be that of a hospital or commercial environment. In the rare event of rapid electrical transients that corrupt the information shown on the display, simply release the pedal to update the information. If the pedal is not engaged, the information is updated periodically.
Surges IEC 61000-4-5	± 1 kV line to line ± 2 kV line to earth	± 1 kV differential mode ± 2 kV standard mode	The quality of the power network must be that of a hospital or commercial environment.
Voltage drops, short interruptions and voltage variations in the power supply input lines. IEC 61000-4-11	< 5% U_T (drop > 95% at U_T) for 0.5 cycle 40% U_T (drop 60% at U_T) for 5 cycles 70% U_T (drop 30% at U_T) for 25 cycles	< 5% U_T (drop > 95% at U_T) for 0.5 cycle 40% U_T (drop 60% at U_T) for 5 cycles 70% U_T (drop 30% at U_T) for 25 cycles	The quality of the power network must be that of a hospital or commercial environment.
	< 5% U_T (drop > 95% at U_T) for 5s	This condition turns off the equipment, which should not be turned back on while the pedal is engaged.	In this case, human intervention is required to release the pedal and restart the equipment, returning it to the previous conditions of use. If the DentSurg Pro ultrasound operator needs the devide to keep working during power interruptions, it is recommended that the DentSurg Pro ultrasound be powered by an uninterruptible power source.
Magnetic field generated by the frequency of the power network (50/60Hz) IEC 61000-4-8	3 A/m	3 A/m	The quality of the environment where the DentSurg Pro ultrasound is installed must provide levels below the test level in order to ensure the correct operation of the equipment.
NOTE: U_T is the voltage of the C.A. network before the application of the test level.			

Table 2 - Guidelines and statement – electromagnetic IMMUNITY

WARNING:
The equipment may restart in case of voltage variations. Observe the selected operating mode as soon as the machine is ready for use.

IMMUNITY Test	IEC 60601 Test level	Compliance level	Electromagnetic environment - guidelines
Conducted RF IEC 61000-4-6 RF irradiation IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	3 Vrms 3 V/m	Mobile or portable RF communication equipment should not be used at shorter distances from any part of the DentSurg Pro ultrasound, including cables, than the recommended separation distance calculated by the equation applicable to the transmitter frequency. **Recommended separation distance** $d = 1{,}2\sqrt{P}$ $d = 1{,}2\sqrt{P}$ $80\ MHz\ a\ 800\ MHz$ $d = 2{,}3\sqrt{P}$ $800\ MHz\ a\ 2{,}5\ GHz$ Where *P* is the maximum declared power output level of the transmitter in watts (W) according to the manufacturer of the transmitter and *d* is the recommended separation distance in meters (m). The field intensity from the RF transmitters, determined by an electromagnetic field survey[a], should be lower than the compliance level for each frequency band[b]. Interference may occur around equipment marked with the following symbol: 
NOTE 1: At 80MHz and 800MHz, the highest frequency band is applicable. **NOTE 2:** These guidelines do not apply to all situations. Electromagnetic propagation is affected by the absorption and reflection of structures.			
a	The field intensity from fixed transmitters, such as radio base stations for telephones (cellular or wireless) and mobile ground radios, amateur radio, AM and FM radio transmissions and TV broadcasts, cannot be predicted theoretically with precision. To evaluate the electromagnetic environment generated by fixed RF transmitters, an electromagnetic field survey should be considered. If the field intensity measured at the location where the DentSurg Pro ultrasound will be used exceeds the applicable RF COMPLIANCE LEVEL defined above, the DentSurg Pro ultrasound should be observed to verify that it is functioning normally. If abnormal performance is detected, additional measures may be required, such as reorientation or relocation of the DentSurg Pro ultrasound.		
b	Above the frequency band of 150KHz to 80MHz, field intensity should be lower than 3V/m.		

Table 3 - Guidelines and statement – electromagnetic IMMUNITY

Recommended separation distance between mobile or portable RF communication devices and the DentSurg Pro ultrasound	
The DentSurg Pro Ultrasound is intended for use in an electromagnetic environment in which disturbances by RF irradiation are controlled. The owner or user of the DentSurg Pro ultrasound can help prevent electromagnetic interference by keeping a minimum distance between mobile or portable RF communication devices (transmitters) and the DentSurg Pro dental ultrasound, as recommended below, according to the maximum output power of the communication device.	
	Recommended separation distance according to the transmitter frequency m

Maximum declared output power level of the transmitter W	**150 kHz to 80 MHz** $d = 1{,}2\sqrt{P}$	**80 MHz to 800 MHz** $d = 1{,}2\sqrt{P}$	**800 MHz to 2.5 GHz** $d = 2{,}3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters with a maximum declared output power level not listed above, the recommended separation distance *d* in meters (m) can be determined by using the equation applicable to the transmitter frequency, where *P* is the maximum declared output power of the transmitter in watts (W), according to the manufacturer of the transmitter.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the highest frequency band is applicable. **NOTA 2:** These guidelines do not apply to all situations. Electromagnetic propagation is affected by the absorption and reflection of structures, objects and people.

Table 4 – Recommended separation distances

STATEMENT

The DentSurg Pro Ultrasound Equipment does not need to be used in an armored environment.

DentSurg Pro is not completely immune to rapid electrical transients. In the tests of IEC 61000-4-2 for rapid pulse trains (± 2 kV for power supply lines and ± 1 kV for input/output lines, in pulse trains of 15 ms duration and 5 kHz frequency) the information shown on the display was corrupted without compromising essential performance. Releasing the pedal will rewrite the display, updating the information. If the pedal is not engaged, the information is updated periodically.

DentSurg Pro is not completely immune to electrostatic discharges (IEC 61000-4-2). Electrostatic discharges into earth planes close to the DentSurg only affect the information shown on the display, without compromising essential performance. Releasing the pedal will rewrite the display, updating the information. If the pedal is not engaged, the information is updated periodically.

Electrostatic discharges to the exposed metal parts that are attached to the ground (handpiece connector and end of the insert placed on the handpiece) can compromise the essential performance of **DentSurg Pro**. In addition to corrupting the information shown on the display, the handpiece control stops working, stopping the operation. In this case, it is necessary to switch the equipment off and on again to restore operating conditions. Despite losing control of operation of the handpiece, this condition offers no risk, because the ultrasound power is not dangerous.

If there is a voltage drop of the power network for more than 5 seconds, the **DentSurg Pro** equipment turns off completely, turning back on when the voltage comes back. As the DentSurg cannot be restarted while the pedal is engaged, if any voltage drop occurs during

operation while it is engaged, it is necessary to release it and then turn the equipment back on. If the pedal is not engaged, the system restarts normally.

STATEMENT
Permitted degradations are: Any corruption of the information shown on the display, which is fully restored periodically if the pedal is not engaged, and, if the pedal is engaged, are fully restored when the pedal is released. This degradation does not disrupt the essential performance of the equipment. An eventual corruption of the handpiece control circuit was observed only under electrostatic discharge above +4 kV on the grounded metal parts (handpiece connector and insert placed on the handpiece). The corruption of the control circuit does not cause risks, because the generated ultrasound power is always safe. This degradation disrupts the essential performance of the **DentSurg Pro**, and normal operation can only be restored by switching the instrument off and on again.

Some electromagnetic events, in particular electrostatic discharges occurring in the vicinity of the **DentSurg Pro** or fast electrical transients in the power network, may momentarily corrupt the information shown on the display. This information is periodically restored if the pedal is not engaged and is re-established immediately after releasing the pedal if it was engaged during these events.

Electrostatic discharges above 4kV directly on the exposed and grounded metal parts (handpiece connector and insert placed on the handpiece) may corrupt the ultrasonic control circuit. Normal operation is only restored by turning the **DentSurg Pro** off and back on again.

Identifying defects

Problem	Cause	Test	Solution
The equipment does not work	The power plug is not connected to the power outlet.	Visual	Plug the power supply into a 127 or 220V outlet.
	The “on-off” switch (⏻) is on (○).	Visual	Turn the “on-off” switch (⏻) to the ON position (I)
	The pedal is not engaged.	Visual	Press the pedal with your foot until it is engaged.
Water is not coming out of the insert.	The tip or adaptor or insert are loose or partially loose from the handpiece.	Tighten	Tighten the tip, adaptor or insert with the tightening wrench, so it is firmly attached to the handpiece.
	The water level in the bottle is below minimum.	Visual	Fill the bottle with cooling liquid.

	The peristaltic pump is not pumping.	Hearing (the pumping sound is perceptible)	Reassemble the peristaltic pump, cleaning it if necessary. If wear is noticed, contact Customer Service to replace the peristaltic pump with a new one.
	The engine does not spin.	Hear if the axis of the engine turns when the pedal is engaged.	Test in various conditions of flow adjustment through the front panel.

Table 5: Identifying possible problems.

If the defect persists after the solution suggested in the table above, the equipment should be sent to the authorized service center to diagnose the cause of the defect and to perform the necessary repair.

CORRECTIVE MAINTENANCE

If the equipment does not operate again after the defect identification procedure or when there is damage to one of the parts of the equipment that compromises its safety, follow the procedures below:

- Separate the equipment and purchase invoice;
- Contact technical assistance for the formalization of the call;
- Submit all the pieces, copy of the invoice and a handwritten letter reporting the problem;
- Securely pack all parts in a suitable package and write down the invoice number on the outside of the box, as directed by Customer Service.

CAUTION: Do NOT modify this equipment without authorization from the manufacturer.

PREVENTIVE MAINTENANCE

Description	Frequency
Inspect the power, pedal and handpiece cables. Check if they are not broken or have exposed wires.	Daily
Inspect the tubes in the cooling system. Check if they are not broken, cracked or strangled.	Daily
Inspect the peristaltic pump and the cooling tube. It is likely that after a long period of use a powder coming from silicone hose wear will form. It is recommended to clean it and replace it if necessary. With the triple syringe, throw	After each sterilization cycle in the autoclave.

compressed air into the peristaltic pump body, without the locker and hose, to remove dust.	
Inspect the CVDentus ultrasound tip (applied part). Check if the tip is correctly attached to the handpiece. The tip must be firmly attached and tightened with a ratchet.	Before each procedure.

Table 6: Indication for preventive maintenance.

Warranty

Under the terms of the Law, any eventual MANUFACTURING DEFECT may be claimed within ninety (90) days from the date of delivery of the equipment. Trusting its quality, we grant the buyer of the product, in addition to the legal guarantee, a complementary cover, reaching a total of ONE YEAR guarantee (90 days of legal warranty plus a supplementary of 9 months) against manufacturing defects from the date of purchase in the invoice, and 06 (SIX) MONTHS of warranty (90 days of legal warranty, plus complementary of 03 months of factory) against manufacturing defects of the hand pieces, also from the date of purchase in the invoice.

In any case of defect, the customer can consult the TECHNICAL ASSISTANCE. Sending out the equipment for evaluation during the warranty period is the responsibility of the buyer.

LOSS OF WARRANTY

This warranty will be voided if any of the following conditions are found:

1. The equipment or parts of it has been damaged by falling, natural phenomena, installation or improper use;

2. The equipment or parts of it has been serviced by persons not authorized by the manufacturer and/or using non-original parts;

3. Malpractice, recklessness, violation and/or negligence in handling or operating;

4. Inadequate electrical installation;

5. Use for purposes other than the intended purpose;

6. Not presenting the invoice.

In case of any of the above, the buyer (CLIENT) shall bear ALL costs incurred in transportation and repair of the product.

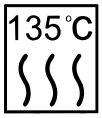
WARNING

Any replacement or repair must be performed by authorized service.

Technical problems, maintenance inside and outside the warranty period, please contact:

Clorovale Diamantes Ind. E Com. LTDA
Estrada José Augusto Teixeira, 500 – Torrão de Ouro II
São José dos Campos, SP, Brazil – CEP: 12229-840
Phone: +55 (12) 3944-1126
e-mail: sac@cvdentus.com.br

List of symbols

	Warning. Read the operation instructions
	Operation instructions.
	Type B. Equipment with Type B applied parts.
IP21	Protected against foreign solid objects with a diameter greater than or equal to 12.5mm. Protected against drops of water falling vertically.
~	AC power supply voltage. The power supply is automatic bivolt and can be connected to any electrical outlet between 127 and 220 VAC. The power outlet must have a grounding terminal.
	Off (power). "On-off" switch in this position. In this case, only the main unit is switched off. To disconnect the equipment completely, it is necessary to remove the plug from the power outlet.
	On (power). "On-off" switch in this position.
	Equipment turned on/energized. When the green LED on the main unit panel is turned on, it indicates this condition, which is obtained when the equipment is plugged into a mains power outlet and the "on-off" switch is in the on position.
	Maximum autoclave temperature.
	Serial number.
	Date of manufacture.

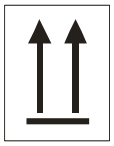
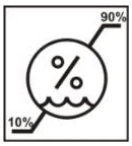
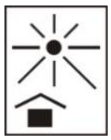
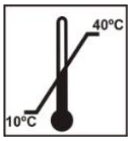
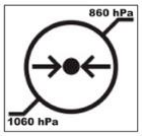
	Manufacturer data.
	**European Authorised Representative**.
	Do not dispose of the equipment along with household waste. Use the appropriate disposal system following the legislation of your country.
	Follow the instructions in the User's Guide.
	Position for transport and storage (upwards).
	Attention in transport and storage. Handle with care (fragile).
	Protect against moisture in transport and storage.
	Percentage humidity limits in transport and storage.
	Protect from sunlight exposure.
	Maximum safe storage temperature.
	Limites de pressão atmosférica.

Table 7: List of symbols