

# USER MANUAL PORTABLE DENTAL UNIT MDE



**R<sub>x</sub> only**



Attention: Carefully read this manual  
before operating the Olsen's equipment!

**Olsen**  
Equipment made to last



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# 1 - Introduction

Congratulations on the great choice!

You have acquired an equipment designed for dental use, built to be assembled and disassembled to facilitate transportation and installation.

The user manual presents the descriptive and technical information, installation instructions, maintenance, cleaning, precautions for use and regulatory guidelines. So before starting the operation of the equipment read carefully its instructions.

# 2 - Package Content

Check out the equipment package contents:



## Standard Items:

- 1 MDE Box
- 1 MDE Chair
- 1 Dental Stool
- 1 Operating Light
- 2 Armrests
- 1 Water Unit
- 1 Stainless Steel Tray
- 1 Working Table
- 1 Caster Adjust Screw
- 1 Water Tank
- 1 Sewage Tank
- 1 3-Way Syringe's Tip Case
- 1 Handpiece Kit
- 1 Pneumatic System
- 1 User Manual MDE
- 2 Olsen Oil Tubes

# 3 - Equipment Presentation

## 3.1 - Chair

- Multi-articulating Headrest
- Backrest Up and Backrest Down Commands
- Footrest with Mechanical Adjustment
- Voltmeter

## 3.2 - Operating Light

- Operating Light Evolution 30.000 Lux
- On/Off Switch on the Commands Panel
- Double Side Handles
- Multi-faceted Mirror with Transparent Polycarbonate Frontal Protection

## 3.3 - Water Unit

- Translucent Spittoon Bowl Made of Polyester
- Water Valve in the Spittoon Bowl
- Water spout in the spittoon bowl

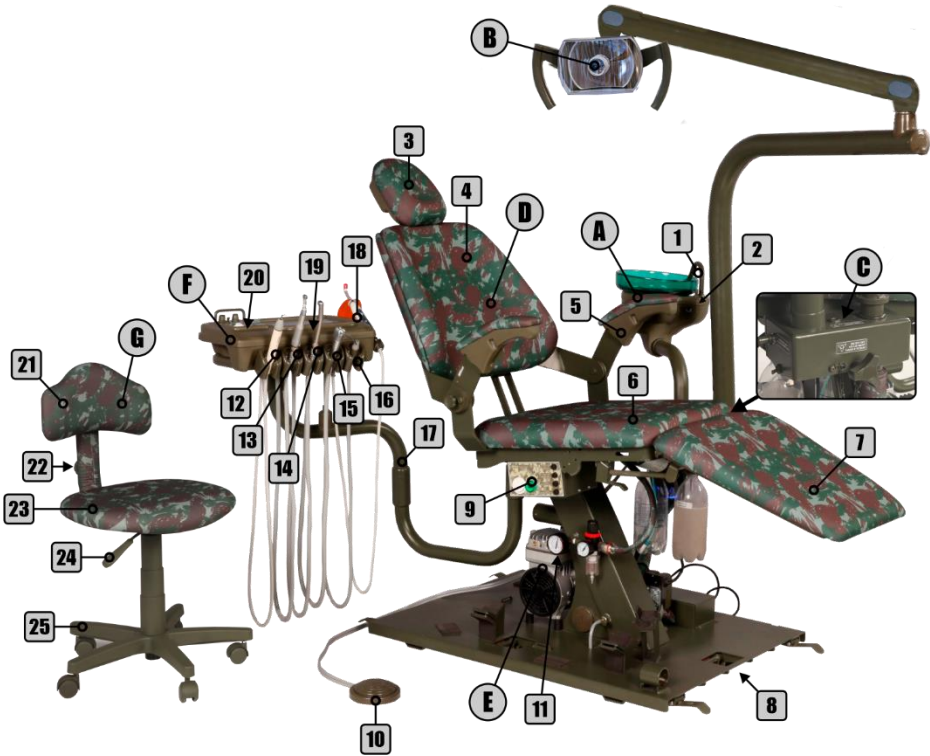
## 3.4 - Working Table

- 3-Way Syringe
- Low-speed Midwest Coupling with Cooling
- High-speed Midwest Coupling with Cooling
- Venturi Ejector
- Curing Light LED
- Ultrasonic Scaler with LED
- Water Treatment System - UV LED
- Thermo Comfort System

## 3.5 - Pneumatic System

- Oil-Free Compressor with Built-in Reservoir
- Filter with Valve, Pressure Gauge and Automatic Drain

## 4 - Parts Identification



**A** - Water Unit

**1** - Spittoon Bowl Water Spout

**2** - Water Valve in the Spittoon Bowl

**B** - Operating Light

**C** - Delivery System

**D** - Chair

**3** - Multi-articulating Headrest

**4** - Backrest

**5** - Armrests

**6** - Seat

**7** - Footrest

**8** - Retractable Caster

**9** - Electrical Panel

**10** - Progressive Pedal

**E** - Compressor

**11** - Compressor Manometer

**F** - Working Table

**12** - Ultrasonic Scaler with LED

**13** - Coupling for Pneumatic Micromotor

**14** - High-speed Coupling

**15** - 3-Way Syringe

**16** - Venturi Ejector

**17** - Table Arm

**18** - Curing Light LED

**19** - Stainless Steel Tray

**20** - Commands Panel

**G** - Dental Stool

**21** - Dental Stool Backrest

**22** - Backrest Adjustment Knob

**23** - Dental Stool Seat

**24** - Seat Adjustment Lever

**25** - Dental Stool Base

## 5 - Equipment Assembling

Before you start assembling the equipment, check if the voltage and frequency of the available electrical power are compatible with the equipment's voltage and frequency.

The place where the equipment will be assembled must have enough space for its assembly and operation (*chapter 1.3 - Dimensional*), and the surface must be regular and no inclination.



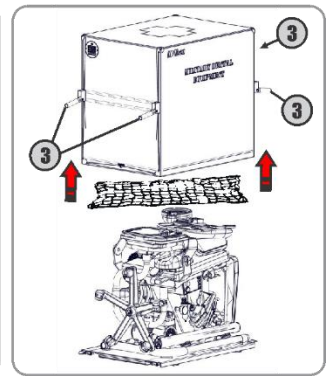
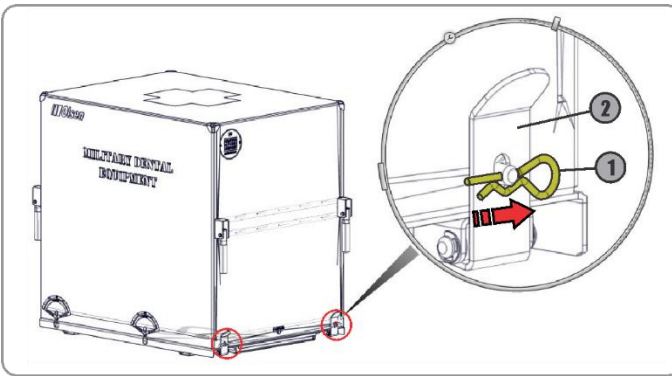
**Do not connect this equipment to the mains with a voltage or frequency other than the specified. This will cause damage to equipment that will not be covered by warranty.**



**This equipment has covers and straps for safety and security. When assembling the equipment, remove and retain all covers and straps as they will be required for disassembly and transportation of the equipment.**

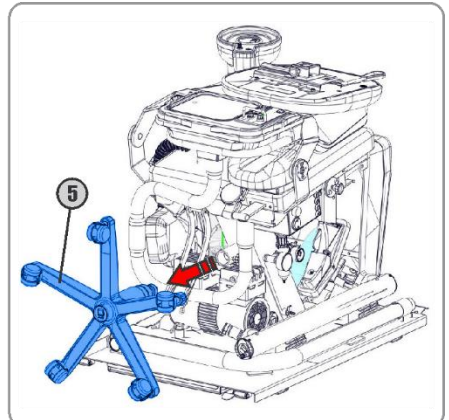
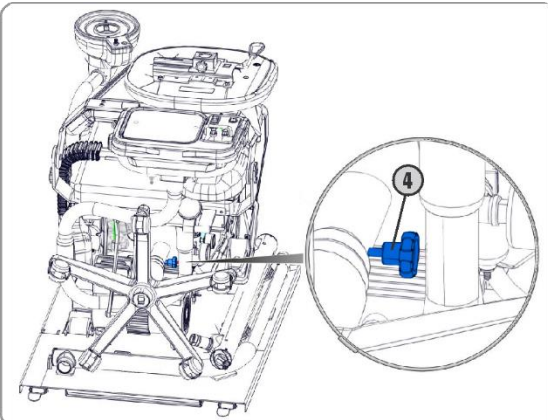
### 5.1 - Assembling Instructions

#### 5.1.1 - Opening



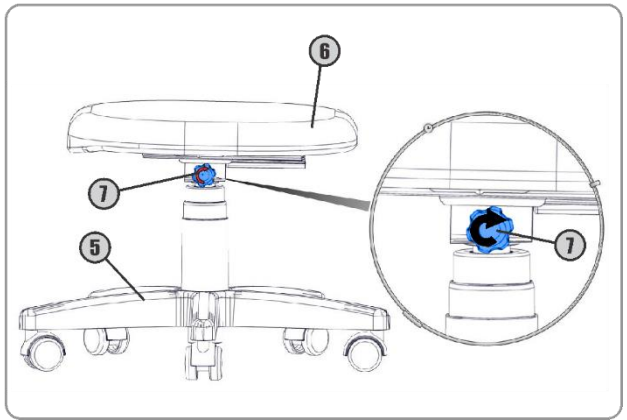
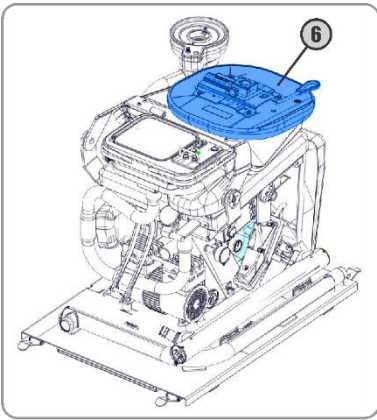
- Remove the 4 clips (1) from the sides of the metal case and lower the latches (2);
- Carefully lift the metal case by the side handles (3) and remove the protective net that involves the equipment.

#### 5.1.2 - Dental Stool

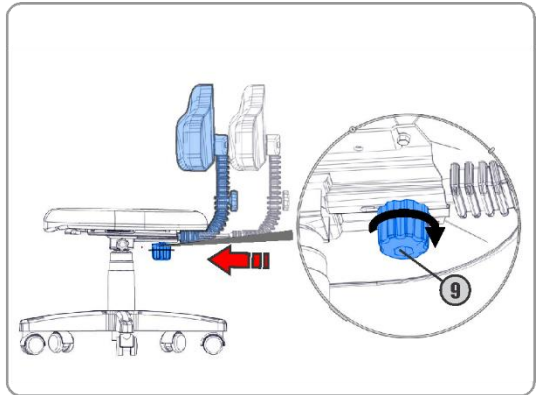
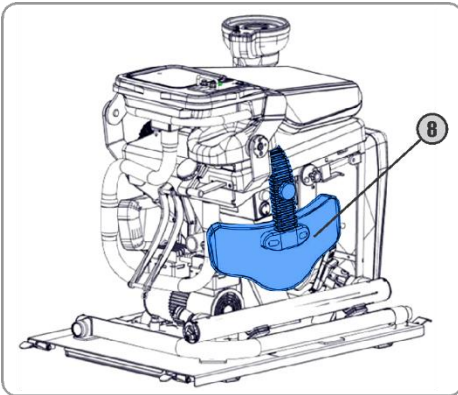


- Loosen the handle screw (4) to release the dental stool base (5) from the mainframe.
- Remove the covers and straps and pull the dental stool base in the direction indicated by the arrow.



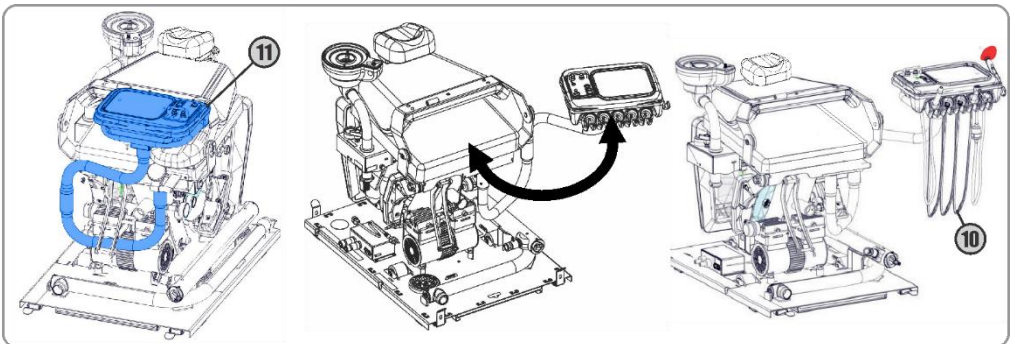


- Loosen the strap and remove the storage bag of the dental stool seat (6) and attach it to its base (5).
- Fasten the seat (6) to the dental stool base (5) using the handle screw (7).



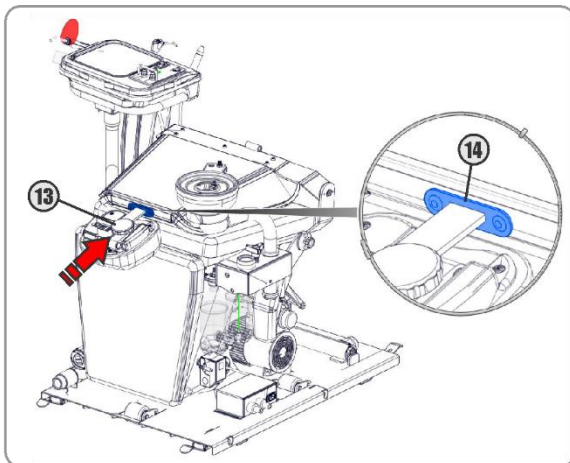
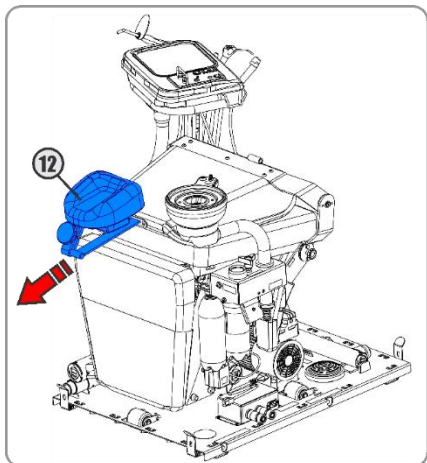
- Remove the backrest (8) and attach it to the bottom of the seat. Lock with the handle screw (9).

### 5.1.3 - Working Table



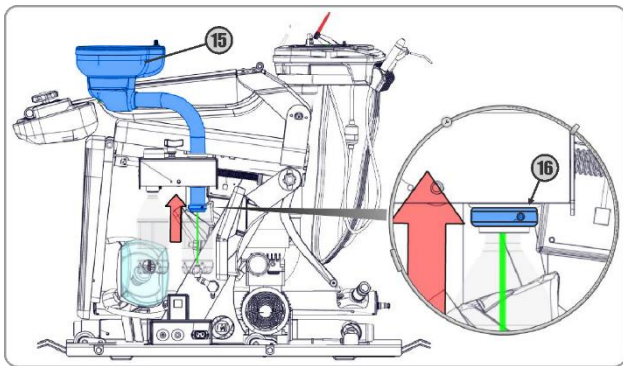
- Loosen the straps from the working table protective bag (11) and move it away from the chair. Remove hoses with couplings from their protective bag (10) and position them on the brackets in order of arrangement without intertwining the hoses.

### 5.1.4 - Headrest

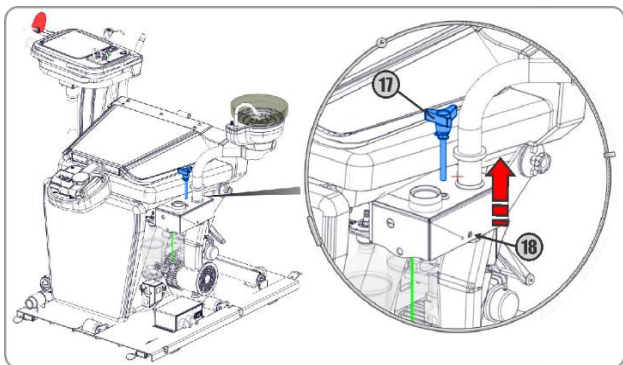


– Pull the headrest (12) to remove it and install it into the backrest socket (14). Use the knob (13) to adjust the headrest.

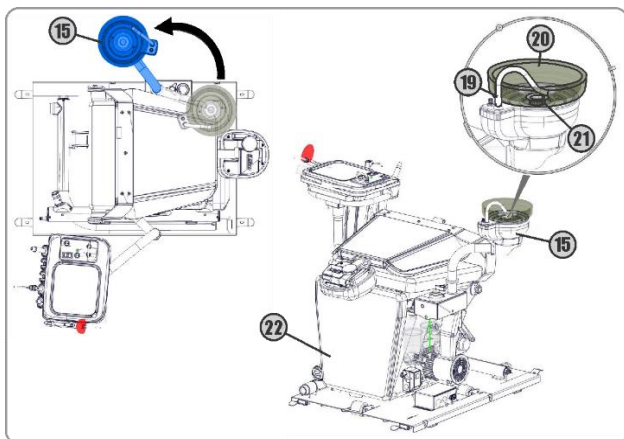
### 5.1.5 - Water Unit



– Remove the protective bab of the water unit and loosen the strap from the water unit (15), then lift it up to the jamb (16).

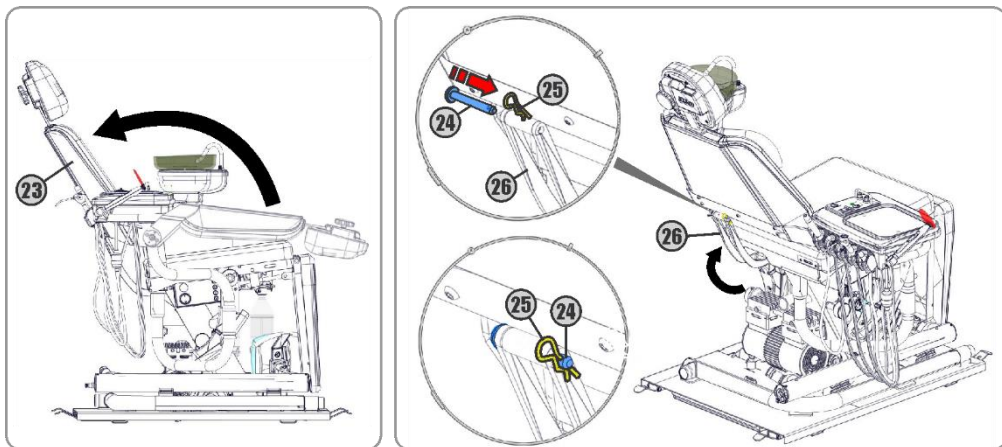


– Remove the handle screw (17) from the top of the platform and place it in the side fitting (18). Tighten it to secure the water unit.



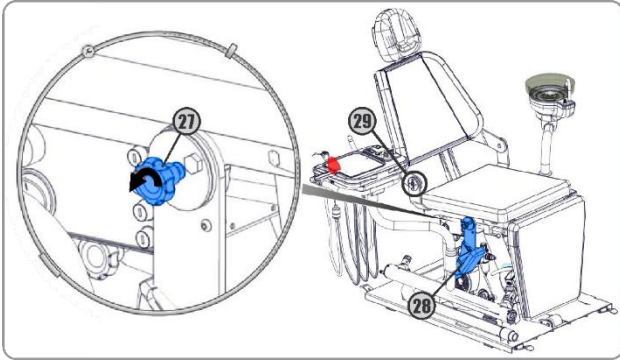
– Move the unit (15) toward the back of the chair. Locate the protective bag of the spittoon bowl under the footrest (22), remove the spittoon bowl (20), the water spout (19) and the strainer (21) and fit them into the water unit.

### 5.1.6 - Backrest of the Chair

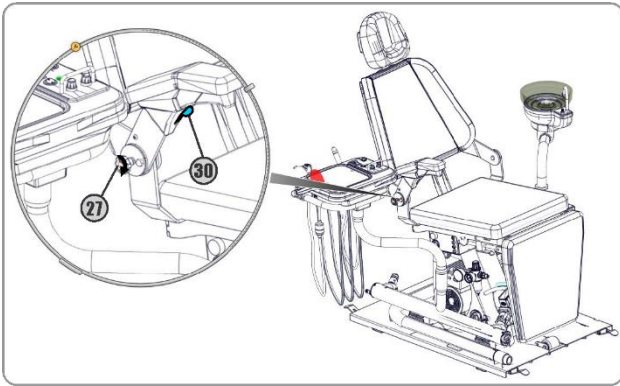


- Raise the backrest (23) and lift the rod (26) to lock into the back of the backrest.
- Connect the rod (26) and the backrest (23) using the pin (24) and the clamp (25) as shown above.

### 5.1.7 - Armrests

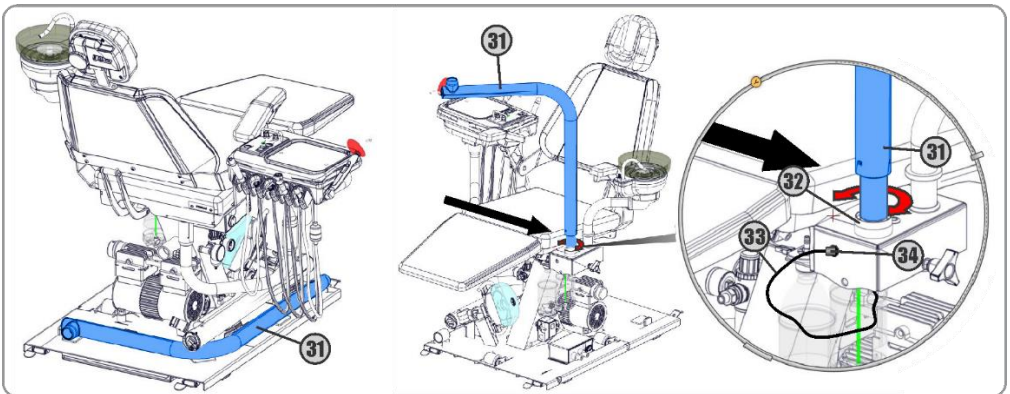


- Loosen the handle screw (27) without removing it from the armrest by turning counterclockwise to loosen the arm (28) from the seat frame.
- Align the hole of the armrest with the backrest hole and seat hole (29) of the chair.



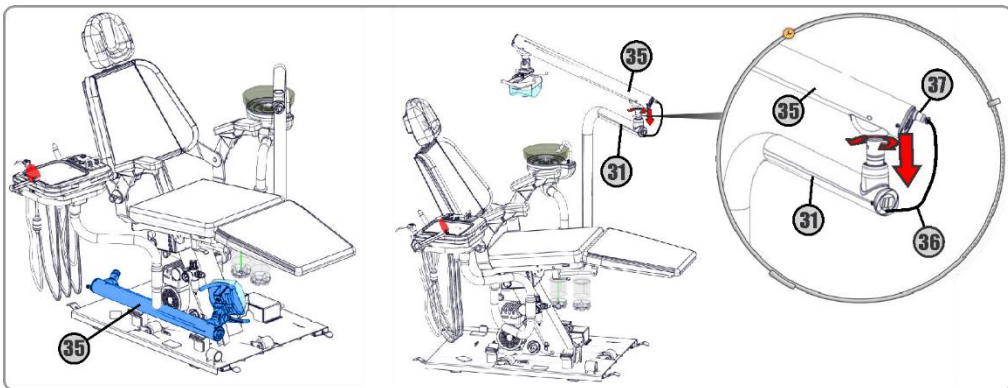
- Press the armrest trigger (30) and secure with the handle screw (27).
- Repeat the same procedure with the armrest on the other side, but without the trigger part, because the left armrest has no trigger.

### 5.1.8 - Operating Light



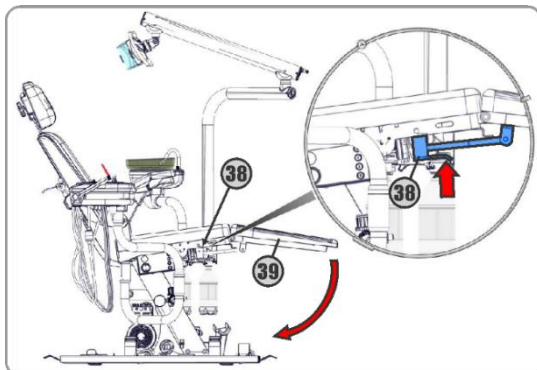
- Remove the operating light primary arm (31) from the base and position over the fit on the platform (32). With circular movements fit the primary arm completely.
- Plug the power cable (33) into the platform terminal (34).



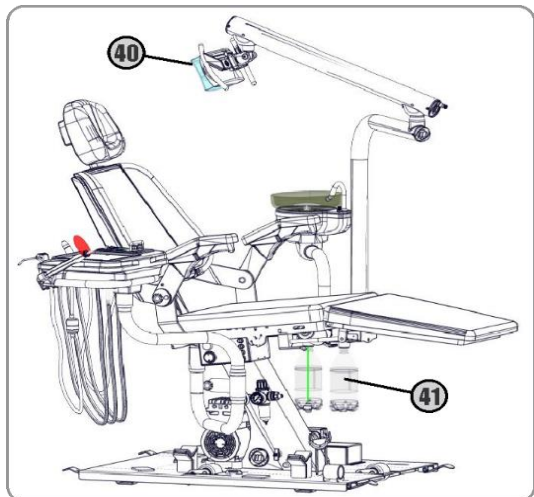


- Remove the secondary operating light arm (35) from the base of the equipment and fit it over the primary arm (31) in a circular movement.
- Plug the power cable (36) into the operating light primary arm terminal (37).

### 5.1.9 – Footrest



- Press the trigger (38) and move footrest (39) to the desired position.



- Move the operating light (40) through the side handles to make sure the arms are properly installed.
- Check the footrest and armrest joints.
- Check other parts of equipment for proper fit and tightness.
- Check the integrity of the reservoirs (41) for perfect conditions (no leakage or perforation).

## 6 - General Features

- **Upholsteries:** are assembled on a very resistant frame, covered with soft foam and coated with flexible laminated PVC, it is easy to aseptic of the set;
- **Mechanical structure:** manufactured in SAE 1020 rolled steel profiles and welded by MIG process, giving the equipment resistance and low weight, facilitating transportation, installation, and maintenance.;
- **Electrostatic painting:** it is applied to all structural metal parts of the equipment. The special polyurethane paint provides the equipment with high durability coating and has antibacterial properties according to *JIS Z 2801: 2000*, wherein 24 hours, the bacterial reduction is greater than 99.9%.
- **Plastic covers:** made of high-strength ABS with acrylic cover, the fairings do not require painting, which facilitates surface polishing to repair small scratches or wear;
- **Electrical system:** the equipment can work in frequencies of 50 or 60 Hz and can be configured to be connected to the voltages of 127/220 Volts by an authorized technician. The maximum supply voltage of operating light and other electronic resources is 24 V. The electrical system has On/Off switch and protection fuses;

### 6.1 - Valves

The valves used in the equipment's hydro-pneumatic system have been developed to ensure its performance and durability, built-in nonferrous metal with chromium coating.

- **Command valves:** releases spray to the pneumatic handpiece, with a piston system to achieve stagnation and non-retraction of water;
- **Pressure-regulating valves:** they guarantee the propulsion pressure stability of the instruments, while also allowing adjustment to the instrument specifications. The factory setting is 2.2 bar air pressure for high-speed handpieces with a regulated flow rate of 35 liters per minute and 2.4 bar for low-speed handpieces with 55 liters of air per minute.

## 7 - Installation Requirements

The installation should be guided by authorized assistance Olsen. In order to use all the resources available on the MDE, it is necessary to provide electric power, water, and sewage access. If the place where the equipment will be installed does not have running water or sewage, it is still possible to use the equipment (without using the resources of the water unit) using only filtered drinking water in the tanks and power supply.



**This equipment is not designed to be installed or operated in a surgical center.**

### 7.1 - Electrical Installation

The power grid must be single-phase, specific grounding and 10 A/30 mA DR circuit breaker exclusive to the equipment. If the power grid presents voltage variation, the installation of a surge protection device is required. The power switch must be turned off at the end of the workday.

There is a table below for sizing the electrical installation.

Tension (V)	Wire Diameter (mm <sup>2</sup> )	Distance (m)	Current (A)
127/220	2,5	Up to 20	10



**This equipment should only be connected to a power source with protective grounding. There is a risk of electric shock!**

### 7.2 - Water for the Water Unit

For supply to the water unit, the water network must be close to the equipment and easily accessible so that the operator can stop water flow when needed.

The water should have a pressure between 2.8 and 6.0 bar, with recommended pH (Hydrogen Potential) between 6.5 and 8.

It is recommended to use a filter before external equipment water supply to avoid clogging in the internal water system.



**If there is no water network available to supply the water unit, water, and other disinfectant materials must be provided for the sanitization of the spittoon bowl, in case it is to be used (chapter 10 - Cleaning and Disinfection).**

### 7.3 - Water for the Tank

The water used in the tanks must be potable and filtered. The water tank supplies water to the 3-way-syringe and to the cooling system of the high-speed coupling. This system allows a constant air pressure balance between the handpieces because the water tank maintains the pressure balanced with the equipment's air pressure.

### 7.4 - Sewage System

The sewage system must present good hydraulic declivity (minimum of  $-2^\circ$ ) and should preferably be installed underground. The nominal diameter of the tubing must be  $\varnothing 40$  mm with a 40 mm sleeve or  $\frac{3}{4}$ " BSP thread to the installation of the sewage connector.



**The equipment uses the sewage network to drain the Venturi saliva ejector and drain the spittoon bowl. If it is not possible to connect the equipment to a sewage system, the sewer should be installed in a sealed container with a vent, to ensure safe drainage of material from the drain and water unit.**

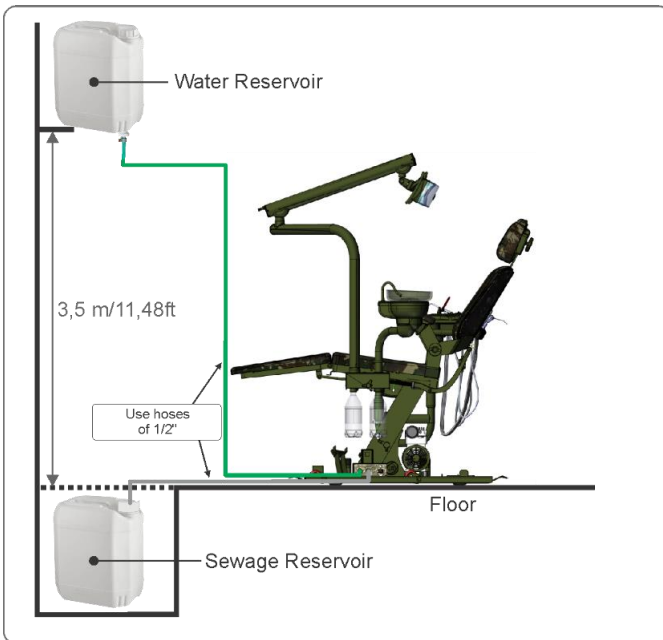
## 8 - Equipment Installation



Provide  $\frac{1}{2}$ " hoses to supply water to the water unit and for the equipment sewer connection.

- Attach the water hose to the connection Water Inlet (A).
- Attach the sewer hose to the connection Drain (B).
- Plug the power cable into the socket (C).
- Plug the power cable into the mains.

In the absence of a sewage system and/or drinking water supply, two reservoirs may be used:



- **Drinking water reservoir:** must be positioned at a minimum height of 3.5 m/11.48 ft from the equipment base. Its purpose is to supply water to the spittoon bowl.

- **Sewage reservoir:** it must be positioned below the level of the equipment base, to ensure the drainage flow of the spittoon bowl and Venturi saliva ejector.

**Note:** Olsen does not provide the external hoses and reservoirs.

## 9 - Equipment Description and Operating

The MDE is an equipment intended for dental use, designed to be used in adverse situations and can be easily assembled and disassembled.

It offers individual adjustment movements, being automatic movement for backrest and mechanical movement for footrest.

The footrest features clear plastic for upholstery protection.

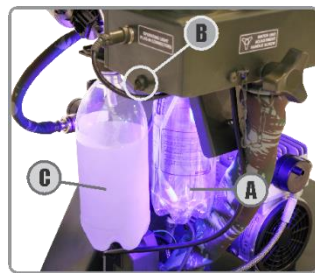
Its seat is built on the compressor air reservoir that is fixed to the base of the equipment.

### 9.1 - Before Turning On the Equipment

- 1° - Verify that the equipment is correctly assembled according to the instructions in *chapter 5 (Equipment Assembly)* of this manual;
- 2° - Make sure that the equipment is mounted on a regular surface, without inclination and that it does not risk being easily displaced from its current position;
- 3° - Check if the water supply and the drainage installation are in accordance with the instructions of *chapter 8 (Equipment Installation)* of this manual;
- 4° - Check if the equipment is connected to the grid/electric power source compatible with its power supply (*chapter 12 - Technical Features*).

### 9.2 - Turning On the Equipment

- 1° - In the delivery system locate the depressurizing valve (B) and close it;
- 2° - Remove the water tank (A) and make sure they are full. If necessary, fill them with filtered drinking water to the limit indicated on the tank and reconnect it to the platform. If desired place prophylactic
- 3° - Open the depressurizing valve (B) and check that the water tank (A) and sewage tank (C) are tightly coupled and leak-free;
- 4° - Press the On/Off switch (D) to the "I" position. The voltmeter (E) will light indicating that the equipment is switched On and the compressor will be active, filling the compressed air tank, if necessary.
- 5° - Before starting to use the equipment, check the operation of all available instruments and controls and clean and sterilize the instruments (*chapter 10 - Cleaning and Disinfection*).



#### 9.2.1 - Electrical Panel

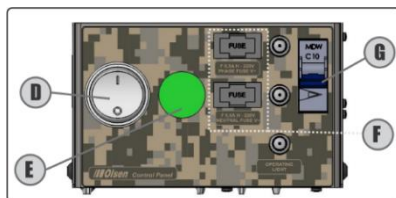
Under the seat, on the left side, near the base of the backrest is the electrical panel, making available the following items:

- D - On/Off Switch
- E - Voltmeter
- F - Fuse Holders
- G - Circuit Breaker

#### 9.2.2 - Voltmeter

When the On/Off switch (D) is turned on, the voltmeter display (E) will show the voltage of the mains to which the equipment is connected. Through the voltmeter, it is possible to monitor the oscillation of the mains voltage.

**Note:** observe the supply voltage of the equipment. Voltage variations of more than 5% (up or down) may degrade performance and damage equipment.



#### 9.2.3 - LED UV Water Treatment System

The UV LED is used to disinfect the water stored in the tank. The ultraviolet light spectrum (UV-C) reduces the concentration of microorganisms to non-infectious levels.

When the equipment is turned on, the UV LED lights up for 5 minutes and stays 55 minutes off. As long as the equipment stays On, the cycle will repeat every 60 minutes.

Resetting the UV system is recommended whenever tank water is replenished. To restart the cycle, press the reset button (H).



**Avoid looking directly at UV light.**



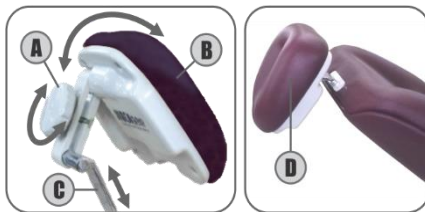
## 9.3 - Chair

### 9.3.1 - Multi-articulating Headrest

The headrest (B) is characterized by multiple adjustable positions that ensure more comfort for patients during clinical procedures. The multi-articulate headrest (B) can also be adjusted to care for wheelchair patients (D).

**To adjust the headrest position:** turn the knob (A) counterclockwise to loosen it while adjusting. Turn knob (A) clockwise to lock in set position.

**To adjust the distance from the headrest to the backrest (C):** pull the headrest (B) away from the backrest. Do not exceed the 13 cm limit between the headboard and the backrest.



### 9.3.2 - Chair Movements

The MDE has backrest and footrest adjustment.

**To move the backrest:** use the switch (A) on the commands panel (section 9.7).

**To move the footrest:** press the trigger (B), while adjusting the footrest position. Release the trigger (B) to lock it in position.

**Note:** for an easy adjustment, lift the footrest while pressing the trigger (B).



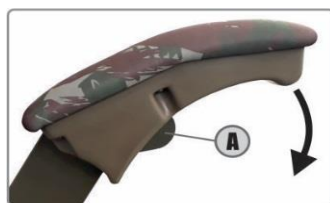
### 9.3.3 - Emergency Position

Allows brain irrigation by gravity, with slow movements to the maximum negative level (-5° related to the ground). The user only needs to adjust the backrest down to its maximum position.

### 9.3.4 - Armrests

The armrests are designed to rest the patient's arms. The right arm is swivel for easy patient accommodation.

To move the armrest: press the trigger (A).



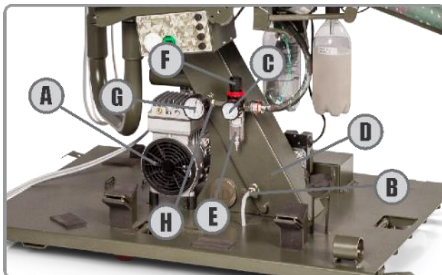
## 9.4 - Air Compressor

The MDE has a compact compressor (A) to supply the compressed air needs of the pneumatic instruments and saliva ejector Venturi.

The compressed air tank is the seat column itself (D), which has a manometer (G), drain (B) and safety valve (F).

The compressed air outlet has an automatic drain (E), manometer (C) and adjustment valve (F) that allows the reduction and cut off the airflow. For this adjustment, simply turn the valve clockwise to reduce or close the flow and counterclockwise to open.

**Note:** the compressor air pressure is set at the factory according to the handpieces specification.



**Reducing the airflow in the automatic drain adjustment valve can impair the performance of pneumatic and ejection instruments.**

### 9.4.1 - Automatic Vapor Drain

Moisture removal filter from the compressed air line installed at the base of the equipment. Performs automatic drainage when inlet pressure is less than 30 PSI.



### 9.4.2 - Air Tank Drainage

The air tank drain is a preventive procedure, which avoids the moisture accumulation, the automatic drain clogging and consequently a drop in the performance of pneumatic and ejection instruments.

**To drain the air tank:** with the compressor turned on, open the air tank drain valve by turning it counterclockwise. Leave the hose outlet free to let out the debris/water until the tank is clean.

**Note:** when the equipment remains assembled for a certain period, it is recommended to drain the tank daily and before disassembly.



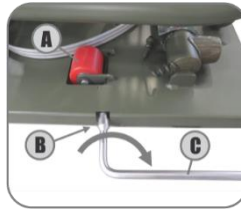
### 9.5 - Retractable Casters

For easy transport, the base of the MDE has 3 retractable casters. They can be positioned with an L wrench provided in the tool tray (section 9.6).

**To retract the castor (A):** insert the L wrench (C) into the base (B) and turn it clockwise.

**To extend the castor (A):** turn the L wrench (B) counterclockwise.

**Note:** each time the base is raised the castors automatically retract.



### 9.6 - Tool Tray

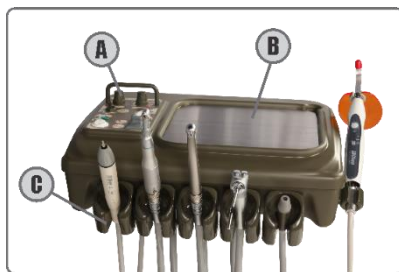
The tool tray features compartments for storing the portable case's closing clips, the L wrench for moving the castors and additional fuses.

The tool tray is provided under the base of the equipment.



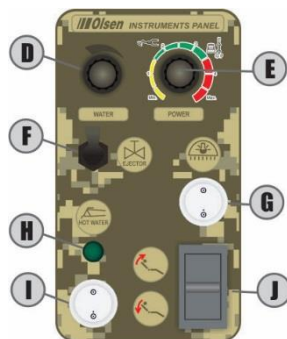
## 9.7 - Working Table

It has articulated arm for its movement, as well as dental instruments arranged in holders (C), commands panel (A) and stainless steel tray (B).



### Commands Panel:

- D - Ultrasonic Scaler Water Control
- E - Scaler Intensity Control and Function Selector Endo/General Perio
- F - Suction of the Ejector
- G - On/Off Operating Light
- H - LED of Thermo Comfort System
- I - On/Off Thermo Comfort System
- J - Backrest Up/Backrest Down



### 9.7.1 - Progressive Pedal

The progressive pedal is used to drive the handpieces such as the micromotor, the high-speed handpiece, and the ultrasonic scaler.

When pressing the progressive valve (A), the higher the pressure on the pedal, the higher will be the handpiece rotation speed.

For the ultrasonic scaler, the pedal only turns it On/Off.



### 9.7.2 - Handpiece Couplings

The MDE equipment is produced with coupling (C) type Midwest (B) with a cooling system for pneumatic micro-motor and for high-speed handpieces. These components have unique features:

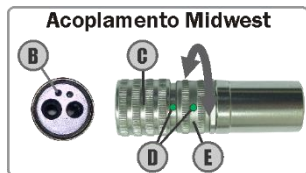
- 1- Entirely made of high-quality non-ferrous metal with chrome surface treatment.
- 2- Disassembly for cleaning with no specific tools needed.
- 3- The coupling with the cooling system has a spray flow adjustment ring (E), without ledges or jams, providing greater comfort to the user.

**To operate the pneumatic instruments:** remove the instrument from the holder and press the button in the progressive pedal (section 9.7.1).

**To adjust the water flow of the cooling spray:** turn the adjusting ring (E) until the desired water flow is obtained. The green dots are water spray indicators (D).

**To adjust the maximum flow of water:** bring the points (D) closer to each other.

**To decrease the flow of water:** rotate the ring (E) so it distances one point from the other (D). The further away, the less water in the spray.



**Never use high-speed couplings at the micromotor coupling terminal.**

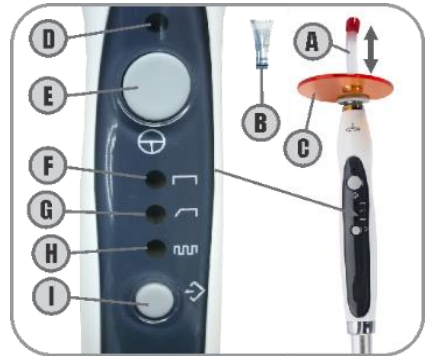
## 9.7.3 - Curing Light

Device for polymerization of materials for restoration and tooth bleaching, curing light produces light radiation to solidify light-sensitive resins, with a short duration shot.

This instrument has a 20 seconds timer for continuous use and protection mode to prevent overheating.

Technical Features:

- Light intensity with optical fiber tip: 1000 - 1200 mW/cm<sup>2</sup>;
- **Dimensions:** 26 x 25 x 260 mm;
- Net weight: 135 g;
- **Wave length:** 420-480 nm;
- Protection timer: 200s.



Before you start using the curing light, install the fiber optic tip (A/B) and eyeshield (C).

**To install the tip:** first, attach the light hood (C) to the tip and then attach it to the curing light unit (A/B). The tip must be pushed all the way to the fitting end.

**To activate/deactivate the curing light:** press the On/Off button (E) twice. The green LED (D) indicates that the curing light is operating. The curing light unit will run for 20 seconds and will turn off automatically.

**To toggle the operating mode:** each tap on the selection button (I) switches the operation mode. Press the selection button (I) until the orange LED (F/G/H) indicates the desired mode.

The curing light operates in the following modes:

- **Continuous (6):** LED on the maximum power for 20 seconds;
- **Ramp (7):** LED activates at its minimum power, gradually increasing. In 5 seconds reaches its maximum power until the cycle of 20 seconds is finished;
- **Pulse (8):** LED keeps blinking for 20 seconds.

**Activation of protection mode:** If the curing lights triggered for several consecutive times without interval, the protection mode will be activated, locking the device for 20 seconds after each drive. To disable the protection mode, allow the device to stand for 4 minutes. The protection mode can be activated automatically from 9 successive starts.

The curing light uses a beep to indicate the following situations:

- 1 - Activation of selection button;
- 2 - Activation of the On/Off button;
- 3 - After operation for 10 seconds;
- 4 - After operation for 20 seconds.

## 9.7.4 - Precautions on the Curing Light Use

- Prohibited the use in patients who present biological reactions;
- Do not aim the light of the curing light directly in the eyes. The curing light produces optical radiation emitted by LED;
- Do not touch the tip directly on the curing material. This will prevent material adhering to the tip, impairing the device performance;
- Do not use the curing light without the light hood (C);
- The optical fiber tip should only be used on the teeth. Avoid touching the patient's gums, lips or skin;
- Use the curing light only on the teeth;
- After 40 seconds of continuous use, the tip end can reach 56° C;
- Consecutive activations of the curing light with an optical fiber tip may cause the tip end to heat, reaching a maximum temperature of 68° C.

### 9.7.5 - Scaler with LED

The scaler operates with a piezoelectric system to generate tip vibration at high frequency. When triggered the scaler initiates the tip vibration, activates the LED and opens the water passage for cooling. Vibration power and cooling water flow control can be adjusted through individual controls on the working table (section 9.7).

This instrument has been developed for use in dental applications such as scarification, root straightening, root canal treatment, periodontal and cavity preparation.

**To attach the transducer (A) to the coupling:** align the points (B) on the transducer (A) and coupling (C) and carefully insert them.

**To install the scaler tips:** insert the tip into the transducer (A) by threading it carefully, then insert the Torque wrench (D) into the tip and then rotate it clockwise until it is tight.

**To remove the tip:** turn it counterclockwise with the Torque wrench (D).

After installing the tip, check for leakage between transducer (A) and coupling (C).

**To install a file adapter (not supplied with scaler):** attach the adapter to the transducer (A) and screw it carefully. Use the Endo wrench (E) to tighten. Insert the file into the tip of the adapter, thread the tip and then use the Endo wrench (E) to tighten.

**To remove the adapter:** use the Endo wrench (E) to loosen it and then carefully unscrew.

**To activate the scaler:** remove the scaler from the holder and press the progressive pedal (section 9.7.1).

Before beginning scaler operation, install the tip on the transducer and make sure it is properly seated and within the wear limit set by the manufacturer.

**To adjust the vibration power:** in the commands panel (section 9.7), turn the Power knob (G) until the desired power is reached.

**To adjust the water:** use the Water knob (F) on the commands panel.

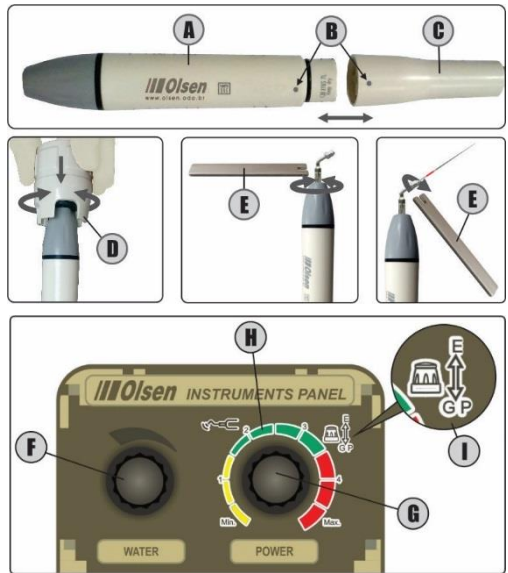
**To toggle functions:** push the Power knob (G) in direction of the table for the "GP" function (General and Perio). Pull the Power knob (G) gently in the opposite direction of the working table for the "E" (Endo) function.

Technical Features:

- **Frequency:** 28 kHz ± 3 kHz;
- Power supply: 24 VCC;
- Output force (half-displacement): <2N;
- Power rating: 3 to 20 W;
- Operation mode: continuous;
- Tip vibration displacement: ≤100 μm.

### 9.7.6 - Scaler Operating Precautions

- Check out the vibration outside the patient's oral cavity before use. If any abnormality is found, discontinue use immediately and contact a certified Olsen assistance;
- Always use gloves to touch the scaler and its components. Always remove the tip of the scaler, before removing the transducer covers;
- Use only the Torque wrench and Endo wrench to fix and remove tips. If the tip is not fixed properly, it will present vibration loss;
- This scaler has been developed for professional dental use only and should not be used for any other purpose;
- The tip wears out with use, this can cause a reduction of power. If this occurs, replace the tip;
- Do not sharpen or bend the tip. Tips can be damaged and do not generate enough vibration;
- While in use, the scaler system may affect computers and LAN cables. During an operation next to radio device, interference may be heard;



- Use only autoclave proper for dental use to sterilize tips, wrenches, transducer and LED;
- Before installing any tip on the scaler, check its maximum intensity power;
- Keep it away from patients with cardiac pacemakers or anesthetized;
- During the scaler use, the tip temperature may rise if the spray is not used. Always use enough spray water for the cooling of the handpiece and the teeth;
- Use the device only on the teeth. Contact with skin, gums and mucous membranes may cause injury;
- Keep the scaler away from explosives and flammable materials;
- Do not submit the handpiece to any strong impact or drop it;
- Do not exceed the recommended intensity for the tip this may damage the tooth and tips;
- Do not use it on metal, or ceramic, porcelain or resin prostheses;
- Do not touch and do not wet the back of the transducer, where there are electrical connections to the power cord. This can result in electric shock;
- Do not force the scaler cable when removing it. This may cause disconnection.

### 9.7.7 - Venturi Saliva Ejector

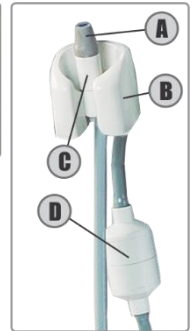
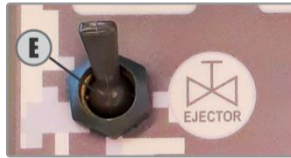
Developed for saliva ejection, the Venturi ejector has cannula adapters (A) for fitting disposable cannulas or autoclavable metal cannulas of Ø6,5 mm, for easy cleaning. It also has a solid debris filter (D) that prevents them from being sent to the sewage system.

**To activate the suction:** remove the ejector (C) from the holder (B) and turn the ejector switch (E).

**To deactivate the suction:** turn the switch (E) and place the ejector (C) in its holder (B).

For proper functioning of this device, it is necessary that the solid debris filter (D) is clean and the drain to the sewage system is properly installed and with proper inclination.

**Note:** the cannulas do not come with the Venturi saliva ejector.



### 9.7.8 - 3-Way Syringe

The 3-Way Syringe has three functions: water jet, air jet, and spray jet.

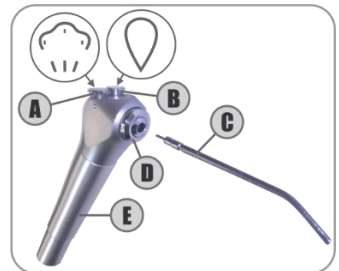
**To emit air jet:** press the air button (A).

**To emit water jet:** press the water button (B).

**To emit spray jet:** press simultaneously the air (A) and water (B) buttons.

The syringe tip (C) is rotatable and detachable.

**To detach the tip:** press the ring (D) and pull the tip (C), to insert it press the ring (D) and fit it.



### 9.7.9 - Handpieces Kit

The MDE receives as a series item the Professional kit, with the following items:

- 2 High-speed Rotation Turbine CX207-F H05-TP;
- 1 Pneumatic Micromotor CX 235 M-3F;
- 1 Straight Piece CX 235 S-2A;
- 1 Contra Angle CX 235 C1-2.

Ergonomic instruments made of stainless steel, with ceramic bearings, offer high strength and durability with low noise levels (approximately 62 dB).





## 9.8 - Thermo Comfort System

For greater patient comfort by minimizing temperature sensitivity during the dental procedure the Thermo Comfort system offers hot water in the 3-way syringe and scaler with output between 37° C and 47° C.

**To activate the Thermo Comfort system:** press button (A) on the commands panel (section 9.7). When activating the device the green LED (B) will light up, indicating that the Thermo Comfort system is operating.

When activating the device wait approximately 10 minutes for the initial heating of the water.

Technical features:

- Bleeding time: ~6 s;
- Syringe's maximum temperature: 47° C;
- Tank capacity: 100 ml;
- Initial warm-up time: ~10 min.
- Rewarming time: ~5 min.



## 9.9 - Operating Light Evolution Plus

The Evolution Plus Operating Light features LED illumination, multifaceted mirror for shadow elimination and On/Off on the commands panel (section 9.7).

The headstock has side handles for ease of movement and high strength clear polycarbonate protection.

**To turn the reflector On/Off:** press the button on the commands panel (A).

Technical Features:

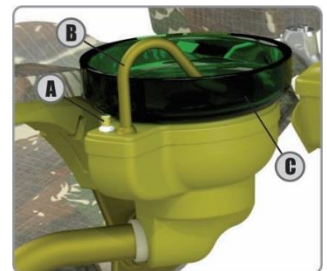
- Light intensity: 30.000 Lux;
- Color temperature: 4500K.



## 9.10 - Water Unit

The water unit features a polyester bowl (C) and a water spout (B), both detachable for easy cleaning.

To enable/disable water in the bowl (C): open/close the water valve (A).

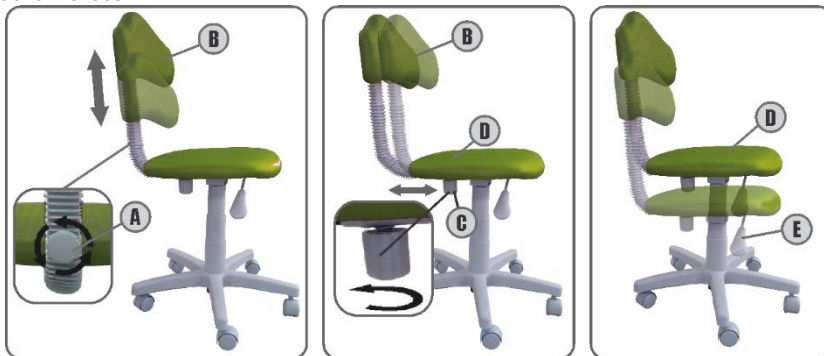


## 9.11 - Dental Stool

The dental stool has upholstery with the same characteristics of the upholstery used in the chair.

The gas column (or piston) has high wear resistance and is self-lubricating, allowing it to be assembled and disassembled several times.

Castors and plastic covers are produced in high impact Nylon with high abrasion resistance without suffering abnormalities.



**To adjust the height of the backrest (B):** turn the handle screw (A) counterclockwise. Position the backrest to the desired height and tighten the handle screw to lock the backrest in position.

**To adjust the backrest to the seat (D):** turn the handle screw (C) counterclockwise to release the backrest. Adjust it to the desired position and turn the handle screw (C) to lock it.

To adjust the seat height (D): press the lever (E) up.

**To lower the seat (D):** sit on the seat (D) until the seat is at the desired height and loosen the lever (E).

**To raise the seat (D):** get up from the stool and loosen the lever (E) as soon as the seat (D) is at the desired height.

## 10- Cleaning and Disinfection



**The whole sanitize process must be done with the use of gloves suitable for cleaning and protection, in addition to a mask and protective glasses, according to biosafety standards.**

### 10.1 - Upholsteries and Plastic Covers

The plastic covers and upholsteries must be cleaned with a damp cloth containing neutral soap or detergent only. Olsen advises against using any chemical product to clean these parts, but in the case of disinfection products, it is important to check if it has suitable compatibility and specifications before use on these materials.

To clean the operating light polycarbonate protection shield, use only a soft cloth dampened with liquid glycerin.



**Never use hypochlorite or alcohol-based products.**

### 10.2 - Painted Parts

It must be cleaned with a slightly damp cloth containing only soap or mild detergent.

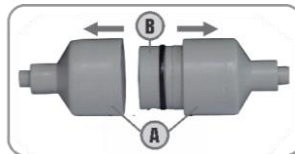


**Never use hypochlorite or alcohol-based products.**



### 10.3 - Saliva Ejectors and Solids Collector

Daily disinfect the saliva ejector's hoses with an appropriate disinfection product for PVC hoses. It is essential to read the instructions of the asepsis product to avoid misuse or overdosage, which can cause damage to the medium and long term to the hoses. Using a proper concentration of the cleaning product, suck up with the suction needed for the effectiveness of the process. With the product still in the hose, place the suction on the hose holder. After the necessary action period of the product, suck 1 L of water.



The solids collector must also be cleaned daily. The saliva ejector efficiency may be impaired if this filter is clogged. In the case of saliva ejector's performance reduction, clean its filters.

To clean the filters, follow the instructions below:

- 1° - Undo the solids collector cover (A);
- 2° - Remove the solids collector (B) for cleaning;
- 3° - After cleaning, re-assemble the solids collector.

To clean the water unit drain, pour aseptic liquid observing the drain in order to remove any debris from the inside of the hose.

### 10.4 - Water Unit and Strainer


The water spout (B) are removable for easy removal of the spittoon bowl (A) for cleaning. The disinfection of the spout should be done with 70% alcohol.

For spittoon bowl cleaning (A) remove spittoon bowl spout (B), spittoon bowl finish (D), strainer (C) and then remove spittoon bowl (A) for cleaning.

For removal of the strainer (C) use a tweezer or gloves to avoid direct contact with the waste.

With a soft sponge, running water and mild soap or detergent clean the strainer (C) and spittoon bowl (A). Do not use abrasive sponge.



 **All debris and contaminated materials should be disposed of in biological waste.**

### 10.5 - Curing Light

To clean and disinfect the curing light tips, use gauze or disposable wipe moistened with soap and neutral detergent. Do not use alcohol, strong or abrasive alkaline detergents, detergents based on bleach, acetone, or other germicides.

The whitening tip cannot be autoclaved.

Curing light's body cleaning must be done with neutral detergent or 70% alcohol.

### 10.6 - Ultrasonic Scaler

The transducer (E), the LED (C), the tips and the scaler wrenches must be autoclaved for sterilization.

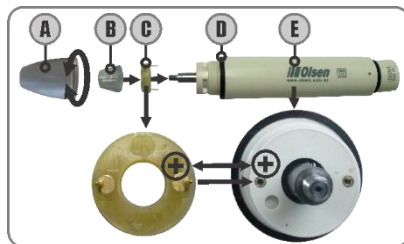
Prior to the transducer sterilization, remove the tip of the scaler (if it is attached), LED removable cover (A), the light driver (B) and the finishing ring (D). These items should be sterilized with 70% alcohol.

For the proper functioning of the scaler, the LED (C) must be correctly inserted in the transducer (E) matching the LED's positive pole with the transducer's positive pole.

Only use dental autoclave for sterilization of tips, wrenches, transducer (E) and LED (C).

The following sterilization methods are prohibited:

- Put in boiling water;
- Heat in stove, oven or microwave;
- Soak in disinfectants such as iodine, alcohol or glutaraldehyde.



## 10.7 - Sterilization by Autoclave

Prior to autoclaving, clean the items, removing all organic residue, both from the surface and internal ducts (if any). Then carefully dry each item, including the internal ducts, if possible, with compressed air.

Individually pack each item, with its own sterilized packaging for the autoclaving process. For steam autoclaving, the following values may be used (sterilization in accordance with *SS-374 of 15/12/1995* and *ISO 17665*):

- a) 130° C, 2 bar, 15 min;    b) 120° C, 1 bar, 30 min;    c) 134° C, 2, 2 bar, 4 min.

The following equipment's items are autoclavable:

- Stainless steel tray;
- 3-way syringe's tip;
- Scaler Torque and Endo wrench;
- Scaler LED and transducer;
- Optical fiber tip of the curing light;

**Note:** the scaler transducer with LED cannot be autoclaved in contact with other materials.

To sterilize the scaler tips, set the autoclave to 132° C for 3 to 6 minutes and pressure of 30 PSI (2 bar) or as indicated on *ISO 17665* standard.

Regarding the resistance to the autoclaving process, the following items support:

- Up to 1000 cycles: scaler tip and wrench, stainless steel tray, 3-way syringe tip and optical fiber curing light tip;
- Up to 600 cycles: transducer and LED of the scaler.



**All equipment items referenced in this chapter must be sanitized and sterilized (where applicable) prior to use.**



**Do not use any type of oil on the items to perform autoclaving.**



**Olsen is not responsible for defects, deformities, spots on or abnormalities caused by improper use of chemical products, contact with tissues, leather, disposable gloves, inks, pigmented detergents and other organic or synthetic products.**

## 11- Disassembling

The process of disassembling the MDE equipment requires attention to detail so that the equipment can fit inside its metal case and not be damaged during transportation.

Before disassembling the equipment, it must be properly sanitized (*chapter Cleaning and Disinfection*), to avoid deterioration of the hoses and contamination of the equipment.

Empty and clean the equipment drain and water tanks separately to avoid cross-contamination.

Clean and drain the hoses to prevent leakage in the equipment from inside.

### 11.1 - Pre-disassembly Cleaning

**1°** - Close the air valve of the water unit, remove the water tank and empty it;

**2°** - Reinstall the empty tank and open the air valve;

**3°** - Press the water button on the 3-way-syringe until no more water comes out;

**4°** - Release the maximum flow of water in the high-speed coupling and actuate until no more water comes out;

**5°** - Remove the instruments and the syringe tip, sterilize them and store them in their packaging;

**6°** - Clean the saliva ejector, filter, spittoon bowl, spouts, and strainer according to the instructions in *chapter 10 (Cleansing and Disinfection)* of this manual;

**7°** - Drain the water unit drain completely and disconnect the drain or sewer connector. It is not necessary to disconnect the hoses from the sewer connector.

**8°** - Open the air compressor drain and drain all compressed air.

## 11.2 - Starting Disassembling

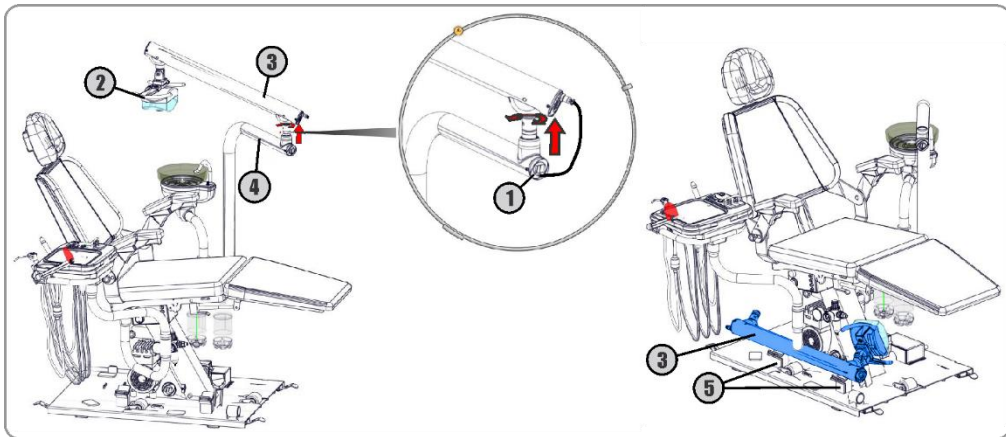
After cleaning the equipment, disconnect the equipment from the power supply and then identify and separate all the packages and straps with Velcro® to follow the process of disassembly:



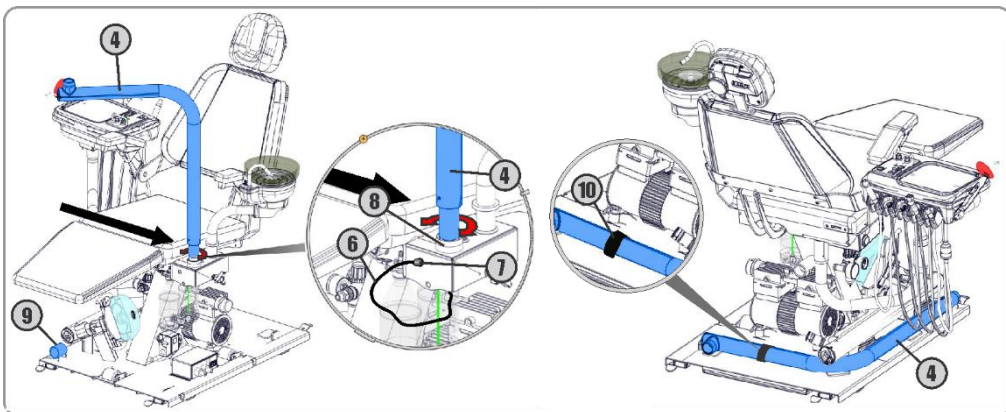
- A - Protective cover of the operating light's primary arm
- B - Protective cover of the operating light's secondary arm
- C - Protective cover of the working table
- D - Protective bag of the doctor's stool base
- E - Protective bag of the arm of working table
- F - Protective bag of the arm of the electric motor
- G - Protective bag of the headlight
- H - Protective bag of the doctor's stool backrest

- I - Protective bag of the backrest handle
- J - Protective bag of the stool rods
- K - Safety belt of the operating light
- L - Protective bag of the remote pedal
- M - Protective bag of the spittoon bowl
- N - Protective bag of the water unit
- O - Storage bag of the handpieces and accessories
- P - Storage bag of the doctor's stool seat
- Q - Protective bag of the hoses

## 11.2.1 - Operating Light

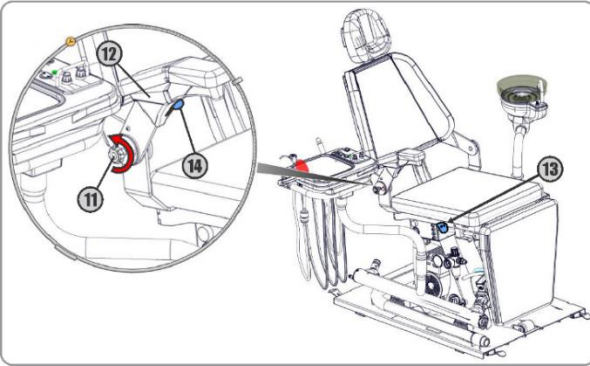


- Remove the operating light's arm connector (1) and place the shield on the headlight (2).
- Remove the operating light's arm (3) in a circular motion until it detaches from the primary arm (4) and rest it on the base brackets (5).

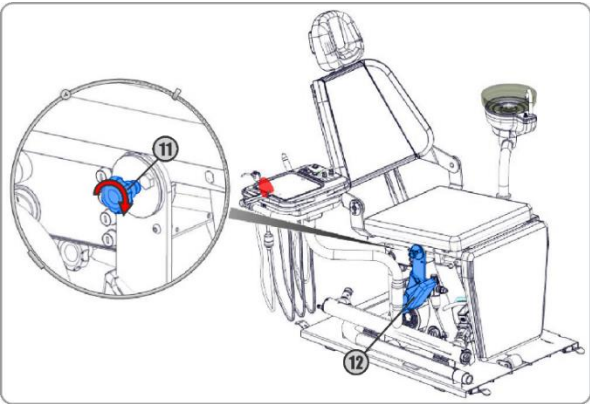


- Remove the power cable (6) from the delivery system terminal (7).
- With circular movements remove the operating light's primary arm (4) from the delivery system (8).
- Attach the operating light's primary arm (4) to the base bracket (9).
- Attach the protective cover operating light's primary arm and thread the safety strap through the base strap (10) to secure the arm securely.

### 11.2.2 - Armrests

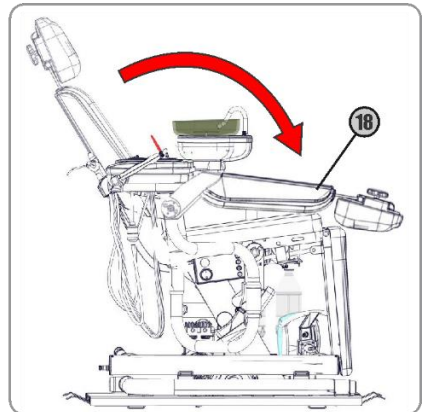
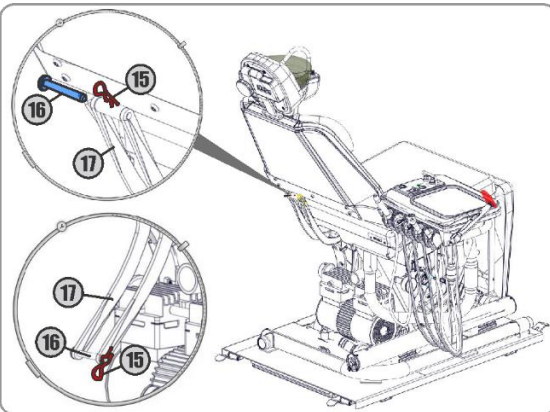


- Loosen the handle screw (11) without removing it from the armrest. Press the trigger (14) to remove the armrest (12) with the handle screw (11).
- Align the handle screw in the chair hole (13).



- Align the armrest handle screw (12) with the fit in the seat side frame. Tighten the handle screw (11) to secure it to the chair.
- Do the same for both armrests.

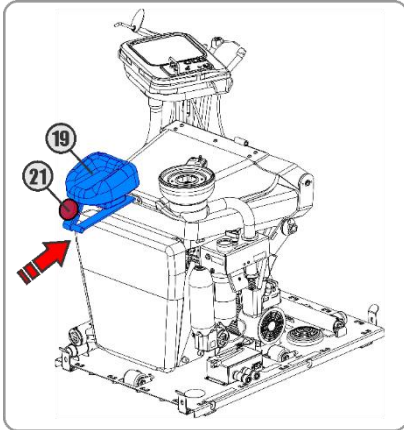
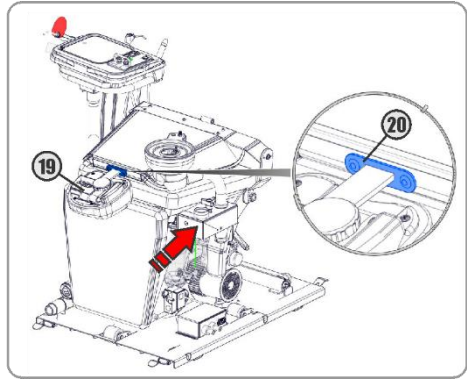
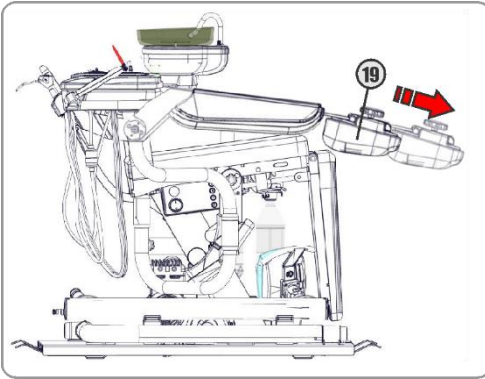
### 11.2.3 - Backrest



- Put the protective bag of the backrest's rods (17).
- Remove the lock (15) and move the joint pin (16) until the backrest comes off.
- Move the backrest (18) forward over the seat.
- To avoid losing the retaining pin (16), re-attach it to the bracket (17) with the lock (15).

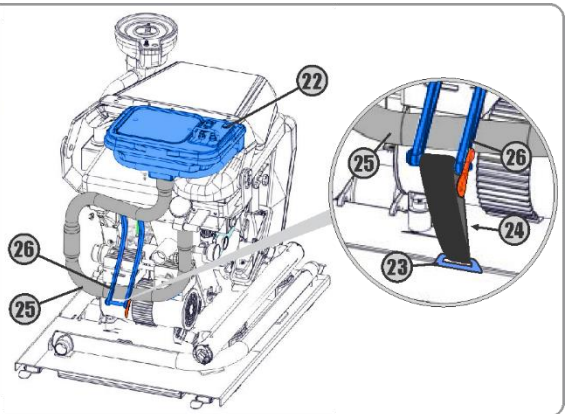
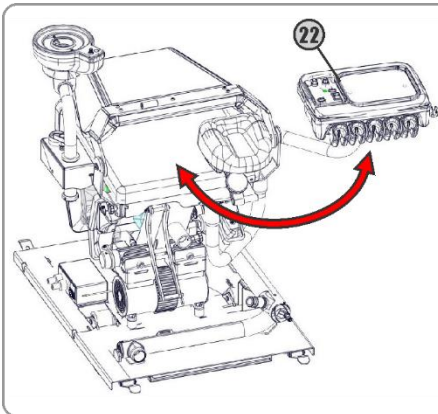


### 11.2.4 - Headrest



- Pull the headrest (19) in the same direction of the arrow.
- Turn the headrest (19) and fit it into the seat lock (20).
- Loosen the knob (21).
- With the headrest unlocked, move the joint so that the headrest fits over the chair backrest.

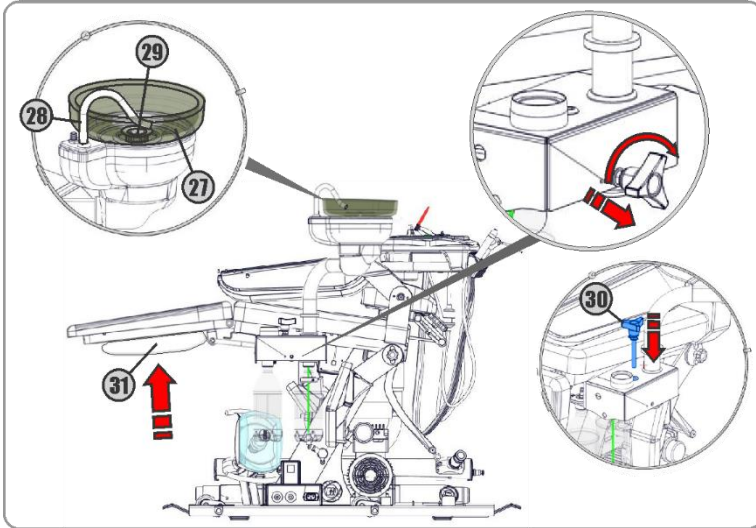
### 11.2.5 - Working Table



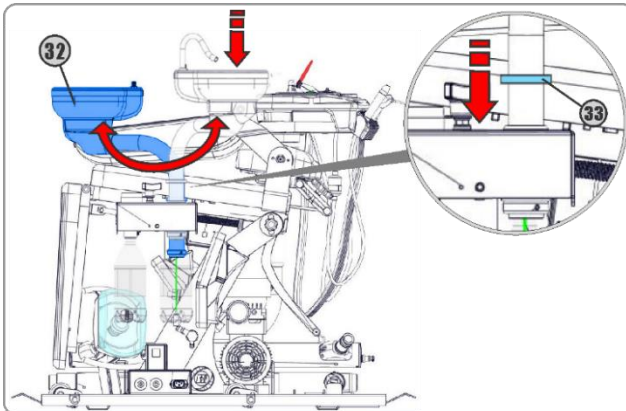
- Remove all handpieces from the holders and store them in the upper compartment of the working table protective bag (22), leaving the hoses out, then keep the working table in your protective bag.

- Also, store the hoses in the protection bag of the hoses.
- Bring the table (22) closer until the backrest, by moving the arm (25) behind the backrest support (26).
- Pass the safety strap (24) inside the metal strap (23) at the base of the chair to secure the backrest bracket (26).
- Use the straps of the working table protective bag (22) to secure it to the chair frame. The strap should run under the back of the seat.

### 11.2.6 - Water Unit

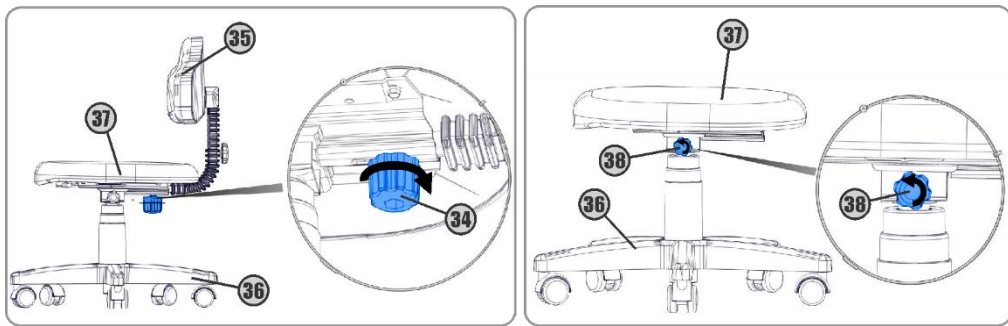


- Remove the spittoon bowl (27), the water spout (28), spittoon bowl finish and the strainer (29).
- Store them in the protective bag of the spittoon bowl and secure them under the footrest (31).
- Remove the handle screw (30) from the side of the delivery system and lock it in the upper hole.

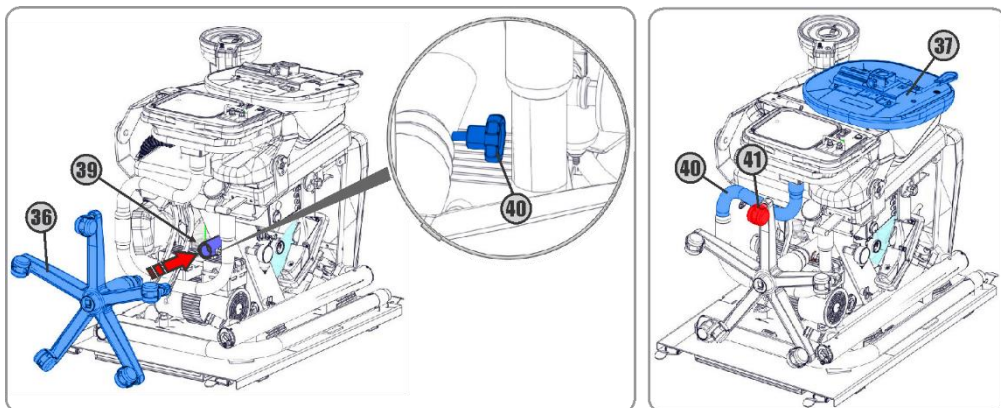


- Move the water unit (32) until it touches the stop (33) on the delivery system.
- Put the protective bag on the water unit in the water unit.
- Rotate the water unit (32) closer to the footrest. Use the safety strap to secure it to the seat.

## 11.2.7 - Dental Stool

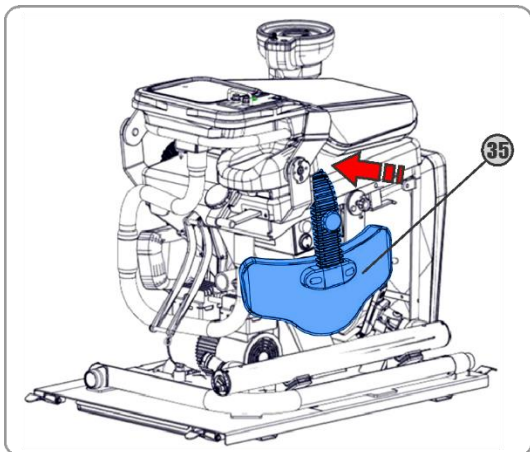


- Before disassembling the dental stool, adjust the seat to the lowest position.
- Loosen the handle screw (34) to release the dental stool backrest (35) and release the handle screw (38) to loosen the dental stool base (36) from the seat (37).
- Place the protection bag of the dental stool backrest (34), the protection bag of the dental stool seat (37) and the protection bag of the dental stool base (36).



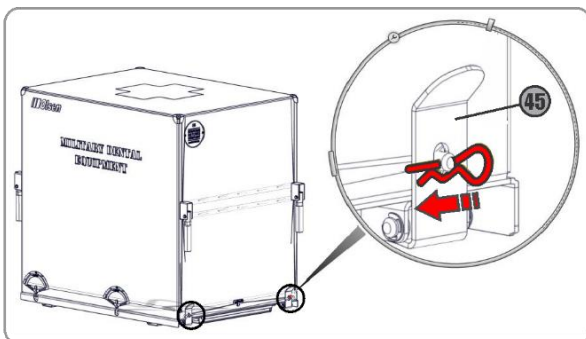
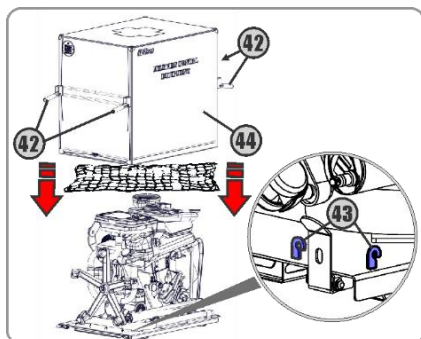
- Place the protective bag of the dental stool castors in the highest castor (41) and secure with the protective strap to the working table arm (40).
- Position the dental stool seat (37) over the backrest of the chair. Secure it with the safety strap going under the chair frame.





- Fit the dental stool backrest bar (35) between the headrest, the backrest, and the seat. It should be slightly inclined due to the armrest of the chair.
- Secure the dental stool backrest through the safety straps on the mainframe.

### 11.2.8 - Closing the Box



- Thread the protective net around, stretching as far as possible to wrap all equipment and secure it to the hooks (or fittings) of the base (43).
- Carefully place the metal case (44) over the equipment, holding the brackets (42), position the locks and attach the clips (45).

## 12- Technical Features

Power supply: 127/220 V~.



**Voltage must be selected when ordering equipment.**

**Number of phases:** single phase.      **Frequency:** 50/60 Hz.

**Power rating:**

- **Equipment:** For 127 V~ : 200 VA;      For 220 V~: 250 VA.
- **Operating light:** 4 VA;
- **Air Compressor:** 750 VA (127 V) e 1000 (220 VA).

**Protection fuses:**

- **For 220 V~:** F 0,5 A H (5 x 20 mm);
- **For 127 V~:** F 1 A H (5 x 20 mm);
- **Operating light:** F 1 A H (5 x 20mm);
- **Air compressor:** Disjuntor 10A (220 V) e 20A (127 V).

**Electrical shock protection type (IEC 60601-1-1 and IEC 60601-1-2 standards):** Class I.

**Protection degree:**

- **B Type Parts:** equipment;

**Operation mode:**

- **Non-continuous operation:**
  - Equipment: time On: 30 s; time Off: 5 min;
  - Curing light: time On: 40 s; time Off: 5 min;
  - Air compressor: Time On: 1 min; Time Off: 5 min.
- **Continuous operation:** operating light, Thermo Comfort System and ultrasonic scaler.

**Harmful water penetration's protection:**

- Equipment: IPX0;
- Pedal: IPX1.

**Operating environment conditions:**

- **Temperature:** between 12° C and 28° C;
- **Pressure:** 75 kPa ~ 106 kPa;
- **Relative humidity:** 30% ~ 70% non-condensing.

**Mains connection cable specification (per IEC 60601-1-2: 2010 requirements 6.1 and 6.2):**

- Circular PP Flexible Cable 500 V 3 x 1 mm 247-5 NM 53-C5;
- Trip Male Tripolar Plug 10 A - 250 V (NBR 14136);
- Female Tripolar Plug 10 A - 250 V (IEC 60083/75);
- Scaler transducer: the manufacturer is Guilin Woodpecker Medical Instrument Co.the model is UDS-N3 LED.

**Electrical connection:** socket according to Brazilian standard of plugs and sockets flexible conduit 3/4.

**Sewer connection:** Quick connection 1/2".

**Water pipe:** Ø25 mm /1" rigid PVC pipe with 25 x 1/2" L/R termination.

**Color of internal hoses:**

- **Blue:** air      – **Green:** water      – **Translucent/White:** sewage.

**Thermal protection of the transformer:** aperture with 130° C ± 3%.

**Lifting capacity (maximum patient weight):** up to 150 kg/ 330,70 lb.

**Total load (equipment + patient + accessories):** 258 kg/ 568,80 lb.

**Weight Net:**

- Assembled: 108 kg/238,1 lb;
- Inside the metal case: 155 kg/341,72 lb;

**Water tank capacity:** 1 L.

**Sewage tank capacity:** 1 L

**Seat height from the floor:** 65 cm/2,13ft.

## 12.1 - Electromagnetic Compatibility (EMC)



**The MDE needs special attention regarding electromagnetic compatibility and must be installed and put into use in accordance with the electromagnetic compatibility information presented in this chapter.**




**Radio Frequency (RF) communication equipment, portable and mobile, can affect the MDE.**

Guidance and Manufacturer's Declaration - Electromagnetic Emissions		
The MDE are intended for use in the electromagnetic environment specified below. The customer or the user of the MDE should assure that it is used in such an environment.		
Emission test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group1	The MDE uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference with nearby electronic equipment.  The MDE are suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings use for domestic purposes.
RF emissions CISPR 11	Class B	
Harmonic emissions IEC 61000-3-2	Not Applicable	
Emissions due to voltage fluctuations/scintillation emissions IEC 61000-3-3	Not Applicable	

Guidance and Manufacturer's Declaration - Electromagnetic Immunity- I			
The MDE are intended for use in the electromagnetic environment specified below. The customer or the user of the MDE should assure that it is used in such an environment.			
Immunity test	IEC 60601 Test Level	Compliance level	Electromagnetic environment guidance
Electrostatic Discharge (DES) IEC 61000-4-2	± 6 kV contact	± 6 kV contact	Floors should be wood, concrete or ceramic. If floors are covered with synthetic material, the relative humidity should be at least 30%.
	± 8 kV air	± 8 kV air	
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines	± 2 kV for power supply lines	Mains power quality should be that a typical commercial or hospital environment.
	±1 kV for input/output lines	±1 kV for input/output lines	
Surge IEC 61000-4-5	± 1 kV differential Mode	± 1 kV differential Mode	Mains power quality should be that a typical commercial or hospital environment.
	± 2 kV common mode	± 2 kV common mode	
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5% $U_T$ (dip > 95% in $U_T$ ) for 0.5 cycle	< 5% $U_T$ (dip > 95% in $U_T$ ) for 0.5 cycle	Mains power quality should be that of a typical commercial or hospital environment. If the user of the MDE requires continued operation during power mains interruptions, it is recommended that the MDE be powered from an uninterruptible power supply or a battery.
	40% $U_T$ (60% dip in $U_T$ ) for 5 cycles	40% $U_T$ (60% dip in $U_T$ ) for 5 cycles	
	70% $U_T$ (30% dip in $U_T$ ) for 25 cycles	70% $U_T$ (30% dip in $U_T$ ) for 25 cycles	
Power frequency (50/60 Hz) Magnetic field IEC 61000-4-8	< 5% $U_T$ (dip > 95% in $U_T$ ) for 5 s	< 5% $U_T$ (dip > 95% in $U_T$ ) for 5 s	Power frequency magnetic fields should be at levels characteristic of a typical commercial or hospital environment.
	3 A/m	3 A/m	
NOTE: $U_T$ is the supply voltage c.a. before the application of the test level.			

### Guidance and Manufacture's Declaration - Electromagnetic Immunity

The MDE are intended for use in the electromagnetic environment specified below. The customer or the user of the MDE should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6  Radiated RF IEC 61000-4-3	3 V <sub>rms</sub> 150 kHz to 80 MHz  3 V/m 80 MHz to 2,5 GHz	3 V <sub>rms</sub>  3 V/m	Portable and mobile RF communications equipment should not be used closer to any part of the MDE, including cables, than the recommended separation distance calculated by the equation applicable to the transmitter frequency. <b>Recommended separation distance</b> $d = [1,2]^2 \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = [1,2]^2 \sqrt{P} \quad 800 \text{ MHz to } 2,5 \text{ GHz}$ $d = [2,3]^2 \sqrt{P}$ where <i>P</i> is the transmitter maximum output power rating in watts (W) according to the transmitter manufacturer and <i>d</i> is the recommended separation distance in meters (m).  Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey <sup>a</sup> , should be less than the compliance level in each frequency range <sup>b</sup> . Interference may occur in the surroundings of equipment marked with the following symbol: 

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measure filed strength in the location in which the MDE are used exceeds the applicable RF COMPLIANCE LEVEL above, the MDE should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the MDE.

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

### Recommended separation distances between portable and mobile RF communications equipment and the MDE

The MDE are intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the MDE can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the MDE as recommended below, according to the maximum output power of the communications equipment

Rated maximum output power of the transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2,5 GHz
	$d = [1,2]^2 \sqrt{P}$	$d = [1,2]^2 \sqrt{P}$	$d = [2,3]^2 \sqrt{P}$
0,01	0,12	0,12	0,23
0,1	0,37	0,37	0,74
1	1,2	1,2	2,3
10	3,7	3,7	7,4
100	12	12	23

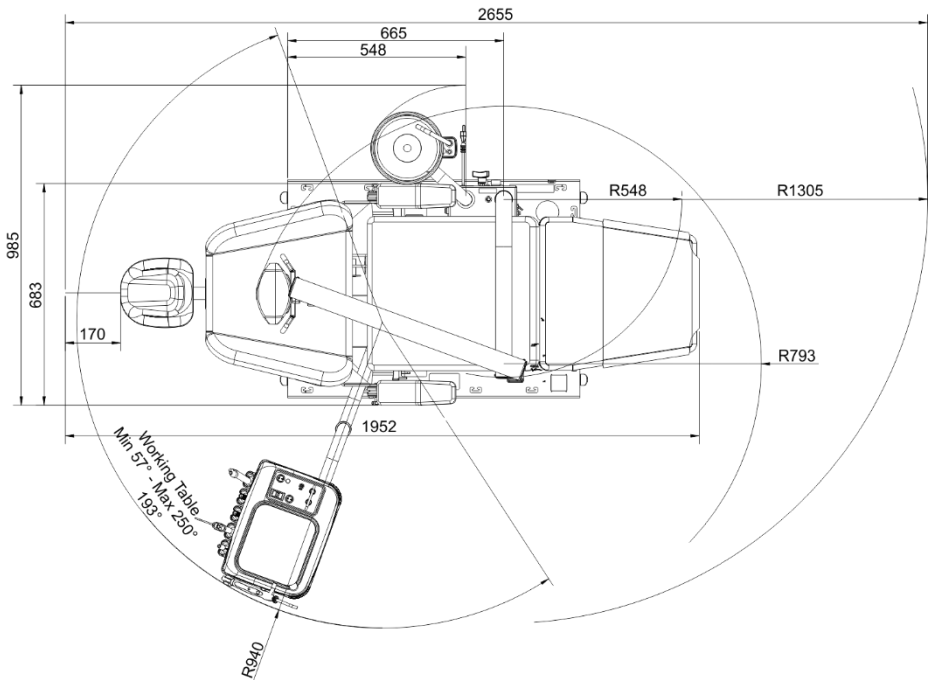
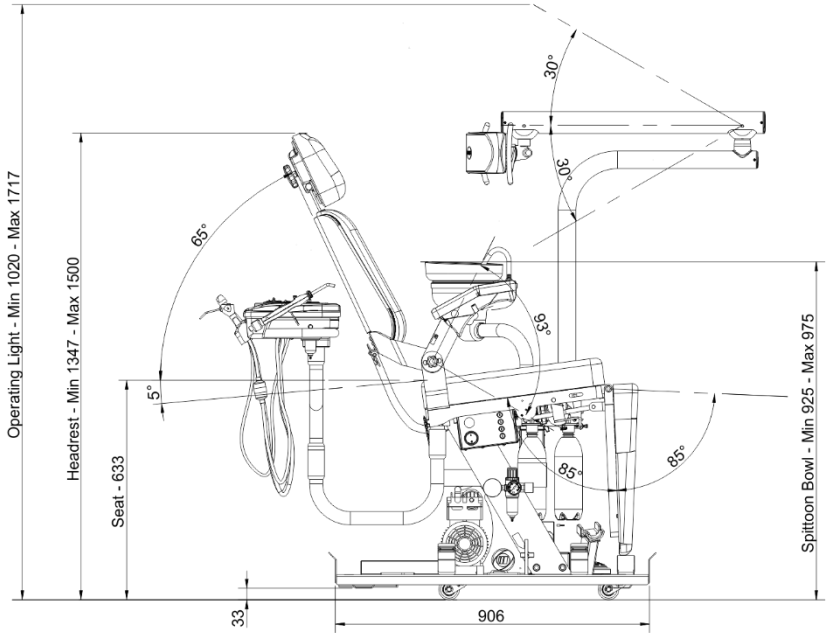
For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in Watts (W) according to the transmitter manufacturer.

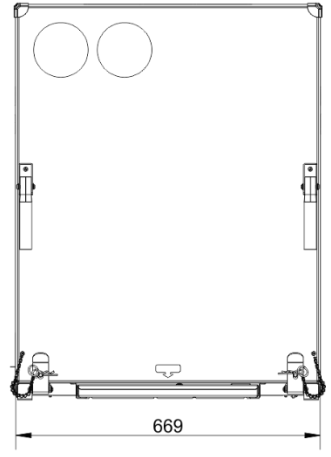
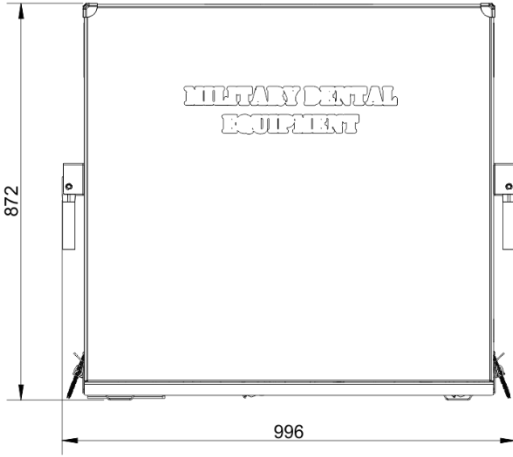
NOTE 1 - At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 - These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

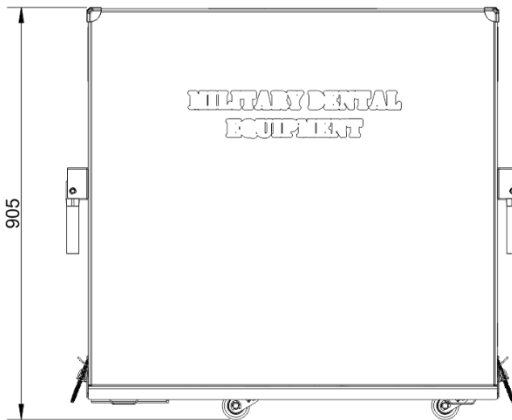
# 13- Dimensional

Measured in millimeters





Measured in millimeters



## 14- Symbology

The symbology complies with IEC 60601-1, IEC 60878, ISO 15223-1, ISO 7010.

	Backrest Up		Backrest Back		Footrest Up
	Footrest Down		Bowl Flush		Dental Air Motor
	Turbine		Multifunction Syringe (Air-Water)		Spray-cooling
	Curing Light		Ultrasonic Scaler		Suction Handpiece
	Saliva Ejector		Hand Control Valve		Variability, for Rotating Movement
	Dental Operating Light		Foot Switch		"OFF" (Power)
	"ON" (Power)		Non-Sterile		Caution
	General Warning Sign		Warning, Electricity		Operating Instructions
	General Prohibition Sign		Refer to the Instruction Manual		General Mandatory Action Sign
	Stepping Prohibited		Type B Applied Part		Type BF Applied Part
	Manufacturer		Level		Sterilizable Up to the Temperature Specified
	Serial Number		Protective Earth (Ground)		Earth (Ground)
	Keep Away from Heat		Humidity Limitation		Fragile, Handle with Care
	Temperature Limitation		Keep Dry		Heaping Up
	This Side Up		Alternating Current		

**EC REP**

Authorized Representative in the European Community

## 15- Important Notes

The reproduction and distribution of these instructions can only be made with prior permission from Olsen Indústria e Comércio S.A.

The technical features of the products described in this manual correspond to the time of its publication. Future technical improvements do not result in any right to update existing products.

The images presented in this manual are illustrative, and the actual equipment may vary in color, size and shape compared to the illustrations presented here.

This equipment is designed to be free from interference from magnetic fields, external electrical influences, electrostatic discharges, pressure or pressure variation if the equipment is transported, installed, operated and sanitized in accordance with the instructions for use contained in this manual.

### 15.1 - General Cares - Compulsory Reading



Follow the instructions in *chapter 7* of this manual (*Installation Requirements*) to suit the electrical and hydraulic network where the equipment will be installed.



Follow instructions for proper use of the equipment and its accessories as described in *chapter 5* of this manual (*Equipment Assembling*). Improper use could be harmful to equipment, which would not be covered by warranty.



Clean the equipment according to the instructions in *chapter 10* (*Cleaning and Disinfection*) of this manual.



Protect your equipment from direct exposure to sunlight. Direct exposure of the equipment to sunlight may cause premature aging of plastic covers and upholstery.



Turn off the circuit breaker or disconnect equipment from the mains and close the office water supply at the end of work.



This equipment does not have a battery pack.



In case of damage to the pedals, discontinue use of the equipment, switch it off, and contact an Olsen accredited service.



The mains cable and the scaler transducer are designed for exclusive use on the MDE. The use of these components in other equipment might compromise their emissions and electromagnetic immunity.



Use only the scaler cable and transducer supplied with the equipment. The use of a cable or transducer other than those specified (*chapter Technical Features*) may result in increased emissions or reduced electromagnetic immunity of the MDE.



The cable for connection to the mains has been developed for exclusive use in the MDE. Use of this component in other equipment may compromise the emissions and electromagnetic immunity of these components.



Only the authorized technician can replace this equipment's mains cable and internal fuses.



This equipment is not suitable for use in the presence of a flammable anesthetic mixture with air, O<sub>2</sub> or Nitrous Oxide.



This equipment should be operated by dental surgeons for oral and maxillo-facial exams and procedures only.




Use only the mains cable supplied with the equipment for mains connection. Use of cables other than those specified (*chapter Technical Features*) may result in increased emissions or reduced immunity of the MDE.




Do not remove the plastic covers from the equipment. There's a risk of electric shock! Only the accredited technician is authorized to perform this procedure.



 In the case of damage to the electrical panel and adjacent plastic covers, disconnect the equipment from the mains and contact the Olsen accredited service. Interrupt the equipment use until maintenance is complete. The equipment use in these conditions offers a risk of electric shock!

 Do not perform maintenance or cleaning on the MDE while it is in use or turned On.


 Do not install or use any electrical equipment over or near the MDE. If necessary, the dental chair must be checked to see if it is functioning normally in the configuration in which it will be used.


 Do not perform the following procedures if it is possible to touch the patient, even if unintentionally, during the procedure:


- Coupling or removal of low and high-speed handpieces from its coupling;
- Coupling or removal of electric micromotor from its coupling;
- Coupling or removal of the scaler from its coupling;
- **Fuse replacement;**
- **Do not perform patient boarding or other procedures on the MDE if the castors are not retracted.**

## 15.2 - Disposal


 Debris, residues and infectious materials resulting from the procedures performed on this equipment must be deposited in biological waste duly identified and in accordance with current legislation.

 For proper disposal of this equipment and its components and accessories, we recommend that it be sent to specialized recycling companies to ensure the best destination of each component without harm to the environment.

 The draining of this equipment should not be disposed of in a common sewage system, complying with the requirements established by the health agencies.

 The disposal of this equipment must be done according to the local laws.

## 15.3 - Transport and Storage

 For transportation and storage, the equipment must be disassembled and protected inside its original metal case.

 Transport carefully protecting equipment from falls and impacts.

 Protect from moisture, rain exposure and direct contact with liquids.

 Keep it sheltered from the sun.


 Do not heap up more than 4 volumes.

 Temperature range for transportation and storage: -10° C to +45° C.

 Moisture limits for transport and storage: 20% to 70%.

 Do not move or store the equipment on uneven surfaces.

## 15.4 - Contraindications

 This equipment is contraindicated for any use other than that for which it is intended or to be operated by unqualified personnel.

## 15.4.1 - Curing Light Contraindications

 **The curing light use in cardiac, pregnant or child patients should be performed with precautions;**

## 15.4.2 - Ultrasonic Scaler Contraindications

- It's forbidden the scaler use on hemophilic patients.
- Patients, dentists or dental assistants with pacemakers are prohibited from using or approaching the scaler during its use.
- The scaler uses in cardiac, pregnant or child patients should be performed with precautions.

## 15.5 - Daily care

At the end of workday, turn off the equipment and follow these instructions:

- Replace the water in the water unit tank daily;
- Clean the equipment daily according to the instructions in *chapter Cleaning and Disinfection* of this manual;
- Close the water supply register and turn Off the equipment's power supply circuit breaker;
- Drain the compressor as instructed in *section Air Compressor* of this manual.

## 16- Troubleshooting

For solving possible problems in a simple and practical way, just follow the instructions in the following

Item	Problem	Causes	Solutions
1	Operating light is not lighting	1°-The equipment is not connected to the mains	1°- Connect the equipment to the main electricity
		2°-Electrical circuit breaker is switched Off	2°- Switch On the electrical circuit breaker
		3°-There is no power on the main electricity	3°- Call the power supply company
		4°-LED is blown	4°-Contact Olsen certified assistance
		5°-The protection fuse is blown	5°-Contact Olsen certified assistance
2	Pneumatic handpiece (micro-motor/turbine) doesn't work or is weak	1°-The handpiece ducts are clogged	1°-The handpiece ducts are clogged
		2°-There's looseness on the handpiece coupling	2°-Attach the handpiece correctly
		3°-The air valve is not completely open	3°-Open completely the air valve
		4°-There's insufficient air pressure for the equipment	4°-Check the inlet air pressure
		5°-The air compressor is not working properly	5°-Call the air compressor assistance
		6°-There's a blocking in the pneumatic system	6°-Contact Olsen certified assistance
3	Pneumatic handpiece has water leakage on the coupling	1°-There's looseness on the handpiece coupling	1°-Attach the handpiece correctly
		2°-The gasket is worn	2°-Replace the gasket
		3°-The gasket is not properly sealing the coupling	3°-Apply original handpiece seal
		4°-The coupling is worn	4°-Contact Olsen certified assistance
4	The pneumatic handpiece doesn't have water on the spray	1°-The coupling spray's adjustment is closed	1°-Align the coupling's green dots
		2°-The water tank is empty	2°-Fill the water tank
		3° - There's looseness on the handpiece coupling	3°-Attach the handpiece correctly
		4°-The air valve is not completely open	4°-Open the air valve
		5°-There's insufficient air pressure for the equipment	5°-Open the main air valve
		6°-The hydro-pneumatic system is locked	6°-Contact Olsen certified assistance

5	The saliva ejector is weak or loses suction during the procedure	1°-The saliva ejector's filter is clogged	1°-Clean the saliva ejector's filter
		2°-There's insufficient air pressure for the equipment	2°-Open the main air valve
		3°-The equipment's drain hose is obstructed	3°-Check if the sewer's drain pipes are crushed and release the flow
		4°-The sewer is clogged	4°-Check if there's water outflow on the spittoon bowl and clean the sewer if necessary
		5°-The hydro-pneumatic system is locked.	5°-Contact Olsen certified assistance
6	The curing light isn't working	1°-There's a problem with power supply	1°-Check troubleshooting, <i>item 1</i>
		2° - Block of 10 consecutive activations	2°-Wait at least for 20 seconds to activate the curing light again
		3°-Possible overheating	3°-Contact Olsen certified assistance
7	The scaler vibrates little or nothing	1° - There's a problem with power supply.	1° - Check troubleshooting, <i>item 1</i> .
		2° - The tip is not properly attached to the transducer.	2° - Remove and attach the tip again using the proper wrench.
		3° - The tip is worn, or the scaler has a defect.	3° - Contact Olsen certified assistance.
8	The scaler is overheating	1° - The vibration control is not adjusted according to tip specification.	1° - Adjust the scaler power control according to the tip specification.
		2° - The tip is not properly attached to the transducer.	2° - Remove and attach the tip again using the proper wrench.
		3° - The tip is worn, or the scaler has a defect.	3° - Contact Olsen certified assistance.
9	The scaler has little or no water	1° - The water tank is empty.	1° - Fill the water tank.
		2° - The scaler water valve is closed.	2° - Open scaler water valve.
		3° - The tip has a hydro-pneumatic system.	3° - Contact Olsen certified assistance.

If you are in doubt or find a problem with the equipment that is not mentioned in this chapter, stop using the equipment immediately and contact your authorized service center or contact us by e-mail [export3@olsen.odo.br](mailto:export3@olsen.odo.br) or by calling +55 48 2106 6000.

## 17- Preventive Review

In order to extend your equipment's lifespan, Olsen has created the extended warranty system by performing scheduled service maintenance.

During the service maintenance, the technician will evaluate the equipment's general maintenance condition, as well as the monitoring of component wear and if there is a need for lubrication.

The technician may suggest the replacement of the parts with wear and tear and will provide guidance on the daily care necessary for the proper equipment functioning.

The following tables list the items that must be checked by the technician:

<b>DENTAL CHAIR/PROGRESSIVE PEDAL</b>
Check backrest adjustment
Check footrest adjustment device
Check headrest movement
Check the valves of the progressive pedal
Check automatic vapor drain

<b>DELIVERY SYSTEM/WORKING TABLE</b>
Check the arm and joints of the working table.
Check the commands of the commands panel
Check of the pneumatic couplings pressure and rings.
Check the valves, blades, and handpieces holders.
Disassembly and lubrication of the 3-way syringe's buttons
Check instrument hoses
Check the suction of the Venturi ejector
Check of the scaler tips wear and tear

<b>WATER UNIT</b>
Lubrication of the solid's collector rings
Cleaning and lubrication of the spittoon bowl ring

<b>OPERATING LIGHT</b>
Check of the joint movements.
Check bulkhead and mirror
Check the operating light focus
LED evaluation

<b>DENTAL STOOL</b>
Check of the castors.
Check of the gas spring and movements.

<b>CURING LIGHT</b>
Check of the intensities and operation modes.
Check for the tips and supporting ring.

<b>BASE/CONNECTIONS</b>
Check of the electric, air, water, and ejection connections.
Check of the sewer connection
Check of the castors



Olsen recommends that the items in this chapter be reviewed every 180 days to prevent possible equipment failure or performance even after the equipment warranty expires.



The performance of preventive or corrective maintenance by an accredited technician does not interfere with the warranty period.



Allow only qualified Olsen technicians to perform installation and maintenance on your equipment and accessories.



Use only Olsen original parts and accessories. The use of non-original components can compromise the performance of the equipment, increasing its emissions or reducing its electromagnetic immunity.



Do not make adaptations, modifications or changes to the equipment or its components or accessories.

## 17.1 Revision Record

For your control, record here the technician's data and the date of the inspection:

<b>REV. 180 DIAS</b>	
Ordem de Serviço N°	_____
Em	_____/_____/_____
Ass. Técnica	_____
Nome do Técnico	_____

## **18- Warranty Term**

### Warranty Term

This equipment has up to 360 days of warranty, subject to 1 revision (6 months).

### Note 01

- 1 - The equipment must be installed within 3 months after the date of the purchase invoice.
- 2 - The tolerance allowed for performing the revision is 10 days before or 10 days after the scheduled date.
- 3 - The warranty period and the revision date are counted from the equipment installation date.
- 4 - Both installation and service must be performed by an Olsen authorized technician.
- 5 - The legal warranty for all equipment is 3 months from the date of the purchase invoice. All the above terms already include the legal warranty period.
- 6 - The equipment installation date, for warranty purposes, will be stated in the service order that should be requested by the customer to the technician responsible for installing the equipment.
- 7 - The product's warranty will only be granted upon presentation, by the customer, of the equipment's purchase invoice, the referred service orders for installation and revision.

### Note 02

- 1 – Lamps, dental light mirrors and fuses are not covered by the warranty.
- 2 - The warranty is limited to the repair or replacement of parts with manufacturing defect, not including the repair of defects originating from:
  - a) non-compliance with the instructions for use, maintenance, lubrication (with recommended oil) and cleaning contained in the user's manual;
  - b) Falls, crashes, inadequate transport and storage;
  - c) Action of nature agents;
  - d) Inadequate application of chemical products;
  - e) Contact of the equipment with materials (fabrics, leather, disposable gloves, paints, pigmented detergents, cutting or perforating objects, etc.) that may alter its original characteristics;
  - f) Connection to the supply mains at a voltage incompatible with the equipment;
  - g) Electric infrastructure in disagreement with the owner's manual and local standards.
- 3 - This warranty will cease when:
  - a) By normal expiration of its validity term;
  - b) By changes made in the equipment;
  - c) By adulterations in the service order or its incorrect filling out;
  - d) By installation, technical assistance or programmed revision carried out by a person not authorized by Olsen;
  - e) By interruption or non-performance of the maintenance plan;
  - f) By not installing the equipment for more than 3 months, counted from the purchase date contained in the invoice;
  - g) By using replacement parts that are not original Olsen parts.
- 4 - The repairing or replacement of parts under the warranty period will not extend its original expiring date.
- 5 - The expenses resulted from the equipment's installation, maintenance plan, travel and accommodation costs of the service staff involved in the calls for service for the equipment's installation or repair will run under the owner's responsibility and in accordance with the distributor's norms.
- 6 - The customer, after checking the installation, must keep the purchasing invoice and the equipment's serial number until the warranty period end, as in the case of service needed, the serial number, the invoice number, and purchasing or installation date will be required.
- 7 - On all calls for service during the warranty period the equipment's serial number and a copy of the purchasing or installation invoice must be shown. In the case of this information is not presented, the service will not be done under warranty.

## **19- Message from the President**

Olsen and its clients:  
A successful relationship.

I have linked my name to the factory and to the dental and medical equipment that are currently produced and trade in more than 100 countries. Having in mind the responsibilities and long-term response to this initiative.

Our products are modern, innovative, durable and of low maintenance cost. These characteristics have been achieved thanks to our competent and dedicated team, which make me very proud for many reasons, as they are always giving the best of their creative capacity to our clients.

Our company will always be open to all those who prefer Olsen products, for any necessary information and technical assistance, but especially for comments regarding the relationship with customers. We expect this connection to always, bring you satisfaction, resulting in more and more benefits to all of us.



Cesar Olsen





[www.olsen.odo.br](http://www.olsen.odo.br) | [loja.olsen.odo.br](http://loja.olsen.odo.br)

+55 48 2106 6000  
[export3@olsen.odo.br](mailto:export3@olsen.odo.br)

# **Olsen**

Equipamentos feitos para durar

Registration at Ministry of Health 1028130009

Technical Manager MSc. Engº Valmor Schirrmann Filho - CREA SC: 196726 - 4

Cod. 5409182 - Rev 01 - 06/03/2023



**Olsen Indústria e Comércio S/A**

Av. Ivo Lucchi, 68, Caixa Postal 59, Distrito Industrial, Jardim Eldorado -  
Palhoça/ SC, Brasil, CEP 88133-510 - Telefone: +55 (48) 2106-6000

