DENTAL UNIT U5000
DENTAL UNIT U1500

Instructions for use
Dear customer,

To begin with, we would like to congratulate you on your decision to purchase an ULTRADENT product for your dental practice.

As is the case for all ULTRADENT products, our 70 years of experience have been combined with the latest ergonomic knowledge.

This product comes with documents such as instructions for use, maintenance instructions, assembly instructions, and technical documentation.

You should always keep these documents at hand.

Read these instructions for use and the maintenance instructions before using the unit and be sure to pay attention to all notes, warnings, and instructions.

This equipment may be used, maintained and serviced only by people who have been appropriately trained and are familiar with the instructions for use and maintenance instructions.

If third-party manufacturer components are used, the relevant manufacturer’s instructions must be observed.

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ULTRADENT has a quality management system that meets the requirements of the following standard:


This product bears the CE mark with the EC number of the certifying body (0123) in accordance with the German Medical Products Act (Medizinproduktegesetz, MPG) and the relevant EC Directive, 93/42/EEC.
Foreword

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It is **vital** that you read this chapter before starting up the unit.

In order to use the unit correctly, properly, and without danger, you need to be familiar with and observe the relevant safety rules and notes.

You should therefore read this chapter carefully before starting up the unit, paying particular attention to the warnings and notes listed here.

**Presentation of warnings**

Important aspects which affect the safety of people and the unit are highlighted in these instructions for use with the following headings and symbols:

- **Caution!**
  - The **Caution!** symbol indicates notes which must be observed because ignoring them would endanger the life and health of the operator or other individuals.

- **Important!**
  - The **Important!** symbol indicates notes which must be observed because ignoring them could damage the unit and could cause property damage.

- **Note!**
  - The **Note!** symbol indicates texts which are particularly important and must be observed as ignoring them may lead to malfunctions during operation.

- **Tip!**
  - Tips are notes indicating how operational processes can be improved.

**Warranty**

Warranty claims can only be asserted if the warranty conditions are met. They are included in the general terms and conditions of sale and delivery. In addition, the notes and warnings in the instructions for use and maintenance instructions must be observed.
A handover certificate is enclosed with the delivered product. If the handover certificate is missing, you should request it from your dealer without delay.

Please make sure that you complete the handover certificate and send it back to ULTRADENT within 15 days of the assembly of the unit.

ULTRADENT uses the handover certificate to record details of the unit so that it can be traced and any subsequent improvements can be made where necessary. The certificate will be used as the basis for meeting any warranty claims. The warranty begins on the unit handover date entered.

Proper use and disclaimer

The unit can only be used as directed for normal use in orthodontic and dental practices.

Any use outside of this will be considered improper. ULTRADENT will not accept liability for any damage resulting from such use; the risk will be borne solely by the user.

This equipment may only be operated by trained medical personnel.

Proper use also involves adhering to the notes in the instructions for use and maintenance instructions, and also carrying out inspection and maintenance work as specified.

The relevant accident prevention regulations and other generally recognized rules regarding safety and occupational medicine must be adhered to. ULTRADENT will not accept any liability for damage that results from disregarding these regulations.

If you make any changes to the unit yourself or if you use spare parts, accessories, or special fittings that have not been checked and approved by ULTRADENT, this may have a detrimental effect on the safety of the unit. ULTRADENT will not accept liability for any damage resulting from this.

ULTRADENT will not accept any liability for injury and/or property damage that results from disregarding the safety notes, disregarding the instructions for use, or violating the duty to act with due care while handling, while operating, while maintaining, or while repairing the unit, even if these duties to act with due care are not specifically pointed out in the safety notes in the instructions for use and the maintenance instructions.

The unit may only be operated after it has been started up, including a functional check and safety check, and after the user/operating staff have been briefed by an authorized medical product consultant. The fact that the unit has been started up and handed over correctly must be documented (including details of tests, the expert providing the briefing, the users briefed, etc.) both in the handover certificate and in Ultradent’s medical products book.

Please read the instructions for use and the maintenance instructions before using, maintaining, or repairing the unit, paying particular attention to all safety notes.
Safety notes

ULTRADENT has a certified quality management system which meets the requirements of the DIN EN ISO13485 standard for medical products.

ULTRADENT dental units, motorized chairs and spittoons are manufactured in accordance with the relevant safety regulations and meet the statutory requirements for medical equipment (e.g. the German Medical Products Act (Medizinproduktegesetz, MPG) and EC Directive 93/42/EWG). EMC requirements have been checked and are observed.

ULTRADENT can only be held responsible for the safety-related properties of the unit if the unit has been assembled, started up, serviced, and modified by ULTRADENT or by a party expressly authorized by ULTRADENT for this purpose and the unit is used in accordance with the instructions for use and maintenance instructions.

Another prerequisite is that components which affect the safety of the unit are replaced with original parts in the event of failure.

In-house installation must have been carried out in line with the requirements laid out in our installation documents.

Changes to the unit’s fittings that may affect the safety of operators, patients, or third parties are not permissible due to statutory regulations.

For reasons relating to product safety, this product may only be operated using original accessories from ULTRADENT or third-party accessories that have been authorized by ULTRADENT. If unauthorized accessories are used, the user will bear the risk.

The operator of the unit is obliged to maintain an inventory listing of dental equipment and maintain a medical products book for all units in accordance with Attachment 2 of the German Ordinance on the Installation, Operation and Use of Medical Devices (MPBetriebV).

According to the German Ordinance on the Installation, Operation and Use of Medical Devices (Medizinprodukte-Betreiberverordnung), this dental-medical unit must be subject to a safety check when it is first started up and then at least every 2 years as well as after every change/repair to safety-related parts. Moreover, these safety checks must be documented in the medical products book. The medical products book must be stored near the unit, together with the instructions for use.

When it comes to carrying out safety checks, the operator must always commission individuals who meet the requirements laid out in Section 6 of the Medizinprodukte-Betreiberverordnung. The operator must carry out technical inspections of this medical unit or have such inspections carried out on a regular basis and as required. We recommend that you have the unit serviced once a year by a party authorized by Ultradent or by the Ultradent factory customer service.

The requirements of the German Ordinance on the Installation, Operation and Use of Medical Devices (Medizinprodukte-Betreiberverordnung, MPBetreibV) and the requirements of the German Medical Products Act (Medizinproduktegesetz, MPG) must be adhered to by the operator/installer and supervisor of the system or medical product.
Section 6 of the German Ordinance on the Installation, Operation and Use of Medical Devices (Medizinprodukte-Betreiberverordnung, MPBetreibV) specifies all the checks required during the maintenance of this equipment.

The user is required to avoid bacterial contamination in the equipment by taking suitable measures.
If there is any reason to believe that a worn part or a technical fault in the unit may put patients or users at risk, an authorized customer service partner must be commissioned without delay to investigate the unit and rectify the fault where necessary.

The requirements of VDE 0751-1 “Repeat testing and testing prior to commissioning of medical electrical devices and systems - general provisions” must be observed in full.
Safety notes, warranty, liability

**Caution!**
Disconnect the unit from the mains before carrying out any maintenance work or rectifying faults.

**Caution!**
This unit is not intended for operation in rooms where there is a risk of explosion.

**Caution!**
High-speed power equipment generates high-frequency operating noise, which may damage the hearing of people who are subjected to it over a long period of time. In order to eliminate this risk, those carrying out treatment are recommended to use electronic hearing protection with an audio frequency selection.

**Caution!**
When patients who have heart pacemakers or similar implanted systems are treated, the functionality of the implanted systems is likely to be affected by electromagnetic fields. The user must question patients accordingly before commencing treatment.

**Caution!**
Due to the risk of electromagnetic interference, the use of mobile phones is not permitted in the treatment room while patients are being treated.

**Caution!**
For safety reasons, the unit must be switched off using the main switch on the supply unit before leaving the practice. This has the result that there is no voltage on any of the mains outputs of the power supply unit.

When the main switch is switched off, the air and water supply to the units is interrupted by suitable solenoid valves in the supply unit. This prevents air or water escaping from the unit unintentionally.

Check this disconnection by activating the syringe. Once the supply has been disconnected, air and water should escape from the multi-way syringe only briefly when the relevant lever is operated.

We recommend switching off the water supply to the units centrally before leaving the practice.
Disposal

Your dental unit is labeled with the “crossed out garbage can” sign on its nameplate and was brought into circulation after 13 August 2005.

The product must be disposed of in accordance with country-specific regulations. So please observe the regulations valid in your country.

Within the European Economic Area, Directive 2002/96/EC (WEEE) for electrical and electronic equipment requires environmentally friendly use/disposal. This means that the product must be disposed of separately from domestic waste.

Clean and disinfect the unit in accordance with the relevant provisions before making it available for disposal.

Please contact your dealer or Ultradent if you wish to dispose of your product for good.
Notes on the instructions for use

These instructions for use contain important information about using the unit. They help to avert hazards and repair costs as well as reducing downtime. This increases reliability during operation and extends the unit’s life.

Operating safety and the usability of the unit directly depend on its maintenance and servicing. It is therefore essential that maintenance and servicing work is carried out on a regular basis. Details of how to maintain the unit are provided in the corresponding maintenance instructions.

When maintaining the unit it is vital that you proceed as described in the maintenance instructions.

If you have any questions regarding the unit, its maintenance, or the instructions for use, please consult your ULTRADENT dealer.

Unit U5000 is a mobile or floor-mounted dental treatment unit. A flexible supply hose attaches it to the associated power supply unit, which is either separate or integrated into the motorized chair.

Unit U1500 consists of the dental treatment component – attached to the instrument table – and the chair spittoon U740.

These instructions for use only describe dental treatment unit U5000 and dental treatment component U1500.

There are separate instructions for using the chair spittoons and the rest of the workplace equipment, and you should proceed as described in these instructions.

Scope of delivery

The instructions for use describe the unit and how to operate it with the maximum possible fittings.

The scope of delivery will not necessary be identical to the maximum unit fittings. It depends on the scope of delivery defined by you. You will find a list of all possible components under “Fittings” in the table of contents.
Brief description of U1500

Chair-mounted unit U1500 belongs with chair spittoon U740 (Fig. 1). They can only be operated together. The unit can be supplied with integrated multimedia equipment (flat screen and intraoral camera).

Unit U1500 is intended to be attached to ULTRADENT patient chair GL2020. It cannot be attached to other motorized chairs.

The adjusting screw ⅅ, which can be used to brake the arm to a greater or lesser extent in the vertical direction depending on the load, is located on the instrument table’s pivot arm.

**Important!**

Never move the pivot arm by force when the adjusting screw is tightened as this may damage it.

Setting options on the instrument table

The angle of the instrument body ℄ (Fig. 1) can be adjusted – by the technician – to meet the customer’s requirements, either during assembly or at a later stage.

The tray table ℇ (Fig. 1) is designed to be adjustable and the dentist can move it to the most appropriate position at any given time.

Brief description of U5000

Dental unit U5000 (Fig. 2) is a mobile ➀ or floor-mounted ➁ dental treatment unit. A flexible supply hose attaches it to the associated power supply unit, which is either separate or integrated into the motorized chair.

The unit can be combined with all common ULTRADENT spittoons and motorized chairs to transform it into a fully-fledged workplace.

The unit can be supplied with integrated multimedia equipment (flat screen and intraoral camera).

Moreover, it is completely suited for partially modernizing existing workplaces from ULTRADENT or other suppliers.

**Fig. 1**
Technical data

Type.....................................................U1500, U5000
Rated voltage** ....................................230 V~ 50/60 Hz
(see nameplate for other voltages)
Rated input ..........................................approx. 450 VA
(depending on fittings)
Weight..................................................approx. 30 kg
(depending on version)
Operating mode.................................Continuous
operation with intermittent loading
Fusing in the power supply unit ..........T 10 A
Protection class.................................1
Degree of protection of the application....Type BF
parts against electric shock
Degree of protection against ............Standard unit
water penetration (not protected)*
Fixed unit
Water pressure.................................2.5-6 bar
Air pressure.................................6-8 bar

Optionally installed:
Tartar remover
  Frequency..........................28-35 kHz
  Rated power..........................8 VA
Electrosurgery unit
  HF frequency..........................1.2 MHz
  HF power..........................35 W to 1kΩ
Foot control F9
  Transmitting frequency..............869.85 MHz
  Transmitting power..................1mW
  Modulation..............................GFSK
  Power supply..........................2xLR6/AA/Mignon
                                    battery, alkali-
                                    manganese
                                    (recommended)

The transmitting frequency is in the ISM band.

*Foot control and power supply unit in accordance with IPX1.
** In supply unit (floor socket)

IPX1 indicates the degree to which the casing is protected
against water (here: protected against dripping water).

The units are not intended for operation in explosive
areas!

We reserve the right to make changes during technical
development.
Introduction

Nameplate for the unit
Attached to the bottom of the instrument body – see ➀ (Fig. 3) e.g. U5000.

Nameplate for power supply unit (rating plate)
The nameplate is located at the front of the floor plate below the casing ➁ (Fig. 3) of the motorized chair (not visible from outside) or, if the power supply unit is free-standing, externally on the frame of the power supply unit e.g. GL2020.

Nameplate for additional electrosurgery unit
Attached to the additional box fitted to the bottom of the unit body.

Nameplate for radio-controlled control unit F9
Attached to the bottom of the control unit’s base plate e.g. F9.

For details of separate disposal, (see disposal notes)
Explaination of the symbols on the nameplates

⚠️ Please pay attention to the important notes in the accompanying documents!

⚠️ Classification: unit type BF.

DAB Operating mode: Continuous operation with intermittent loading.
(The permissible utilization times correspond to the way dentists work.)

IPX1 Casing protection against water:
Protected against dripping water.
(IPX1 is valid for the power supply unit and foot control.)

 ucwords
Emission of non-ionizing radiation.
Startup

Switch the treatment unit on using the main switch on the unit. The main switch ➀ is located on the side of the casing of the motorized chair (Fig. 4). When the unit is switched on, the switch and the display on the unit body are illuminated. The unit is ready for operation.

You can now take the required instruments from the holders and start them using the respective foot controls.

The instrument that has been removed from the holder is ready for operation. If several instruments have been taken out – with the exception of the syringe and any camera that is installed – the active one is always that which was taken out first.

Take care when changing the drill or other attachments to the handpieces:

When changing the drill or other attachments between treatments, you must be careful not to press the pedals on the foot control. There will otherwise be a risk of injury!

Important!

Prior to the first treatment each day, always run the mouth rinse glass filler (where available) on the ULTRADENT spittoon at least five times and pour away the old water. In addition, all water-bearing equipment at the workplace (e.g. syringes, motors, turbines and tartar removers without handpieces and elbow joints) should each be operated in wet operation for 2 minutes, either over the spittoon bowl or over a sufficiently large container, in order to get rid of the old water (RKI recommendation).

If the unit is not used for an extended period of time, the water in the unit and in the supply pipe will contain bacteria. It may then have levels of bacteria much higher than the permissible maximum of 100 CFU/ml specified by the Drinking Water Ordinance. In such cases it is essential that you flush the equipment for longer.
Introduction to the control panel

The unit contains a large-format touch screen display (Fig. 5) to visualize the unit and instrument functions. The functions are represented by large, easily comprehensible symbols and can be changed or triggered by pressing them lightly.

The most important instrument properties are operated in the usual way using the foot controls.

Other settings and functions can be used by pressing the symbols ➀ (Fig. 5) at the top and in the center of the display.

At the bottom of the display, various holder symbols indicate the current assignment of the various instrument holders ➁ (Fig. 5).

The software version installed ➂ (Fig. 5) is displayed above the holder symbols.

---

Fig. 5
Startup and operation

Control panel in resting state

The unit is switched on and all instruments are located in their holders.

The menu line at the top of the display ➀ (Fig. 6) shows the symbols for the functions available in this state:

- Door opener
- Call
- Spittoon bowl rinsing
- Mouth glass filler
- Motorized chair operation (submenu).

The following functions are displayed in the center of the screen above the holder symbols:

- Multimedia equipment (submenu).
- Other functions (submenu)
- User level

U4.30 Current version of the software

The symbols on the bottom line ➁ (Fig. 6) show the assignment of the holders.
Other functions

- After pressing this symbol you obtain a submenu containing additional functions (Fig. 7):
  - Possibility of changing over to an external air polishing unit or other suitable additional device (optional).
  - Possibility of changing over to an external surgical motor (optional).
  - Key for intensive disinfection
  - Key for instrument rinsing.

Service (submenu)

Other functions

- After pressing this symbol you obtain a submenu containing the following functions:
  - Buzzer
  - Display contrast +/ –
  - Display alignment (submenu).

When you press this symbol, the following two possible rinsing times are displayed:
  - Rinsing time of 20 seconds.
  - Rinsing time of 2 minutes.

Other functions

- Pressing this symbol takes you to the submenu for aligning the display.

Pressing the arrow symbol again takes you back to the main menu.
Startup and operation

Control panel in operating state

In this example (Fig. 8), the syringe ① and a motor have been taken out of the holder ②.

The following functions can be triggered by pressing the symbols lightly:

③ Activate spitoon bowl rinsing
④ Activate the mouth glass filler
⑤ Activate the door opener
⑥ Activate the call function
⑦ Activate the submenu for operating the motorized chair

The symbols relevant for operating the syringe and motor are displayed in the center of the display (Fig. 8).

The selection of individual functions is indicated here by various symbol shapes or by whether or not symbols are grayed out.

When you press the various symbols, additional symbols appear on the display where necessary (e.g. “+/−” fields).

In the bottom section, the holders with the holder symbols (Fig. 8) indicate the current status: The black backgrounds indicate that instruments have been taken out of holders ① and ②.
General key functions and symbols

User pre-selection

Display in resting state

Pressing the user symbol for an extended period of time (longer than one second) changes the displayed user number in the range of between 1 and 4.

Users can be pre-selected using the unit foot control. See the “Infinitely variable control unit” section of these instructions for use with regard to this.

The user setting function provides four different setting profiles, which can be used not only for different users but also for different treatment methods.

The units stores the user number of the user currently set when it is switched off. The last user is then set automatically when the unit is switched back on.

Tapping the vision symbol takes you to the menu for multimedia equipment, where you can access the camera, PC, video, white screen, and standby functions as well as adjust the monitor settings. To operate the multimedia equipment, proceed as described in the separate multimedia instructions for use.

Display in operating state

When you tap the user symbol, the symbol appears in the black field and the ‘+’ and ‘-’ symbols appear on the display (Fig. 9).

You can change the user number displayed from 1 to 4 by tapping ‘+’ or ‘-’.

As soon as the required number is displayed, the ‘+’ and ‘-’ symbols can be deactivated by pressing the user symbol again. The black field then disappears.

The user-specific settings that you make during treatment are saved when the instrument is replaced in the holder and are available again the next time the instrument is removed. The settings are also retained for the relevant user if you have switched to a different user in the meantime.

Fig. 9
Startup and operation

The following settings can be set for each of the four users:

<table>
<thead>
<tr>
<th>Component</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syringe:</td>
<td>Hot/cold, light on/off, light brightness</td>
</tr>
<tr>
<td>Turbine:</td>
<td>Spray, chip blower, foot control fixed/adjustable*, light on/off, light brightness, physiodispenser, speed pre-selection</td>
</tr>
<tr>
<td>Motor:</td>
<td>Spray, chip blower, foot control fixed/adjustable, clockwise/anticlockwise motion, physiodispenser, light on/off, light brightness, speed pre-selection</td>
</tr>
<tr>
<td>Tartar remover:</td>
<td>Spray, foot control fixed/adjustable, mode, light on/off, light brightness, intensity pre-selection, physiodispenser</td>
</tr>
<tr>
<td>HF surgery:</td>
<td>Intensity pre-selection</td>
</tr>
<tr>
<td>Steripump:</td>
<td>Intensity pre-selection</td>
</tr>
<tr>
<td>Motorized chair:</td>
<td>Pre-selection of working positions</td>
</tr>
</tbody>
</table>

* only in the case of an adjustable turbine.

The settings defining the display contrast and whether the buzzer is on or off are defined for all users together.

**Intensive disinfection**

![Symbol] Tapping this symbol activates the intensive disinfection unit.

**Instrument rinsing**

![Symbol] Tapping this symbol takes you to the submenu for instrument rinsing.
Buzzer

- Buzzer on
- Buzzer off

You switch the acoustic confirmation of changeovers on the unit off or on by pressing the buzzer symbol. The setting that is pre-selected at any given time is indicated by the appropriate symbol. However, the buzzer tone cannot be deactivated in the following circumstances: if there is a built-in HF surgery unit, when the user level is changed over, during the Endo/Paro function, and for the adjustable/non-adjustable flat starter.

Contrast

You change the contrast of the LCD display by pressing the respective LCD symbols (Plus = more contrast, Minus = less contrast). This enables you to adjust the contrast to accommodate various degrees of ambient brightness and various perspectives.

The contrast setting is the same for all four users and cannot be altered individually.

Call

Tapping this symbol activates a relay in the floor connection box, for instance to operate the facility for calling practice staff.

Door opener

Tapping this symbol activates a relay in the floor connection box, for instance to operate the door opener for the entrance to the practice.

Spittoon bowl rinsing

You switch the spittoon bowl rinsing facility on by tapping this symbol. The rinsing facility switches itself off automatically after a certain time.

Mouth glass filler

You start the facility for filling the drinking glass in the spittoon by tapping this symbol. The water supply is switched off automatically at the end of the filling time.
Startup and operation

Key functions and symbols for the instruments

Instrument light

The light can be switched on and off by tapping the light symbol ➀ (Fig. 10). When it is switched on, the symbol lights up at full strength. The light intensity is displayed numerically next to the symbol.

The light symbol ➀ appears in the black field if you press it briefly (for approximately half a second). The “+” and “−” symbols ❼ for setting the light intensity also light up (gradually if you tap the “+/−” symbols, rapidly if you press them for longer). The “+/−” symbols disappear when you press the light symbol again.

The light for the syringe can also be set – assuming it is illuminated. **However, only the syringe should be activated while you make the setting.** If another instrument is activated at the same time, only the light for that instrument can be set. The light for the syringe then lights up with the brightness of the other instrument if the brightness set for that instrument is not the same.

Speed pre-selection/intensity pre-selection

By pressing the ➀ and ❼ (Fig. 11) symbols, or the holder line ➌ below them, you can set the speed (intensity) or the speed range (intensity range) that can be used for all adjustable instruments. As soon as you press this area, the “+” and “−” symbols ❼ appear and the numeric display appears in the black field. You can adjust the value displayed by pressing the “+/−” symbols (gradually by tapping the “+/−” symbols or rapidly by pressing them for longer). The “+/−” symbols disappear when you press ➀, ❼ or ❼ again.

The value that is set is saved automatically for a specific user. This means that the value is retained even after the instrument is put back into the holder and taken out again.

In the case of the electric motors, the pre-selected speed is displayed in revolutions per minute. You can change the speed in steps of 500 by using the buttons.

In the case of an adjustable foot control, the maximum selectable speed is displayed. The speed that is currently set is indicated by the bar on the display ❼ (Fig. 11).

In the case of the adjustable turbines and the tartar remover, the display shows a percentage ➀ (Fig. 12). You can set the speed in percentage steps using the buttons (gradually if you tap the “+/−” symbols, rapidly if you press them for longer). The “+/−” symbols disappear when you press ➀, ❼ or ❼ again.

The speed and intensity can also be pre-selected at ten different levels using the foot control. See the “Infinitely variable control unit” section of these instructions for use with regard to this.
Important!

If you change the setting using the foot control, the value chosen is not saved for the specific user. When you replace the instrument in the holder, the unit automatically switches to the user-specific value set manually.

Steripump

**STER** You activate the steripump by briefly pressing this symbol (for about half a second).

The “STER” display then lights up fully and the “Ster.” display (② or ③) appears beside the spray display ① (Fig. 14).

You switch the activated steripump on or off by tapping the spray display (② or ③). When it is switched on, the display ③ (Fig. 14) lights up at full strength.

If you press the symbol ③ (Fig. 14) for longer (around one second), the spray symbol appears in the black field with the numerical intensity display in the top right-hand corner ② (Fig. 13). The “+” and “−” symbols for setting the intensity also light up (gradually if you tap the “+/−” symbols, rapidly if you press them for longer). The steripump intensity can be set at 100 different levels. The level is shown on the symbol ② (Fig. 13). The “+/−” symbols, the black field, and the numerical display disappear when you press this symbol again. The spray symbol is shown in its initial state ② (Fig. 14).

Syringe heating

For a syringe that can be heated, you switch the heating component on or off by pressing this symbol (Fig. 15).

The grayed-out symbol for syringe heating indicates that the heating component is switched off ①.

If the heating component is switched on, the symbol, otherwise grayed out, lights up at full strength ②.
Startup and operation

Tartar remover
You pre-select the mode for the piezoceramic tartar remover by briefly pressing the display field (Fig. 16) (for about one second).

The display field shows the symbols for the three possible modes. The pre-selected mode is displayed at full strength (e.g. SCAL in Fig. 16). (The two other modes remain grayed out.)

The meanings are as follows:
- **ENDO**: Endodontics
- **PARO**: Periodontal treatment
- **SCAL**: Tartar removal

The SCAL/ENDO/PARO settings influence the output power of the handpiece and must be defined precisely in accordance with the tips used.

The settings can therefore be changed only using the buttons, not using the foot control.

Foot control
You switch the foot control from adjustable operation to the on/off function and back by pressing this button (Fig. 17).

During non-adjustable operation, the display, otherwise grayed out, lights up at full strength (Fig. 17).

Adjustable:
- With the aid of the pedal or swiveling lever, the speed/intensity of the instrument concerned can be adjusted up to a maximum of the pre-selected speed on the control unit.
- The symbol is grayed out in this mode.

On/off function:
- In this mode, the instrument concerned always runs at the maximum pre-selected speed/intensity, regardless of the position of the pedal or swiveling lever.
- The symbol lights up at full strength in this mode.

Important!
If you change settings using the foot control, the value chosen is **not** saved for a specific user. When you replace the instrument in the holder, the unit automatically switches to the value set manually. However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.
**Instrument symbols**

At the bottom of the display, various holder symbols indicate the current assignment of the various instrument holders (Fig. 18).

1. Syringe
2. Turbine
3. Adjustable turbine
4. Micro motor
5. Surgical motor
6. Micro motor with endo mode
7. Tartar remover
8. Electrosurgery unit
9. Camera
10. Air polishing unit
Startup and operation

Locking holders

The bottom toolbar on the display represents the instrument holders. The four different representations indicate the current state of the associated holder (Fig. 19), as is the case here using the micro motor as an example:

➀ The holder is active, meaning that the instrument is hanging in the holder.

➁ If an instrument is taken out of the holder, the bottom half of the holder symbol is shown in black.

➂ If a second instrument is also removed, the function for this instrument is blocked and the symbol is grayed out.

– The instrument originally activated (removed first) can be replaced and removed again. It remains active.

– The second, blocked instrument is not unblocked until it is put back in its original holder.

– Even if the first instrument is replace, the second instrument remains blocked until it too is replaced. Only then can it be activated by removing it again.

– The electronic system also blocks a holder if the instrument is not positioned in the holder when the unit is switched on. The instrument is only unblocked when it is replaced in the holder.

– The syringe always works in parallel to an instrument that has been removed. It is excluded from the locking logic described (with the exception of the block when the unit is switched on).

➃ The holder assignment is defined in the factory in accordance with your order. The unassigned holders are then blocked permanently, in which case the holder symbol appears without the instrument symbol.
Infinitely variable control unit – type F7

The type F7 infinitely variable control unit (Fig. 20) has a swiveling lever ➀ and a slide switch ➁.
As soon as an instrument is activated – by being taking out of the holder – the control unit provides the following functions:

Swiveling lever

The swiveling lever ➀ (Fig. 20) can be moved to the left and right.

- Tapping it to the left (< 1 sec.): Switches the chip blower on/off
  The display for the chip blower (Fig. 21) lights up fully when it is switched on.
  The “CH” and “Spray/Ster” functions deactivate one another. If “CH” is active, for instance, pressing the “Spray” button switches “CH” off and “Spray” on.

- Keeping it pressed to the left (> 1 sec.): In the unit’s resting and operating state, the user can be changed by pressing to the left for longer (for more than one second) – but excluding built-in multimedia equipment in the case of the resting state (when all instruments are in the holders).
  The relevant user number (1-4) is shown next to the symbol (Fig. 22).

- Moving it to the right: Continuous adjustment of all equipment that can be adjusted using the foot control – and/or Activation/deactivation of all equipment that cannot be adjusted using the foot control.
  The maximum value which can be set is shown on the display ➀ (Fig. 23). The speed/intensity can be read from the bar ➁ (Fig. 23).

Important!

As soon as you use the symbol on the display (Fig. 24) to switch the foot control from “adjustable operation” to “on/off operation”, the instrument concerned always runs at the maximum pre-selected speed/intensity, regardless of the position of the swiveling lever.

The symbol (Fig. 24) lights up at full strength in “on/off mode”.

Fig. 20

Fig. 21

Fig. 22

Fig. 23

Fig. 24
Startup and operation

Slide switch
The slide switch ② (Fig. 20) can be moved forwards and backwards.

- Tapping it briefly away from the dentist (< 1 sec.):
  Switches between dry and spray operation modes (motor, turbine, tartar remover) or between dry and steripump operation.
  The display (Fig. 25) lights up fully during spray and steripump operation.

- Holding it pressed away from the dentist (> 1 sec.):
  The pre-selected speed/intensity is increased incrementally in ten levels by pressing it down for longer (more than one second).
  The value is shown on the display① (Fig. 23).

  **Important!**
  The value pre-selected in this way by foot is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually.
  However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.

- Tapping it briefly towards the dentist (< 1 sec.):
  Switches the rotation direction between clockwise and anticlockwise.
  The display ③ (Fig. 14) lights up at full strength during anticlockwise rotation operation.

  **Important!**
  The rotation direction can only be changed over when the motor is at rest.

- Holding it pressed towards the dentist (> 1 sec.):
  The pre-selected speed/intensity is reduced incrementally in ten levels by pressing it for longer (more than one second).
  The value is shown on the display① (Fig. 23).

  **Important!**
  The value pre-selected in this way by foot is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually.
  However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.
Infinitely variable control units – types F9 and F10

The infinitely variable control unit types F9 and F10 (Fig. 27) have a treadle ➀ and buttons ➁ ... ➃ for switching between different operating states.

Control unit F10 is connected to the dental unit by a cable. However, control unit F9 does not have a cable. Instead, it is fitted with radio control.

Treadle

- Pressing the treadle ➀ (Fig. 27):
  - Continuous adjustment of all equipment that can be adjusted using the foot control – and/or
  - Activation/deactivation of all equipment that cannot be adjusted using the foot control.

  The maximum value which can be set is shown on the display ➀ (Fig. 28). The speed/intensity can be read from the bar ➁ (Fig. 28).

  **Important!**

  As soon as you use the symbol on the display (Fig. 29) to switch the foot control from “adjustable operation” to “on/off operation”, the instrument concerned always runs at the maximum pre-selected speed/intensity, regardless of the position of the treadle.

  The symbol (Fig. 29) lights up at full strength in “on/off mode”.

Middle button

- Briefly tapping the button ➁ (Fig. 27) (< 1 sec.):
  - Switches the chip blower on/off. The display for the chip blower (Fig. 30) lights up fully when it is switched on.

  The “CH” and “Spray/Ster” functions deactivate one another. If “CH” is active, for instance, pressing the “Spray” button switches “CH” off and “Spray” on.

- Keeping button ➁ (Fig. 27) pressed (> 1 sec.):
  - In the unit’s resting and operating state, the user can be changed by pressing for longer (for more than one second) – but excluding built-in multimedia equipment in the case of the resting state (when all instruments are in the holders). The relevant user number (1–4) is shown on the symbol (Fig. 31). Pressing the button for longer during active operation does not have any function.
Startup and operation

Left-hand button

- Briefly tapping the button ③ (Fig. 27) (< 1 sec.):
  Switches the rotation direction between clockwise and anticlockwise.
  The display ③ (Fig. 14) lights up at full strength during anticlockwise rotation operation.

**Important!**

The rotation direction can only be changed over when the motor is at rest.

- Keeping the button ③ (Fig. 27) pressed (> 1 sec.):
  The pre-selected speed/intensity is reduced incrementally in ten levels by pressing it for longer (more than one second). The current value is shown on the display ➀ (Fig. 28).

**Important!**

The value pre-selected in this way by foot is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually. However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.

Right-hand button

- Briefly tapping the button ④ (Fig. 27) (< 1 sec.):
  Switches between dry and spray operation modes (motor, turbine, tartar remover) or between dry and steripump operation.
  The display (Fig. 33) lights up fully during spray and steripump operation.

- Keeping button ④ (Fig. 27) pressed (> 1 sec.):
  The pre-selected speed/intensity is increased incrementally in ten levels by pressing it down for longer (more than one second). The value is shown on the display ➀ (Fig. 28).

**Important!**

The value pre-selected in this way by foot is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually. However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.
Description of foot control F9

Infinitely variable control unit – type F9

The infinitely variable control unit types F9 (Fig. 34) has a treadle ➀ and buttons ➁ ... ➃ for switching between different operating states.

Control unit F9 does not have a cable. Instead, it is fitted with radio control.

**Note!**

! The possibility of faults (resulting from strong external interference fields) can never be eliminated entirely in the case of radio-controlled control units. However, the selected frequency, the modulation, and the data structure make it extremely unlikely that this will actually happen. In extreme cases, the unit must be converted to use a cable control by an authorized customer service office.

**Note!**

Radio-controlled control unit F9 is only intended to be used for dental treatment units from Ultradent. Using it in any other way does not comply with the intended purpose and is not permissible. It meets the technical and administrative requirements of the R & TTE Guideline (which can be viewed on Ultradent’s Website). It can be used in the EAA / EFTA states A, B, DK, E, FIN, F, GR, D, IS, I, IRI, NL, L, N, P, CH, S, and GB.

**Caution!**

! If several units with type F9 control units are used in a practice, all control units will run on different channels assigned to the respective units. **They must never be swapped** because doing so would lead to uncontrollable malfunctions at the various workplaces. The various channels are set by the technician while assembling the workplace equipment. The technician can also change the settings at a later stage, as described in the relevant assembly instructions. This might be necessary if other dental equipment with F9 control units is operated in the direct proximity of the practice or if the existing control unit is replaced with another control unit.
Startup and operation

Changing the battery for F9

Note!
Only change the batteries when the workplace equipment is switched on.

Caution!
The batteries needed for this are located in the battery compartment underneath the foot control. (Fig. 35). If the batteries are not sufficiently charged, an acoustic signal (three beeps) is output in the motorized chair’s power supply unit each time the treadle is released ➀ (Fig. 36). The batteries must then be exchanged without delay (within one or two days). Failure to do so may lead to malfunctions in the unit.
You can change the batteries by removing the two countersunk screws ➀ (Fig. 35) and simply taking off the lid of the battery compartment. You must insert the batteries with the poles the right way round then screw the lid back on.
Important: Straight after changing the batteries, press the button ➁ (Fig. 36) on the control unit for around 2 seconds as far as it will go.
To end with, verify that the control unit is working by activating any drill.

Caution!
Do not use NC batteries. Their voltage is too low.
In addition, with the low power consumption of the foot control, the self-discharge of the batteries is greater than the useful current.

We recommend the following for the power supply:
2xLR6/AA/Mignon batteries, alkali-manganese
Operating the operating lamp

*Important!*

This facility **only** works in connection with the latest ULTRADENT motorized chairs, which are fitted with three programmed working positions.

By pressing the symbol (Fig. 37) to operate the motorized chair you obtain the submenu (Fig. 38) for the operating lamp and to operate the motorized chair.

You switch the operating lamp on or off by pressing the lamp symbol ➀ (Fig. 38).

*Important!*

As soon as you move the motorized chair to the mounting/dismounting position manually or using the zero program, the lamp switches off automatically when the position is reached.

In this position, the lamp can be manually switched back on by tapping the symbol ➀ (Fig. 38) or by pressing the rinse position symbol ➁ (Fig. 38) for more than 2 seconds. The lamp switches on again automatically as soon as the motorized chair moves from the entry/exit position.
Operating the motorized chair

Important!
This facility only works in connection with the latest ULTRADENT motorized chairs, which are fitted with three programmed working positions.

By pressing the symbol (Fig. 39) to operate the motorized chair you obtain the submenu for the operating lamp and to operate the motorized chair (Fig. 40).

The following movements can be controlled/triggered by pressing the various symbols:

Manual control ("pressing"): For manual control, lightly press the relevant symbol.
- Pressing ② moves the chair downwards.
- Pressing ③ moves the chair upwards.
- Pressing ④ moves the back rest to a sitting position.
- Pressing ⑤ moves the back rest to a lying position.

Programmed control ("tapping"): For programmed control, briefly tap the relevant symbol.
- Tapping ⑥, ⑦, or ⑧ automatically moves the chair to the working position programmed.
- Tapping ⑨ moves the chair to the initial position ("zero" position).
- Tapping ⑩ moves the chair to the shock position.
- If you tap this symbol, the chair automatically moves to the sitting position so that the patient can rinse his/her mouth out (the previous position of the back rest is saved automatically). When you tap this symbol again (after rinsing), the back rest automatically moves back to the previous position.

Important!
While the chair is automatically moving to the saved position, you can stop it with any of the chair symbols by tapping briefly (safety stop).
- You can save the selected working position by pressing the memory symbol.
Programming

Three working positions can only be programmed in the case of patient chairs which have been fitted with a program control.

Saving the programs under the relevant user number

- Pressing the user symbol $\text{②}$ (Fig. 40) for an extended period of time (longer than one second) changes the displayed user number in the range of between 1 and 4.
- Enter the required user number and program the motorized chair as described below.
- The unit stores the user number of the user currently set when it is switched off. The last user is then set automatically when the unit is switched back on.

Procedure for programming

- Move the patient chair to the initial position ("zero" position) by tapping the symbol $\text{⑨}$ (Fig. 40).
- Set the required working position manually by pressing symbols $\text{①}$ to $\text{④}$.
- Press the memory symbol $\text{⑥}$. The symbol will then appear in the black field.
- Tap one of symbols $\text{⑤}$ to $\text{⑦}$. The memory symbol will be displayed as usual again. At the same time, a signal will sound indicating that the working position has been saved under the pressed symbol $\text{⑤}$ to $\text{⑦}$.
- Once you have saved a working position in this way, you can activate it simply by briefly tapping the symbol under which the position has been saved.

Interrupting the chair movement during the instrument function

As soon as an instrument taken out of the holder is started up using the foot control, all movements of the motorized chair are blocked. This means that, for safety reasons, the chair cannot be moved as long as an instrument is active.

Upholstery ventilation

In conjunction with dental units U5000 and U1500, more recent GL 2020 motorized chairs can optionally be supplied with ventilated upholstery. The ventilation is activated by tapping button $\text{⑫}$ (Fig. 40). The symbol will then appear in the black field. Tapping again switches the ventilation off.
Startup and operation

Instrument rinsing in accordance with the RKI

The Robert Koch Institute recommends that all water-bearing instruments be operated in wet mode for 2 minutes to prior to starting work each day.

Automated instrument rinsing facilitates the daily task of rinsing all water lines. The rinsing time can be selected simply at the touch of a button.

To do so, proceed as follows:

1. Place the cleaning pot (Fig. 41) on the tray table.
2. Place all the instruments in their holders on the workstation. The main menu then appears on the display (Fig. 42).
3. Tap the arrow key to access the submenu. The RKI symbol for RKI rinsing (Fig. 43) then appears on the top line of the display.
4. Tap the RKI symbol (Fig. 43) to access the "RKI menu".
5. The top line of the RKI menu displays the two possible rinse times and (Fig. 44).
6. Then place all the water-bearing drives apart from the multi-way syringes (turbine coupling, motor and tartar remover) into the L-shaped adapters intended for this purpose (Fig. 41) in the cleaning pot.

**Important!** Instrument rinsing for the water conduits is carried out without the treatment instruments attached (turbine elbow, handpieces and elbows, tartar-removal tips)!

Wherever possible, ensure that the water flow is set to maximum on the instruments and instrument couplings.

- Remove the cases from all the syringes and place the syringes themselves in the corresponding adapter cases , , or , in such a way that the water flow buttons on the syringes are activated.
  - for Sprayvit L
  - for Sprayvit 4000
  - for three-way syringe
- Now immediately press the key for the required rinse time or (Fig. 44). The instruments are then automatically rinsed.
- The rinsing process can be cancelled by pressing the active black rinse-time symbol (Fig. 44).
- Upon completion, a longish signal tone will sound, and after approx. 15 seconds the main menu will be displayed.
Please note!

Instrument rinsing deactivates any syringe heating that may be available. This must be manually re-activated after the rinsing process. Instrument rinsing also deactivates any disinfection that is switched on. However, during active rinsing, disinfection can be additionally switched on via the menu key. Disinfection then continues to remain active after rinsing, and has to be switched off via the menu.

Important!

The water supply to the syringes is not automatically switched off! It is therefore important that the syringes are removed from the cleaning pot as soon as rinsing is complete.

- Place the multi-way syringes back in their holders.
- Remove the rinsed instruments from the cleaning pot and replace them in their holders on the unit.
- Remove the rinsing pot and pour its contents into the spittoon bowl.
Fittings

Removable holder inserts U1500

The inserts in the holders ➀ (Fig. 45) can be taken out of the holders when required and sterilized in the autoclave at up to 135°C and 2.1 bar (minimum dwell time: 3 minutes).

Removing holder inserts

- Switch the unit off using the main switch for the workplace equipment or block the holders concerned as described in the relevant section – see “Locking holders”.
- Remove the handpiece from the holder.
- Unscrew the rapid fastener screw, which can be found at the front of the holder ➀.
- Remove the insert from the holder by pulling it forwards.

Sterilization

The inserts can be sterilized in the autoclave at up to 135°C and 2.1 bar (minimum dwell time: 3 minutes).

Inserting holder inserts

- Put the insert back in the relevant holder and screw it tight.
- Put the handpiece back into the holder.
- Switch the workplace equipment on again and remove any block from the holder concerned.

Disinfection

The holder inserts can be disinfected using a chemical disinfectant (either for spraying or wiping).
Removable holder inserts U5000

The inserts in the six holders ➀ (Fig. 46) can be taken out of the holders when required and sterilized in the autoclave at up to 135°C and 2.1 bar (minimum dwell time: 3 minutes).

Removing holder inserts

- Switch the unit off using the main switch for the workplace equipment or block the holders concerned as described in the relevant section – “Locking holders”.
- Remove the handpiece from the holder.
- Reach under the equipment holder and press the tab ➀ (Fig. 47) - located at the bottom of the insert on the rear side - forwards. The insert will disengage.
- Remove the insert from the holder by pulling it forwards.

Sterilization

The inserts can be sterilized in the autoclave at up to 135°C and 2.1 bar (minimum dwell time: 3 minutes).

Inserting holder inserts

- Put the insert back in the relevant holder.

  **Important!**

> Make sure that the insert snaps into place again. The light barrier will not work properly otherwise.

- Put the handpiece back into the holder.
- Switch the workplace equipment on again and remove any block from the holder concerned.

Disinfection

The holder inserts can be disinfected using a chemical disinfectant (either for spraying or wiping).
Fittings
Handpiece hoses with valve unit

The handpiece hoses (Fig. 48) are fitted with a hose coupling (3), which is screwed onto the valve unit (2). The valve unit contains the valves for media control. In turn, it is screwed onto the hose coupling nearest to the unit (1).

Replacing the valve unit

In the event of a fault, the valve unit can simply be exchanged on site in the practice.

Proceed as follows:

- Switch off the unit.
- Remove the cap nut (3) (Fig. 48) from the valve unit (2) by turning it to the right.
- Remove the hose (4), together with the cap nut, from the valve unit by pulling it downwards.
- Detach the cap nut (2) from the hose coupling nearest to the unit (1).
- Remove the valve unit, together with the cap nut, by pulling it downwards.
- Replace the dismantled valve unit with a new one (or simply replace the valve core – see repair kit, order no. 69852200).
- Replace the valve unit on the hose coupling nearest to the unit.

Make sure that the nose (6) (Fig. 49) of the hose coupling snaps into the slot (5) of the valve unit.

- Tighten the valve unit onto the cap nut (2) (Fig. 48 and Fig. 49).
- Put the hose back on.

In the process, twist the hose – without exerting pressure – until the nipples snap into the hose and the hose can be pushed upwards into the valve unit.

**This is only possible in one position!**

- Screw the hose tightly back onto the cap nut (3) (Fig. 48).
- Switch the unit on again.

**Please note!**

⚠️ A little water will leak from the couplings while the valve unit is being exchanged. This is normal. Simply wipe up the water afterwards.
Three-way syringe FPK

Three-way syringe FPK has been developed in accordance with hygienic and ergonomic requirements (Fig. 50).

Description

➀ Case, handpiece
➁ Cannula
➂ Pushbutton to release the cannula
➃ Water pressure button
➄ Air pressure button

Technical features

- The pushbuttons are coated with silicon membranes to facilitate thorough cleaning.
- The cannula is made of plastic (which can be sterilized in the autoclave at 135°C and 2.1 bar with a minimum dwell time of 3 minutes).
- The case is made of metal (which can be sterilized in the autoclave at 135°C and 2.1 bar with a minimum dwell time of 3 minutes).
- The cannula can be rotated through 360°.

Since the syringe does not have any heating elements, it is permanently supplied with slightly pre-heated water via the central warm water supply in the terminal box (standard in almost all ULTRADENT units). The air is not heated.

Startup

- Press button ➄ (with a drop symbol) for the water supply.
- Press button ➅ for the air supply.
- Press both buttons (➄ and ➅) simultaneously to generate the spray.

The flow of the medium can be metered by varying the pressure exerted on the membrane switch.

Replacing the syringe cover

The case and cannula can be replaced. You remove the parts as follows (Fig. 51):

- Press button ➆ and remove the case in the direction of the arrow.
- Press button ➂ and remove the cannula.
- Before putting the cannula and case on, grease all visible seals/O-rings with Vaseline.

Cleaning spray nozzles

If the small nozzles for water and air are blocked, remove the blockage using the cleaning wire ➇ (Fig. 52).
Sterilization
The cannula and handle sleeve can be sterilized – separately – in the autoclave at 135°C and 2.1 bar with a minimum dwell time of 3 minutes.

**Important!**

*Only ever* sterilize the case and cannula in the autoclave at 135°C and 2.1 bar with a minimum dwell time of 3 minutes.

*Never use hot air sterilization equipment!*

You remove the parts as follows (Fig. 53):

- Press button ⑥ and remove the case in the direction of the arrow.
- Press button ③ and remove the cannula.

Following sterilization, spread a little Vaseline over all visible O-rings.

Disinfection
You should only disinfect the exterior. To do so, pull off the handle sleeve together with the cannula (see above). Use a disinfectant that is commonly used in dentistry.

**Important!**

*Never* dip the parts in disinfectant solutions. The handle sleeve and cannula should only be disinfected externally.
Six-way syringe Sprayvit 4000

The six-way syringe Sprayvit 4000 is a multipurpose handpiece. It allows you to deliver air, water, and spray by simply pressing pushbuttons. The media are warmed using a built-in heating component.

Startup
- Press the button on the right for the water supply.
- Press the button on the left for the air supply.
- Press both buttons at the same time to eject spray.
- Select the required nozzle direction by turning the nozzle (Fig. 54).
- The heating component switches itself on automatically when you press the pushbuttons – if it is pre-selected and displayed on the control panel.

Caution!
In order to prevent the water temperature becoming too high, with the associated risk of scalding, the nozzle must be cleaned regularly. Air and water must be able to leave the nozzle unhindered.

Sterilization
The nozzle and handle sleeve can be sterilized in the autoclave at 135°C and 2.1 bar with a minimum dwell time of 3 minutes.

Important!
Only ever sterilize the handle sleeve and nozzle in the autoclave at 135°C and 2.1 bar with a minimum dwell time of 3 minutes. Never use hot air sterilization equipment!

- Remove the nozzle from the handle sleeve by turning it slightly (Fig. 55).
- Press the locking button ② (Fig. 56) in order to remove the handle sleeve at the end of the supply hose.
- Following sterilization, spread a little Vaseline over both O-rings ➀ (Fig. 55).
- When putting the parts back together, please pay attention to the position of the valve body ⃒ in relation to the handle sleeve. The buttons ➃ in the handle sleeve must not be pressed in the process.

Cleaning the nozzle
If required, the water conduit in the nozzle can be cleaned using the cleaning wire provided ➄ (Fig. 57). It may help to unscrew the tip of the nozzle ⃚.
Disinfection

You should only disinfect the exterior. To do so, pull off the handle sleeve together with the cannula. Use a disinfectant that is commonly used in dentistry.

*Important!*

Never dip the parts in disinfectant solutions. The handle sleeve and nozzle should only be disinfected externally.
**Light six-way syringe Sprayvit L**

The Sprayvit L is a multi-function syringe (Fig. 58). It allows you to deliver air, water, and spray by simply pressing pushbuttons. A built-in heating component heats up water and air. The treatment location is illuminated by a built-in light guide.

**Startup**

The light is switched on automatically when the syringe is taken out, as soon as it is pre-selected using the button on the display and is shown in the central section of the display. The light is switched off automatically as soon as the syringe is replaced in the holder.

**Important!**

Do not leave the syringe out of the holder unnecessarily long as this would cause the syringe body to heat up excessively, greatly reducing the life expectancy of the bulb.

- Press the button on the right for the water supply.
- Press the button on the left for the air supply.
- Press both buttons at the same time to eject spray.
- Select the required nozzle direction by turning the nozzle.
- The heating component is switched on automatically when you press the buttons – as soon as it is pre-selected using the button on the display and is shown in the central section of the display.

**Heating**

You switch the heating component for a heated syringe on or off by pressing this symbol.

The grayed-out syringe heating symbol indicates that the heating component is switched off (Fig. 59).

If the heating component is switched on, the symbol lights up at full strength (Fig. 59).

**Caution!**

In order to prevent the water temperature becoming too high, with the associated risk of scalding, the nozzle must be cleaned regularly. Air and water must be able to leave the nozzle unhindered.
Instrument light

The light can be switched on and off by tapping the light symbol ➀ (Fig. 60). When it is switched on, the symbol lights up at full strength. The light intensity is displayed numerically next to the symbol.

The light symbol ➀ appears in the black field if you press it for longer (around two seconds). The “+” and “−” symbols ❼ for setting the light intensity also light up (gradually if you tap the “+/−” symbols, rapidly if you press them for longer). The “+/−” symbols disappear when you press the light symbol again.

However, only the syringe should be activated while you make the setting. If another instrument is activated at the same time, only the light for that instrument can be set. The light for the syringe then lights up with the brightness of the other instrument if the brightness set for that instrument is different.

Sterilization

Only the nozzle and handle sleeve can be sterilized in the autoclave at 135°C and 2.1 bar with a minimum dwell time of 3 minutes (Fig. 61).

**Important!**

*Only ever* sterilize the handle sleeve and nozzle in the autoclave at 135°C and 2.1 bar with a minimum dwell time of 3 minutes. You should *never* let the temperature exceed 135°C during the drying phase, either.

- Remove the nozzle from the handle sleeve by turning it slightly.
- Press the locking button in order to remove the handle sleeve at the end of the supply hose.
- Remove the parts from the autoclave immediately after sterilization. Spread a little Vaseline over both O-rings ➊.
- Clean the light guide surface ❼ (Fig. 61) with a cotton bud and alcohol.
Fittings

Disinfection
You should only disinfect the exterior. To do so, pull off the handle sleeve together with the nozzle (Fig. 62). Use a disinfectant that is commonly used in dentistry.

Remove the button cover (plastic shape) ➀ for cleaning.

**Important!**

Never dip the parts in a disinfectant solution.

Cleaning the nozzle
If required, you can clean the water conduit in the nozzle using the cleaning wire provided ➁ (Fig. 63).

Cleaning the light guide surface
- Blow particles of dirt, etc. away with air in order to avoid scratching the light guide surfaces ➂ (Fig. 64).
- Wipe the light guide surfaces ➂ with a cotton bud or soft cloth and alcohol.
Non-adjustable turbine

In the case of the non-adjustable turbine, the speed is set to the maximum. It cannot be adjusted using the foot control.

Startup

- Remove the turbine hose provided from the holder on the unit ready for operation.
  
The symbol for turbine operation (\( \text{➁} \)) and the symbols for the maximum speed (\( \text{➀} \)) and the foot control (\( \text{➂} \)) are shown on the display (Fig. 65).

- Now start the turbine by pressing the relevant foot control (pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7).

**Caution!**

If a tartar removal handpiece that can be attached to the turbine hose is used, you should avoid letting the syringes come into direct contact with fillings and areas bordering on fillings.

Setting the light

The light can be switched on and off by tapping the light symbol (\( \text{➀} \)) (Fig. 66). When it is switched on, the symbol lights up at full strength. The light intensity is displayed numerically next to the symbol.

The light symbol (\( \text{➀} \)) appears in the black field if you press it briefly (for approximately half a second). The “+” and “−” symbols (\( \text{➁} \)) for setting the light intensity also light up (gradually if you tap the “+” “−” symbols, rapidly if you press them for longer). The “+” “−” symbols disappear when you press the light symbol again.

The light shines for around 15 seconds as soon as the turbine handpiece is removed from the holder. It goes out if the turbine is not put into operation during this time. The light is automatically switched on again when the equipment is started up.

It also continues to shine for around 15 seconds after the foot control pedal is released. It goes out immediately when the turbine hose is put into the holder.
Spray cooling

You switch the spray cooling function on or off by tapping the spray display (Fig. 67). When it is switched on, the display lights up at full strength.

The spray display symbol appears in the black field if you press it briefly (for approximately half a second). The “+” and “−” symbols for setting the intensity also light up. The intensity can be adjusted to 9 different levels by tapping the “+/−” symbols. The current level is shown numerically next to the symbol (Fig. 67). When you press the spray symbol again, the “+/−” symbols disappear and the spray symbol is shown in its initial state again.

You can also activate or deactivate the spray cooling function using the foot control.

Activating spray cooling using foot control F7

You switch between dry and spray operation by pressing the slide switch (Fig. 68).

- Tapping the slide switch briefly away from the dentist (< 1 sec.):
  Switches between dry and spray operation.

Activating spray cooling using foot control F9/F10

You switch between dry and spray operation by tapping the right-hand button (Fig. 69) on the foot control.

- Briefly tapping the button (< 1 sec.):
  Switches between dry and spray operation.

Tip!

If the quick coupling on the turbine hose is fitted with a regulator (Fig. 70), you can use this rotating ring (spray ring) to set the water quantity for spray operation. The opening should be opened as far as possible during normal operation.
Chip blower

The unit is fitted with a chip blower as standard. You switch the chip blower on or off by tapping the chip blower display (Fig. 71). When it is switched on, the display lights up at full strength.

You can also activate or deactivate the chip blower using the foot control. Once you have pressed (tapped) the relevant switch on the foot control, air will blow out of the spray supply unit on the turbine. Pressing (tapping) the switch again switches the air supply off.

Activating the chip blower using foot control F7

The chip blower is activated by pressing the swiveling lever \(^{①}\) (Fig. 72).

- Tapping the swiveling lever to the left (< 1 sec.): Switches the chip blower on/off.

  The “CH” and “Spray/Ster” functions deactivate one another. If “CH” is active, for instance, pressing the “Spray” button switches “CH” off and “Spray” on.

Activating the chip blower using foot control F9/F10

The chip blower is activated by tapping the middle button \(^{②}\) (Fig. 73) on the foot control.

- Briefly tapping the button (< 1 sec.): Switches the chip blower on/off.

  The “CH” and “Spray/Ster” functions deactivate one another. If “CH” is active, for instance, pressing the “Spray” button switches “CH” off and “Spray” on.

Fitting options

If a quick coupling is screwed onto the turbine hose, you can attach suitable turbine elbows, air motors, or tartar removal handpieces of your choice to this quick coupling and operate them in accordance with the instructions for use from the manufacturer concerned.

There are also turbine elbows, air motors, and tartar removal handpieces available on the market which can be attached to the air supply hose directly – without a quick coupling.

Please note!

The quick coupling and the attachable equipment are not included in the scope of delivery. It is vital that the instructions for use from the respective manufacturers are observed for these parts.
Fittings

Adjustable turbine

In the case of the adjustable turbine, the speed can be continuously adjusted using the foot control. In this mode, the foot control symbol ② (Fig. 74) appears grayed out on the display.

Startup

- Remove the turbine hose provided from the holder on the unit ready for operation.
- The symbol for adjustable turbine operation ② and the symbols for the speed ① and the foot control ③ are shown on the display (Fig. 74).
- Now start the turbine by pressing the relevant foot control (pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7).

Caution!

- If a tartar removal handpiece that can be attached to the turbine hose is used, you must avoid letting the syringe come into direct contact with fillings and areas bordering on fillings.

Adjusting the speed

The speed can be continuously adjusted in the pre-selected range using the relevant foot control.

If the foot control is operated in the non-adjustable ON/OFF mode, the symbol for the foot control ② (Fig. 74) appears at full strength. You then change over by tapping this foot control symbol.

The turbine then always runs at the pre-selected speed shown in the central section of the display ① (Fig. 75), regardless of the position of the pedal.

Speed pre-selection

By pressing the ① or ② (Fig. 75) symbols, or the holder displays ④ below them, you can set the speed or the speed range that can be used in percentage steps. After you press them, the numerical display appears in the black field. The “+” and “–” symbols ③ also light up. You can adjust the value displayed by tapping the “+/–” symbols or pressing them for longer. The “+/–” symbols disappear and the selected value is automatically saved for the specific user when you press ①, ② or ④ again. The setting is therefore also retained after the instrument is put back into the holder and taken out again.

The percentage is shown in the central section of the display ① (Fig. 75).
In the case of an adjustable foot control, the maximum selectable speed is displayed. The speed that is currently set is indicated by the bar on the display (Fig. 75).

The speed and intensity can also be pre-selected in steps of 10% using the foot control.

**Speed pre-selection using foot control F7**

The speed is pre-selected by pressing the slide switch (Fig. 76).

- Holding the slide switch pressed away from the dentist (> 1 sec.):
  The pre-selected speed is increased incrementally in steps of ten by pressing it for longer (more than one second). The current value is shown in the central section of the display (Fig. 75).

- Holding the slide switch pressed towards the dentist (> 1 sec.):
  The pre-selected speed is reduced incrementally in steps of ten by pressing it for longer (more than one second). The current value is shown in the central section of the display (Fig. 75).

**Important!**

The value pre-selected in this way using the foot control is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually.

However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.

**Speed pre-selection using foot control F9/F10**

The speed is pre-selected using the left-hand (Fig. 77) and right-hand buttons on the foot control.

- Keeping the left-hand button pressed (> 1 sec.):
  The pre-selected speed is reduced incrementally in steps of ten by pressing it for longer (more than one second).

- Keeping the right-hand button pressed (> 1 sec.):
  The pre-selected speed/intensity is increased incrementally in steps of ten by pressing it for longer (more than one second).

The current value is shown in the central section of the display (Fig. 75).
Important!

The value pre-selected in this way using the foot control is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually.

However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.

Setting the light

The light can be switched on and off by tapping the light symbol ➀ (Fig. 78). When it is switched on, the symbol lights up at full strength. The light intensity is displayed numerically next to the symbol.

The light symbol ➀ appears in the black field if you press it briefly (for approximately half a second). The “+” and “−” symbols ➋ for setting the light intensity also light up (gradually if you tap the “+/−” symbols, rapidly if you press them for longer). The “+/−” symbols disappear when you press the light symbol again.

The light shines for around 15 seconds as soon as the turbine handpiece is removed from the holder. It goes out if the turbine is not put into operation during this time. The light is automatically switched on again when the equipment is started up.

It also continues to shine for around 15 seconds after the foot control pedal is released. It goes out immediately when the turbine hose is put into the holder.

Spray cooling

You switch the spray cooling function on or off by tapping the spray display (Fig. 79). When it is switched on, the display lights up at full strength.

The spray display symbol appears in the black field if you press it briefly (for approximately half a second). At the same time, the “+” and “−” symbols for setting the intensity light up. The intensity can be adjusted to 9 different levels by tapping the “+/−” symbols. The current level is shown numerically next to the symbol (Fig. 79). When you press the spray symbol again, the “+/−” symbols disappear and the spray symbol is shown in its initial state again.

You can also activate or deactivate the spray cooling function using the foot control.
Activating spray cooling using foot control F7
You switch between dry and spray operation by pressing the slide switch ➁ (Fig. 83).
- Tapping the slide switch briefly away from the dentist (< 1 sec.):
  Switches between dry and spray operation.

Activating spray cooling using foot control F9/F10
You switch between dry and spray operation by tapping the right-hand button ➃ (Fig. 80) on the foot control.
- Briefly tapping the button (< 1 sec.):
  Switches between dry and spray operation.

Tip!
If the quick coupling on the turbine hose is fitted with a regulator (Fig. 81), you can use this rotating ring (spray ring) to set the water quantity for spray operation. The opening should be opened as far as possible during normal operation.

Chip blower
The unit is fitted with a chip blower as standard. You switch the chip blower on or off by tapping the chip blower display (Fig. 82). When it is switched on, the display lights up at full strength.

You can also activate or deactivate the chip blower using the foot control. Once you have pressed (tapped) the relevant switch on the foot control, air will blow out of the spray supply unit on the turbine. Pressing (tapping) the switch again switches the air supply off.

Activating the chip blower using foot control F7
The chip blower is activated by pressing the swiveling lever ➁ (Fig. 83).
- Tapping the swiveling lever to the left (< 1 sec.):
  Switches the chip blower on/off.

  The “CH” and “Spray/Ster” functions deactivate one another. If “CH” is active, for instance, pressing the “Spray” button switches “CH” off and “Spray” on.
Activating the chip blower using foot control F9/F10

The chip blower is activated by tapping the middle button ➁ (Fig. 84) on the foot control.

- Briefly tapping the button (< 1 sec.):
  Switches the chip blower on/off.

  The “CH” and “Spray/Ster” functions deactivate one another. If “CH” is active, for instance, pressing the “Spray” button switches “CH” off and “Spray” on.

Fitting options

If a quick coupling is screwed onto the turbine hose, you can attach suitable turbine elbows, air motors, or tartar removal handpieces of your choice to this quick coupling and operate them in accordance with the instructions for use from the manufacturer concerned.

There are also turbine elbows, air motors, and tartar removal handpieces available on the market which can be attached to the air supply hose directly – without a quick coupling.

Please note!

⚠ The quick coupling and the attachable equipment are not included in the scope of delivery. It is vital that the instructions for use from the respective manufacturers are observed for these parts.
Fittings

**Important!**
Electronic micro motors generate significantly more power than air turbines or air motors. Poorly maintained, damaged or improperly used handpieces generate significantly more frictional heat, and can inflict burns on patients. This heat may be generated very quickly and without warning. Handpieces must be maintained in accordance with specifications after each use, and inspected for possible damage.

**LUX motor KL 7S**
The KL 7S Lux motor is a brushless three-phase micro motor with LED light. It can be used with all handpieces and elbows that have an Intramatic LUX connection (Fig. 85).

**Attaching the motor to the handpiece hose**
Moisten the O-rings on the handpiece hose slightly with spray. Insert the motor into the handpiece hose until it engages, and secure it with the cap nut.

**Removing the motor from the handpiece hose**
Loosen the cap nut and pull the motor out of the handpiece hose.

**Connecting attachment instruments**
Attachment:
- Place the instrument onto the motor.
- Turn the instrument until you hear the catch snap into place.
Removal:
- Remove the instrument from the motor, turning it slightly in the direction of the axis.

**Important!**
Ensure that the O-ring is not damaged. The ring can only perform its function if it is in perfect condition.

**Important!**
**Never** attach or remove the instruments while the drive/motor is still rotating.

**Startup**
- Remove the motor from the tray on the unit ready for operation.
- Start the motor by pressing the relevant foot control (pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7).

**Adjusting the speed**
The speed can be continuously adjusted in the range from 2,000 to 40,000 rpm using the relevant foot control.

If the foot control is operated in the non-adjustable ON/OFF mode, the symbol for the foot control (Fig. 86) appears at full strength. You change over by tapping this foot control symbol. The motor then always runs at the pre-selected speed, regardless of the position of the pedal.
**Fittings**

**Speed pre-selection**

The motor speed can be adjusted from 300-40,000 min⁻¹. By pressing the ➊ and ➋ (Fig. 87) symbols, or the holder display ➌ below them, you can set the speed or the speed range that can be used in steps of 500. As soon as you press one of these symbols, the “+” and “−” symbols ➌ appear and the numeric display appears in the black field. You can adjust the value displayed by pressing the “+/-” symbols (gradually by tapping the “+/-” symbols or rapidly by pressing them for longer). These displays needed to set the setting disappear when you press ➊, ➋ or ➌ again. The value that is set is automatically saved for the specific user. The setting is therefore also retained after the instrument is put back into the holder and taken out again.

The speed is shown on the display ➊ (Fig. 87). In the case of an adjustable foot control, the maximum selectable speed is displayed. The speed that is currently set is indicated by the bar on the display ➋ (Fig. 87).

The speed and intensity can be pre-selected in steps of 5000 using the foot control.

**Speed pre-selection using foot control F7**

The speed is pre-selected by pressing the slide switch ➋ (Fig. 88).

- Holding the slide switch pressed away from the dentist (> 1 sec.):
  The pre-selected speed is increased incrementally in steps of 5000 by pressing it for longer (more than one second).

- Holding the slide switch pressed towards the dentist (> 1 sec.):
  The pre-selected speed is reduced incrementally in steps of 5000 by pressing it for longer (more than one second).

The current value is shown on the display ➋ (Fig. 87).

**Important!**

The value pre-selected in this way using the foot control is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually.

However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.
Speed pre-selection using foot control F9/F10

The speed is pre-selected using the left-hand ➂ and right-hand ➃ buttons on the foot control (Fig. 89).

- Keeping the left-hand button ➂ (Fig. 89) pressed (> 1 sec.): The pre-selected speed is reduced incrementally in steps of 5000 by pressing it for longer (more than one second).
- Keeping the right-hand button ➃ (Fig. 89) pressed (> 1 sec.): The pre-selected speed/intensity is increased incrementally in steps of 5000 by pressing it for longer (more than one second).

The current value is shown on the display ➀ (Fig. 87).

**Important!**

The value pre-selected in this way using the foot control is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually. However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.

Changing the direction of rotation

The rotation direction (clockwise/anticlockwise rotation) of the motor can be changed as required. The direction of rotation is changed by tapping the anticlockwise/clockwise rotation display (Fig. 90) or using the appropriate button on the foot control. The symbol lights up at full strength during anticlockwise rotation operation (Fig. 90).

**Important!**

The rotation direction can only be changed over when the motor is at rest.

Changing the direction of rotation using foot control F7

The direction of rotation is changed by pressing the slide switch ➁ (Fig. 91).

- Tapping the slide switch briefly towards the dentist (< 1 sec.): Switches the rotation direction between clockwise and anticlockwise.

Changing the direction of rotation using foot control F9/F10

The direction of rotation is changed using the left-hand button ➂ (Fig. 89) on the foot control.

- Briefly tapping the button (< 1 sec.): Switches the rotation direction between clockwise and anticlockwise.
Spray cooling

You switch the spray cooling function on or off by tapping the spray display (Fig. 92). When it is switched on, the display lights up at full strength.

The spray display symbol appears in a black field if you press it briefly (for approximately half a second). The “+” and “–” symbols for setting the intensity also light up. The intensity can be adjusted to 9 different levels by tapping the “+/–” symbols. The current level is shown numerically next to the symbol (Fig. 92). When you press the spray symbol again, the “+/–” symbols disappear and the spray symbol is shown in its initial state again.

You can also activate or deactivate the spray cooling function using the foot control.

**Important!**

Too little water may lead to the tooth overheating. A flow of at least 50 cm³/min is needed for spray cooling.

Activating spray cooling using foot control F7

You switch between dry and spray operation by pressing the slide switch (Fig. 93).

- Tapping the slide switch briefly away from the dentist (< 1 sec.):
  - Switches between dry and spray operation.

Activating spray cooling using foot control F9/F10

You switch between dry and spray operation by tapping the right-hand button (Fig. 94) on the foot control.

- Briefly tapping the button (< 1 sec.):
  - Switches between dry and spray operation.

**Tip!**

You can meter the amount of spray water by turning the regulator (Fig. 95) to the left or right. The opening should be opened as far as possible during normal operation.

Chip blower

The unit is fitted with a chip blower as standard. You switch the chip blower on or off by tapping the chip blower display (Fig. 96). When it is switched on, the display lights up at full strength.

You can also activate or deactivate the chip blower using the foot control. Once you have pressed (tapped) the relevant switch on the foot control, air will blow out of the spray supply unit on the turbine. Pressing (tapping) the switch again switches the air supply off.
Activating the chip blower using foot control F7

The chip blower is activated by pressing the swiveling lever ➀ (Fig. 93).

- Tapping the swiveling lever to the left (< 1 sec.): Switches the chip blower on/off.
  
  The “CH” and “Spray/Ster” functions deactivate one another. If “CH” is active, for instance, pressing the “Spray” button switches “CH” off and “Spray” on.

Activating the chip blower using foot control F9/F10

The chip blower is activated by tapping the middle button ➁ (Fig. 94) on the foot control.

- Briefly tapping the button (< 1 sec.): Switches the chip blower on/off.
  
  The “CH” and “Spray/Ster” functions deactivate one another. If “CH” is active, for instance, pressing the “Spray” button switches “CH” off and “Spray” on.

Setting the light

The light can be switched on and off by tapping the light symbol ➀ (Fig. 97). When it is switched on, the symbol lights up at full strength. The light intensity is displayed numerically next to the symbol.

The light symbol ➀ appears in the black field if you press it briefly (for approximately half a second). The “+” and “−” symbols ➁ for setting the light intensity also light up (gradually if you tap the “+/−” symbols, rapidly if you press them for longer). The “+/−” symbols disappear when you press the light symbol again.

The light shines for around 15 seconds as soon as the motor is removed from the holder. It goes out if the motor is not put into operation during this time. The light is automatically switched on again when the equipment is started up.

It also continues to shine for around 15 seconds after the foot control pedal is released. It goes out immediately when the motor hose is put into the holder.
Endo mode

The KL 7 motor can be switched from preparation mode to endo mode.

In preparation mode, the motor functions as before and can be adjusted throughout the full speed range of 300 to 6,000 rpm.

In preparation mode, the symbol "PREP" (Fig. 98) appears in the top left-hand corner of the display.

Endo mode is activated by tapping briefly on the "PREP" symbol (Fig. 98). The display now shows "Ncm" plus a number ➀ (Fig. 99) or "Ncm" plus "MAX" ➁ (Fig. 99). The motor is now in endo mode. Its speed is restricted to between 300 and 6,000 rpm, a torque can be set, and the individual endo modes of operation (autostop, autoreverse, autoreverse-forward) can be selected.
Setting the torque

Pressing the "Ncm" symbol ➀ (Fig. 100) for >1 sec. displays the usual plus and minus keys ➁ (Fig. 100).

**Important!**

Pressing the symbol only briefly (<1 sec.) returns you to preparation mode.

The torque setting is adjusted by pressing the plus and minus keys. The selected value is shown on the display ➁ (Fig. 100). On the highest possible setting, the symbol "MAX" appears on the display instead of a number.

Setting the endo mode of operation

The following modes of operation can be set:

You switch between modes of operation by tapping the symbols ➀ - ➄ (Fig. 101) until the required symbol is displayed. Only the mode of operation currently selected is displayed.

The following modes of operation can be set:

Normal clockwise-anticlockwise operation:

The motor rotates normally, but with limited torque. You change the direction of rotation by tapping the torque symbol displayed ➀, ➁ (Fig. 101).

Autostop:

The motor rotates clockwise and stops when the load reaches the torque limit that has been set ➄ (Fig. 101). To restart the motor, release the button on the foot control then depress it again.

Autoreverse:

The motor rotates clockwise and changes direction when the load reaches the torque limit that has been set ➃ (Fig. 101). The motor then rotates anti-clockwise until the foot control is released.

Autoreverse-forward:

The motor rotates clockwise and changes direction when the load reaches the torque limit that has been set ➂ (Fig. 101). The motor then rotates anti-clockwise until it has run for 2 seconds without its torque being limited (i.e. unimpeded). It then switches back to clockwise rotation.
Cleaning the exterior

Clean the exterior of the motor carefully with a 60 - 70% alcohol solution (Fig. 102). There should be no need to clean the interior.

**Important!**
The motor should be sterilized immediately after being cleaned.

Disinfection

The exterior of the motor can be disinfected using a spray-wipe chemical disinfectant.

Use a disinfectant that is commonly used in dentistry e.g. Mikrozid AF from Schülke&Mayr (liquid or wipes) or FD 322 from Dürr.

**Important!**

Do not immerse the motor in solvent or disinfectant.

Excess oil, cleaning agent, or disinfectant may penetrate the drive unit and have a detrimental effect on how it functions. You should therefore maintain all the instruments – and attachable adapters – only as described in the relevant instructions enclosed with the instruments.

The O-rings on the motor should only be lubricated using a piece of cotton wool that has been moistened with a product such as KaVo spray.
Sterilizing in a DIN EN 13060 steam sterilizer

**Important!**
Prior to each sterilization cycle, the medical product must be cleaned as described above.

The product can be sterilized in an autoclave at a maximum of 138°C.

Packaged sterilization in the autoclave:
The motor can be sterilized using either of two tried-and-tested methods.
- 3 x pre-vacuum: 4 minutes at 134°C (+/- 1°C)
- Gravity procedure: 90 minutes at 121°C (+/- 1°C)

Use as specified in the manufacturer’s instructions.

**Important!**
Following each sterilization cycle, the medical product must be removed from the sterilizer immediately to avoid the risk of contact corrosion.

Ensure the product is dry. This can be done by using an autoclave with a post-vacuum, or a 10 minute drying phase with the autoclave door open.

**Important!**
Leave the motor to cool at room temperature before reusing.

Packaging

**Important!**
The sterilization pack must be large enough to hold the instrument without placing the packaging under stress. The sterilization packaging must meet the applicable quality and usage standards, and must be suitable for the sterilization process. Only one medical product may be sealed in each sterilization pack.
Fittings

Defective LED light
Please return the motor to the manufacturer for repair via your specialist dental/medical dealer.

Replacing the O-rings
You can change the O-rings on the motor as follows (Fig. 103), (Fig. 104):

- Press the O-rings together between your fingers to create loops.
- Push the O-rings forwards and remove them.
- Insert the new O-rings into the grooves.
- Lubricate the new O-rings with cotton wool that has been moistened with spray.

Important!
Do not use Vaseline, oil or any other type of grease!

Important notes

⚠️ During extended periods of non-use, the motor must be cleaned and maintained as instructed. It must be stored in a dry, heated place. You must stop working if any irregular noises occur, if the motor vibrates too much, or if it becomes too hot. In such an event, consult the equipment manufacturer or your dental depot before any major damage occurs.

Tip!
It is recommended that you send the motor back to the manufacturer every 2 years for a service check.
Accessories

The following accessories (Fig. 105) can be obtained from specialist dental/medical dealers:

1. O ring 8.3x0.68 SD Order no. 20002220
2. Shim washer 0.35 Order no. 20007024
3. Seal Order no. 20006272
4. O ring 17x1 Order no. 20002213

Please note!

⚠️ Handpieces and elbows are not supplied as standard. Observe the instructions for use from the relevant manufacturer.
Fittings

Lux motor K 2

The Lux motor K 2 is a brushless three-phase micro motor with a light. All handpieces and elbows with an INTRAmatic LUX connection can be attached (Fig. 106).

Connecting attachment instruments

Attachment:

- Place the instrument onto the motor.
- Turn the instrument until you hear the catch snap into place.

Removal:

- Remove the instrument from the motor, turning it slightly in the direction of the axis.

**Important!**

⚠ Ensure that the O-ring is not damaged. The ring can perform its function only if it is in perfect condition.

**Important!**

⚠ Never attach or remove the instruments while the drive/motor is still rotating!

Startup

- Remove the motor from the tray on the unit ready for operation.
- Now start the motor by activating the foot control. For F9 and F10 type controls, this is done by pressing the pedal.

You operate the motor as described above for the KL 7 motor, and can request and set the following functions:

- **Speed pre-selection**
  However, the minimum speed is 2,000 min-1.
- **Changing the direction of rotation**
- **Spray cooling**
- **Chip blower**
- **Setting the light**
Cleaning the exterior
Clean the exterior of the motor carefully with a 60 - 70% alcohol solution (Fig. 107).

Desinfection
The exterior of the motor can be disinfected using a chemical disinfectant (wiping).
Use a disinfectant that is commonly used in dentistry, e.g. Mikrozid AF from Schülke&Mayr (liquid or wipes) or FD 322 from Dürr.

**Important!**
Do not in place the motor in a solvent or disinfectant.

Excess oil, cleaning agent, or disinfectant may penetrate the drive unit and have a detrimental effect on how it functions. You should therefore maintain all the instruments – and attachable adapters – only as described in the relevant instructions enclosed with the instruments.

The O-rings on the motor should only be lubricated using a piece of cotton wool that has been moistened with a product such as KaVo spray.

Sterilization
The motor is **cannot** be sterilized!

Only the removable motor case can be sterilized in the autoclave at 135°C and 2.1 bar (dwell time: 3 minutes).
Replacing the high-pressure lamp

To replace the high-pressure lamp, proceed as follows:

- Unscrew the case ➀ (Fig. 108) by turning it counterclockwise.
- Remove the case ➀ (Fig. 108) from the motor by pulling it forwards.
- Push the lamp out of the socket using a fingernail ➁ (Fig. 108).

**Caution!**

The lamp may still be hot!
You may be injured if you are not careful!

Reverse this procedure to insert the lamp:

- Place the new lamp in the recess (Fig. 108) in such a way that the contact surfaces correspond with those of the socket.
- Push the lamp into the socket.
- Place the case back onto the motor.
- Screw the case tight by turning it to the right.

Replacing the O-rings

You change the O-rings on the motor as follows (Fig. 109):

- Press the O-rings together between your fingers to create loops.
- Push the O-rings forward and remove them.
- Insert the new O-rings in the grooves.
- Spray the O-rings with KaVo spray.

**Important!**

Do **not** use Vaseline, oils or other forms of grease.

Important notes

During extended periods of non-use, the motor must be cleaned and maintained as instructed. It must be stored in a dry, heated place.

You must stop working if there are any irregular noises during operation, if the motor vibrates too much, or if the motor becomes too hot.

In such an event, consult the equipment manufacturer or your dental supplier before any major damage occurs.
The following accessories (Fig. 110) can be supplied by specialized dental/medical dealers:

1. O-ring 8,3x0,68 SD
2. O-ring 17x0,8 SD
3. High-pressure lamp SD kpl.
4. O-ring 0,7x1 SD
5. O-ring 17x1 SD

Order no. 20002220
Order no. 20002210
Order no. 20001448
Order no. 20002204
Order no. 20002213

Please note!

Handpieces and elbows are not included in the scope of delivery. Observe the instructions for use from the relevant manufacturer.
Fittings
Piezoceramic tartar remover without light

The tartar remover’s ultrasound oscillations are generated piezoelectrically.

**Performance data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>28-35 kHz</td>
</tr>
<tr>
<td>Rated power</td>
<td>8 VA</td>
</tr>
</tbody>
</table>

**Advantages of the piezoceramic system for tartar removal**

- Linear oscillations do not damage healthy enamel.
- Good performance at 28,500 Hz (28,500 oscillations per second).
- Cavitation effect.
- Efficiency of over 90% (low loss of energy caused by mechanical friction and therefore little warming).
- The handpiece is not heated up much and can also be operated without water.
- Removable tip.
- Light, ergonomic handpiece.
- Feedback system (automatic power regulation).

**Advantages of ultrasound in endodontics**

- Water to which ultrasound has been applied is able to reach all parts of the root canal wall (depending on the morphological and anatomical structure of the root canal).
- Ideal treatment is achieved across the entire inner surface of the root canal (in many cases, conventional instruments do not reach all parts of the inner root canal surface).
- Water is also distributed in the apical third by the ultrasound waves.
- The ultrasound cavitation effect allows maximum cleaning efficiency (anti-bacteriological effect and reduction of the risk of infection).
- The ultrasound cleaning and the associated shape of the inner root canal surface has the result that the root canal filling adheres better.
- The thermal and physical effects of ultrasound cause the gutta-percha to soften and therefore permit compact and homogenous root canal fillings.
Cavitation effect when using ultrasound systems

- Ultrasound and H$_2$O generate micro bubbles. The implosion of these micro bubbles leads to a negative pressure which destroys the tartar deposits.
- Suction-rinsing effect in the root canal.
- Removal of tartar.

Startup: tartar removal operation

**Important!**

Only use the appropriate tips from the blue ZEG set of accessories for tartar removal.

- Use the tool included in the accessories to screw the instrument insert (tip) onto the handpiece finger-tight. Put the handpiece in the holder.
- Remove the equipped handpiece from the holder.

Select the SCAL mode (tartar removal) as the default setting as follows:

- You pre-select the mode for the piezoceramic tartar remover by briefly pressing the display field (Fig. 111) (for about one second).

The display field shows the symbols for the three possible modes. The pre-selected mode is displayed at full strength (e.g. SCAL in Fig. 111). The two other modes remain grayed out.

The meanings are as follows:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENDO</td>
<td>Endodontics</td>
</tr>
<tr>
<td>PARO</td>
<td>Periodontal treatment</td>
</tr>
<tr>
<td>SCAL</td>
<td>Tartar removal (SCALING)</td>
</tr>
</tbody>
</table>

The SCAL/ENDO/PARO settings influence the output power of the handpiece and must be defined precisely in accordance with the tips used.

The settings can therefore be changed only using the buttons, not using the foot control.

- Start the ZEG attachment using the relevant foot control (pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7).

**Caution!**

When the tartar removal handpiece is used, you should avoid letting the tip come into direct contact with fillings and areas bordering on fillings.

We recommend only using the foot control in on/off mode.
Startup: endodontic operation

Important!

⚠️ Only use the appropriate tips from the yellow ENDO set of accessories for endodontic operation.

- Use the tool included in the accessories to screw the endodontic insert (tip) onto the handpiece finger-tight. Put the handpiece in the holder.
- Remove the equipped handpiece from the holder.

Select the ENDO mode as the default setting as follows:
- You pre-select the mode for the piezoceramic tartar remover by briefly pressing the display field (Fig. 112) (for about one second).

The display field shows the symbols for the three possible modes. The pre-selected mode is displayed at full strength (e.g. ENDO in Fig. 112). The two other modes remain grayed out.

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The SCAL/ENDO/PARO settings influence the output power of the handpiece and must be defined precisely in accordance with the tips used.

The settings can therefore be changed only using the buttons, not using the foot control.

- Start the attachment using the relevant foot control (pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7).

Caution!

⚠️ It is vital that the ENDO display lights up as the oscillation intensity will otherwise be too high and therefore endanger the patient.

We recommend only using the foot control in on/off mode.
**Startup: periodontal operation**

*Important!*

Use the tool included in the accessories to screw the instrument insert (tip) onto the handpiece finger-tight. Put the handpiece in the holder.

Remove the equipped handpiece from the holder.

Select the PARO mode as the default setting as follows:

- You pre-select the mode for the piezoceramic tartar remover by briefly pressing the display field (Fig. 113) (for about one second).

The display field shows the symbols for the three possible modes. The pre-selected mode is displayed at full strength (e.g., PARO in Fig. 113). The two other modes remain grayed out.

The meanings are as follows:

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The SCAL/ENDO/PARO settings influence the output power of the handpiece and must be defined precisely in accordance with the tips used.

The settings can therefore be changed only using the buttons, not using the foot control.

- Start the attachment using the relevant foot control (pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7).

*Caution!*

It is vital that the PARO display lights up as the oscillation intensity will otherwise be too high and therefore endanger the patient.

We recommend only using the foot control in on/off mode.

**Regulating intensity**

The intensity can be continuously regulated in the pre-selected range using the relevant foot control.

If the foot control is operated in the non-adjustable ON/OFF mode, the symbol for the foot control (Fig. 114) appears at full strength. You change over by tapping the symbol. The instrument then always runs at the maximum pre-selected intensity, regardless of the position of the pedal.
Intensity pre-selection

By pressing the ➀ or ➁ (Fig. 115) symbols, or the holder displays ➄ below them, you can set the intensity or the intensity range that can be used in percentage steps. After you press them, the numerical display appears in the black field. The “+” and “−” symbols ➂ also light up. You can adjust the value displayed by tapping the “+/−” symbols or pressing them for longer. These displays needed to set the setting disappear when you press ➀, ➁ or ➄ again. The value that is set is saved automatically for the specific user. The setting is therefore also retained after the instrument is put back into the holder and taken out again.

The percentage is shown in the central section of the display ➀ (Fig. 115). In the case of an adjustable foot control, the maximum intensity that you can select is displayed. The intensity that is currently set is indicated by the bar on the display ➁ (Fig. 115).

The intensity can also be pre-selected in steps of 10% using the foot control.

Pre-selecting the intensity using foot control F7

The intensity is pre-selected by pressing the slide switch ➁ (Fig. 116).

- Holding the slide switch pressed away from the dentist (> 1 sec.):
  The pre-selected intensity is increased incrementally in steps of 10% by pressing it for longer (more than one second).

- Holding the slide switch pressed towards the dentist (> 1 sec.):
  The pre-selected intensity is reduced incrementally in steps of 10% by pressing it for longer (more than one second).

The current value is shown in the central section of the display ➀ (Fig. 115).

Important!

The value pre-selected in this way using the foot control is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually. However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.
Fittings

Pre-selecting the intensity using foot control F9/F10

The intensity is pre-selected using the left-hand ③ and right-hand ④ buttons on the foot control (Fig. 117).

- Keeping the left-hand button ③ (Fig. 117) pressed (> 1 sec.):
  The pre-selected intensity is reduced incrementally in steps of 10% by pressing it for longer (more than one second).

- Keeping the right-hand button ④ (Fig. 117) pressed (> 1 sec.):
  The pre-selected intensity is increased incrementally in steps of 10% by pressing it for longer (more than one second).

The current value is shown in the central section of the display ① (Fig. 118).

**Important!**

The value pre-selected in this way using the foot control is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually.

However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.

Spray cooling

You switch the spray cooling function on or off by tapping the spray display (Fig. 119). When it is switched on, the display lights up at full strength.

The spray display symbol appears in the black field if you press it briefly (for approximately half a second). The “+” and “−” symbols for setting the intensity also light up. The spray intensity can be adjusted to 9 different levels by tapping the “+/−” symbols. The current level is shown numerically next to the symbol (Fig. 112). When you press the spray symbol again, the “+/−” symbols disappear and the spray symbol is shown in its initial state again.

You can also activate or deactivate the spray cooling function using the foot control.

Activating spray cooling using foot control F7

You switch between dry and spray operation by pressing the slide switch ② (Fig. 120).

- Tapping the slide switch briefly away from the dentist (< 1 sec.):
  Switches between dry and spray operation.
Activating spray cooling using foot control F9/F10

You switch between dry and spray operation by tapping the right-hand button ⃕ (Fig. 117).

Briefly tapping the button:
Switches between dry and spray operation.

Regulating the water flow

The water flow can additionally be regulated using the rotating ring ➀ (Fig. 121 or Fig. 122) at the end of the handpiece.

Cleaning the exterior

Clean the exterior of the handpiece carefully using an alcohol solution.

Disinfection

Disinfect the exterior of the handpiece using a chemical disinfectant (either for spraying or wiping). Use a disinfectant that is commonly used in dentistry.

Important!

Do not place the handpiece in a solvent or disinfectant.

Sterilization

The removable handpiece case can only be sterilized in the autoclave at 135°C and 2.1 bar (minimum dwell time: 3 minutes).
Fittings

**Important areas of application**

- Tartar removal, supragingival;
- Cleaning gingival pockets;
- Loosening crowns and bridges;
- Smoothing roots;
- Removing necrotic tissue;
- Amalgam condensation;
- Root canal treatment;
- Gutta-percha condensation;
- Root canal filling;
- Removing all root canal fillings.
Tips and notes on use

Tartar removal
Only use insert tips 1, 2, 3, 10 and the periodontal tips to remove tartar.

Set the oscillation strength on the unit as required.

All inserts oscillate in a longitudinal direction, i.e. in the direction of the handpiece. No lateral oscillations occur. When the insert tips are inserted into the tooth laterally, the oscillation is not carried over to the tooth. This has the result that the treatment remains painless.

Root canal treatment

• Once the nerve has been removed, prepare the root canal by hand to ISO size 15.
• Establish the length using the x-ray picture.
• Mark the lengths using a rubber stopper in line with ISO file size 15.
• Insert the instrument into the root canal lengthways.
• Activate the unit.
• Perform coronal and apical movements for around 45 seconds.
• Change the file to ISO size 25.
• Repeat the procedure described above. The canal will then approximately correspond to ISO size 45 to 50.
• Fill the root canal, for instance with gutta-percha (the condensation is lateral or vertical).

Amalgam condensation
Insert amalgam using inserts 5, 5AE, or 6 depending on the diameter of the cavity (inserts 5 and 6 do not have a water supply, whereas insert 5AE does).

An amalgam filling filled using ultrasound is much denser and more homogenous. Vacuoles are extremely rare.

In order to avoid mercury vapors, it is good idea to use “dry” amalgam.

Removing cement residues
Tip no. 7 without a water supply is suitable for this.

Removing crowns
Tips 5 and 5AE are suitable for this.
Fittings

**Accessories (tips and inserts)**

We make no claim that the list of accessories provided below for the piezoceramic tartar remover is complete. You can obtain them from your specialist dealer or directly from the manufacturer.

Satelec GmbH  
Industriestr. 9  
40822 Mettmann

Tel. (02104) 13017  
Fax (02104) 16827

The latest list of accessories can also be requested from here.

**Tartar removal**  
(SCAL setting)

**Crown removal**  
(SCAL setting)

**Gutta-percha condensation**  
(SCAL setting)

**Amalgam condensation**  
(SCAL setting)
Periodontal treatment (PARO setting)

Endodontics (ENDO setting)

File holder
Endodontics

File key
Endodontics
Piezoceramic tartar remover with light

The tartar removal handpiece is fitted with a powerful LED ring that has a very long lifespan.

Startup and operation

Proceed as described above for the piezoceramic tartar remover without light. You can now operate the tartar remover as described above, and can request and set the following functions:

- Operating mode (Tartar removal, Endo, Paro)
- Intensity control
- Spray cooling
- Regulating the water flow

However, please observe the following additional instructions relating to the light.

Tip!

The advantages of piezoceramic systems and of using ultrasound for tartar removal and in endodontics are described in the “Piezoceramic tartar remover without light” section. These also apply in full here.

The “Piezoceramic tartar remover without light” section provides tips and usage notes. These also apply here.

Setting the light

The light can be switched on and off by tapping the light symbol (Fig. 123). When it is switched on, the symbol lights up at full strength. The light intensity is displayed numerically next to the symbol.

The light symbol (appears against a black background if you press it briefly (for approximately half a second). The “+” and “−” symbols for setting the light intensity also light up (gradually if you tap the “+/-” symbols, rapidly if you press them for longer). The “+/-” symbols disappear when you press the light symbol again.

The light shines for around 15 seconds as soon as the handpiece is removed from the holder. It goes out if the handpiece is not put into operation during this time. The light is automatically switched on again when the equipment is started up.

It also continues to shine for around 15 seconds after the foot control pedal is released. It goes out immediately when the handpiece hose is replaced in the holder.
Cleaning the exterior
Clean the exterior of the handpiece carefully using an alcohol solution.
If necessary, the front section of the handpiece (Fig. 124) can also be dismantled and carefully cleaned. To do this, unscrew the case ② (Fig. 124).

**Important!**
You MUST ensure that the LED ring ④ (Fig. 124) is plugged in the right way round.
The marks ⑤ (Fig. 124) on the handpiece and the LED ring must match.
Incorrect connection will damage the LEDs irreparably.

Cleaning the light guide surface
Blow particles of dirt, etc. away with air in order to avoid scratching the light guide surfaces ① (Fig. 124).
Wipe the light guide surfaces ① with a cotton bud or soft cloth and alcohol.

Sterilization
Clean the light guide surfaces ① (Fig. 126) with ethanol prior to sterilization. The entire removable handpiece, excluding the working tip, can be sterilized in the autoclave at 135°C and 2.1 bar (minimum dwell time: 3 minutes).

Disinfektion
Disinfect the exterior of the handpiece using a spray-wipe chemical disinfectant. Use a disinfectant that is commonly used in dentistry.

**Important!**
Do not place the handpiece in solvent or disinfectant.
Replacing the LED ring

- Remove the tartar removal handpiece from the handpiece hose.
- Unscrew the case ② (Fig. 127) from the handpiece.
- Carefully pull the LED ring ④ (Fig. 127) off the handpiece forwards.
- Carefully replace it with the new LED ring.

**Important!**

You MUST ensure that the LED ring ④ (Fig. 127) is plugged in the right way round. The marks ⑤ (Fig. 127) on the handpiece and the LED ring must match. Incorrect connection will damage the LEDs irreparably.

- Screw the case ② (Fig. 127) back onto the handpiece.
- Put the tartar removal handpiece back on the handpiece hose.

**Accessories**

The following accessories can be supplied by specialized dental/medical dealers:

- LED ring Order no. F12605
- O-ring (at the connection end) Order no. E15019
Fittings

Air polishing unit

The air polishing unit is located in an additional external container ➀ on the spittoon body (Fig. 127). This additional container contains the operating elements and the filling container for the powder.

The handpiece is located in one of the holders ➁ (Fig. 127).

Startup

- Remove the handpiece from the holder.

The central section of the display will then show the appropriate symbol ➀ (Fig. 128) as well as the symbols for the maximum intensity ➁ (Fig. 128), and the on/off operation of the foot control ➂ (Fig. 128).

- Hold the handpiece over the bowl of the spittoon.

- Activate the foot control – by pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7 – and set the powder and water quantities (see “Setting the spray” and “Setting the powder quantity”).

Setting the spray

At the bottom of the additional container (Fig. 129) you will find an adjustment button ➀ with which you can set the water quantity.

Setting the powder quantity

A slide control ➀ (Fig. 130) is located on the filling container. The powder quantity can be set by moving the control (+ or –).
Setting the powder/water mixing ratio

- Move the slide control ① (Fig. 130) to a central position.
- Now activate the foot control and use the slide control ① to set the required powder quantity.
- Set the necessary water quantity by turning the adjustment button for the spray setting (see ① in Fig. 129).
  Turning it to the right: Less water
  Turning it to the left: More water

If the water flow rate is too high, the polishing effect is reduced due to rinsing.
A water flow rate that is too low makes the polishing aggressive.

The effectiveness of polishing is directly related to setting the water and the sprayed powder quantity correctly.

Important tips on use

Once you have familiarized yourself with the unit’s functions, you can practice on black cardboard before actually using the equipment in someone’s mouth:

- Hold the sheet (black cardboard) at a distance of 3 to 5 mm at an angle of 30° to 45°.

  **Important!**
  It is vital that you comply with the distance of 3 to 5 mm in order to prevent the head of the handpiece getting blocked in contact with water and powder.

In order to achieve the maximum effect, the polishing jet must make small circular movements on the teeth ① (Fig. 131). The speed and duration of the operation depends on how tough the deposit is.

  **Tip!**
  In order to avoid uncomfortable sensations in the mouth, the polishing jet should be aimed more in the direction of the occlusal edge rather than being aimed at the sulcus.

  **Important!**
  If the unit is not used for an extended period of time, it is important that no powder is left in the unit. Air humidity may change the property of the powder, making it necessary to clean the container.
Fittings

Cleaning the storage container

- Put the handpiece in the holder.
- Turn the screw on the container plate by one quarter turn to “OPEN”.
- Lift the plate next to the screw and remove the container.
- Unscrew the powder container.
- Clean the powder container using a dry cloth.
- Check the two holes in the air duct. It is important that they are not blocked (Fig. 132).

Filling the storage container

The powder level can be seen through the transparent lid. You top up the supply as follows:

- Leave the handpiece in the unit’s holder.
- Unscrew the lid of the storage container.
- Pour in a dose of powder (40 g bag).
- Screw the lid back on.

**Important!**

In order to prevent blockage at the outlet of the storage container, you should not add more than one bag of powder at once.

Cleaning the nozzle

Clean the removable nozzle ➊ (Fig. 133) **after each working day**:

- Unscrew the nozzle ➊ from the handpiece ➋ by turning it anticlockwise, and pull it out of the handpiece.
- Clean the nozzle ➋ using a piece of thin, flexible sonofoil.
- Put the nozzle back on the handpiece and screw it tight by turning it clockwise.
Replacing the O-rings

- Replace the O-rings in the handpiece ② + ④ (Fig. 133) every 6 months if you autoclave the nozzle and handpiece (or otherwise every 12 months).
- To do this, unscrew the nozzle from the handpiece then pull the handpiece off the hose.
- Replace the O-rings in the hose ① (Fig. 134) every 12 months.

External care

Clean the exterior of the handpiece carefully using an alcohol solution.

Disinfection

Disinfect the exterior of the handpiece using a chemical disinfectant (either for spraying or wiping).

**Important!**

⚠️ Do not place the handpiece in a solvent or disinfectant.

Sterilization

The handpiece **cannot** be sterilized!

Accessories

The following accessories can be supplied by specialized dental/medical dealers:

- O-ring set for nozzle and handpiece Order no. F10374
- O-ring set for the hose Order no. F10375
15 x 30 cm x-ray viewer

This x-ray viewer is used to view panoramic x-ray pictures. However, it is also possible to view single tooth x-rays.

Startup

- Switch the x-ray viewer on or off using the toggle switch ➊ (Fig. 135) (on the rear of the viewer).
  - Turning the switch to the left: Light off
  - Turning the switch to the right: Light on

You can place x-ray films on the ledge ➋ (Fig. 135) and view them leaning against the screen. If necessary, you can fix films under the ledge – after pressing the film lightly against the screen.

External care

Clean the exterior of the x-ray viewer carefully using a soft cloth.

Disinfection

Disinfect the exterior of the x-ray viewer using a chemical disinfectant (either for spraying or wiping).

Important!

Excess cleaning agent or disinfectant may penetrate the x-ray viewer if you are not careful and have a detrimental effect on how it functions.
Small pluggable x-ray viewer

The small x-ray viewer is used to view single tooth x-rays.

Assembly

A diode plug is fitted to the bottom of the x-ray viewer (Fig. 136).

- Insert the diode plug into the socket located at the top of the unit casing.

The x-ray viewer is then connected to the power supply and mounted in such a way that it can be rotated.

Startup

- Switch the x-ray viewer on using the toggle switch at the top of the viewer.
- View the tooth x-rays
  a) by placing/leaning the film on the bottom edge of the focusing screen or
  b) by lightly pressing the film against the focusing screen and fixing it under an edge of the frame.

External care

Clean the exterior of the x-ray viewer carefully using a soft cloth.

Disinfection

Disinfect the exterior of the x-ray viewer using a chemical disinfectant (either for spraying or wiping).

Important!

Excess cleaning agent or disinfectant may penetrate the x-ray viewer if you are not careful and have a detrimental effect on how it functions.
Multimedia equipment (flat screen and/or intraoral camera)

The flat screen and intraoral camera are multimedia units which can be fitted permanently. However, they can only be installed in connection with GL2020 motorized chairs.

The core is an intelligent 15-inch TFT flat screen (Fig. 137). The high resolution screen is mounted in such a way that it can be rotated and tilted. Using an inbuilt "video controller" you can display not only video images based on the FBAS standard from cameras, video recorders, and DVD players but also PC images based on all common VGA standards.

If all instruments that are controlled using the foot control (e.g. turbine elbow and micro motor) are stored in the holder, the foot control also operates the screen memory or – via a special additional module – the PC.

Together with the high-quality ULTRADENT intraoral camera integrated into it, the unit constitutes a complete video system. The camera can be used to take both intraoral and extraoral pictures. The camera delivers a standardized PAL video signal and can be installed either on the unit or on the spittoon.

Using the external PC adapter you can set up a connection to external video equipment and the practice’s own PC. All data and data sources which are managed by the PC can then be displayed on the TFT flat screen.

Please refer to the separate multimedia instructions for details of how to operate these units.
Separator in accordance with the DVGW

The separator is located in the power supply unit for the dental equipment or spitoons. It includes a free drop distance, which ensures that any contaminated water in the unit is separated from the fresh water supply provided on site.

The separator is activated when the main switch on the power supply unit is switched on, and works fully automatically.

**Caution!**

In the event of faults in the water block which would cause water to leak in the power supply unit, the system switches itself off automatically. At the same time, a continuous tone sounds in the power supply unit. Try to rectify the fault by pressing the main switch several times. If this does not work and the continuous tone does not stop, this means that there is a technical defect which can only be rectified by a service technician.
**Intensive disinfection unit**

The intensive disinfection unit can be used to disinfect the water-bearing parts of the spittoon. Intensive disinfection should be carried out once a week (preferably over the weekend, starting when the practice closes on Friday). If the tap water is highly contaminated (for instance following repairs to the mains water supply), daily intensive disinfection may be necessary for a short period.

**Important!**

It is vital that you perform the following disinfection steps in the order described.

**Important!**

If a continuous tone sounds in the supply unit during intensive disinfection, you must stop the disinfection process and replenish the Ultrades V solution as described below. The intensive disinfection can be continued after filling.

**Important!**

Only use Ultrades V disinfectant solution! Other agents may cause serious corrosion and therefore damage the system.

**Important!**

The disinfectant solution should not stay in the unit for more than 3 days. In other words, after 3 days you should switch the workstation back on and rinse the instruments as described in the section covering the dental unit.
Disinfection units U1500 and U5000 with U740 spittoon

Filling the purification system

- Switch the display on the unit’s control panel to page 2 of the menu by tapping the arrow key on the main menu. The disinfection system symbol will then appear (Fig. 138).

- Make sure that the purification system is switched off and the symbol on the unit’s display (Fig. 138) is shown accordingly. If the symbol appears in the black field, the purification system is active and can be deactivated by tapping the black field.

- Switch off the main switch on the power supply unit (Fig. 139).

- Open the tank lid on the terminal box (Fig. 139).

  **Important!**
  Fill the tank with Ultrades V solution. The best way to do this is to use a measuring jug. When empty, the tank can take up to 200 ml. Proceed with care and make sure that you don’t spill any of the purification solution.

- Close the tank lid and make sure that it is sitting in place correctly.

- Switch the main switch on again.

**Purifying the spittoon**

The spittoon must always be purified first.

- Activate intensive disinfection by tapping the symbol (Fig. 138). The symbol will then appear against a black background.

- Activate the mouth rinse glass filler at least three times (without the glass) in order to fill the lines with sterilization solution.

- Activate the large and small suction hoses by removing them from their holders, and wait one minute before replacing them in their holders.

- Deactivate the disinfection system by tapping the symbol (Fig. 138) (the black background will disappear).
Disinfecting the dental unit

- Place the cleaning pot ➀ (Fig. 140) on the tray table.
- Place all the instruments in their holders on the workstation. The main menu then appears on the display (Fig. 141).
- Tap the arrow key ➂ (Fig. 141) to access the submenu. The RKI symbol for RKI rinsing (Fig. 142) then appears on the top line of the display.
- Tap the RKI symbol (Fig. 142) to access the "RKI menu".
- The top line of the RKI menu displays the two possible rinse times ➀ and ➁ (Fig. 143).
- Then place all the water-bearing drives apart from the multi-way syringes (turbine coupling, motor and tartar remover) into the L-shaped adapters intended for this purpose ➂ (Fig. 140) in the cleaning pot.

**Important!**

Instrument rinsing for the water conduits is carried out without the treatment instruments attached (turbine elbow, handpieces and elbows, tartar-removal tips)! Wherever possible, ensure that the water flow is set to maximum on the instruments and instrument couplings.

- Remove the cases from all the syringes and place the syringes themselves in the corresponding adapter cases (➄, ➅ or ➆), in such a way that the water flow buttons on the syringes are activated
  ➄ for Sprayvit L
  ➅ for Sprayvit 4000
  ➆ for three-way syringe
- Now immediately press the button ➋ (Fig. 143) then immediately press the button (Fig. 144). The instruments are then automatically rinsed.
- The rinsing process can be cancelled by pressing the active black rinse-time symbol (Fig. 143).
- Upon completion, a signal tone will sound, and after approx. 15 seconds the main menu will be displayed.
Disinfection continues to remain active after rinsing, and has to be switched off again. You do this by tapping the arrow key on the main menu once more, then switching disinfection off again by pressing the (Fig. 144) button.

Please note!

Instrument rinsing deactivates any syringe heating that may be available. This must be manually re-activated after the rinsing process.

Important!

The water supply to the syringes is not automatically switched off! It is therefore important that the syringes are removed from the cleaning pot as soon as rinsing is complete.

- Place the multi-way syringes back in their holders.
- Remove the rinsed instruments from the cleaning pot and replace them in their holders on the unit.
- Remove the rinsing pot and pour its contents into the spittoon bowl.
- Switch off the main switch on the connection box.

The disinfectant solution must now remain in the workstation for approximately 24 hours. Do not switch the workstation on again until after this period has elapsed. Under no circumstances should the workstation be used during the disinfection process.

Restarting the workstation

- Switch on the main switch on the connection box.
- Activate the mouth rinse glass filler at least five times (without the glass).
- You must then rinse the instruments in accordance with RKI recommendations as described in section "Instrument rinsing in accordance with the RKI".

The unit is now ready for operation, provided the intensive disinfection function is not activated again.
Permanent disinfection unit

If a permanent disinfection unit has been integrated, a disinfectant solution that has been sufficiently diluted to make it harmless (Ultrades V) is automatically added to tap water when it enters the workstation. This unit largely prevents or reduces the formation of a microbial layer in the water-bearing parts of the unit. The system guarantees low levels of bacteria in water even after an extended standstill, therefore reducing the risk of infection for the dentist and patient alike.

**Important!**

If the supply unit emits an irregular beeping noise during treatment, the supply of Ultrades V solution in the workstation is running low, and should be refilled before the next patient. However, the water supply to the instruments is maintained, even if the filling container is empty.

**Important!**

Only use Ultrades V disinfectant solution! Other agents may cause serious corrosion and therefore damage the system.

To fill the disinfectant system, please proceed as described for the intensive disinfection unit under “Filling the purification system”.

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**E6: HF power as a function of the power setting and the load**

The maximum power that can be set is the rated output power = 35W. This is achieved at a load of 1000 ohms.
Electrosurgery unit

The electrosurgery unit provides the HF (high frequency) current needed for electrotomy and coagulation. The unit may be operated in dental practices to a limited extent, for a only a few seconds at a time (due to the inevitable interfering radiation).

Startup

- Remove the handpiece from the tray.
- Press the foot control (pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7).

The electrosurgery handpiece is in operation. A signal tone indicates that the HF current is available.

Caution!

Never press the foot control during breaks.

Regulating intensity

In connection with the electrosurgery unit, the foot controls work as pure on/off switches (as a result of statutory regulations).

Therefore, when the handpiece is removed from the holder, the symbol for the foot control always lights up at full strength in the central section of the display (Fig. 146). The instrument then always has 100% of the pre-selected intensity, regardless of the position of the pedal.

Intensity pre-selection

You can pre-select the intensity in steps of 1 watt up to a maximum of 40 watts by pressing the symbol (Fig. 147) or the holder displays below them. After you press them, the numerical display appears in the black field. The “+” and “−” symbols also light up. You can adjust the value displayed by tapping the “+/−” symbols or pressing them for longer. The “+/−” symbols disappear when you press again. The value that is set is automatically saved for the specific user. The setting is therefore also retained after the instrument is put back into the holder and taken out again.
Fixing/unfixing electrodes

Caution! YOU MAY BE INJURED IF YOU ARE NOT CAREFUL!

Never press the foot control while fixing or removing the electrodes.
Where appropriate, switch off the unit’s main switch.

- In order to fix the electrodes, hold them by the insulated part and push them into the collet.
- In order to unfix the electrodes, hold them by the insulated part and pull them out of the collet.

Avoiding burns

Caution!

Make sure that no small-area points of contact are formed between the patient and the metal parts of the treatment chair which are carrying mass potential. Heat may develop in such places. Tell patients to put their hands on their body in order to eliminate the risk of being burnt.

Performance data
Treatment using the electrosurgery unit

If dentists are able to use it well, electrosurgery has various significant advantages. However, the most important prerequisite for obtaining the desired results is to fully master the treatment technique.

Therefore, in order to avoid failures, we urgently recommend practicing on a dummy using the various treatment electrodes.

Preliminary tests on a dummy

The most suitable thing to use for practicing is a piece of raw, low-fat beef. Coagulation effects can then be recognized very easily due the white coloring that then occurs.

You can see the test arrangement in (Fig. 148). If you use this arrangement, the electrical conditions on the dummy are very similar to those on the patient.

Maintaining accessories

Good operation results can only be guaranteed if the electrodes are clean and have a shiny metallic color. Burned-in crusts of residual tissue and blood can be removed easily after soaking briefly in water.

Cleaning the exterior

Clean the exterior of the handpiece carefully using an alcohol solution.

Disinfection

Disinfect the exterior of the handpiece using a chemical disinfectant intended for use in dental practices (either for spraying or wiping).

**Important!**

Do not place the handpiece in a solvent or disinfectant.

Sterilization

The removable handpiece and the active electrodes can be sterilized in the autoclave at 135°C and 2.1 bar (minimum dwell time: 3 minutes).
Basic range of active electrodes
The diagram on the left (Fig. 149) provides an overview of the basic range of active electrodes.

Using electrosurgery

**Caution!**

When using the electrosurgery unit, it is vital that you pay attention to the following comments:

1. Only use supply lines supplied by ULTRADENT for the electrosurgery handpiece.

2. If you use HF surgery and physiological monitoring equipment on a patient at the same time you should observe the following rules:
   - When monitoring electrodes do not contain any protective resistors or HF chokes, attach them to the patient as far away as possible from the surgery electrodes.
   - Needle electrodes are not recommended for monitoring in this case.

3. Position the wires for the surgery electrodes in such a way that they touch neither the patient nor any other wires.

4. Set the power output to as low a value as possible for the purpose concerned.

5. Avoid using flammable anesthetics such as laughing gas (N₂O) and oxygen when an operation is carried out in the region of the thorax or head. An exception may be made to this rule if the anesthetics are drawn off or if a unit with a anesthetic check is used. Combustible substances which are used as detergents or disinfectants must have evaporated before HF surgery is applied.

**Caution!**

There is a danger of combustible fluids collecting under the patient or in body cavities. Wipe up any fluids which have collected in these places before applying HF surgery.

There is always a danger of endogenous gases igniting. Materials such as cotton wool and lint may be ignited by the sparks which occur when the HF surgery unit is used if they are saturated with oxygen.
6. Patients who have heart pacemakers or pacemaker electrodes may be at risk. There may be interference with the pacemaker function or the pacemaker may be damaged. If in doubt, consult the cardiology department.

7. When the HF surgery unit is being operated, there is a possibility of interference with other electric medical equipment.

8. If the electrosurgery unit does not work properly with the normal setting or if the unit seems to be outputting too little power, this may be due to a faulty ground wire connection between the treatment chair and the treatment unit.

**Caution!**

- It is vital that you avoid contact with teeth and metal restorations.
Fittings

Power supply unit

The power supply unit for the unit can be found

a) integrated into the front of the motorized chair in the case of motorized chair type GL2020,

or

b) in the separate terminal box (in the case of all other chairs).

The main switch (for air, water, and electricity) on the unit is located on the power supply unit. See the “Startup and operation” chapter of these instructions for use with regard to this.

The power supply unit contains:

– The central switch for air/water/electricity;
– The water filter;
– Air filters;
– Main fuses T 10 A;
– The transformer and boiler fuse;
– The low current supply;
– The central warm water supply (optional, only needed in connection with an ULTRADENT spittoon);
– The separator in accordance with the DVGW.

The following can optionally also be installed in the power supply unit:

– Filling container for the disinfection system
– Multimedia terminal box

**Important!**

Switch the unit off when the practice is closed.

**Important!**

The unit **may only** be connected to a CE-certified power supply unit that has been approved by ULTRADENT.
Steripump (physiodispenser)

For the purpose of dental surgery and implantology, the unit can be supplied with an integrated steripump. This additional facility makes it possible to supply drills and cutters with physiological coolants under sterile conditions. This prevents infections and tissue damage resulting from heat build-up.

The coolant is delivered using the built-in hose pump (Fig. 150). The hose pump is designed in such a way that the sterile-packed infusion set can be exchanged quickly and easily.

The micro motor is operated using the unit’s foot control as during normal operation. A changeover on the display ensures that the system is cooled externally with physiological fluid rather than internally with water.

The steripump includes the following parts (Fig. 150):

1. Stand to support the fluid container.
2. Standardized fluid container with sterile, physiological solutions (which can be obtained from the relevant specialized dealers).
3. Infusion set (Fig. 150 and Fig. 151) with an integrated hose pump (which can be obtained from the relevant specialized dealers: Satelec no. F 58707, 10 items).

Startup

- Put the pump cassette of the infusion set on the motor shaft until it snaps into place on the clips (Fig. 151).
- Attach the infusion hose to the fluid container and connect the coolant hose to the handpiece.
- Activate the steripump using the buttons on the display as described below.
Activating the steripump

- Locate the handpiece that is connected to the steripump via the coolant hose and take it out of the holder.
- Press the steripump symbol ➀ (Fig. 152) for about half a second. The steripump display “Ster” will then light up fully and the normal spray display “H2O” will be grayed out. This means that the unit has switched from normal spray operation to steripump operation.

When the steripump is connected, the word “Ster.” ➁ (Fig. 153) appears on the spray symbol ➀ (Fig. 153):

- Briefly tap the spray display ➁ (Fig. 153). The grayed-out spray display ➁ will then light up at full strength ➂. This means that the coolant has been connected to the instrument via the steripump.
- Now start the handpiece by pressing the relevant foot control (pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7).

The steripump will convey the medium as soon as the current instrument is started using the foot control.

**Important!**

After using the steripump, switch the spray back to normal operation – by pressing the steripump symbol ➀ (Fig. 152) – in order to prevent fluid escaping from the steripump. The H2O display must fully light up again.

**Caution!**

Completely replace the infusion set after every treatment.
Setting the intensity (delivery speed)

The delivery speed can be pre-selected on the display.

- Press the steripump symbol ③ (Fig. 153) for about half a second. The symbol will then appear in the black field with an additional numerical intensity display ④ (Fig. 153) and the “+” and “–” symbols will light up fully.

- Press the “+” and “–” symbols ② (Fig. 152) to adjust the displayed value between 0 and 100 (gradually if you tap the “+/–” symbols, rapidly if you press them longer).

The value that is set is automatically saved for the specific user. The setting is therefore also retained after the instrument is put back into the holder and taken out again.

The “+/–” symbols disappear and the original steripump symbol ③ (Fig. 153) is displayed when you press ④ (Fig. 153) again.

- The flow can be adjusted using the regulating wheel on the infusion set ② (Fig. 151).

Activating steripump cooling using foot control F7

You switch between dry and steripump operation by pressing the slide switch ① (Fig. 154).

- Tapping the slide switch briefly away from the dentist (< 1 sec.):
  Switches between dry and steripump operation.

Activating steripump cooling using foot control F9/F10

You switch between dry and steripump operation by tapping the right-hand button on the foot control.

- Briefly tapping the button ④ (Fig. 155) (< 1 sec.):
  Switches between dry and steripump operation.
Additional sterijoint component for the tartar remover

In the case of unit versions with a built-in steripump (physiodispenser), the steripump can also be used to supply external, sterile rinsing fluids to the handpiece (for instance for PARO/ENDO treatment).

In this case the intermediate sterijoint piece (Fig. 156) is needed – with or without a light guide.

Inserting the intermediate piece

- Remove the handpiece (Fig. 156) from the hose.
- Attach the intermediate sterijoint piece between the handpiece and hose.
- Take the infusion hose belonging to the steripump and attach it to the intermediate sterijoint piece.
- Now operate the tartar remover handpiece as usual in ZEG-PARO or ENDO mode in accordance with the descriptions in these instructions for use.

Important!

In order to remove the intermediate sterijoint piece you should switch the steripump off again in order to prevent unwanted fluid leakage.
Light polymerization unit, type Mini L.E.D.

Description
The Mini L.E.D. emits a visible blue light with a wavelength of between 420 and 480 nm for the photo-polymerization of dental materials.

It consists of:
- The Mini L.E.D. handpiece with a light-emitting diode
- An angled standard light guide that can be sterilized, with a diameter of 7.5 mm
- A glare shield
- A booster light guide with a diameter of 5.5 mm (optional)

Important notes:

⚠️ The light rays emitted by this unit can be dangerous and must never be directed towards someone’s eyes – even if the person is wearing protective goggles. The light must only be aimed at the part of the mouth to be treated.

None of the lamps for photo-polymerization, including the Mini L.E.D., should be used on people who suffer from or have suffered from photo-biological reactions (including light urticaria and porphyria erythropoetica) or on people who are currently taking medication (including methoxsalene and chlorotetracycin) which increases sensitivity towards light.

People who have suffered from diseases of the retina or lens or who have undergone an eye operation, in particular cataract surgery, must consult their optician before using or being treated with the Mini L.E.D. Even if the patient consents to treatment, it is advisable to act with caution as the light intensity could cause accidents. We highly recommend wearing suitable protective goggles (with a UV filter) at all times.

Fluctuations in the mains voltage or the electromagnetic field that exceed the normal safety regulations may automatically activate the light or influence its function.
If you use the Mini L.E.D. without protective goggles, we recommend that you attach the glare shield included in the scope of delivery to the light guide.

Intensive use of the Mini L.E.D. may lead to a rise in temperature in the unit. If this happens, an automatic protection function will prevent the unit being started up and the red display will flash. Let the unit cool down for a few minutes. The lamp can then be used again as directed.

**Specification**

- Classification: Normal
- Type B
- Continuous operation
- IPX0

- Wavelength: 420-480 nm
- Light power (⌀ 7.5 mm): 1100 mW/cm²
- Power: 450-500 mW

**Operating elements**

The handpiece has 4 pilot lamps and 2 function keys (Fig. 157):

1. Function key to select the mode
2. Yellow, display indicating soft start operation
3. Orange, display indicating pulse operation
4. Red, display indicating standard operation
5. Green, display indicating operability
   - Red and flashing, protection against overheating
6. On/off function key
Startup

- Sterilize the light guide and disinfect the handpiece (see “Maintenance”) each time before using them.
- Insert the sterilized light guide into the handpiece, making sure that the light guide is positioned properly. It snaps in with an audible click.

Selecting the mode

You can pre-select the various modes by pressing the function key ➀ (Fig. 158).

“Standard” mode

You select the mode by pressing the function key. The lamp lights up for 10 seconds after you press the on/off switch. The red display ➃ (Fig. 158) indicates your selection. The power of the lamp in this mode is:

- 1100 mW/cm² (±10%) using the standard light guide with a diameter of 7.5 mm
- 2000 mW/cm² (±10%) using the booster light guide (optional) with a diameter of 5.5 mm

“Pulse” mode

You select the mode by pressing the function key. In this mode, the lamp lights up with full power and emits the radiation in 10 consecutive light intervals of 250 ms. The orange display ➂ (Fig. 158) indicates your selection. The lamp power in “pulse” mode corresponds to the power in “standard” mode.

“Soft start” mode

You select the mode by pressing the function key. The yellow display ➁ (Fig. 158) indicates your selection. The “soft start” mode (gradual polymerization as with a halogen lamp) offers:

- A “soft start” in 10 seconds from 0 to 1100 mW/cm² using the standard light guide with a diameter of 7.5 mm or from 0 to 2000 mW/cm² using the booster light guide (optional) with a diameter of 5.5 mm
- Full power during the next 10 seconds
Handling

Once the mode has been selected, the lamp is ready for operation.

- Position the light guide as close as possible to the composite material surface to be photo-polymerized.

**Important!**

The light guide must not touch the material to be hardened as this could damage it and reduce its effect.

- Briefly press the start button to begin the polymerization cycle.
  This is confirmed by a beep.
- The end of the cycle is also indicated by a beep. However, you can interrupt the cycle at any time by pressing the on/off button lightly.
- If the unit is not used for 3 minutes, the lamp will switch to "standby" mode and all displays will disappear. The lamp is switched back on by pressing any button.

Maintenance

- Clean and sterilize the light guide prior to every application on a patient.
- Each time you have used it, check whether any residues of composite material are stuck to the light guide. If this is the case, remove the residues immediately and make sure that the surface of the insert has not been damaged. If you find any damage, replace the light guide because the lamp power will be reduced by more than 30%.

**Important!**

The workplace equipment must be switched off while maintenance work is performed on the handpiece and light guide.

**Caution!**

Do not use any abrasives.
Cleaning

- Wipe all parts using a soft cloth which has been moistened with an alcohol solution or a common surface disinfectant.

**Important!**

Make sure that no liquid gets into the handpiece.

- If there is any hardened composite material on the light guide, immediately remove it carefully using a plastic instrument to avoid scratching the polished surface.

Disinfection

Disinfect the exterior of the handpiece using a chemical disinfectant (either for spraying or wiping).

**Important!**

Make sure that no liquid gets into the handpiece.

**Important!**

Do not place the handpiece in a solvent or disinfectant.

Sterilization

**Important!**

The handpiece cannot be sterilized! Only the light guide can be sterilized – and this must be done in the autoclave.

Remove the light guide from the handpiece:

- Carefully pull the light guide out of the handpiece, holding the metal socket.
- Place it in a cloth or – if available – a sterilizable bag.
- Remove the light guide from the autoclave following sterilization and dry it.
- Remove all traces of residues at both ends of the light guide.
- Put the light guide back in the handpiece.

**Important!**

It is vital that the light guide meets the following sterilization conditions:

- **Unit:** Autoclave, class B
- **Sterilization:** 135°C and 2.1 bar with a minimum dwell time of 3 minutes
Fittings

Surgical motor INTRA SL550

The sterilizable no-commutator motor (SL550) is an additional micro motor for surgical applications. It has no internal spray. The drill site can only be cooled using the steripump (where one is available).

The hose end of the surgical motor nearest to the device is fitted with a quick coupling, which can be attached to the side or bottom of the unit body (depending on the fittings).

This pluggable, non-fixed assembly allows the micro motor to be used on several workplaces.

The motor and handpiece hose can be sterilized in the autoclave at 135°C and 2.1 bar with a minimum dwell time of 3 minutes.

Activating the surgical motor

- Make sure that the quick coupling of the motor hose is attached to the unit body.

- Place the motor in the holder provided at the front of the unit (standard) or – if necessary – in the additional holder at the side. Only then will this holder, which is normally blocked, be activated.

Connecting attachment instruments

Attachment:

- Place the instrument on the surgery motor and, pressing it gently, turn it until you hear the catch snap into place.

Removal:

- Remove the instrument from the motor, turning it slightly in the direction of the axis.

Important!

Never attach or remove the instruments while the drive/motor is still rotating.

- If the instrument is to be supplied with a coolant using the steripump, the coolant hose leaving the hose at the end nearest the unit must first be connected to the steripump’s coolant hose, with the aid of the enclosed nipple. Then establish the coolant hose connection from the intermediate section to the connected instrument. Insert the hose into the retaining ring.
Startup

- Remove the motor from the tray on the unit ready for operation.

**Important!**

If the motor is taken out of the holder – for instance in order to sterilize it – the holder must immediately be fitted with a second motor or the blind plug (holder cover). Otherwise the other equipment cannot be operated – because of the priority circuit.

If neither is available, you can block the holder function by not taking the surgical motor out of the holder until you have taken another drive out of the holder.

- Start the motor by pressing the relevant foot control (pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7).

Adjusting the speed

The speed can be continuously adjusted in the range from 300 to 40,000 rpm using the relevant foot control.

If the foot control is operated in the non-adjustable ON/OFF mode, the symbol for the foot control (Fig. 159) appears at full strength. You change over by tapping this foot control symbol. The motor then always runs at the pre-selected speed shown in the central section of the display ➀ (Fig. 160), regardless of the position of the pedal.

Speed pre-selection

By pressing the ➀ and ➁ (Fig. 160) symbols, or the holder displays ➂ below them, you can set the speed or the speed range that can be used in steps of 500. As soon as you press one of these symbols, the “+” and “−” symbols ➃ appear and the numeric display appears in the black field. You can adjust the value displayed by pressing the “+/-” symbols (gradually by tapping the “+/-” symbols or rapidly by pressing them for longer). The “+/-” symbols disappear when you press ➀, ➁ or ➂ again. The value that is set is automatically saved for the specific user. The setting is therefore also retained after the instrument is put back into the holder and taken out again.

The speed is shown on the display ➀ (Fig. 160). In the case of an adjustable foot control, the maximum selectable speed is displayed. The speed that is currently set is indicated by the bar on the display ➁ (Fig. 160).

The speed and intensity can be pre-selected in steps of 5000 using the foot control.
Fittings

Speed pre-selection using foot control F7

The speed is pre-selected by pressing the slide switch ② (Fig. 161).

- Holding the slide switch pressed away from the dentist (> 1 sec.):
  The pre-selected speed is increased incrementally in steps of 5000 by pressing it for longer (more than one second).

- Holding the slide switch pressed towards the dentist (> 1 sec.):
  The pre-selected speed is reduced incrementally in steps of 5000 by pressing it for longer (more than one second).

The current value is shown in the central section of the display ➀ (Fig. 162).

**Important!**

The value pre-selected in this way using the foot control is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually.

However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.

Speed pre-selection using foot control F9/F10

The speed is pre-selected using the left-hand ③ and right-hand ➂ buttons on the foot control (Fig. 163).

- Keeping the left-hand button ③ (Fig. 163) pressed (> 1 sec.):
  The pre-selected speed is reduced incrementally in steps of 5000 by pressing it for longer (more than one second).

- Keeping the right-hand button ➂ (Fig. 163) pressed (> 1 sec.):
  The pre-selected speed/intensity is increased incrementally in steps of 5000 by pressing it for longer (more than one second).

The current value is shown on the display ➀ (Fig. 162).

**Important!**

The value pre-selected in this way using the foot control is not saved for a specific user. This means that, when you place the instrument in the holder, the unit automatically switches to the user-specific value set manually.

However, if any other value is changed via the display before the instrument is replaced in the holder, all values shown on the display – including those changed using the foot control – are saved for the specific user.
Changing the direction of rotation
The rotation direction (clockwise/anticlockwise rotation) of the motor can be changed as required. The direction of rotation is changed by tapping the anticlockwise/clockwise rotation display (Fig. 164) or using the appropriate button on the foot control.

The symbol lights up at full strength during anticlockwise rotation operation (Fig. 164).

**Important!**
The rotation direction can only be changed over when the motor is at rest.

Changing the direction of rotation using foot control F7
The direction of rotation is changed by pressing the slide switch ① (Fig. 165).

- Tapping the slide switch briefly towards the dentist (< 1 sec.): Switches the rotation direction between clockwise and anticlockwise.

Changing the direction of rotation using foot control F9/F10
The direction of rotation is changed using the left-hand button ① (Fig. 166) on the foot control.

- Briefly tapping the button (< 1 sec.): Switches the rotation direction between clockwise and anticlockwise.

Setting the torque
Pressing the "Ncm" symbol ① (Fig. 167) for >1 sec. displays the usual plus and minus keys ② (Fig. 167).

**Important!**
Pressing the symbol only briefly (<1 sec.) returns you to preparation mode.

The torque setting is adjusted by pressing the plus and minus keys. The selected value is shown on the display ① (Fig. 167). On the highest possible setting, the symbol "MAX" appears on the display instead of a number.
Fittings

Coolant supply

Activating the steripump

- Locate the handpiece that is connected to the steripump via the coolant hose and take it out of the holder.
- Press the steripump symbol (Fig. 168) for about half a second. The steripump display “Ster” will then light up fully and the normal spray display “H2O” will be grayed out. This means that the unit has switched from normal spray operation to steripump operation.

When the steripump is connected, the word “Ster.” (Fig. 169) appears on the spray symbol (Fig. 169):

- Briefly tap the spray display (Fig. 169). The grayed-out spray display (Fig. 169) will then light up at full strength (Fig. 169).
  This means that the coolant has been connected to the instrument via the steripump.
- Now start the handpiece by pressing the relevant foot control (pressing the treadle in the case of control units F9 and F10 or pushing the swiveling lever to the right in the case of control unit F7).

The steripump will convey the medium as soon as the current instrument is started using the foot control.

**Important!**

After using the steripump, switch the spray back to normal operation – by pressing the steripump symbol (Fig. 168) – in order to prevent fluid escaping from the steripump. The H2O display must fully light up again.

**Caution!**

- Completely replace the infusion set after every treatment.
Setting the intensity (delivery speed)

The delivery speed can be pre-selected on the display.

- Press the steripump symbol ③ (Fig. 170) for about half a second. The symbol will then appear in the black field with an additional numerical intensity display ④ (Fig. 170) and the “+” and “−” symbols will light up fully.

- Press the “+” and “−” symbols ② (Fig. 168) to adjust the displayed value between 0 and 100 (gradually if you tap the “+/−” symbols, rapidly if you press them longer).

The value that is set is automatically saved for the specific user. The setting is therefore also retained after the instrument is put back into the holder and taken out again.

The “+/−” symbols disappear and the original steripump symbol ③ (Fig. 170) is displayed when you press ④ (Fig. 170) again.

- The flow can be adjusted using the regulating wheel on the infusion set.

Activating steripump cooling using foot control F7

You switch between dry and steripump operation by pressing the slide switch ② (Fig. 171).

- Tapping the slide switch briefly away from the dentist (< 1 sec.):
  Switches between dry and steripump operation.

Activating steripump cooling using foot control F9/F10

You switch between dry and steripump operation by tapping the right-hand button on the foot control.

- Briefly tapping the button ④ (Fig. 172) (< 1 sec.):
  Switches between dry and steripump operation.
Setting the light

The light can be switched on and off by tapping the light symbol ① (Fig. 173). When it is switched on, the symbol lights up at full strength. The light intensity is displayed numerically next to the symbol.

The light symbol ① appears in the black field if you press it briefly (for approximately half a second). The “+” and “−” symbols ② for setting the light intensity also light up (gradually if you tap the “+/−” symbols, rapidly if you press them for longer). The “+/-” symbols disappear when you press the light symbol again.

The light shines for around 15 seconds as soon as the motor is removed from the holder. It goes out if the motor is not put into operation during this time. The light is automatically switched on again when the equipment is started up.

It also continues to shine for around 15 seconds after the foot control pedal is released. It goes out immediately when the motor hose is put into the holder.
Cleaning the exterior

Clean the exterior of the motor carefully using an alcohol solution.

Disinfection

The exterior of the motor can be disinfected using a chemical disinfectant (wiping).
Use a disinfectant that is commonly used in dentistry.

**Important!**

Do not place the motor in a solvent or disinfectant.

Excess oil, cleaning agent, or disinfectant may penetrate the drive unit and have a detrimental effect on how it functions. You should therefore maintain all the instruments – and attachable adapters – only as described in the relevant instructions enclosed with the instruments.

Sterilization

Sterilize the motor and hose in the autoclave at up to 135°C and 2.1 bar (minimum dwell time: 3 minutes).

Important notes

During extended periods of non-use, the motor must be cleaned and maintained as instructed. It must be stored in a dry, heated place.

**Please note!**

Handpieces and elbows are not included in the scope of delivery. Observe the instructions for use from the relevant manufacturer here.
Fittings

Replacing the high-pressure lamp

To replace the high-pressure lamp, proceed as follows:

- Remove the coolant hose holder from the motor by pulling it towards you.
- Push the lamp out of the socket using a fingernail.

**Caution!**

The lamp may still be hot! You may be injured if you are not careful!

Reverse this procedure to insert the lamp:

- Place the new lamp in the recess in such a way that the contact areas correspond with those of the socket.
- Push the lamp into the socket.
- Reassemble the coolant hose holder.

Accessories

The following accessories can be supplied by specialized dental/medical dealers:

Sterilizable high-pressure lamp Order no. 1.002.2928
Additional external device

This function can be used to operate suitable additional external devices via the workstation’s foot control.

Proceed as follows:

- Place all handpieces in the holders.
- Then press the arrow symbol ③ (Fig. 174).
  The submenu (Fig. 175) appears on the display.
- Then press the relevant symbol, ① or ②, to change over the foot control to the external device concerned. When the device is connected, the symbol appears against a black background.
  ① Changeover to an external surgical motor.
  ② Changeover to an external air polishing unit or other suitable additional device.
- If the same symbol is pressed again, the black background disappears and the additional device is switched off.
- You return to the main menu by pressing the symbol ③ (Fig. 175).

**Important!**

Additional devices that are connected to our electronic medical equipment must demonstrably conform to the relevant IEC or ISO standards (e.g. IEC 60950 for data-processing devices). In addition, all configurations must meet the normative requirements for medical systems (see IEC 60601-1-1 or Section 16 of the 3rd edition of IEC 60601-1). Anyone who connects additional devices to our electronic medical devices is deemed to be the system configurer and is therefore responsible for ensuring that the system meets the normative requirements for medical systems. It should be noted that local legislation takes priority over the aforementioned normative requirements. If you have any queries, please contact your local specialist dealer or the manufacturer’s technical service department.
Aligning the “touch screen” display

Over the course of time or after the “touch screen” display has been replaced due to repair work, it is possible that the switching points on the display are no longer located in the center of the various symbols. The required functions are then not activated or are activated incorrectly when you press the symbols.

If this is the case, you need to re-align the “touch screen” display. To do so, proceed as follows:

- Press the arrow pointing to the right in the main menu. This takes you to the submenu.
- Press the tool symbol in the submenu. The “screen” symbol will then appear on the display.
- Press the “screen” symbol. The “touch-tuning” display (Fig. 176) needed for adjustment will then appear on the display.
- Use a blunt pencil (or pen) to tap precisely in the center of a setting marker until you hear a signal tone and a new value (letter or number) confirmed with an asterisk appears in the bottom line of the input field.
- Repeat this process for the other three setting markers.
- The display is then re-aligned and you can save the new values using the memory button . To do so, press the memory button (for more than 2 seconds) until you hear a signal tone.
- Pressing the arrow pointing right switches the display back to the main menu. The system is then ready for operation again.
Multimedia equipment

Tapping the vision symbol (Fig. 177) takes you to the menu for multimedia equipment, where you can access the following functions (Fig. 178):

➀ Camera
➁ PC
➂ Video
➃ White screen
➄ Standby
➅ Monitor settings

To operate the multimedia equipment, proceed as described in the separate multimedia instructions for use.
Fittings
Electrical appliances - disposal at the end of useful life

This product is subject to EC Directive 2002/96 on waste electrical and electronic equipment and, within the European Union, must be disposed of separately.
Prior to dismantling/disposal, the product must be fully prepared (cleaned, disinfected and sterilized).

Procedure for returning electrical appliances in Germany:

1. On enretec GmbH's website www.enretec.de you will find a disposal request form that you can either download or submit online.

2. Fill in this form with the relevant details and submit it as an online request or fax it to enretec GmbH on +49(0)3304 3919 590.
   Alternatively, if you wish to initiate a disposal request or have any questions, you can contact enretec as follows:
   - Phone: +49(0)3304 3919 500;
   - E-mail: pickup@eomRECYCLING.com or
   - Post: enretec GmbH, Geschäftsbereich eomRECYCLING, Kanalstraße 17, 16727 Velten.

3. Free-standing equipment will be collected from your practice and permanently installed equipment will be collected from the kerb outside your address at an agreed time. Dismantling, transport and packing costs will be covered by the owner/user of the equipment.

International (EU):

You can obtain country-specific disposal information from your dental stockist.
## Guidelines and manufacturer declaration

### Table 201 - Electromagnetic emissions

**Guidance and manufacturer's declaration – Electromagnetic emissions**

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

<table>
<thead>
<tr>
<th>Emission measurement</th>
<th>Conformity</th>
<th>Electromagnetic environment guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-emission according CISPR11</td>
<td>Group 1</td>
<td>The ULTRADENT unit use RF energy only for its internal function. Therefore HF emission is very low and not likely to cause any interference in nearby electronic equipment.</td>
</tr>
<tr>
<td>HF-emission according CISPR11</td>
<td>Class B</td>
<td>The ULTRADENT unit is intended for be used in all facilities including residential areas and in all facilities connected directly to a public power supply providing electricity to buildings used for residential purposes.</td>
</tr>
<tr>
<td>Harmonic emission according IEC 61000-3-2</td>
<td>Class A</td>
<td></td>
</tr>
<tr>
<td>Voltage fluctuations / Flicker according to IEC 61000-3-3</td>
<td>compliant</td>
<td></td>
</tr>
</tbody>
</table>
Annex

Table 202 - Resistance to electromagnetic interference

<table>
<thead>
<tr>
<th>Immunity interference tests</th>
<th>IEC60601-1-2 test level</th>
<th>Conformance level</th>
<th>Electromagnetic environment guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge (ESD) according to IEC 61000-4-2</td>
<td>± 6kV contact discharge</td>
<td>± 6kV contact discharge</td>
<td>Floors should be wood, concrete or ceramic tile. If the floor surface consists of synthetic material, the relative humidity must be at least 30%.</td>
</tr>
<tr>
<td></td>
<td>± 8kV air discharge</td>
<td>± 8 kV air discharge</td>
<td></td>
</tr>
<tr>
<td>Electrical fast transient/burst according to IEC 61000-4-4</td>
<td>± 1kV for input and output lines</td>
<td>± 1kV for input and output lines</td>
<td>The quality of the supply voltage should conform to the typical business or hospital environment.</td>
</tr>
<tr>
<td></td>
<td>± 2kV power lines</td>
<td>± 2kV power lines</td>
<td></td>
</tr>
<tr>
<td>Surge voltages according to IEC 61000-4-5</td>
<td>± 1kV push-pull voltage</td>
<td>± 1kV push-pull voltage</td>
<td>The quality of the supply voltage should conform to the typical business or hospital environment.</td>
</tr>
<tr>
<td></td>
<td>± 2kV push-pull voltage</td>
<td>± 2kV push-pull voltage</td>
<td></td>
</tr>
<tr>
<td>Voltage dips, short interruptions and variations of the power supply according to IEC 61000-4-11</td>
<td>&lt;5% UT for ½ period (&gt;95% dip of UT)</td>
<td>&lt;5% UT for ½ period (&gt;95% dip of UT)</td>
<td>The quality of the supply voltage should correspond to the typical business or hospital environment.</td>
</tr>
<tr>
<td></td>
<td>40% UT for 5 periods (60% dip of UT)</td>
<td>40% UT for 5 periods (60% dip of UT)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>70% UT for 25 periods (30% dip of UT)</td>
<td>70% UT for 25 periods (30% dip of UT)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;5% UT for 5sec. (&gt;95% dip of UT)</td>
<td>&lt;5% UT for 5sec. (&gt;95% dip of UT)</td>
<td></td>
</tr>
</tbody>
</table>

Magnetic field of power frequencies (50/60 Hz) according to IEC 61000-4-8

In cause of interferences it may be necessary to install the ULTRADENT unit with a bigger distance to the sources of power frequency magnetic fields or to install a magnetic shield.

The power frequency magnetic fields should correspond to the typical values found in the relevant business and hospital environment. The power frequency magnetic fields should be checked to ensure that it is inside the permitted values.

Remarks: UT is the AC supply voltage prior to application of the test level.
Table 204 - Resistance to electromagnetic interference

<table>
<thead>
<tr>
<th>Immunity interference tests</th>
<th>IEC60601-1-2 test level</th>
<th>Conformance level</th>
<th>Electromagnetic environment guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable and mobile radio equipment must not be used within the recommended working clearance from the ULTRADENT unit and its cables, which is calculated based on the equation suitable for the relevant transmission frequency.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Conducted HF interference</strong></td>
<td>IEC 61000-4-6</td>
<td>3V_{eff}</td>
<td>150kHz to 80MHz²</td>
</tr>
<tr>
<td><strong>Radiated HF interference</strong></td>
<td>IEC 61000-4-3</td>
<td>3V/m</td>
<td>80MHz to 2,5GHz²</td>
</tr>
<tr>
<td><strong>Recommended working clearance:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d = 1,2 \sqrt{P}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d = 1,2 \sqrt{P}</td>
<td>at 80MHz to 800MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d = 2,3 \sqrt{P}</td>
<td>at 800MHz to 2,5GHz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where P is the nominal transmitter output in watts (W) specified by the transmitter manufacturer and d is the recommended working clearance in meters (m).

The field strength of stationary radio transmitters is based on a local* investigation for all frequencies less than the conformance level* for all frequencies. Interference is possible in the vicinity of equipment bearing the following graphic symbol.

---

* The higher frequency range applies at 80MHz and 800MHz.

* The field strength of stationary transmitters such as the base stations of radio telephones and land mobile services, amateur radio stations as well as AM and FM radio and television broadcasting stations cannot be accurately predetermined. An investigation of the location is recommended to determine the electromagnetic environment resulting from stationary HF transmitters. If the field strength measured at the ULTRADENT unit location exceeds the conformance level specified above, the ULTRADENT unit must be observed with respect to its normal operation at each application site. If unusual performance characteristics are observed, it may be necessary to take additional measures such as reorientation or repositioning of the ULTRADENT unit.

* A frequency range of 150kHz to 80MHz results in a field strength of less than 3V/m.
Table 206 - Recommended safety distances

Recommended working clearances between portable and mobile HF communication devices and the ULTRADENT unit

The ULTRADENT unit is intended for operation in an electromagnetic environment, where radiated HF interference is checked. The customer or the user of the ULTRADENT unit can help prevent electromagnetic interference by duly observing the minimum distances between portable and/or mobile HF communication devices (transmitters) and the ULTRADENT unit. These values may vary according to the output power of the relevant communication device as specified above.

<table>
<thead>
<tr>
<th>Nominal transmitter output W</th>
<th>Working clearance according to transmission frequency m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150kHz to 80MHz</td>
</tr>
<tr>
<td></td>
<td>( d = 1,2\sqrt{P} )</td>
</tr>
<tr>
<td>0,01</td>
<td>0,12</td>
</tr>
<tr>
<td>0,1</td>
<td>0,38</td>
</tr>
<tr>
<td>1</td>
<td>1,2</td>
</tr>
<tr>
<td>10</td>
<td>3,8</td>
</tr>
<tr>
<td>100</td>
<td>12</td>
</tr>
</tbody>
</table>

For transmitters whose maximum nominal output is not specified in the above table, the recommended working clearance \( d \) in meters (m) can be determined using the equation in the corresponding column, where \( P \) is the maximum nominal output of the transmitter in watts (W) specified by the transmitter manufacturer.

**Annotation 1**
For calculating of the recommended separation distance for protection of transmitters in the frequency range 80 MHz to 2,5 GHz an additional factor of 10/3 has been used to decrease the plausibility that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas.

**Annotation 2**
These guidelines may not be applicable in all cases. The propagation of electromagnetic waves is influenced by their absorption and reflection by buildings, objects and persons.