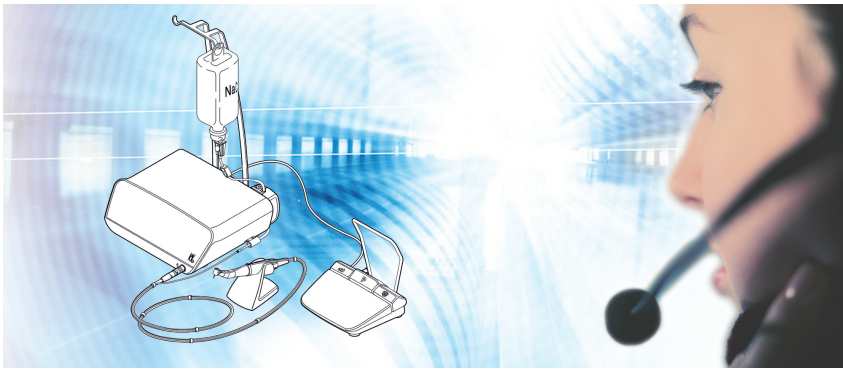
Instructions for use

EXPERTsurg LUX
REF 1.008.3500



Always be on the safe side.

KaVo. Dental Excellence.

Distributed by:

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CE 0124

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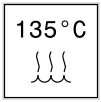
1 User instructions

1.1 User guide

1.1.1 Symbols

	Refer to the chapter on Safety/Warning symbol
	Important information for users and service technicians
	Thermodisinfectable
	Sterilisable up to 135 °C
	CE mark (European Community). A product bearing this mark meets the requirements of the pertinent EC directives, i.e. the standards applicable in Europe.

1.2 Target group

This document is for dentists and dental office staff.

1.3 Service

Direct questions regarding the product, service and maintenance to the following address.

Please indicate the product serial number in all requests.

Service hotline:

+49 7351 56-1500

Service.Instrumente@kavo.com

Additional information can be obtained at: www.kavo.com

1.3.1 Repair Service

KaVo offers a fixed-price service check for the original factory maintenance. You can use a loaner device for the time of the service check.

For scheduling or if you have any questions, please call:

KaVo Repair Service

+49 (0) 7351 56-4900

Service.Reparatur@kavo.com

KaVo Dental GmbH

Repairs

Bahnhofstr. 18

88447 Warthausen

1.4 Warranty terms and conditions

KaVo provides the final customer with a warranty that the product cited in the handover certificate will function properly and guarantees zero defects in the material or processing for a period of 12 months from data of purchase, subject to the following conditions:

Upon justified complaints of flaws or a short delivery, KaVo will make good its warranty by replacing the product free of cost or repairing it according to the customer's wishes. Other claims of any nature whatsoever, in particular with respect to compensation, are excluded. In the event of default and gross negligence or intent, this shall only apply in the absence of mandatory legal regulations to the contrary.

KaVo cannot be held liable for defects and their consequences due to natural wear, improper cleaning or maintenance, non-compliance with operating, maintenance or connection instructions, calcification or corrosion, contaminated air or water supplies or chemical or electrical factors deemed abnormal or impermissible in accordance with factory specifications.

The warranty does not usually cover bulbs, glassware, rubber parts and the colourfastness of plastics.

Defects or their consequences that can be attributed to interventions on or changes made to the product by the customer or a third party are excluded from the warranty.

Claims from this warranty can only be asserted when the transfer form (copy) belonging to the product has been sent to KaVo, and the original can be presented by the operator or user.

1.5 Transportation and storage

1.5.1 Currently valid packaging regulations

Note

Only valid for the Federal Republic of Germany.

Dispose of and recycle the sales packaging appropriately in accordance with current packaging regulations, employing waste management or recycling companies. Comply with the comprehensive return system. KaVo has had its sales packaging licensed for this purpose. Please comply with the regional public waste-disposal system.

1.5.2 Damage in transit

In Germany

If the packaging is visibly damaged on delivery, please proceed as follows:

1. The recipient of the package must record the loss or damage on the delivery receipt. The recipient and the representative of the shipping company must sign this delivery receipt.
2. Leave the product and packaging in the condition in which you received it.
3. Do not use the product.
4. Report the damage to the shipping company.
5. Report the damage to KaVo.
6. Consult with KaVo first, before returning a damaged product.
7. Send the signed delivery receipt to KaVo.

If the product is damaged but there was no discernable damage to the packaging upon delivery, proceed as follows:

1. Report the damage to the shipping company immediately and no later than 7 days after delivery.
2. Report the damage to KaVo.
3. Leave the product and packaging in the condition in which you received it.
4. Do not use a damaged product.

Note

Failure on the part of the recipient to comply with any of the above-mentioned obligations will mean that the damage will be considered to have arisen following delivery
(in accordance with the General German Freight Forwarders´ Terms and Condition
.

Outside Germany

Note

KaVo shall not be held liable for damage arising from transportation.
The shipment must be checked on arrival.

If the packaging is visibly damaged on delivery, please proceed as follows:

1. The recipient of the package must record the loss or damage on the delivery receipt. The recipient and the representative of the shipping company must sign this delivery receipt.
   Without this evidence, the recipient will not be able to assert a claim for damages against the shipping company.
2. Leave the product and packaging in the condition in which you received it.
3. Do not use the product.

If the product is damaged but there was no discernable damage to the packaging upon delivery, proceed as follows:

1. Report any damage to the shipping company either immediately or no later than 7 days after delivery.
2. Leave the product and packaging in the condition in which you received it.
3. Do not use a damaged product.

Note

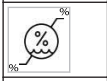
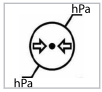
Failure on the part of the recipient to comply with any of the above-mentioned obligations will mean that the damage will be considered to have arisen following delivery (in accordance with CMR law, Chapter 5, Art. 30).

1.5.3 Information on the packaging: Storage and transportation

Note

Please keep the packaging in case you need to return the product for servicing or repair.

The symbols printed on the outside are for transportation and storage, and have the following meaning:

	Transport upright with the arrows pointing upwards!
	Fragile - protect against impact!
	Protect from moisture!
	Permissible stacking load
	Temperature range
	Humidity
	Air pressure

2 Safety

2.1 Description of safety instructions

2.1.1 Warning symbol

	Warning symbol

2.1.2 Structure

⚠ DANGER

The introduction describes the type and source of the hazard.

This section describes potential consequences of non-compliance.

- ▸ The optional step includes necessary measures for hazard prevention.

2.1.3 Description of hazard levels

Safety instructions distinguishing between three hazard levels are used in this document to prevent personal and property damage.

⚠ CAUTION

CAUTION

indicates a hazardous situation that can cause damage to property or mild to moderate injuries.

⚠ WARNING

WARNING

indicates a hazardous situation that can lead to serious or fatal injury.

⚠ DANGER

DANGER

indicates a maximal hazard due to a situation that can directly cause death or fatal injury.

2.2 Information on electromagnetic compatibility

Note

Based on IEC 60601-1-2 (DIN EN 60601-1-2) concerning the electromagnetic compatibility of electrical medical devices, we must draw your attention to the following points:

• Medical electrical devices are subject to special measures regarding electromagnetic compatibility and must be operated in accordance with the KaVo assembly instructions.

• High-frequency communications devices may interfere with electrical medical devices.

See also

Information about electromagnetic compatibility [⇨ 0]

Note

KaVo cannot guarantee the compliance of accessories, cables, and other components not supplied by KaVo with the EMC requirements of IEC 60601-1-2 (DIN EN 60601-1-2).

2.3 Disposal of electronic and electrical devices

Note

According to EC directive 2002/96 concerning used electrical and electronic devices, this product is subject to the cited directive and must be disposed of accordingly within Europe.

For more information, please visit www.kavo.com or contact your specialised dental supplier.

For final disposal, please contact:

In Germany

To return an electrical device, you need to proceed as follows:

1. On the homepage www.enretec.de of enretec GmbH, you can download a form for a disposal order under the menu item eom. Download the disposal order or complete it as an online order.
2. Enter the corresponding information to complete the order, and submit it as an online order or by fax (+49 (0)3304 3919 590) to enretec GmbH.
   The following contact options are also available for questions and for initiating a disposal order:
   Phone: +49 (0) 3304 3919-500
   Email: eom@enretec.de and
   Postal address: enretec GmbH, Geschäftsbereich eomRECYCLING®
   Kanalstraße 17
   D-16727 Velten
3. A unit that is not permanently installed will be picked up at the office.
   A permanently installed unit will be picked up at the curb at your address on the agreed date.
   The owner or user of the device will have to bear the cost of disassembly, transportation and packaging.

International

For country-specific information on disposal, contact your dental supplier.

2.4 Safety instructions

⚠ WARNING

Application of un-authorised accessories or un-authorised modifications of the product.

Accessories that have not been approved and/or inadmissible modifications of the product could lead to hazards and/or personal injury or material damage.

- Only use accessories that have been approved for the combination with the product by the manufacturer or are equipped with standardised interfaces (e. g. MULTIflex couplings, INTRAmatic).
- Do not make any modifications to the device unless these have been approved by the manufacturer of the product.

⚠ CAUTION

Electrical sparks in the product.

Explosion and/or fire.

- Do not use product in areas subject an explosion hazard.
- Do not operate the product in an oxygen-enriched atmosphere.

⚠ CAUTION

Damaged mains cable / missing protective conductor.

Electrical shock.

- Check the mains cable before use. The socket outlet must have a protective contact and meet the respective national guidelines.

⚠ CAUTION

Damage by liquids.

Faults on electric components.

- Protect openings of the product from any ingress of liquids.

⚠ CAUTION

Inadvertent penetration of liquids.

Electrical shock.

- Do not immerse the product in a tub-like container.
- Check and ensure the absence of leakage from the coolant containers and lines. If any liquid is detected on the device, do not touch the device and disconnect the device from the mains supply without delay. Make sure that the surface of the device is completely dry before plugging the main plug back in the socket.

⚠ CAUTION

Rotating parts while the pump is operating

Injury

- Do not stick anything in the pump. Turn off the device when the pump is open.

⚠ CAUTION

Risks from electromagnetic fields.

Electromagnetic fields might interfere with the functions of implanted systems (such as pacemakers).

- Ask patients whether they have a pacemaker or other systems implanted before commencing treatment!

⚠ CAUTION

Impact of power failure.

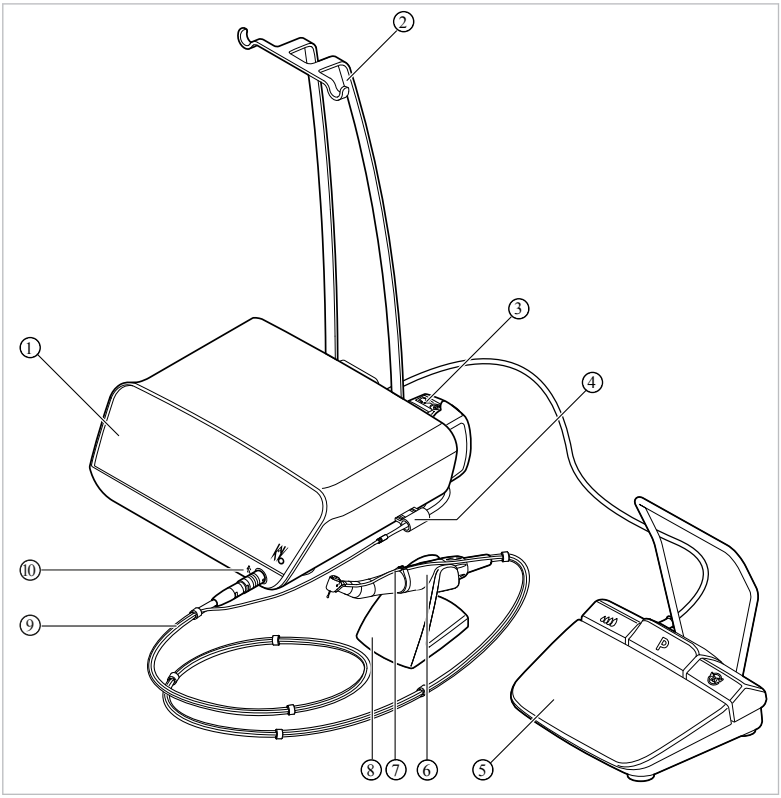
Failure of the voltage supply or other errors can cause the surgical motor to come to a standstill.

- Make sure that the power supply is working.

3 Product description

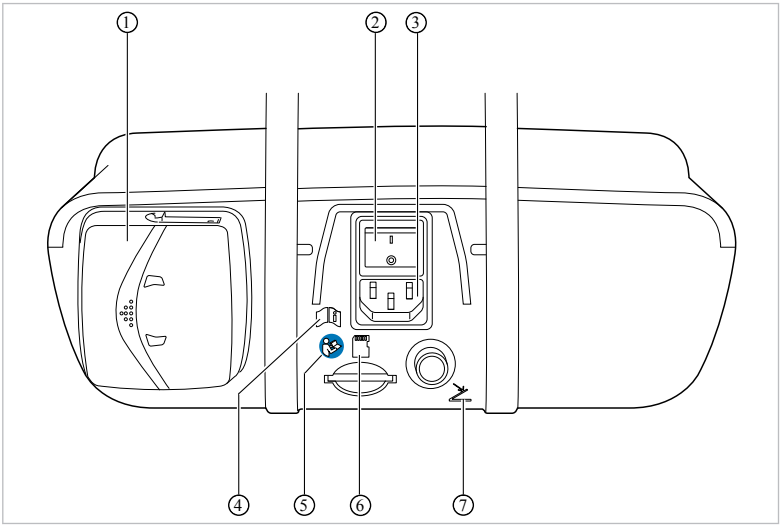
3.1

3.2 EXPERTsurg LUX



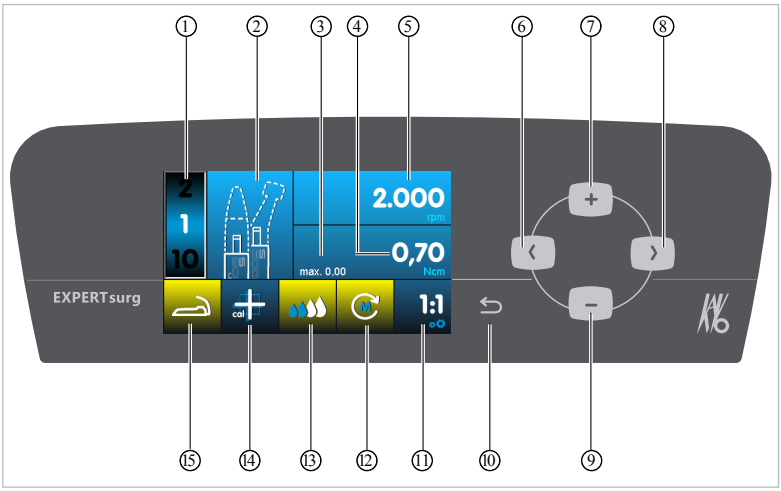
① Hand-held control panel
② Bottle holder
③ Hose pump
④ Hose fixation/hose recognition
⑤ Foot control
⑥ Surgical motor
⑦ Coolant hose
⑧ Handpiece tray
⑨ Motor cable
⑩ Symbol of type B application part

Rear



① Hose pump locking mechanism
② On-button
③ Power plug
④ Please note the instructions for use
⑤ Follow the instructions for use
⑥ SD card slot (for software update only)
⑦ Foot control electrical outlet

3.3 Controls



① Program step
② Display of the activity
③ Maximal torque reached
④ Torque limit
⑤ Speed
⑥ Left arrow key
⑦ Plus key, increase value
⑧ Right arrow key
⑨ Minus key, decrease value
⑩ Back key
⑪ Transmission ratio
⑫ Direction of motor rotation
⑬ Coolant pump settings
⑭ Activation of one-touch calibration
⑮ Foot control status indicator / service check requirement

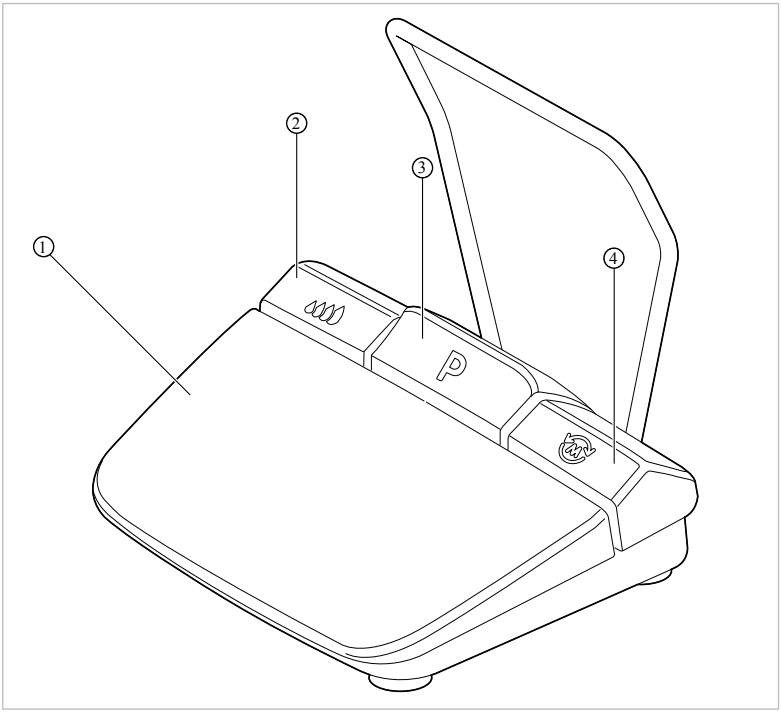
The back key has two functions. Pressing the back key briefly open the selection of program steps. Pressing the back key long opens the device settings.

Parameters can be selected using the arrow keys.

Use the plus key to increase the value.

Use the minus key to decrease the value.

3.4 Foot control

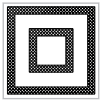


① Speed key
② Coolant key
③ Program button
④ Direction of motor rotation key

3.5 Rating plates of EXPERTsurg LUX and foot control

The rating plates of EXPERTsurg and foot control are affixed on the underside of the housing and include the following symbols:

CE 0124	CE mark
DVE	VDE mark
C SP US	CSA mark
	Classification, type B

	Please note the instructions for use
	Please note the electronic instructions for use
	Follow the instructions for use
	Operating mode: continuous operation with intermittent load
	Alternating current (AC)
	Supply voltage
	Protection class II
	Manufacturer
	YYYY = Year manufactured XXXXXXX = Serial number
	Material number
Type:	Device type
	For disposal information, see use in accordance with intended purpose
	GOST R certification
	HIBC Code

3.6 Technical Specifications of the EXPERTsurg LUX

Width	265 mm
Depth	255 mm
Height	100 mm
Weight	Approx. 1.9 kg
Weight of foot control	approx. 1.1 kg
Weight of motor	approx. 125 g
Input voltage	100 - 240 V ~
Input frequency	50/60 Hz
Speed	300 – 40,000 rpm
Max. speed on motor	5.5 Ncm
Pump delivery rate	30 – 110 ml/min
Foot control: Class of protection	IPX8
Foot control: cable length	2.5 m
Length of motor cable	6.5 ft (2 m)
Operating mode Continuous operation with intermittent load	30 sec. of operation/ 9 min. pause

Note

The maximal motor load is 30 seconds operating time / 9 minutes pause (full load at maximal speed).

Transportation and storage conditions

Ambient temperature	-20°C to +50°C
Relative humidity	5% to 95%
Air pressure	700 hPa to 1,060 hPa

Operating environment

⚠ WARNING

Inappropriate operating conditions.

Impairment of the electrical safety of the device.

- It is essential to comply with the operating conditions specified in the "Technical Specifications" chapter and not to exceed those conditions.

Ambient temperature	+10 to +35 °C
Relative humidity	15 to 80%
Air pressure	700 to 1,060 hPa
Max. elevation for operation	up to 3000 m

3.7 Scope of delivery

The scope of delivery of the EXPERTsurg LUX includes the following:

- EXPERTsurg LUX unit
- Foot control
- Surgical motor INTRA LUX S600 LED
- Motor cable S600
- Handpiece tray
- Hose set sterile S600 (5 units)

4 First use

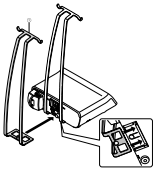
4.1 Unpacking

Note

You need to keep the cardboard box and all packaging materials to be able to safely ship the unit in the future.

- Open the cardboard box.
- Remove the hose boxes.
- Take out the foot control and additional equipment.
- To take out the unit pull it vertically upward and place it on a level surface.

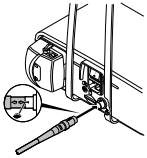
4.2 Installing the bottle holder



- Slide the bottle holder ① in the guide on the underside of the unit.

4.3

4.4 Plugging in the foot control



- Insert the plug of the foot control in the electrical outlet for the foot control. Make sure that the marker arrows on the plug and the socket are aligned towards each other.

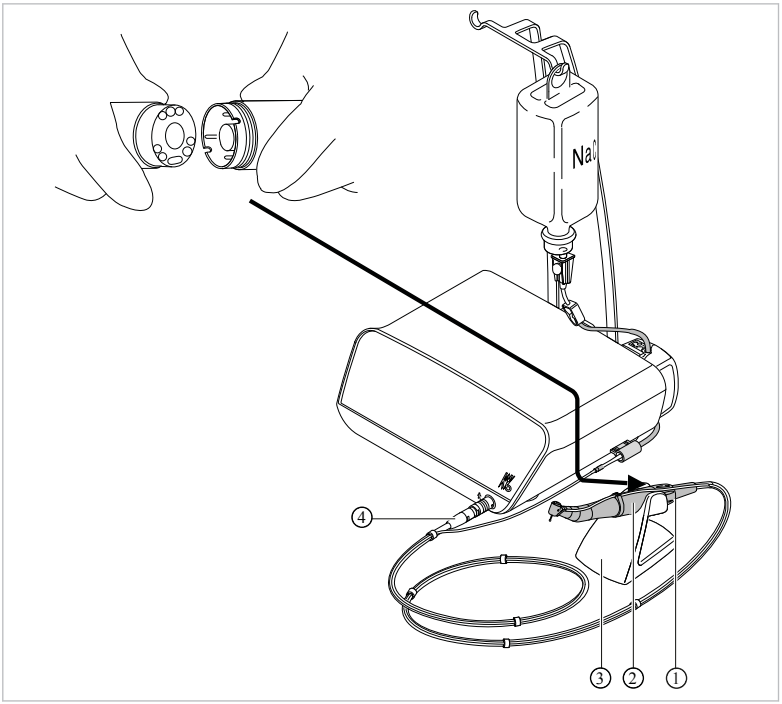
4.5 Connecting the surgical motor

Note

The parts as delivered are not sterile, except for the coolant hose! Before the first treatment of a patient, the surgical motor, motor cable, and the handpiece tray need to be sterilised.

See also

Sterilisation [⇨ 0]



① Motor coupling
② Surgical motor
③ Handpiece tray
④ Plug of motor cable

- Plug the surgical motor ② into the motor coupling ① and secure it with a union nut. Please note the separate instructions for use of the motor.
- Place the surgical motor on the handpiece tray ③.
- Insert the plug of the motor cable ④ into the connector on the device, align the marker points, and insert the plug until it snaps into place.

4.6 Connecting the coolant container and hose set

⚠ CAUTION

Running, open hose pump.

Injury hazard

- Turn off the device before opening the hose pump.

⚠ CAUTION

Danger of tipping due to the coolant containers being too heavy.

Malfunctions.

- Use coolant containers with a maximal volume of 1 litre only.
- Check the stability.

Note

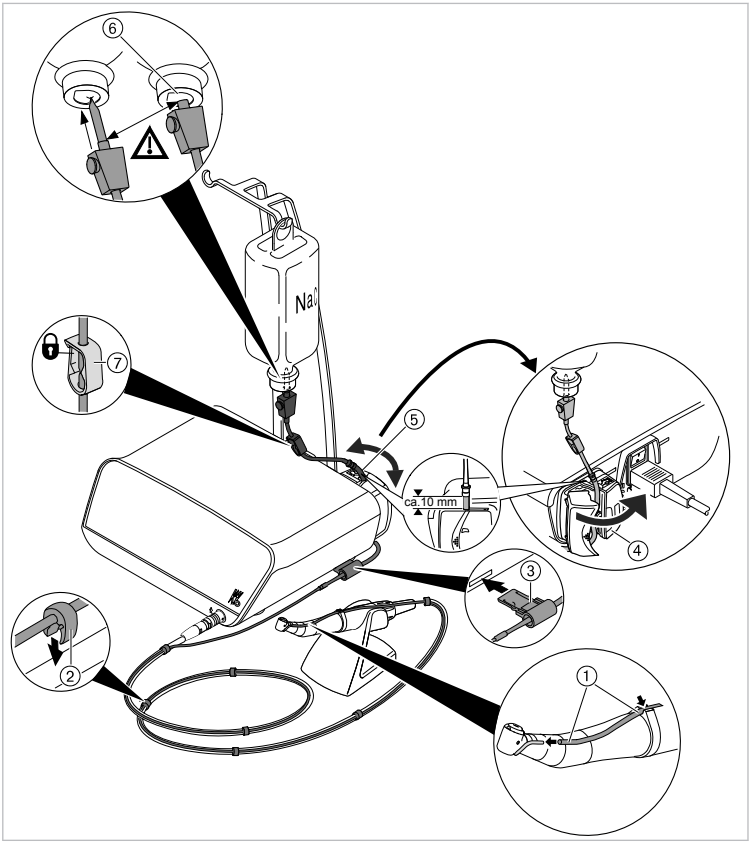
The coolant must be selected to suit the planned application.

Note

The hose set sterile S 600 (10 pcs.) (**10098757**) must be changed after each application.

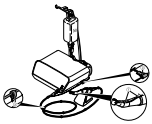
Note

Check the integrity of the hose set before use. If product or packaging are damaged, the product needs to be discarded.



① Coolant hose
② SR Point
③ Hose adaptor
④ Lock
⑤ Pump hose
⑥ Puncture needle
⑦ Hose clamp

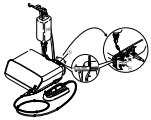
- Close the hose clamp ⑦ of the hose set.
- Attach the coolant hose ① to the straight or contra-angle handpiece.



- Place the coolant hose ① tightly, without loops or kinks, against the outside of the motor cable and attach it in regular intervals using the enclosed clips ⑦.
- Plug the hose adaptor ③ into the unit, until the hose adaptor ③ snaps into place.

Note

The unit recognises the hose adaptor. If the unit fails to recognise the hose adaptor or if it is not plugged in, the coolant supply symbol is shown with a yellow background.

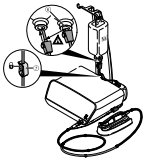


- Open the lock ④ and insert the pump hose ⑤.

- Close the lock ④.

Note

Make sure to place the pump hose in the pump appropriately such that the pump hose does not get clamped or pinched by the lock. Route all hoses relaxed and without tension.



- Stick the puncture needle ⑥ into the coolant container and hook-in the coolant container on the bottle holder.

- Check the sealing and firm seating of the puncture needle ⑥. Prevent fluid from leaking above the device.
- If you use a glass bottle, open the ventilation on the puncture needle ⑥.
- If you use a bag, keep the ventilation on the puncture needle ⑥ closed.
- Open the hose clamp ⑦ before start-up.

Note

Using a new hose, it may take up to approx. 10 seconds for the coolant to exit on the handpiece, depending on the feed rate. The pump does not have any back suction.

4.7 Electrical connection

⚠ CAUTION

Damaged mains cable / missing protective conductor.

Electrical shock.

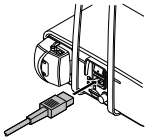
- Check the mains cable before use. The socket outlet must have a protective contact and meet the respective national guidelines.

Note

The unit must be set-up appropriately such that the mains plug and the electrical outlet are easily accessible.

Note

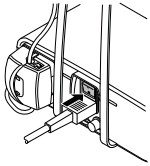
The protective earth conductor is used as functional earthing (FE) rather than as protective earthing (PE).



- Plug the mains cable first into the mains socket on the device and then the other end of the mains cable into the electrical outlet of the supply network.

5 Operation

5.1 Switching the device on



- Turn the device on.

Note

Unless the equipment is monitored, KaVo recommends turning it off for safety and energy-saving reasons.

5.2 Device settings

The following device settings can be made or displayed:

- Language
- LUX brightness
- LUX afterglow
- Foot control, operating mode
- Time of day
- Date
- Volume
- LCD brightness
- Acoustic signal - noise intensity
- Reset to factory defaults
- Version

- Press the back key long, until the device settings are shown.

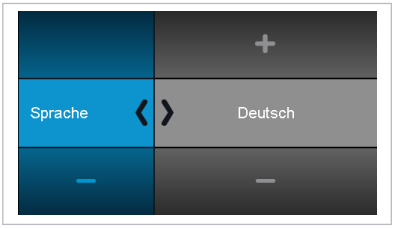
- Press the plus or minus keys to select the desired setting.

- Press the right arrow key to activate the selected setting.
- Press the plus and minus keys concurrently to change selected and activated settings.
- Press the left arrow key to return to the selection of device settings.

⇨ Changed values are stored automatically.

- Press the back key long in order to exit from the device settings.

5.2.1 Setting the language



- Press the right arrow key to activate the selected setting.

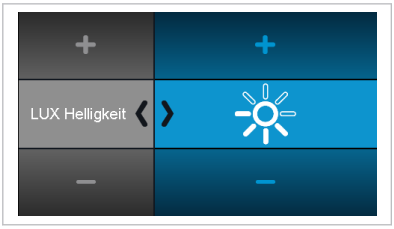
- Press the plus and minus keys concurrently to change the selected setting.

- Press the left arrow key or back key to return to the selection of device settings.

⇨ Changed values are stored automatically.

5.2.2 Setting the LUX brightness

The LUX brightness determines the brightness of the LEDs on the handpiece. The brightness can be set in 4 steps ranging from off to maximal brightness.



- Press the right arrow key to activate the selected setting.

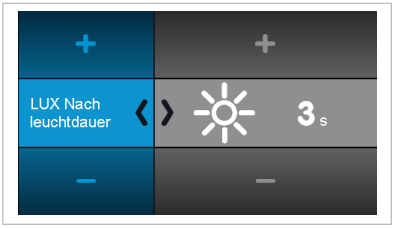
- Press the plus and minus keys concurrently to change the selected setting.

- Press the left arrow key or back key to return to the selection of device settings.

⇨ Changed values are stored automatically.

5.2.3 Setting the LUX afterglow time

The LUX afterglow time determines how long the handpiece LEDs afterglow after each motor stop. The afterglow time can be set from 0 to 10 seconds.



- Press the right arrow key to activate the selected setting.

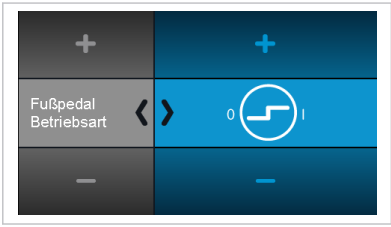
- Press the plus and minus keys concurrently to change the selected setting.

- Press the left arrow key or back key to return to the selection of device settings.

⇨ Changed values are stored automatically.

5.2.4 Setting the operating mode of the foot control

The motor can be triggered in either of two operating modes:



The motor starts at full speed when the foot control is actuated.

The motor speed can be set continuously up to the maximal level using the foot control.

- Press the right arrow key to activate the selected setting.

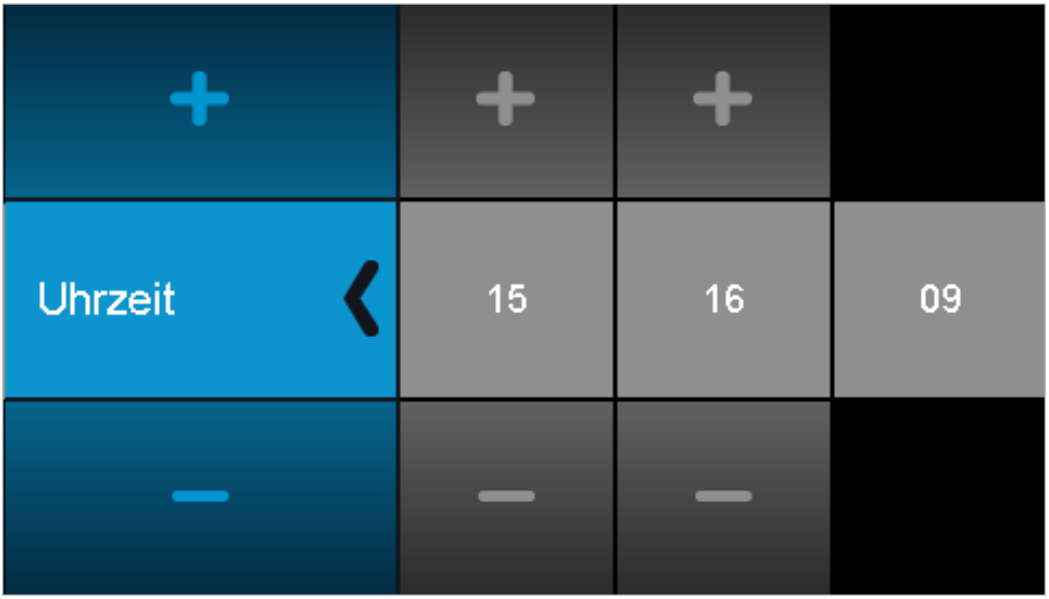
- Press the plus and minus keys concurrently to change the selected setting.

- Press the left arrow key or back key to return to the selection of device settings.

⇨ Changed values are stored automatically.

5.2.5 Setting the clock time

The time can be set in hours and minutes:



- Press the right arrow key to activate the selected setting.

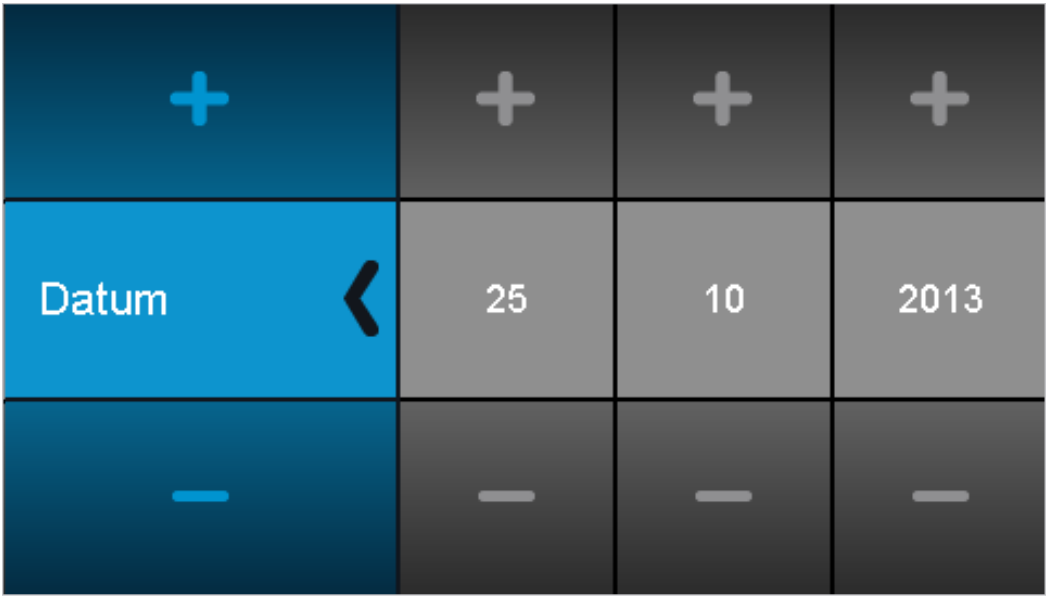
- Press the plus and minus keys concurrently to change the selected setting.

- Press the left arrow key or back key to return to the selection of device settings.

⇨ Changed values are stored automatically.

5.2.6 Setting the date

The date can be set in days, months and years:



- Press the right arrow key to activate the selected setting.

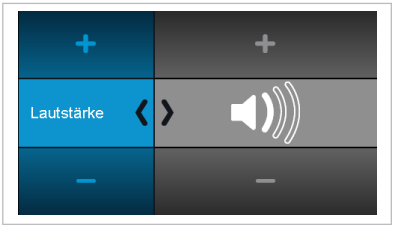
- Press the plus and minus keys concurrently to change the selected setting.

- Press the left arrow key or back key to return to the selection of device settings.

⇨ Changed values are stored automatically.

5.2.7 Setting the volume

The volume level determines the volume of signal sounds. The volume can be set in 3 steps ranging from quiet to maximal volume. The volume cannot be turned off for safety reasons.



- Press the right arrow key to activate the selected setting.

- Press the plus and minus keys concurrently to change the selected setting.

- Press the left arrow key or back key to return to the selection of device settings.

⇨ Changed values are stored automatically.

5.2.8 Setting the LCD brightness

The LCD brightness determines the brightness of the display. The brightness can be set in 3 steps ranging from dark to maximal brightness.

- Press the right arrow key to activate the selected setting.

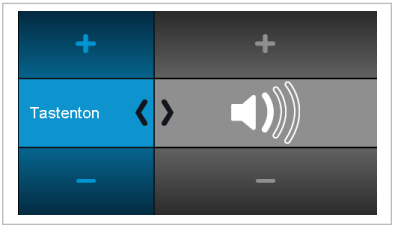
- Press the plus and minus keys concurrently to change the selected setting.

- Press the left arrow key or back key to return to the selection of device settings.

⇨ Changed values are stored automatically.

5.2.9 Acoustic signal / Setting the volume

The key sound determines the volume of the sound made when a key is pressed. The volume can be set in three steps or switched off.



- Press the right arrow key to activate the selected setting.

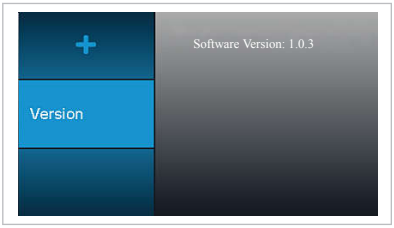
- Press the plus and minus keys concurrently to change the selected setting.

- Press the left arrow key or back key to return to the selection of device settings.

⇨ Changed values are stored automatically.

5.2.10

5.2.11 Version



Indicator of the software version

- Press the back key long in order to exit from the device settings.

5.3 Surgical Motor INTRA LUX S600 LED

Note

Following instructions for use, service instructions and installation instructions in the motor, handpiece and contra-angle handpiece packaging.

See also

Instructions for use INTRA LUX S600 LED [⇨ 0]

5.3.1 Attaching the straight or contra-angle handpiece

⚠ CAUTION

Damage from changing the handpiece and angle piece during operation.

Wear to the catch on the handpiece and angle piece and the motor.

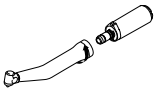
Unbalanced motor axis.

- ▸ Change the handpiece and angle piece only when the motor not running.

Note

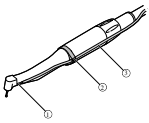
Following instructions for use, service instructions and installation instructions in the motor, handpiece and contra-angle handpiece packaging.

All straight and contra-angle handpieces with INTRAmatic connection ISO 3964 can be attached.



- ▸ Place the KaVo handpiece on the motor, lightly press it against the motor while turning it slightly in the direction of the arrow until the guide stud can be heard to lock into place.

- ▸ Pull on the KaVo handpiece to make sure that it is securely attached to the motor.



- ▸ Route the coolant hose ③ from the unit along the motor cable (clips) and connect it to the straight or contra-angle handpiece ①. Place the coolant hose ③ into the holding ring ② for this purpose.

5.3.2 Removing the straight or contra-angle handpiece

⚠ CAUTION

Damage from changing the handpiece and angle piece during operation.

Wear to the catch on the handpiece and angle piece and the motor.

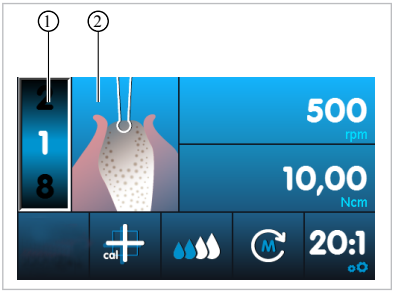
Unbalanced motor axis.

- ▸ Change the handpiece and angle piece only when the motor not running.

- ▸ Pull the coolant hose off the straight or contra-angle handpiece.
- ▸ Twist the straight or contra-angle handpiece slightly to pull it off.

5.4 Setting and executing program steps

The EXPERTsurg LUX is based on program steps and assigned activities and can be used intuitively via the graphic user guide.



Program step 1: Marking

The current program step is shown as a digit ① and the corresponding activity as a symbol ② on the display. Any activity can be assigned to every program step by selecting the corresponding symbol.

By means of the visualisation of the activity, you can easily verify whether the activity set on the equipment is compliant with the current treatment step to be carried out. This will eliminate operating errors as far as possible.

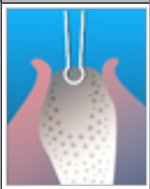
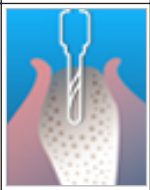
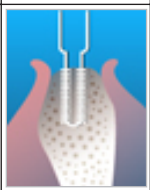
Default values have been set in the factory for the parameters speeds, torques, transmission ratios and coolant flow rate for every activity according to application. The parameters can only be changed within a range that is reasonable for the activity. All available values can be adjusted in the activity "Free application". The value ranges and default factory settings are listed in the following table.

A treatment sequence can consist of 4 to 10 program steps or activities. The treatment sequence can be individually designed by arrangement of the activities exactly as required. Navigation is via foot control within the sequence, meaning that the equipment need not be touched during the intervention.

Changed values are saved automatically and are then available for the next use.

5.4.1 Factory settings

The following program steps are pre-set at the factory:

Program step	Symbol	Activity	Speed [rpm]	Torque [Ncm]	Transmission ratio	Coolant flow
1		Marking	200 – 2000 500 (D)	5 – 20 10 (D)	27:1 20:1 (D)	0 – 4 2 (D)
2		Pilot drilling	200 – 2000 500 (D)	5 – 20 10 (D)	27:1 20:1 (D)	0 – 4 2 (D)
3		Template drilling	200 – 2000 500 (D)	5 – 20 10 (D)	27:1 20:1 (D)	0 – 4 2 (D)
4		Thread cutting	15 – 50 20 (D)	5 – 80 25 (D)	27:1 20:1 (D)	0 – 4 2 (D)
5		Placing implant	15 – 50 20 (D)	5 – 80 25 (D)	27:1 20:1 (D)	0 – 4 0 (D)
6		Setting closure cap	15 – 50 20 (D)	5 – 15 8 (D)	27:1 20:1 (D)	0 – 4 0 (D)
7		Free use	300 – 40,000 40,000 (D)	0.15 – 5.5 3 (D)	1:1	0 – 4 2 (D)
			10,000 – 200,000	0.05 – 0.6	1:5	
			15 – 2000	5 – 80	20:1	
			15 – 1200	5 – 80	27:1	

Program step	Symbol	Activity	Speed [rpm]	Torque [Ncm]	Transmission ratio	Coolant flow
8		Treatment completed (can be set from program step 4)	–	–	–	–

(D) = factory setting (default setup)

Note

The listed indications are only examples. In order to prevent risks, it is essential to comply with the manufacturer recommendations concerning implants, handpieces, and tools.

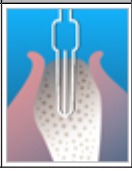
5.4.2 Examples of program set sequences

Example 1: Default (factory setting)

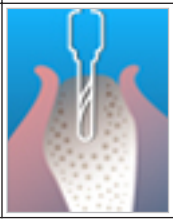
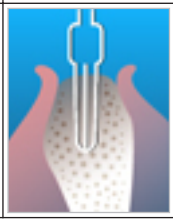
Step	1	2	3	4	5	6	7	8
Activity	Marking	Pilot drilling	Template drilling	Thread cutting	Placing implant	Setting closure cap	Free use	Treatment completed (can be set from program step 4)
Symbol								

Example 2: Program steps without activity "Thread cutting"

Step	1	2	3	4	5	6	7
Activity	Marking	Pilot drilling	Template drilling	Placing implant	Setting closure cap	Free use	Treatment completed (can be set from program step 4)

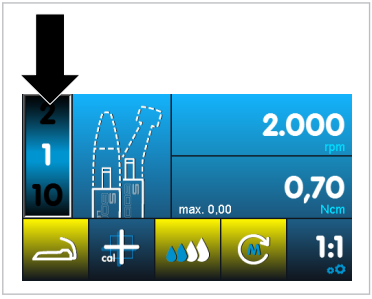
Step	1	2	3	4	5	6	7
Symbol							

Example 3: Activity "Free application" as step 1, screw in implant manually

Step	1	2	3	4	5
Activity	Free use	Marking	Pilot drilling	Template drilling	Treatment completed (can be set from program step 4)
Symbol					

5.4.3 Selecting the program steps

- Press the arrow keys until the program step display is highlighted.



- Press the plus and minus keys to select the desired program step.
- ⇨ The program step is saved automatically.

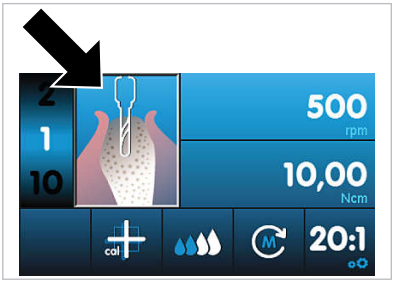
The program steps can be selected during the treatment using the program key of the foot control. The final program step is followed by the first once again. Press the program key long to select the previous program step.

See also

Foot control [⇨ 0]

5.4.4 Selecting activities

- Press the arrow keys until the activities display is highlighted.

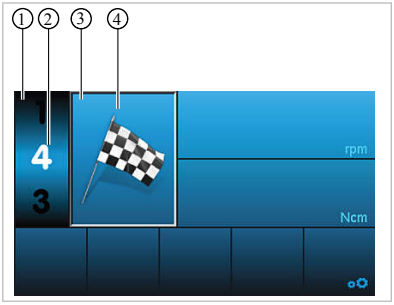


- Press the plus or minus keys to select the desired activity.

⇨ The activity is saved automatically.

5.4.5 Limiting the program steps

The number of program steps can be limited. Program steps that are not needed are deleted from the display.



- Press the arrow keys until the program step display ① is highlighted.

- Press the plus and minus keys to select the program step ② that terminates the treatment (can be set from program step 4).

- Press the arrow keys until the activities display ③ is shown.

- Press the plus and minus keys until the flag symbol ④ is displayed.
- ⇨ The settings are saved automatically and the treatment is terminated with the selected program step.
- ⇨ The step with the flag symbol is skipped on navigation through the program steps via foot control.

Undo the limitation of program steps

- Select program step with flag symbol and assign new activity.

5.5 Changing default values

The default values set at the factory can be changed within a given range. If the selected activity is free use, the values can be set freely.

See also

Factory settings [⇨ 0]

The following values can be changed:

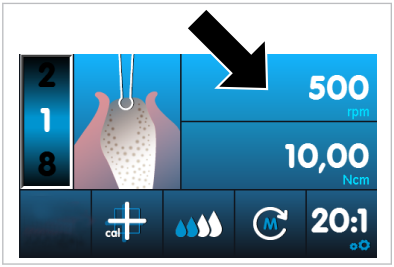
- Maximal speed
- Torque limit
- Coolant flow
- Direction of motor rotation
- Transmission ratio

- Press the arrow keys to select the desired value.
- ⇨ The selected value is shown highlighted.

- Press the plus and minus keys to set the desired value. The step width depends on the transmission ratio and the range of values.
- ⇨ The value is saved automatically.

5.5.1 Setting the maximum speed

- Press the arrow keys until the speed display is highlighted.



- Press the plus and minus keys to set the maximal speed. The step width depends on the corresponding transmission ratio setting.

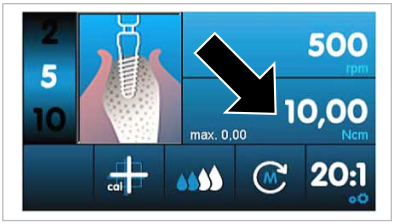
⇨ The value is saved automatically.

5.5.2 Setting the torque limit

Note

The EXPERTsurg LUX reduces the power to prevent the maximal torque setting from being exceeded. This may lead to the motor coming to a standstill if the rotating handpiece is blocked.

- Press the arrow keys until the torque display is highlighted.



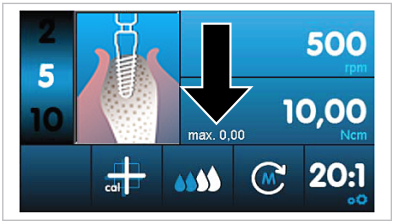
Note

With the KaVo SURGmatic S201 contra-angle handpieces, the torque values can deviate by max. ± 10 %. Greater deviations are possible with other contra-angle handpieces.

- Press the plus and minus keys to set the desired value. The step width depends on the transmission ratio and the range of values.

⇨ The value is saved automatically.

The maximum torque value reached is displayed during the treatment in the activities "Cut thread", "Fit implant" and "Fit sealing cap". The value is re-set as soon as the motor starts again.



5.5.3 Setting the coolant flow

⚠ CAUTION

Coolant dosed incorrectly.

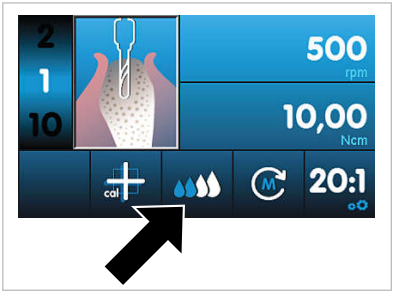
Tissue damage.

- ▸ Please note the instructions for use of the attachment tool.
- ▸ Set the coolant flow sufficiently high.

The coolant flow can be set to 4 levels or switched off:

- Off
- Level 1 = 32 ml/min
- Level 2 = 50 ml/min
- Level 3 = 76 ml/min
- Level 4 = 110 ml/min

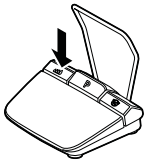
▸ Press the arrow keys until the coolant display is highlighted.



▸ Press the plus and minus keys to set the desired value. The step width depends on the transmission ratio and the range of values.

⇨ The value is saved automatically.

The coolant flow can be set during the treatment using the coolant key of the foot control. The changed value is shown on the display and is then available for the next use.

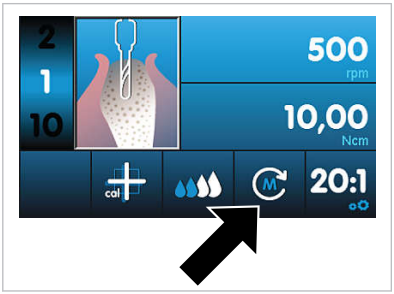


See also

Foot control [⇨ 0]

5.5.4 Changing the direction of motor rotation

- Press the arrow keys until the display of the direction of motor rotation is highlighted.



- Press the plus and minus keys concurrently to change the direction of motor rotation.

The direction of motor rotation can be changed during the treatment using the direction of motor rotation key of the foot control. The changed direction of motor rotation is shown on the display. For safety reason, running in counterclockwise direction is not saved.

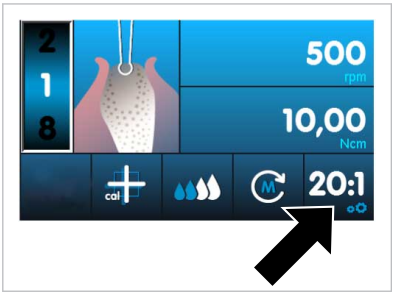
See also

Foot control [⇨ 0]

3 acoustic signals indicate counterclockwise rotation. When the motor is started, 3 more acoustic signals are transmitted.

5.5.5 Setting the transmission ratio

- Press the arrow keys until the transmission ratio display is highlighted.



- Press the plus and minus keys to set the desired value. The step width depends on the transmission ratio and the range of values.
- ⇨ The value is saved automatically.

See also

Factory settings [⇨ 0]

5.5.6 Activating the one-touch calibration

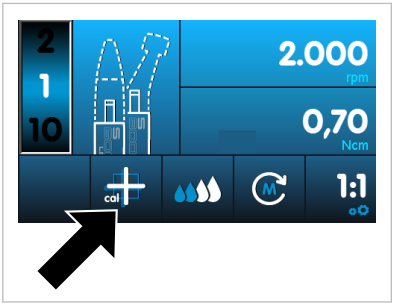
The One-Touch calibration compensates the torque deviations of the motor automatically which could be caused by aging processes, for example. Sluggish or defective instruments are detected when they are attached. The One-Touch calibration ensures that the torque on the contra-angle handpiece is accurate.

Note

One-touch calibration should be carried out only with KaVo surgical handpieces with a transmission ratio of 27:1 or 20:1.

The one-touch calibration cannot be carried out with third-party handpieces or handpieces with different transmission ratios.

- Press the arrow keys until the one-touch calibration is highlighted.



- Press the plus or minus keys to start the one-touch calibration.

⇨ The display shows "Press foot control".

⚠ CAUTION

The motor starts at full speed.

Risk of injury.

- Hold the motor firmly or put it in a safe holder during the calibration.

- Press the foot control and hold it down until the display shows that the calibration has been measured to be successful "Measurement done".
- If you release the foot control before the display shows that the calibration was successful, press the foot control again until the display shows that the calibration was successful.
- Press the back key to terminate the calibration and to return to the selection of device settings.

If an unsuitable or defective handpiece was used in the calibration, the calibration is discontinued and the error message, "Measurement failed undefined error", is shown.

- Press the back key to terminate the failed calibration.

See also

Troubleshooting [⇨ 55]

5.6 Foot control

5.6.1 Changing the speed, coolant flow, and direction of motor rotation

- Press the speed key with your foot to start the motor and increase the speed.

- Press the coolant key of the foot control to set the coolant flow.

- Press the direction of motor rotation key of the foot control to set the direction of motor rotation.

5.6.2 Selecting the program steps

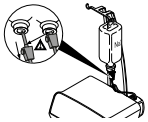
Program steps can be selected during the treatment using the program key of the foot control.

- Program button of the foot control
  Briefly
  press to select the next program step.

- Program button of the foot control
  Press
  for a longer period to select the previous program step.

5.7 Changing the coolant container

The coolant container can be changed as follows:



- Pull the hose and puncture needle out of the empty coolant container.

- Replace the empty coolant container by a full coolant container.

See also

Connecting the coolant container and hose set [⇨ 0]

6 Disposal

Note

The coolant hose with accessories needs to be exchanged and discarded after each treatment.

- Close the hose clamp ①.
- Pull the puncture needle ② out of the coolant container.
- Open the lock ③ and remove the hose.

- Remove the hose set from the unit and discard it.

7 Reprocessing steps in accordance with DIN EN ISO 17664

Note

The reprocessing methods for surgical motors with motor cables and straight and contra-angle handpieces are described in the corresponding IfU.

Note

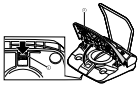
The instructions for cleaning and sterilisation have been validated by the manufacturer. Any deviation from the instructions provided should be checked by the user for efficacy and possible detrimental consequences.

7.1 Cleaning

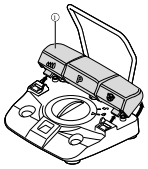
7.1.1 Manual cleaning

- Use a soft disposable cloth to wipe down all visible surfaces of the unit, bottle holder, foot control surfaces, and connecting cables.

Cleaning the foot control

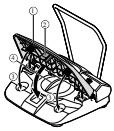


- On the underside of the foot control, press down the snap-in lug ① of the speed button ② and take the speed button ② off the foot control.



- Pull the button bar ① including the coolant button, program button, and motor direction button slightly upwards and take it off the foot control.

- Clean the individual parts of the foot control under running water and then dry them.
- Plug the button bar ① onto the foot control ② and press it on lightly until the button bar ① snaps into place ③.



- Plug the speed button ① onto the foot control and press it on lightly until the snap-in lug ② snaps in. Make sure that the pedal springs are situated in the recesses of the housing ③.

Note

The lid ④ needs to stay closed while the foot control is being cleaned.

7.1.2 Machine cleaning

⚠ CAUTION

Damage by liquids.

Faults on electric components.

- Do not subject the EXPERTsurg LUX unit to machine-based cleaning.

The following parts of the unit are released for machine-based cleaning:

- Handpiece tray
- Motor and motor cable

Note

Please comply with the corresponding Instructions for use when you re-process the motor and motor cable.

The re-processing steps for the handpiece tray are as follows:

KaVo recommends thermodisinfectors in accordance with EN ISO 15883-1, which are operated with alkaline cleaning agents with a pH value of max. 10 (e.g. Miele G 7781/G 7881 – Validation was carried out with Programme "VARIO-TD", cleaning agent "neodisher® mediclean", neutralisation agent "neodisher® Z" and rinsing agent "neodisher® mielclear" and only applies to the material compatibility with KaVo products).

- For program settings as well as cleansers and disinfectants to be used, please refer to the Instructions for Use of the thermodisinfector (complying with max. pH value of 10).

7.2 Disinfection

Note

After each treatment of a patient, the surfaces near the patient that may have been contaminated by contact or aerosol need to be disinfected. All disinfection measures need to be carried out by wipe disinfection.

7.2.1 Manual disinfection

- Use a soft disposable cloth and an approved disinfectant for disinfection by wiping down all visible surfaces of the unit, bottle holder, foot control surfaces, and connecting cables. Make sure that all surfaces are wetted.
- Let the disinfectant act for the prescribed time.
- Dry the surfaces.

Permissible disinfectants (the uses correspond to the existing manufacturer's instructions and national guidelines. Please note material safety data sheets.) KaVo recommends the following products based on the compatibility of the materials. The microbiological efficacy must be ensured by the disinfectant manufacturer.

- CaviCide made by Metrex

7.2.2 Automated disinfection

The following parts of the unit are released for machine-based disinfection:

- Handpiece tray
- Motor and motor cable

Note

Please comply with the corresponding Instructions for use when you re-process the motor and motor cable.

The re-processing steps for the handpiece tray are as follows:

KaVo recommends thermodisinfectors in accordance with EN ISO 15883-1, which are operated with alkaline cleaning agents with a pH value of max. 10 (e.g. Miele G 7781/G 7881 – Validation was carried out with Programme "VARIO-TD", cleaning agent "neodisher® mediclean", neutralisation agent "neodisher® Z" and rinsing agent "neodisher® mielclear" and only applies to the material compatibility with KaVo products).

- For program settings as well as cleansers and disinfectants to be used, please refer to the Instructions for Use of the thermodisinfector (complying with max. pH value of 10).

7.2.3 Drying

Note

Coolant hose with accessories is intended for single use only and is not to be disinfected and sterilised. No drying required.

- Allow all disinfected and and sterilised parts to dry fully on room air before using them again.

Automatic Drying

The drying procedure is usually part of the cleaning program of the thermodisinfector.

- Follow the instructions for use of the thermodisinfector.

7.2.4 Service, inspection and testing after preparation

Note

It is essential to comply with the hygiene requirements (sterility) during the test after reprocessing. If sites of fracture and clear changes of the surface are visible, the parts need to be checked by the Service.

Check for cleanliness, intactness, servicing, and repair as described in the following:

- Check the adjustment function of the unit and the motor function.
- Check the hose pump for sufficient coolant flow.
- Check the control commands on the foot control.

7.3 Packaging

Note

The quality and use of the sterilisation packaging must comply with applicable standards and be suitable for the sterilisation procedure!

Note

If potentially infectious liquids and particles can contact the products, it is recommendable to cover and protect these areas with sterile disposable products.

- Seal the handpiece tray and motor cable in a sterilisation pouch.

7.4 Sterilisation

Sterilisation by moist heat in accordance with ISO 17665-1 in a steam steriliser (autoclave)

⚠ CAUTION

Product damage due to improper sterilisation.

Damage to the sterile product.

- No hot air sterilisation, no chemical cold sterilisation, do not sterilise with ethylene oxide!

⚠ CAUTION

Product damage

Contact corrosion

- Remove the sterilised item from the autoclave immediately after sterilising and drying.

Note

When treating patients who may have an acute, critical infectious disease, be sure to observe the hygienic measures cited in applicable publications and reports. If possible, use suitable disposable products to avoid the transmission of critical pathogens. These protect the user, the patient and all participants in the surgery.

All materials that are contaminated from the dental and medical fields must suitably processed and sufficiently identified after cleaning and sterilisation.

Note

The user is responsible for observing the regulations and conditions for sterility. The coolant container needs to be disposed and the hoses need to be changed after each patient.

KaVo medical devices released for sterilisation are temperature-resistant up to 138 °C (280.4 °F).

The following parts of the unit are released for sterilisation:

- Motor cable
- Handpiece tray
- Autoclave with 3-fold fractionated pre-vacuum:
  - at least 3 minutes at 134 °C -1 °C / +4 °C (273 °F -1.6 °F / +7.4 °F)
  – Drying time: 20 min.
- Autoclave using the gravitation method
  - at least 10 minutes at 134 °C -1 °C / +4 °C (273 °F -1.6 °F / +7.4 °F)
  – Drying time: 30 min.

Note

Let the sterilised materials cool and try to the ambient temperature before using them again.

7.4.1 Storage

Observe all necessary measures for hygiene when storing sterile goods. Store protected from dust, release with identification on the packaging. Monitor storage length.

8 Troubleshooting

Note

If your problem cannot be rectified after reading the following troubleshooting documentation, please contact a KaVo-trained Service Technician.

Note

The permitted work is described in the Technician's Instructions that is available to the trained service staff.

IN case of malfunction, the display names the malfunction directly or shows an error number.

Malfunction	Cause	Remedy
Equipment without function.	Blown fuse.	▸ Contact customer service.
	The unit is switched off.	▸ Switch-on the mains switch on the rear of the unit.
	Neither end of the power cable is plugged in.	▸ Plug in the power input cable.
	Unknown.	▸ Turn the unit off and on.
No coolant in the instrument.	No coolant flow pre-selected. Pump is off.	▸ Pre-select coolant flow.
	Hose adaptor not plugged in.	▸ Plug in the hose adaptor.
	Bottle is empty.	▸ Connect new bottle.
	Hose clamp is closed.	▸ Open the hose clamp.
	Pump locking mechanism is not closed.	▸ Check and close, if needed, the closing mechanism.
	Hose is kinked.	▸ Check hose and remove the kink, if any.
	Glass bottle containing the coolant is not ventilated.	▸ Open the cap on the ventilation valve of the puncture needle.
Insufficient coolant flow in the instrument.	Spray nozzles are crusty or soiled.	▸ Clean the spray nozzles with the nozzle needle or re-process the part.
	Glass bottle containing the coolant is not ventilated.	▸ Open the cap on the ventilation valve of the puncture needle.

Malfunction	Cause	Remedy
The motor makes a grinding noise or the motor runs out of true.	The motor is not correctly plugged on or screwed on.	▸ Firmly insert the motor hose into the housing. ▸ Firmly screw on the motor hose to the motor. ▸ Check if all the connections and couplings are firmly seated.
No light on the straight or contra-angle handpiece	The light is not turned on.	▸ Turn on the light.
	The straight and contra-angle handpiece is improperly attached.	▸ Attach the straight and contra-angle handpiece until the catch audibly locks.
	Defective LED.	▸ Replace the LED.
	No suitable light, straight and contra-angle handpiece.	▸ Use a suitable light, straight and contra-angle handpiece.

Error message from software

Malfunction	Cause	Remedy
The motor symbol has a yellow background.	No motor attached.	▸ Connect the motor.
The pump symbol has a yellow background.	Hose adaptor not plugged in.	▸ Plug in the coolant hose.
Warning E3: Release the foot control	Foot control was activated while the unit started up.	▸ Release the foot control.
Warning E4: Data initialisation	Setting data newly initialised.	▸ Confirm message and check or correct the program settings. If the problem persists, notify the service technician.
Message E5: Internal communication Error	Internal system error.	▸ Turn the unit off and on. If the problem persists, notify service engineer.
Message E9: Setting the date and time	Time was not reset after re-start.	▸ Setting the date and time. ▸ If the problem continues to persist, have the battery of the real-time clock replaced by the service technician.
The foot control symbol has a yellow background	No foot control connected / detected.	▸ Connect the foot control.

Malfunction	Cause	Remedy
	Time error in data transmission, data error foot control, foot control is defective.	▸ Turn the unit off and on. If the problem persists, notify service technician.
One-Touch calibration has failed.	Instrument is too sluggish.	▸ Carry out run without instrument. ⇨ The instrument is too sluggish if no error message appears. ▸ Use a different unit.
	If the run without an instrument leads to an error message again, the speed of the motor is too low.	▸ Use another motor or send the defective motor to be repaired if necessary.
Hardware error	Internal system error.	▸ Turn the unit off and on. If the problem persists, notify service technician.
Service symbol is green	Service is soon due.	▸ Arrange a precautionary appointment at a KaVo subsidiary or with a KaVo authorised dealer.
Service symbol is yellow	The servicing time has expired	▸ Arrange an appointment at a KaVo subsidiary or with a KaVo authorised dealer.
Service symbol is red	Service check is more than due: > 4 months	▸ Arrange an appointment immediately at a KaVo subsidiary or with a KaVo authorised dealer.
Warning E36 and E37: Motor overload	Overtemperature on stator. Overcurrent > nominal current.	▸ Let the motor rest. If the problem persists, notify service technician.

9 Run a software update

Please proceed as follows to update the software:

- ▸ Download the current firmware file from www.kavo.de/produkte.
- ▸ Copy the firmware file to an SD card (storage capacity 1 - 32 GB, FAT format).
- ▸ Turn the device off.
- ▸ Insert the SD card with the new firmware file into the unit. Make sure that only a single firmware file with the .bin file extension (the downloaded current file) is stored on the SD card.
- ▸ Turn the device on.

⇨ The update process starts automatically.

Note

The unit must not be turned off during the update process.

After the update process, the unit starts using the updated software.

⚠ WARNING

Malfunctions of the equipment.

The software version displayed in the start screen or in the version display must harmonise with the software version that was downloaded. If these do not coincide or if there is any other error, please contact Customer Service.

See also

Version [⇨ 34]

Note

All program and device settings remain unchanged.

Note

If the error message, "SD card defective", is displayed during the update process, the SD card needs to be formated in the FAT16 or FAT32 format or a different SD card needs to be used. Then, the update process needs to be repeated using the formatted SD card or a different SD card.

10 Safety checks ("STK")

The EXPERTsurg LUX must be subjected to a service check including safety check ("STK") every 2 years. The safety check may only be done by a professional trained by KaVo or in a shop trained by KaVo. Perform the safety check ("STK") as described in the KaVo technician's instructions.

The urgency of the service check is indicated on the display by a symbol in "traf- fic-light colours".

Symbol	Description
 green	Service check is soon due. ▸ Arrange a precautionary appointment at a KaVo subsidiary or with a KaVo authorised dealer.
 yellow	Service check is due. ▸ Arrange an appointment at a KaVo subsidiary or with a KaVo authorised dealer.
 red	Service check is more than due. ▸ Arrange an appointment immediately at a KaVo subsidiary or with a KaVo authorised dealer.

Repair Service

KaVo offers a fixed-price service check for the original factory maintenance. You can use a loaner device for the time of the service check.

For scheduling or if you have any questions, please call:

KaVo Repair Service

+49 (0) 7351 56-4900

Service.Reparatur@kavo.com

KaVo Dental GmbH

Repairs

Bahnhofstr. 18

88447 Warthausen

11 Accessories

The following accessories are approved for the EXPERTsurg LUX:

- Hose set sterile S600 (10 units) (**10098757**)
- Handpiece tray (**10093411**)
- Motor INTRA LUX S600 LED (**10088000**)
- Motor cable S600 (**10091700**)
- KaVo SURGmatic straight and contra-angle handpieces

12 Details on electromagnetic compatibility

12.1 Guidelines and manufacturer's declaration - electromagnetic transmission

The EXPERTsurg LUX is designed for operation in an environment like the one described below. The EXPERTsurg LUX customer or user should ensure that the unit is used in an environment matching the description.

Measurements of emitted interference	Conformance	Electromagnetic environment - Guidelines
HF emissions according to CISPR 11	Group 1	The EXPERTsurg LUX uses HF energy for its internal functions exclusively. Therefore, the HF emission of the device is very low and interference with adjacent electronic devices is unlikely.
HF emissions according to CISPR 11	Class B	The EXPERTsurg LUX is designed for use in all facilities including residential ones, and facilities that are directly connected to a public power supply that also supplies residential buildings.
Emission of harmonics according to IEC 61000-3-2	Class A	The EXPERTsurg LUX is designed for use in all facilities including residential ones, and facilities that are directly connected to a public power supply that also supplies residential buildings.
Emission of voltage fluctuations/ flicker according to IEC 61000-3-3	complies	The EXPERTsurg LUX is designed for use in all facilities including residential ones, and facilities that are directly connected to a public power supply that also supplies residential buildings.

Note

The device or system may not be used or stacked directly next to other devices. If it has to be used close to or stacked next to other devices, the device or system must be monitored to ensure that it is used properly in the existing arrangement.

Note

The immunity test levels required in IEC 60601-1-2 (DIN EN 60601-1-2) are met.

12.2 Guidelines and manufacturer's declaration - electromagnetic resistance to jamming

The EXPERTsurg LUX is designed for operation in an environment like the one described below. The EXPERTsurg LUX customer or user should ensure that the unit is used in an environment matching the description.

Interference immunity tests	IEC 60601 test levels	Compliance level	Electromagnetic environment - Guidelines
Electrostatic discharge (ESD) according to IEC 61000-4-2	± 6 kV contact discharge ± 8 kV atmospheric discharge	± 6 kV contact discharge ± 8 kV atmospheric discharge	Floors should be made of wood or concrete or be fitted with ceramic tiles. If the floor is fitted with synthetic material, the relative humidity must be at least 30%.
Fast transient electrical interference / bursts according to IEC 61000-4-4	± 2 kV for power lines	± 2 kV for power lines	The quality of the supply voltage should correspond to that of a typical business or hospital environment.
Surges according to IEC 61000-4-5	± 1 kV push-pull voltage (symmetrical) ± 2 kV common mode voltage (unsymmetrical)	± 1 kV push-pull voltage (symmetrical) ± 2 kV common mode voltage (unsymmetrical)	The quality of the supply voltage should correspond to that of a typical business or hospital environment.
Voltage interruptions, short-term interruptions, and fluctuations of the supply voltage according to IEC 61000-4-11	< 5% U_T for ½ period (> 95% interruption) 40 % U_T for 5 periods (60% interruption) 70 % U_T for 25 periods (30% interruption) < 5% U_T for 5 s (> 95% interruption)	< 5% U_T for ½ period (> 95% interruption) 40 % U_T for 5 periods (60% interruption) 70 % U_T for 25 periods (30% interruption) < 5% U_T for 5 s (> 95% interruption)	The quality of the supply voltage should correspond to that of a typical business or hospital environment. If the user of the EXPERTsurg LUX needs uninterrupted function of the unit even when the power supply is interrupted, it is recommended to supply the EXPERTsurg LUX from an uninterruptible power system or a battery.
Magnetic field at a supply frequency (50/60 Hz) according to IEC 61000-4-8	3 A/m	3 A/m	Magnetic fields at the mains frequency should correspond to typical values in a business and hospital environment.

NOTE: V_T is the alternating mains voltage before the test level is used.

12.3 Guidelines and manufacturer's declaration - electromagnetic resistance to jamming

The EXPERTsurg LUX is designed for operation in an environment like the one described below. The EXPERTsurg LUX customer or user should ensure that the unit is used in an environment matching the description.

Interference immunity tests	IEC 60601 test levels	Compliance level	Electromagnetic environment - Guidelines
Wire-based HF interference according to IEC 61000-4-6 Wireless HF interference according to IEC 61000-4-3	3 V_{eff} 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	3 V_{eff} 3 V/m	Portable and mobile radio devices should not be used closer to the EXPERTsurg LUX, including the wires, than the recommenced safe distance calculated using the equation for the transmission frequency. Recommended safe distance: d = [3.5/3] = 1.17 d= [3.5/3] =1.17 for 80 MHz to 800 MHz d= [7.0/3] = 2.33 for 800 MHz to 2.5 GHz where P is the maximal nominal power of the transmitter in watts (W) as specified by the transmitter manufacturer and d is the recommended safe clearance in metres (m). The field strength of stationary wireless radio transmitters as measured locally[a] should be lower than the conformance level at all frequencies.[b] Interference is possible in the vicinity of devices that bear the following symbol.

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

NOTE 2: These guidelines may not be applicable in every case. The spread of electromagnetic waves is absorbed and reflected by buildings, objects and people.

[a]The field strength of stationary transmitters such as base stations of mobile telephones and land mobile radio devices, amateur radio stations, AM and FM radio and television broadcasting stations cannot be determined based on theoretical considerations. A site study should be considered to determine the electromagnetic environment in terms of stationary transmitters. If the measured field strength at the site, at which the EXPERTsurg LUX is used, exceeds the compliance levels shown above, the EXPERTsurg LUX should be monitored to demonstrate proper function. Should unusual performance features be observed, additional measures may be required, such as, e.g., a different alignment or different location for the EXPERTsurg LUX.

[b] In the frequency range of 150 kHz to 80 MHz, the field strength should be less than 3V_{eff} V/m.

12.4 Recommended safe distance between portable and mobile HF telecommunications equipment and the EXPERTsurg LUX

The EXPERTsurg LUX is designed for operation in an electromagnetic environment like the one described below. The customer or user of the EXPERTsurg LUX can help prevent electromagnetic interference by keeping the minimum safe distance between portable and mobile HF telecommunication devices (transmitters) and the EXPERTsurg LUX – depending on the output cable of the communication device - as given below.

Rated power of the transmitter in W	150 kHz to 80 MHz d=1.17	80 MHz to 800 MHz d=1.17	800 MHz to 2.5 GHz d=2.33
0,01	0,12	0,12	0,23
0,1	0,37	0,37	0,74
1	1,17	1,17	2,33
10	3,70	3,70	7,37
100	11,70	11,70	23,30

For transmitters whose maximum rated power is not in the above table, the recommended safe distance d in meters (m) can be calculated using the equation for the respective gap, where P is the maximum rated power of the transmitter in Watts (W) according to the manufacturer's information.

NOTE 2: These guidelines may not be applicable in every case. The spread of electromagnetic waves is absorbed and reflected by buildings, objects and people.

Comment 1: To calculate the recommended safe distance from transmitters with a frequency range of 80 MHz to 2.5 GHz, an additional factor of 10/3 was used to reduce the probability that a mobile unintentionally brought into the patient area would cause malfunction.

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