Instructions for use

MASTER lase
EXPERT lase

English

CE 0124

Order number for these instructions for use: 1.010.0274

Trademarks

Registered trademarks, trade names and names are used in these instructions for use. The relevant protective provisions are applicable even if they are not designated as such.

Manufacturer

EC	REP

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Use of these instructions for Use

⚠ WARNING **Warning means that if instructions are ignored or not followed correctly, this could lead to the endangering of patients, and/or operator and/or third parties.**

⚠ CAUTION **Caution means that if instructions are ignored or not followed correctly, this could lead to damage of the device.**

Instructions are given by additional information.

A cross reference with item number is provided in brackets:
e. g. (4, fig. 3)

meaning: the component mentioned is presented in fig. 3, item 4.

Operating instructions are marked with bold numbers.

e.g.	**1**	Switch the device on.
	2	Switch peripherals on.

A single operating instruction is also assigned a number.

If a setting is made by directly touching a display, the symbol ☞ is used in combination with the display text: e. g. ☞ *Pilot*-settings on the pilot light are selected by touching the display text „Pilot“.

Display indications are presented in italics: e. g. *WATT*

Images and on-screen displays in the present instructions for use may be slightly different in appearance from the actual product as long as this does not have any adverse effects on the technical features and safety of the product.

Introduction

Intended medical use - application field

The device is a portable diode laser for multidisciplinary application in dental surgeries and practices.
The power transmitted to the tissue by the device amounts to up to 10 Watt.

⚠ WARNING **The device may only be used in accordance with its intended use.**

The manufacturer shall assume no liability in case of application not conformant to intended use.

⚠ WARNING **Use or operation that does not comply with the description in these instructions for use could lead to dangerous exposure to radiation.**

The manufacture shall assume no liability for interventions in the product.

⚠ WARNING **Alterations to the device are prohibited.**

Indications, indication areas

The indication area of the MASTER/EXPERT lase is subject to continual extension due to clinical research. State-of-the-art findings can be found in the current specialised literature and current publications.

The MASTER/EXPERT lase can be employed for dental applications within the following indication areas:

- Dental-surgical tissue preparations such as resection, extirpation, ablation, vaporisation, coagulation, haemostasis, incision, excision;
- Germ reduction;
- Desensitisation, bio-stimulation;
- Activation of bleaching material.

Dental-surgical indications are primarilly given in operations, in which a minimum invasive intervention, good haemostasis, extended coagulation volume or cutting and removal of tissue with the least possible blood loss is in the foreground.

Indications for selection can be found in table: Selection of indications, page 46.

Contraindications

Those patients who suffer from photodermatosis and who are photosensitive (photoallergies) may not be treated.

Requirements for laser application

The fundamental prerequisite for successful, safe application of the laser for medical reasons is a comprehensive specialised knowledge of laser knowledge.

Current addresses and notes on laser literature can be requested from Kaltenbach & Voigt GmbH.

Experimental work helps quickly and reliably to understand the connections between laser radiation and tissue samples under different treatments modes and parameters, types of tissue and different accessories.

Education and declaration of consent of patient

The patient must be educated about the course of treatment. The customary declaration of consent must be obtained from the patient.

Safety

Prior to the startup of the MASTER/EXPERT lase, every user must have read the complete instructions for use and understand them.
The adherence to the safety guidelines when handling the laser is the responsibility of the laser safety officer.

All safety aspects defined in the section "Safety" of these instructions for use must be adhered to.

The instructions for use must always be available in the vicinity of the device.

The instructions for use must be passed on to all subsequent users.

Medical Device Law (MPG) / EU – Medical products - guideline

The laser device is an active medical device in accordance with Class IIb pursuant to Directive 93/42/ECC concerning medical devices.

In accordance with the Medical Product Law, medical devices may only be set up, used and operated in accordance with their intended purpose, according to the guidelines of this law and the pursuant approved legislation, the acknowledged rule of technology and the occupational safety and accident prevention regulations. They may not be used or operated if they exhibit defects or could endanger patients, staff or other persons. They may only be used and operated by persons who can ensure proper handling based on their training or knowledge and practical experience.

Class IIb medical devices may only be used by persons who have been familiarised with the device and trained in appropriate handling in consideration of the instructions for use.

Only such persons who can ensure proper handling based on their training or knowledge and practical experience in handling the device may be trained.

In addition, the user must keep a medical device log.

Possible complications, risks and hazards

Independently of laser, all known operative and clinical risks and complications must be taken into account which are due to the operative procedure, the condition of the patient and the clinical pattern.

There a laser-specific risks and hazards for the patient or surgical personnel due to:

- Thermal damage of such critical body structures that are in the immediate vicinity of the treatment area (e.g. teeth. bone, periodontium).
- Thermal damage to critical body structures due to unintentional activation and the associated remote effect of the laser beam
- Damage to sensitive body parts such as the eye of skin of the operating personnel or patients due to unintentional, undirected activation of the laser beam in the laser area.

⚠ **WARNING**

Potential interaction of the laser light with optical diagnostic and monitoring systems.
In case of intended use of high intensity light, the device transmits such wavelengths that are defined in the laser specification label of the individual device. Attention must be paid both to the wavelength of the therapy laser and of the pilot laser. Irradiation of this light (direct or due to scattering) in the detectors of optical diagnosis and monitoring systems can result in measuring errors or faulty interpretation of measurements by this device. This can lead to potentially dangerous situations for the patient.
Avoid irradiation of the light, both of the therapy laser and the pilot laser (direct or due to scattering) in the detectors of optical diagnosis and monitoring systems.

Installation and initial commissioning

The installation and initial commissioning may only be performed by Kaltenbach & Voigt GmbH staff or by persons authorised by Kaltenbach & Voigt GmbH. The devices may not be used until:

- acceptance has been obtained from the purchasing body
- a laser protection officer has been appointed by the purchasing body or the operator∗
- the device has been registered with the German Federation of Institutions for Statutory Accident Insurance and Prevention and the authorities responsible for occupational safety∗
- All safety measures have been carried out
- the device is mastered, even in cases of emergency, due to training of the personnel
- the device has been handed over ready for operation by Kaltenbach & Voigt GmbH and the personnel has been trained

The inventory list and instructions for use must be kept in an accessible location.

Accidents and personal injuries must be reported to Kaltenbach & Voigt GmbH or the responsible authority without delay.

∗ Applicable if required by national industrial standards.

Laser Safety

All valid guidelines concerning radiation protection for laser devices must be adhered to when operating the device. In case of ambiguity of the guidelines, the laser safety officer must be consulted.

⚠ WARNING **Irreversible damage could be caused.**
The retina and the skin may not be exposed to direct or reflected laser radiation (e.g. due to shining materials) under any circumstances. The laser safety glasses provide only short-time protection from direct laser light.

The laser area is defined as the area in which the values for the maximum permissible radiation dose (MRD) for eyes (IEC/EN 60825-1:2007) could be achieved or exceeded.

The entire operating room is regarded as laser area if hand applicators are used for open work.

An unintentional distraction of the laser beam must be taken into consideration.

Adequate laser safety goggles must be worn inside the laser area.

The laser area must be marked with door signs and warning lights, must be kept as small as possible and secured against unauthorised entrance.

The number of persons within the laser area must be as low as possible.

Reflecting, shining materials must be removed form the laser area or packed in flame-retardant cloths. Combustible materials must be removed.

⚠ WARNING **The application of laser radiation can lead to smoke formation. This can contain viable particles of tissue.**
Provide sufficient smoke extraction in the laser area.

Substances, which could contribute to the generation of gases, dust and mist due to the effect of laser radiation, as well as inflammable substances, must be removed from the laser area or be protected by appropriate measures.

Only devices that are suitable for laser treatment may be used during laser treatment. Special laser devices inhibit the reflection of the laser beam by their shape and surface characteristics.

Appropriate protective equipment must be provided in adequate quantity and flawless condition.

If endoscopes are used without a video camera, appropriate laser protection filters must be used for the endoscope. The user need not wear safety goggles during laser endoscopy with laser filter. All other persons present must wear safety goggles.

The laser beam must not be used in body regions with oxygen-enriched air or where combustible gases or vapours exist or could arise. It is essential that protective measures are taken against fire and explosion hazards.

⚠ **WARNING** **The device generates a highly energetic laser ray.**
The device may not be operated in potentially explosive and/or burns inductive atmospheres.

An explosive or inflammable atmosphere is deemed to exist e.g. on incidence of vapours arising from anaethesia, cleaning agents or disinfectants, or due to oxygen enrichment as a result ventilation using oxygen.

All persons working in the laser area must receive annual training on laser safety and the operation of the devices. Participation in training must be confirmed in writing.

Application of laser radiation

The device is a laser device of Class 4 according to IEC 60825-1:2007 / EN 60825-1:2007.

⚠ WARNING **High-energy laser beam.**
Inappropriate use can lead to personal injury and/or damage to devices.
All prescribed safety measures must be accomplished and the corresponding safety aids used and kept in faultless condition.

Laser safety office*

According to the Laser Safety Directive BGV B2 (Germany), a laser safety officer must be appointed in writing by the operator or owner of the equipment. The.laser safety officer is responsible for:

- Performance and verification of the safety measures and the protective equipment
- Familiarisation of the users with the safety measures and operation of the device
- Identification of the laser area
- Checking the warning lights at the entrance to the laser area
- Safe keeping of the access code (PIN)
- Safe storage of the device
- Correct connection of the device following a change of location

* Applicable if required by national industrial standards.

Eye protection

The eye is especially endangered due to the high energy density. The eye can be damaged even by weak laser radiation.

Laser area according to IEC EN 60825 (version 03-2007; section 3.61).

The safe distance from the eye to the laser beam egress point is defined as „Nominal Ocular Hazard Distance“ (NOHD). Laser safety goggles need not be worn outside this area if the fibre optic conductor is not operated in combination with the focussing optics. The beam divergence (a) is 10° (full angle).

The safety distance NOHD for the MASTER/EXPERT lase is defined as 3.2 m to the distal end of the fibre optic conductor or handpiece used.

⚠ WARNING **Irreversible eye damage could be caused.**
Each person within the laser area must wear safety goggles.

Laser safety goggles for the laser system must fulfil the following conditions at least:

Laser type	Wavelength of the filtered beam	Protection class EN 207:2002	Manufacturer abbreviation
D	**980 nm**	**LB3**	**in accordance with EN 207:2009**

Laser safety goggles do not provide absolute protection, therefore the exposure time should be brief. The safety goggles may not exhibit any damage.

⚠ WARNING **The recommended protection class is only applicable for the use of accessories without imaging optics, e.g. fibre optic conductor with blank fibre tip. An effective protection for accessories with imaging optics, e.g. focussing handpieces, is only guaranteed when they are used as intended. Furthermore, the relevant national industrial standards in their valid version must be adhered to, e.g. IEC 60825 (Safety of Laser Devices)**

Safety of the patients, user and third parties

Numerous safety devices are incorporated into the device.

All functions are continuously monitored automatically.

The therapy laser can only be activated if all functions are faultless.

Training and responsibility of the user

As does every highly effective medical device, a laser device demands special expertise and caution in handling and use. The laser device may only be used by persons who have been familiarised with the device and trained in appropriate handling in consideration of the instructions for use. and are familiar its therapeutic effects and potential hazards.

Training courses are conducted by specialists authorised by Kaltenbach & Voigt GmbH as well as by reference physicians with clinical expertise.

⚠ **WARNING**

Irreversible damage to health could be caused.
Read and observe the above mentioned information.
The safe and successful performance of the therapy requires participation in a training course prior the initial use.

Prior to every treatment, the user must have verified the proper functioning of the device in order to exclude any danger to patients, third parties or himself. If the device is used with accessories, the instructions for use of the accessories must have been read completely and understood.

Training and due dilligence of the operating personnel

Untrained or unqualified operating personnel may not operate the device in any circumstances.

Training courses are conducted by specialists authorised by Kaltenbach & Voigt GmbH.

Operating and cleaning personnel must exercise enhanced care when handling the device. More information in the chapter on cleaning.

Responsibility of Kaltenbach & Voigt GmbH

In relation to the safety, reliability and performance of the device, Kaltenbach & Voigt GmbH shall only be held responsible if:

- The installation, adjustment and initial commissioning are only performed by Kaltenbach & Voigt GmbH staff or by persons authorised by Kaltenbach & Voigt GmbH
- The electrical system in the relevant room meets the requirements of the national standards
- The unit is operated according to the instructions for use

Warning and safety instructions concerning electromagnetic compatibility in accordance with EMC - Norm DIN EN 60601-1-2:2007

Medical electrical devices are subject to special measures regarding electromagnetic compatibility and must be operated, installed and commissioned in accordance with the EMC instructions contained in the KaVo instructions for use.

Portable and mobile high-frequency communications devices may interfere with electrical medical devices.

The EMC requirements according to EN 60601-1-2:2007 are applicable in combination with the power cable connected to the device, type H05VV (length max. 2.5 m)

⚠ CAUTION **Using other accessories or cables as those defined - with the exception of internal original spare parts - can lead to increased emission or reduced interference immunity in the device.**

Guidelines and manufacturer's declaration - electromagnetic emission:

The device is for use in an electromagnetic environment like the one cited below. The customer or user of the device should ensure that it is used in the correct environment.

Measurement of emissions	Conformance	Electromagnetic environment - Guidelines
HF emissions according to CISPR 11	Group 1	The device uses HF energy for its internal functions exclusively. Its HF transmission is therefore very low, and it is improbable that neighbouring electronic devices will be disturbed.
HF emissions according to CISPR 11	Class B	The device is for use in all facilities including residential areas and facilities that are directly connected to a public power supply that also supplies residential buildings.
Harmonics in accordance with IEC 61000-3-2	Class A	
Voltage fluctuation / flicker in accordance with IEC 61000-3-3	complies	

⚠ CAUTION **The device may not be used or stacked directly next to other devices.**
If operation of the device stacked right next to other devices is indispensable, the device must be monitored to verify the proper operation in this arrangement.

Guidelines and manufacturer's statement - Electromagnetic immunity:

The device is for use in an electromagnetic environment like the one cited below. The customer or user of the device should ensure that it is used in the correct environment.

Immunity tests	IEC 60601 test levels	Compliance level	Electromagnetic environment - Guidelines
Electrostatic discharge (ESD) according to IEC 61000-4-2	± 6 kV contact discharge	± 6 kV contact discharge	Floors should be made of wood or concrete or be fitted with ceramic tiles. If the floor is made of synthetic material, the relative humidity must be at least 30%.
	± 8 kV atmospheric discharge	± 8 kV atmospheric discharge	
Fast transient electrical disturbances/ 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.
	± 1 kV for input and output lines	± 1 kV for input and output lines	
Surges according to IEC 61000-4-5	± 1 kV push-pull voltage	± 1 kV push-pull voltage	The quality of the supply voltage should correspond to that of a typical business or hospital environment.
	± 2 kV common mode voltage	± 2 kV common mode voltage	

Immunity tests	IEC 60601 test levels	Compliance level	Electromagnetic environment - Guidelines
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)	< 5 % U_T for ½ period (> 95 % interruption)	The quality of the supply voltage should correspond to that of a typical business or hospital environment. When the user of the device needs continued operation even when the power supply is interrupted, it is recommended to supply the device from an uninterrupted power supply or a battery.
	40 % U_T for 5 periods (60 % interruption)	40 % U_T for 5 periods (60 % interruption)	
	70 % U_T for 25 periods (30 % interruption)	70 % U_T for 25 periods (30 % interruption)	
	> 5 % U_T for 5 s (> 95 % interruption)	> 5 % U_T for 5 s (> 95 % interruption)	
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 the typical values in a business and hospital environment.
NOTE: U_T is the alternating mains voltage before the test level is used			

Immunity tests	IEC 60601 test levels	Compliance level	Electromagnetic environment - Guidelines
Handheld and mobile wireless devices should not be used at a shorter distance from the including cables than the recommended safe clearance calculated with the appropriate equation for the emission frequency.			
			Recommended safe distance:
Conducted HF disturbances according to IEC 61000-4-6	10 V_{eff} 150 kHz to 80MHz in the ISM bands [a]	1 V_{eff}	$d = 1.2 \sqrt{P}$
Wireless HF interference according to IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$d = 1.2 \sqrt{P}$ 80 MHz to 800 MHz
			$d = 2.3. \sqrt{P}$ 800 MHz to 2.5 GHz
With *P* as the rated power of the transmitter in Watts (W) according to the transmitter manufacturer, and *d* as the recommended safe distance in meters (m). The field strength of stationary wireless radio transmitters as measured locally: [b] should be lower than the conformance level of all frequencies. [c] 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 all situations. The spread of electromagnetic waves is absorbed and reflected by buildings, objects and people.			
[a] The ISM bands between 150 kHZ and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz and 40.66 MHz to 40.70 MHz. [b] The field strength of stationary transmitters such as base stations of mobile telephones and land radio devices, amateur radio stations, AM and FM, radio and television broadcasters cannot be theoretically predetermined accurately. A site study should be considered to determine the electromagnetic environment in terms of stationary transmitters. The device should be observed to verify the functioning as intended. Should unusual performance features be observed, additional measures may be required, such as e.g. a different alignment or another location for the device. [c] The field strength is less than 3 V/m over the frequency range of 150 kHz to 80 MHz.			

Recommended safe distance between portable and mobile HF telecommunications equipment and the device

The device is intended for use in an electromagnetic environment in which HF disturbances are controlled. The customer or the user of the device can help prevent electromagnetic disturbances by maintaining the minimum distance between portable and mobile HF telecommunications devices (transmitters) and the device - depending on the output of the communication device as indicated below.

Nominal power of the transmitter (W)	Safe distance according to the transmission frequency (m)		
	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz $d = 1.2 \sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters whose maximum rated power is not in the above table, the distance 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 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/portable communication device unintentionally brought into the patient area would cause malfunction.

NOTE 2:
These guidelines may not be applicable in all situations. The spread of electromagnetic waves is absorbed and reflected by buildings, objects and people. A site study should be considered to determine the electromagnetic environment in terms of mobile transmitters. The device should be observed to verify the functioning as intended. Should unusual performance features be observed, additional measures may be required, such as e.g. a different alignment or another location for the device.

Safety measures and safety systems

Electrical installation

The device may only be used in rooms designed for medical purposes in which installations are carried out in accordance with the relevant national installation standards. The device may only be connected to a separate secured socket. The device is a protection class 2 device according to IEC/EN 60601-1 (revision 1996 & 2005).

For proper operation in relation to the electromagnetic compatibility, see “Warning and safety instructions concerning electromagnetic compatibility in accordance with EMC - Norm DIN EN 60601-1-2:2007".

The distance between the edges of the housing of the device and the wall must be at least 10 cm to avoid impairing ventilation and exhaust. Installation in closed cabinets in not permissible.

Disconnection from the supply network

Pull the power plug to disconnect the device from the power supply. Ensure unobstructed access to the power plug when installing the device.

Laser Stop

A LASER STOP button is provided to enable quick switching off by the operator during operation.

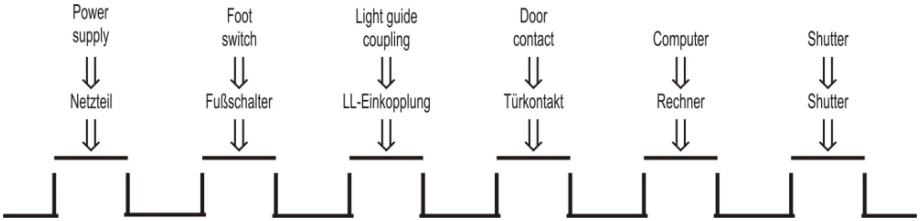
Figure 1. ***Laser STOP button***

Laser safety chain

A chain of safety devices is incorporated into the device. This laser safety chain reliably prevents unintentional triggering. The laser safety chain consists of hardware switches arranged in sequence.

The laser cannot be triggered if a switch is open, i.e. a safety condition is not fulfilled. The final link of the laser safety chain is the shutter, an electronic switch which short-circuits the laser diode, thus disconnecting the power supply.

Figure 2. ***Laser safety chain***



Laser audible warning

During the laser activation, an acoustic signal is emitted to warn of laser radiation.

Safety during transportation

The device may only be transported as described in section „Transportation of the device“, page 104.

Operating position

The device may only be operated in the position shown in section "Preparation for commissioning“, page 52.

Exchanging parts

Reliable functioning of the device and consequently safety for patients are only achieved if original spare parts from Kaltenbach & Voigt GmbH are used. Spare parts are manufactured by Kaltenbach & Voigt GmbH under especially high conditions with regard to material and manufacturing process and must be approved for use in a medial device in accordance with the relevant industrial standards.

Combination with accessories

The device may only be combined with approved fibre optic conductors and devices. For the selection of accessories, see chapter „Scope of delivery and accessories“, page 30.

Sterilisation of accessories

The legal directives must be observed for the sterilisation of accessories.

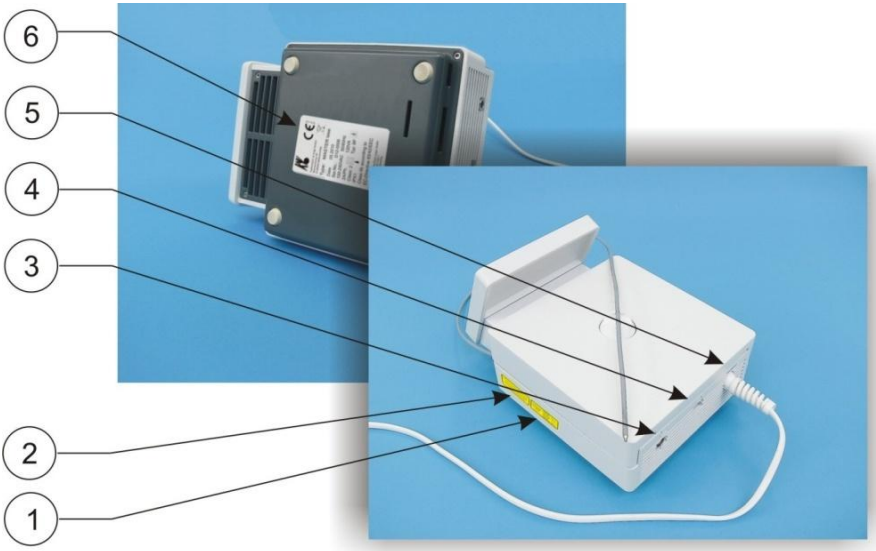
Te instructions and warnings contained in the instructions for use of accessories must be observed.

Warning and instruction signs

Numerous warnings and instructions signs are attached to the device.

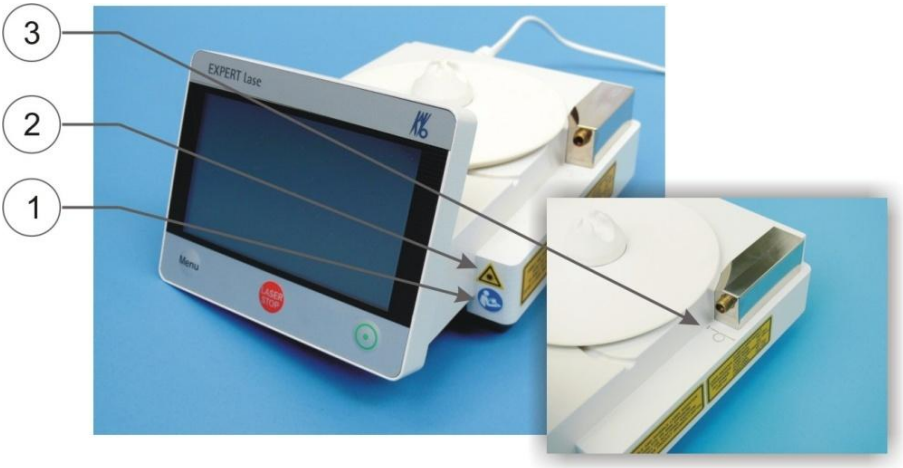
Figure 3 shows the warning and instruction plates and their position on the side and bottom of the device, Figure 4 shows the plates on the front of the device.

Figure 3. ***Warning and instruction plates (side and bottom of device)***



No. in Figure 3	Sign	
1		Warning laser beam
2		Specification laser beam
3		Foot switch connection
4		Connection for door contact
5	100 -240 VAC	Connection for power cable
	24 VDC	Connection for battery charger
6		Type of device, For current manufacturing date, serial number and performance / supply data see nameplate on device
		See „Product service life and disposal“, page 111.
		Device of protection class II according to EN 60601-1.
		Type BF according to EN 60601-1.

Figure 4. ***Warning and instruction plates, front of device***



No. in Figure 4	Plate / symbol	
1		Follow the instructions for use!
2		Caution laser beam!
3		Fibre optic conductor connection

Description

Technical specifications

Model designation

KaVo EXPERT lase	**Laser devices with internal power supply for use in the dental field**

Electrical connection data

Voltage	**100 - 240 VAC**
Frequency	**50/60 Hz**
Power consumption	**≤ 120 VA**
Power consumption:(max.)	**2 A**

Climate (operating state)

Ambient temperature	**+15° C to +30° C**
Relative humidity	**30 % to 85 %**
Air pressure	**800 hPa to 1060 hPa**

ON-time

	P < 4 Watt: 66%, max. 15 min cw
	P = 4 – 5 Watt: 30%, max. 3 min cw

Dimensions and weight

	Cupboard	**with display**
Height	**70 mm**	**85 mm**
Width	**142 mm**	**142 mm**
Depth	**145 mm**	**200 mm**
Weight	**approx. 1.4 kg**	

Noise emission

Maximum	**L ≤ 60 dB**
in standby	**L < 50 dB**

Fibres

Min. core diameter	**240 µm**
na.	**≥ 0.22**

Therapy laser

Wavelengths	**980 ± 15 nm**
Laser power	**0.2 - 8 Watt** (see also Setting ranges, page 44)

Pilot laser

Wavelengths	**640 ± 10 nm**
Laser power	**0 to 1 mW**

Model designation

KaVo MASTER lase	Laser devices with internal battery for use in the dental field

Electrical connection data — Charger adaptor

Voltage	**100 - 240 VAC, 24 VDC**
Frequency	**50/60 Hz**
Power consumption	**≤ 300 VA**
Power consumption:(max.)	**3 A**

Climate (operating state)

Ambient temperature	**+15° C to +30° C**
Relative humidity	**30 % to 85 %**
Air pressure	**800 hPa to 1060 hPa**

ON-time

	P < 4 Watt: 66%, max. 15 min cw
	P = 4 – 6 Watt: 30%, max. 3 min cw
	P = 6 – 10 Watt: 20%, max. 2 min cw

Battery

Laser operation	**5 W > 30 min.; 8 W > 15 min.**
Standby (display switched on)	**> 3 hours**
Charging duration	**≤ 30 min. (90%)**

Dimensions and weight

	Cupboard	**with display**
Height	**70 mm**	**85 mm**
Width	**142 mm**	**142 mm**
Depth	**145 mm**	**200 mm**
Weight	**approx. 1.4 kg**	

Noise emission

Maximum	**L ≤ 60 dB**
in standby	**L < 50 dB**

Fibres

Min. core diameter	**240 µm**
na.	**≥ 0.22**

Therapy laser

Wavelengths	**980 ± 15 nm**
Laser power	**0.2 - 10 Watt** (see also Setting ranges, page 44)

Pilot laser

Wavelengths	**640 ± 10 nm**
Laser power	**0 to 1 mW**

Accuracy of the defined values is compliant with EN 60601-2-22.
Further technical details can be found in the current service manual for *MASTER/EXPERT lase*.

Scope of delivery and accessories

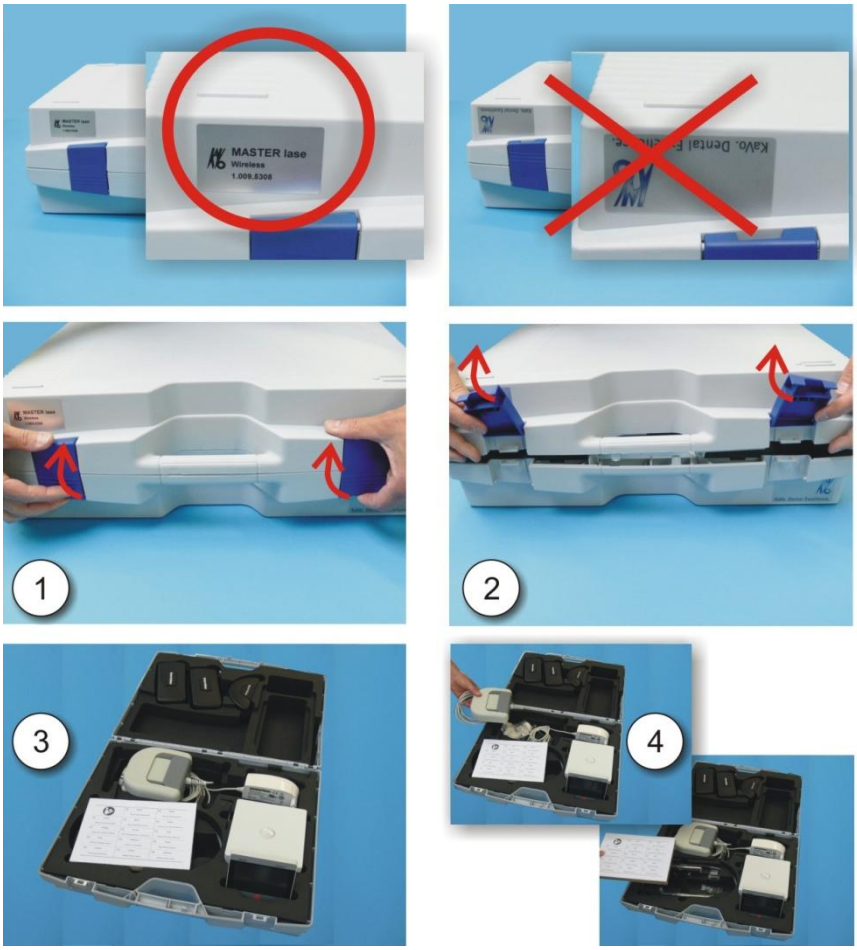
Different device variants can be selected. The accessories specified for the device are dependent on the model (see „Combination with accessories, page 24).

Figure 5. ***Arrangement of the transport case with instructions for use and accessories in a transport carton***

No. in Figure 5	
1	Instructions for use
2	Bare fibre tips
3	Transport case containing device and accessories

⚠ CAUTION **The device case may only be opened in the position shown in Figure 6. Observe the upper / lower alignment of the corporate lettering!**

Figure 6. ***Opening the device case***



Scope of delivery

	Device variants		
	EXPERT lase	MASTER lase	
		Standard	Wireless
with internal power supply	1 x	-	-
with internal battery	-	1 x	1 x
Charger adaptor*	-	1 x	1 x
Wired foot switch	1 x	1 x	-
Wireless foot switch	-	-	1 x
Tool** for the wireless foot switch	-	-	1 x
Bare fibre tip 300 µm	3 x	3 x	3 x
Bare fibre tip 240 µm	2 x	2 x	2 x
Sapphire tip	-	2 x	2 x
Cleaning cap for sapphire tip	-	1 x	1 x
Tool for sapphire tip	-	2 x	2 x
Handpiece for bare fibre tip	1 x	1 x	1 x
Handpiece for sapphire tip	-	1 x	1 x
Transmission fibre optic conductor	1 x	1 x	1 x
Safety goggles (patient)	1 x	1 x	1 x
Safety goggles (operator)	2 x	2 x	2 x
Device case	1 x	1 x	1 x
Laser warning label	1 x	1 x	1 x

Article numbers for device accessories

Name	piece	Art. no.
Charger adaptor	1	1.009.5371
Safety goggles (patient)	1	1.009.5369
Safety goggles (operator)	2	1.009.5370

Article numbers for application accessories

Name	piece	Art. no.
Sapphire tip (2x) including cleaning cap (1x)	1	1.009.5368
Tool for sapphire tip	1	1.009.5365
Handpiece for sapphire tip	1	1.009.5363
Bare fibre tip 300 µm	20	1.009.5366
Bare fibre tip 240 µm	20	1.009.5367
Handpiece for bare fibre tip	1	1.009.5360
Transmission fibre optic conductor MASTER lase	1	1.009.5357
Transmission fibre optics conductor EXPERT lase	1	1.009.5359

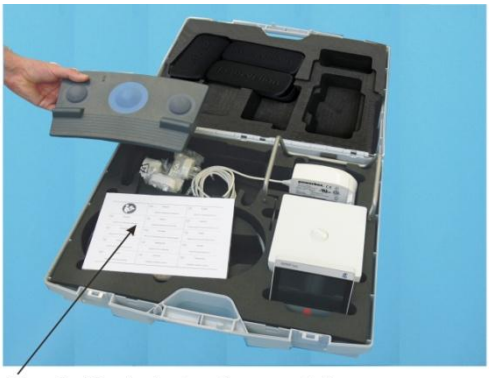
* The charging adaptor charges the battery (version with battery) and charges the battery of the wireless foot switch.

** The tool is required for the assembly of the wireless foot switch for the initial commissioning (see Assemble wireless foot switch, page 55).

Figure 7. ***Arrangement of the EXPERT lase with accessories in the transport case***

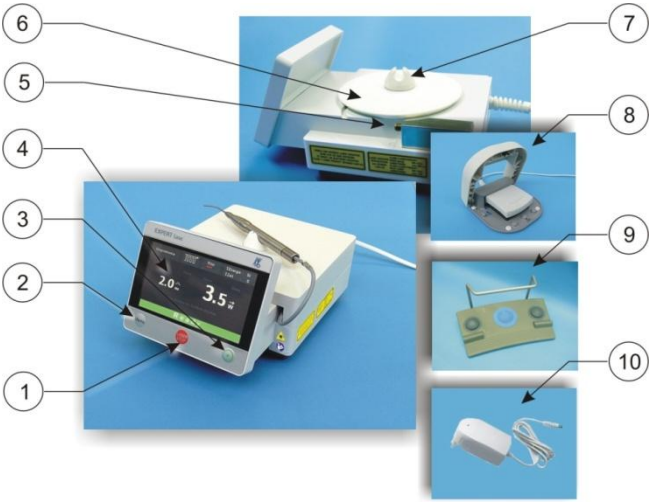
Figure 8. ***Arrangement of the MASTER lase with accessories in the transport case***

Figure 9. ***Arrangement of the MASTER lase (option: wireless foot switch) with accessories in the transport case***



Setup

The device is enclosed in portable housing.



Control panel

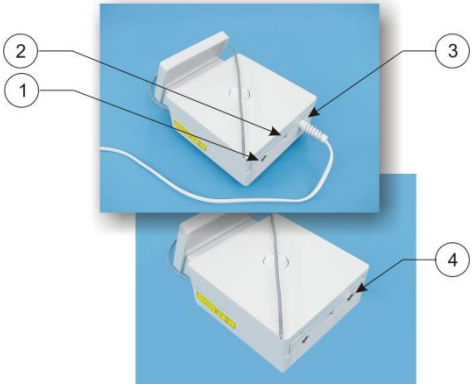
1	Laser Stop: Emergency switch off of device
2	Switch on the device, access to menu settings
3	Switching on the device, Switching over the device: Ready → Standby → Ready (for version with wired foot switch); Ready → Standby (for version with wireless foot switch);
4	Contact touchscreen (hereinafter referred to as touchscreen)
5	Connection for transmission fibre optics
6	Transmission fibre optic conductor winding (fibre winding)
7	Handpiece or fibre holder
8	Wired foot switch
9	Wireless foot switch - wireless foot switch (only for device versions with wireless foot switch)
10	Charging adaptor for charging the battery (version with battery) and for charging the battery of the wireless foot switch

Terminals

Electrical terminals

Electrical terminals are located on the rear side of the device.

Figure 10. ***Connections (rear side)***



1 Foot switch connection

2 Interlock

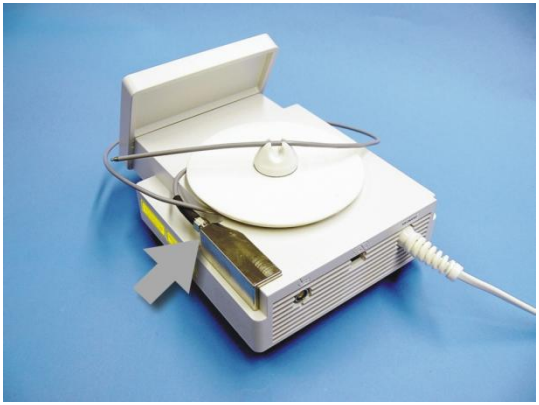
3 Power cable

4 Connection charger (battery model)

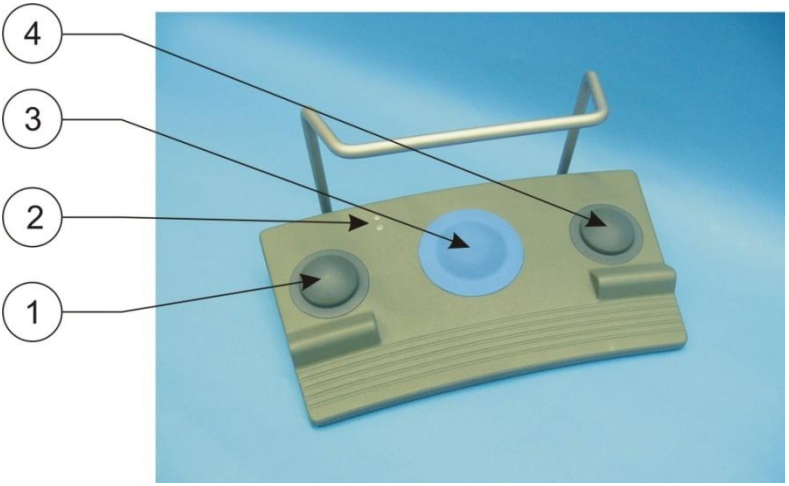
Transmission optic fibres connection

The fibre optic conductor terminal is located on the side of the device and is for the connection of the transmission of the transmission fibre optic conductor.

Figure 11. ***Device with transmission fibre optic conductor***



Operating elements of the wireless foot switch



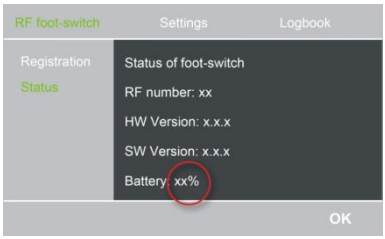
No.	Name	Function
1	Left button	Switches the device from „Standby“ mode to „Ready“ mode and back.
2	LEDs	LEDs shining indicates that the device is in „Ready“ mode
3	Middle button	Triggers the therapy laser beam.
4	Right button	Switches the performance of the device one level higher

The wireless foot switch id equipped with a position sensor. If the wireless foot switch is considerably inclined for longer than 3 sec., the device emits an error message. If this position is not rectified within 5 sec., the foot switch logs off automatically. You must log the wireless foot switch into the device again to continue the therapy (see Assemble wireless foot switch and log into the device, page 55).

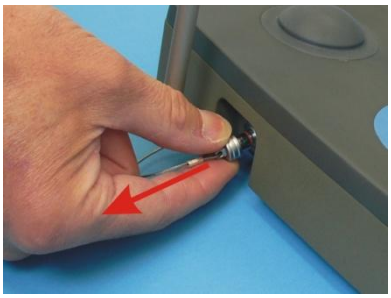
Power supply of the wireless foot switch

The supply to the wireless foot switch is secured by a battery. The scope of delivery includes a charger adaptor (Scope of delivery and accessories, see page 30).

If the battery charging is inadequate, a symbol will appear at the bottom of the screen on the left. From this time, the foot switch will remain in operation for approx. 5 hours. Charge the battery after completing the running therapy.

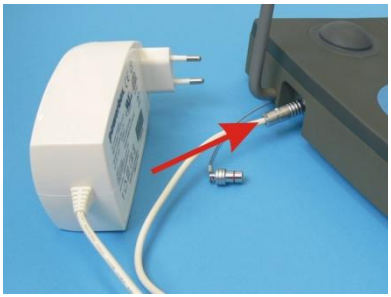


You can also read the status of the battery on the screen via the menu: menu → wireless foot switch → status.



To charge the battery, connect the wireless foot switch to the power supply by means of the charger adaptor included in the delivery.

When connecting the charger adaptor with the foot switch, check the position of the groove and spring of the plug connection (red mark on the plug must be pointing upwards).

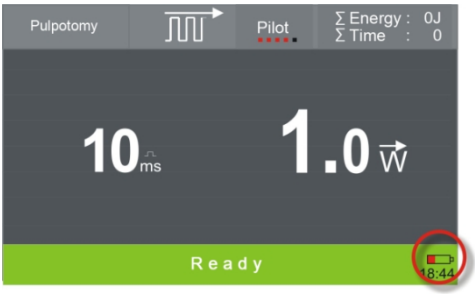


The charge symbol is blended out when the battery has been adequately charged.

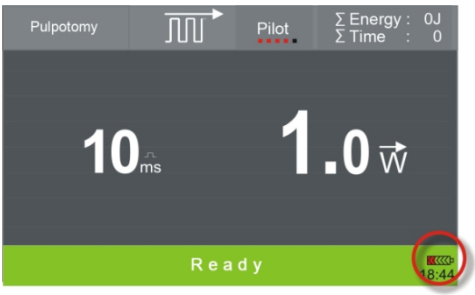
The course of therapy is not disturbed by this procedure.

Power supply of the battery

The scope of delivery of the battery-operated device includes a charger adaptor (Scope of delivery and accessories see page 30).



If the battery charging is below 50%, a symbol will appear at the bottom of the screen on the right.
For information concerning the remaining duration of operation, see chapter „Technical specifications“, page 28.



To charge the battery, connect the device (see Terminals, page 37) to the power supply by means of the charger adaptor.

The charging process is indicated by the arrow in the symbol.
For information concerning the remaining duration of operation, see chapter „Technical specifications“, page 28.

The course of therapy is not disturbed by this procedure.

To extend the duration of operation, chose a brief automatic switch-off time (see „Setting the switch-off time“, page 89) or switch the device off as soon as it is no longer needed.

Control panel

The control panel serves the input and display of the device functions (operating modes, setting parameters etc.) and consists of the display and the touch keys.

The display is equipped with a touch-sensitive surface (touchscreen). the touchscreen is divided into three areas which are emphasised by different background colours.

The input is made by pressing the keys and touching a displayed element or value.

⚠ WARNING **Undesired operating functions are possible!**
If several pressure points are activated, this could lead to an undesirable operating function.
On input, it must be ensured that only one pressure point on the touchscreen is active.

⚠ CAUTION **Make entries by gently touching the touchscreen, excessive pressure can lead to destruction of the display.**

Figure 12. ***Control panel***

No. in Figure 12	Name	Function
1	Lower status bar	The device status is displayed in the status bar with messages. A change of status leads to an immediate update of the status display. The status bar also serves the display of messages as well as the release of the foot switch for laser activation. Activation of the status bar releases lthe fioit switch to trigger the laser 2 seconds after activation.
2	Slider scale	Setting the indiviudal laser parameters. The activated value can be changed by direct activation of one of the values displayed in the slider scale. For confirmation of the activation, the colour of the selected element or value changes from white to green. The range of values available for selection can be shifted to the left or right or displayed by "dragging" over the slider scale.
3	Laser parameter field	Laser parameters are displayed and can be changed by direct activation of one of the values displayed in the slider scale. The slider scale is blended in on selection of a corresponding laser parameter.
4	Upper status bar	The therapy status is displayed in the status bar. The therapy status can be changed via the drop-down menu. The respective drop-down menu is opened on selection of a corresponding status element.
5	Indication element	Setting, call and programming of the der application oriented laser parameters.
6	Pulse form element	Selection of the pulse form of the therapeutic laser beam.
7	Protocol element	Selection of the displayed protocol data and timers as well as resetting all protocol data and timers to 0.
8	Pilot element	Setting the pilot brightness level.
9	Switch-on button	Switching on the device, Switch over Ready < - > Standby (see page 36).
10	Laser Stop button	Emergency device switch off
11	Menu button	Switch on the device, access to menu settings.

Therapy mode

Setting parameters

Table 1. *Adjustable pulse forms*

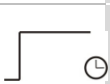
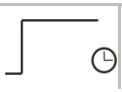
Pulse forms		Description
Continual: (cw)		The set laser performance is emitted as soon as the foot switch is activated.
Continual with setting of the application time:		The set laser performance is emitted for a pre-selected time as soon as the foot switch is activated.
Interval:		The set laser performance is emitted in a pre-selected pulse pause / pulse duration ratio as soon as the foot switch is activated.
Interval with setting of the application time:		The set laser performance is emitted in a pre-selected pulse pause / pulse duration ratio for a pre-selected time as soon as the foot switch is activated.
Peak:		The maximum performance of the laser device (Pp) is emitted in a pulse pause / pulse duration ratio as soon as the foot switch is activated. Pulse duration (tp) and average performance (Pa) are set. The necessary pulse pause (ti) is calculated automatically by the system from the selected pulse duration (tp), the average performance (Pa) and the maximum performance (Pp) in µs accuracy. e.g.: tp=1ms, Pa=5W, Pp= 10W → ti = 1ms

Table 2. *Adjustable parameters*

Parameters	Description
Power	Setting the power for the therapy laser beam.
Pulse duration	Setting the active phase of a pulse of the therapy laser beam.
Pulse pause	Setting the inactive phase between two pulses of the therapy laser beam.
Duration	Setting the application time for the therapy laser beam.

Table 3. *Setting ranges*

Device variants	Parameters	Laser power				
						
EXPERT lase	Power	0.2 - 5W	0.2 - 5W	0.2 - 5W	0.2 - 5W	0.2 - 4W*
	Peak performance	-	-	-	-	8W**
MASTER lase	Power	0.2 - 8W	0.2 - 8W	0.2 - 10W	0.2 - 10W	0.2 - 5W*
	Peak performance	-	-	-	-	10W**
		Duration				
EXPERT/ MASTER lase	Pulse duration	cw	cw	0.5ms – 3s	0.5ms – 3s	0.5 – 50ms
	Pulse pause	cw	cw	0.5ms – 3s	0.5ms – 3s	-
	Timer	-	0.1 – 90s	-	0.1 – 90s	-

* adjustable average power

** output peak power

Selection of indication

The treatment parameters are specified by selection of the desired indication (recommendations).
Treatment instructions compiled by experienced specialists and reference physicians are given with the indications. Special cautionary measures are prefixed with CAVE and displayed in orange.

⚠ WARNING **All information is kept as conservative as possible and has been provided with the utmost care and according to our best knowledge and judgement. The achievement of the required effect on tissue is to be obtained by adaptation of the laser parameters if necessary and must, in any case, be verified by suitable measures. The treatment instructions of the current specialised literature should be consulted for this purpose. Kaltenbach & Voigt GmbH shall assume no liability for personal injury and materiaL damage resulting from application of indication settings and indication instructions.**

⚠ WARNING **Irreversible damage to health could be caused in soft and hard tissue. MASTER laser or EXPERT lase must be released for use with the bleaching material by the manufacturer of the bleaching material. Comply with the instructions for use of the manufacturer of the bleaching material.**

⚠ WARNING **Irreversible damage to health could be caused in soft and hard tissue.**
Always keep the laser fibre in motion and do not concentrate one one point. If possible, always laser parallel to the tooth and periodontium.

The indications can be saved in a list of Favorites and the settings changed to indiviudal requirements (see chapter „Compilation and use of list of Favorites“, page 81).
The performance is restricted in some specialist areas for safety areas.

Table 4. ***Selection of indications***

Specialised areas	Maximum adjustable performance	Indication		
		Display on indication selection	Display on the indication element button	Full text
Surgery				
	8 W	**Abscess**	**Abscess**	
		Adenoma	**Adenoma**	
		Biopsy	**Biopsy**	
		Drainage	**Drainage**	
		Epulis	**Epulis**	
		Fibroma	**Fibroma**	
		Fistula duct	**Fistula duct**	
		Labial frenectomy	**Labial frenectomy**	
		Lingual frenect.	**Lingual frenect.**	
		Gingivectomy	**Gingivectomy**	
		Gingivoplasty	**Gingivoplasty**	
		Hemangioma	**Hemangioma**	
		Hemostasis	**Hemostasis**	
		Hyperplasias	**Hyperplasias**	
		Implant exposure	**Implant exposure**	
		Incision / excision	**Incision / excision**	
		Leukoplakias	**Leukoplakias**	
		Lichen planus	**Lichen planus**	
		Mucocele /ranula	**Mucocele /ranula**	
		Operculectomy	**Operculectomy**	
		Papilloma	**Papilloma**	
		Vestibuloplasty	**Vestibuloplasty**	

Specialised areas	Maximum adjustable performance	Indication		
		Display on indication selection	Display on the indication element button	Full text
Endo / Paro				
	4 W	**Endodontics**	**Endodontics**	Endodontics adjuvant
		Endo periapical	**Endo periapical**	Endo adjuvant in periapical defect
		Exstirpation	**Exstirpation**	
		Periodontology	**Periodontology**	Periodontology adjuvant
		Periimplantitis	**Periimplantitis**	Peri-implantitis decontamination of the implant
		Pulpotomy	**Pulpotomy**	
		Pulp capping	**Pulp capping**	
Others				
	8 W	**Aphthea, herpes**	**Aphthea, herpes**	
		Bleaching	**Bleaching**	Activation of bleaching material by means of laser light
		Desensitisation	**Desensitisation**	
		Mycoses	**Mycoses**	
		Sulcus dilation	**Sulcus dilation**	
		LLLT	**LLLT**	Low Level Laser Therapy
		Blacken the fiber	**Blacken the fiber**	
		Customized 1 to 5	**Call indications**	

Pilot

The pilot laser simulates an invisible therapy laser beam by means of visible light. The brightness of the pilot laser can be set from 0 to 5 in single increments.

The pilot laser is a laser of the laser class 2 according to IEC EN 60825:2007-03.

If the pilot is switched off and invisible, the device may only be used for contact applications.

Protocol

The device logs and displays automatically:

- the sum of the applied energy and application times
- the duration of the inactive phase of the laser beam
- the duration of the inactive phase and the duration of the active phase of the laser beam
- Peak performance and average performance

You will find information concerning the selection of the Changing the display mode of the protocol button on page 86.

The protocol data can be reset to 0 via the protocol element.

The protocol data are principally reset to 0 when the device is switched on.

Menu

.The menu enables the individual definition and saving of basic settings for the user.

Table 5. ***Adjustable parameters in the menu***

Function / setting	Description
- Settings Tab	
Volume	Volume setting
Laser audible warning	Volume of the audible warning the volume of the audible warning can be set at 5 levels.
Input feedback	volume of the feedback tone on button activation the volume of the audible warning can be set at 5 levels.
Tool Option	
Switch-off time (min.)	Set the time for the automatic switch off. Devices with mains power supply: 3, 5, 10, 15, 30 minutes or Off. Devices with battery supply: 3, 5, 10, 15 minutes. The devices switches off automatically if it is not used over a time period.
Transitional period Ready → Standby (min.)	The time required for setting the automatic status change of the device:1, 2, 3 minutes. The devices switches automatically to STANDBY mode if it is not used over a set time period when it is the READY mode.
Pilot during treatment	Switching the pilot laser on and off If you have set the the selection *Off* for the *Pilot* option *during the treatment*, the pilot laser is switched off automatically when you activate the foot switch.
Operation	Select operating mode
Therapy	Treatment is possible in this setting
Demo	Demonstration of functions and operation only.
Service	Only for authorised service personnel
Switch off	Turn device off

Language	Select language for display texts
Deutsch	Texts in the display appear in German
English	Texts in the display appear in English
Français	Texts in the display appear in French
Español	Texts in the display appear in Spanish
Italiano	Texts in the display appear in Italian
Portuguese	Texts in the display appear in Portuguese
Svenska	Texts in the display appear in Swedish
Norsk	Texts in the display appear in Norwegian
*Polski**	Texts in the display appear in Polish
Time	Set the real-time clock
Clock	Time (hour/minute) The time is specified in 24/hour format.
Date	Date (day/month/year) The date is specified in dd.mm.yy format.
Pin	Setting the frequency of the automatic PIN - request (Off, daily, ON)
	Change the access code
Logbook	
Up to 255 treatments can be recorded in the logbook. A new entry is made when the data changes and laser performance is applied.	
Operation	Read operating logbook
Therapy	Reading therapy logbook
Wireless foot switch	
Login	Instructions for logging the foot switch into the device
Status	Information about the foot switch status

* from SW – Version 1.3.1

Operation

This chapter assumes that you are familiar with the operating elements of the device.

Read and observe the chapters „Safety“ „Description“.

Observe safety

Carry out a visual inspection prior to every startup:

⚠ CAUTION **You may not start the device if the safety checks give reason for concern.**
In this case, notify your responsible after sales service.

---

1. Check the control panel and the housing of the device for mechanical damage.
2. Check the existing cable for mechanical damage.
3. Check the existing connections for mechanical damage.

Preparation for commissioning

A wide range of devices and accessories are available for the MASTER/EXPERT lase.

Observe the instructions for use of the devices.

⚠ WARNING **If the laser beam hits inner parts of the device, this could damage the eyes of the user and damage the device.**
The fibre optic conductor must protrude distally on laser activation from the device canal.

⚠ CAUTION **The MASTER/EXPERT lase is an device of protection class IPX1 in accordance with IEC60529, i.e. it is equipped with normal protective measures against the ingress of dust and fluids and is not waterproof.**
Malfunctioning could occur in case of high air humidity or ingress of water and dust into the housing. Corrosion of the internal mechanical and electronic systems can lead to irreparable damage.

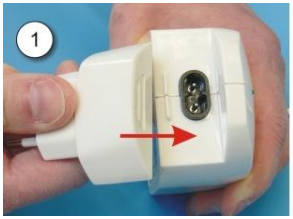
Condensation can from on the optic components as a result of sudden changes in temperature (e.g. relocation of the device from a warm area with high air humidity to an air conditioned cooler room).
It is essential to ensure, prior to startup, that the MASTER/EXPERT lase is set up several hours in the intended operating area in order to prevent destruction of optic components due to condensation.

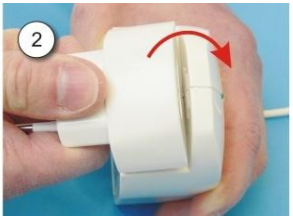
⚠ CAUTION **<u>On application of the device with battery:</u>**
Charge the battery of the device completely (approx. 1 hour). Observe the information in chapter „Power supply of the battery“, page 40).

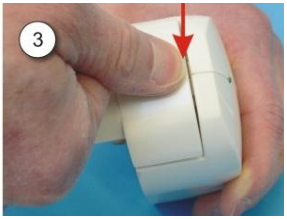
<u>On application of the wireless foot switch:</u>
Charge the battery of the foot switch completely (approx. 5 hours) prior to the initial commissioning. Observe the information in chapter „Power supply of the wireless foot switch“, page 39).

⚠ CAUTION **Only use the charger adaptor provided to charge the battery.**

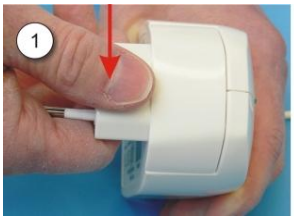
Mounting the charger adaptor

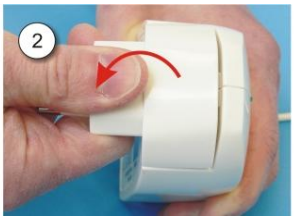


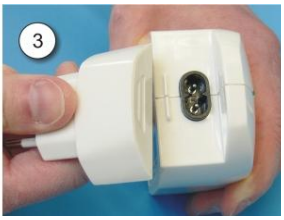




Dismounting the charger adaptor







⚠ CAUTION

Observe the position of the plug when you connect the charger adaptor:

The marking (red dot) on the sleeve of the plug must be pointing downwards when you connect the device.

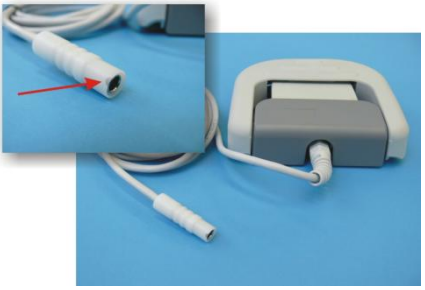
The marking (red dot) on the sleeve of the plug must be pointing upwards when you connect the device to the wireless foot switch.

1. Bring the device into the operating position as shown in Figure 13.

Figure 13. ***Operating position***

2. Clearly define and mark the laser area, see section „Laser protection officer“.
3. Only for models with mains power supply:
   Connect the power cable to the power supply.
4. Connect the foot switch (wired) or log the wireless foot switch into the device.

⚠ CAUTION

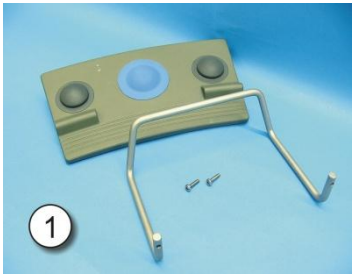


When connecting the foot switch:
Observe the position of the plug.
The marking (groove) on the sleeve of the plug must be pointing upwards when you connect the footswitch to the device.

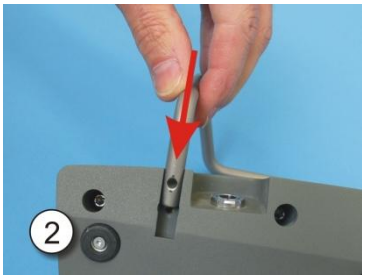
Assemble wireless foot switch and log into the device, page 55.

Assemble wireless foot switch and log into the device

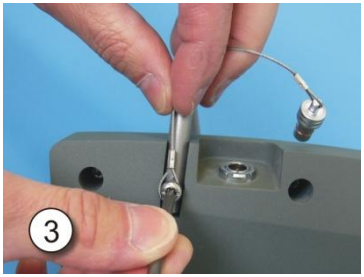
The steps 1 to 3 must be carried out only for the initial commissioning of the wireless foot switch. When the wireless foot switch is assembled, begin with step 4.



1. Remove the wireless foot switch parts from the packaging.



2. Guide the ends of the bracket into the intended recesses at the bottom of the wireless foot switch.



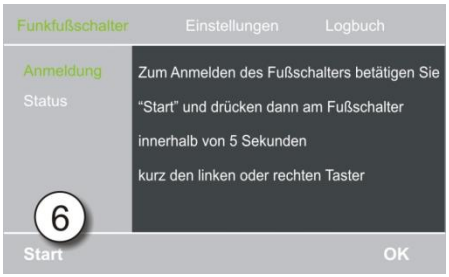
3. Screw both ends of the bracket tightly to the foot switch, fastening the sealing cap of the bush.

The screws and required tolls are included in the scope of delivery (Scope of delivery and accessories, page 30).
Store the tools in the devices case after the assembly.

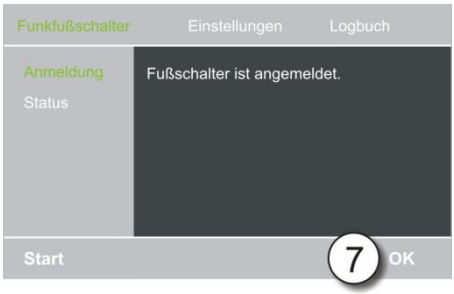
4. Place the wireless foot switch near to the device.

The wireless foot switch may not be connected to the device and the device must be switched on. When switching on the device, observe chapter „Commissioning“, page 57.

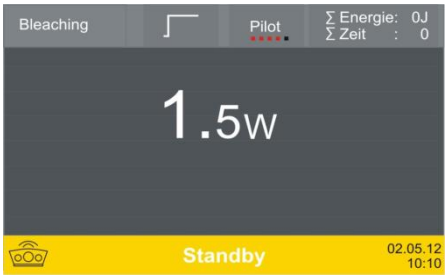
5. Activate ☞ the lower status bar.



6. Follow the instructions shown on the screen.



7. Confirm selection with ☞ *OK*.



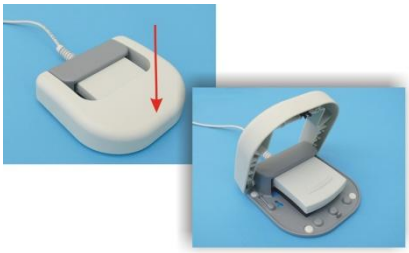
The device changes to therapy mode. The symbol for the wireless foot switch is blended in below, on the left.

if you possess several KaVo devices with wireless foot switches, you have to log the foot switch into the device each time you switch on.

Commissioning

⚠ WARNING **Use of the operating units or setting possibilities in any other manner as described here can lead to dangerous radiation.**

1. Carry out the preparation for startup.



2. Open the protective bracket of the foot switch (by gently touching the bracket).

3. Activate the switch-on button to switch the device on  .

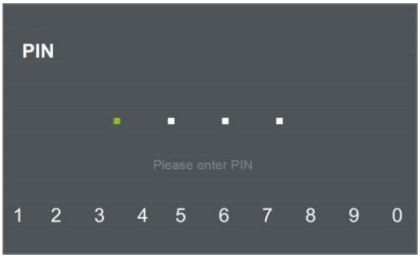
For approx. 3 seconds, the startup image is displayed at the left of the screen (example: EXPERT lase), the devices performs a self test.

The number in brackets is only relevant for internal administration purposes.

if a safety check is required, this switch-on image appears for approx. 3 seconds (example).

Warning notes and instructions for possible maintenance are displayed.

if an error occurs during the startup, the device will show this image with an ERROR number and an explanatory text. In this case carry out a new start. If the error persists, please notify the KaVo Service and tell the service employee the error message, the software version and the serial number of the device.

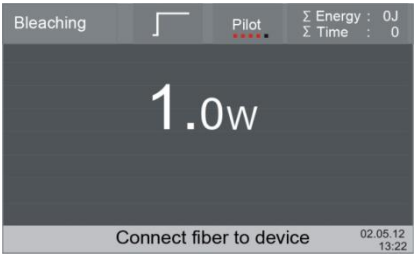


If the self test has been completed successfully, the screen for the entry of the access code (PIN) on the device is blended in.

The cursor is displayed by a green dot.

With number input the green dot is replaced by *.
Enter the PIN via the number bar (the PIN is a default setting 1234).

The number bar is blended out if the identification is successful.



After approx. 1 sec., this screen is blended in on the device (the display of the screen is an example).

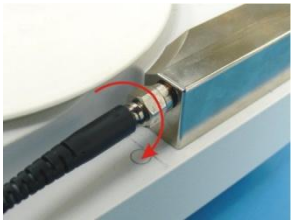
⚠ WARNING **Every laser device in current disuse must be safeguarded against unauthorised use.**
Changing the factory PIN (see Changing the PIN, page 96).

if you have forgotten your personal PIN, you can start up the device with a Super PIN. You can obtain the Super PIN from Kaltenbach & Voigt GmbH Service Support. After the start with the Super PIN, change the PIN on your personal PIN again.

Commissioning of the transmission fibre optic conductor

⚠ WARNING **Follow the instructions for commissioning and sterilisation in the Instructions for use of the relevant accessory.**

⚠ WARNING **Danger of contamination!**
Carry out the wipe disinfection of the transmission fibre optic conductor both just before application as well as directly after application including the initial commissioning.



Connect the transmission optic fibres to the laser device.

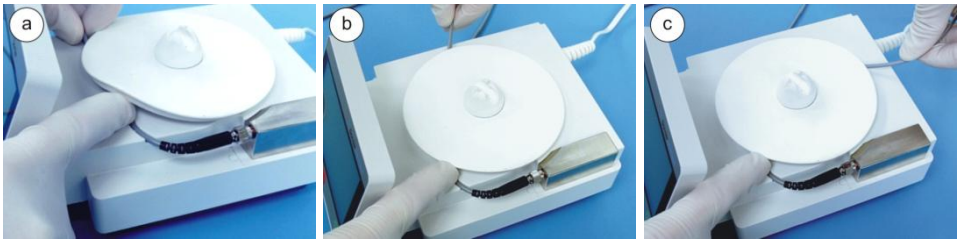
⚠ The plug of the fibre optic conductor must be screwed on completely, approx. 5 clockwise turns are required.

Verify the firm seating of the fibre optic conductor plug.

⚠ CAUTION **To prevent damage to the fibre optic conductor:**

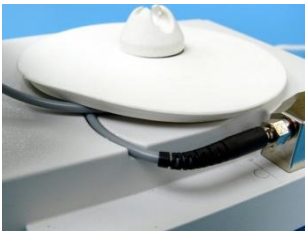
hold the transmission fibre optic conductor firmly in the guide grove while winding (a);

while winding, grip the transmission fibre optic conductor at a distance of 1 cm to 2 cm from the edge of the fibre winding (b, c), so that the fibre optic conductor can be wound gently under the white silicone disc;



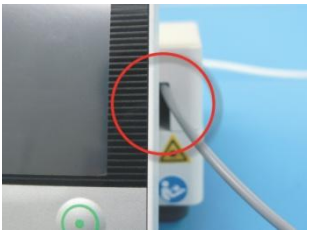
Avoid contact with the distal and proximal ends of the transmission fibre optic conductor.

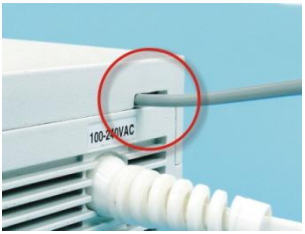
The part of the transmission fibre optic conductor, which is not required for the treatment, can be completely wound under the fibre winding (bending radius is 25 mm).



1. Wind or unwind the transmission fibre optic conductor
   on the fibre winding according to requirement, ensuring that the length of the conductor is adequate for the treatment.

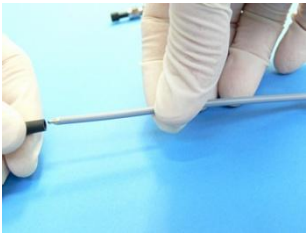
2. Put the housing cover on,
   guiding the transmission fibre optic conductor through one of the recesses provided for this purpose.





3. Check the eye protection.
4. Switch on the laser device.

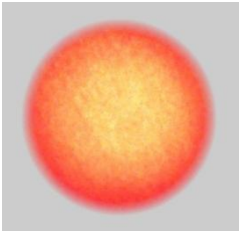
The laser device detects the connection of the fibre optic conductor.
The message „*Connect the fibre optic conductor to the device*“ extinguishes. The laser status bar is blended in.



⚠ **WARNING**

Cross contamination hazard!
Do not put on the protective cap during applications.
The protective cap serves as protection only for delivery or in case of prolonged storage in the case.

5. If necessary, remove the protective cap of the fibre optic conductor.

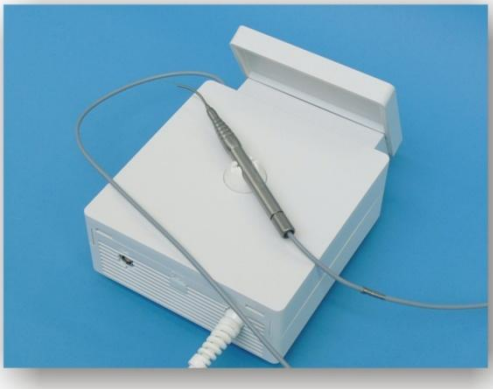


6. Direct the distal end of the transmission fibre optic conductor (distance: approx. 20 mm) vertically to a bright, flat surface and observe the light spot of the pilot laser beam (radiation characteristics).

In case of a technically faultless transmission fibre optic conductor, an even circular light spot is generated with intensity rapidly decreasing to the outside.

⚠ WARNING **If the radiation characteristics do not comply with the above mentioned description, or presentation, the complete functioning of the fibre optic conductor tip cannot be achieved. Hence the desired success of treatment cannot be guaranteed or the handpiece is overheated. If necessary, replace the fibre optic conductor and check again.**

Figure 14. ***Device with connected transmission optic fibre conductor and div. accessories***



Mounting the sapphire tip handpiece and commissioning

⚠ WARNING

The handpieces and sapphire tips are delivered in non-sterile condition by the manufacturer.
To enable sterile application, handpieces and sapphire tips must prepared prior to every application including the initial commissioning together with the tools (see Instructions for Use Accessories for Dental Application).

⚠ WARNING

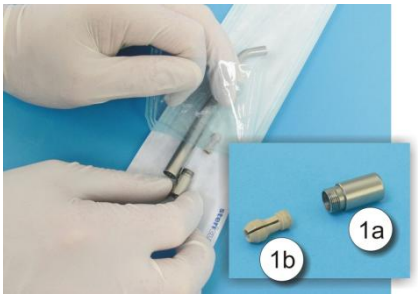
It is essential to prevent contamination of the sterilised handpieces and sapphire tips that come into contact with patients.
Observe the instructions for the aseptic removal and assembly of the handpieces and sapphire tips.

⚠ WARNING

Contamination hazard!
If sterile packaging is damaged, previously sterilised handpieces and sapphire tips must be sterilised again before use.

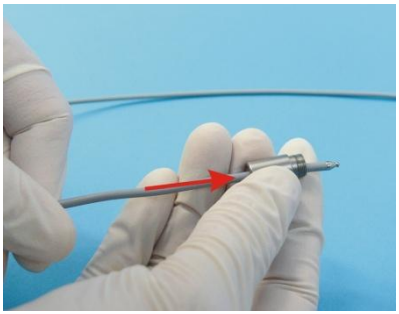
⚠ WARNING

Contamination hazard!
If possible, keep the handpiece in your hand and do not lay it down on an unsterile surface. Avoid contact with the sapphire tip.
Use only a sterile holder throughout the entire process!

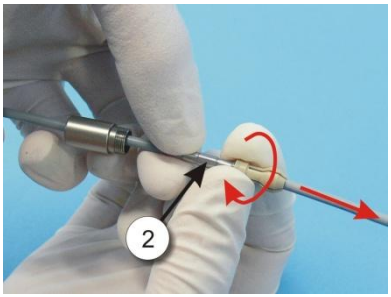


Transmission optic fibre conductors must be connected to the device by means of fixing sleeves (see page 59)

1. Open the pack at the handle side of the handpiece and remove the fixing sleeve (1a) and the chuck (1b).

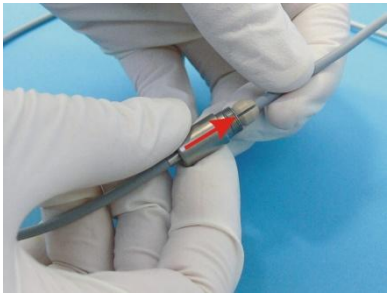


2. Guide the transmission optic fibre conductor through the opening in the fixing sleeve.



3. Guide the optic fibre conductor through the opening in the chuck and screw the chuck onto the fixing sleeve (2) of the optic fibre conductor.

The chuck must be hand-tightened onto the fixing sleeve of the optic fibre conductor. Verify the firm seating of the chuck before you continue.



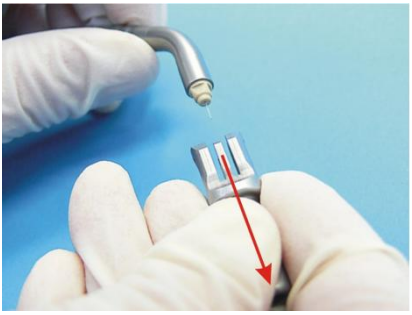
4. Mount the fixing sleeve, applying slight pressure to the chuck.

5. Remove the handpiece from the packaging.

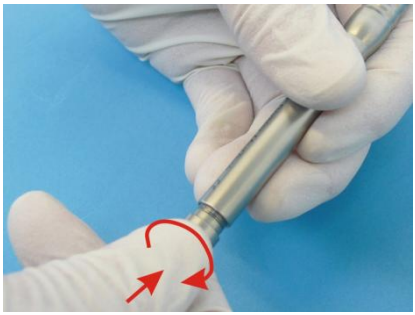
6. Open the sapphire tip pack at the tool side.

7. Remove the tool with sapphire tip from the pack, avoiding contact with the sapphire tip.

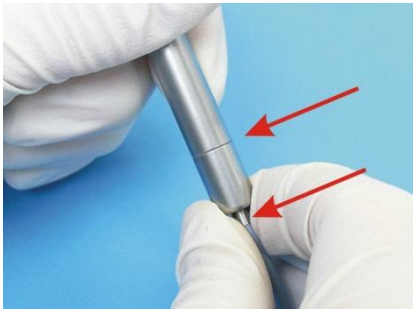
8. Screw the sapphire tip into the handpiece in a clockwise direction.



9. Pull off the tool from the sapphire tip.

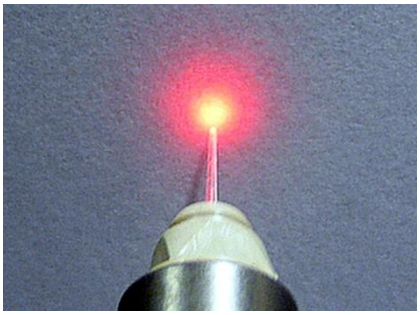


10. Guide the transmission fibre optic conductor into the handpiece to backstop and screw the fixing sleeve to the proximal end of the handpiece tightly.



Guide the transmission fibre optic conductor slowly through the curve of the handpiece, exercising only slight pressure. Excessive pressure compresses the transmission optic fibre conductor and intensifies the resistance.

11. Check that there is no gap at the screw connection between the clamping and the handpiece and verify the firm sea of the transmission optic fibre conductor.



12. Switch the laser device on and verify that the pilot light an the distal end of the sapphire tip is clearly detectable. If necessary, check the screw connections of the clamping on the fixing sleeve and on the handpiece.

13. Set the desired parameters on the laser device and commence the treatment.

In case of a technically faultless sapphire tip, an even light spot is generated with intensity rapidly decreasing to the outside.

⚠ WARNING **If the radiation characteristics do not comply with the above mentioned description, or presentation, the handpiece could heat up inadmissibly and the complete functioning of the sapphire tip cannot be achieved. Hence the desired success of treatment cannot be guaranteed. If possible, keep the handpiece in your hand and do not lay it down on an unsterile surface.**

Mounting the bare fibre handpiece and commissioning

⚠ WARNING

The bare fibre handpieces are delivered in non-sterile condition by the manufacturer.
To enable sterile application, bare fibre handpieces must prepared prior to every application including the initial commissioning (see Instructions for Use *Accessories for Dental Application*).

⚠ WARNING

It is essential to prevent contamination of the sterilised handpieces and bare fibre tips that come into contact with patients.
Observe the instructions for the aseptic removal and assembly of the handpieces and bare fibre tips.

⚠ WARNING

If sterile packaging is damaged, previously sterilised handpieces must be sterilised again before use.

⚠ WARNING

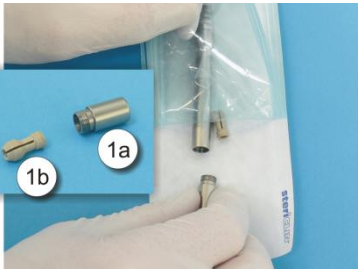
Contamination hazard!
If possible, keep the handpiece in your hand and do not lay it down on an unsterile surface. Avoid contact with the bare fibre tip.
Use only a sterile holder throughout the entire process!

STERILE | EO

⚠ WARNING

The bare fibre tips are delivered in sterile condition by the manufacturer (EO = ethylene oxide).

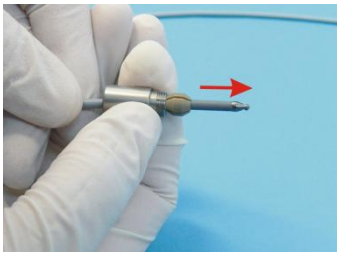
The bare fibre tips from damaged sterile packaging may not be used.



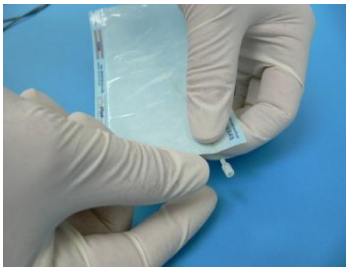
the transmission optic fibre conductor must be connected to the device (see page 59)

1. Open the pack at the handle side of the handpiece and remove the fixing sleeve (1a) and the chuck (1b).

2. Mount the fixing sleeve, applying slight pressure to the chuck.

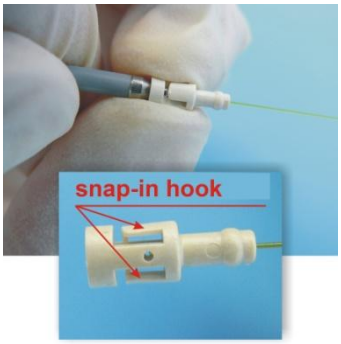


3. Guide the transmission optic fibre conductor through the opening in the fixing sleeve and the chuck.



4. Open the pack at the adaptor side of the bare fibre tip.

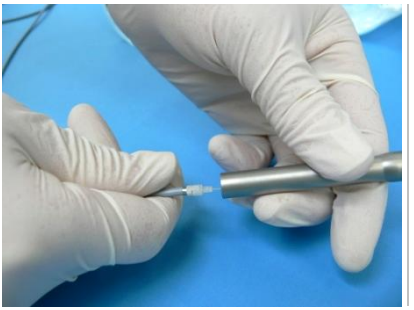
5. Remove the bare fibre tip from the pack, avoiding contact with the fibre of the fibre optic conductor.



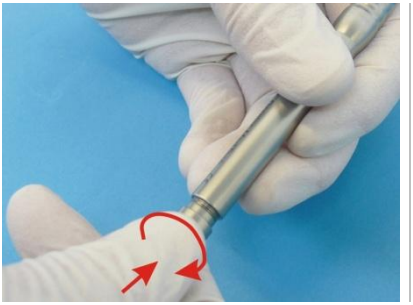
Hold the bare fibre tip without touching the snap-in hook.

6. Attach the adaptor of the bare fibre tip to the distal end of the transmission fibre optic conductor until the adaptor perceptibly snaps into place.

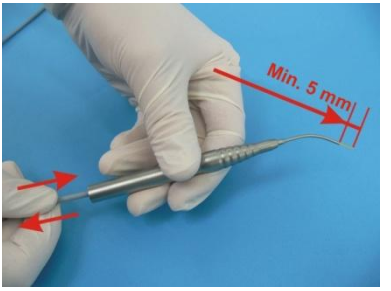
7. Remove the handpiece from the pack, avoiding contact with the distal end of the handpiece.



8. Guide the transmission fibre optic conductor with the mounted bare fibre tip into the handpiece.

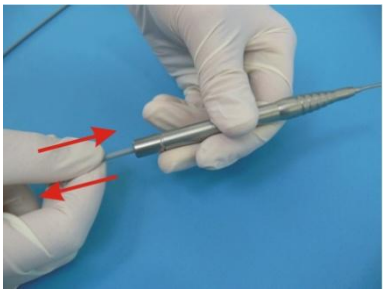


9. Screw the fixing sleeve at the proximal end of the handpiece so that the fibre optic conductor will still have freedom of movement.

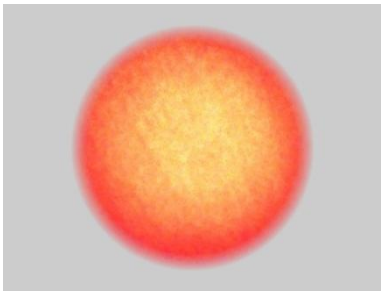


10. Adjust the required length of the bare fibre tip at the distal end. The distal end of the fibre optic conductor must protrude from the handpiece by at least 5 mm.

11. Screw the clamping at the proximal end of the handpiece tightly.



12. Verify the firm seating of the transmission fibre optic conductor.



13. Switch on the laser device. Direct the distal end of the bare fibre tip (distance: approx. 20 mm) vertically to a bright, flat surface and observe the light spot of the pilot laser beam (radiation characteristics).
If necessary, check the screw connections of the clamping on the handpiece.

In case of a technically faultless bare fibre tip, an even circular light spot is generated with intensity rapidly decreasing to the outside.

⚠ WARNING **If the radiation characteristics do not correspond to the above-mentioned description or depiction, the handpiece might heat up inadmissibly, which may lead to burn injury. You may need to replace the BareFiber-Tip and check the new tip again.**

⚠ WARNING **Undesirable side effects could arise in case of contact cutting (e.g. overheating of deeper layers of tissue).**
To prevent complications, the sapphire tip or bare fibre tip must be burnt in (see Blacken the sapphire tip / bare fibre tip, page 70).

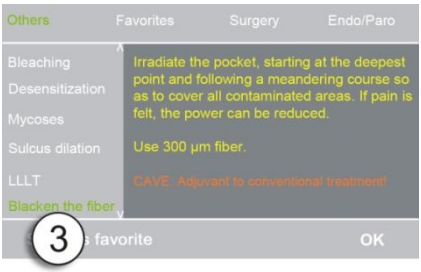
14. If you have selected an indication that is not performed in the contact, set the desired parameters on the laser device and commence the treatment.

Blacken the sapphire tip / bare fibre tip

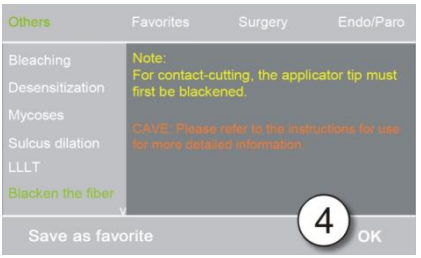
1. Activate ☞ the indication element.

2. Activate ☞ the display others.

The display *Others* changes colour to green and moves to the left.



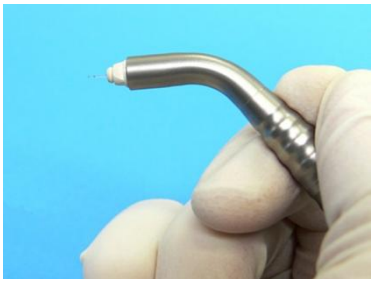
3. „Draw“ up via the indication list and select ☞ *Blacken the fiber* from the list.



4. Confirm with ☞ *OK* to proceed to therapy mode.

The parameters for *Blacken the fiber* are set automatically.

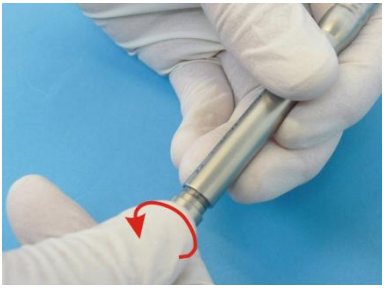
5. Touch the imprinted dark square on the sapphire tip & bare fibre tip pack with the distal end of the sapphire tip / bare fibre tip and activate the laser beam.



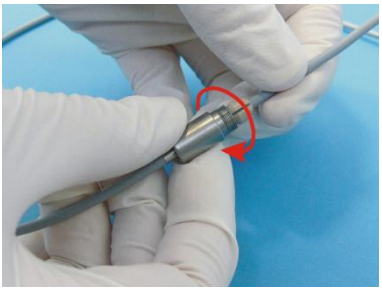
6. Check that the sapphire tip / bare fibre tip has been burnt in (a dark coating must be detectable at the distal end of the sapphire tip / bare fibre tip), if necessary, repeat the procedure from step 5.

7. Set the desired indication on the laser device.
8. Commence the treatment.

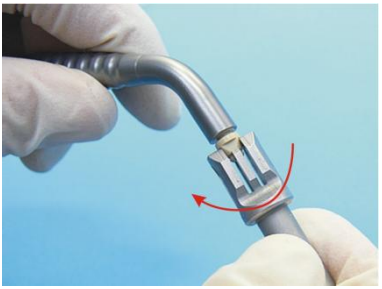
Dismounting the sapphire tip handpiece



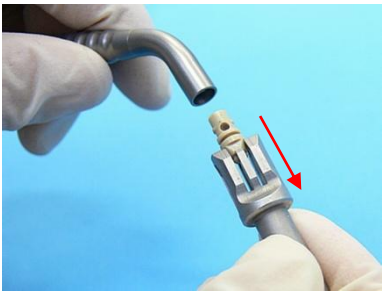
1. Unscrew the fixing sleeve from the handpiece completely and pull the transmission fibre optic conductor with the chuck and fixing sleeve slowly from the handpiece.



2. Unscrew the chuck from the fixing sleeve and pull the chuck with the fixing sleeve from the transmission fibre optic conductor.



3. Unscrew the sapphire tip from the handpiece using the tool.

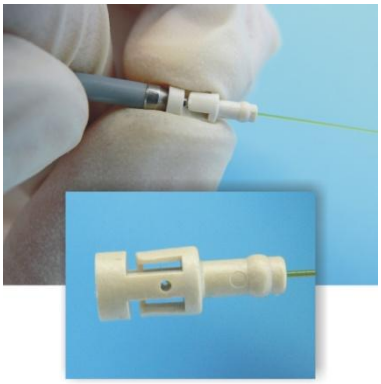


4. Pull off the sapphire tip.

5. Then carry put the preparation process
(see Instructions for use *Accessories for dental application*).

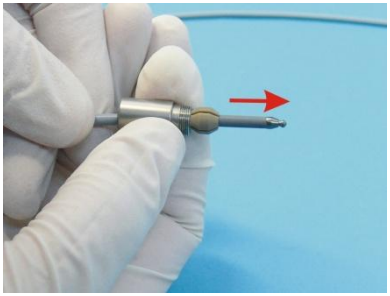
Dismantling the bare fibre handpiece

1. Unscrew the fixing sleeve from the bare fibre handpiece and pull the transmission fibre optic conductor with the bare fibre tip from the handpiece.



Hold the bare fibre tip without touching the snap-in hook.

2. Pull the adaptor of the bare fibre tip from the distal end of the transmission fibre optic conductor.



3. Pull the chuck with the fixing sleeve from the transmission fibre optic conductor.

4. Then carry put the preparation process
(see Instructions for use *Accessories for dental application*).

At the end of the service life cycle, dispose of the optic fibres and handpieces in accordance with the local regulations for contaminated products. In this way you will minimise hazards for the environment and personnel that could be caused by contamination and residues of the fibres and handpieces employed.

Therapy settings

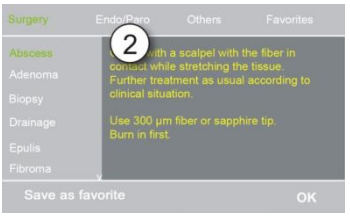
To be able to monitor the set parameters during therapy, secure a clear view of the display of the device.

Select the indication

⚠ CAUTION

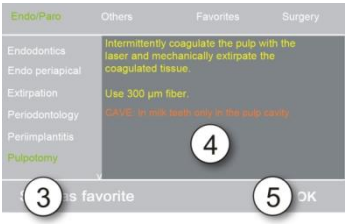
Unsuitable fibre optic conductors could be damaged.
Only use suitable fibre optic conductors when you change the indication or the specialist area. Follow the instructions in the Instructions for use of the fibre optic conductor.

1. Activate the indication element ☞ *e.g. Abscess.*



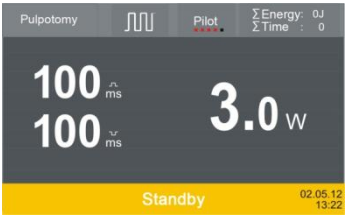
2. Select the specialist area (☞ e.g. *Endo/Paro).*

The display for the chosen specialised area changes colour to green and moves to the left. The corresponding indications are blended in.



3. Select the indication (☞ e.g. *Pulpotomy*).

White arrows are blended in if the list of indications is longer than can be shown on the screen. The indications can be shifted by „dragging“ up or down over the indication list.



4. Read the instructions with care.

5. Confirm selection with ☞ *OK* to proceed to therapy mode.

On return to therapy operation, the chosen indication is blended into the upper status bar and the parameters are set to the chosen indication.

Setting the performance

The desired indication must be chosen (Select the indication, page 74).

1. Activate ☞ the performance value.

The chosen value changes the colour from white to green and the slider scale is blended in.

2. Activate ☞ the desired value on the slider scale.

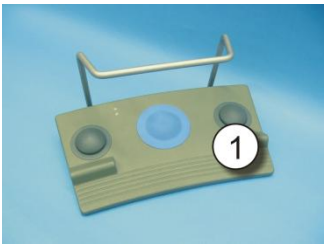
The chosen value is set.

if you want to set a value that is higher or lower than is indicated on the display, shift the slider scale in the corresponding direction.

After approx. 5s, the colour of the display changes from green to white and the slider scale is blended out.

Setting the performance with the wireless foot switch

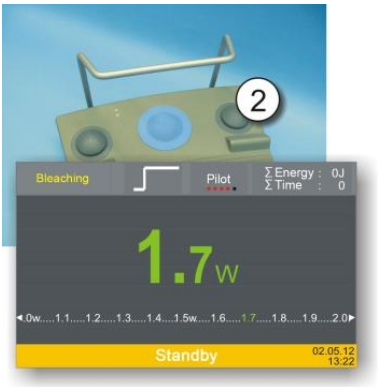
The desired indication must be chosen (Select the indication, page 74).



1. Activate the right button on the wireless foot switch.

The chosen value changes the colour from white to green, the next highest value is set at once and the slider scale is blended in.

⚠ WARNING **Continually check the performance display visually!**



2. Activate the right button on the wireless foot switch repeatedly until the desired value is activated on the slider scale.

The cursor (value marked in green) moves from left to right within the visible area of the slider scale.

When the highest value at the end of the visible area of the slider scale has been reached, the cursor springs to the first lowest vale at the beginning of the slider scale.

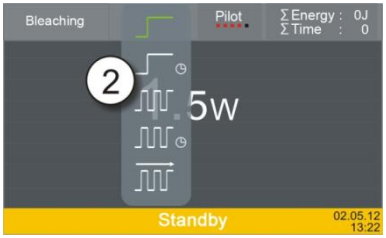
The chosen value is set at once.

After approx. 5s, the colour of the display changes from green to white and the slider scale is blended out.

Setting the pulse form

The desired indication must be chosen (Select the indication, page 74).

1. Activate the element ☞Pulse form.



The activated element changes colour from white to green.
The pulse forms for selection (Drop-Down list) are blended in.

2. Select ☞the desired pulse form in the Drop-Down list.

The symbol for the chosen (activated) pulse form changes colour to green.

The selected pulse form can be adopted actively by pressing the pulse form element. Otherwise the chosen pulse form is set automatically and the pulse forms for selection (Drop-Down list) are blended out after approx. 2 s. The element changes colour from green to white. The corresponding laser parameter values are displayed and can now be changed.

Setting the pulse duration

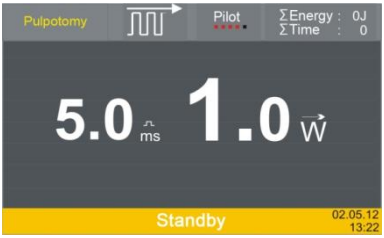
The desired indication must be chosen (Select the indication, page 74).

1. Confirm ☞ the value of pulse duration (provided with ⎍ icon).

The chosen value changes the colour from white to green and the slider scale is blended in.

2. Activate ☞ the desired value on the slider scale.

The chosen value is set.



After approx. 5s, the colour of the display changes from green to white, the slider scale is blended out.

Setting the pulse pause

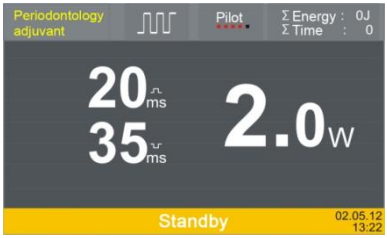
The desired indication must be chosen (Select the indication, page 74).

1. Confirm ☞ the value of pulse duration (displayed with ⊔ icon).

The chosen value changes the colour from white to green and the slider scale is blended in.

2. Activate ☞ the desired value on the slider scale.

The chosen value is set.



After approx. 5s, the colour of the display changes from green to white, the slider scale is blended out.

Setting the duration of application

The desired indication must be chosen (Select the indication, page 74).

1. Activate ☞ the value for the duration of application.

The chosen value changes the colour from white to green and the slider scale is blended in.

2. Activate ☞ the desired value on the slider scale.

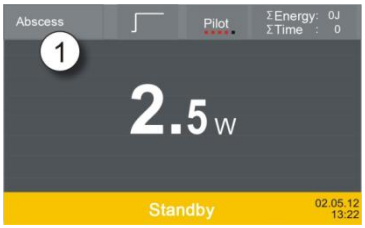
The chosen value is set.

After approx. 5s, the colour of the display changes from green to white, the slider scale is blended out. Additional information can be obtained from: pages 43 and 44.

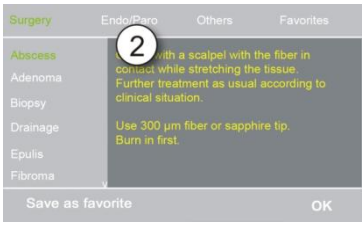
Compilation and use of list of Favorites

Saving the default settings of the indication parameters

Each indication can be saved in the list of Favorites.
The indication will be overwritten if it is already in the list of Favorites.



1. Activate ☞ the indication element.



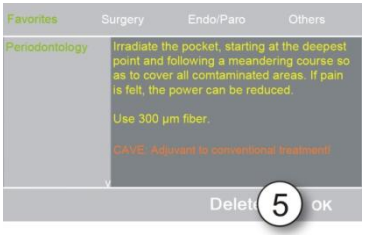
2. Select the desired specialist area (☞ *e.g. Endo/Paro*).

The display for the chosen specialised area changes colour to green and moves to the left. The corresponding indications are blended in.

3. Select the desired indication (☞ e.g. *Periodontology)*.

4. Activate ☞ *Save in Favorites*.

The Favorites display changes colour to green and moves to the left. The desired indication is included in the list of Favorites.



5. Confirm with ☞ *OK* to proceed to therapy mode.

Saving individual indication parameter settings

Each indication can be saved with any settings (including pilot).
The indication will be overwritten if it is already in the list of Favorites.

1. Select the indication
(see. „Select the indication“, page 74),
e.g. ☞ *Paro adjuvant*.

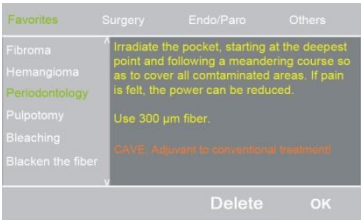
The recommended therapy parameters (default settings) are set.

2. Set the desired values.

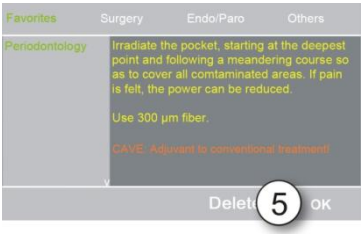
As soon as you have changed the recommended therapy parameters, the colour of the indication element changes to yellow.

3. Activate ☞ the indication element.

4. Activate
☞ Save in Favorites.



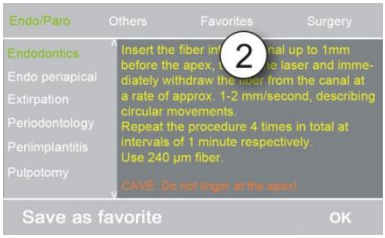
The Favorites display changes colour to green and moves to the left. The changed indication is included in the list of Favorites.



5. Confirm with ☞ *OK* to proceed to therapy mode.

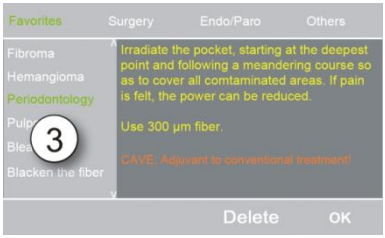
Calling up indication parameters from the list of Favorites

1. Activate ☞ the indication element.



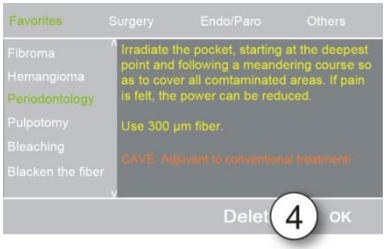
2. Activate ☞ *Favorites*.

The Favorites display changes colour to green and moves to the left.



3. Select ☞ the indication from the list of Favorites.

White arrows are blended in if the list of Favorites is longer than can be shown on the screen. The indications can be shifted by „dragging“ up or down over the list of Favorites.



4. Confirm with ☞ *OK* to proceed to therapy mode.

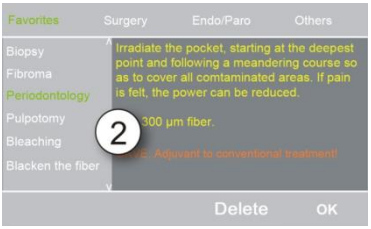
The indication parameters are set automatically.

the indication element is displayed in yellow if the indication has been saved with individual changed parameters.

Deleting indication parameters from the list of Favorites

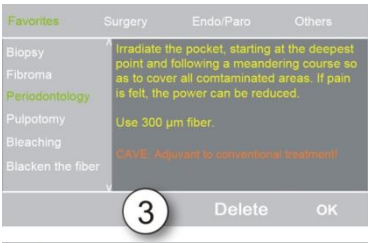
1. Activate the ☞ indication element.

Select menu ☞ *Favorites* if necessary.

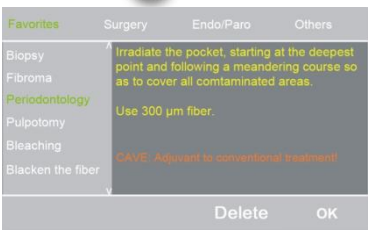


2. Select ☞ the indication to be deleted from the list of Favorites.

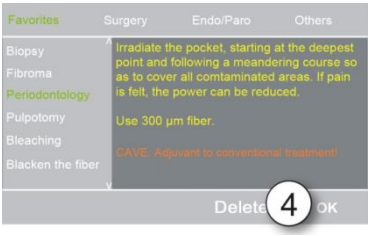
The name of the indication changes colour from white to green.



3. Activate ☞ *Delete*.



The indication is removed from the list of Favorites. The indication following in the list of Favorites is activated.



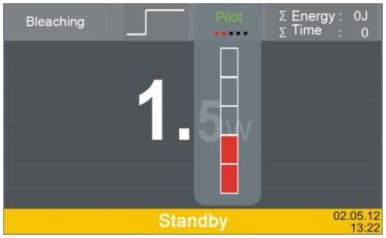
4. Confirm with ☞ *OK* to proceed to therapy mode.

Setting the brightness of the pilot laser

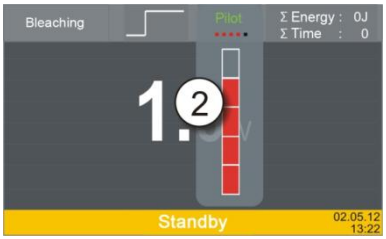
The fibre optic conductor must be connected to the device to be able to visually check the brightness of the pilot laser.

The desired indication must be chosen („Select the indication", page 74).

1. Activate ☞ the element *Pilot*.



The activated element changes colour from white to green. The bar with the pilot brightness level is blended in.
The activated pilot brightness levels are displayed red.



2. Activate ☞ the pilot brightness levels on the bar that has been blended in.

The brightness setting can be checked visually on the connected fibre optic conductor.

The pilot laser can be switched off. To achieve this, activate the lower pilot brightness level twice.

⚠ WARNING Risk of injury!
If the pilot is switched off and invisible, the device may only be used for contact applications.

The selected value can be adopted actively by pressing the pilot element. Otherwise the chosen value is set automatically. After 2 seconds, the bar with the pilot brightness levels is blended and the colour of the element changes from green to white.

Changing the display mode of the protocol button

1. Activate ☞ the protocol button.

2. Select ☞ the desired pulse lines in the Drop-Down menu.

Display Σ Energy, Time:

The sum of the applied energy and the sum of the application times are displayed.

Display ◷ off (mm:ss):

the duration of the inactive phase of the laser beam is displayed.

Display ◷ off / on (mm:ss):

the duration of the inactive phase and the duration of the inactive phase and the duration of the inactive phase of the laser beam are indicated alternatively.

Display $\hat{P}$, $\bar{P}$:

The peak performance ($\hat{P}$) and average performance resulting from the parameter selection
($\bar{P}$) are displayed.

Resetting the protocol or timer

⚠ The data to be reset must be displayed in the upper status bar.

1. Activate ☞ the protocol element.

The activated element changes colour from white to green.

2. Activate ☞ *Reset* on the Drop-down menu blended in.

The saved data are deleted from the protocol. The protocol element changes colour from green to white. The drop-down menu is bended out.

When the device is switched off after completion of treatment, the saved data are deleted from the protocol automatically.

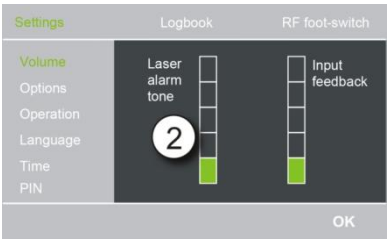
Menu settings

The setting in the menu is made by touching a displayed element or value. For confirmation, the colour of the selected element or value changes from white to green.

Setting the volume for laser warning signal tones and input feedback

Begin with step 2 if you are already in the settings menu.

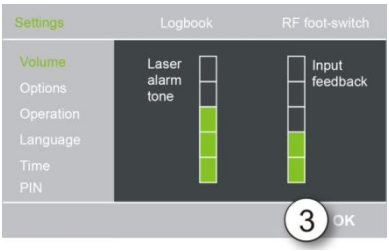
1. Activate the „Menu“ button.



2. Activate ☞ the laser warning signal / input feedback levels in the relevant bar.

The volume of the tone can be acoustically controlled.

Activate the lower volume level twice to switch off the input feedback.



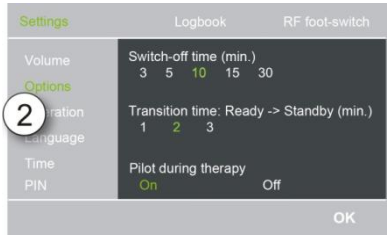
3. Confirm the setting with ☞ *OK*.

The device changes to therapy mode.

Setting the switch-off time

Begin with step 3
if you are already in the menu - settings → options.

1. Activate the „Menu“ button.



2. Activate the menu dialogue ☞ *Options.*

3. Select the desired switch-off time and activate the corresponding symbol (e.g. ☞ *15*).

Here you can also deactivate the automatic switch-off of the device in device variants with an internal power supply (☞ *Off*).

This possibility is not available in battery-operated devices.

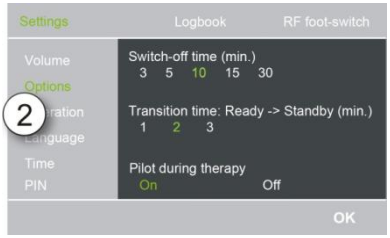
4. Confirm the setting with ☞ *OK.*

The device changes to therapy mode.

Setting transitional period Ready → Standby

Begin with step 3
if you are already in the menu - settings → options.

1. Activate the „Menu“ button.



2. Activate the menu dialogue ☞ *Options.*

The time required for the automatic status change of the device:
1, 2, 3 minutes

3. Select the desired transitional period (e.g. *3*) and activate ☞ the corresponding symbol.

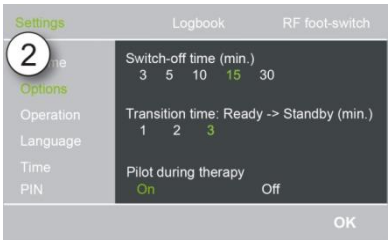
4. Confirm the setting with ☞ *OK.*

The device changes to therapy mode.

Selecting option „Pilot during treatment“

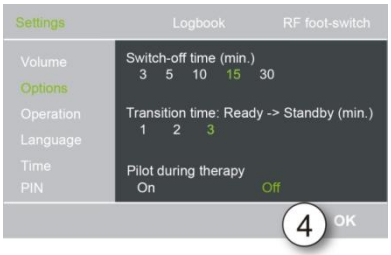
Begin with step 3
if you are already in the menu - settings → options.

1. Activate the „Menu“ button.



2. Activate the menu dialogue
☞ *Options.*

3. Select the desired setting under the line „Pilot during treatment“, to achieve this, activate the corresponding selection (e.g.
☞ *Off*).



4. Confirm the input with
☞ *OK.*

the device changes to therapy mode (observe the information in chapter Pilo, page 48).

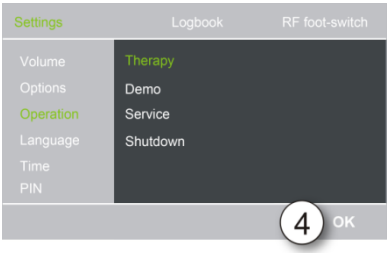
Selecting operation

Begin with step 2 if you are already in the settings menu.

1. Activate the „Menu“ button.

2. Activate the menu dialogue ☞ *Operation.*

3. Select the desired operating mode (☞ e.g. *Therapy*).



4. Confirm selection with ☞ *OK.*

The device changes to therapy mode.

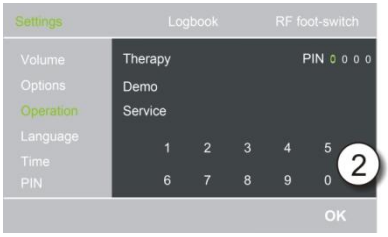
The **Demo** operation is only for demonstration purposes. Treatment is not possible.

the **Service** operation is only accessible to the customer service. Treatment is not possible.

In this screen, you can also switch off the device, ☞ *Switch off.*

if you are in the menu – settings – operation – demo and would like to change to therapy operation, the device will start the PIN request once again.

1. Activate ☞ *Therapy*.



The PIN input is blended in

Switch off is blended out.

A number bar is blended in.

2. Enter the PIN, to do this activate the corresponding figures on the number bar.

The cursor is displayed by a green mark. On the entry of numbers, the green **0** is replaced by *.

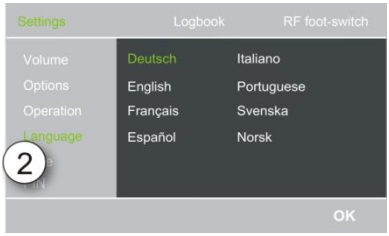
3. Confirm the input with ☞ *OK.*

The device changes to therapy mode.

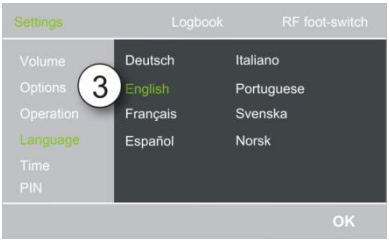
Setting the language

Begin with step 2 if you are already in the settings menu.

1. Activate the „Menu“ button.

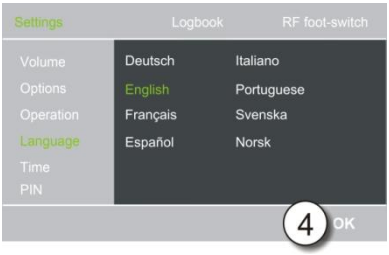


2. Activate the menu dialogue ☞ *Language.*



3. Select the desired language (☞ z.B. *English*).

A Polish version is also available from SW – Version 1.3.1.



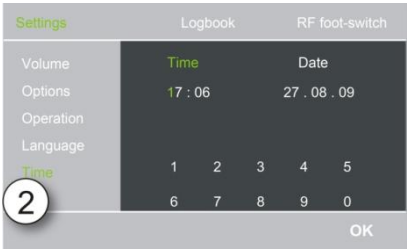
4. Confirm selection with ☞ *OK.*

The device changes to therapy mode.

Setting the date and time

Begin with step 2 if you are already in the settings menu.

1. Activate the „Menu“ button.



2. Activate the menu dialogue ☞ *Time.*

The time display is active and displays green. The cursor is displayed by a green marking of the time/date figures. A number bar is blended in.

3. Enter the time and date, to do this activate the corresponding ☞ figures on the number bar.

If you only want to change a certain number, ☞ activate the number (the first digit changes colour from white to green) and activate the corresponding ☞ figures on the number bar.

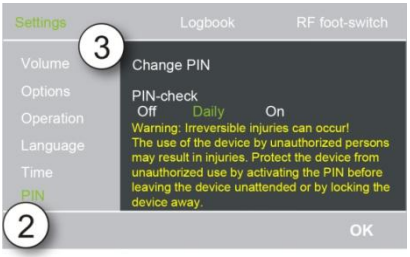
4. Confirm selection with ☞ *OK.*

The device changes to therapy mode.

Changing the PIN

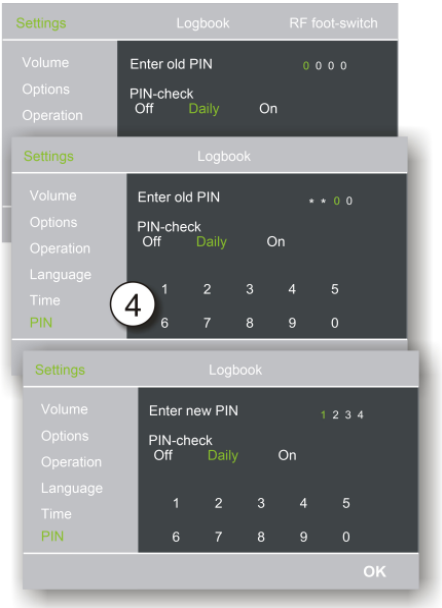
Begin with step 2 if you are already in the settings menu.

1. Activate the „Menu“ button.



2. Activate the menu dialogue ☞ *PIN.*

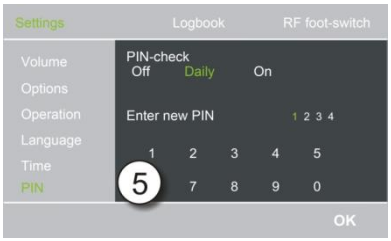
3. Activate the function ☞ Change *PIN*.

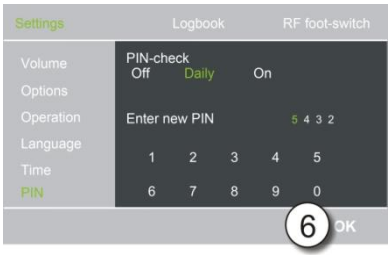


The text *Change PIN* is replaced by the text *Enter old PIN*.
The cursor is displayed by a green mark.
A number bar is blended in.

4. Enter the old PIN (e.g. 1234) to do this, activate the corresponding ☞ figures on the number bar.

On the entry of numbers, the green **0** is replaced by ✱.
If the identification is successful, the text *Enter old PIN* is replaced by the text *Enter new PIN*.





5. Enter the old PIN (e.g. 5432) to do this, activate the corresponding ☞ figures on the number bar.

The cursor is displayed by a green marking of the PIN code.

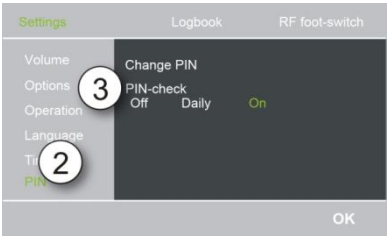
6. Confirm the input with ☞ *OK*.

The device changes to therapy mode.

Setting the frequency of the PIN - request

Begin with step 2 if you are already in the settings menu.

1. Activate the „Menu“ button.

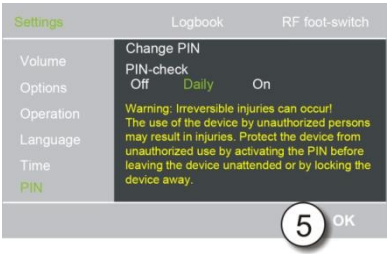


2. Activate the menu dialogue ☞ *PIN.*

3. Activate the function ☞ *PIN request.*

4. Select the desired PIN request, to do this, activate the corresponding selection (e.g. ☞ *daily*).

⚠ WARNING **The device emits a warning in case of selection of the PIN request *Daily* or *Off*. Read carefully and follow the warning text on the screen of the device.**



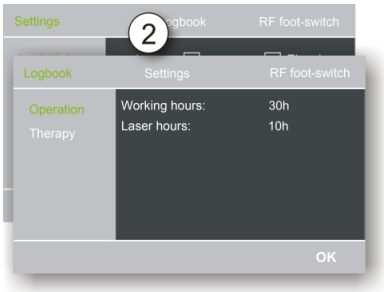
5. Confirm the input with ☞ *OK.*

The device changes to therapy mode.

Reading the logbook

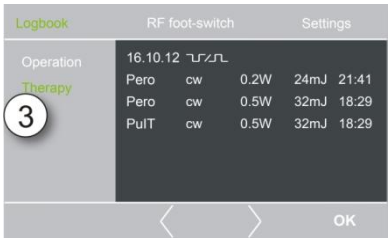
Begin with step 2 if you are already in the settings menu.

1. Activate the „Menu“ button.



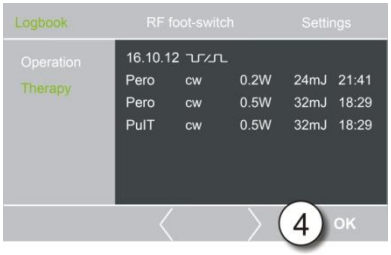
2. Activate the function
☞ *Logbook*

The *Logbook* display changes colour to green and moves to the left. The menu dialogue *Operation* is active and displays green. You can read the information concerning operating hours and laser hours on the screen.



3. Activate the menu dialogue
☞ *Therapy*.

You can read the therapy data on the screen. You can "scroll" between entries by activating the arrows.



4. Activate ☞ *OK* to return to therapy mode.

The device changes to therapy mode.

Triggering the therapy beam

⚠ WARNING **Warn all persons in the laser area before triggering the laser beam.**
All persons present in the laser area must wear safety goggles.

⚠ WARNING **The laser button may not be pressed until the fibre optic conductor or application handpiece is directed to the field of operation.**

⚠ WARNING **Contact cutting involving high pressure on the fibre can lead to breakage of the fibre tip.**
Avoid high pressure of the fibre to tissue.

⚠ WARNING **The fibre optic conductor may not be unplugged during the therapy.**

⚠ WARNING **Monitor the tissue effect continually and visually during the therapy.**

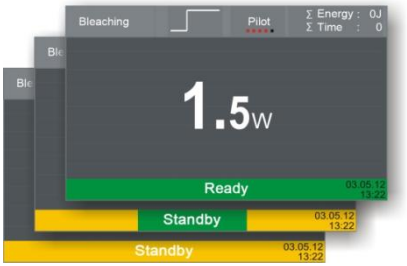
⚠ WARNING **It is essential to follow the instructions for use of the fibre optic conductor.**

 if an error occurs during the therapy, the device will show an ERROR number and an explanatory text. In this case carry out a new start. If the error persists, please notify the KaVo Service and tell the service employee the error message, the software version and the serial number of the device.

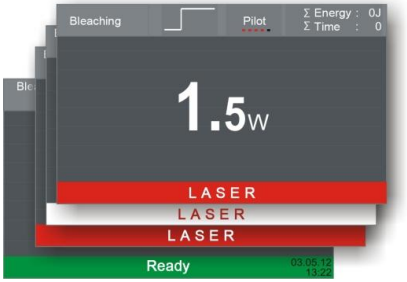
Triggering the therapy beam with the wired foot switch

The laser changes to "Standby" as soon as the fibre optic conductor and the foot switch are connected and there is no disturbance.

1. Select the indication.
2. Check or set the therapy parameters.
3. Activate the laser bar or the switch-on button of the device.



The laser bar „Standby“ is replaced by the laser bar „Ready“. On transition, the background colour changes from yellow to green within 2 s from the centre to the outside. Hence the foot switch is released for laser activation.



4. Activate the foot switch when the laser bar „Ready“ has completely changed the background colour to green.

During laser radiation, the laser bar with the display LASER is displayed flashing white/red and a laser warning signal is audible. The date and time are not displayed in laser operation.

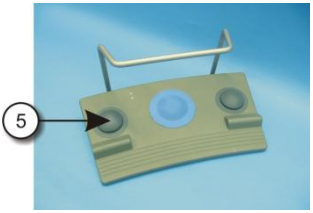
⚠ WARNING **Risk of injury!**

Activate the laser bar or the switch-on button of the device and switch the device to „Standby“ - mode if you want to interrupt the laser operation or treatment.

Triggering the therapy beam with the wireless foot switch

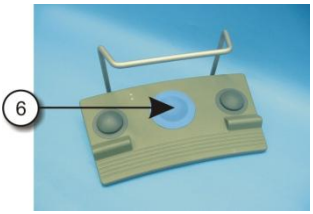
1. Connect the fibre optic conductor.
2. Log the wireless foot switch into the device
   (see Assemble wireless foot switch and log into the device, page 55).

   The laser changes to "Standby" as soon as the fibre optic conductor and the wireless foot switch are connected and there is no disturbance.
3. Select the indication.
4. Check or set the therapy parameters.

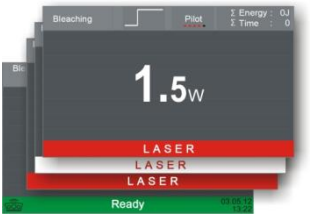


5. Activate the left button on the wireless foot switch once.

The laser bar „Standby“ is replaced by the laser bar „Ready“. On transition, the background colour changes from yellow to green within 2 s from the centre to the outside. Hence the foot switch is released for laser activation.



6. Activate the middle button on the wireless foot switch when the laser bar „Ready“ has completely changed the background colour to green on the touchscreen.



During laser radiation, the laser bar with the display LASER is displayed flashing white/red and a laser warning signal is audible. The date, time and wireless foot switch symbol are not displayed in laser operation.

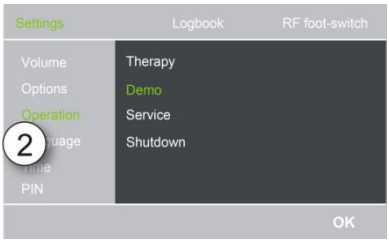
⚠ WARNING **Risk of injury!**
Activate the left button on the wireless foot switch and switch the device to „Standby“ - mode if you want to interrupt the laser operation or treatment.

Switching off the device

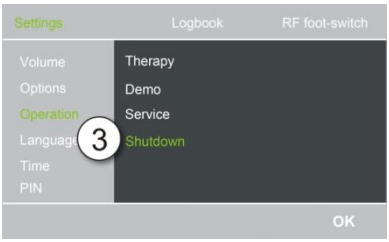
⚠ WARNING **Every laser device in current disuse must be safeguarded against unauthorised use.**

Begin with step 2 if you are already in the settings menu.

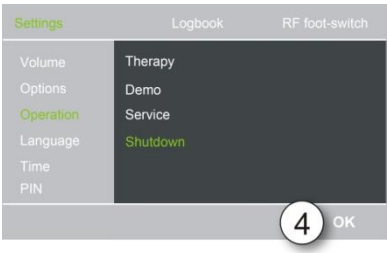
1. Activate the „Menu“ button.



2. Activate the menu dialogue ☞ *Operation.*



3. Select ☞ *Switch off.*



4. Confirm selection with ☞ *OK.*

The device switches itself off.

⚠ CAUTION **Pull the power plug to disconnect the device from the power supply.**

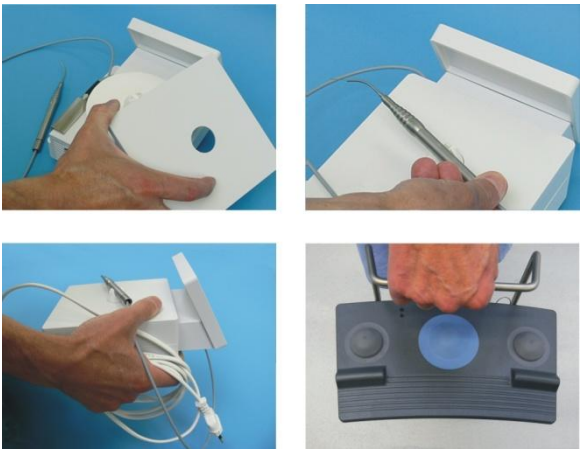
Transportation of the device

⚠ CAUTION **Intense vibration cab cause defects in the device that mandates a safety check.**
Do not expose the device to excessive vibration during transportation.

⚠ CAUTION **Damage to the device during transportation is possible.**
Take measures to prevent damage to the screen and cladding.

1. Switch the device off.
2. Disconnect the power plug from the power supply.
3. Disconnect the foot switch cable from the device.
4. Disconnect the door contact plug if existing.
5. Roll the fibre optic conductor onto its holder.
6. Carry the device as shown below.

The manufacturer recommends transporting the wireless foot switch by the handle (see also the note on page 38).



⚠ CAUTION **To transport the device and accessories, use the case (see 0 to Figure 9, from page 33).**

Maintenance, cleaning, safety check

⚠ WARNING **Maintenance carried out by unauthorised persons could lead to life-threatening personal injury and/or severe material damage to the device.**
Maintenance may only be performed by authorised persons. Authorised persons are exclusively persons who have been trained by KaVo or by a company authorised by KaVo. This group of persons are provided with the documents necessary for the maintenance and servicing. Authorised persons for device maintenance are e.g. KaVo Service staff.

⚠ The maintenance of accessories is described in the instructions for use of the accessories. The instructions for use of accessories must be observed.

Maintenance by the operator

⚠ CAUTION **Prescribed routine maintenance work may only be performed by trained and authorised practice and clinical personnel.**

Table 6. ***Prescribed routine maintenance work***

Maintenance	Interval
Please check and clean the outer surfaces	before/after use
Check the accessories	before/after use
Check the foot switch and the connection to the device	before/after use
Check the laser warning light on the OP door	before/after use
Check the electric cable (power cable and accessory cables)	before/after use
Check the functioning of the LASER-STOP button	before use
Check the battery charging status of the device and wireless foot switch (MASTER lase)	before use

Cleaning

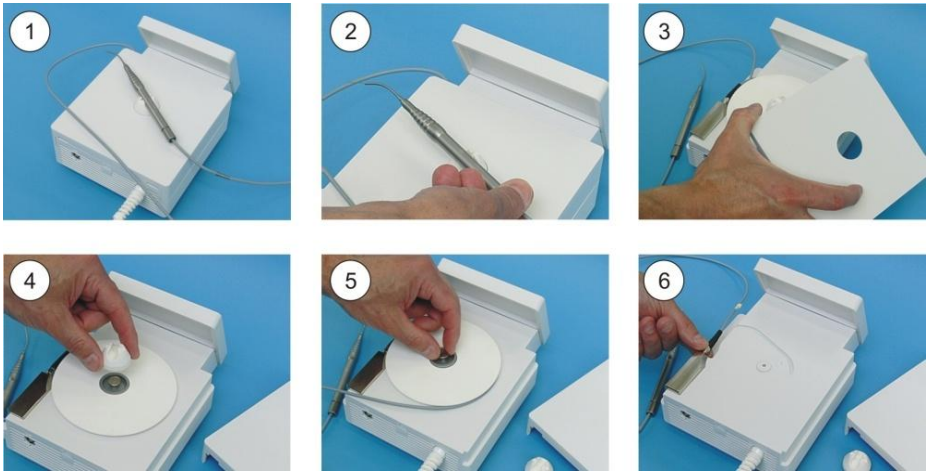
⚠ WARNING **The device must be disconnected from the power supply prior to cleaning.**
Device parts, in particular electrical parts may not be exposed to water spray.
The device may not be disinfected with gas and/or spray disinfectants. Information from manufacturers of disinfectants and legal regulations with regard to disinfection and protection against explosion must be observed.

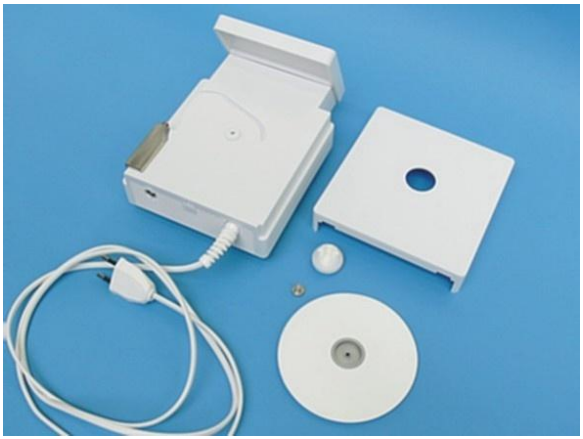
⚠ CAUTION **The device may only be wiped down with a moist cloth on the outside with conventional clinical cleaning agents.**
The control panel (touchscreen) must be cleaned especially carefully and gently using a dry, soft cloth. If the control panel (touchscreen) is really dirty, it can be cleaned with a slightly moistened cloth.

1. Switch the device off.
2. Remove the fibre optic conductor from the device if necessary.
3. Dismantle the transmission fibre optic conductor and unscrew the plug of the transmission fibre optic conductor (see Figure 15, page 107).
4. Clean the device and the dismantled parts. It is essential to observe the warning instructions stated above.
5. Carry out the wipe disinfection of the transmission fibre optic conductor.

The cleaning, disinfection (or sterilisation) of accessories is described in the instructions for use of the accessories.
The instructions for use of accessories must be observed.

Figure 15. ***Dismantling the transmission fibre optic conductor winding***





6. Assemble the device in reverse sequence.

Safety checks

Safety checks are understood as maintenance conducted at regular intervals.

⚠ WARNING **Safety checks carried out by unauthorised persons could lead to life-threatening personal injury and/or severe material damage to the device.**

Safety checks may only be performed by authorised persons. Authorised persons are exclusively persons who have been trained by Kaltenbach & Voigt GmbH tor by a company authorised by Kaltenbach & Voigt GmbH.

⚠ WARNING **The comparison of the laser performance at the fibre end with the value set on the touchscreen is a mandatory constituent of the safety check.**

The laser performance can be checked with a conventional, calibrated laser performance measuring device suitable for the wavelength.

The interval for the device is determined at every 500 operating hours or every 12 months, at the latest. A note appears in the device display if the interval is exceeded.

After every change of location outside the clinic or dental practice - in case of appropriate transportation without detectable transport damage - a function check is sufficient (National German Guidelines / BGV A3, MPBetreibV).

Function check comprises commissioning with device self test (see page 57), fibre optic conductor with pilot laser (see page 65) and subsequent check of laser performance at fibre end at 5 Watt setting.

Messages

Messages are indicated in the display. Some messages are accompanied by an acoustic alarm.

Table 7. *Messages*

Message	Meaning	Action, reference
Connect fiber to device	The transmission optic fibre conductor is not or not correctly connected	Then check whether the transmission optic fibre conductor is correctly connected.
Unlock remote interlock	The door contact is interrupted	Check whether the door contact switch is closed.
Over-temperature housing	the device has switched off because the housing temperature or therapy laser beam is too high	Wait until the device is ready for operation again (do not switch off). Please contact KaVo Service if the message is still displayed after 2/5 minutes.
Over-temperature fiber connector	The device has switched off because the temperature at the transmission fibre optic conductor or therapy laser beam is too high	Check the proximal end of the transmission fibre optic conductor (with a magnifying glass). If you do not detect any damage, wait until the device is ready for operation again (do not switch off). If you detect any damage when you check the transmission fibre optic conductor, replace the conductor. Please contact KaVo Service if the message is still displayed after 2-5 minutes.
Over-temperature laser	The device has switched off the therapy laser beam because the laser diode temperature too high	Wait until the device is ready for operation again (do not switch off). Please contact KaVo Service if the message is still displayed after 2/5 minutes.
Over-temperature heatsink	The device has switched off the therapy laser beam because the cooling unit is overloaded	Wait until the device is ready for operation again (do not switch off). Please contact KaVo Service if the message is still displayed after 2/5 minutes.
High temperature, switch-off possible	The battery temperature is too high.	The current therapy can be continued for 3 - 5 minutes.

Message	Meaning	Action, reference
Over-temperature battery pack	The battery temperature is too high.	Do not switch off the device. Wait until the device is ready for operation again. The therapy can be continued in approx. 30 minutes.
Heatsink non-functional	The cooling unit is defective. The device switches off the therapy laser beam	Switch off the device, please notify the KaVo Service.
Deviation laser power	The deviations in the performance of the laser diodes are outside the tolerance limits. The device switches off the therapy laser beam.	Continue the therapy. Please contact KaVo Service if the message is displayed repeatedly.
Pilot control not possible	The pilot diode has overtemperature or is defective	Wait until the device is ready for operation again (do not switch off). Please contact KaVo Service if the message is still displayed after 2/5 minutes.
Do not tilt RF foot-switch	The wireless foot switch is considerably tilted for longer than 1.5 seconds	If this position of the foot switch is not rectified within 5 sec., the foot switch logs off automatically. You must log the wireless foot switch into the device again to continue the therapy. Put the foot switch in a horizontal position and continue the therapy. Replace the foot switch if the message appears repeatedly.
Update date/time	Invalid date and time set	Set the correct date and time.
Exchange RTC battery	Index	Notify service, have the battery for the real/time clock changed.
Battery charging insufficient	Device battery charging is lower than 25%	Charge the battery completely. If you are administering therapy, connect the device to the power supply and charge the battery completely after the therapy.
Battery health weak	The battery has reached the end of its life	Notify service, have the battery changed.

Product service life and disposal

The service life of the instrument is designed for an application period of at least 8 years.

At the end of the service life of the laser system, contact the manufacturer or his representative to obtain instructions for disposal or recycling (WEEE 2002/96/EC: European Guideline for the Disposal of Obsolete Electrical Devices).

At the end of the service life cycle, dispose of the optic fibres (fibre optic conductors) in accordance with the local regulations for contaminated products. In this way you will minimise hazards for the environment and personnel that could be caused by contamination and residues of the fibres employed.

Disposal of accessories in accordance with the instructions for use of accessories.

China-RoHS declaration of conformity for products of the company Kaltenbach & Voigt GmbH

This product of the company Kaltenbach & Voigt GmbH is complaint with the Industrial Directive # 39 of the Ministry of Information of the People´s republic of China, adopted on 28. February 2006, coming into force on 1. March 2007 („Control of Environmental Pollution by Electronic Products“).

This product bears the EFUP environmental protection mark (environmentally-friendly period of usage), in accordance with the industrial standard SJ/T11364-2006.

This mark indicates that while the product contains specific toxic or hazardous substances, it does not cause environmental pollution and can be used safely during its EFU period. This period is defined for a specific time period and the corresponding mark is attached to the product (e.g. 50 = 50 years EFUP).

Figure 16. ***Environmentally-friendly service periods – marking/China***