Instructions for use
KEY Laser 3+ 1343
KEY Laser III 1243 upgraded

Always be on the safe side.

KaVo. Dental Excellence.

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CE 0124

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Setup plan 104

1 User instructions

1.1 Service

Service hotline:
+49 7351 56-2800
Service.Laser@kavo.com
Please indicate the product serial number in all requests.
Additional information can be obtained at: www.kavo.com

To ensure that the KEY 3+ / III upgraded maintains its value and is always ready for use, have it serviced once a year as recommended.
Observe the respective national regulations.

The servicing covers all testing and safety checks.

1.2 Purpose – Proper use

Note
The KEY Laser 3+ / III upgraded is a dental treatment device in accordance with ISO 74 94.

The device can be used in hospitals and private practices and can be transported.

Note
The device is not suitable for use in surgical theatres.

Note
The KEY Laser 3+ / III upgraded may not be used in areas in which flammable anaesthetics or flammable agents are used for disinfection or skin cleaning.

The KEY Laser 3+ / III upgraded is for use by physicians. The treating physician is exclusively responsible for determining the suitability of the device and selecting the corresponding treatment methods.

The KaVo KEY Laser 3+ / III upgraded is a universally usable erbium laser for dentistry in the dental environment for oral, jaw and facial surgery. With its variable pulse lengths, it is appropriate for treating enamel, bone and concrements and for processing soft tissue, (mucosa, muscle and connective tissue).

Note
The current application manual is always available from KaVo.

1.2.1 Training opportunity

Training options are available at www.kavo.com "Fortbildung" [Continuing education].

1.2.2 Effects

The physiological and biological effects of laser radiation on tissue, safety considerations (effects on the eye) and treatment instructions are described in a separate application manual.

1.2.3 Indications and contraindications

Therapy	Indications	Contraindications
General information		Patients who suffer from photodermatosis and photosensitive patients (photoallergies). Surgery on patients with serious diseases of the hemopoietic system (such as haemophilia and leukaemia).
Ablation of primary carious lesions in the region far from the pulp	Primary carious lesions in the region far from the pulp.	Crown stump preparations Cavities for preparing cast fillings without subsequent mechanical treatment
Ablation of primary carious lesions in dentin close to the pulp	Primary carious lesions in the region close to the pulp.	Crown stump preparations Cavities for preparing cast fillings without subsequent mechanical treatment,
Ablation of secondary carious lesions	Secondary carious lesions that are filled with composite (small cavities or residual composite), or cement.	Amalgam fillings must be mechanically removed before laser therapy. Given the good reflection of IR radiation by gold, gold fillings must be mechanically removed beforehand. Crowns must be mechanically removed before laser therapy. Metal should not be irradiated since it can heat the surrounding tissue. Likewise, spatter from removed metal can damage peripheral tissue and quickly damage the window.
Dentin conditioning	Condition the dentin surface to promote the adhesion of the filling in cavities that were upgraded using the KEY Laser 3+ / III or were prepared by a rotating instrument.	None known.
conditioning the enamel	Condition the enamel surface to promote the adhesion of composite fillings in cavities that were upgraded using the KEY Laser 3+ / III or were prepared by a rotating instrument.	None known.
Fissure sealing	Preventative seal of caries-free molars and premolars Enhanced fissure sealing after initial preparation of the curious fissure.	None known.
root canal disinfection:	Reduction of germs in the root canal after mechanical preparation for vital extirpation or treatment of an infected canal.	None known.

Therapy	Indications	Contraindications
Incision, excision	Incision for draining abscesses. Frenectomy, incision of cheek ligaments Excision of fibromas, flap fibromas, Gingivectomy for gingiva hyperplasias or excision of hyperplasias. Pre-prosthetic surgery: Alveolar flabby ridge, vestibuloplasty, implant exposure, hyperplasia, epulides, papillomas, fibromatosis, benign growths.	Malignant tumours, obligate precancerous tumours, hemangiomas (According to the present state of knowledge)
Ablation of diseases of the oral mucosa covering flat areas	Simple diseases of the oral mucosa such as Leukoplakia simplex, idiopathic leukoplakia, Lichen ruber planus, hyperkeratosis, aphthae.	Malignant tumours, obligate precancerous tumours, hemangiomas (according to the present state of knowledge)
Implant exposure	Exposure of the implant post after transgingival or subgingival healing in the alveolus by excision or incision of the mucosal hood in two-phase implants. The implant coping (of plastic, metal or ceramic) should completely cover the implant post.	None known.
Fibroma excision	Pediculate fibromas, broad-based fibromas or flap fibromas on soft/ hard gums, cheek mucosa, lips, tongue margin or tongue base and gingiva, hyperplasias, including epulis, Granuloma teleangiectaticum	None known.
Frenectomy	Correction of high-inserted lip, tongue and cheek ligaments that extend too far into the alveolar ridge or the marginal gingiva and thereby impair function, phonetics, the seat of the prosthesis, et cetera.	None known.
Root tip resection	Root tip resection of teeth with periapical lesions on which prior endodontic treatment was unsuccessful, or in which a revision is not recommendable (such as large cysts or a large prosthetic restoration). Use of the KEY Lasers 3+ / III upgraded for opening the bone window and for root tip resection.	As usual (particularly in regard to systemic diseases). Close to an inferior nerve canal. Poor accessibility. Root canals that are provided with metal pins extending to the apex.
Curettage	Removal of subgingival concrements in periodontal pockets with periodontitis with closed or open curettage.	None known.
Curettage with detection	Removal of subgingival concrements on subgingival root surfaces with periodontitis with closed door open curettage including the detection function of the KEY Lasers 3+ / III upgraded.	None known.

1.3 Important instructions

Note
The operating instructions must be read by the user prior to commissioning, in order to avoid incorrect operation and other damage.

Modifications and improvements to the product are possible on the basis of new technical developments. This does not imply any right to upgrading.

KaVo cannot accept responsibility for damage caused by:
- External factors beyond its control (poor media quality or defective installation)
- The use of incorrect information,
- Improper use,
- Improper installation, startup and repairs.

The KEY Laser 3+ / III upgraded may only be installed, repaired and serviced by technicians who have successfully passed KEY Laser 3+ / III upgraded training. Permits become void upon non-observance.

Note
only original KaVo replacement parts may be used.

Note
The device may not be altered without the manufacturer's permission.

Note
Additional steps for installation or startup as well as service of the KEY Laser 3+ / III upgraded must be performed by a technician trained by KaVo. These steps are described in training documents. The technician obtains these after successfully completing training for the KEY Laser 3+ / III upgraded.

1.3.1 Registration

The operator in the Federal Republic of Germany is required to register the KEY Laser 3+ / III upgraded before first to start up at:
- the responsible trade board
- the responsible Employee Liability Insurance

The respective national regulations for operation must be complied with.

1.4 Packages

1.4.1 Weight and IDs

See also: 3.5 Technical data and requirements, Page 34

1.4.2 Packaging ordinance of August 28,1998

Note
Applies only to the Federal Republic of Germany

KaVo packaging is disposed and recycled at the local disposal waste management companies and recycling firms.
For more information about disposal and recycling, and an up-to-date list of local disposal service providers and recycling companies, please visit the following Internet sites:
http://www.umweltdatenbank.de
http://www.quality.de
Should customers choose to return KaVo packaging to KaVo (whereby the cost of carriage shall be borne by the customer), KaVo shall forward such packaging to a suitable recycling company; customer expenses will not be reimbursed.

Polystyrene

EPSY GmbH
Kaiser Friedrich Promenade 89
81348 Bad Homburg v. d. H.
08062-3691
08062-8574

Ethafoam

SCHERTLER VERPACKUNGEN
Eulatalstraße 31-39
Postfach 1720
86622 Neuburg/Donau
08431-5060
08431-50660

What is Ethafoam (polyethelene foam packaging product)?
- It has elastic properties – but cannot be fully compressed
- It is not air permeable
- It is unbreakable (it differs from polystyrene here)
- It is non-absorbent

Cartons

RESY GmbH
Hilpertstr. 22
Postfach 4212
64295 Darmstadt

2 Safety

2.1 Safety instructions

2.1.1 Description of danger levels

Safety instructions with three hazard levels are used in this document for avoiding personal and property damage.


CAUTION

CAUTION
indicates a hazardous situation that can lead to property damage or minor to moderate injury.


WARNING

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


DANGER

DANGER
indicates a maximum hazardous situation that can directly cause serious injury or death.

2.1.2 Hazard levels

DANGER indicates the maximum hazard level. indicates a directly hazardous situation that can cause death or serious injury.
WARNING indicates a hazardous situation that can cause death or serious injury.
CAUTION indicates a hazardous situation that can cause damage to property, or mild or moderate physical harm.

2.1.3 Warning symbol

	Warning symbol

2.1.4 Structure


DANGER

The introduction describes the type and source of the hazard.
This section describes the potential consequences of non-observance.
- The optional step contains necessary measures for avoiding hazards.

2.2 Laser safety

2.2.1 Safety instructions

Medical Device Law (only applicable for Germany)

The KEY 3+ / III upgraded is a class II b device according to EC directive 93/42/EEC.

In Germany, operators, equipment managers and users are obliged to operate their equipment in accordance with the Medical Device Act regulations.

In particular, such devices may only be operated in accordance with the generally recognized rules of technology and occupational health protection and accident protection regulations.

Note
Country-specific provisions must be observed when operating a medical laser. In the Federal Republic of Germany, the respectively valid version of the regulations of German professional associations on safety (BGV) for laser radiation BGV B2 must also be observed.

Accessories by other manufacturers may not be used.

Note
The operator must install a warning light and warning sign before each entrance door to the treatment room in which the KEY Laser 3+ / III upgraded is located. (identification of the laser treatment room according to BGV B2)

In addition, operators in Germany are required to keep a medical device book. Our service technician can be of assistance in filling it out.

Note
The medical device book is included in the delivery.

Legal provisions

Apply and meet the overarching guidelines and/or national laws, national regulations and the rules of technology for medical devices applicable for startup and use of the KaVo product for the intended purpose.

Observe IEC 60825-1 in its entirety.

Safety checks

Note
Make sure that the devices undergo regular annual safety checks and document the results.
Information on the schedule and scope of the safety checks are in the assembly instructions.

Requirements for correct operation

Responsibility is assumed for the safety, reliability and performance of the unit when:
- Installation, expansions, adjustments, changes or repairs must be done by technicians trained by KaVo.
- Individuals have been assigned the responsibility of protecting the laser.
- The electrical system in the relevant room meets the requirements and regulations of VDE 0107 and VDE 0100.
- The unit is operated according to the instructions for use. All the provisions of VDE 0751 are followed in maintenance.

This device has been tested according to:
- IEC 60601-1/VDE 0750 part 1
- ISO 7494
- IEC 60825-1 / VDE 0837 part 1
- VDE 0750 part 2-22

2.3 Safe use

2.3.1 General Safety Instructions


CAUTION

Malfunctions due to electromagnetic fields.
The product meets the applicable requirements regarding electromagnetic fields. Given the complex interactions between equipment and cell phones, the product may be influenced by a cell phone that is in use.
- Do not use cell phones in medical offices, hospitals, or laboratories.
- Put electronic devices such as e.g. computer storage media, hearing aids etc. down during operation .

The KaVo product is not permitted to be used in areas subject an explosion hazard.

The user must ensure that that the unit works properly and is in a satisfactory condition before each use.


CAUTION

Danger from damaged operating parts
When operating parts are damaged, they may not be used.


CAUTION

Hazard of air embolism and skin emphysema
The insufflation of spray in open wounds in the surgical area can cause air embolisms and skin emphysema.
- Avoid the insufflation of spray in open wounds in surgical area!


CAUTION

Damage from long periods of non-use.
Due to stagnation, damage can arise during first use or after periods of disuse (weekends, holidays, vacation, etc.).
- Rinse or blow out spray-conducting lines in treatment devices.
- Remove the handpiece from the holder, and operate intermittently with spray.


CAUTION

Hazards from the unsupervised use of lasers
Before leaving the treatment room, turn off the KEY Laser 3+ / III upgraded and protect against unauthorized use:
- Turn off the main power switch.
- Remove the key from the key-operated switch.


CAUTION

Hazard from previous illness and susceptibility to haemorrhaging
Haemorrhaging or other reactions dangerous to patients.
- Ask patients about prior illnesses, haemophilia, etc. before treatment.


CAUTION

Damage from tipping
The laser device contains a water cooler for cooling.
- Never tip the KEY Laser 3+ / III upgraded or lay it on its side!


CAUTION

Damage from transport
Property damage
- Only pull the KEY Laser 3+ / III upgraded on the grip along the device when transporting it.
- When transporting it over a threshold, only pull in the direction of the arm and slightly lift the device.

Pacemakers


CAUTION

Risks from electromagnetic fields.
The functions of implanted systems (such as pacemakers) can be influenced by electromagnetic fields.
- Observe current updates in journals.
- Ask patients before treatment.
- Have the patient present identification that he or she wears a pacemaker to assess potential hazards.
- Evaluate the risks and benefits.
- Take suitable emergency precautions and immediately react to any changes in health.
- Monitor symptoms such as elevated heart rate, irregular pulse and dizziness. These can indicate problems with a pacemaker.

2.3.2 Disposal of electronics and electrical devices

Note
According to EC directive 2002/96 concerning used electrical and electronic devices, this product is subject to the cited directive and must be disposed of accordingly within Europe.
Before disassembling / disposing of the product, it must be completely processed (disinfected, sterilized) according to the section "Preparation methods"
Additional information can be obtained from KaVo (www.kavo.com) or your dental supplier.

For final disposal, contact:

Germany

To return an electrical device, proceed as follows:
1. At the website www.enretec.de of enretec GmbH, you can download a form for a disposal request under the menu item eom, or you can use it as an online request.
2. Fill out the form with the corresponding information, and send it as an online request or by fax (+49(0)3304 3919 590) to enretec GmbH.
   The following avenues are also available for questions and for initiating a disposal request
   Telephone: +49(0)3304 3919 500
   E-mail: pickup@eomRECYCLING.com and
   Mail: enretec GmbH, eomRECYCLING Department
   Kanalstraße 17
   16727 Velten
3. Your **permanently installed** device will be picked up in your practice, and your **movable** unit will be picked up at the curb at your address on the agreed deadline.

The owner or user of the device will bear the costs for disassembly, transportation and packaging.

International (EU)

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

2.3.3 Personal eye protection

All of the persons that are in the range of the laser during treatment must wear laser safety goggles. The laser safety goggles must be in conformance with safety level L3 (DIN EN 207), wavelength 2.94 µm.

See also: 7 Accessories, Page 87


CAUTION

Laser beam hazard
Irreversible eye damage.
- Observe the instructions accompanying the laser safety goggles.
- Do not activate the laser when the handpiece is not mounted.
- Never look into the distal end of the handpiece, laser hose coupling or the laser hose, either with or without the laser safety goggles!

2.3.4 Safety of the construction

The KEY Laser 3+ / III upgraded was constructed according to the relevant safety standards such as IEC 60601-1, IEC 60825-1 and VDE 0837 .
Numerous measures have been undertaken to ensure both active safety with substantial comfort during use.

The user will not be directly aware of many of these measures:
- Directly after turning the device on, the microprocessor control will run a self-check.
- Then a series of safety-relevant components will be operated and tested. If the test is unsuccessful, the device will turn off again.
- If the test is successful, the device will go to standby mode.
- During operation, the proper functioning of the microprocessor control and all safety-relevant components is continuously checked.
- Maximum value was placed on preventing the malfunctioning of individual components from endangering the physician, dental personnel, patients, or third parties.

2.3.5 Electromagnetic compatibility

Note
Based on EN 60601-1-2 concerning the electromagnetic compatibility of electro-medical devices, we need to point out that:
• Medical electrical devices are subject to special measures regarding electromagnetic compatibility and must be operated in accordance with KaVo assembly instructions.
• Portable and mobile high-frequency communications devices can influence electrical medical devices.
- Further details on the technical EMC description can be made available on request.

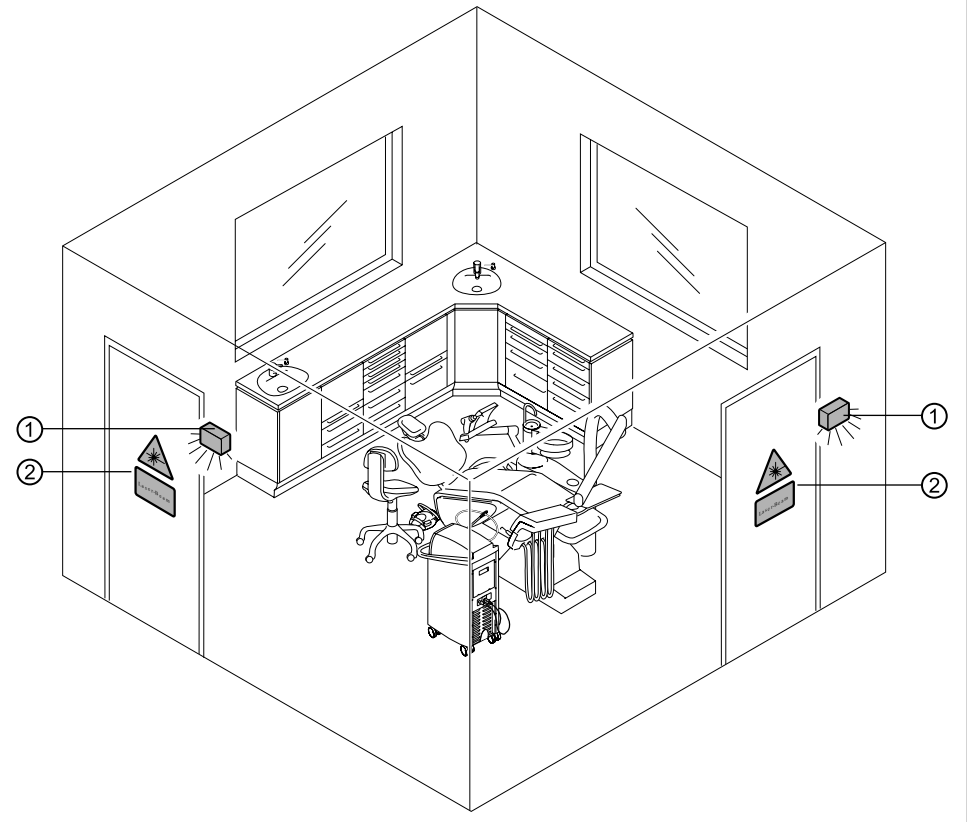
CAUTION

Damage from incorrect accessories
The use of other accessories, transformers and lines than those indicated (with the exception of transformers and lines that KaVo sells as replacement parts for internal components) can increase transmission or reduce the electromagnetic immunity of the product.
▸ Only use accessories recommended by KaVo.

Note
KaVo cannot guarantee that accessories, lines and transformers not delivered by KaVo will correspond with EMC requirements of EN 60601-1-2.

2.4 Safe laser range

Note
Each time the KEY 3+ / III upgraded is started, the regulations for operating lasers must be observed.
The room must be identified by the required warning signs and lights at all points of entry.



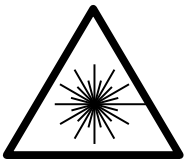
① Warning lamps ② Warning signs

2.4.1 Warning lamps

In the planning stage, make sure that warning lights are installed at all entrance doors to the treatment rooms in which the KEY Laser 3+ / III upgraded is operated.
If possible, install the electronics as follows:
The warning lights operate when power is applied to the socket for the KEY Laser 3+ / III upgraded.
The warning lights must be installed by a professional electrician.

Note
The warning lamps are not included with the delivery of the KEY Lasers 3+ / III upgraded.

2.4.2 Warning signs



The current warning signs are to be affixed at eye height to the entrance doors to the treatment room in which the KEY laser 3+ / III upgraded is used and be visible from the outside.

Note
The warning signs are included in the accessories.

See also: 7 Accessories, Page 87

2.5 Electromagnetic compatibility

The KEY Laser 3+ / III upgraded is for use in an environment like the one cited below. The customer or user of the KEY Laser 3+ / III upgraded must ensure that it is operated in such an environment.

2.5.1 Electromagnetic Transmissions

Measurements of noise transmissions	Conformance	Electromagnetic environment - guidelines
HF transmission according to CISPR 11	Group 1	The KEY Laser 3+ / III upgraded uses HF energy only for its internal operation. Its HF transmission is therefore very low, and it is improbable that neighbouring electronic devices will be disturbed.
HF transmission according to CISPR 11	Class B	The KEY Laser 3+ / III upgraded is for use in all facilities including residential ones, and facilities that are directly connected to a public power supply that also supplies residential buildings.
Transmission of harmonics according to IEC 61000-3-2	Class A	ditto
Transmission of voltage fluctuations or flicker according to IEC 61000-3-3	In conformance	ditto

2.5.2 Resistance to electromagnetic interference

The KEY Laser 3+ / III upgraded is for use in an environment like the one cited below. The customer or user of the KEY Laser 3+ / III upgraded must ensure that it is operated in such an environment.

Immunity tests	IEC 60601 test level	Conformance level	Electromagnetic environment - guidelines
Electrostatic discharge (ESD) according to IEC 61000-4-2	± 6 kV contact discharge ± 8 kV air discharge	± 3 kV contact discharge ± 8 kV air discharge	Floors should be made of wood or concrete or have ceramic tiles. When the floor is made of synthetic material, the relative humidity must be at least 30%.
Fast transient electrical disturbances/ Bursts according to IEC 61000-4-4	± 2 kV for power lines ± 1 kV for input and output lines	± 2 kV for power lines	The quality of the supply voltage should correspond to that of a typical business or hospital environment.
Surges according to IEC 61000-4-5	± 1 kV normal mode voltage ± 2 kV common-mode voltage	± 1 kV normal mode voltage ± 2 kV common-mode voltage	The quality of the supply voltage should correspond to that of a typical business or hospital environment.
Voltage interruptions, short-term interruptions and fluctuations of the supply voltage according to IEC 61000-4-11	< 5% U_T (>95% interruption) for 1/2 period 40 % U_T (60 % interruption) for 5 periods 70 % U_T (30% interruption) for 25 periods < 5% U_T (>95% interruption) for 5 s (250 periods)	< 5% U_T (>95% interruption) for 1/2 period 40 % U_T (60 % interruption) for 5 periods 70 % U_T (30% interruption) for 25 periods < 5% U_T (>95% interruption) for 5 s (250 periods)	The quality of the supply voltage should correspond to that of a typical business or hospital environment. When the user of the KEY Lasers 3+ / III upgraded needs continued operation even when the power supply is interrupted, it is recommended to supply the KEY Lasers 3+ / III upgraded from an uninterrupted power supply or a battery.
Magnetic field with a supply frequency (50/60 Hz) according to IEC 61000-4-8	3 A/m	3 A/m	Magnetic fields at the mains frequency should correspond to typical values in a business and hospital environment.

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

Immunity tests	IEC 60601 test level	Conformance level	Electromagnetic environment - guidelines
Conducted HF disturbances according to IEC 61000-4-6	3 V_{eff} 150 kHz to 80 MHz outside of ISM bands[a]	10 V_{eff}	Portable and mobile radio devices should not be used closer to the KEY Lasers 3+ / III upgraded including the wires, than the recommenced safe distance calculated using the equation for the transmission frequency. Recommended safe distance: $d=0.35\sqrt{P}$ $d=0.35\sqrt{P}$ for 80 MHz to 800 MHz $d=0.70\sqrt{P}$ for 800 MHz to 2.5 GHz with P as the maximum rated power of the transmitter in Watts (W) according to the transmitter manufacturer, and d as the recommended safe distance in meters (m). [b]The field strength of stationary radio transmitters should be less than the conformance level at all frequencies in an on-site check[c]. [d] Close to devices that have the following symbol  disturbances are possible.

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2 These guidelines may not be applicable in every case. The spread of electromagnetic waves is absorbed and reflected by buildings, objects and people.
[a] The ISM frequency bands (for industrial, scientific and medical applications) 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 conformance levels in the ISM frequency bands between 150 kHz and 80 MHz and the frequency range of 80 MHz and 2.5 GHz are intended to reduce the probability that mobile and portable communications equipment will produce disturbances when they are unintentionally brought near the patient. For this reason, the additional factor of 10/3 is used when calculating the recommended safe distances within these frequency ranges.
[c]The field strength of stationary transmitters such as base stations of mobile telephones and land mobile radio devices, amateur radio stations, AM and FM, radio and television broadcasters cannot be theoretically predetermined. To determine the electromagnetic environment of stationary transmitters, a study of the location should be considered. When the measured field strength at the site where the KEY Laser 3+ / III upgraded is used exceeds the above conformance level, the STERIclave B should be monitored to demonstrate proper function. Should unusual performance features be observed, additional measures may be required, such as e.g. a different alignment or another location for the KEY Laser 3+ / III upgraded.
[d] Within the frequency range of 150 kHz to 80 MHz, the field strength should be less than 3V_{eff} V/m.

2.5.3 Recommended safe distances

The KEY Laser 3+ / III upgraded is intended for use in an electromagnetic environment in which HF disturbances are controlled. The customer or the user of the KEY Laser 3+ / III upgraded can help prevent electromagnetic disturbances by maintaining the minimum distance between portable and mobile HF telecommunications devices (transmitters) and the KEY Laser 3+ / III upgraded depending on the output of the communication device as indicated below.

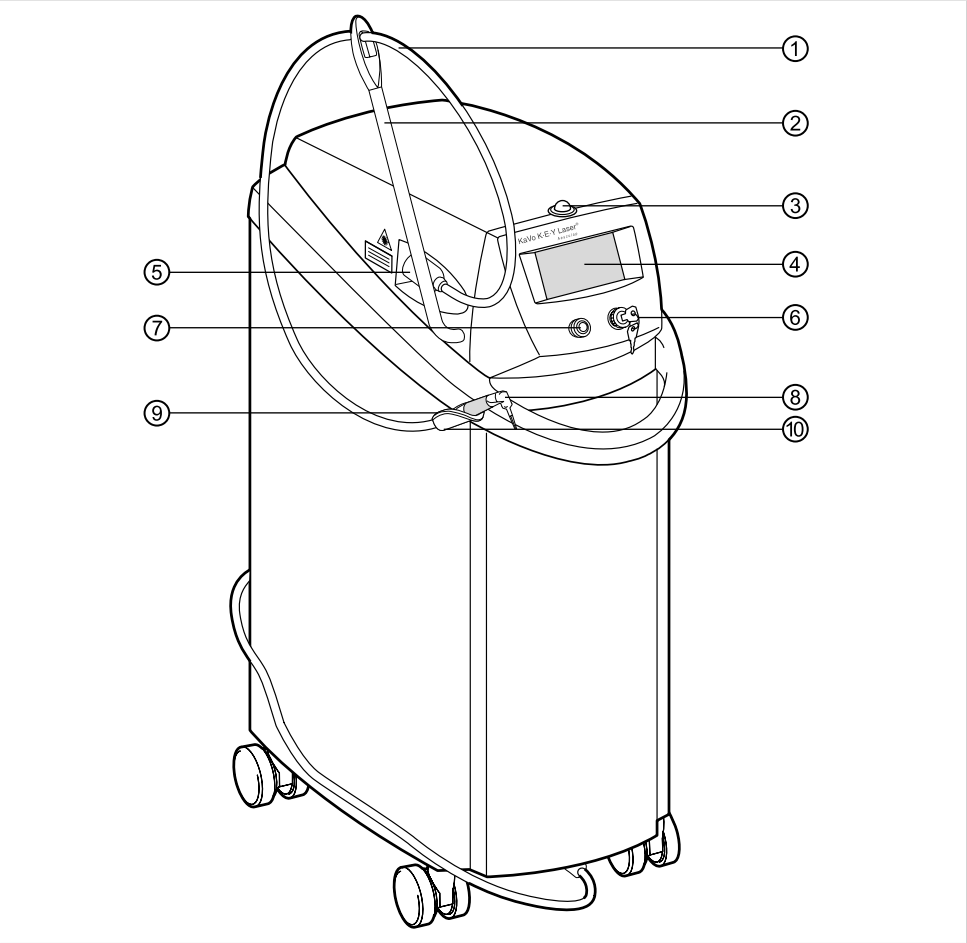
Rated power of the transmitter in W	150 kHz to 80 MHz $d=1.17\sqrt{P}$	80 MHz to 800 MHz $d=0.35\sqrt{P}$	800 MHz to 2.5 GHz $d=0.70\sqrt{P}$
0.01	0.12	0.04	0.07
0.1	0.37	0.11	0.22
1	1.17	0.35	0.70
10	3.70	1.11	2.21
100	11.70	3.5	7.0

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

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2: These guidelines may not be applicable in every case. The spread of electromagnetic waves is absorbed and reflected by buildings, objects and people.

3 Device description

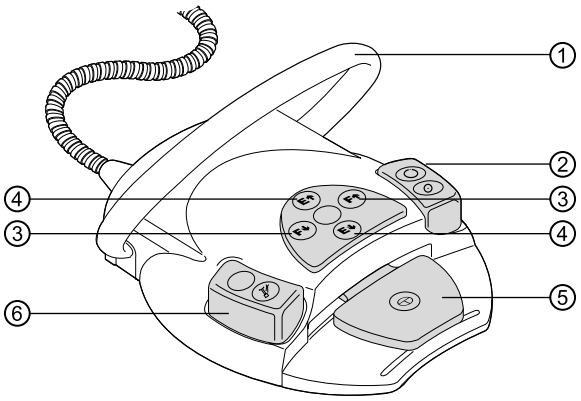
3.1 KEY Laser 3+ 1343 (Mat. no. 1.006.4200)



① Laser tubing
② Swing arm
③ Laser emission indicator
④ Touch screen
⑤ Input coupling
⑥ Key switch (on/off function)
⑦ Emergency laser stop
⑧ Handpiece
⑨ Handpiece support
⑩ Laser tube coupling

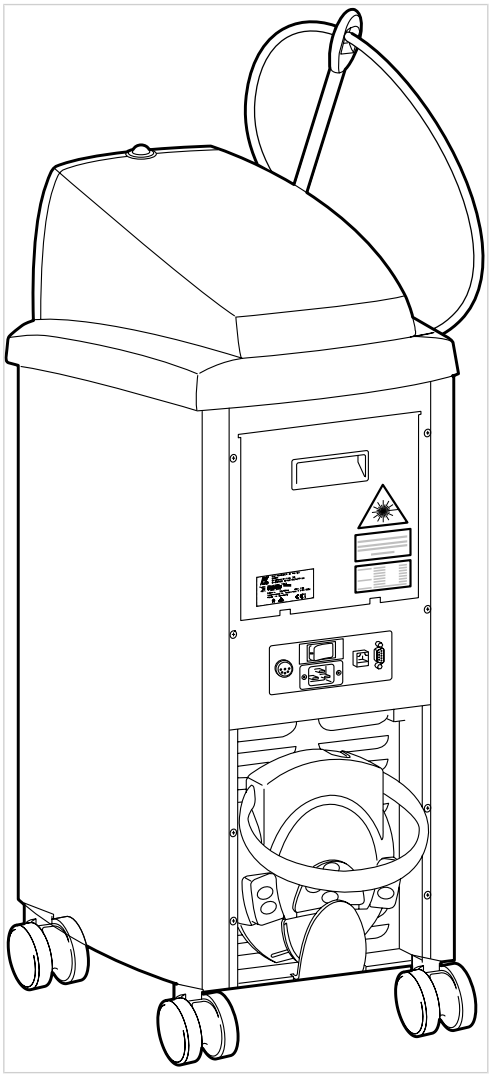
The design and description of the KEY Laser III 1243 upgraded correspond to the KEY Laser 3+ 1343.

3.1.1 Multifunctional foot control

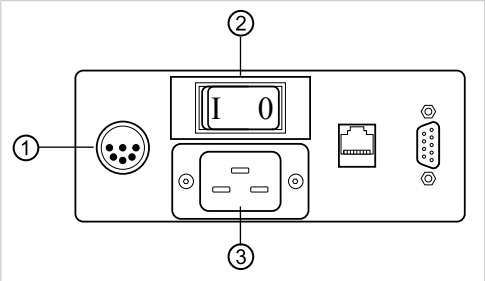


① Tread protection hoop
② Ready button
③ Frequency setting
④ Energy setting
⑤ Laser pulse trigger
⑥ Spray button

3.1.2 Rear of the laser device



Version A (230 V~ / 50 Hz / 60 Hz)



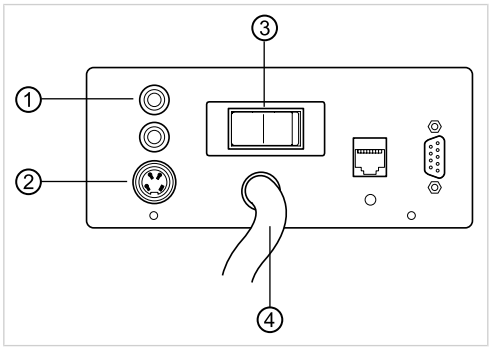
① Connection for external door contact (switch)

② Main switch with integrated circuit breaker

③ Plug for power input 230 V~ / 50 Hz / 60 Hz (All-pole disconnection from the supply network)

Note
Connection for external door contact:
max. 5 V/10 mA (load of the door contact)
max. 24 V/1 A (switch contact for external warning lamp)
Do not connect external voltage with the door contact.

Version B (100 V~ / 110 V~ / 120 V~ / 127 V~ / 50 Hz / 60 Hz)



① Mains input fuse 25 A,
(Japan: 20 A)
② Connection for external door contact (switch)
max. 5 V / 10 mA (load of the door contact)
max. 24 V / 1 A (switch contact for external warning lamp)
③ Main switch with integrated automatic circuit breaker
④ Fixed connected mains cable

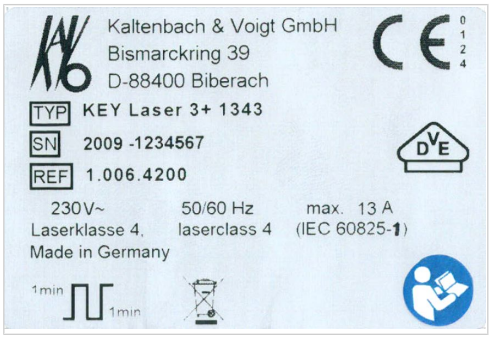
Note
Connection for external door contact:
max. 5 V/10 mA (load of the door contact)
max. 24 V/1 A (switch contact for external warning lamp)

3.2 Touchscreen

The 's central control is a touchscreen whose surface is actively used to control functions when it is touched with a finger.

3.3 Type plate and power rating plate

Note
The type plate and rating plate is on the back of the KEY Lasers 3+. They provide information on the customer's electrical connected loads and the device version, serial number and material number.



See also: 3.5 Technical data and requirements, Page 34

Note
The type and rating plates are on the back of the KEY Lasers III upgraded, and the plate for the respective upgrade version (I, II or III) is next to them.

Type:	Device type
SN:	Serial number with Year of manufacture: 2008 (example) Running serial number: 12345678 (example)
REF:	Material number
	Type B application part
	Follow the instructions for use
CE 0124	CE mark (statement of conformity) according to 93/42/EEC
	For disposal information, see use in accordance with intended purpose
DVE	VDE safety sign
1min 1min	Mode: Operating time for the KEY Laser 3+ / III upgraded: 1 min of pulses Pause time for the KEY Laser 3+ / III upgraded: 1 min pause

Note
For permissible operating times for the unit and handpiece, see the "Technical Data" sections.

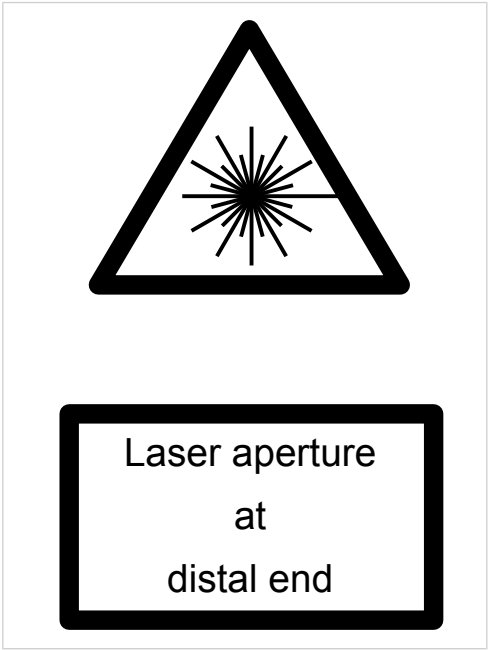
Note
In case of malfunctions of the KEY Laser 3+ / III upgraded or in the case of complaints, always indicate the serial number and material number.

Note
Modifications that might impair safety are prohibited by legal regulations.

3.4 Location to affix the laser warning plates and laser reference

On the back of the laser unit, there is a triangle warning sign and the reference sign according to IEC 60825-1.

A triangular laser warning symbol and information notice is also mounted at the laser tube coupling.



3.5 Technical data and requirements

Setup plan No.	111 052 94 003
Electrical lead	230 V Schuko socket
Mains power input line	3 m long
Input voltage	230 V~
By installing the "External voltage kit" or an isolating transformer, the input voltage is expandable to	100 V~/110 V~/120 V~/127 V~
Frequency	50/60 Hz
Power consumption	40 - 2200 W and 100 - 2500 VA
Customer fuse protection 220-240 V	B16 or C16- automatic
Customer fuse protection 100-127 V	25 A
Customer fuse protection 100-127 V (Japan)	20 A

Classification

Device of protection class I
Device not protected against the penetration of water
Type B application part

Operating conditions

Ambient temperature	15 - 35°C
Relative humidity	max. 85%
Condensate on unit	not permissible

Suitable for operation up to 2,000 m above sea level.

Mode: continuous operation duty type

(valid for the laser device load, for mode of the handpieces, see the handpiece instructions)
For a 1 min. pulse/1 min. pause with a unit setting of 600 mJ/13 Hz.

at an environmental temperature of 35 °C	permissible length of operation: 5 min.
at an environmental temperature of 25 °C	permissible length of operation: 30 min.

Therapy laser

Laser type	Solid state Er:YAG laser
Wave length	2.94 µm (infrared)
Laser class	4

Pulse energy

at the exit of the laser contra-angle hand piece 2060 **Mat. no. 1.000.4841**)	80 - 600 mJ
Settable within a range of 80 - 200 mJ	in 20 mJ steps
Settable within a range of 200 - 600 mJ	in 50 mJ steps
Pulse frequency	2 - 30 Hz
Pulse duration	200 - 700 µs

Divergence

Divergence of the laser beam after exiting the laser contra-angle hand-piece 2060 (**Mat. no. 1.000.484**1)	approx. 5 - 10 °
NOHD	1 m

Pilot laser

Laser type	Red laser diode
Laser class	2 / max 1 mW
Wave length	655 nm red
Heat radiation	0.4 – 8 KJ/h
Cooling	air-cooled with internal water circuit
Cooling water	Conductivity below 10 µS/cm (refer to VDE 0510)
Amount of cooling water	approx. 2.5 l
Spray water supply	Reservoir integrated in the KEY Laser 3+ / III upgraded
Spray water quality	only distilled and demineralized water, pH-neutral
Spray water level	100 - 400 ml
Spray air supply	integrated in the KEY Laser 3+ / III upgraded

Unit weight	78 kg
Connection to door contact	max. 5 V / 10 mA (load on the door contact)
Switching contact for external warning lamp	max. 24 V / 1A

Packaging, transportation and storage

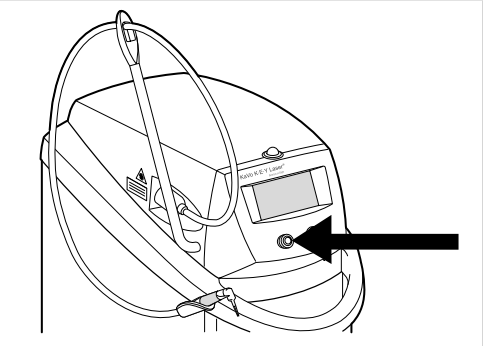
Gross weight	93 kg
Net weight	81 kg
Package dimensions	1100 x 600 x 900 mm

Transportation and storage conditions

temperature	min.: - 20 °C, max.: + 55 °C
Humidity	min.: 5%, max.: 95 %
Air pressure	min.: 700, max.: 1060 hPa

4 Operation

4.1 Emergency-off switch



The emergency laser stop is intended for emergencies during normal operation.

In confusing and hazardous situations, press the emergency off switch to immediately shut off the laser.

Note
However, the emergency laser stop should not be used for switching off normally since its use may lead to premature wear of the laser. The emergency laser stop does not provide all-pole disconnection from the mains.

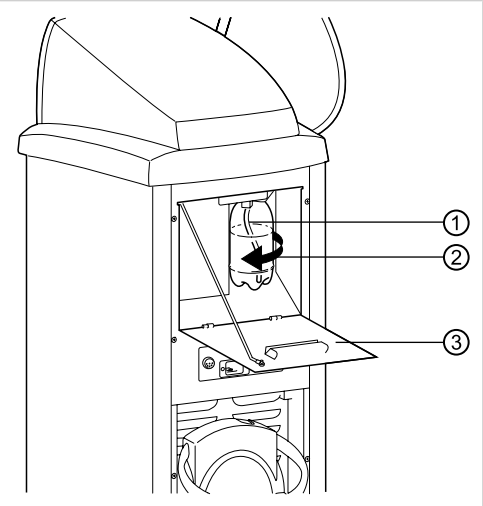
See also: 4.18 Switching off, Page 71

4.2 Fill the spray water

In order to avoid microbial contamination, the spray water reservoir must be replenished completely at least once a week.

If "SPRAY RESERVOIR EMPTY" is displayed on the touchscreen, this indicates that the spray water reservoir is diminishing.

Fill the spray water as indicated below.



- Open the flap ③ on the back of the device.
- Unscrew the spray water reservoir bottle ② in a clockwise direction.
- Fill spray water reservoir bottle.

Note
The spray water reservoir bottle may be filled only with distilled or demineralized water (neutral pH). Acidic water may lead to corrosion in spray water supply system.

- Insert the aspiration tube ① again into the filled spray water reservoir bottle and screw on the bottle by turning counterclockwise.
- Close door ③ so that the magnetic catch locks audibly.

Note
Alternatively, you can continue working immediately – with the remaining spray water – by pressing the CONTINUE key on the touchscreen.

4.3 Laser hose and handpieces

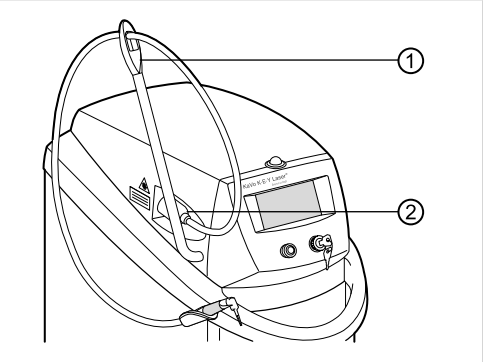
4.3.1 Laser hose

Note
If the laser hose is removed when the device is turned on, a safety switch ensures that the KEY Lasers 3+ / III upgraded cannot be switched to ready.

CAUTION

Dropping the laser hose.
Damage to the coating and construction of the exit window.
- Do not let the laser hose drop.
- Do not bump the laser hose couplings or set them down roughly.
- Make sure that the exit window of the laser coupling is not dirty or does not have fingerprints.

See also: Section 2.3 of the handpiece instructions

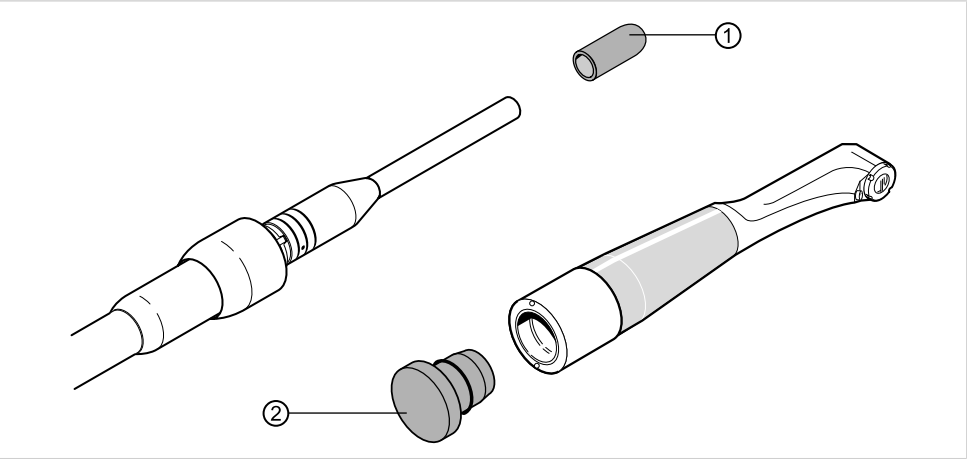


- Push the laser tube coupling ② into the input coupling block ensuring correct alignment of the plug.
- Screw down with lock nut.
- Guide the laser tube through the swing arm ①.

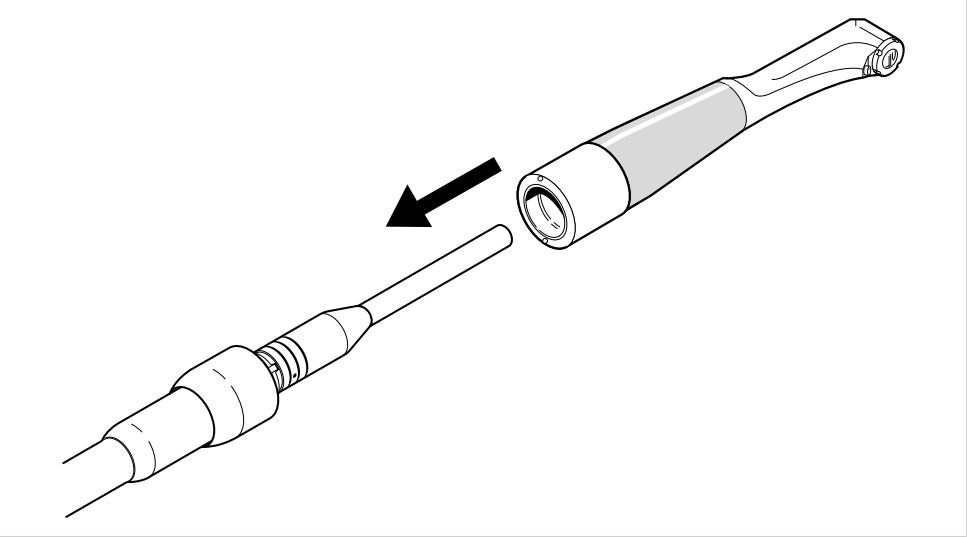
4.3.2 Couple the handpieces

Note
Make sure that the KEY Laser 3+ / III upgraded is switched to stand by.

- Remove protective caps ① and ②.



- Push handpiece axially so that it will go onto the laser coupling until it is heard to snap in.



- Before treatment, set the spray and run a user test.

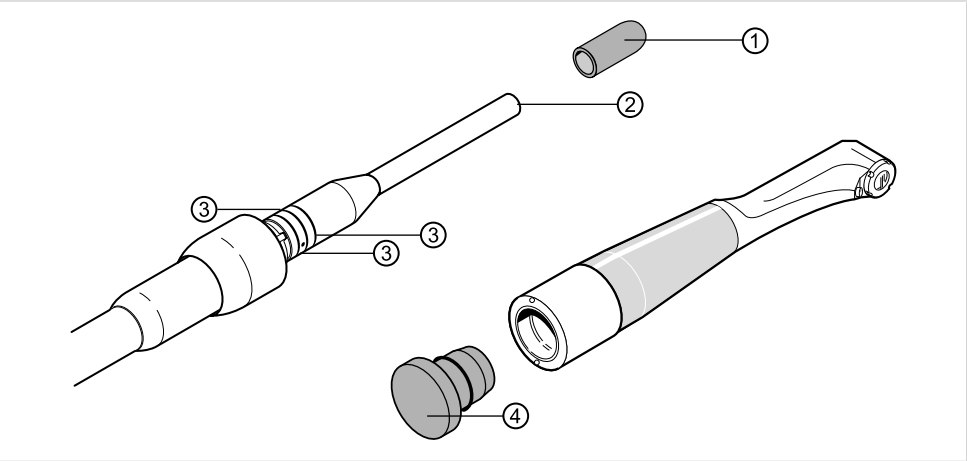
See also: 4.17 Spray regulation, Page 70

See also: 4.8 User test with handpiece 2060, Page 51

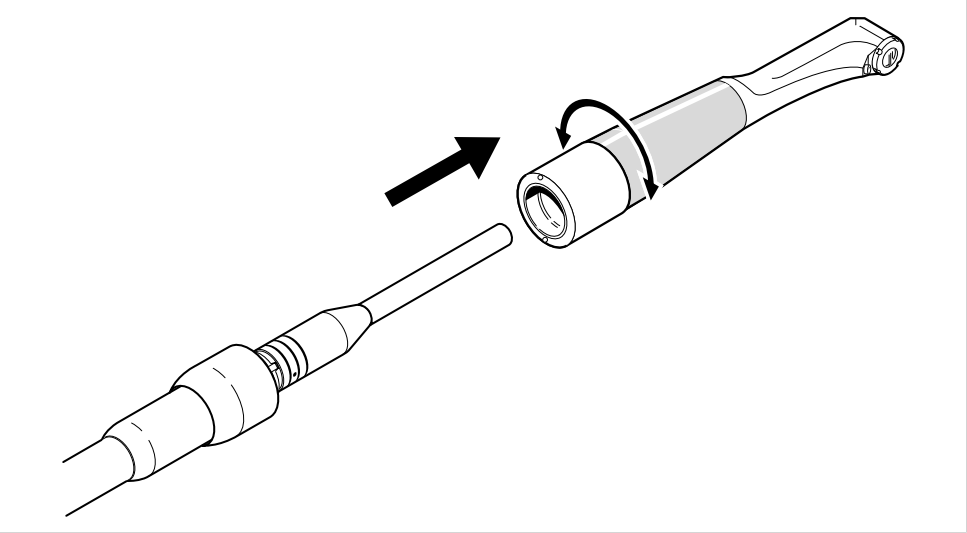
4.3.3 Undo the connection

Note
It is essential to avoid penetration of water into the interior of the handpieces, since this may result in disturbance of the detection and feedback functions.

Note
Make sure that the KEY Laser 3+ / III upgraded is switched to stand by.



- Unscrew and detach the handpiece.



- To avoid contamination of the tube coupling window ② wipe the tube coupling from back to front using a clean dry cloth.

See also: Section A 2.3 of handpiece instructions.

Note
Windows are coated. Do not wipe unnecessarily.

- Check that the window ② is clean and dry and that the O-rings ③ are not damaged.

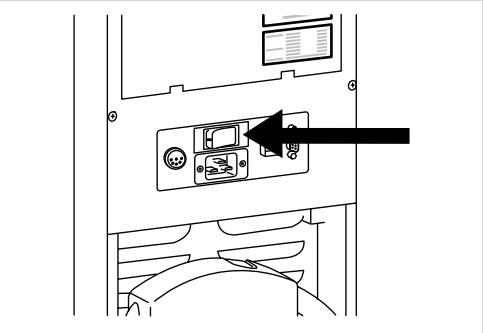
Note
If a handpiece is not coupled directly afterwards, the laser hose coupling must be provided with the cap ① and the handpiece with the cap ④. These two caps prevent the penetration of dirt into the laser hose coupling and the handpiece.

- Dry the inside of the handpiece coupling.

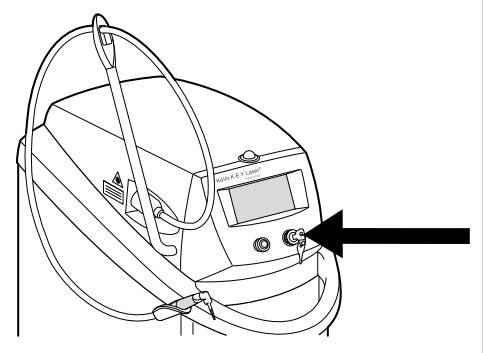
4.4 Switching on

Note
Ensure that the emergency laser stop is not pressed. It can be released or its state checked by rotating the red knob to the right. If it was pressed, it springs out.

- Turn on the main switch on the back of the device.



- Insert the key in the key-operated switch.



- Turn the key to the right to turn on the KEY Laser 3+ / III upgraded.
  After a few seconds, the boot screen appears on the touchscreen. The software version appears at the bottom right.

The unit then performs an internal function test. On successful completion, the start menu appears on the touchscreen.

Now, the preset values are displayed and the unit switches to the standby mode.

Note
Never allow the laser unit to stand unattended in the switched-on state

See also: 4.18 Switching off, Page 71

4.4.1 Energy-saving mode

If the KEY Laser 3+ / III upgraded Is not used for five minutes, and the device goes into energy saving mode. The cooling fan is turned off, and the display changes. When the touch screen is touched at any location, readiness for operation is a story.

4.5 Using the touchscreen

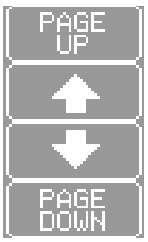
In general, the following is applicable for operating the touchscreen:
All fields which have a rounded border have the same functionality as keys. The key must be touched in the middle almost without any pressure. If the key has been successfully pressed, a brief acoustic signal is heard.

The FEEDBACK and DETECT keys also serve as indicators:
Bright field background means on.
Dark field background means off.

Arrow keys under a numerical value make it possible to change this value. ⬆ increases, ⬇ reduces the value in accordance with a preset scale. Once the minimum or maximum value is reached, the arrow key disappears and two acoustic signals are heard.
Touching the keys continuously changes the values consecutively.

Max. 6 lines are displayed in the selection windows.

Note
A selection bar, which can be moved with the arrows, always marks a possible selection.



The selection bar is moved 6 lines up/down using the keys PAGE UP / PAGE DOWN.

Pressing the OK key results in the setting entered being adopted and in the return to the superior menu.

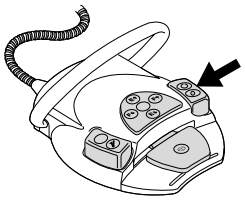
Pressing the Abort key returns you to the superior menu without accepting the selection made.

Press the S-pulse key to activate the short pulse.

4.6 Ready state

CAUTION

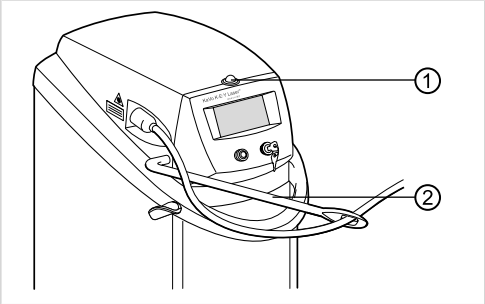
Laser beam hazard
Irreversible eye damage.
- Observe the instructions accompanying the laser safety goggles.
- Do not activate the laser when the handpiece is not mounted.
- Never look into the distal end of the handpiece, laser hose coupling or the laser hose, either with or without the laser safety goggles!



Press the READY key in the start menu or the corresponding key on the foot control to switch the KEY Laser 3+ / III upgraded from standby to ready.

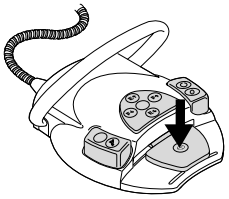
The KEY Laser 3+ / III is in ready mode when the READY key is bright with dark lettering, and the red pilot laser exits the front of the handpiece. Laser pulses can only be emitted in this mode.

4.6.1 Trigger laser pulses



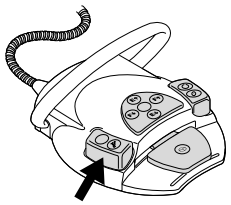
A priority logic switch which detects the position of the swing arm in its rear rest position is integrated in the swing arm bearings. On removal of the handpiece, the swing arm swivels out of its rear rest position, with the result that the unit detects the removal of the handpiece from its support (handpiece priority logic circuit).

In order to trigger laser pulses, the handpiece must be removed from the support and drawn forward to such an extent that the priority logic switch of the swing arm ② switches.



Laser pulses can now be triggered by pressing the trigger. The yellow emission warning display① above the display indicates that laser pulses are being emitted.

In Ready mode, you choose the DETECT and FEEDBACK buttons to toggle between modes.



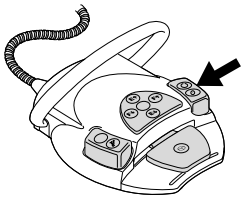
Use the spray key on the foot control or or the spray key on the touchscreen to select or combine the spray media of air and water.
See also: 4.11 Spray settings, Page 58

4.6.2 Interrupting ready mode

Note
During pauses in treatment, the handpiece should be placed on the handpiece support.

The KEY Laser 3+ / III upgraded independently switches from ready to standby when:
- A control element is not used for three minutes (touch screen, foot control, handpiece holder switch).
- The trigger is actuated while the handpiece is still in the holder.

4.6.3 Ending ready mode



The ready mode is ended by pressing the READY key again on the touchscreen or on the foot switch.

See also: 4.6.1 Trigger laser pulses, Page 47

4.7 Setting pulse energy and pulse frequency

4.7.1 Selecting the pulse energy

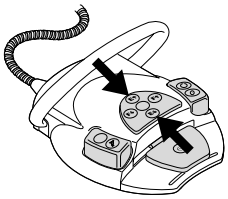
Different energies and frequencies

Frequency in Hz	Pulse energy in mJ
2, 4 , 6, 10 and 13	80 to 600
15	80 to 500
20	80 to 400
25	80 to 200

Different energies and frequencies with S-PULSE

Frequency in Hz	Pulse energy in mJ
10, 13 , 15, 20 and 25	80 to 300
30	80 to 250

The chosen setting is displayed on the touchscreen (e.g.: 160 mJ).
The pulse energy levels can be regulated with the arrow keys and .



Alternatively, the pulse energy can also be set via the foot switch by pressing the button.

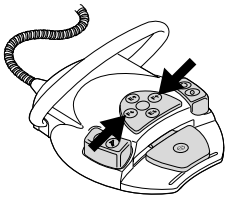
Note
If the pulse energy is changed when the laser is in ready mode, the KEY Laser 3+ / III upgraded automatically switches to standby mode.

4.7.2 Select pulse frequency

2, 4, 6, 10, 13, 15, 20, 25 and 30 Hz are available.

Note
If the pulse energy is changed when the laser is in ready mode, the KEY Laser 3+ / III upgraded automatically switches to standby mode.

The chosen setting is displayed on the touchscreen (e.g.: 10 Hz).
The pulse frequency levels can be regulated with the arrow keys and .



Alternatively, the pulse frequency can also be set via the foot switch by pressing the button.

4.7.3 Display of average performance

Display of the set average performance in W

4.8 User test with handpiece 2060

Note
Ensure that the laser tube is inserted into the input coupling and is screwed tight and that the handpiece 2060 is mounted.

When the laser is in the ready mode the red pilot laser indicates the point of contact of the therapy laser beam. This pilot laser makes it possible to judge whether the transmission system is in the proper state.

See also: 4.6 Ready state, Page 47

- Point the handpiece at a cotton wool ball or swab moistened with water.

If the pilot laser is visibly poor, broken up or completely invisible, the laser exit window is probably soiled or damaged.

See also: 5 Setup methods according to DIN EN ISO 17664, Page 73

- If the pilot laser is clearly detectable, then trigger a laser pulse using the trigger.

You can tell if the laser output is operating properly by the typical noise that arises when water is evaporated with the KEY Laser 3+ / III upgraded.

Note
All safety-relevant functions as well as the laser energy of the laser system are continuously monitored by the control electronics. In case of malfunctions, the safety shutoff of the KEY Lasers 3+ / III upgraded is immediately activated.

4.9 Modes

Three modes of operation are available to the user:
- Standard therapy mode
- S-PULSE (short pulses)
- DETECT (detection mode)
- FEEDBACK (feedback mode)

Note
Outside light sources can cause the detection and feedback system to malfunction by illuminating the optical applicators. This can be identified by a broad spread of MOMENT values. These external disturbances must be identified and eliminated.
Tools for finding plaque can generate an elevated fluorescence signal; teeth should therefore be carefully cleaned beforehand.
Fluorinated toothpastes can change the fluorescence signal. The measurements should hence be taken before using fluorinated toothpastes.
Seals, amalgam and composite fillings can also change the fluorescence signal.

Detection and feedback modes use the fluorescent radiation emitted by altered tooth substance on exposure to a specific light wavelength. This radiation is detected and evaluated.

When the following points are not taken into consideration, the detection and feedback values can be misinterpreted:
- Soiling
- Composite fillings that are fluorescent
- Composite fillings with contaminated edges
- calculus/concretions
- Instances of higher values have been observed close to the pulp
- Food residue in the fissures
- Prophylaxis pastes
- remineralised caries
- discoloured teeth that are naturally highly fluorescent
- patients who have been exposed to radiation

4.9.1 Switch mode

The mode (DETECT or FEEDBACK) whose key appears bright with dark inscription is activated.

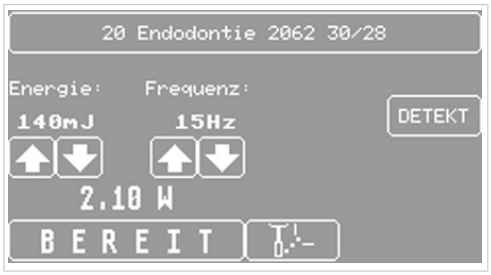
To change to another mode, press the corresponding key.

After the key has been pressed, the newly activated mode appears bright with dark inscription.

Note
Detection and feedback mode are disabled relative to one another. Activation of the detection mode thus leads to deactivation of feedback mode, and vice versa.

4.9.2 Standard therapy mode

Press the bright mode key to deactivate the selected mode without activating the other modes. This shuts off both detection and feedback mode. No information appears in the area between the frequency readout and mode key.



Note
The laser can be operated under this setting but without the feedback function.

4.9.3 S-PULSE (short pulses)

By using the S-PULSE function, you can switch to short pulses when working on hard tissue (programs 15 - 18) and thereby increase the individual pulse efficiency.

S-PULSE mode is only useful for processing dental hard tissue and is not required for processing softer materials (such as calculus and soft tissue).

S-Pulse is not activated.

S-Pulse is activated.

Note
S-PULSE can only be selected for programs 15 to 18.
When creating your own programs, S-PULSE can only be saved in combination with the laser contra-angle handpiece 2060 and the laser contra-angle handpiece K 2063.

4.9.4 Detection mode

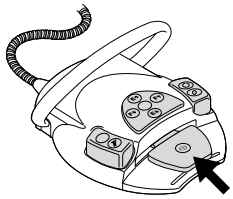
The detection mode is for detecting tissue.

If the handpiece is guided over the tooth, the following display appears:
- The instantaneous fluorescence measurement appears below Mom.
- Under PEAK the highest value measured since the last reset is displayed. The peak value can be reset to the current instantaneous value in the detection mode by pressing the laser pulse trigger.
- The most recently entered threshold value is shown below the threshold value key.

See also: 4.10 Setting the threshold, Page 56

4.9.5 Feedback mode

The feedback mode combines the detection function of the detection mode with the therapeutic function of the laser beam.



When the laser pulse trigger is pressed in the ready mode, laser pulses are triggered only when, as a result of the detection, an altered tooth substance is found, i.e. when the fluorescence measurement is above the said threshold value.

As soon as the fluorescence measurement falls below the threshold value, triggering of laser pulses is stopped.

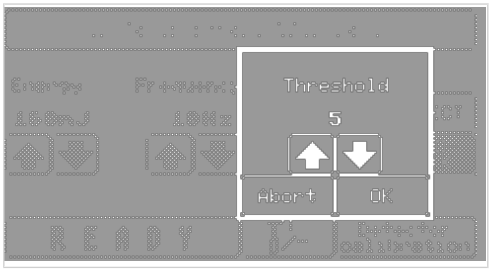
See also: 4.10 Setting the threshold, Page 56

4.10 Setting the threshold

For working in the feedback mode, it is first necessary to set a threshold value. This threshold value marks the limit above which the laser pulses are output in the ready mode when the laser pulse trigger is pressed. The output of laser pulses is stopped below the threshold value.

The numerical display shows the currently saved threshold value.

When the Threshold value key is pressed, the threshold value menu opens.



When the arrow key is pressed, the threshold value increases by one value in each case.

Note
Apply continuous pressure to the key to continuously change the values.

Water and air

Note
If a minimum or maximum value is reached, two signal tones are heard.

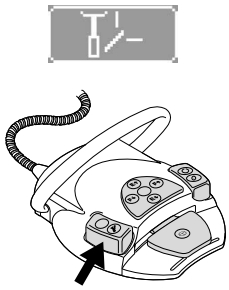
Press the Stop key to return to the start menu without changing the threshold.

When the OK key is pressed, you return to the start menu. Saving of the threshold value is present on the display.

In the start menu, the saved threshold value is now displayed.

4.11 Spray settings

4.11.1 Media default



Use the spray key on the start menu or the foot control to select the spray settings.

In the spray menu, the user chooses between the spray settings AIR_and WATER. The two keys function according to the on/off principle:
- Off: Dark key with bright inscription.
- On: Bright key with dark inscription.

AIR and WATER can also be switched on simultaneously. An air/water mixture then emerges.

The spray function can be switched off by deactivating AIR and WATER.

In the start menu, the symbol on the spray key changes appropriately.

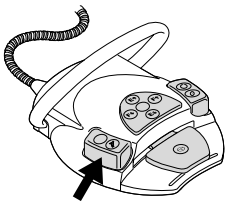
	Water and air	
	Water	

	Air	
	No spray	

If the OK key is pressed, the changed spray setting is accepted.

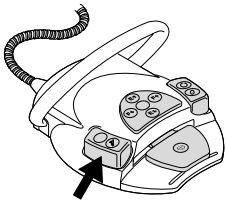
If Abort is pressed, you return to the start menu without accepting the changed spray setting.

4.11.2 Footswitch



The chosen spray medium can be switched on and off using the spray key of the foot switch.

4.11.3 Spray test

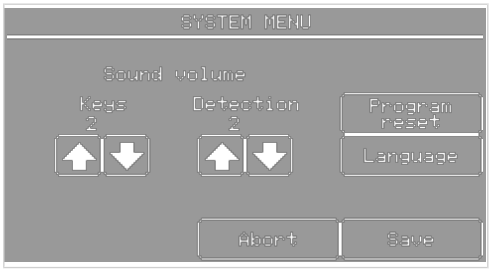


The spray test function is activated by holding down the spray button on the foot control. Use the graduated collar on the handpiece to regulate the amount of spray water.

See also: 4.17 Spray regulation, Page 70

4.12 System menu

The system menu can be opened from the program selection menu by pressing the System menu key.

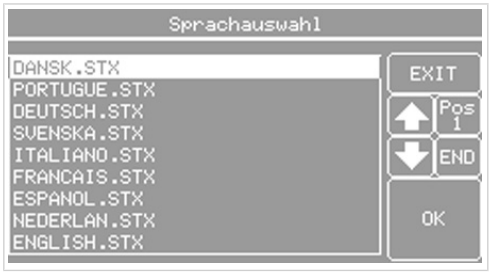


Here, the following settings can be entered:
- - the sound volume for the key tone
- the noise level of the detection signal
- - the language of the touchscreen
- resetting of the changed programs for default values

Setting the noise level for keys and detection via the arrow key

Program reset and language selection via additional dialogue, etc.

For language selection, a list of all available language files appears.



Note
After the end of the language selection using the OK key all texts, including the predefined programs, are reloaded. This means that a program reset is also performed.

4.13 Programs

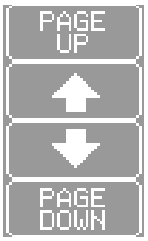
Default programs are available for operating the KEY Lasers 3+ / III upgraded. Additional programs can only be defined and saved by the user.

4.13.1 Program selection

The start menu shows the currently chosen program in the form of the program selection key at the upper edge of the touchscreen.

When the program selection key is pressed, the program selection menu opens.

4.13.2 Program selection menu



Max. 6 lines can be displayed in the selection menu overview. The selection bar is moved 6 lines up/down using the keys PAGE UP / PAGE DOWN.
The keys and can be used to move the highlighter bar up and down, to find the required program.

When the OK key is pressed, the selected program is accepted and you return to the start menu.

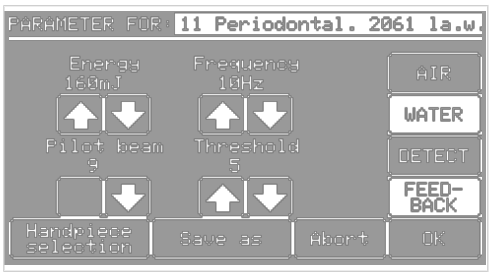
Pressing the Abort key results in a return to the start menu without acceptance of the selected program.

4.13.3 Delete program

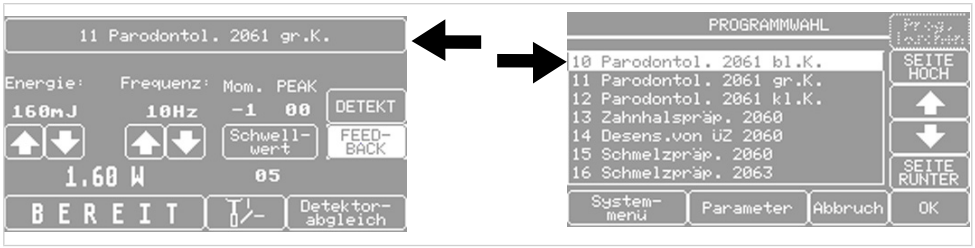
The predefined programs cannot be deleted. Only programs defined by the user can be deleted.

4.14 Program settings

When the Parameter key is pressed in the program selection menu, the parameter menu appears.



Here, it is possible to change the settings for the currently active program. The active program with the preset handpiece appears in the selection list in the start menu, in the parameter menu with bright background and dark characters.



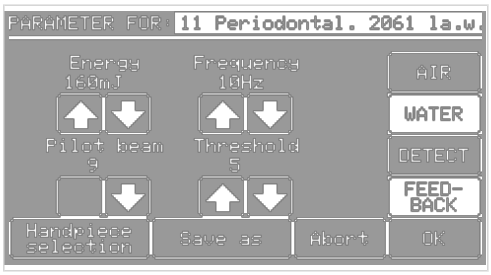
The changes can be saved under the existing program name by pressing the OK key.

If you want to save the changes under a new name, you have to save them in a new program by using the Safe key.

The AIR and WATER keys act as on/off switches. Active keys have a bright background with dark inscription. DETECT and FEEDBACK are mutually exclusive.

4.14.1 New program

If, in the parameter menu, a new parameter setting has been produced by changing the settings of an existing program this can be saved as a new program.

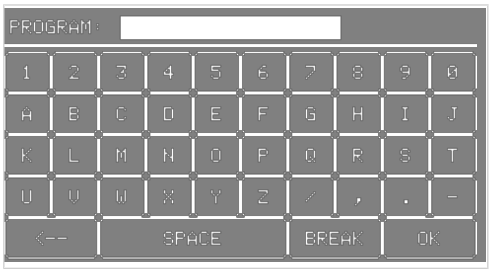


Save new program

Note
S-Pulse mode can only be saved as a program in conjunction with the handpieces 2060 / K 2063.

Save as

After the Save as key is pressed, the input mask with an input field appears on the touchscreen.



Characters can be entered by pressing the number and letter keys and pressing the SPACE bar generates a space.

<--

The arrow key moves the input cursor one character to the left and deletes the character present there.

Note
The program name is limited to 18 characters.

OK

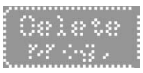
The previously selected handpiece code is automatically added to the program name after the OK key is pressed.
Pressing the OK key saves the new program under the name entered. The program selection menu appears; the new program has been included in the selection list.

Abort

If the Abort key is pressed, you return to the program selection menu without saving the new settings.

Note
The number of the newly definable programs is limited. Once the maximum number of programs is reached, the touchscreen shows the message "ATTENTION Creation of another program not possible" when an attempt is made to create a further program.

Delete program



Only the programs created by the user can be deleted by pressing the Delete progr. key in the program selection menu.

4.14.2 Reset the new settings

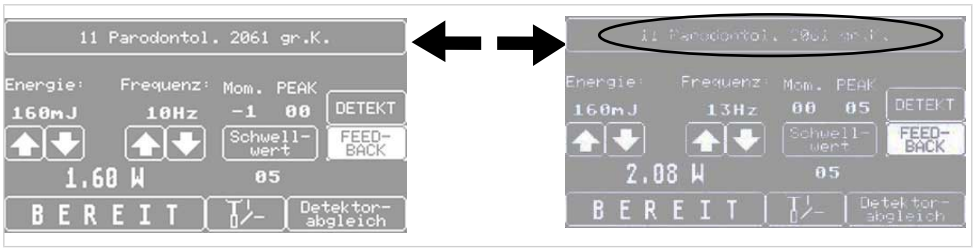
To reverse the changes in the program settings, press the program reset key in the system menu.

See also: 4.12 System menu, Page 60

4.14.3 Pilot beam setting

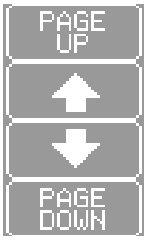
The intensity of the pilot laser can be adjusted by pressing the arrow keys. The highest value corresponds to the highest possible intensity.
In the feedback or detection mode, the pilot beam brightness cannot be set.

Note
If, in a selected program, at least one parameter is changed in the start menu and is confirmed with OK, the text in the program selection key of the parameter is displayed in shaded form.



4.15 Handpiece selection

The handpiece can be selected by pressing the handpiece selection key in the parameter menu.



Max. 6 lines can be displayed in the hand piece overview. The selection bar is moved 6 lines up/down using the keys PAGE UP / PAGE DOWN.

The keys and can be used to move the highlighter bar up and down, to find the required program.

If the OK key is pressed, the selected handpiece is accepted and you return to the parameter menu.

If the Abort key is pressed, you return to the start menu without acceptance of the selected handpiece.

Note
S-Pulse mode can only be saved as a program in conjunction with the handpieces 2060 / K 2063.

4.16 Detector adjustment

KaVo recommends checking the detection function each time before the Key Laser 3+ / III upgraded is used in detection or feedback mode. The hand-piece is held against the reference. If the values on the reference do not correspond with the values on the touchscreen, take the following steps.

Detector calibration

When the detector calibration key in the start menu is pressed, the detector calibration menu opens.

With the aid of this menu, the detection of the laser is calibrated. The results of the calibration are administered separately for each handpiece (and each fibre tip).

4.16.1 Check or change the reference value

Note
The value indicated on the reference must correspond to the reference value on the touchscreen .

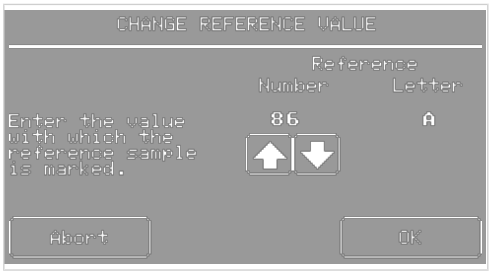
If the letter on the touchscreen does not correspond to the letter on the reference, the corresponding reference should be obtained through the Customer Service Center. For this purpose, it is essential to notify the contact person at KaVo of the letter code of the reference value which is displayed on the touchscreen.

Change ref. value

If the digit on the reference does not correspond to the digit on the touchscreen, the digit on the touchscreen should be changed with the aid of the "Change reference value" dialogue.

OK

When the OK key is pressed, the reference value is accepted and you are returned to the detector calibration menu.



The change is performed in the "Change reference value" menu with the aid of the arrow keys ⬆ and ⬇.

Note
The reference is located in a magnetically adhering plastic holder. It can thus be fastened to the sheet metal cladding of the KEY Laser 3+ / III upgraded.

4.16.2 Start adjustment

START

- Have the reference sample ready.
- In the detector adjustment menu, press the START key to start adjustment.
- The user will be guided through the detector adjustment by the program. Follow the instructions on the touchscreen.

4.16.3 Determining the zero value

The following instruction appears on the touchscreen: "Point the handpiece to the floor".

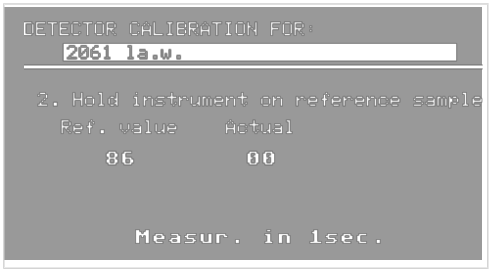
Note
It should be ensured that the handpiece is not directed at a foreign light source.

After 5 seconds, the measurement of the zero value begins automatically.

Duration of the measurement is 2 seconds.

4.16.4 Determine reference value

The following instruction appears on the touchscreen: "Hold instrument on reference probe".



After 5 seconds, the measurement of the reference value begins automatically. Duration of the measurement is 2 seconds.

4.16.5 Complete detector adjustment

The following information appears on the touchscreen: "The detector calibration was successfully completed!"

Pressing the OK key saves the result and returns you to the start of the menu.

Pressing the button "Repeat detector adjustment" returns you to step 1 of the detector adjustment menu.

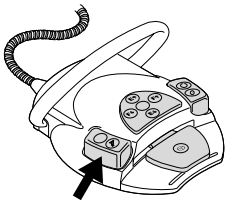
4.17 Spray regulation

The amount of spray water is of great importance for ensuring that the laser treatment is performed effectively. During use of the handpiece 2060, the amount of spray water is set so that, when a surface is sprayed, a thin film of water forms on it. Water flow and aspiration should be tailored to the laser parameters. The channels should be cleaned with the jet needle with reduced water flow.

See also: Handpiece-instructions

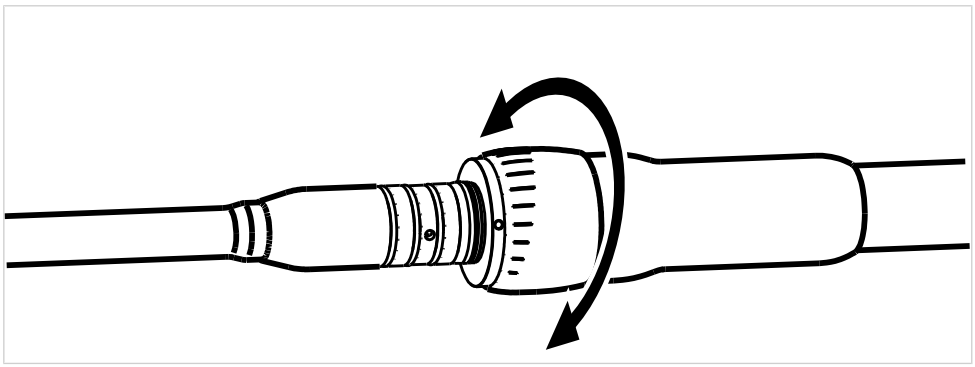
Note
Make sure that the laser hose is inserted and screwed tight in the coupling, and that a handpiece is connected.
Make sure that the KEY Laser 3+ / III upgraded is switched to stand by.

- Remove the handpiece from the holder.



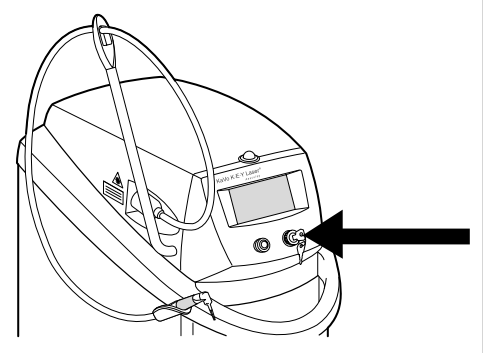
- Hold down the key to release the spray.

The spray or water flow rate is regulated by the setscrew
Turning counter clockwise increases the water flow rate (long tick marks) and turning clockwise reduces the water flow rate (short tick marks).



4.18 Switching off

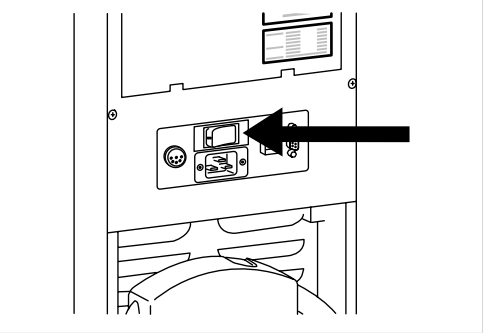
Turn the key to the left to turn off the KEY Lasers 3+ / III upgraded.



CAUTION

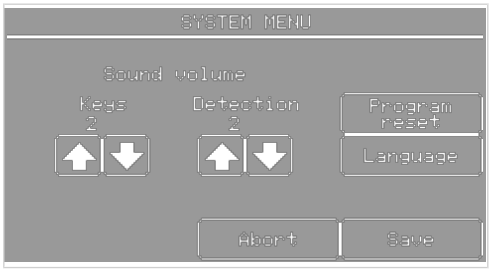
Hazards from the unsupervised use of lasers
Injury hazard
- Before leaving the treatment room, turn off the KEY Laser 3+ / III upgraded and protect against unauthorized use.
- Turn off the main power switch.
- Remove the key from the key-operated switch.

By pressing the main switch on the back of the unit, the unit can be completely disconnected from the mains.



4.19 System menu

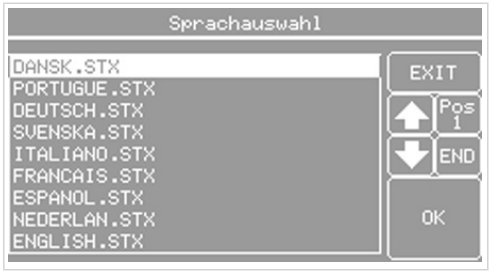
The system menu can be opened from the program selection menu by pressing the System menu key.



Setting the noise level for keys and detection via the arrow key

Program reset and language selection via additional dialogue, etc.

For language selection, a list of all available language files appears.



Note
After the end of the language selection using the OK key all texts, including the predefined programs, are reloaded. This means that a program reset is also performed.

5 Setup methods according to DIN EN ISO 17664

The instructions on cleaning and sterilisation were validated by the manufacturer of the medical device as suitable for preparation. The individual preparing the devices is responsible for the preparation facility achieving the desired results. Normally, validation and routine monitoring of the process are required. Likewise, any deviation from the instructions by the person preparing the device should be carefully checked to see if it is effective, and potential negative consequences should be evaluated.

Note
Frequently setting up does not substantially influence the product. The product life normally ends due to wear and damage from use.

Note
All handpieces must be prepared. Preparation (cleaning) should be carried out directly after each use.

CAUTION

Product damage from improper disinfection
Malfunctions.
- Use disinfectant in accordance with manufacturer's instructions.
- Only disinfect by wiping.
- Do not immerse product or product parts in liquids.

Note
Only when the unit has been switched off.
During cleaning, ensure that no liquid enters the interior of the unit since this may lead to faults.

Note
Direct spraying of switches, key switches for instance, can lead to contact problems in the long term. At such points, it is better to spray disinfectant onto a cloth and to wipe the area to be disinfected.

Note
In general, it is to be ensured that only disinfectants approved for use on painted surfaces and plastic surfaces in the dental sector are used.

Note
The methods to prepare the laser handpieces can be found in the instructions for use for the laser handpieces.

Owing to the variety of medicaments and chemicals used in the dental practice, upholstered and painted surfaces and plastics may be damaged.

Tests have shown that surfaces cannot be protected entirely against all substances available on the market.

As damage to surfaces is very much dependent upon the reaction times of these substances, it is essential for any spilled substances to be wiped away immediately using a damp cloth.

5.1 Manual cleaning

Neutral, non-abrasive detergents and cleaning agents may be used conditionally on painted and plastic surfaces to clean away any disinfectant residues.
When cleaning gloss surfaces (on which water droplets form), it is sufficient to use water and non-abrasive, mild cleaning agents.

Worn surfaces (non-glossy with dark, more non-distinct colours) should first be cleaned as above, and then preserved using commercial paint care agents. Apply paint care agents with a lint-free cloth and circular movements. Then polish with a cotton wool pad or a cloth until the surface shines.

5.2 Machine cleaning

Not applicable.

5.3 Manual disinfection

Note
Only when the unit has been switched off.
The most important requirement is that the disinfectant is used in accordance with the manufacturer's instructions.

Using alcohol disinfectants:
Disinfectants are available in a wide variety of different concentrations.

As a guideline, we have provided you with a list of recommended concentrations of disinfectant ingredients as tested by us.

Note
The levels shown are maximum levels and must not be exceeded!

- 96% ethanol = 40g/100g disinfectant max.
- Propanol = 35g/100g disinfectant max.
- 25% glutardialdehyde = 75 mg/100g disinfectant max.
- Ethyltexanol = 10mg/100g disinfectant max.
- Formaldehyde solution = 10mg/100g disinfectant max.
- Glyoxal = 165mg/100g disinfectant max.

Note
KaVo accepts no responsibility if disinfectants are used with higher ingredient concentrations than those specified here.

5.4 Automated disinfection

Not applicable.

5.5 Sterilisation

Not applicable.

5.6 Cooling circuit


CAUTION

Damage from tipping
The laser device contains a water cooler for cooling.
- Never tip the KEY Laser 3+ / III upgraded or lay it on its side!

Note
An ion exchanger is in the cooling circuit. This deionises distilled water. The operator cannot service it.

The KaVo factory customer service therefore checks the cooling system during maintenance.

6 Safety checks

CAUTION

Damage due to improper servicing
Using improper servicing tools can restrict the function or damage the unit.
- Use at least the basic KaVo service equipment.
- After first start up, servicing tasks and manipulating safety-relevant components, run a safety check.
- Do a safety check at least every 12 months.

KaVo recommends carrying out the annual maintenance service before the safety checks.

See also: 2 Safety, Page 11

- Observe the section on safety.

6.1 Scope of tests

The following tests must be carried out taking into account IEC 60601-1 and IEC 60825-1 and the regulations of the professional associations for safety and health at the workplace (laser safety BGV B2).
The test runs according to the following table:

Frequency in Hz	Pulse energy in mJ
4, 6, 10 and 13	300
15, 20 and 25	200

S-PULSE

Frequency in Hz	Pulse energy in mJ
10, 13, 15, 20, 25 and 30	200

6.2 Safety check of energy

If the energy safety check is activated, in the following test steps are automatically performed by the KEY Laser 3+ / III upgraded:

- The KEY Laser 3+ / III upgraded automatically runs a test of the average, maximum, minimum, standard deviation and error (average in comparison to the setpoint).
  – The error may not exceed +/- 10%.
- The test results must be transmitted from the KEY Laser 3+ / III upgraded to the terminal program. The report must be printed out and added to the medical device reference and customer service report.

See also: 6.7 Safety check report (example), Page 86

Note
Only energy meters that have been properly calibrated and monitored of the type Gentec SUN EM1, Gentec PRJ-M RS-232 or OPHIR NOVA are approved for the safety check of the energy of the KEY Laser 3+ / III upgraded. For source, see service equipment catalogue.
Observe the technical information on the "KEY Laser 3+ / III upgraded / 1240 / 1242 / 1243 / 1343 Adjusting energy meters"!

6.3 Handpieces

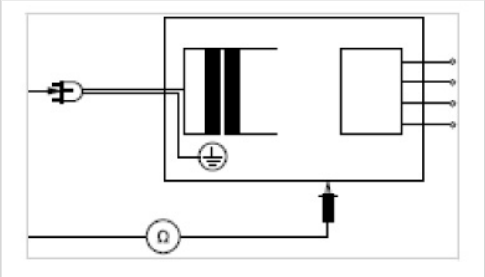
- Check the transmission of laser handpieces P 2061, P 2261, E 2062 and K 2063 according to the instructions accompanying the handpieces.

6.4 Protective conductor test according to DIN VDE 0751 Part 1

Perform the earthed conductor test on the laser unit in accordance with VDE 0751-1. The limit is 0.2 Ω.
If the readings taken are higher than this, determine and remedy the cause.
The earthed conductor test and the spare unit leakage current test are performed after removal of the side casing on the right.

Perform the earthed conductor test on the mains cable between the mains connecting plug and following measuring points:
A Frame of upper middle Z profile strut
B Hexagonal profile for holding the right rear wheel

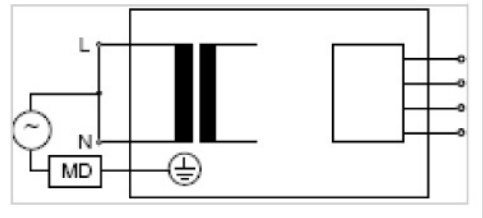
- The measured value should be documented in the medical device book.



6.5 Replacement device leakage current test according to DIN VDE 0751 Part 1

Requirement
Before starting the test unit, hold the key-operated switch of the KEY-Lasers 3+ / III upgraded in on position until the test is over.

- Check the replacement device leakage current between the mains input circuit and protective conductor.
- The maximum replacement device leakage current may not be more than 1.0 mA.
- Document the measured value in the medical device reference.



6.6 Additional tests

- Visual check of the device and accessories
- Function check
- No visible leaks in the unit
- Check internal safety devices
  - Emergency-off switch
  - Key-operated switch
  - Safety switch for swing arm (shutter locking)
  - Safety switch for laser hose coupling
  - Connection for external door contact
  - Connection for external warning lamp
  - Monitoring the cooling system
  - Energy monitoring/control
  - Shutter/absorber
  - Safety foot control
- Check the external safety devices
  - Warning signs
    Check if all required warning signs are affixed to all the access doors to the KEY Laser 3+ / III upgraded treatment room.
  - Warning lamps
    Check if all the access doors to the KEY Laser 3+ / III upgraded treatment room have warning lights.
  - Door switch
    If door switches have been installed, their function should be tested. When a door is open, the KEY Laser 3+ / III upgraded may not switch to READY mode.
  - Safety goggles
    All safety goggles must be checked for suitability.

6.7 Safety check report (example)

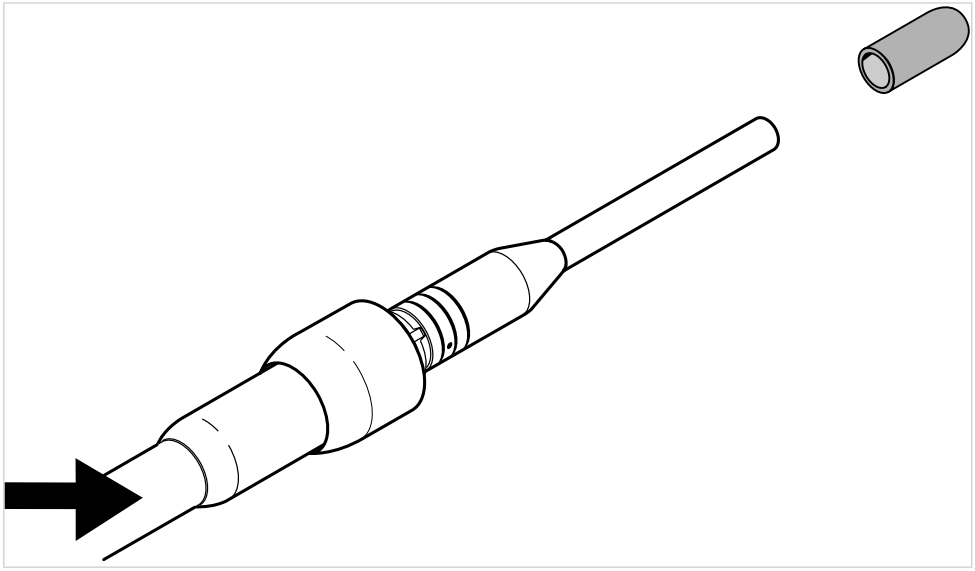
```
-->Write STK_500.DAT
11.12.2008              KaVo    K E Y 3 + Laser
                        ========================
test record for safety inspection / CS report no.:.....................
KEY laser type          : 1343                S/N :                0000152
SW version              : KEY3+ 3.30.081210
start operating date    : 04.12.2008    start operating period : 01:29:37
since operating date    : 04.12.2008    since operating period : 01:29:37

last safety inspection : 11.12.2008
KEY laser type          : 1343
KEY laser serial no.    :          0000152
SW Version              : KEY3+ 3.30.081210
meas. instrument typ    : Ophir NOVA
meas. instrument no.    :   112184
meas. head no.          :   110978
sensitivity             : 00.98 V/J
+--+-----+----+-----+-------+-------+-------+---------+-------+------+-----+
|no|   t |  f |   E |  avg. |   min |   max | std.    | error |    T | Cnt |
|  |  us | Hz |  mJ |    mJ |    mJ |    mJ | dev. mJ |     % | degC |     |
+--+-----+----+-----+-------+-------+-------+---------+-------+------+-----+
| 1| 280 | 10 |  80 |  84.3 |  78.5 |  90.5 |     3.3 |   5.3 | 24.8 | 130 |
| 2| 280 | 10 | 200 | 209.3 | 198.5 | 221.1 |     5.9 |   4.7 | 25.1 | 130 |
| 3| 280 | 13 |  80 |  83.7 |  76.9 |  90.8 |     3.4 |   4.6 | 25.3 | 132 |
| 4| 280 | 13 | 200 | 206.7 | 196.2 | 217.5 |     5.9 |   3.4 | 25.6 | 131 |
| 5| 280 | 15 |  80 |  83.8 |  78.0 |  90.9 |     3.1 |   4.7 | 25.8 | 174 |
| 6| 280 | 15 | 200 | 205.0 | 194.4 | 217.0 |     5.9 |   2.5 | 26.1 | 187 |
| 7| 280 | 20 |  80 |  83.2 |  76.2 |  92.8 |     4.0 |   4.0 | 26.3 | 252 |
| 8| 280 | 20 | 200 | 200.5 | 187.4 | 213.8 |     6.5 |   0.2 | 26.8 | 252 |
| 9| 280 | 25 |  80 |  84.4 |  76.2 |  92.0 |     3.8 |   5.6 | 27.1 | 263 |
|10| 280 | 25 | 200 | 203.1 | 191.0 | 215.1 |     5.8 |   1.6 | 27.1 | 257 |
|11| 280 | 30 |  80 |  83.1 |  74.8 |  91.5 |     3.5 |   3.9 | 27.9 | 340 |
|12| 280 | 30 | 200 | 204.8 | 191.7 | 219.9 |     6.5 |   2.4 | 28.1 | 324 |
+--+-----+----+-----+-------+-------+-------+---------+-------+------+-----+

last safety inspection : 11.12.2008
KEY laser type          : 1343
KEY laser serial no.    :          0000152
SW Version              : KEY3+ 3.30.081210
meas. instrument typ    : Ophir NOVA
meas. instrument no.    :   112184
meas. head no.          :   110978
sensitivity             : 00.98 V/J
+--+-----+----+-----+-------+-------+-------+---------+-------+------+-----+
|no|   t |  f |   E |  avg. |   min |   max | std.    | error |    T | Cnt |
|  |  us | Hz |  mJ |    mJ |    mJ |    mJ | dev. mJ |     % | degC |     |
+--+-----+----+-----+-------+-------+-------+---------+-------+------+-----+
| 1| 500 |  4 |  80 |  79.6 |  73.8 |  86.5 |     3.3 |   0.5 | 26.6 | 127 |
| 2| 500 |  4 | 300 | 315.7 | 301.4 | 335.9 |     7.3 |   5.2 | 26.8 | 127 |
| 3| 500 |  6 |  80 |  79.3 |  70.4 |  86.1 |     3.3 |   0.9 | 26.8 | 128 |
| 4| 500 |  6 | 300 | 310.7 | 296.9 | 324.6 |     6.1 |   3.6 | 27.1 | 128 |
| 5| 500 | 10 |  80 |  87.6 |  80.9 |  94.5 |     3.3 |   9.5 | 27.1 | 130 |
| 6| 500 | 10 | 300 | 320.9 | 306.9 | 333.6 |     7.0 |   7.0 | 27.1 | 130 |
| 7| 500 | 13 |  80 |  79.8 |  68.1 |  90.3 |     5.0 |   0.2 | 27.4 | 132 |
| 8| 500 | 13 | 300 | 301.1 | 288.7 | 316.5 |     7.1 |   0.4 | 27.6 | 131 |
| 9| 500 | 15 |  80 |  74.3 |  66.9 |  84.9 |     4.0 |   7.1 | 27.9 | 187 |
|10| 500 | 15 | 200 | 194.5 | 179.5 | 207.3 |     6.6 |   2.7 | 28.1 | 215 |
|11| 500 | 20 |  80 |  77.4 |  69.6 |  88.2 |     3.9 |   3.2 | 28.1 | 252 |
|12| 500 | 20 | 200 | 199.8 | 188.0 | 212.4 |     6.0 |   0.1 | 28.6 | 262 |
|13| 500 | 25 |  80 |  84.6 |  78.0 |  93.7 |     3.7 |   5.8 | 28.9 | 269 |
|14| 500 | 25 | 200 | 202.0 | 190.6 | 213.5 |     5.8 |   1.0 | 29.1 | 259 |
+--+-----+----+-----+-------+-------+-------+---------+-------+------+-----+


signature:.....................
```

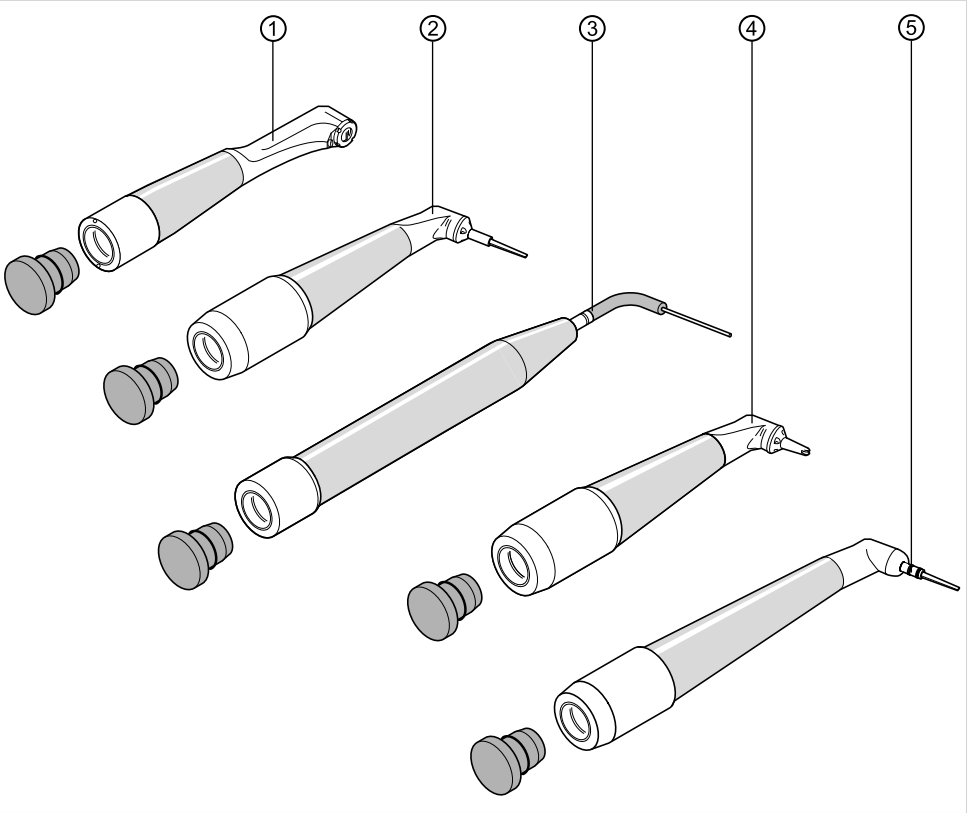
7 Accessories

Note
The described safety instructions must be observed.

See also:
2.2 Laser safety, Page 12
2.3 Safe use, Page 14

7.1 Handpieces



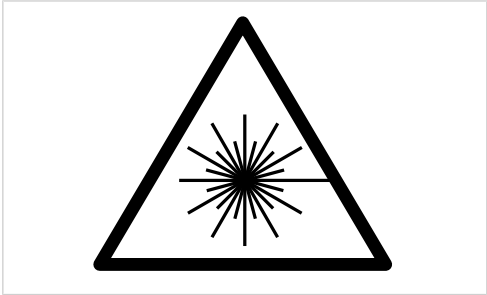


The laser hose (**Mat. no. 1.000.6774**) and handpieces listed below have been tested and approved for use with the KEY Laser 3+ / III upgraded:

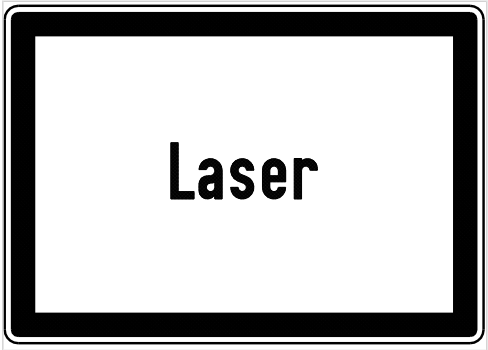
- The accompanying laser contra-angle handpiece 2060 ① (**Mat. no. 1.000.4841**).
- The accompanying laser handpiece P 2061 ② (**Mat. no. 1.000.6050**).
- The accompanying laser handpiece 2062 ③ (**Mat. no. 1.001.0844**).
- The accompanying laser handpiece K 2063 ④ (**Mat. no. 1.004.9010**).
- The accompanying laser handpiece P 2261 ⑤ (**Mat. no. 1.005.9590**).

7.2 Warning signs

Three copies of the warning signs come with the KEY Laser 3+ / III upgraded. They are used to identify the laser area.
Additional warning signs can be ordered from KaVo:
Warning sign (**Mat. no. 0.236.2439**)

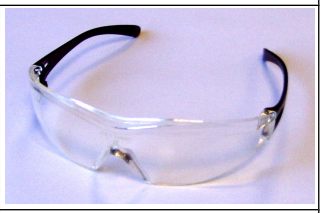


Warning sign (**Mat. no. 0.236.2440**)



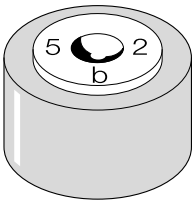
7.3 Laser safety goggles

Laser safety goggles come with the KEY Laser 3+ / III upgraded.
Additional laser safety goggles can be ordered from KaVo:

Protective laser goggles with a side-shield design for the dentist and assistant were delivered up to September 2007 (**Mat. no. 0.228.2202**)	
Protective laser goggles with a side-shield design for the dentist and assistant were delivered up to November 2008 (**Mat. no. 0.228.2202**)	
Current protective laser goggles for the dentist and assistant have been available since December 2008. Lambda One, (**Mat. no. 1.006.4435**).	
Protective laser goggles with mask design for the patient and glasses wearer were available up to September 2007. (**Mat. no. 0.228.2204**)	
Protective laser goggles with mask design for the patient and glasses wearer were available up to November 2008. (**Mat. no. 1.004.9809**)	
Current protective laser goggles for the dentist and assistant have been available since December 2008. Dyna Guard (**Mat. no. 1.006.4436**)	

Note
If the dentist or dental nurse normally wears spectacles, prescription laser-protective eyewear can be ordered from an optician.

7.4 references



Reference A**Mat. no. 1.000.9603**
Reference B**Mat. no. 1.000.9604**
Reference C**Mat. no. 1.000.8552**
Reference D**Mat. no. 1.000.9605**
Reference E**Mat. no. 1.000.9606**
Reference F**Mat. no. 1.000.9607**
Reference H**Mat. no. 1.000.9608**
Reference L**Mat. no. 1.000.9609**

8 Malfunctions

8.1 Error messages

The user guidance system controlled by a microprocessor helps you operate the KEY Lasers 3+ / III upgraded with a touchscreen. In addition, there are numerous automatic self tests incorporated in the unit that control the device.

Thus, lamp ageing and deadjustment are automatically compensated, for example, via a microprocessor-controlled energy regulation system with self-adjustment.

If the microprocessor detects faults, these are localized and are displayed on the touchscreen.

A distinction is made between warnings and faults.
Warnings are displayed on the touchscreen with ATTENTION and faults with FAULT.

8.2 Warning

If the spray water reservoir is becoming empty during operation, the information appears on the touchscreen only on exiting the ready mode.

CONTINUE

When the Continue key is pressed, it is possible to continue working in the Ready mode.

See also: 4.2 Fill the spray water, Page 38

Note
The spray reservoir should however then be refilled as quickly as possible since the spray water level is not checked again by the unit until you next switch on.

8.3 Malfunctions

When a fault message is displayed on the touchscreen, the unit automatically switches off after 30 seconds.

- You should therefore switch the unit on again.

Note
If a fault message appears on the touchscreen again, the content of the fault message should be noted and the responsible service (see Section A 1.5 After Sales Service) should be informed.

If an error message occurs, first check if the trigger key has been activated, or if it was activated when the KEY Lasers 3+ / III upgraded was being turned on.

- Disable trigger operation.
- Switch unit back on.

If the fault message appears on the touchscreen again, contact the service.

Note
In the case of safety-relevant faults, the unit switches off in a period of milliseconds. There is no possibility for any information on the touchscreen.

8.4 Troubleshooting

This part of the instruction is intended as an aid to self-help.

If you are unable to pinpoint or rectify your problem after reading this troubleshooting documentation, please contact a KaVo-trained Service Technician.


CAUTION

Danger when opening the KEY Laser
Damage to the device
- The KaVo KEY Laser 3+ 1343, KEY Laser III 1243 upgraded may only be opened and repaired by specially trained technicians.
- Never open the KEY Laser!

Malfunction	Cause	Remedy
Everything has stopped working.	Mains switch switched off.	▸ Switch on main switch.
	Emergency laser stop actuated.	▸ Release emergency laser stop.
	Power line not connected.	▸ Connect a power line.
No spray at handpiece.	Spray reservoir is empty	▸ Fill the spray water.
	Spray regulation screw on the laser coupling is closed.	▸ Open spray regulation screw.
	Spray nozzle blocked	▸ Clean spray nozzle.
Spray at handpiece poor.	Spray nozzle furred or soiled.	▸ Pierce spray nozzle with a jet needle. A jet needle is included among the accessories. **See also:** Handpiece instructions.
		▸ Clean spray nozzle. **See also:** Handpiece instructions.
Unsatisfactory laser result.	Exit window on handpiece soiled.	▸ Clean exit window. **See also:** Handpiece instructions.
	Exit window on handpiece faulty.	▸ Replace exit window. **See also:** Handpiece instructions.
Leak in handpiece.	O-rings on laser tube coupling faulty.	▸ Replace O-ring.
		Leak in laser instrument. A leak in the laser instrument can lead to damage to the internal handpiece optical system. ▸ It is therefore necessary to have the optical system checked by a Service Technician or the instrument sent to KaVo for checking.
The laser cannot be switched to ready mode.	Priority logic switch of the swing arm not actuated.	▸ Remove the handpiece from the support and pull forward until the support micro switch of the swing arm switches.
	The entrance doors to the treatment room are provided with door switches and are opened.	▸ Close the entrance doors.
	No door switches are installed and the jumper for the door contact connection is not correctly inserted.	▸ Correctly insert and screw down the jumper supplied (**Mat. no. 0.236.2394**).
The touchscreen display disappears during operation.	The device independently turns off when malfunctions arise that affect safety.	▸ Turn the KEY Laser 3+ / III upgraded off and on.

Malfunction	Cause	Remedy
		If the display does not appear on the touchscreen, call service.

9 Assembly instructions

9.1 Floor composition

The quality of the floor surface must correspond to a load-bearing capacity for structures according to DIN 1055 Sheet 3 and must have a compressive strength according to DIN 18560 T1.

The KEY Laser 3+ / III upgraded is delivered from the factory with soft castors.

Note
The castors may not be used on soft floor coverings (carpeting, etc.).
The floor topping, floor covering, adhesive and floor seal must be suitable for chair castors.
In the event of improper use on other floor coverings, KaVo shall assume no liability for any damage.

9.2 Media

9.2.1 Spray water

The KEY Laser 3+ / III upgraded has an internal spray water supply.
The spray water storage bottle may be filled only with distilled or demineralised water (neutral pH).

See also: 4.2 Fill the spray water, Page 38

9.2.2 Spray air

A compressor is integrated in the KEY Laser 3+ / III upgraded to generate a system air supply.

9.3 Electrical connection

CAUTION

Damage to the unit from wrong fuses or supply cables.
Damage to the unit.
- ▸ Provide separate fuses for the KEY Laser 3+ / III upgraded.
- ▸ Use a separate supply cable for the KEY Laser 3+ / III.

9.3.1 Customer

- The connection must conform to the provisions of VDE 0100 for safety sockets.
- Receptacle connection for USA: 125V/30 AMP, NEMA 5-30R
- Fuse for 230V version with B16 or C16 automatic circuit breakers
- Fuse for 100-127V version with 25 A
- Fuse for 100-127V version with 20 A - Japan only

9.3.2 On the unit 230 V version

- Mains cable, unit connector and mains connector requirements:
  - 230V rated voltage
  - 16 A rated current
  - Length: 3m
- Mains cable H05VV-F3 1.50 (3 x 1.5 mm²), not shielded
- Unit connector compliant with IEC 60320 C 19.
- Mains connector, even safety connector compliant with CEE (7) VII
- Protective conductor is important!
- All components used must comply with these requirements and the pertinent in-country requirements.

9.3.3 On the unit 100-127 V version

- Mains cable attached to an external voltage transformer or isolating transformer
- Mains connector, rated current with 25A (20A for Japan).
- Protective conductor is important!
- Mains connector compliant with specific in-country requirements
- Mains connector for USA only: 125V/30AMP, NEMA 5-30P, UL-, CSA-listed

9.4 Transportation and storage

9.4.1 In the dental practice


CAUTION

Damage from transport
Property damage
- Only pull the KEY Laser 3+ / III upgraded on the grip along the device when transporting it.
- When transporting it over a threshold, only pull in the direction of the arm and slightly lift the device.

9.4.2 Outside of the dental practice

The KEY Lasers 3+ / III upgraded comes in cardboard packaging.

The transport and storage information printed on the outside must be observed:

	Keep upright in transit: with arrow pointing upwards.
	Handle with care.
	Keep dry.

9.5 What should be done if there is damage from transportation?

- Goods and packaging must always be left unchanged and the goods must not be used.
- Report the damage to the transport company.
- Contact KaVo, Shipping Department, within 4 days. Tel.: 0 73 51 / 56 – 0
- Under no circumstances should you return the damaged product to KaVo without prior consultation.

Note
In order to settle a claim, KaVo requires the consignment note with confirmation of damage.

9.6 Setup plan

The installation plan provides information about:
- Space required
- treatment position

See also: Installation plan

9.7 Installing the door switch

Note
Door switches do not have to be mounted.

Note
An electrician must assemble and install the door switch. A technician trained by KaVo must connect the KEY Laser 3+ / III upgraded.

On the rear of the KEY Laser 1243, there is a connection for door switches.

See also: 3.1.2 Rear of the laser device, Page 26

An opener can be connected.
This means that if the access door to the KEY Laser 3+ / III upgraded treatment room is open, the door switch must also be opened.
If several access doors exist, they must all be equipped with a door switch.
The door switches must be switched sequentially.
The maximum load for the swtiches is 5 V /10 mA.

Note
Do not connect any external voltages to the "door switch" connection.

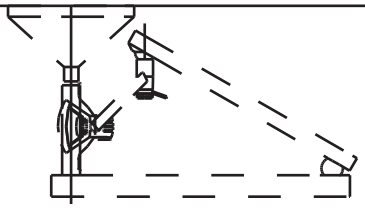
If no door switches are provided, bridge the connection using the jumper supplied.
If the 'door switch' connection is broken, changing from standby to ready mode is impossible.
The following message appears on screen: “Door open – Close the door contact“

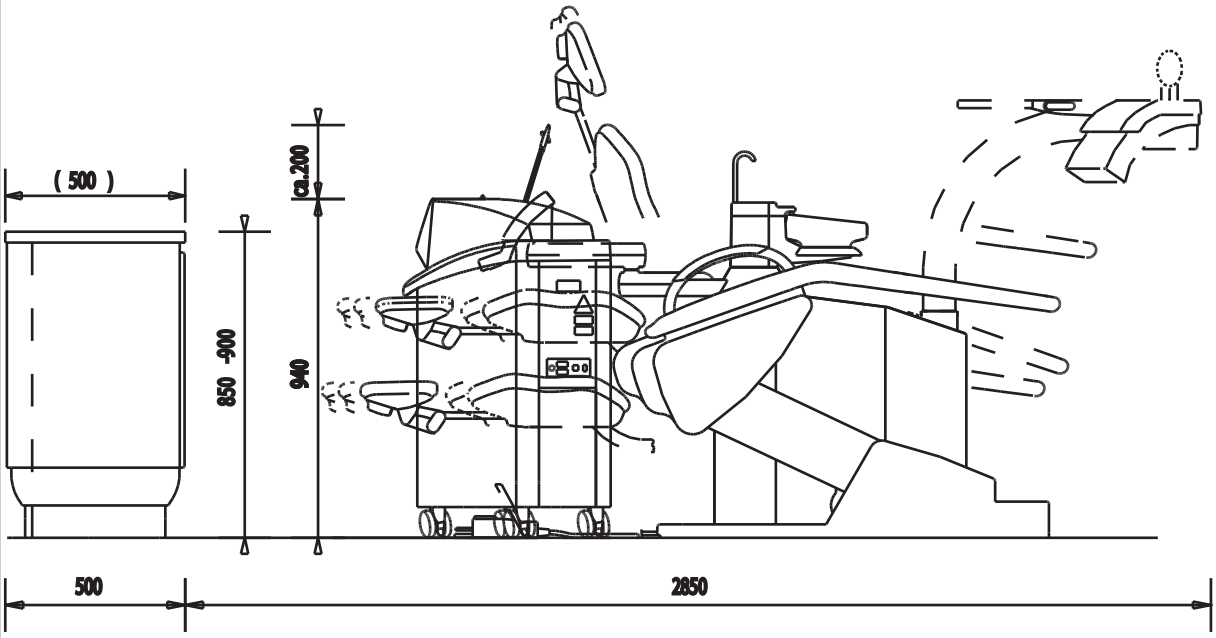
DER LASERRAUM MUSS IM EINGANGSBEREICH DURCH SCHILDER UND EINE WARNLEUCHTE GEKENNZEICHNET SEIN.

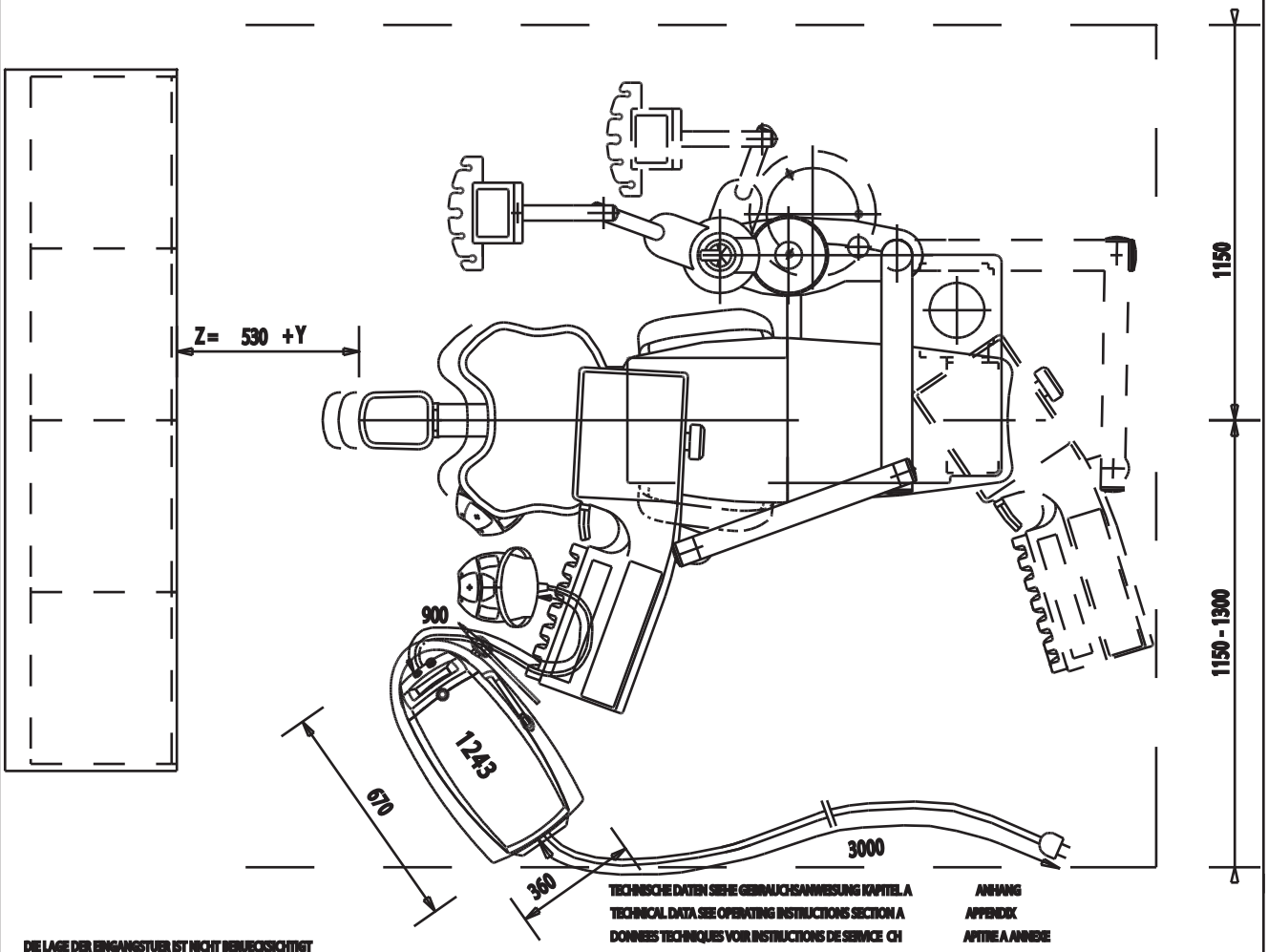
WARNING SIGNS AND SIGNALS ARE TO BE INSTALLED OUTSI DE THE ENTRANCE DOOR OF THE LASER TREATMENT ROOM.

IL EST OBLIGATOIRE D'INSTALLER UN SIGNAL D'AVERTISS EMENT LUMINEUX A L'EXTERIEUR DE L'ENTREE DE LA SALLE OPER ATOIRE LASER.

LA SALA DE TRATAMIENTO LASER TIENE QUE SER MARCADA MEDIANTE PLACAS Y UNA LUZ INTERMITENTE DE ADVERTENCIA EN EL AREA DE ENTRADA.







DIE LAGE DER EINGANGSTUER IST NICHT BERUECKSICHTIGT

THE POSITION OF THE DOOR IS NOT TAKEN INTO CONSIDER ATION

LA POSITION DE LA PORTE D ENTREE N EST PAS PRISE EN CONSIDERATION

LA POSICION DE LA PUERTA DE ENTRADA NO ESTA CONSIDE RADA

TECHNISCHE DATEN SIEHE GEBRAUCHSANWEISUNG KAPITEL A ANHANG

TECHNICAL DATA SEE OPERATING INSTRUCTIONS SECTION A APPENDIX

DONNEES TECHNIQUES VOIR INSTRUCTIONS DE SERVICE CH APITRE A ANNEXE

DATOS TECNICOS VEASE INSTRUCCIONES PARA EL USO CAPI TULO A ANEXO

	Datum	Name
gezeichnet	14.03.01	GROSS
geprüft	Datum	Name

KALTENBACH & VOIGT GmbH & Co. BIBERACH/RIß DONAUSCHWABEN TELEFON 07351/560-0

1243

1:20

ZG.NR. 111 052 94 003

KaVo. Dental Excellence.

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