LASERPEN

LA-XP500



Operating Instructions

2026-10

CE 0197

Preface

This user manual is intended for healthcare professionals who are familiar with the handling and use of low-level laser systems.

The LA-X P500 laser pen (hereinafter referred to as the LA-X P500) is a therapeutic device for localized or small-area low-level laser therapy and is a treatment option in alternative medicine.

Note: 
Read this user manual carefully before use. Keep the user manual at the location where the low-level laser system is used at all times.

Users must be able to address the risks and complications associated with the use of low-level laser systems by taking appropriate precautions and measures.

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Content

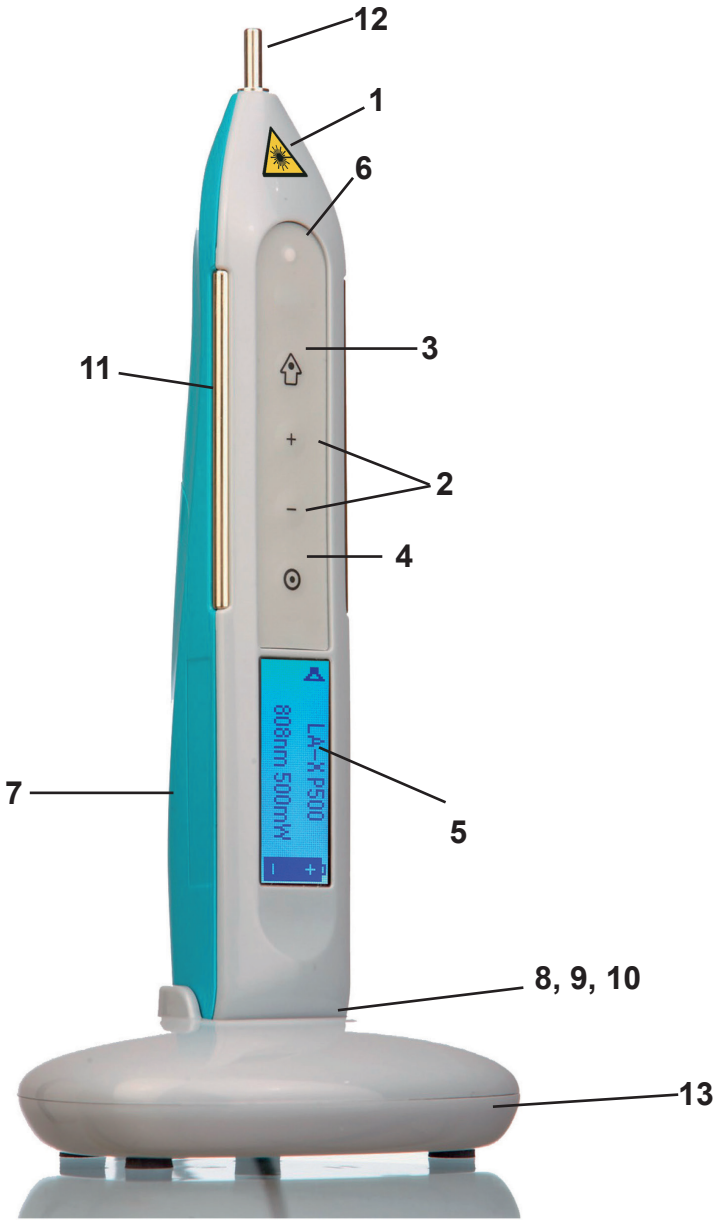
1. Function Keys and Display Elements 5
2. Intended Medical Use 6
2.1 General Description of the Product 6
2.2 Medical Purpose 6
2.3 Medical Applications 6
2.4 Contraindications and Exclusions 6
2.5 Patient Characteristics 7
2.6 User Characteristics 7
2.7 Operating Environment 7
3. Display 8
4. Operation 9
5. Changing the Laser Parameters 10
6. Laser Application 13
6.1 Point Search 13
7. Application 15
8. Installation and Charging of the Batteries 15
9. Maintenance and Care 16
10. Safety Instructions 16
11. Overview of Type and Warning Labels 18
11.1 Definition of symbols of the Laser Pen 19
11.2 Definition of symbols on AC adapter 19
11.3 Transport and Storage Symbols 19
12. Error messages and safety information 20
13. Technical Data – Laser Pen LA-X P500 21
14. Appendix: Therapy Frequencies/Therapy Programs 22
15. Notes on Electromagnetic Compatibility 24
15.1 Manufacturer’s Declaration on Electromagnetic Emissions 24
15.2 Manufacturer’s Declaration on Electromagnetic Immunity 25
15.3 Immunity in the near field of wireless RF communication devices 26
15.4 Immunity to magnetic near fields in the frequency range from 9 kHz to 13.56 MHz 26

Scope of Delivery

The scope of delivery includes the following items:

- LA-X P500
- Charging station, including 230V AC power adapter
- Therapeut laser safety goggles (sold separately, optional)
- Softcaps patient laser safety goggles (sold separately, optional)
- Carrying case (sold separately, optional)
- User manual

Function Keys and Display Elements



1	Laser	This button turns the laser on or off
2	+/-	This button allows you to change the values selected with the SET button
3	SET	This button allows you to save the values selected with the SET button
4	POWER	This button turns the LA-X P500 on or off
5	Display	The display (menu-driven) shows the set laser power, operating mode, spot-finding mode, therapy time, dose, and battery charge status.
6	LED	This LED above the LASER button indicates when the laser is activated. An error in the laser diode control is indicated by a red light. In this case, contact service
7	Battery compartment	The battery compartment is located on the bottom of the housing
8	Red port	Socket for the key pin
9	Charging contacts	Charging contacts for the charging station
10	Black port	Socket for storing the key pin
11	Contact surface	For spot search
12	Light guide	Laser beam exit port
13	Charging station with power adapter	For charging the batteries

2. Intended Medical Use

2.1 General Description of the Product

The LA-X P500 laser pen is a device for low-level laser therapy. Low-level laser therapy falls within the field of complementary therapy.

Treatment with the laser pen involves delivering laser radiation to the skin via a laser diode and is suitable for treating small areas. Acupuncture points can also be stimulated. The laser pen is moved slowly and evenly across the patient's skin surface.

2.2 Medical Purpose

The LA-X P500 laser pen is a therapeutic device for low-level laser therapy (LLLT) and can be used for wound healing, pain relief, and reducing inflammation.

2.3 Medical Applications

The following indications are listed in the professional literature. These also apply to the LA-X P500 laser pen.

- Wound treatment
- Pain relief
- Anti-inflammatory effects

2.4 Contraindications and Exclusions

The following contraindications and treatment exclusions are listed in the professional literature. These also apply to the LA-X P500 laser pen.

Absolute Contraindications

- Exposure of the eyes to the laser
- Light sensitivity
- Cancer patients
- Open fontanelles and epiphyseal plates in children
- Hyperthyroidism

Relative Contraindications

- Patients with pacemakers (chest)
- Epilepsy (head)
- Pregnancy (abdominal and back areas)
- Endocrine organs (thyroid, testicles, ovaries, etc.)

Therapeutic Contraindications

- Deep X-ray therapy
- Long-term medication
- Chemotherapy

Chemotherapy

- Skin irritation
- Thermal injury to the skin (temperature rise above 45°C)
- Damage to the eyes of the operator, the patient, or other persons near the device
- Skin sensitization
- Skin irritation or intradermal reactivity
- Fatigue / dizziness

2.5 Patient Characteristics

Patient selection

- Male, female
- Adults (over 18 years of age)
- Children (ages 3 to 18)

Patient and User Contact

The treatment involves directing laser light onto the skin.

The laser pen is moved slowly and evenly across the patient's skin surface.

The distance from the skin should be only a few millimeters.

The device does not come into contact with mucous membranes; it is non-invasive and not an implantable device. Depending on the body area, however, the mucous membrane may also be treated indirectly via the skin's surface

The laser pen is a handheld device, so the user has direct skin contact (hands) with the housing during treatment.

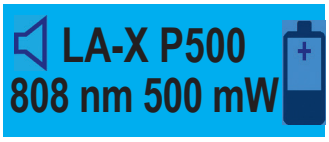
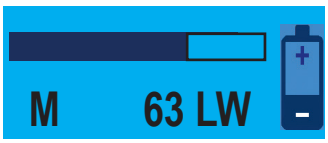
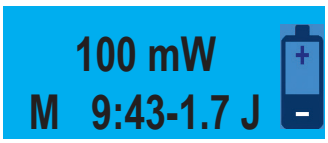
2.6 User Characteristics

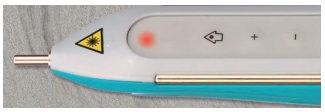
- General practitioners
- Dermatologists
- Orthopedists
- Physical therapists
- Clinical staff such as nurses, acting under a physician's direction

2.7 Operating Environment

The LaserPen is used in medical facilities (professional healthcare settings). Users and patients must always wear laser safety goggles. Care must be taken to ensure that there are no mirrors or other reflective surfaces within the NOHD (nominal ocular hazard distance) from the LaserPen (reflection of laser light).

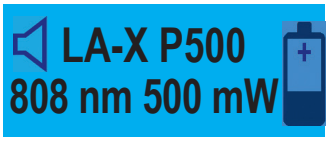
3. Display

	This screen appears after the laser is turned on during the boot process. The first line displays the device model, and the second line shows the device's software version.
	This screen appears after the laser is turned on, following the boot sequence. The second line displays the wavelength and the maximum CW power. The battery charge level is shown on every screen. The speaker icon indicates whether sound output is enabled. If sound output is disabled, the speaker icon is crossed out.
	Default Settings. This screen always displays the most recently used settings and the current therapy parameters (laser power, spot-search mode, therapy program, energy dose), as well as the battery charge level.
	A value displayed in reverse can be adjusted using the + or - buttons. In this screen, the laser power can be adjusted. Pressing the SET button saves the current value. The following parameters can be edited: Power – Spot Search Mode – Therapy Programs – Energy Dose and/or Therapy Time.
	Setting the spot-finding mode and selecting manual or automatic laser start.
	Setting the therapy program. These are listed on pages 10 and 22.
	Setting the energy dose—the maximum dose is 60 joules.
	Setting the therapy duration; the maximum therapy time is 10:00 min.
	In spot-search mode **M**, the skin conductance is displayed on a bar graph and as a numerical value (0–99).
	In spot-search mode **A**, the stored skin conductance is displayed in the first row as a shaded area on the bar graph. The second row shows the current measurement value.
	This screen appears when the laser is activated. It displays the laser power, the spot-search program, the remaining treatment time, and the energy dose delivered in joules (J).
	This screen indicates that the device is charging.

	LED display of laser power level: The green LED indicates that the laser discharge is active.
	LED display says “Error”: The red LED indicates that an error has occured. In this case always check the message on the display
	Red safety connector where the key pin is inserted. By pulling the key pin you will prevent inadvertent laser discharge.

4. Operation

Insert the red key pin into the red connector on the left (8) and turn on by pressing the POWER key (4). The display now shows the following message:



The output data of the laser system (wavelength and max. output) are indicated in the second line. You can turn the display (right-handed/left-handed users) with the “+” key (2). The sound (which is issued every 20 s during laser discharge) can be turned on and off with the “-” key (2). When the loudspeaker icon is crossed out, the sound is turned off.

By pressing the “SET” key you can then have the current parameters (initial setting) of the unit shown as follows:



The display always shows the values for laser power level, point search program, therapy program, and energy dose rate that were selected last (stored).

When the unit is operated for the first time factory preset settings are: output 200 mW , operation mode CW, point search mode OFF (0) and the maximum energy dose rate 60J.

The parameters can be modified as explained in the chapter “Changing the Laser Parameters”.

The laser discharge is started as explained in the chapter “Using the Laser” (page 13).

5. Changing the Laser Parameters

Pressing the SET button (3) causes the power value to flash as shown in the figure below; it can be adjusted using the “+” and “-” buttons (2). The available settings range from 10% to 100% (relative to the maximum value) in 10% increments.



Pressing the SET button (3) again confirms and saves the selected value. The display changes to the following screen, and the spot-search mode can be adjusted using the “+” and “-” buttons (2)



The available settings for spot search mode are “0” (spot search off), “M” (manual spot search), and “A” (automatic spot search) (see the “Spot Search” chapter, page 13). Press the SET button (3) to confirm and save the set value.

The display changes to the following screen.



Changing the Laser Mode

Press the arrow key until the desired laser program appears (see image). Use the “+/-” key to select the desired frequency program.



Possible settings:

- CW
- Multi-frequency
- Alpha frequency
- Nogier frequencies A through G, L
- Nogier frequencies (pot.) A’ through G’
- Bahr Frequencies 1 through 7
- Bahr+ Frequencies
- Reininger Frequencies
- Solfeggio Frequencies 1 through 9
- Frequency Bands (FI: Regeneration, Pain, Interference, Trauma, Inner Center, Detox, Infection, Bones, Nerve, Transcranial, Psyche/Autonomic, Lymph, Trigger Points)
- Sweeps (Sweep: Alpha, Purr, Beta, Theta, Delta)
- Cranio
- Freely programmable frequencies from 1 to 9,999 Hz

If you hold down the arrow key for 2–3 seconds, you'll enter the corresponding submenu, where you can select the desired frequency or frequency program.

Example:

You want to select the "Regeneration" frequency band:

1. After turning on the device, use the arrow key to select the "Frequencies" programming mode.
2. The currently selected mode is highlighted in black and flashes.
3. Use the "+/-" button to select the FI bands. "FI: xxxxx" is now displayed.
4. Hold down the arrow button for 2–3 seconds. The display now shows "FI-Autorun" on the first line and the currently selected program on the second line.
5. Use the "+/-" button to select the "Regeneration" frequency band—it is highlighted in black and blinks.
6. Press the arrow button twice; the second line of the display will now show "FI: Regeneration," the value will stop blinking, and you will enter the "Dose/Time" setting mode.

The sweeps can be set accordingly.

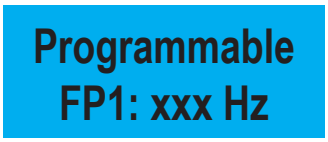
Possible settings are:

- Alpha
- Purr
- Beta
- Theta
- Delta

The Bahr+ and Solfeggio frequency series can be set in the same way as the Nogier frequencies.
For therapy programs and frequencies, see Appendix 1 (pages 22–23).

Setting a Freely Programmable Frequency:

There are 20 memory slots (FP1 through FP20) available for freely programmable frequencies. While the value is flashing, use the "+" or "-" button to enter the FP frequency program. Press and hold the SET button for 2–3 seconds to enter the "Programmable" display.



Now hold down the SET button for 2–3 seconds to enter the frequency setting mode.



Use the "+/-" and SET buttons to set the desired frequency (1–9,999.99 Hz). Start with the thousands place, then the hundreds place, and so on. Once the desired frequency is set, confirm by pressing and holding the SET button for 2–3 seconds. The frequency is now transferred to the treatment display (initially as a blinking value). Press the SET button to save the frequency and display it on the screen.

A set value remains stored until it is overwritten by another frequency.

After setting the treatment mode, the display changes to the following screen:



The energy dose can be adjusted using the "+ / -" buttons. Press the SET button to confirm the selected value. The selected dose is automatically displayed as a flashing value on the screen, representing the required treatment time based on the set power level



Press the SET button to confirm the value. The required therapy time now flashes and can be confirmed by pressing the SET button.

Please note: If you now change the therapy time using the "+ / -" buttons, the dose required for this therapy time will also change based on the set power level.

Possible settings for the therapy time of the LA-X P500 are:

10 sec.–1 min. in 10-second increments
1 min.–10 min. in 1-minute increments

Possible settings for the dose of the LA-X P500 are:

1 J–60 J max.

Once all laser parameters have been set, this is indicated on the display. The individual values will no longer flash, and you can begin the laser treatment – ***see the following chapter, "Laser Application".***

Please note:

The maximum adjustable energy dose is 60 J.

Example: With a setting of 60 J (dose), a laser power of 500 mW, and CW laser mode, the treatment time is 2 minutes; in frequency mode, it is 4 minutes.

Note: Please note that, due to the relationship between energy and treatment time, changing one of these two parameters will also affect the other. The corresponding value is automatically adjusted.

Pressing the SET button (3) again confirms and saves the set value for the treatment duration. You can now begin the laser treatment (see the following chapter, "Laser Application").

Note that the set parameters are retained even after the device is turned off and back on.

6. Laser Application

The laser application can only be activated when the default setting (parameter display) is active on the display.



Pressing the LASER button (1) activates the laser after a 2-second warm-up time. The LED (6) lights up green, and the display changes to the following screen.



The display (5) now shows the remaining treatment time and the energy dose delivered in joules, as well as the selected spot-search mode. The set treatment time now counts down, and the energy dose changes according to the set laser power and the elapsed treatment time, based on the formula “Energy dose (joules) = Laser power (mW) × Treatment time (sec.)”.

If the speaker is turned on, an audible signal sounds every 20 seconds.

The treatment ends automatically once the set treatment time has elapsed or once the selected energy dose has been reached. The end of the treatment is indicated by a short triple beep.

The treatment can be manually interrupted at any time by pressing the LASER button (1).

After the therapy ends, the display returns to the “Default Settings” screen.

> ***Note:*** If the device is not being used for laser treatment, it automatically turns “OFF” if there is no user interaction for a period of >= 10 minutes (AUTO OFF)..

6.1 Point Search

Acupuncture points exhibit different electronic behavior than the surrounding areas of skin with the same external structure and can be identified as zones of increased skin conductivity (or reduced electrical skin resistance).

This fact forms the basis for working with a point-finding device. To activate point finding, you must first switch to point-finding mode (M or A for manual or automatic point finding). Starting from the default state (last-used settings), press the SET button (3) twice. You can now adjust the point-finding mode using the “+” and “–” buttons (2). The following settings are available:

● 0 = Point Search Off, ● M = Manual Point Search, ● A = Automatic Point Search
● Setting M (Manual Point Search)

Point Search is activated by touching one of the metallic contact surfaces (11) while simultaneously making contact with the patient. The skin conductance values are displayed as a bar graph and as a numerical value. At the same time, an audible signal indicates whether the skin conductance value is increasing or decreasing.



Place the LA-X P500 vertically near the suspected acupuncture point (1–2 cm) while applying light pressure to the skin. Acupuncture points can be located by moving the LA-X P500 across the skin.

There are areas of the skin where the skin conductance value falls below the measurement range. This is the case when the display (5) shows a skin conductance value of 0 during measurement. In this case, you must press the LA-X P500 more firmly against the skin or lightly moisten the skin area.

In manual point-search mode (setting M), you can activate the laser system by pressing the LASER button (1) at the highest measured point.

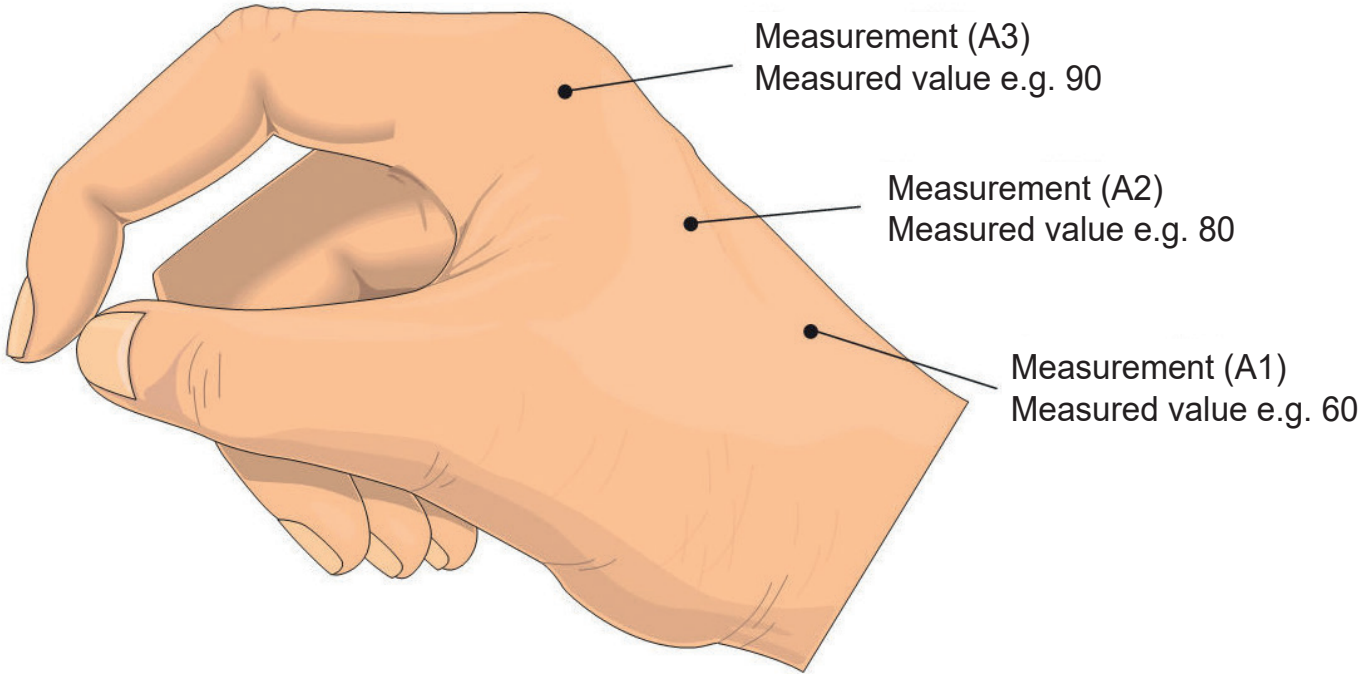
Automatic Spot Search

If you briefly press the SET button (3) while in Spot Search mode (M) during a spot search measurement, the current skin conductance value is measured and stored. The value is shown on the display (5). On the bar graph, the shaded area indicates the stored value.

During spot detection, the stored value is continuously compared with the current value. If a spot with a higher conductivity value than the stored measurement is found, this is indicated on the display (5) both as a digital value and on the bar graph. If the LA-X P500 is no longer moved—i.e., the conductivity value remains stable for approximately 2 seconds and the current reading is greater than the stored value—the laser turns on automatically. The display (5) now shows the treatment time and the delivered dose.

Measurement

For example, if you save the skin conductance value at point A1 and move the LA-X P500 toward A2, only skin conductance values greater than 60 will be displayed. If, for example, you take a measurement at A2, only conductance values where the reference value is greater than 80 will be displayed. All values below 80 will no longer be displayed, and so on.



The entire procedure described must be repeated for each acupoint search.

Please note:

Turning on the laser does not necessarily mean that you have found an acupoint; it only means that the current skin conductance value is higher than the measured value. You may well have to take several measurements before locating the point.

Using a point-finding device cannot replace knowledge of the location of acupuncture points. Extremely moist, dry, or heavily hairy skin can lead to inaccurate measurement results. The same applies to extremely high humidity in the room.

Some acupuncture points are located very deep and are difficult to find. The same applies to points that are not active. These points can be very difficult or even impossible to locate with a point finder. If acupuncture points are relatively far apart, the measurement is very precise. When acupuncture points are very close together, the point finder naturally has its limitations.

7. Application



To achieve optimal treatment results, please observe the following:

- To minimize reflection losses, the skin must be free of oil, and the LA-X P500 must be held perpendicular to the skin.
- As a general rule for all treatments, the principle of gradual dosage applies. Initial treatments should not exceed 2 minutes.
- The maximum treatment duration per patient for the LA-X P500 is 10 minutes. After this time, the device shuts off automatically.
- The LA-X P500 laser pen should be moved slowly and evenly across the skin's surface. The distance between the laser pen and the skin should be a few millimeters.
- **Warning:** Do not activate the laser until you have reached the treatment site.
- Apply ointments, lotions, and creams only after laser treatment.
- Avoid irradiating areas of skin with tattoos, highly pigmented skin, or moles at power levels > 50 mW CW to eliminate the risk of thermal injury to the skin.

8. Installing and Charging the Batteries

Before using the LA-X P500 laser pen for the first time, it must be charged. To do this, carefully open the battery compartment cover on the back of the LA-X P500 using a pointed object or the plastic tool provided, and insert the two included rechargeable batteries. Pay attention to the polarity of the rechargeable batteries (+, -) indicated inside the housing. Close the battery compartment cover completely.

Use only the included rechargeable batteries or batteries that meet the specifications listed in the technical data (see the "Technical Data" section). Never use regular batteries. Using the wrong type of rechargeable batteries or regular batteries can damage the device.

Connect the included charging station to the power supply (100 V – 230 VAC) and insert the LA-X P500 vertically into the charging station. The current charge level is always shown on the display (5).

After charging is complete (the battery is fully charged), remove the LA-X P500 from the charging station.

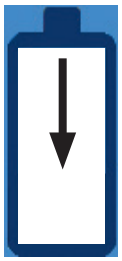
Display:



Charge Level
Battery 1/2 full



Battery
empty



Battery is
charging



The battery is
fully charged

After inserting or replacing the batteries (even if they are fully charged), the laser pen must be connected to the charging station. If the batteries are already fully charged, the initialization time is approximately 1 minute.

Important: The LA-X P500 must not be stored with discharged batteries. We recommend removing the batteries if you will not be using the device for more than 1 month. Removed batteries must be charged at least every 3 months. The battery charging control system accounts for the memory effect, so the device can be charged safely after each treatment.

9. Maintenance and Care

To ensure safe and hygienic operation, please observe the following:

- The beam outlet must be cleaned after each skin contact and when switching patients using a soft cloth or cotton swab and a 70% ethanol solution (medical alcohol).
- Do not expose the device to direct sunlight.
- The housing can be cleaned with a mild cleaner and a damp cloth. The LA-X P500 must be disconnected from the charging station before cleaning. Unplug the charging station before cleaning it.
- Unauthorized repairs or modifications to the LA-X P500 may pose a hazard to users or patients. Repairs may therefore only be performed by the manufacturer or by persons authorized by the manufacturer. Unauthorized opening may result in uncontrolled emission of laser radiation and will void the warranty. In the event of a repair, please contact the service department.
- Operate the LA-X P500 only in enclosed rooms at room temperature. The supplied laser warning sign must be affixed to the door.
- The device must be protected from moisture ingress.

Service and safety inspections for this laser system must be performed every 24 months by the manufacturer or by partners authorized by the manufacturer.

Scope of the inspection in accordance with the Medical Device Operator Ordinance (MPBetreibV):

1. Visual inspection
2. Functionality check
3. Inspection of the necessary monitoring, safety, display, and alarm devices
4. Measurement of safety-relevant output parameters and special technical tests. As part of the inspection, the output and laser power are also calibrated using calibrated laser power meters.
5. Inspection report and evaluation of the safety inspection

10. Safety Instructions

Please follow the instructions in the user manual and observe all warnings.

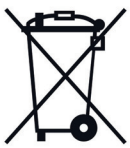
- The laser pen must be protected from unauthorized use by inserting the key pin.
- Use only the rechargeable batteries supplied or those specified in the technical data (see the “Technical Data” section). Never use regular batteries. Using the wrong type of rechargeable or regular batteries can damage the device.
- **Warning:** The laser pen may only be operated by medical professionals who have been trained in its use in medical practices. Treatment must be performed under constant supervision.
- Due to its wavelength, the laser radiation is not visible or only very faintly visible.
- **Warning:** Do not look into the laser output aperture and do not direct the beam into other people’s eyes. **The beam must not be directed at a closed eye either.**
- The safety distance NOHD (nominal ocular hazard distance) when looking directly into the beam is 200 cm at maximum power (laser range).

  Lasers can cause eye damage if used improperly, especially if the distance between the eye and the laser exit port is less than the safety distance NOHD (nominal ocular hazard distance). Please ensure that there are no mirrors or other reflective surfaces within the safety distance from the laser pen (back reflection of laser light). **Warning: The user and patient must always wear laser safety goggles.**

- Laser safety goggles must comply with the EU standard EN 207 and be suitable for the laser diodes used (protection level = L3).
- **Warning:** Check that the laser safety goggles provide an adequate level of protection before using them.
- Laser treatment of patients with heavily pigmented skin, moles or tattoos may result in unintended heating of the treated skin area. Direct irradiation with skin contact or at a distance of less than 2 cm from the treatment area must be avoided. Maintain a minimum distance from the skin of more than 2 cm and keep the applicator moving.

Warning: Switch off CW mode when treating areas of skin with heavy pigmentation, moles or tattoos.

- Do not use continuous wave (CW) operation at power levels >50 mW.
- Please also observe the Technical Regulations on Artificial Optical Radiation (TROS Laser Radiation) and the Ordinance on the Protection of Employees from Hazards Caused by Artificial Optical Radiation (OstrV) when handling this laser product..
- **Warning:** The laser pen must only be switched on once it is in the treatment position. Before changing the treatment position, the laser pen must be switched off and may only be switched on again once it is in the new treatment position.
- After treatment, switch off the laser pen and remove the key pin (page 5, Fig. 1).
- Under the German Act on Non-Medical Practitioners, as amended in October 2001, medical conditions may only be treated on a professional basis with a licence.
- **Warning:** The laser pen must not be used if it is damaged.
- If the laser pen shows any external damage, it must not be used any further and must be sent back to the manufacturer.
- **Warning:** If the laser cannot be switched off using the buttons, or if the display fails whilst the device is in use, remove the key pin and return the device to the manufacturer.
- Magnetic and electric fields and ionising radiation may affect the operation of the device. You should therefore not operate the laser system near equipment that generates strong electromagnetic fields or ionising radiation – such as X-ray or diathermy equipment.
- In hospitals, the device must not be used near active equipment containing radio-frequency surgical devices or in radio-frequency shielded rooms used for magnetic resonance imaging, where high-intensity electromagnetic interference may occur.
- **Warning:** Do not operate the device in areas at risk of explosion. There is a risk of fire or explosion if the LASER OUTPUT is used in the presence of flammable materials, solutions or gases, or in an oxygen-enriched environment. Some materials, such as cotton, which are saturated with oxygen, may ignite at the temperatures generated during the INTENDED USE of the laser device. Solvents from adhesives and flammable solutions used for cleaning and disinfection should be allowed time to evaporate before the laser device is used. Attention should also be paid to the risk of ignition of endogenous gases.
- The laser pen is subject to the WEEE Directive (Waste Electrical and Electronic Equipment) 2012/19/EU and must not be disposed of with household waste.



- If you are taking the laser pen out of service permanently, please let us know. The manufacturer is only responsible for the safety and reliability of the laser device if it is used in accordance with the instructions for use.
- Please note that any serious incidents occurring whilst the equipment is in operation must be reported immediately to the manufacturer and the relevant authorities in the country where the equipment is being used.

11. Overview of Type and Warning Labels



WARNING - INVISIBLE LASER RADIATION AVOID EXPOSURE TO BEAM CLASS 3B LASER PRODUCT (IEC 60825-1:2014)	This warning indicates that the device is a Class 3B laser.
P_0 = max. 500 mW λ = 808 nm	Labelling of emitted radiation/ laser power in accordance with EN 60825
APERTURE FOR LASER RADIATION	This warning label indicates the laser output port. Do not look into the laser port without wearing laser safety goggles.
LA-X P500 (01)04260585220569 (21)LAXP52601034 (11)260928 CE 0197 livetec Ingenieurbüro GmbH Marie-Curie-Str. 8, 79539 Lörrach MD	Type plate
Power Supply LA-X P500 SN: nnnnnn-nnnnn 06/2025	Charging station signage

11.1 Definition of symbols of the Laser Pen

CE 0197	CE marking. Conformity with the European Regulation (EU) 2017/745 for medical devices.
	Follow user's manual
	Application type BF
	Manufacturer
MD	Medical Device
	Date of manufacture
SN	Serial number
	Meets WEEE guideline (waste of electrical and electronic equipment) 2012/19/EU and must not be disposed of in the domestic waste.
	Warning: Laser beam
GS1 Anwendungs-kennzeichnung (AI)	(01) Global Trade Item Number (GTIN, UDI-DI) (11) Production date (YYMMDD) (21) Serial number

11.2 Definition of symbols on AC adapter

	Date of manufacture (only AC adapter) in form YY-MM
	Device of laser protection class II (only AC adapter)
AC 	Alternating current (only AC adapter)
DC 	Direct current (only AC adapter)
	Caution (only AC adapter)

11.3 Transport and Storage Symbols

	Protect against moisture		Storage-/Transport temperature
	Protect against heat		Storage-/Transport huimidity
	Recycling in general		Storage-/Transport air pressure

12. Error messages and safety information

	The batteries are empty and need to be charged. In this state, the laser can no longer be activated.
	Insert the key into the red socket.
	Error in the laser diode control (laser power too high). When this message appears, the emitted laser power differs from the set laser power. However, laser emission can still occur. This message may also appear due to reflections of the laser light off wet, shiny, or reflecti-ve surfaces (such as wet, sweaty, light-colored, or white skin, or generally highly reflective surfaces like light-colored metal or glass); it does not necessarily indicate a device malfunction. Please ensure that no reflective surfaces are exposed to the laser. If the error persists, contact customer service.
	Error in the laser diode control (laser power too low). If this message appears repeatedly, it is highly likely that a laser diode is defective. In that case, contact service.

13. Technical Data – Laser Pen LA-X P500

Power Supply	About built-in rechargeable batteries NiMH (2 cells) / 1.2 V, AA size, 2600 mAh
Docking Station Power Supply	Power Supply (FRIWO NEO018.0-1-X-12 Medical 12V AC Adapter) / 110–240 VAC, 50–60 Hz, 400–200 mA Output: 12 VDC, 1.5 A
Permissible Temperature Range	Operating temperature: +10 to +30° C; Storage/transport: 0 to +50° C
Permissible Relative Humidity	Operation: 30–75%, Storage/Transport: 10–90%
Permissible Air Pressure (Absolute)	Operating pressure: 80 to 106 kPa; storage/transport pressure: 70 to 110 kPa
Dimensions	W x H x D = approx. 34 x 36 x 225 mm
Total Weight	Approx. 200 g (laser pen only)
Classification	BF-rated application section in accordance with EN 60601-1 No protection against moisture (IPX0) Laser Class 3B in accordance with IEC/EN 60825-1:2014
Laser Type	808 nm semiconductor laser (-5/+3 nm)
Effective Power	500 mW/808 nm, tolerance ±10%
Max. Pulse Duration	0.5 seconds (for the freely programmable programs)
Beam Divergence	x-direction 8–11°, y-direction 39–48°
NOHD (Nominal Ocular Hazard Distance)	200 cm
Therapist Laser Safety Goggles (sold separately, optional)	Filter thickness: 2 mm, Filter color: pink, VLT: approx. 67% Suitable for the following wavelengths: 180-315 D LB8 + IR LB4 (OD8+) 750-753 DIR LB1 (OD1+) 754-768 DIR LB2 (OD2+) 769-780 DIR LB3 (OD3+) 781-799 DIR LB4 (OD4+) 800-820 DIR LB5 (OD5+) 821-833 DIR LB4 (OD4+) 834-843 DIR LB3 (OD3+) 844-850 DIR LB2 (OD2+) PF S CE The laser safety goggles comply with EU regulations for the use of Class 3B medical lasers. The laser safety filter is CE certified in accordance with the provisions of DIN EN 207.
Softcaps Patient Laser Safety Goggles (sold separately, optional)	Suitable for UV and diode lasers, in accordance with DIN EN 207. Provides UV-A, UV-B, and UV-C protection when used with UV lamps. Suitable for applications with wavelengths from 560 nm to >830 nm DI LB3, 830–880 DI LB2, VLT: 0.2%. CE certified.
Conformity	CE 0197
Manufacturer	livetec Ingenieurbüro GmbH, Marie-Curie-Str. 8, D-79539 Lörrach
Distributed by	MKW Lasersystem GmbH Landstr. 67 D-76547 Sinzheim, Germany Phone: +49 7221 / 98 83 91 Email: mkw@mkw-laser.de Website: www.mkw-laser.de

14. Appendix: Therapy Frequencies/Therapy Programs

Program	Frequency
CW	Solid line (Continouos Wave)
Multi-Frequency	200 Hz bis 3,5 kHz - Zufallssignal abgleitet aus Quarzosillator, Impulsdauer max. 0,25 msec
Alpha-Frequency	10 Hz
Nogier A	2,28 Hz
Nogier B	4,56 Hz
Nogier C	9,12 Hz
Nogier D	18,25 Hz
Nogier E	36,5 Hz
Nogier F	73,0 Hz
Nogier G	146,0 Hz
Nogier L	276,0 Hz
Nogier A' (exponential Nogier frequency)	292,0 Hz
Nogier B'	584,0 Hz
Nogier C'	1168 Hz
Nogier D'	2336 Hz
Nogier E'	4672 Hz
Nogier F'	9344 Hz
Bahr 1	599,5 Hz
Bahr 2	1199 Hz
Bahr 3	2398 Hz
Bahr 4	4796 Hz
Bahr 5	9592 Hz
Bahr 6	149,87 Hz
Bahr 7	299,75 Hz
Bahr+ Self Heal	4625 Hz
Bahr+ Qi	7695 Hz
Bahr+ Interferon	699,0 Hz
Bahr+ Serotonin	9613 Hz
Bahr+ Cortison	5743 Hz
Bahr+ ADHS	547,0 Hz
Bahr+ Allergie	1927 Hz
Reininger LIV/LE	442,0 Hz
Reininger ST/MA	471,0 Hz
Reininger HEA/HE	497,0 Hz
Reininger PC/KS	530,0 Hz
Reininger LI/DI	553,0 Hz
Reininger GBL	583,0 Hz
Reininger KI/NI	611,0 Hz
Reininger BL	667,0 Hz
Reininger SP/MP	702,0 Hz
Reininger 3W/3E	732,0 Hz
Reininger SI/DUE	791,0 Hz
Reininger LU	824,0 Hz

Program	Frequency
Solfeggio 1	174,0 Hz
Solfeggio 2	285,0 Hz
Solfeggio UT	396,0 Hz
Solfeggio RE	417,0 Hz
Solfeggio MI	528,0 Hz
Solfeggio FA	639,0 Hz
Solfeggio SOL	741,0 Hz
Solfeggio LA	852,0 Hz
Solfeggio 9	963,0 Hz
Fi-Band	Regeneration, Pain, Interference, Trauma, Inner Center, Detox, Infection, Bones, Nerve, Transcranium, Psyche/Vegetativum, Lymph, Trigger Points
Sweep	Alpha, Purr, Beta, Theta, Delta
Cranio	
FP1 through FP 20	Freely programmable within the range of 1 Hz to 9,999 Hz

15. Notes on Electromagnetic Compatibility

The LA-X P500 laser pen is intended for use in the electromagnetic environment of medical facilities (Professional Healthcare) and home-based practices.

The customer or user of the laser pen should ensure that it is operated in an appropriate electromagnetic environment in accordance with the EMC instructions contained in the accompanying documentation.

Warning: Portable and mobile RF communication devices (including their accessories, such as antenna cables and external antennas) must be kept at a distance of at least 30 cm (12 inches) from all parts of the laser pen, including cables and the power adapter. Failure to comply may result in a reduction in the device's performance.

Warning: The manufacturer guarantees the device's compliance with EMC requirements only when the specified accessories are used. The use of other accessories may result in increased emission of electromagnetic interference or reduced immunity to electromagnetic interference.

Warning: The device must not be placed immediately adjacent to or stacked with other devices. If such an arrangement is nevertheless necessary, the device must be monitored to verify that it operates as intended in this configuration.

Under the influence of increased electromagnetic interference, the laser energy output may be temporarily disrupted or fail.

Provided that the EMC instructions and guidelines for the electromagnetic environment listed in this user manual are followed, no reduction in performance is expected over the medical device's entire 7-year service life.

Additional EMC information can be found in the "Safety Instructions" chapter of the user manual as well as in the technical information below.

15.1 Manufacturer's Declaration on Electromagnetic Emissions

<table>
<tr><th>Interference Emission Measurements</th><th>Compliance</th><th>Electromagnetic Environment - Guide</th></tr>
<tr><td>RF emissions according to CISPR 11</td><td>Group 1</td><td>The laser pen uses RF energy exclusively for its internal operation. Therefore, its RF emissions are very low, and it is unlikely to interfere with nearby electronic devices.</td></tr>
<tr><td>RF emissions according to CISPR 11</td><td>Class B</td><td rowspan="3">The laser pen is suitable for use in all facilities, including residential settings and those directly connected to the public utility grid that also supplies buildings used for residential purposes.</td></tr>
<tr><td>Harmonic emissions according to IEC 61000-3-2 (*)</td><td>Not applicable</td></tr>
<tr><td>Voltage fluctuations/flicker emissions according to IEC 61000-3-3 (*)</td><td>Not applicable</td></tr>
<tr><td colspan="3">*Note: This requirement applies only to devices with a power consumption between 75 and 1,000 W.</td></tr>
</table>

15.2 Manufacturer's Declaration on Electromagnetic Immunity

Immunity Tests	Test levels IEC 60601-1-2:2014/AMD1:2020	Match Level	Electromagnetic Environment - Guidelines
Electrostatic Discharge (ESD) in accordance with IEC 61000-4-2	± 8 kV contact discharge ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV air discharge	± 8 kV contact discharge ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV air discharge	Floors should be made of wood or concrete, or covered with ceramic tile. If the floor is covered with synthetic material, the relative humidity must be at least 30%.
Fast transient electrical disturbances (AC power supply) 61000-4-4	± 2 kV, 100 kHz Repetition rate	± 2 kV for power lines	The quality of the power supply should be consistent with that of a typical commercial or hospital environment.
Fast transient electrical disturbances (AC power supply) 61000-4-4	+ 0,5 kV, + 1 kV	+ 0,5 kV, + 1 kV	The quality of the power supply should be consistent with that of a typical commercial or hospital environment.
Voltage dips, short-term interruptions, and variations in supply voltage according to IEC 61000-4-11	0% UT; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315° 0% UT; 1 cycle and 70% UT; 25/30 cycle Single-phase: at 0° 0% UT; 250/300 cycle	0% UT; 0,5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% UT; 1 cycle and 70% UT; 25/30 cycle Single phase: at 0° 0% UT; 250/300 cycle	The quality of the power supply should be equivalent to that of a typical commercial or hospital environment. If the user requires continuous operation even in the event of power interruptions, it is recommended that the device be powered by an uninterruptible power supply (UPS).
Magnetic field at the power supply frequency (50/60 Hz) per IEC 61000-4-8	30 A/m 50 Hz or 60 Hz	30A/m 50 Hz or 60 Hz	Magnetic fields at power-line frequency should correspond to typical levels found in commercial or hospital environments. The Laserpen contains no magnetically sensitive components or circuit elements.
Conducted RF disturbances per IEC 61000-4-6 Radiated RF disturbances per IEC 61000-4-3 Near field of wireless RF communication devices	3 Veff 0.15 to 80 MHz 6Veff in ISM bands between 0,15 and 80 MHz 80% AM at 1 kHz 3 V/m 80 MHz – 2,7 GHz 80% AM at 1 kHz 385MHz – 5,7GHz 9-28V/m	3 Veff 0.15 to 80 MHz 6Veff in ISM bands between 0,15 and 80 MHz 80% AM at 1 kHz 3 V/m 80 MHz – 2,7 GHz 80% AM at 1 kHz 385MHz – 5,7GHz 9-28V/m	Portable and mobile radio devices should not be used at a distance from the "Laserpen" laser system—including its cables—that is less than the recommended safety distance of 30 cm. The AAMI TIR 18 guideline provides guidance on managing the electromagnetic environment and managing medical devices for EMC, including assessment of the electromagnetic environment, investigation and reporting of EMI issues, and site selection (e.g., distance from radio/TV transmitters). Interference may occur in the vicinity of devices bearing the following symbol.

Note: UT is the AC mains voltage prior to applying the test levels



Note 1: For 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not be applicable in all cases. The propagation of electromagnetic quantities is influenced by absorption and reflection from buildings, objects, and people.

Note 3: Table 9 of IEC 60601-1-2:2014/AMD1:2020 contains all test frequencies and immunity levels for wireless RF communication devices. It also provides information on calculating the minimum clearance distances based on power, frequency band, and immunity level.

15.3 Immunity in the near field of wireless RF communication devices (IEC 60601-1-2:2014/AMD1:2020, Table 9)

Test Frequency	Band [1]	Service [1]	Modulation [2]	Maximum Power	Distance	Immunity Test Level	Compliance Level
MHz	MHz			W	Meter	(V/m)	(V/m)
385	380-390	TETRA 400	Pulse Modulation [2] 18 Hz	1,8	0,3	27	27
450	430-470	GMRS460, FRS 460	FM [3] ± 5 kHz deviation 1 kHz sine wave	2	0,3	28	28
710 745 780	704-787	LTE Band 13, 17	Pulse Modulation [2] 217 Hz	0,2	0,3	9	9
810 870 930	800-960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse Modulation [2] 18 Hz	2	0,3	28	28
1720 1845 1970	1700-1900	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse Modulation [2] 217 Hz	2	0,3	28	28
2450	2400-2570	Bluetooth, WLAN 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse Modulation [2] 217 Hz	2	0,3	28	28
5240 5500 5785	5100-5800	WLAN 802.11a/n	Pulse Modulation [2] 217 Hz	0,2	0,3	9	9

Note: To achieve the immunity test level, the distance between the transmitting antenna and the device may be reduced to 1 m if necessary. A test distance of 1 m is permitted under IEC 61000-4-3.

Test Frequency

1) For some services, only the uplink frequencies are included.
2) The carrier is modulated with a square-wave signal with a duty cycle of 50%.
3) As an alternative to frequency modulation, 50% pulse modulation at 18 Hz can be used. Since this does not correspond to the current modulation, this would be the worst-case scenario.

15.4 Immunity to magnetic near fields in the frequency range from 9 kHz to 13.56 MHz (IEC 60601-1-2:2014:AMD1:2020, Table 11)

Testfrequenz	Modulation	Immunity Test Level (A/m)
30 kHz [a]	CW [a]	8 [a]
134,2 kHz	Pulse modulation [b] 2,1 kHz	65 [c]
13,56 MHz	Pulse modulation [b] 50 kHz	7,5 [c]

a) This test applies only to ME devices and ME systems intended for use in a home environment.
b) The carrier must be modulated with a rectangular signal having a 50% duty cycle.
c) r.m.s., before modulation is applied.



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