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LPS-BaX

Manual

November 2025

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

Foreword / Confirmation of EG/CE conformity

Thank you for purchasing an LPS product.

Before you operate this product the first time, please read this manual carefully, because thus you should be able to operate your device safely, properly and economically. By observing the operating instructions, hazards are avoided, repair costs and downtimes are reduced and the reliability and service life of our products are increased. In the case of improper use, dangers may arise for the user or third parties or impairments may occur on the device or other property. Therefore, use the device only as intended and in perfect condition, observing all the instructions in this manual. Our operating instructions contain the important guidelines for the intended use of the device. Only compliance with them shall be considered as proper use. Errors and risks arising from incorrect application are not the responsibility of the manufacturer. Therefore, our request:

Before installing or commissioning the laser system, please be sure to read the operating instructions.

Our laser systems are equipped with highly sensitive electronics and mechanics.
Pay attention to the safety of your device during transport.
Strong vibrations or shocks can cause significant damage to the system.
Furthermore, the laser system must be regularly maintained to guarantee error-free operation.

CAUTION!

Should an error occur due to improper handling or maintenance, there is no warranty.

ONLY special trained persons are allowed to operate this device!

LPS-Lasersysteme reserves the right for any technical and/or design changes.

LPS-Lasersysteme is not liable for errors and printing errors.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

EC/CE Confirmation of conformity

We hereby confirm that the design and construction of the product named below, as well as the version we have placed on the market, comply with the specifications and requirements of the harmonized EU regulations named below.

Model: LPS-BaX Serie
Variants: This declaration covers all variants of the above product.

The object of the declaration described above is in compliance with the relevant Union harmonization legislation:

2014/30/EU EMC Directive
(Standards: EN 61000-6-4:2020-9, EN 61000-6-2:2019-11)
2011/65/EU RoHS Directive (RoHS 2 and RoHS 3 conform 2015/863/EU)
(Standards: EN 63000:2018)
2014/35/EU Low Voltage Directive
(Standards: EN 62368-1:2021-5)

Note: the product ranges mentioned and their variants also comply with the following guidelines:

2006/25/EG Protection against artificial optical radiation
(Standards: EN 60825-1:2014 "Safety of laser devices", please note the information in the product documentation)

In the case of changes that have not been carried out by LPS-Lasersysteme, this declaration of conformity immediately loses its validity.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

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Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

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LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
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1 Commissioning

Intended use
Laser devices must be equipped with the protective devices required for safe operation in accordance with their laser protection class and use.

Do not put the show laser device into operation until you have familiarized yourself with its functions.

The LPS-BaX laser system is designed for entertainment laser shows.
During installation, both permanent and temporary, all requirements of the current TROS and OStrV must be complied with.
The laser system may only be operated by qualified, commissioned and trained personnel. The company must instruct all persons who use laser equipment or are in the laser protection area about the dangers of laser beams and responsible behaviour. This training shall be repeated several times a year, if necessary.

Please note that unauthorized modifications to the device are prohibited for safety reasons.

If the show laser device is used other than as described in this manual, this may cause damage to the product and void the warranty. In addition, any other use involves hazards, such as short circuit, fire, electric shock, etc.

The operator must ensure that the instructions have been understood. The operating instructions must be kept at all times at the place of use of the system.

Check for transport damage
Before commissioning the laser system, please check the following points:
1. Check that the packaging (carton) is undamaged.
2. Control of the laser system for external damage.
3. Any damage to the packaging or defects to the delivered product must be carried out within 24 hours to the freight forwarder and the company LPS-Lasersysteme.
4. After consultation with LPS laser systems send back only in original packaging or with correspondingly good foam padding.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

1.1 Areas of use

This laser system is designed for professional applications, such as event stages, entertainment centers, theaters, etc.

This laser must only be used as intended for laser shows. The operation of a class 3B and 4 show laser is only permitted if the laser operation is controlled and monitored by a laser safety officer or a competent person.

This device is intended for both mobile operation and fixed installations.

Laser devices are not designed for continuous operation. Remember that regular breaks in operation increase the life of the device.

1.2 Safety Instructions

Please read this information carefully and keep it safe!

- Please refer to the technical specifications of the laser system.
- Operate the laser system only with the specified operating voltages.
- For any changes made to the laser system, such as changes to electronics, manipulation of controllers, housings or optics is not assumed any liability or warranty.
- Manipulation of laser systems may lead to the output power deviates significantly from the guaranteed values!
- Lasers can emit visible or invisible laser radiation. On the laser device is a warning attached or enclosed, observe the instructions for the corresponding laser class!
- The accident prevention regulation TROS (formerly "laser radiation" BGV B2 or Occupational Health and Safety Ordinance on Artificial Optical Radiation) and OstrV must be observed. The operator of the laser show device is responsible for compliance with the protective measures.
- The operation of class 4 laser equipment must be registered with the employers' liability insurance association. When operating such lasers, a laser protection area must be demarcated and be marked. In addition, the operator of Class 4 laser equipment must appoint expert personnel as laser safety officers.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

Laser radiation! Avoid irradiation of the eye or skin by direct or scattered radiation. This warning is intended to remind you to comply with all safety regulations, as you are working with a Class 4 laser. Decisive for the classification of the laser device into the classes is the standard EN 60825-1, laser devices are classified according to their dangerousness in classes. See point 2.2 Laser Classes.

Beware of laser radiation! This marks the **output windows** of the visible laser radiation. Avoid direct or indirect contact with the eye and skin. Never look directly into the beam! Also, do not use optical or mechanical components to look into the laser beam or deflect it accordingly!

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

Unplug before opening the housing! This prevents injuries caused by electric shock and also protects your laser device from electronic damage. **ONLY specially trained specialist personnel or laser technicians from LPS-Laser are allowed to do this!**

1.3 Electrical Connection

This product is approved to be operated **only** with an alternate current of 100 - 240 V.

Do not use dimmer or other electronically switched sockets. Do not use the laser device together with other large devices, like smoke machines, on the same mains.

1.4 Installation

The laser system may only be mounted via the mounting bracket or on a stable platform. To ensure good air circulation, a free space of at least 25 cm must be maintained around the device.

When installing, dismantling and performing service work, make sure that the area below the installation site is cordoned off.

The equipment must always be secured with a suitable safety rope.

1.5 Operation

Operate the device only if you are familiar with its functions. Do not permit operation by persons not qualified for operating the device. Most accidents and damages are the result of unprofessional operation!

Please consider that unauthorized modifications on the device or opening the housing of the device are forbidden due to safety reasons!

If the device is operated in any way different to the one described in this manual, the product may suffer damages and the guarantee becomes void.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

1.6 Unpack and connect

Check the content of the package of its completeness. The following parts are included:

- Show laser LPS-BaX (1 piece)
- Manual (see USB flash drive)
- PowerCON True 1 cable
- Key for the show laser
- Emergency-off with 10 m XLR cable and key

Before connecting the show laser device, please read "2. Laser Safety" carefully and conscientiously.

Use this device **only according to these operation instructions**. Read them carefully.

If there are any **visible damages** at the housing or cables, do NOT use this device.

Never look directly into the laser light source. Risk of blindness!!!

All systems can be operated from 100 V to 240 VAC. Make sure these voltages are available.

Connecting the system is very simple:

- Connect the laser system by the data cable via ILDA, LAN or DMX.
- Plug the power plug of the laser system (PowerCON True1).
- Place or hang the show laser system stably and securely and ensure that it cannot be moved or fall down.

Important!

For reasons of laser and operational safety, you should be able to switch off the laser beam by a lockable emergency-stop-button. Operation without an emergency-stop-button is not permitted by law.
LPS-Lasersysteme is not liable for damage caused by improper installations and improper operation!

CAUTION!
If you make adjustments, or perform procedures other than those listed here, this can lead to dangerous radiation exposure!
The laser beams of this laser system are capable of igniting flammable materials.
Improper use of the laser system can also harm people.
There is a high risk of eye and skin injuries if the laser beams are accessible to unauthorized persons.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

1.7 Warranty

The duration of the warranty depends on the condition of this device (used or new). You will find this information on the invoice.

The warranty claim expires if the following points are intentionally or unintentionally disregarded

- Only special trained persons are allowed to operate the device.
- Only use the correct voltage. Therefore, see information on device and read this manual.
- Make sure, the laser device is not connected to mains during installation or service. These points are **ONLY allowed by specially trained specialist personnel or laser technicians from LPS-Laser** according to safety regulations of the concerned country.
- Use the device only according to these operation instructions.
- Do not use the device if there are any visible damages at the housing, technical slots or cables.
- Avoid overheating through bad installation. Mount the device with a minimum distance of 25 cm from each kind of objects (other devices, walls, …) and avoid exposing to spotlights like moving heads.
- Make sure to use appropriate safety cords to protect the device from falling. It should be able to withstand tenfold the weight of the device. Protection for device and people!
- Give the device time to adjust to the room or outside temperature before you turn it on.
- Do not cover the device at any time, except the LPS Rain Defender if needed.
- Protect the device against water, rain and other liquid (like soft drinks, foam, …), even if it is protected by Rain Defender or IP65 status.
- Never use it improperly. Avoid misuse.
- Damages to the device caused by improper handling, disregard or neglect the safety instructions and the information of this manual will void the warranty.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

2 Laser Safety

2.1 Legal Notice

Despite all fascination for this "magic light", it should not be forgotten that a laser also includes certain dangers.
On these pages you will learn how it is possible to create a fascinating laser spectacle for you and your guests without danger, despite the many regulations.
Please read this carefully. LPS-Lasersysteme is not liable for damage caused by improper installation and improper operation!

2.2 Laser Classes

Laser devices are technical work equipment in accordance with the Equipment Safety Act.
They must comply with its requirements, as well as the generally accepted rules of technology.

Laser Classes:

Class 1	All wavelengths	The accessible laser radiation is harmless to human eyes under foreseeable conditions. **LASER RADIATION**
Class 1M	302,5 nm – 400 nm	Eye-safe without the use of optical instruments; unsafe when using optical instruments such as telescopes or lenses. **LASER RADIATION – DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS**
Class 2	400 nm – 700 nm, up to 0,25 s	Eye-safe through aversion reactions plus eyelid closure reflex; unsafe when using optical instruments. **LASER RADIATION – DO NOT LOOK INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS**

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Class 2M	400 nm – 700 nm, 0,25 s	As with Class 2 lasers, as long as using no optical instruments, such as magnifying glasses, lenses, telescopes and similar. **LASER RADIATION – DO NOT LOOK INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS**
Class 3R	400 nm – 700 nm, 0,25 s 302,5 nm – 400 nm 700 nm – 10 nm, 100 s	If the GZS value (limit value of accessible radiation) exceed the radiation a maximum of five times higher than the GZS values of class 1 or class 2, it becomes dangerous for the human eye. **LASER RADIATION – AVOID DIRECT EYE EXPOSURE**
Class 3B	all wavelengths Laser devices with laser power up to 0,5 W	Dangerous to human eye and in special cases also to human skin. **LASER RADIATION – AVOID EXPOSURE TO BEAM**
Class 4	All wavelengths Laser devices with laser power of more than 0,5 W	The accessible laser radiation is very dangerous for eyes and skin. Diffuse radiation can also be dangerous. The laser radiation can cause fire or explosion hazard. **LASER RADIATION – AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION**

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

The laser class 4 (from 0.5 W) used by us requires the following points to be observed and avoided:

1. Danger to the eye

The most light-sensitive organ of humans is the eye. A laser beam is coherent and very high-energy light. Even over long distances, a laser beam almost retains its intensity. If a laser beam hits the human eye, it can suffer irreparable damage and the retina can be destroyed.
Never look directly into the laser beam and do not place objects in the laser beam, because even diffusely reflected radiation can cause eye damage.
Never direct the laser beam at a person's eyes.

2. Danger to the skin

The high energy density of the laser beam causes painful burns when it hits the human skin. The laser beam also burns holes in textiles.
Never reach into the laser beam and do not get into the laser beam with other body parts.

3. Danger through life-threatening voltages

When operating your laser system, observe the warnings on the laser, as well as the information on laser safety in the operating instructions of your laser. Make sure that unauthorized persons do not have access to your laser system!

4. Fire hazard

If a laser beam hits easily flammable material, e.g. paper, it ignites and a fire can start quickly. Therefore, before turning the laser on, you should make sure that there is no easily flammable material in the beam path.
In addition, regularly check your air-cooling system on the laser. Fans should be checked regularly for their function to avoid defects caused by overtemperature.

The use of a laser is only considered harmless if the laser beam is sufficiently attenuated, widened, split or moved very quickly. The eye is thus only hit for a short time and the values for the maximum permissible irradiation (MZB, depending on the wavelength, the irradiation time and the repetition frequency of pulse sequences) or the limit value of accessible radiation (GZS) are not exceeded.

To ensure that you are always up to date on the topic of "laser radiation" and its legal basis, we recommend that you inform yourself regularly about the legal provisions and regulations of your country. Comprehensive information (also in pdf for download) on TROS, OStrV and other provisions can be obtained directly from the employers' liability insurance association or its website. LPS-Lasersysteme assumes no liability for the content and availability there; the operators of the website are solely responsible.
We are happy to help you via phone +49 7473 271177.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

2.3 Danger by laser beams

The first commissioning of a show laser of classes 3B and 4 (more detailed explanations under point 1. Commissioning) must be reported to the authority responsible for occupational safety and health and to the competent employers' liability insurance association in accordance with the accident prevention regulations TROS and OStrV (formerly BGV B2).

The operating personnel and persons who are in the laser protection area must be informed about the dangers.
Instruction includes imparting knowledge about the dangers of laser radiation, other hazard possibilities, protective regulations, behavior in the laser protection area, safety precautions, as well as familiarization with the operating procedures when using show laser systems.

The operating personnel can be trained by LPS laser systems in a seminar to become a laser safety officer according to the specifications of the OStrV and TROS laser radiation.

Anyone operating this system must be a proven laser safety officer.

A laser safety seminar includes the following points:

- Physical quantities and properties of laser radiation
- Biological effect of laser radiation
- legal foundations and rules of technology
- Laser safety and protection (incl. indirect hazards)
- Laser safety practice: Exemplary performance of a risk assessment
- Tasks and responsibilities of the laser safety officer in operation
- Written examination

The company that operates class 3B or 4 lasers must name at least one permanent employee as laser safety officer in writing!

Eye and skin damage caused by improperly operated laser devices can constitute bodily injury and be prosecuted.

Please note that the organizer is responsible for compliance with all protective measures. If a laser system gets out of control, the event may need to be canceled.

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If the organizer does not comply with his traffic safety obligations, he is liable under civil law for all resulting damages, e.g.:

- The health insurance fund of the injured party can claim the costs of treatment.
- The injured parties themselves can sue for compensation.
- Any resulting (economic) damage can be claimed from the operator of the laser device by means of a civil lawsuit.

Please note:
LPS-Lasersysteme is not liable for damage caused by improper installations and improper operation!

Protective measures for safe operation

For the generation and application of laser radiation, the safety precautions from the current DIN EN 60825-1 "Safety of laser equipment", the BG regulation TROS Laser Radiation (formerly BGV B2), OStrV, and also the state occupational safety regulations, the otherwise applicable accident prevention regulations and the generally recognized rules of technology must be observed.

Only excerpts of the above provisions are reproduced here. The information status of this instruction manual corresponds to the time of printing. When a laser product is put into operation in the public or industrial sector, a number of safety regulations must be followed, of which this manual is only reproducing a part. The operator must independently seek to procure the current safety regulations and comply with them – depending on the country where the laser system is used!

2.4 Safety Shutdown

Show lasers must have a manual safety shutdown that allows to interrupt the laser beam (beam output) at any time. For this our laser projectors are fitted with E-Stop.

2.5 Mechanical Construction

The show laser must be secured against adjustment and unintentional changes in position. The show laser must be set up in such a way that improper leakage of the laser beam during operation is prevented.
Any optically effective components in the room (e.g. mirrors) must be firmly attached to the wall or similar; access by unauthorized third parties must be prevented. The load-bearing elements (e.g. trussing) must themselves be firmly attached.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
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2.6 Public Area

In the public area (spectator area), the limit values for irradiation and scanner strength must not be exceeded.

Persons must not be intentionally exposed to laser radiation above the GZS values (MPE Maximum Permissible Exposure).

The contractor must take technical or organizational measures to ensure that irradiation above the maximum permissible irradiation, including reflected or scattered laser radiation, is prevented.

2.7 Laser Safety Area

The following steps must be carried out by the designated laser safety officer before each commissioning:

Before each operation, a visual inspection must be carried out to check whether safety-relevant changes have occurred.

This includes following points:

- Are there highly flammable objects (such as decoration) crossing the laser beam?
- Are all plugs, especially all with electricity, plugged in and have safety deficiencies, e.g. defect of the sheathing or insulation?

If one of the above questions has been answered with “yes”, the defect that has occurred must be remedied immediately. For this purpose, please consult with LPS laser systems
(Phone number: +49 7473 271177 or email)

The operation of the show laser results in a dangerous area, the so-called laser safety area, in which the specified limit values for irradiation duration and strength can be exceeded. This area must not be entered by any unauthorized person during operation.

The laser safety area must be kept as small as possible within the framework of the applicable regulations. Only persons whose stay there is necessary should be present in the laser safety area.

The laser safety area may only be entered by instructed and authorized persons. Appropriate protective measures must be taken.

If, for scenic reasons, it is necessary for persons to be present in the laser safety area, suitable protective measures must be taken to avoid dangers, e.g. spatially defined and marked positions.

The geometrical boundaries of the laser safety area must be calculated or measured before commissioning.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

Laser radiation may only extend as far as it is necessary for the type of use. As far as possible, the beam shall be limited at the end of the useful distance by a diffusely reflecting target surface in such a way that the risk of direct or diffuse reflections is as low as possible.

Uncontrolled reflected radiation from laser devices must be avoided; reflective or shiny objects or surfaces must be kept away from the scope of the laser beam as far as possible, removed or covered.

To protect against dangerous reflections, tools, accessories and adjustment devices used in the laser safety area should not have highly reflective surfaces. In addition, present persons should not visibly carry any highly reflective objects with them in the laser safety area.

The laser safety area must be safely separated from the spectator area, e.g. by a raised stage area (minimum height 0.8 meters) or grids. A safety distance of at least 1 meter must be provided laterally between the laser safety area and the spectator area. The distance from the lowest point of the spectator area to the top must be at least 2.70 meters.

If the laser system is used in mobile use, further special safety regulations must be observed:

2.8 Registration of a laser show

Any temporary laser show must be reported to the competent authority and requires a risk assessment by an expert. The nearest expert in Germany can be obtained from LPS laser systems. Phone +49 7473 271177.

If a laser show takes place outdoors, it must also be reported to air traffic control or the public order office.

Please check and comply with the regulations in force in your country.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

2.9 Operating Area

The operating area of the show laser must be located outside the laser safety area, and from there the entire laser safety area must be visible.

The operating area shall be accessible only to authorized persons.

The show laser must never be operated unattended!

During an event, no repairs or other operations such as new adjustments or corrections of the laser beams may be carried out on laser systems.

During a break of the current laser show, the beam must be interrupted or switched off as close to the laser as possible.

After changes that may affect the safety of the audience, e.g. change in the position of the laser device, a new risk assessment by a specialist (Laser Safety Officer) is required.

The system must be protected against unauthorized activation or operation. If the system is not in operation, it must be ensured that the key for the "emergency off button" is removed and stored safely. Before removing the key, it must be checked whether the system is switched off.

2.10 Operating personnel

The laser show may only be done by a laser safety officer or a competent person. This person must monitor the beam path during the show and switch off the device or interrupt the laser beam in the event of malfunctions on the device or unsafe operating conditions (pressing the "emergency off button”!).

The operator must ensure that authorized persons who use laser devices of classes 2 to 4, or who are in laser protection areas of laser devices of classes 3B or 4, have been instructed about the behavior to be observed. The operator must be aware that incorrect or careless handling of the laser system is a dangerous instrument that can lead to irreparable damage, especially to the eyes and skin. Therefore, the operation of the laser system is always associated with extreme caution and consistent compliance with safety regulations.

In the case of laser equipment used for demonstrations, displays and representations of lighting effects, the operator must give instructions to authorized persons on how to keep accessible irradiation as low as possible. The authorized persons must follow these instructions.

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
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The employer must ensure that employees are informed at least once a year about the dangers of laser radiation and are familiarized with the safety equipment in place and with the necessary protective measures if a class 2 to 4 laser device is operated.

The employer may not employ young people in laser protection areas where class 3B or 4 laser equipment is operated. This does not apply to the employment of young people in age of over 16 years, if this is necessary to achieve their educational objective and their protection is guaranteed by the supervision of a competent person.

The employer must ensure that only authorized persons whose presence is required there are in the laser protection area.

2.11 Medical Care

If there is reason to believe that eye damage has been caused by laser radiation, the employer must ensure that the employee concerned visits an ophthalmologist immediately or, in the case of skin damage, a dermatologist.

2.12 Improper Use / Conduct in Incidents

This laser system must not be operated in private households, as there is hardly any possibility to demarcate and monitor laser protection areas. Furthermore, there is a risk that children play with the laser.

This laser must NOT be used if the device is not equipped with all the protective devices necessary for safe operation.

CAUTION!
If controls or adjusting devices other than those specified herein are used or other procedures are used, this may result in dangerous radiation exposure.

If the laser beam does not move automatically in the scanner path when the device is switched on, it must be taken out of operation immediately. Have the device checked by a technician from LPS-Lasersysteme.

Class 2 to 4 laser equipment shall be arranged to prevent unintentional radiation. Unintentional radiation occurs when laser radiation emits from the laser device without actuating the intended control devices, e.g. through defective insulation or interference pulses; or if it is not prevented that control devices can be operated unintentionally.

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Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

3 Technical Specifications

Laser source	Laser diodes (Pure Diode)
Operating voltage	100 V – 240 VAC
Voltage line frequency	50 Hz / 60 Hz
Operating current	from 1.12 A
Power consumption	from 250 W
Cooling requirements	air-cooled, optimized airflow
Degree of protection	with Raindefender IP54
Protection class	1, protection ground
Operating temperature	0°C up to 40° C
Total laser power	**LPS-BaX S:** LPS-BaX 7W RGB LPS-BaX 10W RGB LPS-BaX 15W RGB LPS-BaX 20W RGB **LPS-BaX M:** LPS-BaX 24W RGB LPS-BaX 30W RGB LPS-BaX 40W RGB

LPS-Lasersysteme Siegmund Ruff / CEO Haidschwaerze 18 72131 Ofterdingen Germany
Phone: +49 7473 271177 www.lps-laser.com s.ruff@lps-laser.de

Wavelengths	**LPS-BaX S:** LPS-BaX 7W RGB 2W red@638nm, 2W green@525nm, 3W blue@445nm LPS-BaX 10W RGB 3W red@638nm, 3W green@525nm, 4W blue@445nm LPS-BaX 15W RGB 4W red@638nm, 4W green@525nm, 7W blue@445nm LPS-BaX 20W RGB 6W red@638nm, 6W green@525nm, 8W blue@445nm **LPS-BaX M:** LPS-BaX 24W RGB 6W red@638nm, 8W green@525nm, 10W blue@445nm LPS-BaX 30W RGB 8W red@638nm, 10W green@525nm, 12W blue@445nm LPS-BaX 40W RGB 10W red@638nm, 14W green@525nm, 16W blue@445nm
Scanner	**LPS-BaX S:** LPS-BaX 7W RGB 40 kpps scanning LPS-BaX 10W RGB 40 kpps scanning LPS-BaX 15W RGB 40 kpps scanning LPS-BaX 20W RGB 40 kpps scanning

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	LPS-BaX M: LPS-BaX 24W RGB 40 kpps scanning LPS-BaX 30W RGB 30 kpps scanning LPS-BaX 40W RGB 30 kpps scanning
Deflection angle	Maximum 60°
Dimension and weight	**LPS-Bax S:** 28 x 28 x 28 cm (L x W x H) 17 kg **LPS-Bax M:** 41 x 39 x 28 cm (L x W x H) 25-30 kg
Modulation	analogue modulation up to 100 kHz

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4 Overview Laser System

The overview will help you to handle the functions of the systems.

4.1 Housing, front view

4.1.1 Laser Output Window

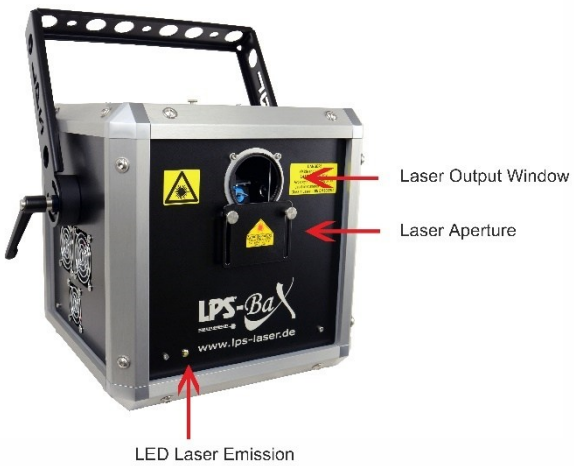
At the front of the laser system is the laser output window with laser aperture. Never look directly into the laser output window (possible eye damage!) if the device is still connected to the power supply and thus laser output would be possible!

4.1.2 Laser Aperture

With the laser aperture, you prohibit a possible, unexpected laser output if it is completely closed and thus completely obscures the laser output window. In addition, the laser aperture is used to define a laser range. The so-called Safety Zone can be individually adjusted, as the panel can be infinitely adjusted up and down.

4.1.3 LED Laser Emission

The LED lights up amber (yellow) when all security prompts are OK. It will be displayed, that a laser output is now possible.



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4.2 Housing, side view with Bracket

The sides with brackets are similar in laser systems of the LPS-BaX series, which is why only one model is shown here for illustration and a better overview.

4.2.1 Bracket

With the bracket, the laser system can be attached to a truss or similar. With an angle of inclination of 270° due to the bracket device, the laser output can be flexibly positioned in compliance with the laser safety regulations.

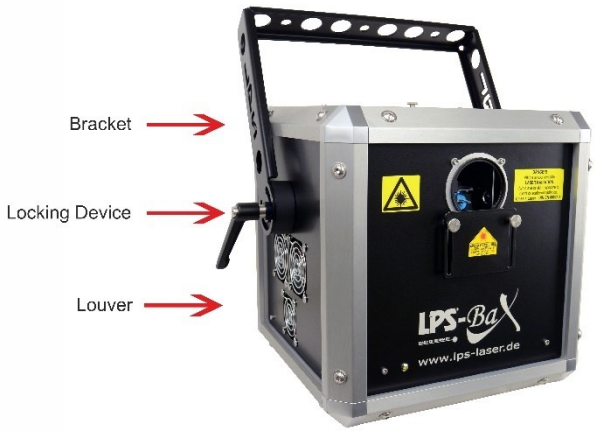
IMPORTANT: The laser system MUST ALWAYS be additionally secured with a safety rope as a connection between the ring eyelet (also called Safety Eyelet or Eyebolt) and the truss (or other mounting device)!

4.2.2 Locking Device

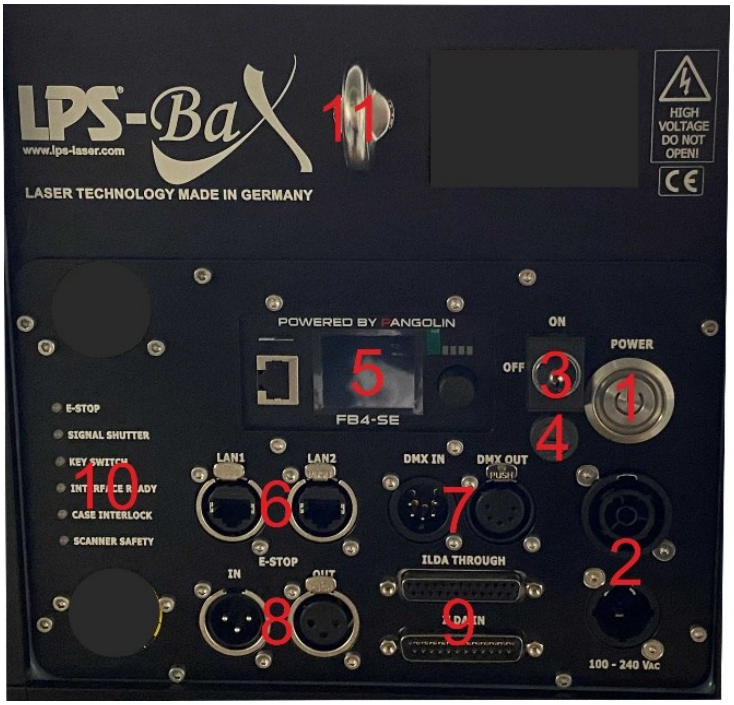
As soon as the desired inclination is reached, the bracket is locked with the locking levers on the left and right of the housing.

4.2.3 Louver

All louvers at the laser systems are used for optimal ventilation and cooling. To prevent overheating and thus possible heat damage, make sure that these grilles are always clean and free. Covers, walls or other objects that are closer than 25 cm to the louvers may interrupt the ventilation of the laser system and thus the required cooling and constant temperature.



4.3 Housing, rear view



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1	**ON / OFF switch**
2	**PowerCON TRUE 1 IN/OUT**
3	**Key-Switch**
4	**Fuse**
5	**FB4 Interface**
6	**Ethernet connection**
7	**DMX IN/OUT**
8	**XLR E-Stop IN / OUT (can be used as INTERLOCK)**
9	**ILDA In / Through**
10	**System Status LEDs**
11	**Safety eyelet for Safety Rope (Ring Eyelet, Eyebolt)**

Explanation of No. 10 „System Status LEDs“:

Emergency Off

If the LED lights up green, then the emergency stop circuit is fine. Laser output is now possible. If the LED lights up red, then the emergency stop switch has been pressed and the Emergency stop circuit is broken. The laser modules are deactivated. There is no laser output possible.

Signal Shutter

If the LED lights up green, then the software is connected, or an output has been started. Laser output is now possible.
If this LED lights up red, then the software is not connected, or the output is stopped. The laser modules are deactivated. Now a laser output is no longer possible.

Key Interlock

If this LED lights up green, then the laser system is activated. A laser output is possible. If this LED lights up red, then the laser system is deactivated. The laser modules will be disabled. Laser output is not possible. In order to install the laser system, turn the key switch to the ON position.

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Interface Ready

If the LED lights up green, then an ILDA transmitter is connected to the laser system, or if FB4 is used, then the FB4 is connected with software. Laser output is now possible.
If the LED lights up red, then no ILDA transmitter is connected to the laser system.
The ILDA input is switched to high impedance and the laser modules are deactivated.
The signal is still looped through to ILDA through. Check that your signal line is plugged in correctly and that it is not defective.

Case Interlock

Relevant only for the North American market. Basically, this means that when the LED turns green, all housing covers are properly closed.

Scanner Safety

If the LED is green, then no scan error was detected. Laser output is possible. If this LED lights up red, then a scan error has been detected. The laser modules are deactivated. Laser output is not possible. The following is detected as a scan error:

User's error:
- the image was drawn too small
- only one point should be emitted
- the output size was set too small in the software
- the image is scanned too slowly
- no software output

Hardware error:
- one or both galvanometers are defective
- one or both drivers are defective
- the signal transmission is interrupted

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4.4 Power Switch

By using the power switch you turn on and off the laser system.
When the laser system is turned on the light of the power is on.
When the LED Laser Emission at the front side of the laser device is on, the laser is on and can emit laser light.

4.5 Power Socket

Plug the cable into the PowerCON TRUE1 socket. Above the PowerCon sockets there is a fuse holder. The amperage of the fuse used, please refer to the type plate.

4.6 Key Switch

Use the key switch to activate or deactivate the laser system.
Only the lasers will be switched on and off in this process. All other components, which are integrated in the laser system, will still work.

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5 Emergency Off

5.1 Emergency In

Connect the emergency-off switch to the 3-pin socket (male).
There are two different ways to realize emergency-off.

Pin Assignment:

Pin No.	Name	Description
Pin 1	GND	GND
Pin 2	Vcc out	5 V output voltage
Pin 3	Return	Signal In

5.2 Emergency through

Connect the 3-pin socket (female) to the laser system. You only need one emergency-off switch to switch off several laser systems at the same time.

Pin Assignment:

Pin No.	Name	Description
Pin 1	GND	GND
Pin 2	Vcc out	5 V output voltage
Pin 3	Return	Signal In

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6 ILDA In

This socket is an ILDA compatible D-sub socket. This means that any ILDA-compatible laser software can be used for this laser system.
In order to prevent radio-related interference, a symmetrical signal transmission is recommended. In order to achieve the best results with this type of signal transmission, only pair-stranded and shielded cables should be used. At least 7 pairs of wires are required for this laser system.

The following signals are used in this laser system:

X, Y, Interlock, Red, Green, Blue, Shutter, GND.
The exact pin assignment can be found in the list below.

Pin-No.	Signal	Comment
Pin 1	X +	+/- 5 V (symmetrical), max. +/- 10 V (asymmetrical)
Pin 2	Y +	+/- 5 V (symmetrical), max. +/- 10 V (asymmetrical)
Pin 3	Blanking +	Not used, but connected to ILDA through
Pin 4	Interlock A	+ 4,3 V
Pin 5	Red +	+/- 2,5 V (symmetrical), max. + 5 V (asymmetrical)
Pin 6	Green +	+/- 2,5 V (symmetrical), max. + 5 V (asymmetrical)
Pin 7	Blue +	+/- 2,5 V (symmetrical), max. + 5 V (asymmetrical)
Pin 8	Deep Blue +	Not used, but connected to ILDA through
Pin 9	Yellow +	Not used, but connected to ILDA through
Pin 10	Cyan +	Not used, but connected to ILDA through
Pin 11	Z +	Not used, but connected to ILDA through
Pin 12	NC	Not used, but connected to ILDA through
Pin 13	Shutter +	+ 5 V (asymmetrical)
Pin 14	X -	-/+ 5 V (symmetrical), GND (asymmetrical)
Pin 15	Y -	-/+ 5 V (symmetrical), GND (asymmetrical)
Pin 16	Blanking -	Not used, but connected to ILDA through
Pin 17	Interlock B	Internally connected to GND
Pin 18	Red -	-/+ 2,5 V (symmetrical), GND (asymmetrical)
Pin 19	Green -	-/+ 2,5 V (symmetrical), GND (asymmetrical)
Pin 20	Blue -	-/+ 2,5 V (symmetrical), GND (asymmetrical)
Pin 21	Deep Blue -	Not used, but connected to ILDA through
Pin 22	Yellow -	Not used, but connected to ILDA through
Pin 23	Cyan -	Not used, but connected to ILDA through
Pin 24	Z	Not used, but connected to ILDA through
Pin 25	GND	GND

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7 ILDA Through

The D-Sub socket, ILDA through is ILDA compatible. The pin assignment can be found in the list below. The ILDA through connection is used to connect further laser systems.

Pin-Nr.	Signal	Kommentar
Pin 1	X +	Connected to ILDA In
Pin 2	Y +	Connected to ILDA In
Pin 3	Blanking +	Connected to ILDA In
Pin 4	Interlock A	Bridged with Interlock B
Pin 5	Red +	Connected to ILDA In
Pin 6	Green +	Connected to ILDA In
Pin 7	Blue +	Connected to ILDA In
Pin 8	Deep Blue +	Connected to ILDA In
Pin 9	Yellow +	Connected to ILDA In
Pin 10	Cyan +	Connected to ILDA In
Pin 11	Z +	Connected to ILDA In
Pin 12	NC	Connected to ILDA In
Pin 13	Shutter +	Connected to ILDA In
Pin 14	X -	Connected to ILDA In
Pin 15	Y -	Connected to ILDA In
Pin 16	Blanking -	Connected to ILDA In
Pin 17	Interlock B	Bridged with Interlock A
Pin 18	Red -	Connected to ILDA In
Pin 19	Green -	Connected to ILDA In
Pin 20	Blue -	Connected to ILDA In
Pin 21	Deep Blue -	Connected to ILDA In
Pin 22	Yellow -	Connected to ILDA In
Pin 23	Cyan -	Connected to ILDA In
Pin 24	Z	Connected to ILDA In
Pin 25	GND	GND, connected to ILDA In

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8 Maintenance

8.1 Beam Alignment

Caution: ONLY specially trained specialist personnel or laser technicians from LPS-Laser are allowed to do this!
Before using the laser device, **and after each** transport, it is important to set the laser to a maximum of 10% laser power in order to make any necessary color adjustments. **Do not immediately operate the laser at full power until you have performed beam alignment!!!**

Carefully make minimal rotations on this unit (outside of the housing) to adjust the colors. Only when the beam alignment is complete, and thus all color lines are exactly on top of each other, the laser device can be operated at full power. Failure to do so could cause damage to the laser device and void the warranty!

There is a mechanical device for adjusting the individual colors, the so-called beam alignment:

Adjusting the colours:

1. Move the red laser beam by turning the brass-screws, until it is aligned on the green laser beam at the projection zone.
   Hint: Dim the blue laser module to zero for that.
2. Move the blue laser beam by turning the brass-screws, until it is aligned on the green laser beam at the projection zone.
   Hint: Dim the red laser module to zero while you are moving the blue beam.

Now your colours should be aligned on each other.

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Main Beam:

The position of the main beam (green) is only to be changed, if this laser beam is not aligned on the scanner unit correctly!

<u>Caution:</u> Make sure that there are no people or flammable materials in the beam path during the adjustment. People could be injured and material could catch fire.

8.2 Service Flap Rear

Unplug before opening the housing! Electrical hazard! This is for service or repair work on all controllable elements such as interlock board, FB4, ILDA board, DMX board, etc.
<u>Caution:</u> ONLY specially trained specialist personnel or laser technicians from LPS-Laser are allowed to do this!

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8.3 Service Flap Bottom

Unplug before opening the housing! Electrical hazard! This is for service or repair work on all power supplies, modulation boards, 5-port switches or scanner drivers, etc.
Caution: ONLY specially trained specialist personnel or laser technicians from LPS-Laser are allowed to do this!

8.4 Cleaning

To clean the housing:

Use a damp cloth without chemical cleaning agents. Water and / or glass cleaner are enough.

To clean the fans:

Disconnect all cables and make sure, that the device is cooled down.
Then remove dirt particles and dust by using a soft brush and cotton swab. Be careful when using compressed air or vacuum cleaners.

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9 Service

Service means all work inside the device and thus to open a service flap or lid. For this, the interlock has to be bridged. **ONLY specially trained specialist personnel or laser technicians from LPS-Laser are allowed to do this!**

If you are allowed to do the service, you must urgently consider the following points:

1. Make sure the complete laser system is de-energized. That means, the main plug is not connected to the power supply while installing or opening it.
2. Anything that could reflect (such as jewelry, …) has to be removed before.
3. Use only non-reflecting tools
4. Wear protective clothing like special laser goggles, gloves and so on.

Dust, fog fluid, etc. cause deposits on mirrors, which might evoke a substantial decrease in laser power. This applies to the mirrors inside the laser system as well as the glass pane. But also by open-air events, depending on the location, contamination in the laser system can occur.

Therefore, a professional and periodic cleaning is essential!

LPS-Lasersysteme recommends a regular service, which should be implemented at least once a year by a technician or a trained person.
Even if, in addition to the prescribed service, you need further cleaning of the mirrors, this may only be done with special instruction! For this purpose, LPS-Lasersysteme has no liability!

UNPLUG the show laser system before opening the device for cleaning!!!

Benefits:

- A complete professional check of the system by an expert can prevent minimum technical errors and / or attrition with large consequences.

- Due to inadequate cleaning of the fan and the heatsink, overheating and electronic defects may occur.

- By its completely closed optical area, a pollution is hardly possible, but still not excluded. Therefore, it should be checked during the regular cleaning of the electronics sector, whether and how dirty the optical area is.

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- For cleaning the electronic area, please remove the bottom plate of the laser system and remove all dust particles.
- For cleaning the optical and the laser area, please remove the top plate of the laser system.
- For cleaning, only manufacturer's recommended products should be used, because wrong cleaning supplies can damage the components and warranty voids.

10 Questions?

If you have any question about this device, or if you are not sure, if or what you are allowed to do, it is better to contact us. Feel free to call us or send an email.

Our contact data:

LPS-Lasersysteme

CEO Siegmund Ruff

Haidschwaerze 18, D-72131 Ofterdingen

Germany

Email to: s.ruff@lps-laser.de

Phone: +49 7473 27 11 77

Website: www.lps-laser.com