
USER MANUAL

LASER SHOW SYSTEM

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INTRODUCTION

Thank you for purchasing your purchase. To optimize the performance of your laser, please read these operating instructions carefully and familiarize yourself with the basic operations of this system. These instructions contain important safety information regarding the use and maintenance of this system as well. Please keep this manual with the unit, for future reference. If you sell this product to another user, be sure that they also receive this document.

Notice

- We are constantly striving to improve the quality of our products. As such, the content of this manual may be changed without notice.
- We have tried our best to guarantee the accuracy of this manual. If you have any questions or find any errors, please contact us directly to help address this.

WHAT IS INCLUDED

NAME	PCS	Remark
Laser projector	1	
RJ45 cable 5M	2	
Power cord AC 1,5m	1	
Keys for Projector key switch	2	
Keys for E-stop box	2	
E-stop Box	1	
E-stop box connecting cable 10m	1	
Remote interlock bypass 3pin	1	
Flight case	1	
User guide	1	

UNPACKING INSTRUCTIONS

- Open the package and carefully unpack everything inside.
- Ensure all parts are present and in good condition.
- Do not use any equipment that appears to be damaged.
- If any parts are missing or damaged, then please immediately notify your carrier or local distributor.

GENERAL INFORMATION

The following chapters explain important information about lasers in general, basic laser safety and some tips about how to use this device correctly. Please read this information as it contains critical information you must be aware of, prior to using this system.

SAFETY NOTES

WARNING! This projector is a Class 4 laser product. It must never be used for audience-scanning applications. The output beam of the projector must always be at least 3 meters above the floor in the audience. See the Operating Instructions section for further information.

Please read the following notes carefully! They include important safety information about the installation, usage, and maintenance of this product.

- Keep this User Manual for future consultation. If you sell this product to another user, be sure that they also receive this document.
- Always make sure that the voltage of the outlet to which you are connecting this product is within the range stated on the decal or rear panel of the product.
- Always disconnect this product from the power source before cleaning it or replacing the fuse.
- Make sure to replace the fuse with another of the same type and rating.
- If mounting it overhead, always secure this product to a fastening device using a safety chain or cable.
- In the event of a serious operating problem, stop using the projector immediately. Never try to repair the unit except in a controlled environment under trained supervision. Repairs carried out by unskilled people can lead to damage or malfunction of the unit, as well as exposure to dangerous laser light.
- Make sure the power cord is not crimped or damaged.
- Never disconnect the power cord by pulling or tugging on the cord.
- Never carry a product from the power cord or any moving part. Always use the hanging/mounting bracket or the handles.
- Always avoid eye or skin exposure to direct or scattered light from this product.
- Lasers can be hazardous and have unique safety considerations. Permanent eye injury and blindness is possible if lasers are used incorrectly. Pay close attention to each safety REMARK and WARNING statement in this user manual. Read all instructions carefully BEFORE operating this device.
- Never intentionally expose yourself or others to direct laser light.
- This laser product can potentially cause instant eye injury or blindness if laser light directly strikes the eyes.
- It is illegal and dangerous to shine this laser into audience areas, where the audience or other personnel could get direct laser beams or bright reflections into their eyes.
- It is a US Federal offense to shine any laser at aircraft.
- **No service allowed by customer. There are no user serviceable parts inside the unit. Do not attempt any repairs yourself.**
- **Service is only to be handled by the factory or authorized factory trained technicians.**
- **Product is not to be modified by the customer.**
- **Caution – use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.**

LASER AND SAFETY NOTES

STOP AND READ ALL THE LASER SAFETY NOTES BELOW

Laser Light is different from any other light sources with which you may be familiar. The light from this product can cause eye and skin injury if not set up and used properly. Laser light is thousands of times more concentrated than light from any other kind of light source. This concentration of light can cause instant eye injuries, primarily by burning the retina (the light sensitive portion at the back of the eye). Even if you cannot feel “heat” from a laser beam, it can still potentially injure or blind you or your audience. Even very small amounts of laser light are potentially hazardous even at long distances. Laser eye injuries can happen quicker than you can blink. It is incorrect to think that because these laser entertainment products use high speed scanned laser beams, that an individual laser beam is safe for eye exposure. It is also incorrect to assume that because the laser light is moving, it is safe. This is not true.

Since eye injuries can occur instantly, it is critical to prevent the possibility of any direct eye exposure. It is not legal to aim this laser projector into areas where people can be exposed. This is true even if it is aimed below people’s faces, such as on a dance floor.

- Do not operate the laser without first reading and understanding all safety and technical data in this manual.
- Always set up and install all laser effects so that all laser light is at least 3 meters (9.8 feet) above the floor on which people can stand. See the “Proper Usage” section later in this manual.
- After set up, and prior to public use, test the laser to ensure proper function. Do not use if any defect is detected.
- Laser Light - Avoid Eye or Skin Exposure to Direct or Scattered Light.
- Do not point lasers at people or animals.
- Never look into the laser aperture or laser beams.
- Do not point lasers in areas where people can potentially be exposed, such as uncontrolled balconies, etc.
- Do not point lasers at highly reflective surfaces, such as windows, mirrors and shiny metal objects. Even laser reflections can be hazardous.
- Never point a laser at aircraft, as this is a US Federal offense.
- Never point un-terminated laser beams into the sky.
- Do not expose the output optic (aperture) to cleaning chemicals.
- Do not use the laser if the housing is damaged, open, or if the optics appear damaged in any way.
- Never leave this device running unattended.
- This product must always be operated by a skilled and well-trained operator who is familiar with the data included in this manual.
- The legal requirements for using laser entertainment products vary from country to country. The user is responsible for the legal requirements at the location/country of use.
- Always use appropriate lighting safety cables when hanging this projector overhead.

LASER EMISSION DATA

- Class 4 Laser Projector - Avoid Eye and Skin Exposure to Direct or Scattered Light!
 - This Laser Product is designated as Class 4 during all procedures of operation.
-
- Laser Classification Class 4
 - Red Laser Medium AlGaInP, 638 nm, depending on model
 - Green Laser Medium InGaN, 520-525 nm, depending on model
 - Blue Laser Medium InGaN, 445 nm to 465 nm depending on model
 - Beam Diameter <10 mm at aperture
 - Divergence (each beam) <1.5 mrad

PRODUCT SAFETY LABEL LOCATION

FRONT PANEL

- 1. Hazard Warning Symbol
- 2. Aperture Label

TOP PANEL

- 3. Aircraft Warning Label
- 4. Interlocked Housing Label
- 5. Caution Label

See following large reproductions of the product labels. All these labels must be intact and legible prior to using the projector.

PRODUCT SAFETY LABELS



Hazard Warning Symbol



Aperture Lable



Aircraft Warning Label



Interlocked Housing Label



Caution Label

INSTRUCTIONS FOR USING E-STOP SYSTEM

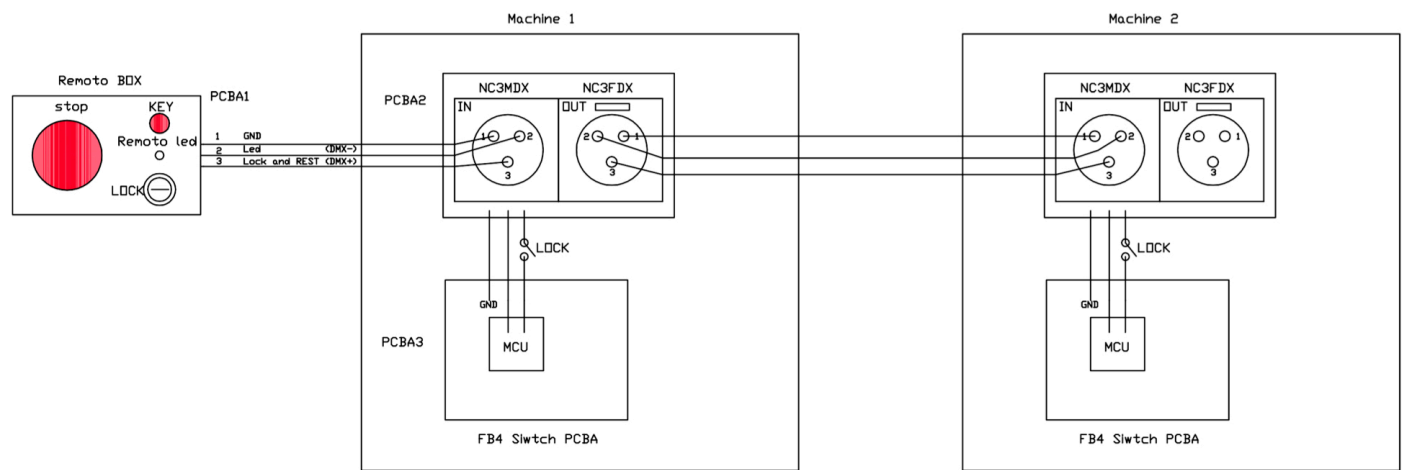
The ESTOP BOX is used to switch off any connected effect lasers directly in the event of a hazard. Once there is an emergency issue, laser can be shut down immediately by pushing the Mushroom Switch, or turn off the KEY Switch on the Estop box.

Connect the ESTOP box to the 3-pin interlock connector on the rear of the laser projector using a 3-PIN XLR cable.



NO.	Name	Function
1	Laser emission LED	After pressing START button, this LED will keep flashing. It takes about 10 seconds for activating laser output. The LED indicator will stay steady ON as soon as the laser beam is emitted.
2	START	VERY IMPORTANT! Every time the laser is shut down, it will be required to press this START button again, to restart laser emitted.
3	Key switch	Key switch for laser on and off.
4	Mushroom switch	Push to shut off laser. Release to have laser on.

The diagram below outlines the pinout configuration for the 3-pin connection from ESTOP BOX to the rear of the projector.

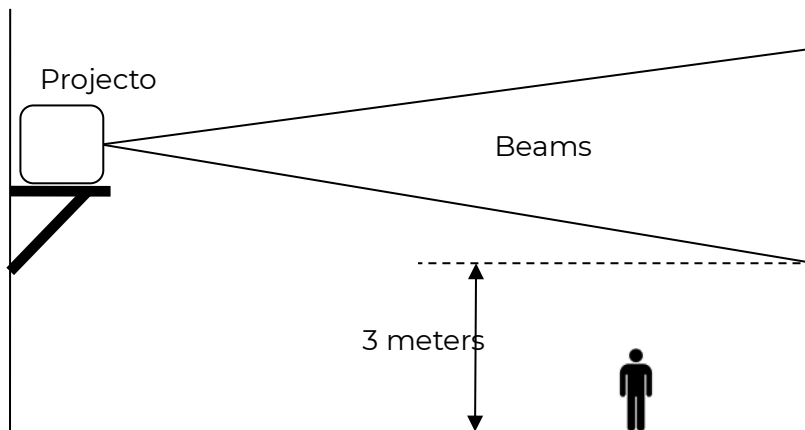


PROPER USAGE

This product is for overhead mounting only. For safety purposes, this projector should be mounted on steady elevated platforms or sturdy overhead supports using suitable hanging clamps. In all cases, you must use safety cables.

International laser safety regulations require that laser products must be operated in the fashion illustrated below, with a minimum of 3 meters (9.8 ft.) of vertical separation between the floor and the lowest laser light vertically. Additionally, 2.5 meters of horizontal separation is required between laser light and audience or other public spaces.

The audience area can be passively protected by sliding the aperture cover plate upwards and fixing it in proper position by the two thumb screws.



RIGGING

- Be sure that the structure onto which you are mounting this product can support its weight.
- Mount the product securely. You can do this with a screw, a nut, and a bolt. You may also use a mounting clamp if rigging this product onto a truss. The U-shaped support bracket has three mounting holes which may be used to secure the clamps to the projector.
- When mounting this product overhead, always use a safety cable.
- Always consider ease of access to the unit before deciding on a location for this product

Caution – use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This Laser Product is designated as Class 4 during all procedures of operation.

OPERATION

INSTRUCTIONS FOR POWERING ON THE LASER SYSTEM

1. Connect power cable and E-stop.
2. Connect the 3-pin Interlock cable between the E-stop box and projector, pull up the red mushroom switch and turn on the key switch. Press the start button.
3. Connect the RJ45 cable(s) to the projector. Then select the pattern on software (Pangolin Quickshow software). Notice; please choose "Allow laser output" in software.

INSTRUCTIONS FOR TURNING OFF THE LASER SYSTEM

1. Turn off the key switch; and deactivate via the red mushroom switch on the E-stop box. You can remove the 3-Pin interlock box too, if the laser will be kept for no use. (We recommend having a professional operator to keep the keys and 3-Pin interlock switch.)
2. Disconnect the power cable.

SAFETY TESTS

The following tests **MUST** be performed each time the projector is used.

Before performing these tests, verify that the projector is facing a safe direction (away from all people and reflective objects) and aimed at a suitable termination surface.

E-STOP FUNCTION

- With the projector operating and projecting laser light, press the red E-stop switch. The projector must shut off immediately.
- Twist the red Mushroom switch to reset it. The projector must not emit any laser light.
- Press the start button on E-stop box. The projector should now re-start and begin emitting laser light.
- Verify that the emission indicator is now lit.

INTERLOCK RESET FUNCTION (POWER)

- With the projector operating and projecting laser light, power off the projector. The projector must shut off immediately.
- Power on the projector again. The projector must not emit any laser light.
- Press the start button on the E-stop box. The projector should now re-start and begin emitting laser light.
- Verify that the emission indicator is now lit.

KEY SWITCH FUNCTION

- With the projector operating and projecting laser light, turn the key switch on the remote E-stop control unit to off. The projector must shut off immediately.
- Turn the key switch back to on. The projector must not emit any laser light.
- Press the start button on the E-stop box. The projector should now re-start and begin emitting laser light.
- Verify that the emission indicator is now lit.

If any of the above tests fail, the projector must be taken out of service and returned to the manufacturer for repair.

MODEL SPECIFICATIONS:

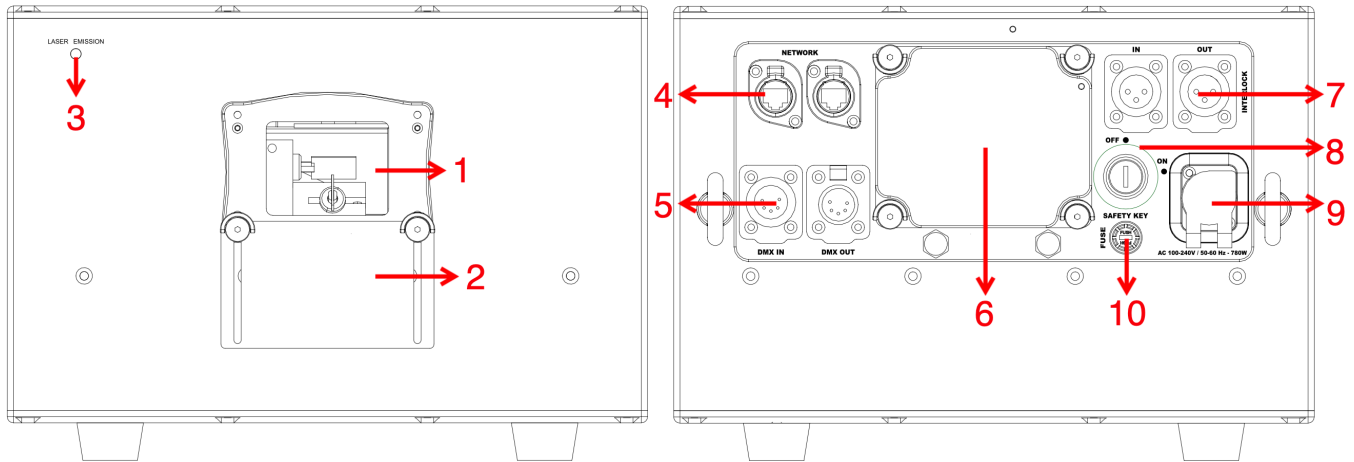
Product Specification

Type of laser:	full-colour, semiconductor diode laser system
LASER POWER:	20W
Control signal:	Pangolin FB4 – Ethernet (Ethercon in/out), ArtNet, DMX PC, Lighting Console, Autoplay
Scanning system:	35kpps @ ILDA 8°
Scan angle:	50°
Safety:	fully complies with the latest EN 60825-1
Net Weight:	30 kg
Package Includes:	Flight case, power cord, 2X5m ethernet (rj45) signal cable, E-STOP box with 10m cable, set of 4 safety keys, remote interlock bypass, Pangolin QuickShow laser control and creation software is available for download.
R G B [watts]:	6 6 8
Beam size [mm]:	5.5 x 6
Beam divergence:	<1.1mrad [full angle]
Modulation:	Analog 100 kHz
Power requirements:	100-250V, 50/60Hz
Consumption:	max. 500W
Operation temperature:	-10 °C - 45 °C
Ingress rating:	IP 65
System features:	All the adjustments such as power output of each colour, X & Y axes invert, X & Y size and position, etc. are managed by inbuilt FB4 control system. Scanning system protection, emergency STOP signal for multiple system "one-hit" operation.
Laser safety features:	Keyed interlock, emission delay, magnetic interlock, scan-fail safety, mechanical shutter, 4-way adjustable aperture masking plate.
Notice:	*Due to Advanced Optical Correction technology used in our laser systems the optical power output of each laser colour within the system may slightly differ from the specification of respective laser module(s) installed. This does not affect the total guaranteed power output.
Dimensions [mm]:	Length: 466 Width: 308 Height: 218

Type of laser:	full-colour, semiconductor diode laser system
Guaranteed optical output:	30W
Control signal:	Pangolin FB4 – Ethernet (Ethercon in/out), ArtNet, DMX PC, Lighting Console, Autoplay
Scanning system:	35kpps @ ILDA 8°
Scan angle:	50°
Safety:	fully complies with the latest EN 60825-1
Net Weight:	30 kg
Package Includes:	Flight case, power cord, 2X5m ethernet (rj45) signal cable, E-STOP box with 10m cable, set of 4 safety keys, remote interlock bypass, Pangolin QuickShow laser control and creation software is available for download.
R G B [watts]:	8 10 12
Beam size [mm]:	5.5 x 6
Beam divergence:	<1.1mrad [full angle]
Modulation:	Analog 100 kHz
Power requirements:	100-250V, 50/60Hz
Consumption:	max. 700W
Operation temperature:	-10 °C - 45 °C
Ingress rating:	IP 65
System features:	All the adjustments such as power output of each colour, X & Y axes invert, X & Y size and position, etc. are managed by inbuilt FB4 control system. Scanning system protection, emergency STOP signal for multiple system "one-hit" operation.
Laser safety features:	Keyed interlock, emission delay, magnetic interlock, scan-fail safety, mechanical shutter, 4-way adjustable aperture masking plate.
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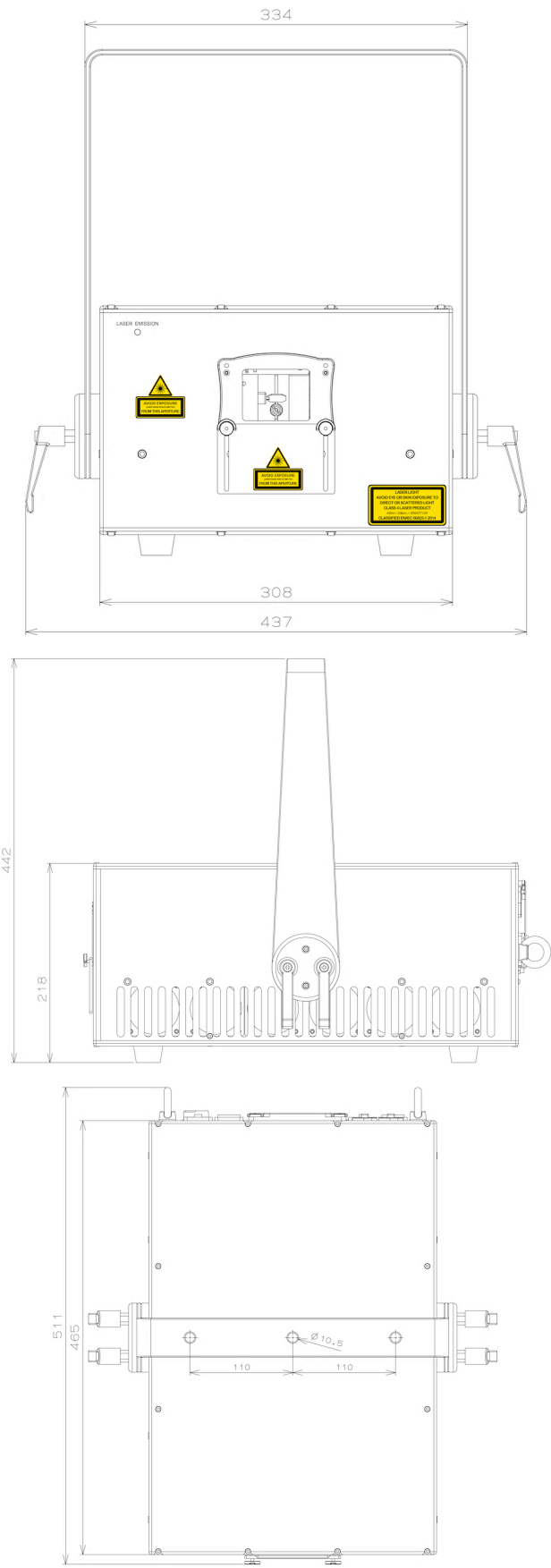
Type of laser:	full-colour, semiconductor diode laser system
LASER POWER:	40W
Control signal:	Pangolin FB4 – Ethernet (Ethercon in/out), ArtNet, DMX PC, Lighting Console, Autoplay
Scanning system:	30kpps @ ILDA 8°
Scan angle:	50°
Safety:	fully complies with the latest EN 60825-1
Net Weight:	30 kg
Package Includes:	Flight case, power cord, 2X5m ethernet (rj45) signal cable, E-STOP box with 10m cable, set of 4 safety keys, remote interlock bypass, Pangolin QuickShow laser control and creation software is available for download.
R G B [watts]:	10 13 17
Beam size [mm]:	6.5 x 6.8
Beam divergence:	<1.1mrad [full angle]
Modulation:	Analog 100 kHz
Power requirements:	100-250V, 50/60Hz
Consumption:	max. 900W
Operation temperature:	-10 °C - 45 °C
Ingress rating:	IP 65
System features:	All the adjustments such as power output of each colour, X & Y axes invert, X & Y size and position, etc. are managed by inbuilt FB4 control system. Scanning system protection, emergency STOP signal for multiple system "one-hit" operation.
Laser safety features:	Keyed interlock, emission delay, magnetic interlock, scan-fail safety, mechanical shutter, 4-way adjustable aperture masking plate.
Notice:	*Due to Advanced Optical Correction technology used in our laser systems the optical power output of each laser colour within the system may slightly differ from the specification of respective laser module(s) installed. This does not affect the total guaranteed power output.
Dimensions [mm]:	Length: 466 Width: 308 Height: 218

Front & Rear panel view



NO.	Name	Function
1	Laser aperture	Laser output, do not look directly into this aperture
2	Aperture masking plate	Can be moved up and down when two locking bolts are loosened.
3	Laser emission	When this indicator is lit up the laser system is ready to emit the laser radiation as soon as it receives instructions from control software.
4	Ethercon in/out	Ethercon in and out for FB4 control
5	DMX Input/Through	Use these ports to connect DMX control signal or to daisy chain the DMX signal between multiple laser display systems.
6	FB4 laser control interface	The inbuilt control interface allows you to control the laser via Ethernet and DMX/ArtNet, but it also handles all the basic settings of the laser system master size and positions, method of control, colour settings etc.). All of these settings can be accessed through the menu using the endless rotary knob and once saved, they are stored on included mini SD card.
7	3-Pin Interlock in/out	Laser output is available only when the interlock is connected. It could be used to connect a laser emergency switch and daisy chain between several projectors.
8	Key switch	Turn the key switch ON to allow laser output.
9	Power in	Neutrik PowerCon True1. AC100~240V power input sockets.
10	Fuse	T10A fuse

Dimension details



TECHNICAL INFORMATION – MAINTENANCE AND SERVICE

MAINTENANCE

GENERAL CLEANING INSTRUCTIONS – TO BE DONE BY USER

Due to fog residue, smoke, and dust cleaning the external body of the projector should be carried out periodically to optimize light output. Cleaning frequency depends on the environment in which the fixture operates (i.e. smoke, fog residue, dust, dew). Periodic cleaning will ensure longevity, and crisp output.

- Unplug the product from power.
- Wait until the product is cold.
- Use a soft damp cloth to wipe down the outside projector casing.
- Use compressed air and a brush to wipe down the cooling vents and fan grill(s).
- Clean the glass panel (laser aperture) with glass cleaner and a soft cloth when dirty.
- Gently polish the glass surface until it is free of haze and lint.
- Always be sure to dry all parts completely before plugging the unit back in.

LASER BEAM ALIGNMENT – TO BE DONE BY USER OR MANUFACTURER

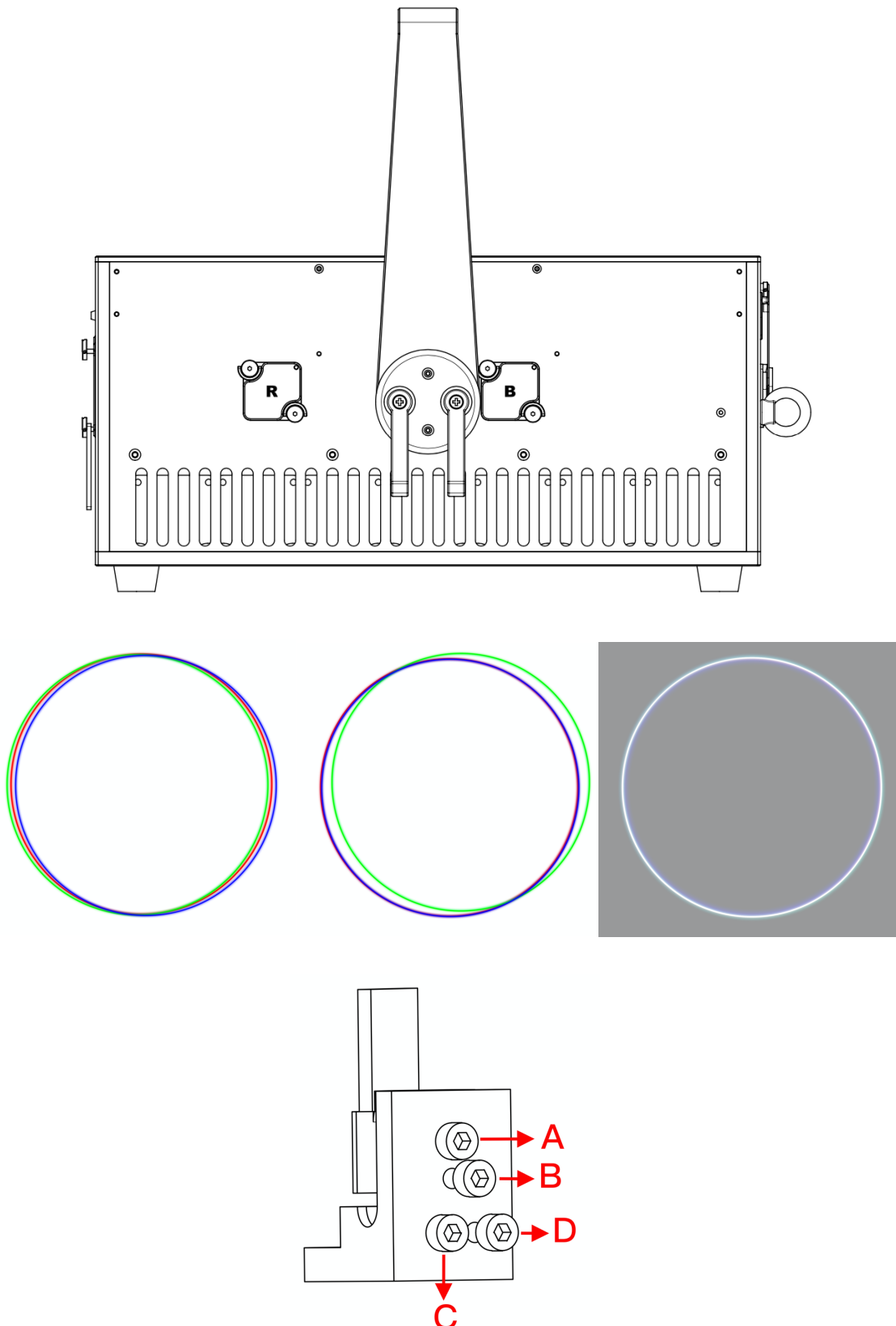


This procedure should be conducted only in a controlled environment and with extreme caution. When aligning the beams it is recommended to wear sufficient laser safety protection and to avoid accidental exposure to Class 4 laser radiation.

There is an all-in-one RGB module inside this laser projector. Inside the module there are one of each primary colors of Red, green and blue. The goal is to have all 3 colors overlay each other as perfectly as possible. The easiest way to test and achieve alignment is to project a large circle onto a suitable surface (fire safe surface). It is recommended to have as much distance between the projector and the terminating wall as possible. It is also recommended to perform the alignment using the least amount of power that enables all the laser modules.

STEP BY STEP INSTRUCTIONS FOR BEAM ALIGNMENT

1. Project a large white circle onto a laser safe surface. Use the least amount of power that enables all the laser modules.
2. Open the metal lid on the side panel, to reach R/G/B laser module optics holders.
3. Using a 2.5mm hex key to adjust the alignment hex button screws on the combining optics until all the beams overlay each other perfectly.
4. In this model, we take green laser as standard, and adjust R/B to combine with Green.
5. Once the alignment is satisfactory then power off the system.
6. Replace the metal lid on the side panel.



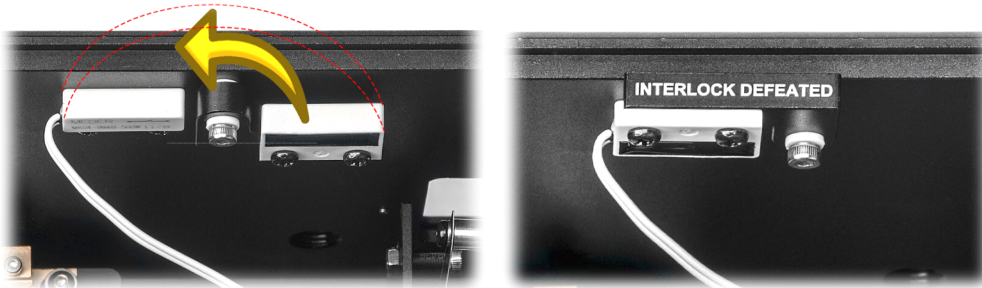
How to use the beam alignment mechanism (to align each beam)

- A. Fixed position pivoting bolt for B screw. DO NOT USE!
- B. Adjuster for moving the beam LEFT & RIGHT
- C. Fixed position pivoting bolt for D screw. DO NOT USE!
- D. Adjuster for moving the beam UP & DOWN

MAINTENANCE INSIDE THE LASER

!	<i>This operation can only be done by well-training engineers!</i>
!	<i>Take extra care to avoid interrupting the laser beam with any tools. Class 4 laser reflections could result.</i>
!	<i>Danger – after defeating the interlock system and having the housing of the laser open, certain laser reflections happen that can cause skin burn or damaging your eyes. Wear safety goggles and avoid skin exposure during operation.</i>

1. If there is necessary to open the laser housing to do maintenance, pls be caution.
2. Remove the top panel hex button bolts.
3. Defeat the magnetic interlock switches by flipping over the right side of the magnetic interlock.
4. Placing the interlock in the defeated position raises the interlock higher than the surrounding panels. This prevents the projector top plate from being replaced while the interlocks are defeated.
5. When the interlocks are defeated you should see the “interlock Defeated” labels. See example images below.
6. Only with interlock defeated, you can have laser output.



SERVICE

There are no user serviceable parts inside this unit. Do not attempt any repairs yourself; doing so will void your manufactures warranty. In the unlikely event your unit may require service please contact us directly or your local distributor, who will help you with a repair or replacement. We will not accept any liability for any resulting damages caused by the non-observance of this manual or any unauthorized modification to this unit.

