OUTDOOR LASER SERIES

HIGH POWER RGB OUTDOOR LASER

FOS 20W RGB IP65

USER GUIDE

SAFETY NOTES
ANIMATION LASER SHOW SYSTEM SAFETY NOTES

Thank you very much for choosing our product, for your safety, please read the laser safety instruction and this manual carefully before your operation.

This manual includes installation and user information.

Please install and operate the laser according to the requirements of this manual and safety guidelines.

DO NOT OVER DRIVE THE SCANNERS. WHEN USING MAX SPEED KEEP THE ANGLE SMALL. FOR MAX ANGLE DO NOT EXCEED 40000PPS ON THE ILDA SOFTWARE SETTING.

Class 3B and 4 Laser Lighting Effect User Safety Guide
Important Warnings

Class 4 Lasers have the potential to harm eyesight if viewed directly in the face, and in many instances this may be the case even if viewed over longer distances of several tens of metres. Therefore before using the laser product you should familiarise yourself with its operation, and also the safety aspects that need to be considered.

Laser lighting effects are quite safe to watch if installed and used correctly, and being aware of a few basic factors will help you to achieve this. This guide has been prepared to help provide a basic backgrounder to the key safety aspects, and is based on current UK health and safety guidance on the use of lasers for public displays.

Installation and Operation Notes

1. The laser should only be installed and operated by those that are aware of how to operate laser, and what the various controls perform.

2. The laser should be mounted in a suitable and secure position in the venue, so that once in position it is unlikely to be affected by unintended movement.

3. Prior to installation and operation of the laser, the paths of the beams and effects should be considered, particularly with respect to how they will touch the audience. If direct audience scanning is desired then the laser energy in the effects needs to be considered to decide if the effects are safe for direct viewing.

Introduction

Laser lighting products are used to create some of the most vivid and striking visual effects, and are often noted for how they seem to produce solid shapes that cut through the air, and pick up highly defined swirling smoke patterns. The light that is used to create these stunning effects is different from normal light and therefore several precautions need to taken when using lasers to ensure that the lighting effects are safe and enjoyable to view. The optical power output from the

kind of lasers used for lighting displays can be harmful if not properly setup or is misused. But when used following the recommended health and safety guidelines, laser lighting effects no more harmful than looking at any conventional lighting effect.

Although this guide covers the main points to consider when using laser effects, users are advised to familiarise themselves with other guidance, particularly that issued by the Health and Safety Executive, HS(G)95 The Radiation Safety Of Lasers Used For Display Purposes.

A laser product that emits more than 5mW of light and less than 500mW can be classified as a Class 3B laser product

A laser product that emits more than 500mW of light and can be classified as a Class 4 laser product

Class 3B and 4 are safe if used responsibly, and in accordance with the relevant the guidance issued by the Health and Safety Executive.

Class 4 laser devices may cause fires and burn the skin if exposed directly.

In the simplest terms, generally keeping the beams and effects above the audience will not present a hazard to those viewing the show or effects. When you start to aim the laser effects down into the audience area is when it becomes harder to tell if the effects could cause harm. With a Class 3B and 4 laser lighting effect, the problem can arise if the beams or effects actually hit someone's face. If in doubt, keep the effects above the audience.

Class 3B and 4 laser devices can be harmful to eyesight if viewed directly. i.e. that is, the beam or effect strikes the face of a person directly. The actual injury that a Class 3B and 4 laser can cause depends upon a number of factors, including how long the laser beam enters the eye for, the intensity of light, and what part of the eye it actually gets focused onto. The most susceptible part of the eye to receive damage from a laser is the internal back wall of the eyeball, known as the retina. It is this part of the eye that receives the light signals that are sent to brain. All light entering the eye gets focused onto the retina.

There are no specific "laser laws" or any "laser licences" that anybody needs in order to own or operate a laser for lightshow use. However, there is specific guidance issued by the Health and Safety Executive in the form of a document called HS(G)95 The Radiation Safety of Lasers Used for Display Purposes. HS(G)95 outlines a number of detailed points to consider when using lasers for lightshow purposes.

Class 3B and 4 laser products are required to have several specific safety features as part of their design. These features are laid out in the British Standard on Laser Product Safety BS/EN 60825-1 and are a requirement of the product meeting CE approvals. The important ones are listed below:

1)   Laser Safety Warning Labels   2) Emissions Indicator   3) Remote Interlock Connector

Audience Scanning

Audience Scanning is the term commonly used to describe when laser effects are being directly aimed at the viewing audience. This creates a very dramatic looking effect, as people can touch the light, and look down smoky tunnels. But because the laser light can touch or scan past people's faces, it also carries a risk that it could cause damage to people's eyesight, if they are overexposed to the laser light.

The amount of laser light that a person can be exposed to without it causing harm to eyesight is known as the Maximum Permissible Exposure or MPE. These levels are defined the in the British Laser Safety Standard BS/EN 60826-1. When people are exposed to laser light which is above the MPE, it poses a risk of causing eye damage. This could be of concern when the laser effects are viewed directly in the face or there is a chance that they could be.

Knowing what the MPE and exposure level is for a given laser effect is quite a complex and involved process to establish. For it is dependant on a whole number of conditions and variables that need to be taken into account. The laser safety standard BS/EN 60825-1 contains the data required to calculate the safe levels, but it is not straightforward to interpret. Laser Safety Calculation Software has been developed to help ease the task of establishing laser effects exposure.

The BS/EN60825-1 Laser Safety Standard recommends that all establishments that use, or businesses that work with Class 3B laser products, should appoint a Laser Safety Officer (LSO). The Laser Safety Officer should be aware of the safety issues when using lasers, and is responsible for overseeing how the laser is used. In smaller businesses, the LSO will probably also be the installer, operator, owner etc.

The worst case effect to look at directly is a static single beam, because all the light energy is concentrated into one point.

# General instructions
Unpacking:

Thank you for purchasing this product. Please read user guide for safety and operations information before using the product. Keep this manual for future reference. This product can create perfect laser programs and effects since it has passed a series of strictly tests before delivery. Please check the attachments listed on the page after opening the carton. In the event of carton damage or attachment missing in transit, please contact your dealer or our after sales service department.

Attachments:

1. Laser Light: 1PC

2. Power Cable: 1PC

3. User Guide: 1PC

4. 3 Pins XLR Waterproof Plug: 2PCS

5. RJ45 XLR Plug: 2PCS

Notice:

1. Do not exposure the human eye direct to laser beam.

2. Do not turn on and off the unit frequently.

3. Before using this unit make sure the power supply is ground.

4. Use cleaning tissue to remove the dust absorbed on the external lenses periodically to optimize light output.

5. Do not remove or break the warranty label, otherwise it void the warranty.

6. Always replace with the exact same type fuse, replacement with anything other than the specified fuse can cause fire or electric shock and damage your unit, and will void your manufactures warranty.

DANGER
LASER RADIATION AVOID EXPOSURE
TO BEAM CLASS 4 LASER PRODUCT
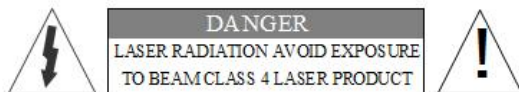
Features

1. Water proof laser with IP65 rating designs. Multi-waterproof structure design. The housing reaches IP65 protection level (protection against dust and low-pressure jets of directed water for any angle).

2. Made of water proof materials and special process designs to make sure the exposed components(fans, socket, screws, etc.) working well.

3. Full pure diode RGB laser with more stable performance and longer working life. Diode solid-state (DSS) laser is that when power on, the diode will have laser output directly. It can work properly between -30°C and 40°C.

4. Made of analog laser modulation. Users can dimmer the laser brightness linearly to makes the laser light more colorful.

5. Graphics & Effects: Beam show and animated graphics show patterns.

6. Safety intelligent: PC control mode will shut off laser automatically without trigger signal. The scanner failure protection will shut off the laser signal and the shutter will block the laser output Automatically, so as to avoid the single beam coming out.

7. Applicable for all kinds of large-scale outdoor performances, outdoor lighting projects.

Technical Specification

1. Voltage: AC100~250V/AC, 50HZ/60HZ

2. Rated Power: 200W

3. Waterproof Level: IP65

4. Work Environment: outdoor and indoor, -30 °C ~40 °C

5. Scanner: 40K High-speed optical scanner, ±30° big angle scanning

6. Laser: RGB analog modulate, 10KHZ frequency

    5.5W red laser, wavelength 638nm

    5.5W green laser, wavelength 525nm

    9W blue laser, wavelength 450nm

7. RGB Beam Diameter<5mm, Divergence<1.3mrad.

8. Working Modes: DMX512 (14 CH/22CH), ILDA Mode (PC Control), Music Mode, Auto Mode

9. Safety Configure: Security protection, Laser key switch, SFS Control(scanner fail safety control ON/OFF),

    Flying rings bolt

10. Interface: 3 pins XLR jack for DMX, RJ45 interface for ILDA control and interlock

11. Machine dimension: 370(L)*260(W)*210(H)mm

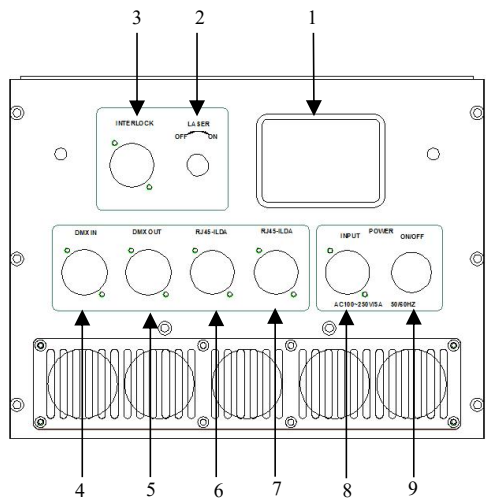12. Net Weight: 13.5Kg

Front Panel Picture

The following pictures are for your reference only, the specific kind prevail.
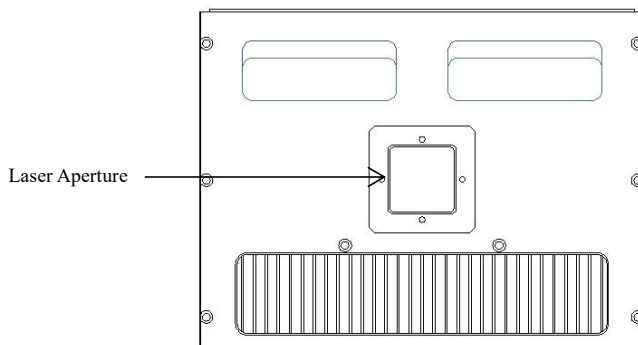
Laser Aperture

Laser aperture: Laser scan aperture. Don't look at the laser aperture, avoid laser shoot at the eye.

Rear Panel Picture

1. Control Panel   & LCD Display: Display the current operation information, ENTER is the confirmation key, UP key is the upward key, and DOWN key is the down key

2．Laser Key： ON and OFF laser. When at the ON position, laser ON, at the OFF position, laser OFF.

3. Interlock: Laser interlock/remote control interface to control laser ON and OFF. Connection to laser ON, Disconnection to laser OFF. Cooperating with laser key, when all ON then have laser output. When emergency, can shut off the laser quickly.

4/5．DMX IN/OUT: Connect the input and output of DMX signal with 3 pins XLR jack

6/7．ILDA In and Out RJ45 Interfac e： Use laser software control (such as QuickShow from Pangolin). Simple ILDA interface, using RJ45 network port as input and output port, only 8 pin signal.

The international standard DB25-ILDA interface of computer laser software (such as QuickShow of PANGOLIN) is converted to RJ 45 interface and the definition matches the pin. To use this interface function, we recommend using our company conversion interface
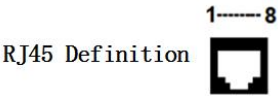
RJ45 Pin	1	2	3	4	5	6	7	8
ILDA signal	X+	X−	Y+	Y−	R	G	B	GND

8. POWERCON Input Socket: AC100~250V,50/60HZ

9. POWER Switch

Menu Function

Primary Menu	Sub Menu	Third-level Menu	Default
Function Mode >	DMX-512 Mode Auto Mode Music Mode ILDA Mode		Auto Mode
Show Listing >	Choose List All The List -001-002-003……		002
Playing Show >	Choose Show All The Show -001-002……255		All The Show
Play Setup >	< Play Setup		
	Play Speed >	Auto/Music Speed 1~100	50
	Play Mode >	Loop Play Random Play	Loop Play
Address Setup >	Address Setup 001~512		001
Channel Setup >	Normal Mode Expert mode		Expert mode
Laser Setup >	Laser Light		
	Scanner 30KPPS >	Scan Rate 10~40KPPS	30KPPS
	Color RGB >	Color Setup Single RGY RBP GBC RGB WYPC	RGB
	Laser Analog >	Laser Type TTL/Analog	Analog
		Bright Rmax:0~255	255

		Bright Gmax:0~255	255
		Bright Bmax:0~255	255
	Invert Normal >	Normal Invert X Invert Y Invert XY	Normal
	Image Size XY >	Scan Size X 10%~100%	100%
		Scan Size Y 10%~100%	100%
		Auto Size X 10%~100%	100%
		Auto Size Y 10%~100%	100%
	Position XY >	Position Setup	
		Position X -50%~+50%	0%
		Position Y -50%~+50%	0%
General Setup >	<Settings		
	Reset Default >	Reset Default Yes No	No
	Safety Protected >	Safety Protected Turn ON Turn OFF	Turn ON
	Master Setup>	Master Setup Turn ON Turn OFF	Turn ON
	Back Light	Back Light Normally ON Delay 15S OFF	Delay 15S OFF
	Language >	Language Chinese English	Chinese/ English
	Display Setup >	Display Setup Rotate 180 deg Normal Display	Normal Display
	About System >		

DMX Mode: DMX-512 mode, control with DMX512 signals. The LCD shows the current mode and DMX address.

Music Mode: Sound active mode, play built-in music/sound programs.

Auto Mode: Auto mode, Play built-in auto programs.

Channel Setup：DMX Channel mode selection. You can choose the standard 14 channel mode, or choose the profession 22 channel mode.

Laser Setup > Scanner > Scan rate: Scanner rate setting. Range is from 10KPPS to 40KPPS. It is better to set the speed between 25~30KPPS. If speed is too low, then the pattern is too flashing. If the speed is too high, when it is running complex patterns or big angle projection, the scanner is damaged easily. Especially when you control it with laser software in ILDA mode (if available in your device), the scanning speed set in the software can't exceed the projector speed at the standard of 8 degree.

General Setup > Safety Protected： Single point protection setting. Scanner fail safety control ON/OFF. If turned off, a single point of laser will appear if the scanner fails.

Show Listing		
Show Listing	**Show Content**	**Application place**
001	People & Animal animation effect	Laser show
002	Line pattern effect, small animation effect	Beam show
003	Line pattern effect	Beam show
004	Wave, fan,circular pattern,to aurora effect	Aurora effect
005	Fixed with the large circular color-change pattern, to aurora effect	Aurora effect, Spatio-temporal tunnel
006	single point, three points, five points, horizontal movement effect, contraction effect	Building landmark laser
007	single point, two points, three points, white light horizontal movement effect	Building landmark laser
008	single point, two points, three points, multi-color horizontal movement effect	Building landmark laser
009	single point, two points, three points, multi-color horizontal movement effect	Building landmark laser
010	single point, two points, three points, four points, five points, Static effect	Building landmark laser
011	single point, two points, three points, four points, five points, white light horizontal movement effect	Building landmark laser
012	Line/beam pattern effect	Beam show

1) Show Listing(006—011) have laser single point pattern. If the "**Safety Protected**" is set to **"Turn ON"**, the single point pattern is without laser output; if set to **"Turn OFF"**, be careful to avoid projection to dangerous areas and exposure to people, camera and mobile phone to avoid laser exposure.

2) If no single point laser effect is needed, please set the " **Safety Protected** " to **"Turn ON"** to avoid a single point laser, that is, operation: **General Setup > Safety Protected > Turn ON**

DMX Operation:

The system has two channel versions for customers to choose.

1. Normal Mode 14 Channel Versions

Channel	Function	Value	Description
CH1	RGB Dimmer	000-255	RGB dimmer from 0% to 100%
CH2	Red Dimmer	000-255	RGB dimmer from 0% to 100%
CH3	Green Dimmer	000-255	RGB dimmer from 0% to 100%
CH4	Blue Dimmer	000-255	RGB dimmer from 0% to 100%
CH5	Strobe	000-010	No strobe
		011-255	Auto strobe, strobe speed from low to fast
CH6	Pattern Size	000-255	Adjust XY size, The pattern is not in the center after the adjustment. The center is decided by the CH4 and CH5
CH7	X Position	000-255	Horizontal position selection, value 128 is the central position and valid when CH6 is 1～255
CH8	Y Position	000-255	Vertical position selection, value 128 is the central position and valid when CH6 is 1～255
CH9	Color combination	000-255	In combination with CH 10
CH10	Color Selection	000-000	Built-in color of pattern
		001-007	Fixed Multi-color pattern
		008-015	White
		016-023	Red
		024-031	Yellow
		032-039	Green
		040-047	Cyan
		048-055	Blue
		056-063	Pink
		064-095	Seven color change effect speed selection

		096-127	RGB color change effect speed selection
		128-159	Seven color change effect speed selection
		160-191	Multi-color flow effect speed selection
		192-223	Full color flow effect speed selection
		224-255	Color drawing effect speed selection
CH11	Line Scanning Speed	000-127	Adjust line scanning speed
	Dot Scanning Speed	128-255	Adjust dot scanning speed
CH12	Pattern Selection	000-255	Select an effect or pattern from the effect library or pattern library. Two digits is for one pattern. Play all in 0
CH13	Effects and Patterns Library	000-007	Patterns library 1, People & Animal animation effect, Corresponding Show Listing 001 pattern
		008-015	Effects library 1, line pattern is the main, Corresponding Show Listing 002 pattern
		016-023	Effects library 2, line dynamic pattern, Corresponding Show Listing 003 pattern
		024-031	Effects library 3, wave, fan, circular, multipoint dynamic pattern, Corresponding Show Listing 004 pattern
		032-039	Effects library 4, single circular dynamic pattern, Corresponding Show Listing 005 pattern
		040-047	Effects library 5, single point, three points, five points, dynamic pattern, Corresponding Show Listing 006 pattern
		048-055	Effects library 6, single point, two points, three points, dynamic pattern, Corresponding Show Listing 007 pattern
		056-063	Effects library 7, single point, two points, three points, dynamic pattern, Corresponding Show Listing 008 pattern
		064-071	Effects library 8, single point, two points, three points, dynamic pattern, Corresponding Show Listing 009 pattern
		072-079	Effects library 9, 1~5 points, dynamic pattern, Corresponding Show Listing 010 pattern
		080-087	Effects library 10, 1~5 points, dynamic pattern, Corresponding Show Listing 011 pattern
		088-255	Patterns library 2, line/beam Static pattern, Corresponding Show Listing 012 pattern Static effect

Channel	Function	Value	Description
CH14	Auto Trigger	000-26	Default automatic speed
		027-127	Select the automatic speed
	Sound Active Trigger	128-255	Select the sound active sensitivity

2. Expert Mode 22 Channel Versions

Channel	Function	Value	Description
CH1~ CH14 same to normal mode. If CH13 selects the effect library, then CH15~CH22 is invalid, that is, CH15~CH22 is only valid for the pattern library			
CH15	Rotation	000-127	Rotation Angle Selection
		128-191	Clockwise rotation speed selection
		192-255	Counterclockwise rotation speed selection
CH16	X Rotation	000-127	The X-direction rotate selection
		128-191	The X-direction rotate change speed selection
		192-255	The X-direction rotate change speed selection
CH17	Y Rotation	000-127	The Y-direction rotate selection
		128-191	The Y-direction rotate change speed selection
		192-255	The Y-direction rotate change speed selection
CH18	X move	000-127	Horizontal position selection
		128-159	Move from left to right automatically
		160-191	Move from right to left automatically
		192~223	Move from right to left automatically
		224-255	Move Left and right circularly
CH19	Y move	000-127	Vertical position selection
		128-159	Move from up to down automatically
		160-191	Move from down to up automatically
		192-223	Move from down to up automatically
		224-255	Move up and down circularly
CH20	Zoom(+/-)	000-127	Pattern size selection
		128-159	Zoom -
		160-191	Zoom +
		192-223	Zoom (+/-) circularly
		224-255	Zoom (+/-) circularly
CH21	Drawing	000-127	Drawing one speed selection

		128-255	Drawing two speed selection
CH22	X Wave	000-063	X Wave speed selection
		064-127	X Wave speed selection
	Y Wave	128-192	Y Wave speed selection
		192-255	Y Wave speed selection