

LASER SHOW SYSTEM

PROFESSIONAL ANIMATION SERIES

MODEL FOS 20W RGB

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 be 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 are 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 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 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:

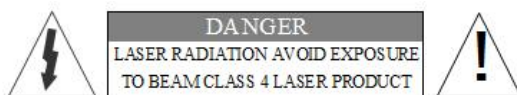
Thank you for purchasing this product. Please read user guide for safety and operations information before using the product. Keep this manual for future reference. This product can create perfect laser programs and effects since it has passed a series of strictly tests before delivery. Please check 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 |

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. This unit is intended for indoor use only and should be prevented form water, moisture and shake. The working temperature of this unit is $-30 \sim 40^{\circ}\text{C}$, do not use this continuously over 6 hours, otherwise it shortens the lifetime of the unit.
5. Use cleaning tissue to remove the dust absorbed on the external lenses periodically to optimize light output.
6. Do not remove or break the warranty label, otherwise it void the warranty.
7. 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.



Features

1. Full pure diode 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.
2. Made of analog laser modulation. Users can dimmer the laser brightness linearly to makes the laser light more colorful.
3. Use precise 2D dichro for RGB alignment. The users can do the RGB realignment even by the fingers. No special equipment and no skilled workers needed.
4. Graphics & Effects: Beam show and animated graphics show patterns.
5. TF Card: 8GB, for storage build in program and downloading program.
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.

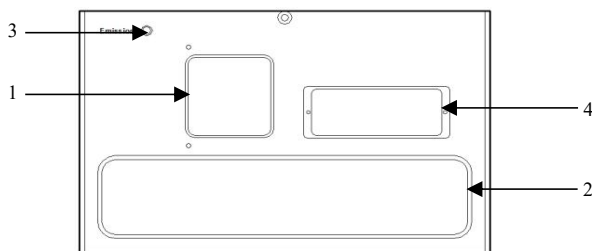
Technical Specification

1. Voltage: AC90~250V/AC, 50HZ/60HZ
2. Rated Power: 150W
3. Waterproof Level: IP51
4. Work Environment: outdoor and indoor, -30 °C --40 °C
5. Scanner: 35KPPS High-speed optical scanner, $\pm 30^\circ$ big angle scanning
6. Laser: RGB analog modulate, 30KHZ frequency
 - Red laser, 5W, wavelength 638nm
 - Green laser, 5W, wavelength 525nm
 - Blue laser, 10W, wavelength 450nm
7. Beam Diameter < 6mm, Divergence < 1.5mrad
8. Working Modes: ILDA mode (PC Control), DMX512 (18 CH), CF PRG(CF card program), CF ILD(CF card program), DMX512 (18 CH), Soud(Sound Active) Mode, AUTO Mode, Outdoor Mode
9. Play Program Format: .ild laser show document
10. Safety Configure: Security protection, Laser key switch, laser remote interlock, SFS Control(scanner fail safety control ON/OFF), flying rings bolt
11. Interface: 3 pins XLR jack for DMX, DB25 interface for PC control
12. Machine dimension: 395(L)*280(W)*240(H)mm
13. Machine Weight: 19.8Kg

Machine Pictures

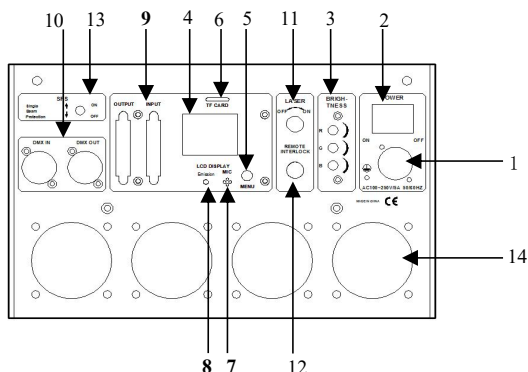
The following pictures are for your reference only, the specific kind prevail.

Front Panel Picture



1. **Laser aperture**
2. **Fan air outlet**
3. **Laser indicator**: White indicator light, laser output is allowed when turned on, please operate carefully; laser output is not allowed when turned off.
4. **Alignment adjusting window**: If the RGB light is offset, please open this window with the attached screwdriver tool, and you can directly adjust the RGB light closing.

Rear Panel Picture



1. **POWERCON Power Input Socket**: AC100~250V,50/60HZ
2. **POWER Switch**
3. **BRIGHTNESS**: RGB brightness adjusting knob, 0~100% adjustment
4. **LCD DISPLAY**: LCD display, displaying current operation information
5. **MENU**: Menu reuse keys, rotation to make choices, keys to confirm or exit functions
6. **CF CARD**: CF memory card, store laser program, and store the largess program to make laser software and other data

7. **MIC:** Sound-control microphone with SOUND mode recognition sound rhythm signal
8. **Emission:** Signal indicator light, signal flashing in DMX mode, other conditions for power indication
9. **ILDA In and Out Interface** with DB25: Use laser software control(such as QuickShow from Pangolin).When connect to hardware of laser software, it turn to ILDA mode automatically.
10. **DMX IN/OUT:** Connect the input and output of DMX signal with 3 pins XLR jack
11. **Key Lock:** ON and OFF laser. When at the ON position, laser ON, at the OFF position, laser OFF.
12. **Remote Interlock:** Laser remote control interface to control laser ON and OFF. Connection to laser ON, Disconnection to laser OFF. Cooperating with key lock, when all ON then have laser output. When emergency, can shut off the laser quickly.
13. **SFS: SFS control**, scanner fail safety control ON/OFF. If turned OFF, a single point of laser will appear if the scanner fails. If turned ON, if there is a single point, automatically turn off the laser
14. **FAN:** Radiator fan *4PCS

Manu Setting

Manu	Sub Item	Default Setting	Remarks
DMX Address	001/...../511	001	DMX address
Show Mode	Auto/Sound/ILD/ PRG/Outdoor/TEST	Auto	Built-In Program Mode
Sound Sense	000/...../100	080	Sound sensitivity
CF File			CF/SD card folder setting. Double click exit menu to select the required PRG or ILDA files in the main interface.
Size	010/...../100	100	Pattern size setting
Phasic	X+ Y+/X- Y+/ X+ Y-/ X- Y-	X- Y+	XY Phasic setting of only built-In program mode valid
Speed	08/...../40	30	Scanner speed setting
DMX State	Show/Black	Show	SHOW: No DMX signal is received, the built-in operation mode is run BLACK: If the signal is not received, the light is black.
Slave Mode	Master/Slave	Master	Master/Slave mode
X Phasic	Positive/Reverse	Positive	X Phasic setting of all mode valid
Y Phasic	Positive/Reverse	Positive	Y Phasic setting of all mode valid

Color Mode	RGB/White	RGB	Color setting
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Function & Setting

- 1) RRG: CF PRG mode(playlist mode), play PRG file. The LCD shows current playlist name, rotate button to change the playlist, press the button to change current folder.
- 2) ILD: CF ILD mode, play single ILDA file (extension name is .ILD, case insensitive) repeatedly. The LCD shows the current playing ILDA file name, rotate button to change ILDA file; press the button to change current folder.
- 3) SOUND: play built-in music programs, rotate button to change sonic rhythm.
- 4) AUTO: play built-in auto programs.
- 5) Outdoor: play built-in auto programs for outdoor place.
- 6) DMX: the LCD shows the current mode and DMX address.
- 7). SETTING: set color, speed, size, music sensitivity, phase, direction of X and Y separately.

In PRG and ILD Mode, read the contents inside the CF card. Users can edit their own programs then save into CF card. Also there are many programs built inside control board. Users can display those programs in AUTO, SOUND and DMX mode.

Attention

1. The system just support short file name, file name (include folder name), most 8-bit file name and 3 extension name, file name and extension name formed by letter, number and under line. File name can't over 8 and no Chinese words, otherwise the system can't identify it.
2. CF card can't mix other file, most support 20 folders, every folder can save maximum 255 files and 10 PRG files.
3. Program table: user can use notepad to edit program list, the extension name is .PRG. Program table formed by play file name, play speed, play times, ISHOW identify code "i" (if use ISHOW software make ild file), middle using "i" separate. Edit item, for example: one program formed by File1.ild, File2.ild, File3.ild. File1.ild play speed is 30K, replay 3 times; file2.ild play speed is 35K, play one time, and file 2 is made by ISHOW software; file3.ild play speed is 30K, play 4 times. Then prg1.prg contents as below:

File1.ild,30,3,0

File2.ild,35,1,1,i

File3.ild,30,4,2

When create one folder, need create the same PRG file under the folder, and put all the files need to play in the folder into the PRG file. For example, under aurora folder, create aurora.prg file. After adding ILDA file,

need add the file to prg file, so that we can find the file quickly and play the file as per the speed you set.

DMX Operation

The system has two channel versions for customers to choose.

1. 18 Channel Versions(V10 software version)

Channel	Function	Value	Description	
CH1	Mode Select	000--009	Laser off	
		010--049	Outdoor mode, CH2~CH18 invalid	
		050--099	Auto mode, CH2~CH18 invalid	
		100--149	Sound Active mode, CH2~CH18 invalid	
		150--199	TF PRG mode, CH15 invalid	
		200--249	TF ILD mode, CH15 invalid	
		250--255	DMX Manual mode, CH2~CH18 valid	
CH2	Pattern Page /Folder Select	000--255	DMX Manual Mode	PRG/ILD Mode
			Pattern page select, every 10 value one page	Folder selection, numeric equal assignment
CH3	Pattern /File Select	000--255	DMX Manual Mode	PRG/ILD Mode
			Pattern select, every 5 value one pattern	File select, numeric equal assignment
CH4	Strobe	000--010	No strobe	
		011--255	Auto strobe, the bigger the number, the faster the speed.	
CH5	Color Select	000--016	Built-in color of pattern (White)	
		017--033	Red	
		034--050	Green	
		051--067	Blue	
		068--084	Yellow	
		085--101	Purple	
		102--118	Cyan	
		119--135	White, red, green, blue, 4 color section	
		136--152	Blue, yellow, purple, cyan, 4 color section	
		153--169	W, R, G, B, Y, P, C, 7 color section	

		170--186	White, red, green, blue, 4 color flow
		187--203	Blue, yellow, purple, cyan, 4 color flow
		204--220	Blue, yellow, purple, cyan, 4 color flow
		221--237	color subsection by inflexion
		238--255	White color
CH6	X Move	000--125	Adjust position by manual
		126--155	Move circle from right to left automatically
		156--185	Move circle from left to right automatically
		186--225	Move circle from left to right automatically
		226--245	Auto jumping left and right
		246--255	Audio jumping left and right
CH7	Y Move	000--125	Adjust position by manual
		126--155	Move circle from down to up automatically
		156--185	Move circle from up to down automatically
		186--225	Move circle from up to down automatically
		226--245	Auto jumping up and down
		246--255	Audio jumping up and down
CH8	Zoom(+/-)	000--010	No change
		011--087	Adjust size by manual
		088--150	Zoom +
		151--200	Zoom -
		201--255	Zoom (+/-) circle
CH9	Rolling X	000	No change
		001--128	Manual rotation
		129--255	Auto rotation
CH10	Rolling Y	000--000	No change
		001--128	Manual rotation
		129--255	Auto rotation
CH11	Rolling Center	000--000	No change
		001--128	Manual rotation
		129--192	Auto clockwise rotation
		193--255	Auto counterclockwise rotation
		000--010	No change

CH12	Drawing	011--074	Manual drawing
		075--104	Auto drawing +
		105--144	Auto drawing -
		145--184	Auto drawing circle
		185--224	End to end drawing circle +
		225--255	End to end drawing circle -
CH13	X Wave	000--009	No wave
		010--069	Small wave
		070--129	Medium wave
		130--189	Big wave
		190--255	Biggest wave
CH14	Y Wave	000--009	No wave
		010--069	Small wave
		070--129	Medium wave
		130--189	Big wave
		190--255	Biggest wave
CH15	Display Mode	000--063	Normal display
		064--127	Light dot display
		128--191	Segment display
		192--255	Dot display
CH16	Red Dimmer	000--255	Dimmer laser output power from 100% to 0%
CH17	Green Dimmer	000--255	Dimmer laser output power from 100% to 0%
CH18	Blue Dimmer	000--255	Dimmer laser output power from 100% to 0%

2. 25 Channel Versions(V20 software version)

Channel	Function	Value	Description
CH1	RGB Dimmer	000--255	RGB dimmer from 0% to 100%
CH2	Mode Select	000--049	DMX Manual mode, CH1~CH25 valid
		050--099	TF ILD mode, CH25 invalid
		100--149	TF PRG mode, CH4 and CH25 invalid
		150--199	Auto mode, CH1/CH4/CH6 valid
		200--249	Outdoor mode, CH1/CH4/CH6 valid
		250--255	Sound Active mode, CH1/CH4/CH6 valid

CH3	Pattern Page /Folder Select	000--255	DMX Manual Mode	PRG/ILD Mode
			Pattern page select, every 10 value one page	Folder selection, numeric equal assignment
CH4	Pattern /File Select /Speed	000--255	DMX Manual Mode	Pattern select, every 5 value one pattern
			PRG /ILD Mode	File select, numeric equal assignment
			Auto /Outdoor /Sound	Play speed: 0~10: Default speed, 11~255: Speed up
CH5	Strobe	000--010	No strobe	
		011--255	Auto strobe, Speed up	
CH6	Color Mode	000--009	Built-in color of pattern, no dimming	
		010--018	Built-in color of pattern, can dimming	
		020--029	Red	
		030--039	Green	
		040--049	Blue	
		050--059	Yellow	
		060--069	Purple	
		070--079	Cyan	
		080--109	R&W, The larger the value, the more segments	
		110--139	G&W, The larger the value, the more segments	
		140--169	B&W, The larger the value, the more segments	
		170--179	W, R, G, B, 4 color section	
		180--189	B, Y, P, C, 4 color section	
		190--199	W, R, G, B, Y, P, 6 color section	
		200--209	W, R, G, B, 4 color flow	
		210--219	B, Y, P, C, 4 color flow	
		220--229	B, Y, P, C, 4 color flow	
		230--239	Color subsection by inflexion	
		240--255	White color	
CH7	Red Dimmer	000--255	Dimmer laser output power from 0% to 100%	

CH8	Green Dimmer	000--255	Dimmer laser output power from 0% to 100%
CH9	Blue Dimmer	000--255	Dimmer laser output power from 0% to 100%
CH10	X Position	000--255	Coarse, black in outside
CH11	X Position	000--255	Fine tuning
CH12	Y Position	000--255	Coarse, black in outside
CH13	Y Position	000--255	Fine tuning
CH14	Zoom	000--255	Adjust XY size
CH15	Size Y	000--255	Adjust Y size
CH16	Size X	000--255	Adjust X size
CH17	Rotation	000--255	0~360°rotation
CH18	Drawing	000--255	Drawing from 100% to 0%
CH19	X Move	000--001	No moving
		002--100	From left to right automatically move
		101--185	From right to left automatically move
		186-200	Left and right circulate move
		201--245	Left and right circulate jump
		246--255	Left and right circulate jump by sound active
CH20	Y Move	000--001	No moving
		002--100	From down to up automatically move
		101--185	From up to down automatically move
		186-200	Up and down circulate move
		201--245	Up and down circulate jump
		246--255	Up and down circulate jump by sound active
CH21	Zoom(+/-)	000--010	No change
		011--127	Adjust size by manual
		128--146	Zoom -
		147--148	Zoom +
		149-160	Fast zoom -
		161--255	Zoom (+/-) circulate
CH22	Rotation	000--002	No change
		003--128	Automatic counterclockwise rotation, speed up
		129--130	No change
		131--255	Automatic clockwise rotation, speed up

CH23	X Wave	000--010	No wave
		011--069	Small wave
		070--129	Medium wave
		130--189	Big wave
		190--255	Biggest wave
CH24	Y Wave	000--010	No wave
		011--069	Small wave
		070--129	Medium wave
		130--189	Big wave
		190--255	Biggest wave
CH25	Display Mode	000--063	Normal display
		064--127	Light dot display
		128--191	Segment display
		192--255	Dot display