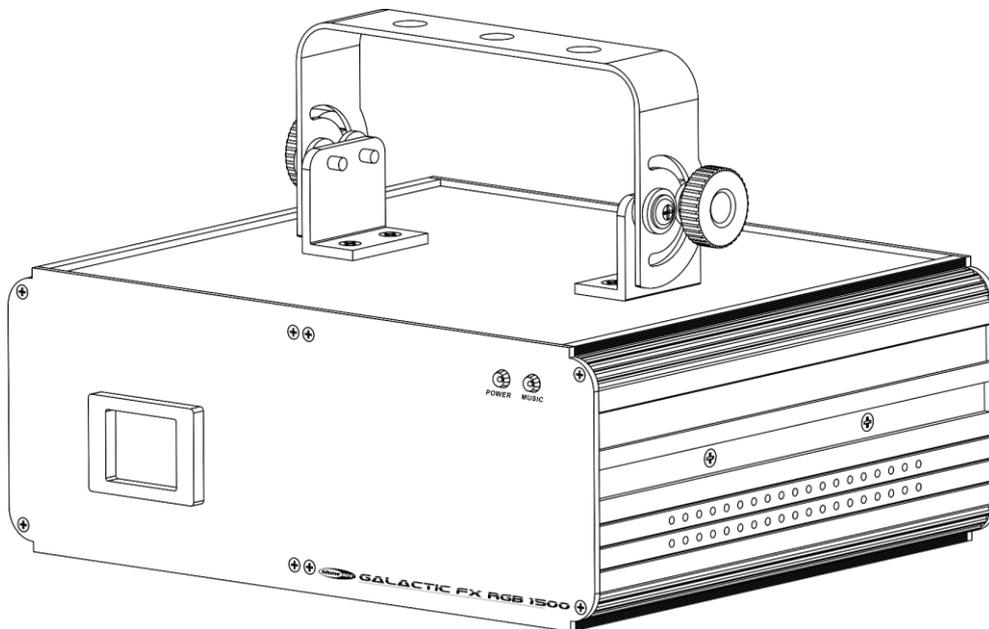# Showtec®

USER MANUAL

ENGLISH

Galactic FX RGB-1500　　　V1

Product code: 51341

Preface

Thank you for purchasing this Showtec product.

The purpose of this user manual is to provide instructions for the correct and safe use of this product.

Keep the user manual for future reference as it is an integral part of the product. The user manual shall be stored at an easily accessible location.

This user manual contains information concerning:

- Safety instructions
- Intended and non-intended use of the device
- Installation and operation of the device
- Maintenance procedures
- Troubleshooting
- Transport, storage and disposal of the device

Non-observance of the instructions in this user manual may result in serious injuries and damage of property.

Design and product specifications are subject to change without prior notice.

For the latest version of this document or other language versions, please visit our website www.highlite.com or contact us at service@highlite.com.

Table of contents

1. Introduction

1.1. Before Using the Product

> **Important**
> **Read and follow the instructions in this user manual before installing, operating or servicing this product.**

The manufacturer will not accept liability for any resulting damages caused by the non-observance of this manual.

After unpacking, check the contents of the box. If any parts are missing or damaged, contact your Highlite International dealer.

Your shipment includes:

- Showtec Galactic FX RGB-1500
- Schuko to IEC (C13) power cable – 1,5 m
- Remote interlock test connector
- 2 keys for key switch
- User manual
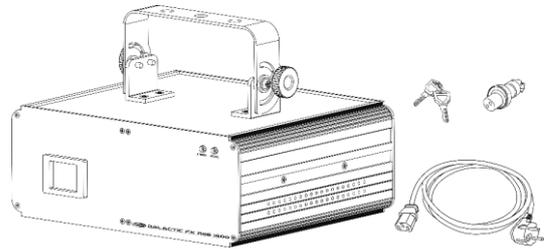
Fig. 01

1.2. Intended Use

This device is intended for professional use as a laser projector to produce laser displays and show effects. It is suitable only for indoor installation. This device is not suitable for households.

Any other use, not mentioned under intended use, is regarded as non-intended and incorrect use.

1.3. Product Lifespan

This device is not designed for permanent operation. Disconnect the device from the electrical power supply when the device is not in operation. This will reduce the wear and will improve the device's lifespan.

1.4. Text Conventions

Throughout the user manual the following text conventions are used:

- Buttons: All buttons are in bold lettering, for example "Press the **UP/DOWN** buttons"
- References: References to chapters and parts of the device are in bold lettering, for example: "Refer to **2. Safety**", "turn the **adjustment screw (02)**"
- 0–255:   Defines a range of values
- Notes: **Note:** (in bold lettering) is followed by useful information or tips

1.5. Acronyms and Abbreviations

3D	Three-dimensional	LED	Light-Emitting Diode
AC	Alternating Current	LSO	Laser Safety Officer
DMX	Digital multiplex	MPE	Maximum Permissible Exposure
EN	European Standard (*Europäische Norm*)	NEN	Dutch Standard (*Nederlandse Norm*)
IEC	International Electrical Committee	NOHD	Nominal Ocular Hazard Distance
ILDA	International Laser Display Association	XLR	External Line Return
IP	Ingress Protection		

1.6. Symbols and Signal Words

Safety notes and warnings are indicated throughout the user manual by safety signs.

Always follow the instructions provided in this user manual.

⚠️	**DANGER**	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠️	**WARNING**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠️	**CAUTION**	Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury.
❗	**Attention**	Indicates important information for the correct operation and use of the product.
👓	**Attention**	Indicates that eye protection must be used.
📖	**Important**	Read and observe the instructions in this document.
⚡	**Electrical hazard**	
☢️	**Laser beam hazard**	
🗑️		Provides important information about the disposal of this product.

1.7. Laser Hazard Labels

This device is a class 4 laser device and is provided with the following labels and hazard warnings. Refer to Fig. 02 for the position of the labels.

1 — DANGER
Avoid exposure – laser radiation is emitted from this aperture

2 — DANGER
Class 4 Laser according to EN/IEC 60825-1:2014
Avoid eye or skin exposure to direct or scattered radiation

3 — DANGER
Class 4 Laser when open
Avoid eye or skin exposure to direct or scattered radiation
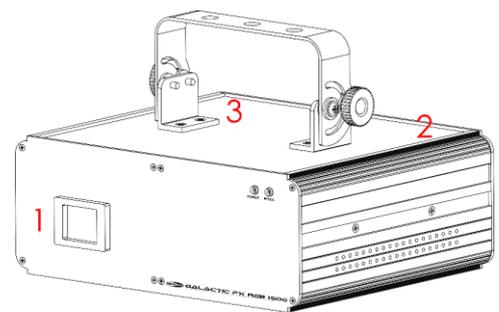
Fig. 02

1.8. Symbols on the Information Label

This product is provided with an information label. The information label is located at the backside of the device.

The information label contains the following symbols:

This device is designed for indoor use.

This device shall not be treated as household waste.

This device falls under IEC protection class I.

CAUTION: Risk of electric shock. Disconnect input power before opening.
WARNING: This unit must be earthed.

Warning: Laser beam

Read and follow the instructions in this user manual before installing, operating or servicing this product.

2.   Safety

> **Important**
> **Read and follow the instructions in this user manual before installing, operating or servicing this product.**

The manufacturer will not accept liability for any resulting damages caused by the non-observance of this manual.

2.1.   Warnings and Safety Instructions

> **DANGER**
> **Danger for children**

For adult use only. The device must be installed beyond the reach of children.

● Do not leave various parts of the packaging (plastic bags, polystyrene foam, nails, etc.) within children's reach. Packaging material is a potential source of danger for children.

> **DANGER**
> **Electric shock caused by dangerous voltage inside**

There are areas within the device where dangerous touch voltage may be present.

● Do not open the device or remove any covers.
● Do not operate the device if the covers or the housing is open. Before operation, check if the housing is firmly closed and all screws are tightly fastened.
● Disconnect the device from electrical power supply before service and maintenance, and when the device is not in use.

> **DANGER**
> **Electric shock caused by short-circuit**

This device falls under IEC protection class I.

● Make sure that the device is electrically connected to ground (earth). Connect the device only to a socket-outlet with ground (earth) connection.
● Do not cover the ground (earth) connection.
● Do not bypass the thermostatic switch or fuses.
● For replacement use fuses of the same type and rating only.
● Do not let the power cable come into contact with other cables. Handle the power cable and all connections with the mains with caution.
● Do not modify, bend, mechanically strain, put pressure on, pull or heat up the power cable.
● Make sure that the power cable is not crimped or damaged. Examine the power cable periodically for any defects.
● Do not immerse the device in water or other liquids. Do not install the device in a location where flooding may occur.
● Do not use the device during thunderstorms. Disconnect the device from the electrical power supply immediately.

> **WARNING**
> **Laser radiation**
> **Avoid eye or skin exposure to direct or scattered radiation.**

This device is a class 4 laser device according to the classification in NEN-EN-IEC 60825-1:2014. It emits visible radiation in the wavelength range 400–700 nm. Exposure to the direct or scattered laser beam can result in severe eye damage and serious skin injuries.

Check all applicable national and international regulations concerning laser safety before using this device. The user is responsible for the safety of all persons present during the use of the laser device.

- Do not look into the laser beam.
- Do not open the device and do not modify the device.
- Do not use the device if the housing or the optics are damaged.
- Do not point the laser beam at people or animals.
- Make sure that the beam is terminated on non-reflective and non-combustible surface.
- Do not point the laser beam at reflective surfaces such as windows, mirrors and shiny metal.
- Do not operate the device without supervision.

> **Attention**
> **Risk of fire**

Can instantly burn materials.

- Do not point the laser beam at flammable materials.

> **Attention**
> **Power supply**

- Before connecting the device to the power supply, make sure that the current, voltage and frequency match the input voltage, current and frequency specified on the information label on the device.
- Make sure that the cross-sectional area of the extension cords and power cables is sufficient for the required power consumption of the device.

> **Attention**
> **General safety**

- Do not insert objects into the air vents.
- Do not connect the device to a dimmer pack.
- Do not switch the device on and off in short intervals. This decreases the device's life.
- Do not shake the device. Avoid brute force when installing or operating the device.
- If the device is dropped or struck, disconnect the device from the electrical power supply immediately.
- If the device is exposed to extreme temperature variations (e.g. after transportation), do not switch it on immediately. Let the device reach room temperature before switching it on, otherwise it may be damaged by the formed condensation.
- If the device fails to work properly, discontinue the use immediately.

> ⓘ **Attention**
> **For professional use only**
> **This device shall be used only for the purposes it is designed for.**

This device is designed to be used as a professional laser projector. Any incorrect use may lead to hazardous situations and result in injuries and material damage.

- This device is not suitable for households.
- This device is not designed for permanent operation.
- This device does not contain user-serviceable parts. Unauthorized modifications to the device will render the warranty void. Such modifications may result in injuries and material damage.

> ⓘ **Attention**
> **Before each use, examine the device visually for any defects.**

Make sure that:

- All screws used for installing the device or parts of the device are tightly fastened and are not corroded.
- The safety devices are not damaged.
- There are no deformations on housings, fixations and installation points.
- The lens is not cracked or damaged.
- The power cables are not damaged and do not show any material fatigue.

> ⓘ **Attention**
> **Do not expose the device to conditions that exceed the rated IP class conditions.**

This device is IP20 rated. IP (Ingress Protection) 20 class provides protection against solid objects greater than 12 mm, such as fingers, and no protection against harmful ingress of water.

2.2. Requirements for the User

This product may be used only by instructed or skilled persons. Installation and maintenance can be carried out by instructed or skilled persons. Service shall be carried out only by skilled persons. Contact your Highlite International dealer for more information.

This product may not be used by ordinary persons. Users, operators and installers should have received sufficient training in laser safety to be able to accurately assure that the maximum permissible exposure (MPE) is not exceeded in spectator occupied areas and that the required separations are maintained between spectators and projections that exceed the MPE.

Instructed persons have been instructed and trained by a skilled person, or are supervised by a skilled person, for specific tasks and work activities associated with the operation, installation, service and maintenance of this product, so that they can identify risks and take precautions to avoid them.

Skilled persons have training or experience, which enables them to recognize risks and to avoid hazards associated with the operation, installation, service and maintenance of this product.

Ordinary persons are all persons other than instructed persons and skilled persons.

2.3. Laser Safety

> ⚠️ **CAUTION**
> **Use of controls or adjustments, or performance of procedures, other than those specified in this manual, may result in hazardous radiation exposure.**

Check all applicable national and international regulations concerning laser safety before using this device. In some countries, there may be specific requirements, such as government permissions or notifications of shows, or prohibitions, such as against laser scanning of spectators without appropriate safeguards.

Laser displays and shows, where class 3B and/or class 4 lasers are used, should be supervised by a laser safety officer (LSO). LSOs are trained to evaluate and control laser hazards and are responsible for overseeing the control of laser hazards. An LSO is recommended but not required for laser displays and shows, where only class 1, 1M, 2, 2M and/or 3R lasers are used.

During laser displays and shows the applicable eye and skin maximum permissible exposure (MPE) may not be exceeded. Under no circumstance should any person be exposed to laser radiation exceeding the applicable eye and skin MPE. MPE for spectators, ancillary personnel and performers is specified in IEC 60825-14, IEC 60825-3, and in the applicable local laser regulations.

Each time before operation of the device, make sure that:

- The beam is aligned and properly terminated
- All controls, including scan failure safeguards and emergency stop controls, are properly working
- Warning signs and barriers are in place as appropriate
- All components are securely mounted and locked into position

The device should be secured and protected against misalignment or maladjustment between alignment completion and the beginning of the laser display or show.

2.4. Safety Devices

This device is equipped with a key switch and a remote interlock connector. The key switch prevents that unauthorized and untrained persons can operate the device. If the key is removed, you cannot operate the device.

The remote interlock connector permits the connection of a remote interlock (not supplied). When you press the remote interlock, the laser radiation is terminated immediately. We recommend that you purchase a remote interlock. Check the local regulations, as in some countries it is not allowed to operate the device without a remote interlock.

For testing and programming purposes you may use the supplied test connector. If the test connector is not inserted into the remote interlock connector, you cannot operate the device.

2.5. Personal Protective Equipment

> **Attention**
> **Use laser protective eyewear during alignment and setup.**

Wearing of laser protective eyewear is necessary for Class 4 lasers. Make sure that you follow any applicable national and site-specific regulations.

During alignment and setup use protective eyewear that complies with the requirements of EN 208. In all other cases laser protective eyewear must be in compliance with EN 207.

3. Description of the Device

The Showtec Galactic FX RGB-1500 is a 3D laser projector for creating 3D laser shows. It is suitable only for indoor venues. It features 80 built-in patterns with color, clipping, zooming, X/Y/Z roll and X/Y move effects. The device is ILDA-compatible.

3.1. Front View
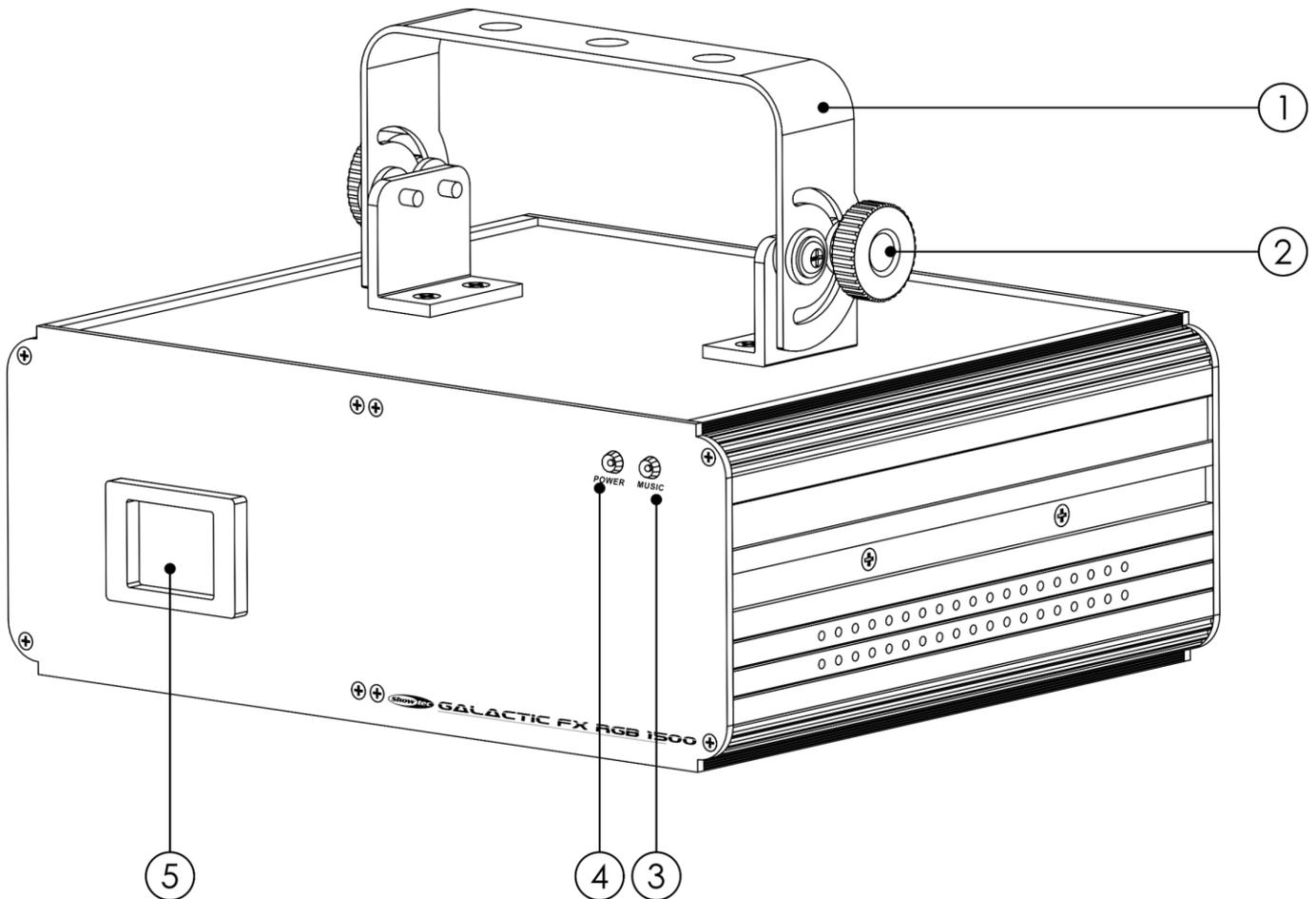
Fig. 03

01) Mounting bracket
02) 2 adjustment screws
03) Sound control LED indicator
04) Power LED indicator
05) Laser beam aperture

3.2. Back View
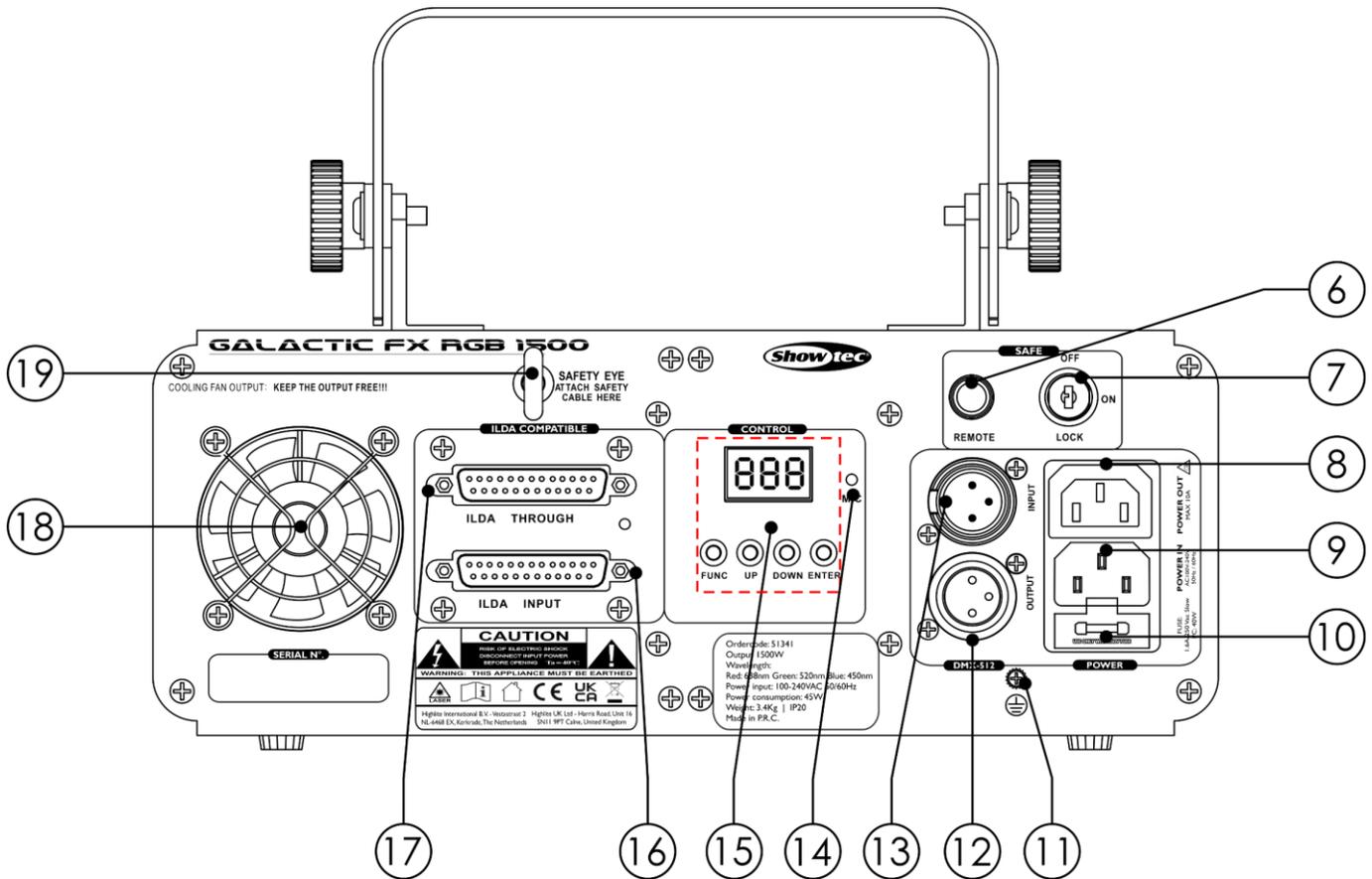
Fig. 04

06) Remote interlock connector
07) Key switch
08) IEC (C13) power connector OUT, 100–240 V, 50–60 Hz, max 10 A
09) IEC (C14) power connector IN, 100–240 V, 50–60 Hz
10) Fuse T1,6 A, 250 V AC slow
11) Ground (earth) connection
12) 3-pin DMX connector OUT
13) 3-pin DMX connector IN
14) Built-in microphone
15) Control panel: 3-digit 7-segment LED display and control buttons
16) ILDA-compatible DB-25 connector IN
17) ILDA-compatible DB-25 connector THROUGHPUT
18) Cooling fan
19) Safety eye

3.3. Product Specifications

Model:	Galactic FX RGB-1500

Electrical:	
Input voltage:	100–240 V AC, 50/60 Hz
Power consumption:	45 W
Fuse:	T1,6 A, 250 V AC slow

Physical:	
Dimensions:	290 x 266 x 205 mm (L x W x H) (without accessories)
Weight:	3,4 kg (without accessories)

Laser:	
Laser class:	4
Laser power:	638 nm = 410 mW (red)
	520 nm = 430 mW (green)
	450 nm = 950 mW (blue)
Laser modulation:	TTL
Beam diameter at aperture:	5 mm/638 nm, 5 mm/520 nm, 6 mm/450 nm
Beam divergence:	2 mrad
NOHD:	235 m (P total output power all beams = 1790 mW)
MPE:	25 W·m^{-2} for exposure duration of 0,25 s

Scanning system:	
Scanner speed:	20K
Scan angle:	20° (max)

Operation and control:	
Control:	Stand-alone (auto, sound-controlled)
	Master/Slave (auto, sound-controlled)
	DMX-512
DMX channels:	7 and 19 channels
	2 channels (with ILDA-compatible connection)
Control panel:	3-digit 7-segment LED display and control buttons

Connections:	
Power connections:	IEC (C14) power connector IN, 100–240 V, 50–60 Hz
	IEC (C13) power connector OUT, 100–240 V, 50–60 Hz, max 10 A
Data connections:	3-pin DMX connectors IN/OUT
	ILDA-compatible DB-25 connectors IN/THROUGHPUT

Construction:	
Housing:	Aluminum
Color:	Black
IP rating:	IP20
Cooling:	Cooling fan

Thermal:	
Maximum ambient temperature t$_a$:	40 °C
Minimum ambient temperature:	10 °C
Maximum housing temperature t$_c$:	60 °C

3.4. Dimensions

205 mm

111 mm

290 mm

35 mm

240 mm

266 mm
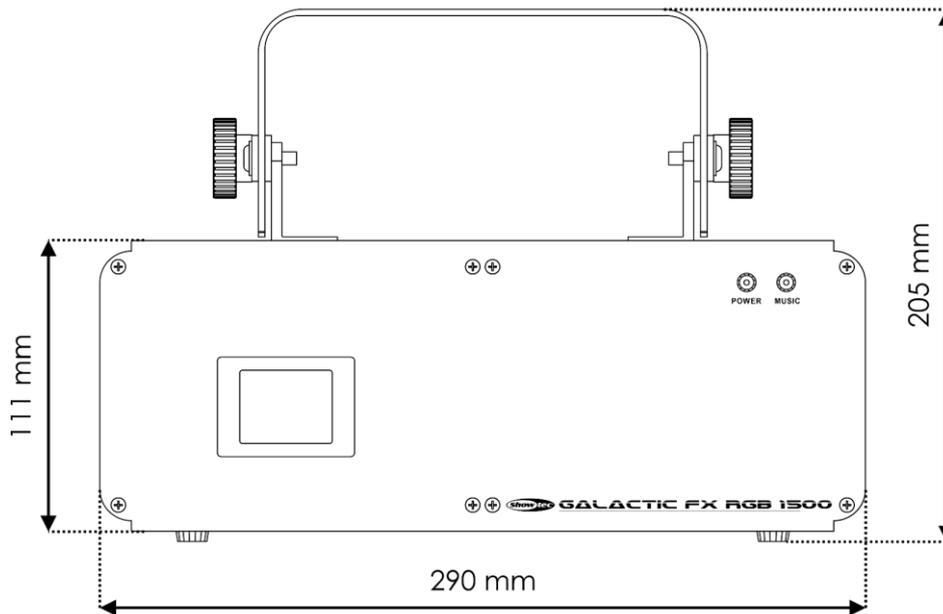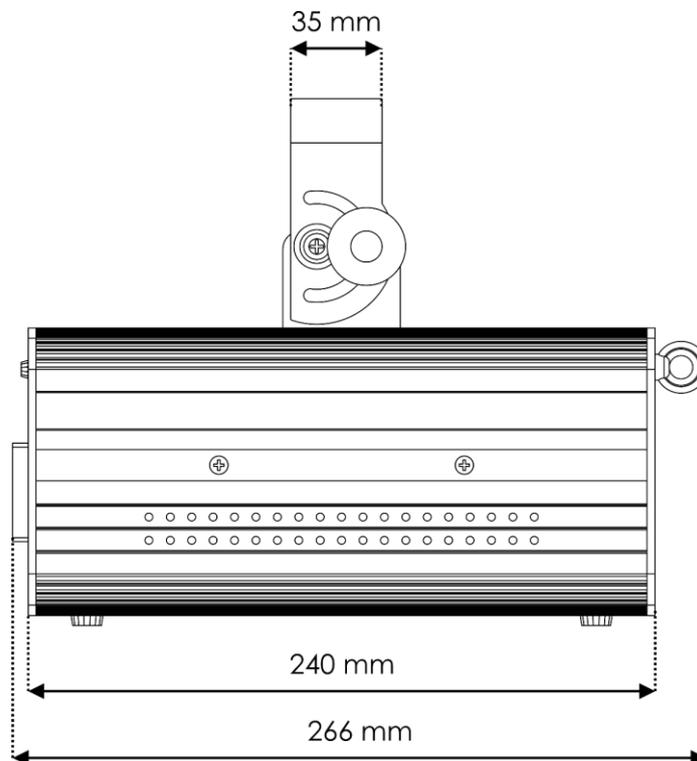
4. Installation

4.1. Safety Instructions for Installation

⚠	**WARNING** **Incorrect installation can cause serious injuries and damage of property.**

If trussing systems are used, installation must be carried out only by instructed or skilled persons.

- Make sure that the device is rigidly mounted to prevent movement due to vibration or jarring.
- Follow all applicable European, national and local safety regulations concerning rigging and trussing.

The device should be installed in such a way that there is at least 3 m distance in height and 2,5 m laterally between the laser beam that exceeds the spectator MPE and the surface where spectators are expected to stand.

This zone may exceed spectator MPE under operator supervision

Audience < spectator MPE

2,5 m   3 m   2,5 m

Barrier   Barrier
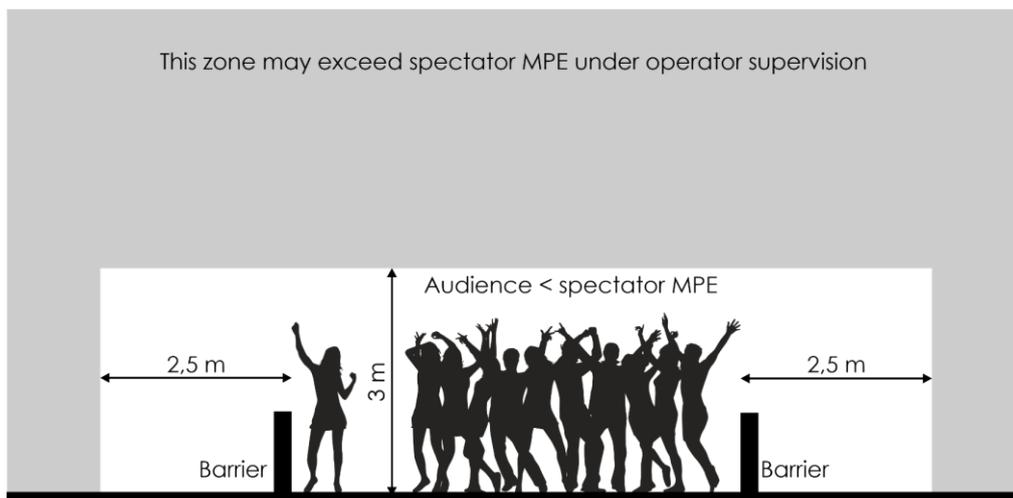
Fig. 07

If the laser display or show is not under the continuous control of an operator who can immediately terminate laser radiation in the event of a problem, the MPE shall not exceed 5 times the spectator MPE in the space between 3 m and 6 m above the surface where spectators are expected to stand.

This zone may exceed 5 x spectator MPE

Audience < 5 x spectator MPE

6 m minimum height above floor

Audience < spectator MPE

2,5 m   3 m   2,5 m

Barrier   Barrier
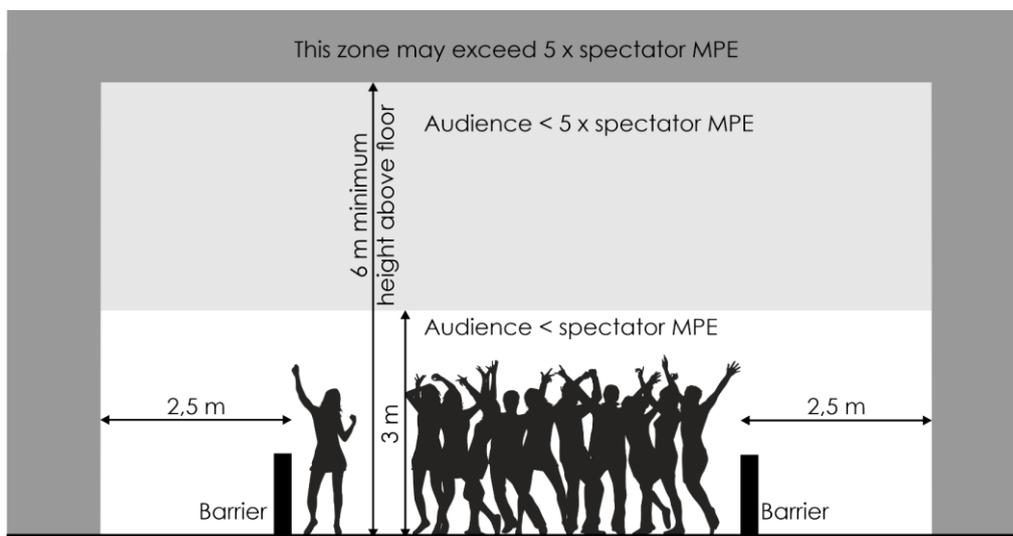
Fig. 08

4.2. Personal Protective Equipment

During installation and rigging wear personal protective equipment in compliance with the national and site-specific regulations.

4.3. Installation Site Requirements

- The device can be used only indoors.
- The minimum distance to other objects must be bigger than 0,5 m.
- The maximum ambient temperature t_a = 40 °C and the minimum ambient temperature t = 10 °C must never be exceeded.
- The relative humidity must not exceed 50 % with an ambient temperature of 40 °C.

4.4. Rigging

The device can be positioned on a flat surface or mounted to a truss or other rigging structure. Make sure that all loads are within the pre-determined limits of the supporting structure.

⚠	**CAUTION** **Restrict the access under the work area during rigging and/or derigging.**

To mount the device, follow the steps below:

01) Use a clamp to attach the device to the supporting structure, as shown in Fig. 09. Make sure that the device cannot move freely.
02) Secure the device with a secondary suspension, for example a safety cable. Make sure that the secondary suspension can hold 10 times the weight of the device. If possible, the secondary suspension should be attached to a supporting structure independent of the primary suspension. Put the safety cable through the **safety eye (19)**, as shown in Fig. 09.
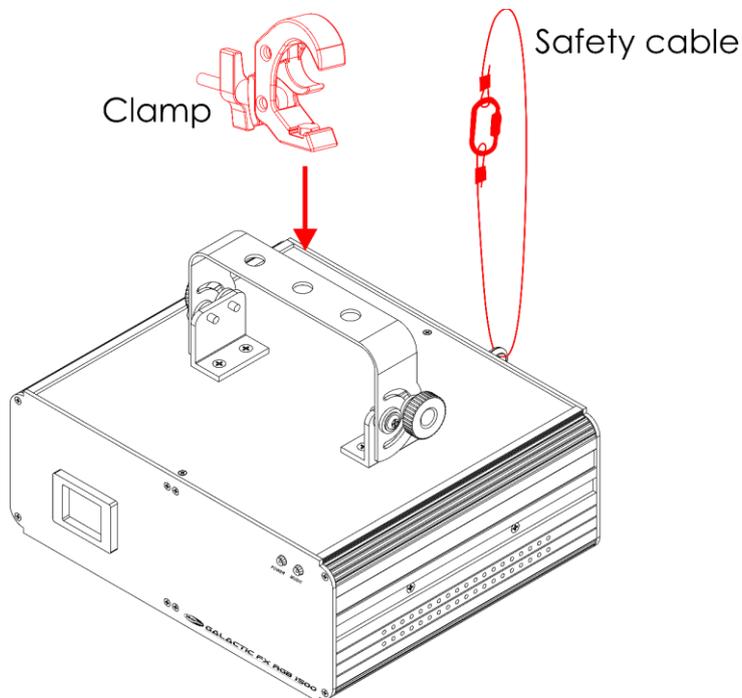
Fig. 09

4.4.1. Angle Adjustment

You can adjust the angle of the device with the **adjustment screws (02)**.

01) Turn the **adjustment screws (02)** counterclockwise to release them.
02) Tilt the device at the desired angle (see Fig. 10).
03) Turn the **adjustment screws (02)** clockwise to tighten them. Make sure that the device cannot move freely after the **adjustment screws (02)** are tightened.
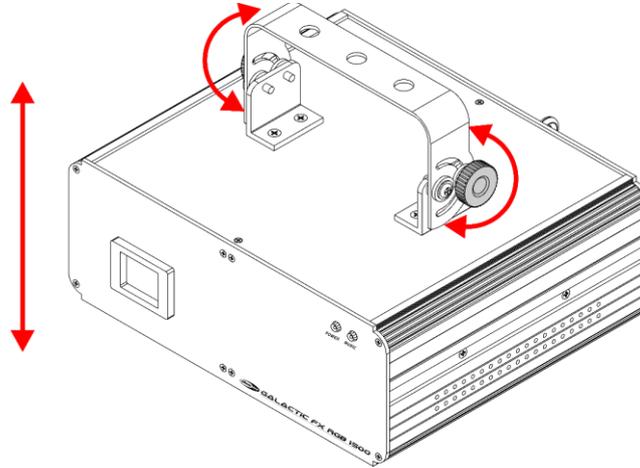
Fig. 10

4.5. Connecting to Power Supply

⚡	**DANGER** **Electric shock caused by short-circuit**

The device accepts AC mains power at 100–240 V and 50/60 Hz. Do not supply power at any other voltage or frequency to the device.

This device falls under IEC protection class I. Make sure that the device is always electrically connected to the ground (earth).

Before connecting the device to the socket-outlet:
- Make sure that the power supply matches the input voltage specified on the information label on the device.
- Make sure that the socket-outlet has ground (earth) connection.

Connect the device to the socket-outlet with the power plug. Do not connect the device to a dimmer circuit, as this may damage the device.

Make sure that the socket-outlet is easily accessible.

5. Setup

5.1. Warnings and Precautions

	WARNING **Laser radiation** **Avoid eye or skin exposure to direct or scattered radiation.**

	Attention **Use laser protective eyewear during alignment and setup.**

During alignment and setup the access of unauthorized persons to the area, where the laser radiation exceeds the spectator MPE, must be restricted. The temporary laser controlled area must be marked accordingly.

Follow all applicable national and site-specific regulations regarding laser safety.

5.2. Stand-alone Setup

When the Galactic FX RGB-1500 is not connected to a controller or to other devices, it functions as a stand-alone device. It can be operated manually with the control panel.

5.3. DMX Connection

	Attention **Connect all data cables before supplying power.** **Disconnect power supply before connecting or disconnecting data cables.**

5.3.1. DMX-512 Protocol

You need a DMX serial data link to run light shows of one or more devices using a DMX-512 controller or to run synchronized shows of two or more devices set in a master/slave operating mode.

The Galactic FX RGB–1500 has 3-pin DMX signal IN and OUT connectors.

The pin assignment is as follows:
- 3-pin: pin 1 (ground), pin 2 (-), pin 3 (+)

Devices on a serial data link must be daisy-chained in a single line. The number of devices that you can control on one data link is limited by the combined number of the DMX channels of the connected devices and the 512 channels available in one DMX universe.

To comply with the TIA-485 standard, no more than 32 devices should be connected on one data link. In order to connect more than 32 devices on one data link, you must use a DMX optically isolated splitter/booster, otherwise this may result in deterioration of the DMX signal.

Note:
- Maximum recommended DMX data link distance: 300 m
- Maximum recommended number of devices on a DMX data link: 32 devices

5.3.2. DMX Cables

Shielded twisted-pair cables with 3-pin XLR connectors must be used for reliable DMX connection. You can purchase DMX cables directly from your Highlite International dealer or make your own cables.

If you use XLR audio cables for DMX data transmission, this may lead to signal degradation and unreliable operation of the DMX network.

When you make your own DMX cables, make sure that you connect the pins and wires correctly as shown in Fig. 11.

Pin 1: GND (screen)
Pin 2: Signal (-)
Pin 3: Signal (+)
Pin 4: N/C
Pin 5: N/C

Pin 1: GND (screen)
Pin 2: Signal (-)
Pin 3: Signal (+)

Pin 1: GND (screen)
Pin 2: Signal (-)
Pin 3: Signal (+)

Pin 1: GND (screen)
Pin 2: Signal (-)
Pin 3: Signal (+)
Pin 4: N/C
Pin 5: N/C
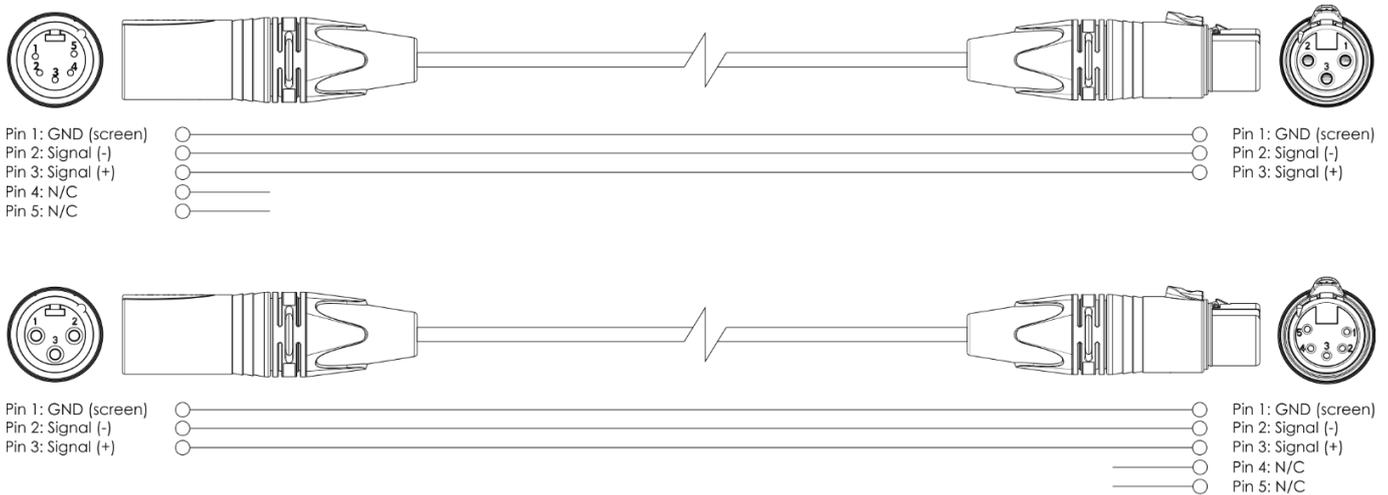
Fig. 11

5.3.3. Master/Slave Setup

The Galactic FX RGB–1500 supports master/slave control mode. To connect multiple devices in a master/slave setup, follow the steps below:

01) Connect the first device's DMX OUT connector to the second device's DMX IN connector with a 3-pin DMX cable.
02) Repeat step 1 to connect all devices as shown in Fig. 12.
03) Connect a DMX terminator (120 Ω resistor) to the DMX OUT connector of the last device in the setup.
04) The first device on the data link will be automatically recognized as a master device. Set the remaining devices as slave devices. See **6.6.4. Slave Mode** on page 26 for more information.
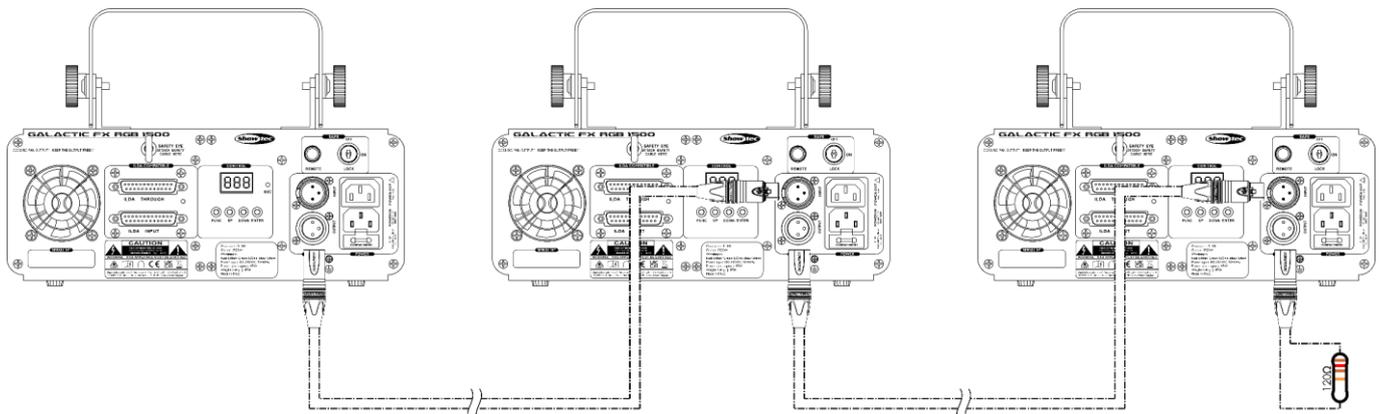
Fig. 12

5.3.4. DMX Linking

To connect multiple devices on one DMX data link, follow the steps below:

01) Use a 3-pin DMX cable to connect the DMX OUT connector of the lighting controller to the DMX IN connector of the first device.
02) Connect the first device's DMX OUT connector to the second device's DMX IN connector with a 3-pin DMX cable.
03) Repeat step 2 to connect all devices in a daisy-chain as shown in Fig. 13.
04) Connect a DMX terminator (120 Ω resistor) to the DMX OUT connector of the last device on the data link.
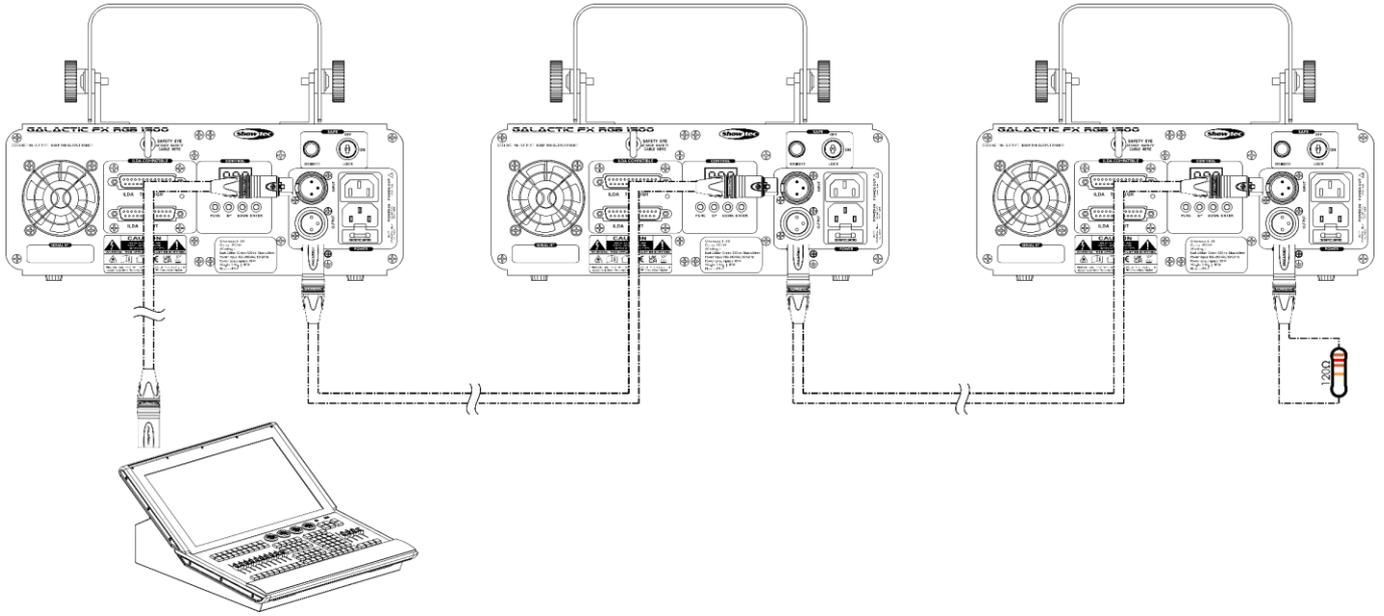
Fig. 13

5.3.5. DMX Addressing

In a setup with multiple devices, make sure that you set the DMX starting address of each device correctly. The Galactic FX RGB–1500 has 2 personalities: basic (7 channels) and advanced (19 channels).

If you want to connect multiple devices on one data link and use them in 19-channel mode, for example, follow the steps below:

01) Set the starting address of the 1st device on the data link to 1 (001).
02) Set the starting address of the 2nd device on the data link to 20 (020), as 1 + 19 = 20.
03) Set the starting address of the 3rd device on the data link to 39 (039), as 20 + 19 = 39.
04) Continue assigning the starting addresses of the remaining devices by adding each time 19 to the previous number.

Make sure that you do not have any overlapping channels in order to control each Galactic FX RGB–1500 correctly. If two or more devices are addressed similarly, they will work similarly.

Show tec

5.4. ILDA-compatible Connection

> **Attention**
> **Connect all data cables before supplying power.**
> **Disconnect power supply before connecting or disconnecting data cables.**

The Galactic FX RGB–1500 has DB-25 INPUT and THROUGHPUT connectors which are ILDA-compatible. You can connect the device to an ILDA-controller. The pinouts of the DB-25 connectors are as follows:

Fig. 14
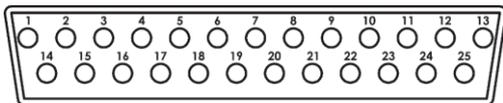
Pin	Signal	Pin	Signal
1	X+	14	X-
2	Y+	15	Y-
3	Intensity+	16	Intensity-
4	Interlock A	17	Interlock B
5	R+	18	R-
6	G+	19	G-
7	B+	20	B-
8	User-defined signal 1+	21	User-defined signal 1-
9	User-defined signal 2+	22	User-defined signal 2-
10	User-defined signal 3+	23	User-defined signal 3-
11	User-defined signal 4+	24	User-defined signal 4-
12	Projector return signal	25	Ground
13	Shutter		

5.4.1. DB-25 Linking

To connect multiple devices with the DB-25 connectors, follow the steps below:

01) Use an ILDA-compatible DB-25 cable to connect the laser controller to the DB-25 INPUT connector of the first device.
02) Use an ILDA-compatible DB-25 cable to connect the DB-25 THROUGHPUT connector of the first device to the DB-25 input connector of the second device.
03) Repeat step 2 to connect all devices in a daisy-chain as shown in Fig. 15. The devices recognize automatically the ILDA connection and can be operated with ILDA-compatible software.

Notes:

- If you want to connect the device to a computer, you will need a digital-to-analog converter.
- If you want to control the connected devices individually, you will need to connect an ILDA controller to each device on the serial link.
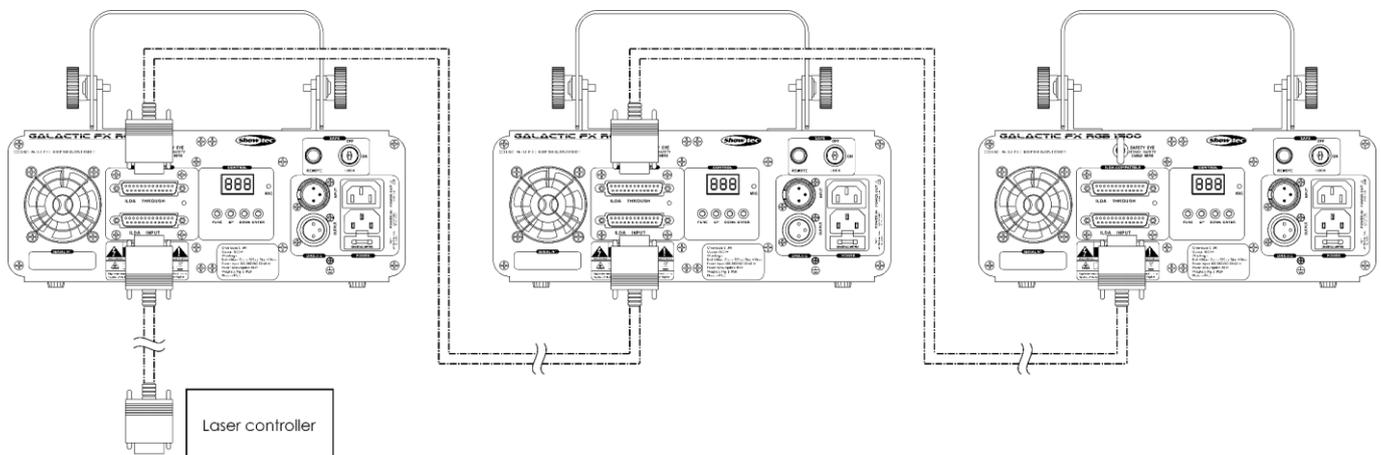
Fig. 15

6.   Operation

6.1.   Safety Instructions for Operation

> **WARNING**
> **Laser radiation**
> **Avoid eye or skin exposure to direct or scattered radiation.**

This device is a class 4 laser device according to the classification in NEN-EN-IEC 60825-1:2014. It emits visible radiation in the wavelength range 400–700 nm. Exposure to the direct or scattered laser beam can result in severe eye damage and serious skin injuries.

Check all applicable national and international regulations concerning laser safety before operating this device.

> **Attention**
> **This device must be used only for the purposes it is designed for.**

This device is intended for professional use as a laser projector to produce laser displays or show effects. It is suitable only for indoor installation. This device is not suitable for households.

Any other use, not mentioned under intended use, is regarded as non-intended and incorrect use.

> **Attention**
> **Power supply**

Before connecting the device to the power supply, make sure that the current, voltage and frequency match the input voltage, current and frequency specified on the information label on the device.

6.2.   Control Modes

The Galactic FX RGB–1500 supports the following control modes:
- Stand-alone: Auto mode (built-in shows), sound-controlled mode (built-in shows)
- Master/Slave: Auto mode (built-in shows), sound-controlled mode (built-in shows)
- DMX-512:   7 and 19 channels
- ILDA-mode

6.3. Starting the Device

01) Make sure that all laser safety measures are in place and working. See **2.3. Laser Safety** on page 10 for more information.
02) Connect all data cables, if applicable. See **5.3. DMX Connection** on pages 18–20 and **5.4. ILDA-compatible Connection** on page 21 for more information.
03) Connect the remote interlock (or emergency switch) to the **remote interlock connector (06)**. See **2.4. Safety Devices** on page 10 for more information. For programming purposes you may use the supplied test connector.

Notes:

● If the test connector is not inserted into the remote interlock connector, you cannot operate the device. The device will power up, but it will not produce a laser beam.
● The remote interlock is not supplied. You can purchase a remote interlock from your Highlite International dealer.

04) Connect the device to the socket-outlet with the power plug. See. **4.5. Connecting to Power Supply** on page 17 from more information. The device is powered. The **power LED indicator (04)** turns on. The display shows a splash screen with the current version of the firmware:

05) Insert the key into the **key switch (07)**. The device is now operational.
06) Turn the **key switch (07)** into ON position to turn on the laser beam. See **2.4. Safety Devices** on page 10 for more information.

6.4. Control Panel
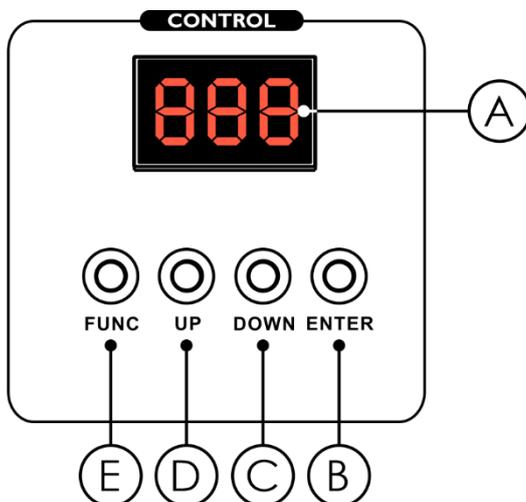
A) 3-digit 7-segment LED display
B) ENTER button
C) DOWN button
D) UP button
E) FUNC (FUNCTION) button

Fig. 16

● Use the **FUNC** button to exit the current submenu, to return to the main menu and to navigate through the main menu.
● Use the **UP/DOWN** buttons to navigate through the submenus.
● Use the **ENTER** button to confirm your choice or to set the currently selected value.

6.5. Menu Overview
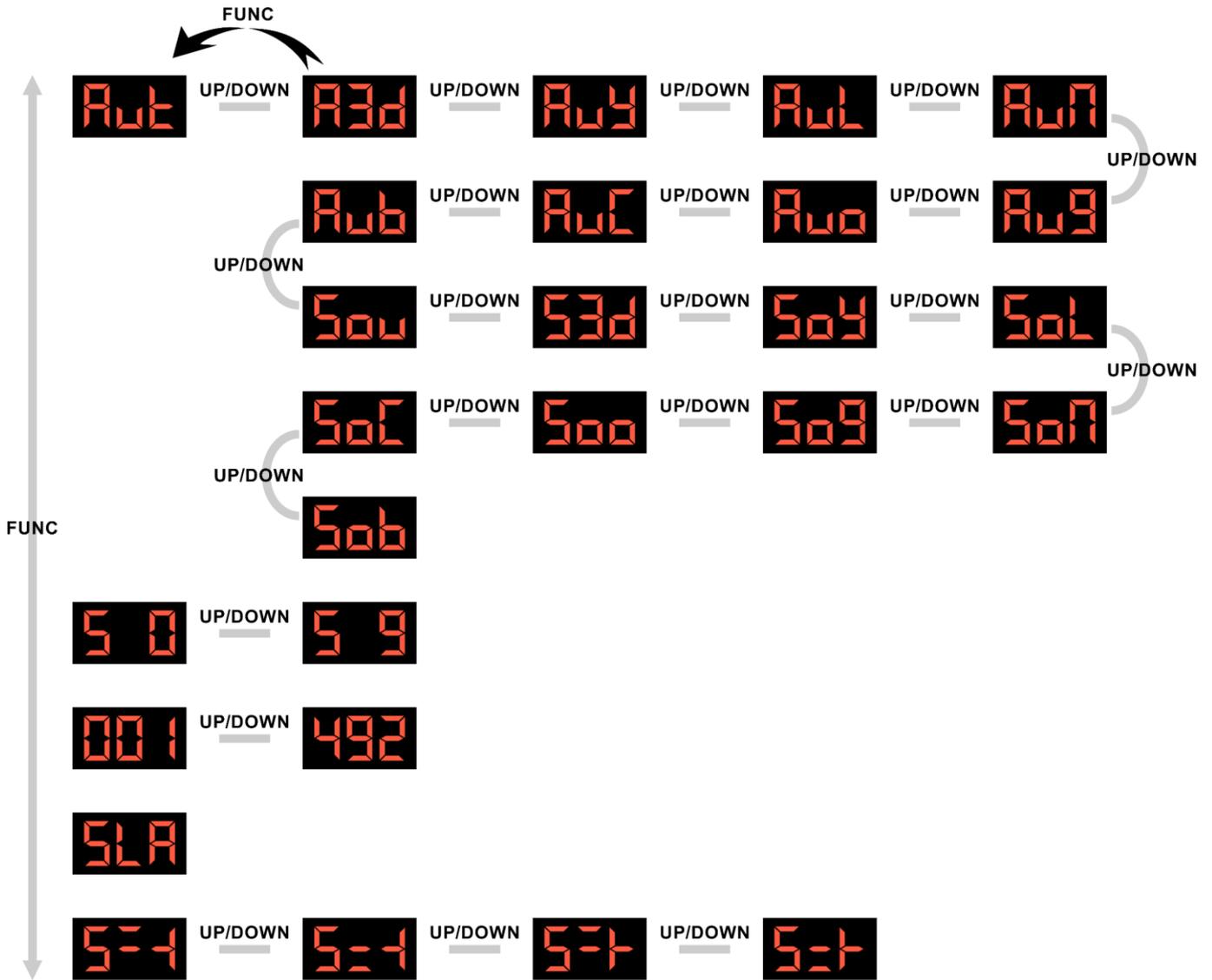
6.6. Main Menu Options

From the main menu you can access the following submenus:

Aut	1. Auto programs
S 0	2. Microphone sensitivity
001	3. DMX address
SLA	4. Slave mode
S=4	5. Mirroring

6.6.1. Built-in Shows

In this menu you can play the built-in shows in auto mode and in sound-controlled mode.

01) Press the **UP/DOWN** buttons to select one of the built-in shows.

Auto mode	Sound-controlled mode		Description
Aut	**Sou**	AUT/SOU	All 8 built-in shows
A3d	**S3d**	A3D/S3D	3D show
AuY	**SoY**	AUY/SOY	2D grating show
AuL	**SoL**	AUL/SOL	Lumia show
AuM	**SoM**	AUM/SOM	Falling star show
Au9	**So9**	AUQ/SOQ	Colorful wheel show
Auo	**Soo**	AUO/SOO	Universe nebula show
AuC	**SoC**	AUC/SOC	Spring show
Aub	**Sob**	AUB/SOB	Light beam show

02) Press the **ENTER** button to confirm the selection and play the show.

Note:

When you select a show in sound-controlled mode, the **sound control LED indicator (03)** turns on.

6.6.2. Microphone Sensitivity

In this menu you can adjust the sensitivity level of the built-in microphone.

01) Press the **UP/DOWN** buttons to adjust the microphone sensitivity. The adjustment range is 0–9, from receiving no sound to high level of sensitivity.
02) Press the **ENTER** button to confirm the selection.

6.6.3. DMX Address

In this menu you can enable DMX control mode and set the DMX starting address of the device.

01) Press the **UP/DOWN** buttons to select the DMX starting address. The selection range is 001–492.
02) Press the **ENTER** button to confirm the selection.

Notes:

- If you exit DMX mode, the DMX connection will be discontinued and the device will not react to the DMX controller.
- If there is no DMX connection, the display is blinking.

6.6.4. Slave Mode

In this menu you can set the device as a slave device in master/slave control mode.

Press the **ENTER** button to set the device as a slave device.

6.6.5. Mirror Effect

In this menu you can mirror the projection along the X and Y axes.

01) Press the **UP/DOWN** buttons to select one of the following options:

    Horizontal mirror effect

    Normal view

    Horizontal and vertical mirror effect

    Vertical mirror effect

02) Press the **ENTER** button to confirm the selection.

6.7. DMX Channels

The device has basic DMX mode with 7 channels and advanced DMX mode with 19 channels. In CH 1 you can select the operating mode of the device:

- Set CH 1 in the range 235–244 to select basic DMX mode (7 channels)
- set CH 1 in the range 245–255 to select advanced DMX mode (19 channels)

Depending on the selection made in CH 1, the rest of the channels have different functions.

CH	Function	Value	Setting	
1	**Mode Selection**	000–018	No laser output	
		019–030	All 8 built-in shows	(auto mode)
		031–042	3D show	(auto mode)
		043–054	2D grating show	(auto mode)
		055–066	Lumia show	(auto mode)
		067–078	Falling star show	(auto mode)
		079–090	Colorful wheel show	(auto mode)
		091–102	Universe nebula show	(auto mode)
		103–114	Spring show	(auto mode)
		115–126	Light beam show	(auto mode)
		127–138	All 8 built-in shows	(sound-controlled mode)
		139–150	3D show	(sound-controlled mode)
		151–162	2D grating show	(sound-controlled mode)
		163–174	Lumia show	(sound-controlled mode)
		175–186	Falling star show	(sound-controlled mode)
		187–198	Colorful wheel show	(sound-controlled mode)
		199–210	Universe nebula show	(sound-controlled mode)
		211–222	Spring show	(sound-controlled mode)
		223–234	Light beam show	(sound-controlled mode)
		235–244	Basic DMX mode (7 channels)	
		245–255	Advanced DMX mode (19 channels)	

6.7.1. Basic DMX Mode (7 channels)

Set CH 1 between 235 and 244 to select basic DMX mode.

CH	Function	Value	Setting
2	**Revolving Effect**	000–004	Static projection
		005–127	Clockwise revolving
		128–133	Static projection
		134–255	Counterclockwise revolving
3	**Color**	000–007	Built-in colors
		008–015	Red
		016–023	Green
		024–031	Yellow (Red + Green)
		032–039	Blue
		040–047	Magenta (Red + Blue)
		048–055	Cyan (Green + Blue)
		056–063	White (Red + Green + Blue)
		064–111	Single color switch (color rolling)
		112–159	Horizontal color movement from right to left (color jumping)
		160–207	Vertical color movement from top to bottom (color moving)
		208–255	Strobe effect, from low to high frequency

CH	Function	Value	Setting
4	X Movement	000–127	128 fixed positions on the X axis
		128–191	Continuous horizontal movement, from left to right
		192–255	Continuous horizontal movement, from right to left
5	X Movement Speed	000–255	Speed adjustment, from fast to slow
6	Y Movement	000–127	128 fixed positions on the Y axis
		128–191	Continuous vertical movement, up–down
		192–255	Continuous vertical movement, down–up
7	Y Movement Speed	000–255	Speed adjustment, from fast to slow

6.7.2. Advanced DMX Mode (19 channels)

Set CH 1 between 245 and 255 to select advanced DMX mode.

CH	Function	Value	Setting
2	Pattern Group Selection	000–051	Patterns from group 1
		052–103	Patterns from group 2
		104–155	Patterns from group 3
		156–207	Patterns from group 4
		208–255	Patterns from group 5
3	Pattern Selection	000–255	One pattern per 16 values – 80 patterns in total for all 5 groups (see **6.7.4. Pattern Selection Chart** on page 30)
4	Grating Effects	000–031	3D effect
		032–063	2D grating effect
		064–095	Lumia effect
		096–127	Falling star effect
		128–159	Colorful wheel effect
		160–191	Universe nebula effect
		192–223	Spring effect
		224–255	Light beam and animation effect
5	Revolving Effect	000–004	Static projection
		005–127	Clockwise revolving
		128–133	Static projection
		134–255	Counterclockwise revolving
6	Color	000–007	Built-in colors
		008–015	Red
		016–023	Green
		024–031	Red + Green (Yellow)
		032–039	Blue
		040–047	Red + Blue (Magenta)
		048–055	Green + Blue (Cyan)
		056–063	Red + Green + Blue (White)
		064–111	Single color switch (color rolling)
		112–159	Horizontal color movement from right to left (color jumping)
		160–207	Vertical color movement from top to bottom (color moving)
		208–255	Strobe effect, from low to high frequency
7	Drawing Effect	000	Off (complete pattern)
		001–127	Fixed clipping, 100–0 %
		128–255	Continuous clipping, 0–100 %, from slow to fast
8	Zoom Effect	000–127	Fixed zooming, 100–5 %
		128–169	Zoom in
		170–209	Zoom out
		210–255	Alternating zoom in and zoom out

CH	Function	Value	Setting
9	**Zoom Speed**	000–255	Speed adjustment, from fast to slow
10	**Y Rotation**	000–127	Fixed rotating 0–359°
		128–191	Continuous clockwise rotation
		192–255	Continuous counterclockwise rotation
11	**Y Rotation Speed**	000–255	Speed adjustment, from fast to slow
12	**X Rotation**	000–127	Fixed rotating 0–359°
		128–191	Continuous clockwise rotation
		192–255	Continuous counterclockwise rotation
13	**X Rotation Speed**	000–255	Speed adjustment, from fast to slow
14	**Z Rotation**	000–127	Fixed rotating 0–359°
		128–191	Continuous clockwise rotation
		192–255	Continuous counterclockwise rotation
15	**Z Rotation Speed**	000–255	Speed adjustment, from fast to slow
16	**X Movement**	000–127	128 fixed positions on the X axis
		128–191	Horizontal movement, from left to right
		192–255	Horizontal movement, from right to left
17	**X Movement Speed**	000–255	Speed adjustment, from fast to slow
18	**Y Movement**	000–127	128 fixed positions on the Y axis
		128–191	Vertical movement, up–down
		192–255	Vertical movement, down–up
19	**Y Movement Speed**	000–255	Speed adjustment, from fast to slow

6.7.3. DMX Channels with ILDA-compatible Connection (2 channels)

The device is ILDA compatible. When you connect the device to an ILDA-compatible controller, you can control the grating effects via DMX.

The device has 2 DMX channels when connected to an ILDA-compatible controller.

CH	Function	Value	Setting
1	**Revolving Effect**	000–004	Static projection
		005–127	Clockwise revolving
		128–133	Static projection
		134–255	Counterclockwise revolving
2	**Grating Selection**	000–031	3D effect
		032–063	Light beam and animation effect
		064–095	Lumia effect
		096–127	Light beam and animation effect
		128–159	2D grating
		160–191	Light beam and animation effect
		192–223	Universe nebula effect
		224–255	Light beam and animation effect

6.7.4. Pattern Selection Chart

To select a pattern in advanced DMX mode (19 channels), follow the steps below:

01) Set CH 1 in the range 245–255 to select advanced DMX mode.
02) Set CH 2 in one of the 5 group ranges, for example in the range 052–130 to select Group 2. See Fig. 17 on page 30 for more information.
03) Set CH 3 in the range 096–111. The following pattern is projected:

Channel 2 / Channel 3	Group 1 000–051	Group 2 052–103	Group 3 104–155	Group 4 156–207	Group 5 208–255
000–015					
016–031					
032–47					
048–063					
064–079					
080–095					
096–111					
112–127					
128–143					
144–159					
160–175					
176–191					
192–207					
208–223					
224–239					
240–255					

Fig. 17

7. Troubleshooting

This troubleshooting guide contains actions which can be carried out by the user. The device does not contain user-serviceable parts.

Unauthorized modifications to the device will render the warranty void. Such modifications may result in injuries and material damage.

Refer servicing to instructed or skilled persons. Contact your Highlite International dealer in case the solution is not described in the table.

Problem	Probable cause(s)	Solution
The device does not power up	No power to the device	● Check if power is switched on and cables are plugged in
	Main fuse is blown	● Replace the fuse. See **8.3.1. Replacing the Fuse** on page 33
The device does not produce a laser projection	The key switch is not in ON position	● Insert the key switch and turn it in ON position. See **2.4. Safety Devices** on page 10
	The remote interlock or the test connector is not connected	● Connect the remote interlock or the test connector. See **2.4. Safety Devices** on page 10
The device does not respond to DMX control	The controller is not connected	● Connect the controller
	The device is not in DMX mode	● Activate DMX mode from the main menu
	The signal is reversed. The 3-pin DMX OUT of the controller does not match the DMX IN of the device	● Install a phase-reversing cable between the controller and the device
	The controller is defective	● Try using another controller
The device responds erratically to DMX control	Bad data link connection	● Examine connections and cables. Correct poor connections. Repair or replace damaged cables
	The data link is not terminated with a 120 Ω termination plug	● Insert a termination plug in the DMX OUT connector of the last device on the link
	Incorrect addressing	● Check address settings and correct, if necessary
	In case of a setup with multiple devices, one of the devices is defective and disturbs data transmission on the link	● To find out which is the defective device, bypass one device at a time until normal operation is restored

8. Maintenance

8.1. Safety Instructions for Maintenance

> **DANGER**
> **Electric shock caused by dangerous voltage inside**

Disconnect power supply before servicing or cleaning.

> **WARNING**
> **Laser radiation**
> **Avoid exposure to beam.**

This device is a class 4 laser device according to the classification in NEN-EN-IEC 60825-1:2014.

Maintenance can be carried out by instructed or skilled persons. Service shall be carried out only by skilled persons. Contact your Highlite International dealer for more information.

8.2. Preventive Maintenance

> **Attention**
> **Before each use, examine the device visually for any defects.**

Make sure that:

● All screws used for installing the device or parts of the device are tightly fastened and are not corroded.
● The safety devices are not damaged.
● There are no deformations on housings, fixations and installation points.
● The lens is not cracked or damaged.
● The power cables are not damaged and do not show any material fatigue.

8.2.1. Basic Cleaning Instructions

> **WARNING**
> **Laser radiation**
> **Avoid exposure to beam**

To avoid laser emission, remove the key before cleaning the device.

The external lens of the device must be cleaned periodically in order to optimize the laser output. The cleaning schedule depends on the conditions at the site where the device is installed. When smoke or fog machines are used at the site, the device will need more frequent cleaning. On the other hand, if the device is installed in well-ventilated area, it will need less frequent cleaning. To establish a cleaning schedule, examine the device at regular intervals during the first 100 hours of operation.

To clean the device, follow the steps below:

01) Disconnect the device from the electrical power supply.
02) Allow the device to cool down for at least 15 minutes.
03) Remove the dust collected on the external surface with dry compressed air and a soft brush.
04) Clean the lens with a damp cloth. Use a mild detergent solution.

05) Dry the lens carefully with a lint-free cloth.
06) Clean the DMX and other connections with a damp cloth.

> **Attention**

- Do not immerse the device in liquid.
- Do not use alcohol or solvents.
- Make sure that the connections are fully dry before connecting the device to the power supply and to other devices.

8.3. Corrective Maintenance

The device does not contain user-serviceable parts. Do not open the device and do not modify the device.

Refer repairs and servicing to skilled persons. Contact your Highlite International dealer for more information.

8.3.1. Replacing the Fuse

> **DANGER**
> **Electric shock caused by short-circuit**

- Do not bypass the thermostatic switch or fuses.
- For replacement use fuses of the same type and rating only.

Power surges, short-circuit or incorrect electrical power supply may cause a fuse to burn out. If the fuse burns out, the device will not function anymore. If this happens, follow the steps below.

01) Disconnect the device from the electrical power supply.
02) Allow the device to cool down for at least 15 minutes.
03) Pry up the integrated fuse holder with a flat-blade screwdriver.
04) If the fuse is brown or unclear, it is burned out. Remove the old fuse.
05) Insert a new fuse in the fuse holder. Make sure that the type and the rating of the replacement fuse are the same as the ones specified on the information label of the product.
06) Replace the integrated fuse holder in the opening and push it gently back in its place.

9. Deinstallation, Transportation and Storage

9.1. Instructions for Deinstallation

⚠️ **WARNING**
Incorrect deinstallation can cause serious injuries and damage of property.

- Let the device cool down before dismounting.
- Disconnect power supply before deinstallation.
- Always observe the national and site-specific regulations during deinstallation and derigging of the device.
- Wear personal protective equipment in compliance with the national and site-specific regulations.

## 9.2. Instructions for Transportation

- Use the original packaging to transport the device, if possible.
- Always observe the handling instructions printed on the outer carton box, for example: "Handle with care", "This side up", "Fragile".

9.3. Storage

- Clean the device before storing. Follow the cleaning instructions in chapter **8.2.1. Basic Cleaning Instructions** on pages 32–33.
- Store the device in the original packaging, if possible.

10. Disposal

Correct disposal of this product
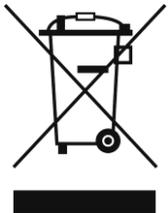
Waste Electrical and Electronic Equipment

This symbol on the product, its packaging or documents indicates that the product shall not be treated as household waste. Dispose of this product by handing it to the respective collection point for recycling of electrical and electronic equipment. This is to avoid environmental damage or personal injury due to uncontrolled waste disposal. For more detailed information about recycling of this product contact the local authorities or the authorized dealer.

11. Approval

CE

Check the respective product page on the website of Highlite International (www.highlite.com) for an available declaration of conformity.

This product is in compliance with IEC60825-1:2014.