



Pro-4000RGB



User Manual

Please read this manual carefully before use!

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Checking parts

Please check if all listed parts are included, and are not damaged. Included:

- 1 x Laser projector
- 1 x Power cable
- 1 x 9-pin plug
- 2 x key
- 1 x safety cord
- 1 x manual



Safety instructions

If the device has been exposed to great temperature changes, do not switch it on immediately. Condensation water may damage your device. Leave the device switched off until it has reached room temperature.

The laser must only be used for shows. Any operation has to be attended and supervised by a skilled and well-trained operator.

Never leave this device running unattended and keep it away from children and unauthorized persons. Keep away from heaters and other heat sources. In order to safeguard sufficient ventilation, leave 50 cm of free space around the device.

Never direct the laser beam to people or animals.

CAUTION LASER DIODE: If you open the device for cleaning, always disconnect from mains!

HEALTH HAZARD! Never look directly into the light source, as sensitive persons may suffer an epileptic shock!

These lasers are considered a definite eye hazard, particularly at the higher power levels, which WILL cause eye damage. So these laser series models supplied with a key switch to prevent unauthorized use, warning labels and aperture labels affixed to the laser.

Installation safety

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 reach 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. Always ensure, that the maximum permissible exposure (MPE) is not exceeded in the area accessible to the public. So install the laser in such a way, that minimum distances and heights ensure the MPE is never exceeded in the public area.

When setting up the laser, make sure the laser is affixed firmly, to avoid vibrations.

Warning labels on the device

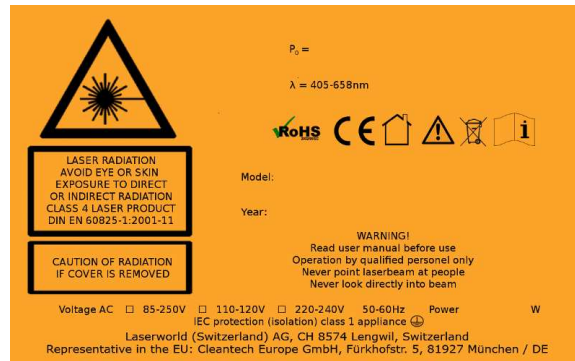
Laser radiation

Avoid exposure
To the beam
Laser class 4

Caution of radiation
If cover is removed

Indoor use only

At front opening: Avoid exposure – laser radiation is emitted.



Read manual
before use
Operation by qualified
personal only
Never direct laser
Beam at people
Never look directly
into beam

OPERATING THE LASER

Don't remove the warranty/serial number label - removal voids warranty

The operator has to make sure that laser radiation – for laser class 4 also reflected laser radiation – higher than the maximum permissible level is avoided by technical or organisational measures. (Especially with respect to the MPE, see above.)

Make sure to use the correct voltage. Use a power socket with earth/ground. **Don't use dimmer, RC, or other electronically switched sockets.** Whenever possible, don't use the laser together with large appliances, especially fog machines, on the same mains!

If the device is used in a flying installation, the mounting brackets and an appropriate safety-rope must be afixed.

In some countries, the operator must notify the accident insurance and the authority for industrial safety, before operating a laser. For more information, contact the relevant authorities.

Please consider that unauthorized modifications on the device are strictly forbidden due to safety reasons!

If this device will be operated in any way differently than described in this manual, the product may suffer damages and the guarantee becomes void. Furthermore, any other operation may lead to dangers like short-circuit, burns, electric shock, etc.

Keep surrounding dry and clean. This unit should be keep dry, do not use in the rain or damp and dusty environment, don't put liquid filed containers on the device. Projector should be put in a water-proof housing when operated outside.

Regularly open the device (see "cleaning" further down) to check for dust inside, or if fog fluid condenses in the housing (if so rearrange hazer and/or laser position).

Operating temperature is 10~35°C . In a new installation, check after some 15-30 minutes whether the outlet air gets too warm. Regularly check the inside for dust deposits, especially around the fans. Let laser cool off 10minutes after 2 hours of operation, to ensure maximum lifetime for the diode.

Distance between laser aperture and projection screen should be not less than 1 meter.

Do not turn device on and immediately off again frequently.

Do not look into the laser beam directly, especially not with optical instruments.

Do not touch the device with wet hands.

When the laser diode becomes dim or broken, please contact your dealer.

When returning laser to dealer/manufacturer always use original packaging.

Maintenance should be performed every 15-day period. See "cleaning" further down.

To ensure maximum lifetime of the laser:

Don't overheat the laser:

- Always ensure good ventilation
- Don't have stage lights (especially moving heads) directed towards the laser
- Regularly clean the fans and the interior from dust
- In a new installation check the temperature after 30 minutes of operation

Keep the laser dry

- Make sure fog/hazer fluid doesn't condensate inside the laser - fog has to be in front of the laser – not inside
- A few days after (each new) installation, open the cover to check if fluids condensate inside
- If fluids condensate inside, reposition the laser or fogger/hazer

Turn the device off, when not used. The diode is on, when the device is on. Even if it is not lit.

If the laser is equipped with a remote connector, connect an emergency switch to the Remote lock connector on the backside, if no emergency switch is used, insert the 9 pin dongle instead. If the laser has no remote lock, use an emergency switch in the mains connection.

Using the laser

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

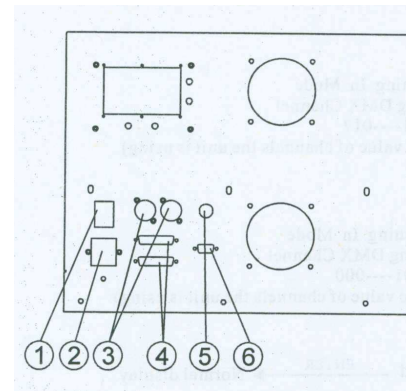
Make sure the correct voltage is used. Connect mains.

Connect an emergency switch to the Remote lock connector on the backside, the switch has to interrupt the connection between pins 1 and 2 to turn off the laser. If no emergency switch is used, insert the 9 pin dongle instead. If the 9 pin dongle is used, use an emergency switch in the mains connection.

Depending on the mode selected (see below), laser light should come out of the opening on the front panel – be careful.

Connectors

1	Power on/off
2	Power input: make sure the correct voltage is used
3	DMX in/out
4	ILDA connector in/out
5	Safety switch: Laser on/off
6	Remotelock: connect emergency switch. If no emergency switch is connected use the 9 pin plug supplied.



Control panel

- **MODE:** select mode, or go up in menu
- **ENTER:** confirm changes, or go down in menu
- **UP/ DOWN:** change DMX address

Operating modes:

"DMXAddr": DMX512 mode-. Here you can change the DMX address:

"Open": change address

"Up" & "down": increase/decrease address

"Save": save new address

"LCD display memory function": save settings automatically.

Laser: On/Off, when off, the laser is off in DMX mode (only ILDA mode available)

X/Y-Axis: invert output horizontally / vertically

Upside down: invert display

ILDA mode

When an IDLA compatible interface is connected to the laser, the laser is automatically switched to ILDA mode. Output is then controlled from a PC running software.

The laser uses pins 4 and 17 of the IDLA signal to detect the presence of an ILDA interface.

Further information can be found in the software manual.

DMX mode

The laser uses 18 DMX channels:

Channel		DMX512 value	Funktion
1	Red	0~255	0~100% Dimmer
2	green	0~255	0~100% Dimmer
3	blue	0~255	0~100% Dimmer
4	Colour	0~25	Original colour
		26~51	White
		52~77	Yellow
		78~103	Red
		104~129	Green
		130~155	Cyan
		156~181	Blue
		182~207	Purple
		208~233	Colour change
		234~255	Colour change slow to fast
5	Pattern group	0~51	Pattern group 1
		52~103	Pattern group 2
		104~154	Pattern group 3
		155~205	Pattern group 4
		206~255	Pattern group 5
6	Pattern	0~255	160/5=32pcs
7	Horizontal rotation	0~255	Rotate slow to fast
8	Vertikal rotation	0~255	Rotate slow to fast
9	Z rotation	0~255	Rotate slow to fast
10	Horizontal movement	0~255	slow to fast
11	Vertikal movement	0~255	slow to fast
12	Horizontal size	0~255	slow to fast
13	Vertikal size	0~255	slow to fast
14	Horizontal & vertikal size	0~255	slow to fast
15	Drawing speed	0~255	slow to fast
16	Point draw	0~255	slow to fast
17	Scanspeed	0~255	slow to fast
18	Pattern size	0~1	Original size
		2~255	Change

Maintenance / cleaning

Always disconnect from mains before cleaning/opening the laser. Regularly clean the interior from dust, especially ensure operation of the fans. Use a sponge with alcohol, rather than wet cloth or other chemical liquid, to clean the mirrors. Be careful, even light scratches reduce the output power of the laser. Mirrors need cleaning, when a "halo" is noticeable around the beam, or an unusual high amount of diffuse light can be seen inside the device.

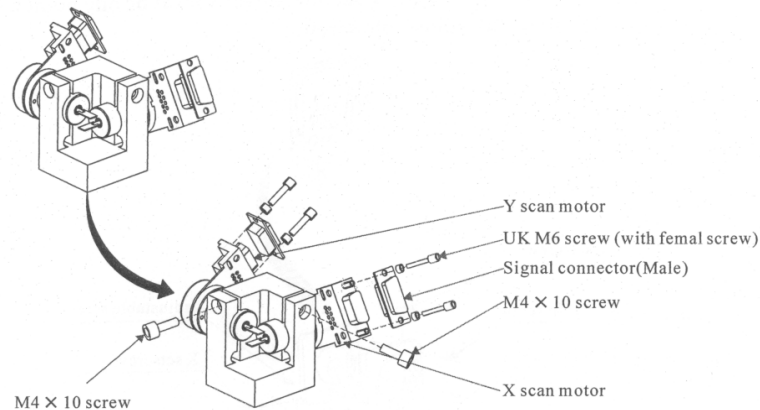
Technical specifications

- **Output power:** typical: 4000mW, guaranteed: 2700mW, >900mW 532nm green, >300mW 445nm blue, >1500mW 655nm red
- **Lasersources:** aircooled DPSS laser
- **Laser class:** 4
- **Modes:** ILDA, DMX 512
- **ILDA:** 25pin ILDA standard Sub-D shaped 25pin connector
- **Galvos:** 45k scanspeed
- **DMX 512:** 18 channels
- **Patterns:** 160
- **Scanangle:** max. 40° optical
- **Beam:** ca. 3mm/1mrad
- **Accessories:** power cable, key switch, interlock plug, manual
- The laser comes in a flightcase.
- **Input voltage:** AC 110~120V or 220~240V switchable 50/60Hz

- **Power consumption:** 450W
- **Size:** 800 x 530 x 350 mm (W x D x H)
- **Weight:** 69kg Laser, **total:** 96kg (with flightcase)
- **Operating temperature:** 10°-35°C
- **Loudness:** <70dB

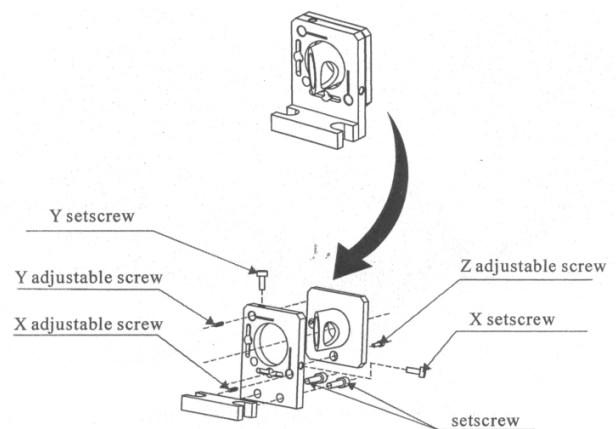
Change scanner

1. Unscrew UK M6 screws and disconnect signal cable.
2. Loosen M4 x 10 screw and remove galvo.
3. Insert galvo, reconnect and fix signal cable.
4. Rotate galvo to center projection. Fix galvo.



Adjustable mirror mounts

1. Loosen setscrews, then adjust with X/Y adjustable screws. Make sure beam is centered on scanner mirrors.
2. Adjust Z-screw simultaneously.
3. Tighten setscrews.
4. When combining beams (RGY/RGB laser), first make sure the beams are (roughly) on the same spot on the mirrors/dichros. Then use a test pattern (e.g. rectangle) to do fine adjustment. For adjustments, always turn output power down (if possible).



Troubleshooting

Problem	Possible reason	Damaged part	Replacement
No power	Fuse blown	Fuse	09-00-3001-01
	Power switch defective	Power switch	08-05-0400-03
	Power supply defective	+ -24V	16-03-0039-00
	Power supply defective	12V	16-03-0019-00
X and/or Y axis no deflection	Scanner defective	Galvo	15-01-6800-00
	CPU defective	STC89C516	00-89C516ED-00
	Control board defective	Steuerung PCB	26-2A-2009LD-00
	Power supply defective	+ -24V	16-03-0039-00
	Scanner driver board defective	Scanner driver board	26-2A-6800A-00
Laser dark or dim	Lenses / mirrors dirty	Clean with alcohol	
	Laser diode defective	Laser diode	Inquire
	Control board defective	Control board	26-2A-2009LD-00
	Configuration / wrong mode	Check configuration (see paragraph control panel)	
No output	Configuration / wrong mode	Check configuration (see paragraph control panel)	
	Control board defective	Steuerung PCB	26-2A-2009LD-00
	Power supply defective	+ -24V	16-03-0039-00
	Display board defective	Display	26-2A-YX2012DI-00
	Pins 4 and 17 of the ILDA signal not connected	See below	

Laser does not switch to ILDA mode:

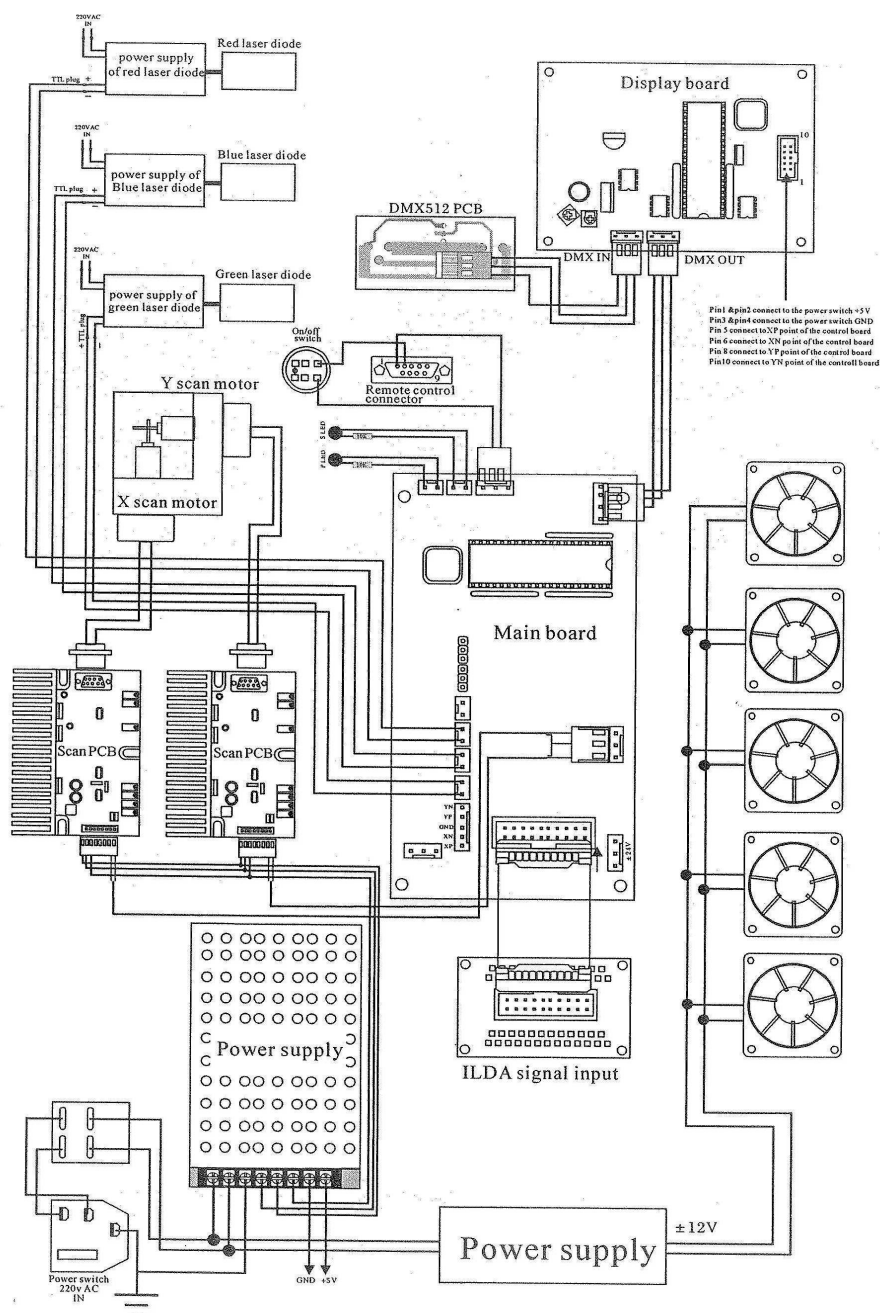
- The interface does not connect pins 4 and 17 (Interlock) of the IDLA signal. See interface manual
- The cable does not connect pins 4 and 17. Use a cable that connects pins 4 and 17.
- Use an adapter, that connects pins 4 and 17.

ILDA signal

Pin out of the standard ILDA signal:

1 Scanner X+	-5V..+5V	14 X-	+5V..-5V
2 Scanner Y+	-5V..+5V	15 Y-	+5V..-5V
3 Intensity/Blanking+	0V..+2.5V	16 Intensity/Blanking-	0..-2.5V
4 Interlock A		17 Interlock B	
5 Red+	0..2.5V	18 Red-	0..-2.5V
6 Green+	0..2.5V	19 Green-	0..-2.5V
7 Blue+	0..2.5V	20 Blue-	0..-2.5V
8 – 12 Not used		23-24 Not used	
13 Shutter +5V, max. 20 mA		25 GND Signal ground	

Technical diagram



Please note

This device has left our premises in absolutely perfect condition. In order to maintain this condition and to ensure a safe operation, it is absolutely necessary for the user to follow the safety instructions and warning notes written in this user manual.

Laserworld cannot be made liable for damages caused by incorrect installations and unskilled operation!

For service contact your dealer, or Laserworld. Only use Laserworld spare parts.
Data subject to change without notice. Errors and omissions expected.

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