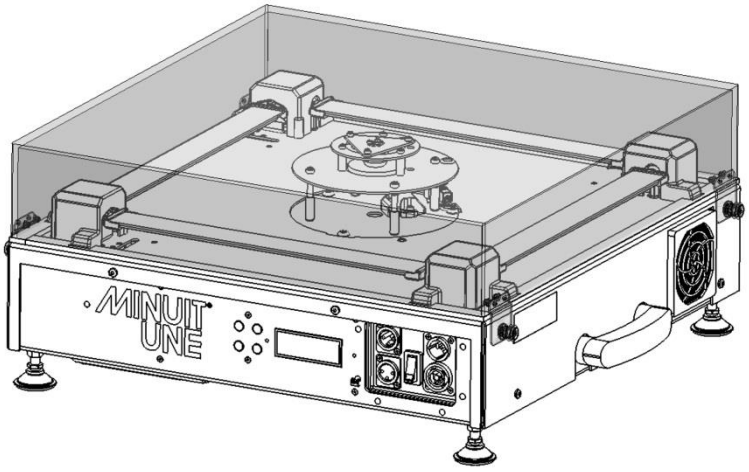
IVL™ LIGHTING by MINUIT UNE

SERVICE MANUAL

IVL™ Square



Edition Notes

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Revision of this manual: A0

Table of Content

Important Information

This service Manual contains instruction about how to service Minuit Une's IVL Square product.

Service work must comply with local regulations and accepted codes of good practice.

Any person in charge of servicing this product shall have receive a service training by Minuit Une and/or by an official training center recognized by Minuit Une.

Read and understood all safety information and procedure in this service manual, and in the IVL Square's user manual before servicing or cleaning this product.

Failure to respect service procedure may cause damage that is not covered by product warranties.

Any procedure or work on the product which is not described in this manual is not covered by product warranties.

Always turn off and disconnect the product from power before removing the plexiglas shape or opening the product, or performing procedures of service

Risk Levels and Alert Symbols

Safety warnings, safety alert symbols, and signal words in these instructions indicate different risk levels:

DANGER!

DANGER indicates an imminent hazardous situation which, if not avoided, **will result** in death or serious injury.

WARNING!

WARNING indicates a potentially hazardous situation which, if not avoided, **may result** in death or serious injury.

CAUTION!

CAUTION indicates an potentially hazardous situation which, if not avoided, **may result** in minor or moderate injury.

NOTICE

NOTICE explains practices not related to physical injury. No safety alert symbol appears with this signal word.

Vital Precautions and general safety information

DANGER!

High voltage! Risk of blindness, electric shock and fire.
Read and understand all safety information and operation instructions before you service the product.
Not observing the safety information or general rules of safety may cause injury, blindness, burn hazards, electric shock, falls and death to yourself and others or damage to equipment.
Use solely and exclusively as described in the instructions.
Using the product in any other ways than described in this manual is not permitted and can damage the product and lead to associated risks such as short-circuit, fire, electric shock, etc.
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
Do not bypass or remove any safety feature of the product.
Only use the attachments/ accessories specified by the manufacturer

WARNING!

Humidity, Condensation and Moisture.
Never expose the product to rain or moisture.
Do not use this apparatus near water.
Clean only with a dry cloth.
Never expose the product to dripping water or water splashes.
Never place an object filled with liquid (e.g. a vase or a bottle filled with liquid) on the product.
Risk of injury and damage through falls.
Always service the product on a stable platform.
Never hang the product before doing service on it.
Risk of electric shock and fire.
Disconnect the product from AC power before doing service on it.
Do not service near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
No flame source, like a candlelight, should be placed on or nearby the product.
Wait until the product is at room temperature before handling.

CAUTION!

Class 3R laser product according to IEC 60825-1:2014
Avoid direct eye exposure.
Do not look at laser devices with magnifiers, telescopes, binoculars or similar optical instruments that may concentrate the light output.
Please refer to ANSI Z136.1 “Standard for Safe Use of Lasers” for guidance on safe use. This publication is available from Laser Institute of America
Note that the national and local recommendations, regulations, standards and codes of practice in laser show are different from a country to another.
Please contact your provider or Minuit Une’s legal service if you have any interrogation.

NOTICE

Always work in a clean, well-lit area.
Always take the necessary precaution to prevent static electricity from damaging the product during service.
Regular cleaning is very important for fixture life and performance.

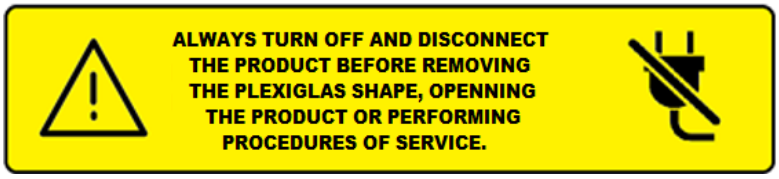
Important Laser Information

Procedures that could allow access to Class 4 levels of radiation include the following:

- Removing the square Plexiglas shape (page 15)
- Square to pyramid Plexiglas shape (page 16)
- Opening the IVL (page 18/19)
- All the procedure which can be done with the IVL open

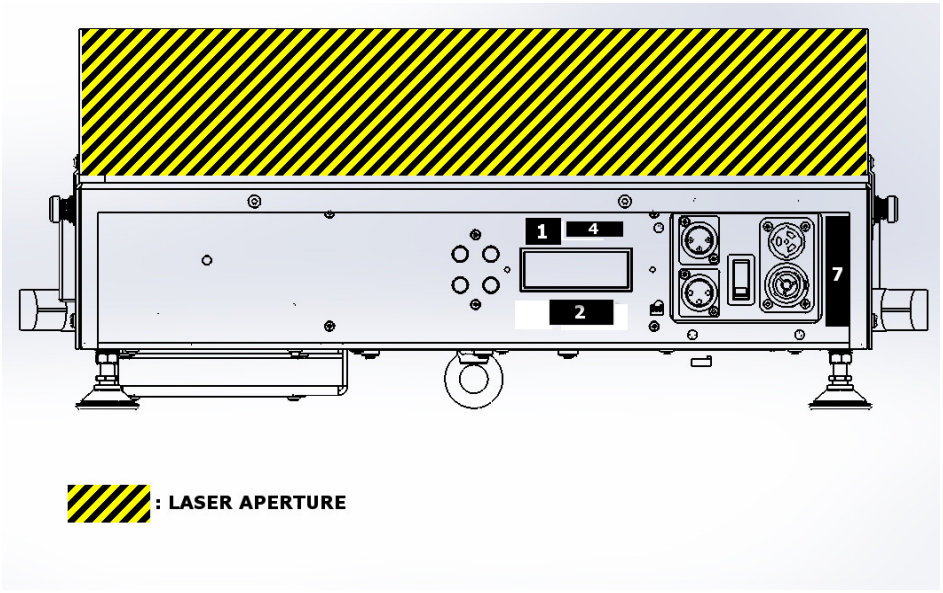
To avoid increase accessible emission level of radiation during the procedure listed above, you should always turn off and disconnect the product from power before removing the plexiglas shape or opening the product

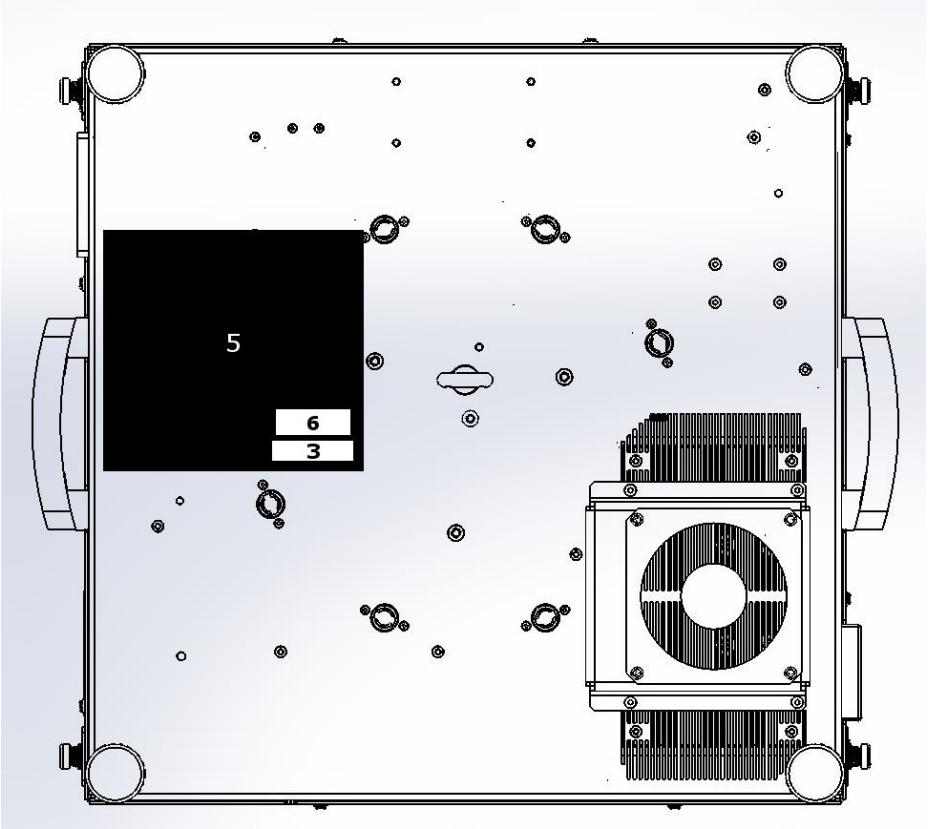
This will be regularly recall in this manual with the following label:



Labelling diagram

The following symbols are used in this manual or on the product to identify important safety information:





1. Hazard Warning Symbol Label

Warning! Visible and / or invisible Laser Radiation can be emitted.

2. Explanatory label

This Laser product is designated as Class 3R during all procedures of operation
Laser parameters:
Wavelength: 448nm, 518nm, 638nm
Emission type: pulsed (340Hz)
Energy: <15,5uJ

3. Protective Housing Non-interlocked Label

Before opening any part of the product, disconnect the AC power. Otherwise you may be exposed to a class 4 Laser. MINUIT UNE cannot be held responsible if this instruction is not respected
This label is also present on the embed laser inside the product (see figure 8)

4. Aperture Label

This label indicates the laser aperture. On this product, the laser aperture is the whole area above the Plexiglas shape of the product.

5. Manufacturer's Identification Label

The manufacturer plate is located at the bottom of the product. It contains important information about the type, serial number, and safety. Please contact your dealer or Minuit Une when a type plate is missing as it must be present on the product and needs to be replaced.

6. Certification Label

7. Power Label

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

OVERVIEW

All dimensions are given in millimetres.

IVL Square and Base Dimensions

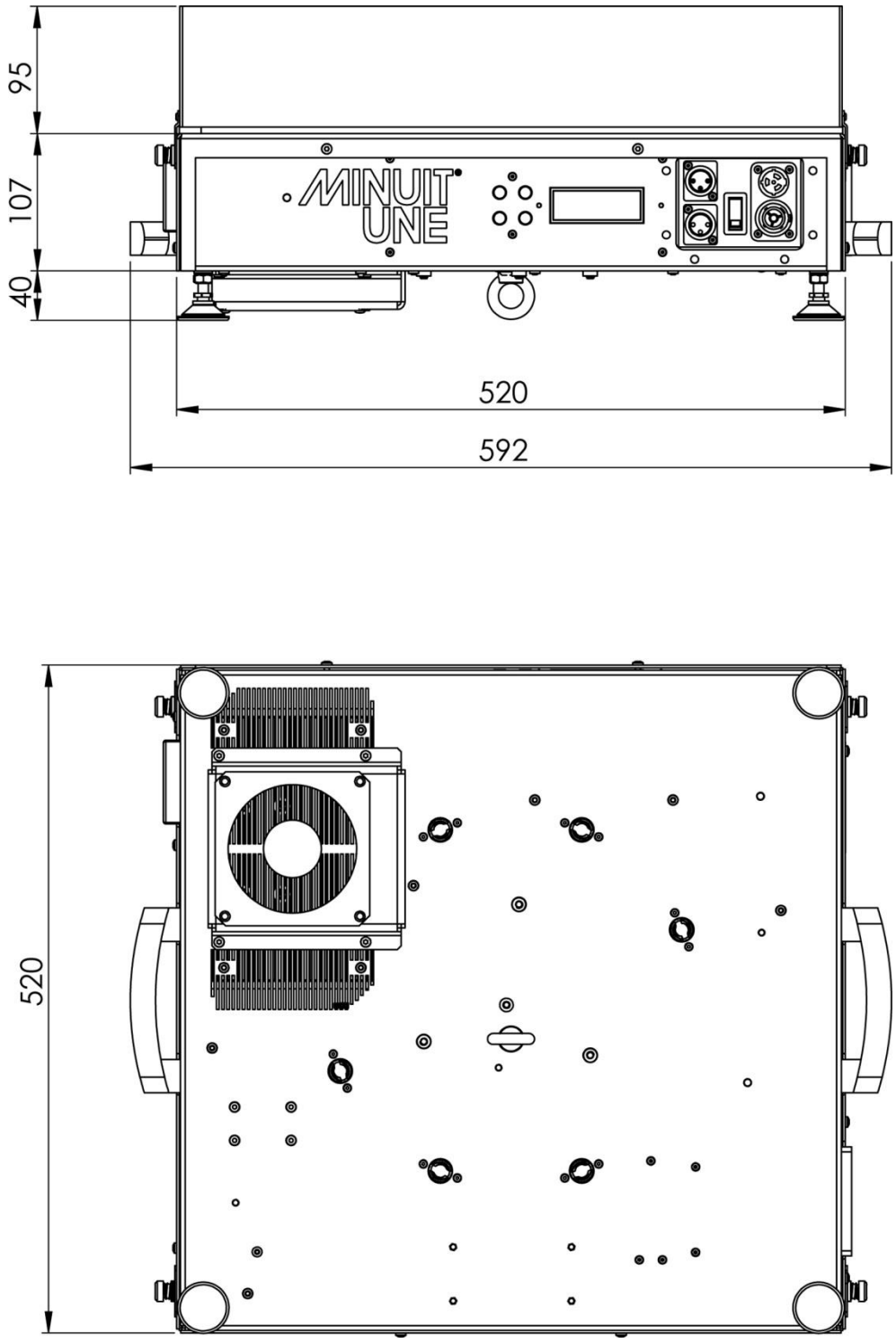


FIGURE 1 : IVL SQUARE DIMENSIONS

IVL Pyramid Dimensions *

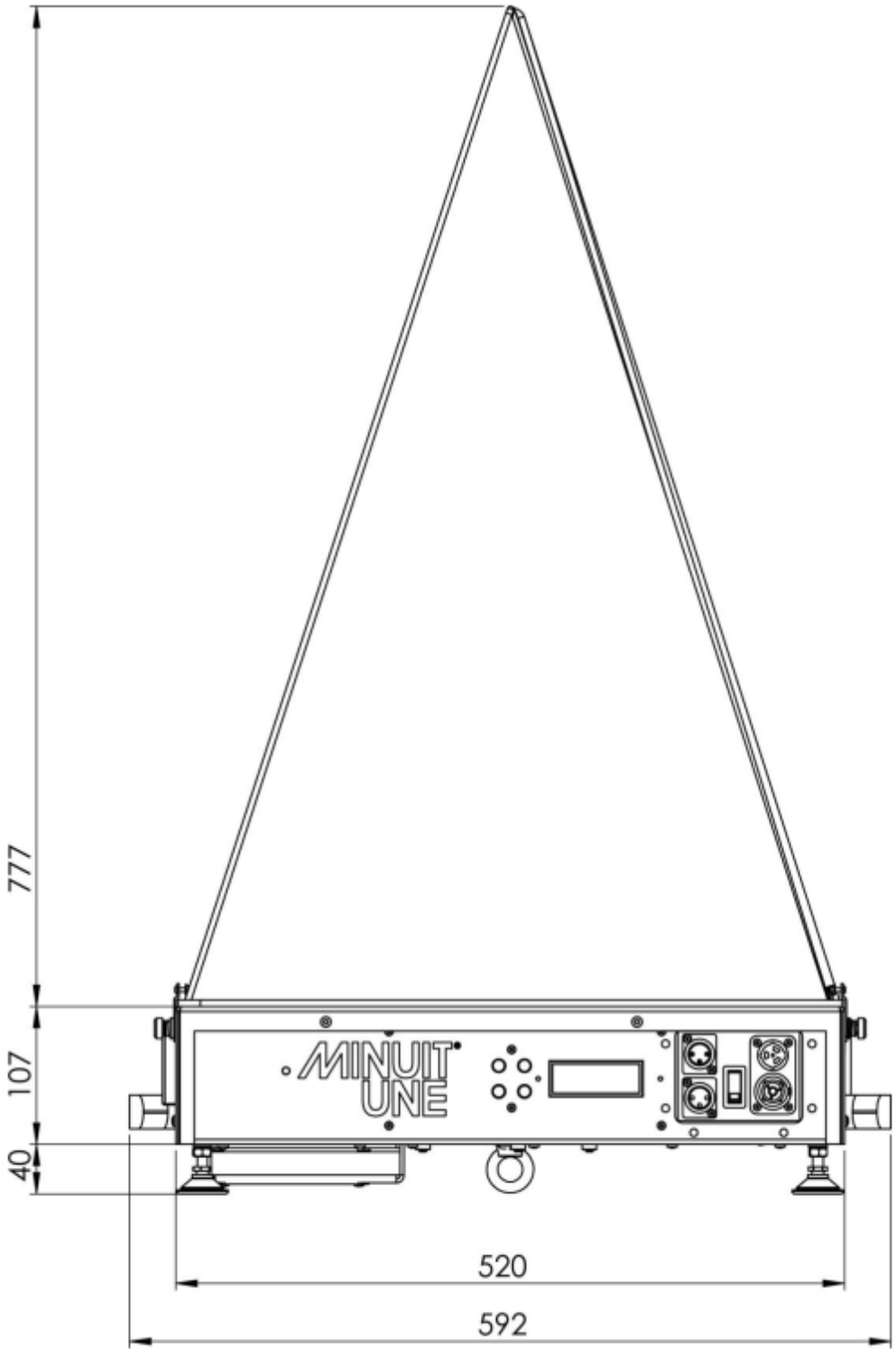


FIGURE 2 : IVL PYRAMID DIMENSIONS

**The Pyramid is a service accessory described in section "Square to Pyramid Plexiglas shape service procedure", page 17.*

Fixture menu and connectors

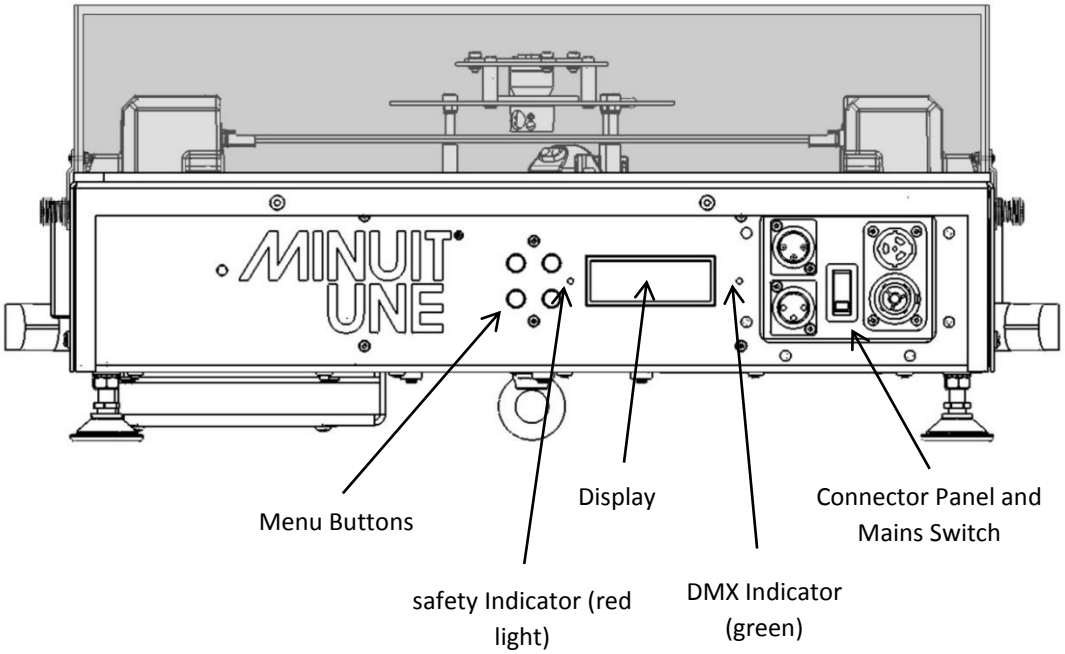


FIGURE 3 : FRONT PANEL DESCRIPTIONS

Menu buttons

ENTER	Press to open the main menu. Press to open a sub menu.
ESC	Cancel an action without saving any changes.
+ / - - -	Select an option or change a value. Push to display the software version, the maximal temperature, and the lifetime of the IVL. Hold for 5 seconds to display the four first DMX frameworks received in real-time by the product.

Display and LED indicators

The display shows fixture and menu information.

The Green LED is the DMX connector / interlock indicator: it lights up when a valid DMX signal is detected at the DMX Input.

The Red LED is the safety signal indicator: it lights up when the safety signal is “passed”.

FIGURE 4 : MAIN MENU

If you push the Minus button, the display shows the sub-menu information like the software version, the maximal temperature, and the lifetime of the IVL.

FIGURE 5 : SUB MENU

Tools and accessories

Here are the different tools and accessories necessary to do service on the product.

All these tools and accessories are not provided with the product.

Tools

1. Wrench key T7
2. Cruciform (Phillips) screwdriver PH1/PH2
3. Hexagonal screwdriver T3
4. Removable bit / Torx screwdriver T3
5. Thin rod hexagonal screwdriver
6. Small and long Allen key T2
7. Small and long Allen key T3
8. Loctite 243 thread lock
9. Thin-nosed flat pliers
10. Thin-nosed cutting pliers
11. Brussels Precision tweezers

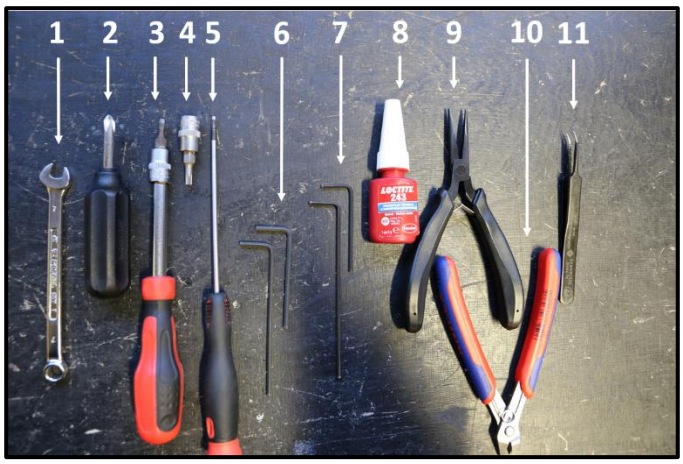


FIGURE 6 : TOOLS

Free ESD kit – Antistatic mat

1. Connect the mat to an earthing contact.
2. Connect yourself to the mat by the strap (the green cable on the picture beside).

FIGURE 7 : FREE ESD KIT

Service accessories

Description	Order Reference	Section
Pyramid Plexiglas Shape	ACCE-00009	Service Operation, p.17
Set Up Plate Accessory	ACCE-00013	Service Operation, p.18

Spare part view

Lower Part

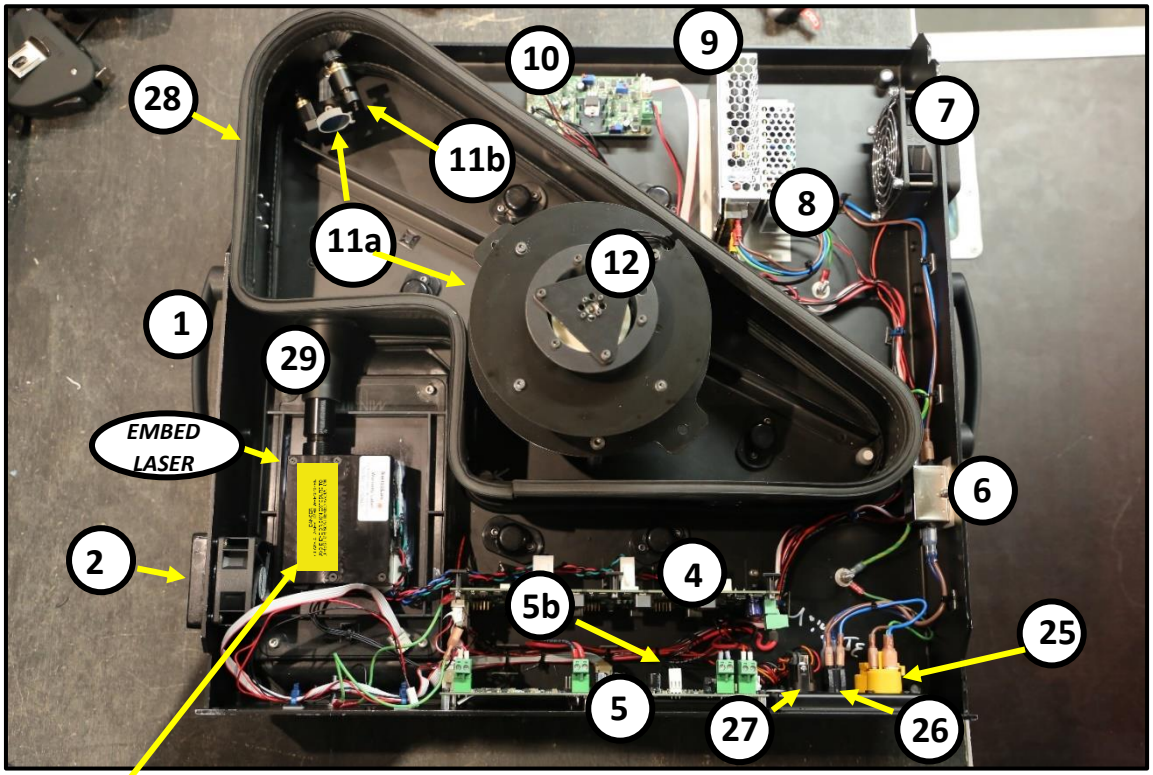


FIGURE 8 : SPARE PART – INSIDE VIEW

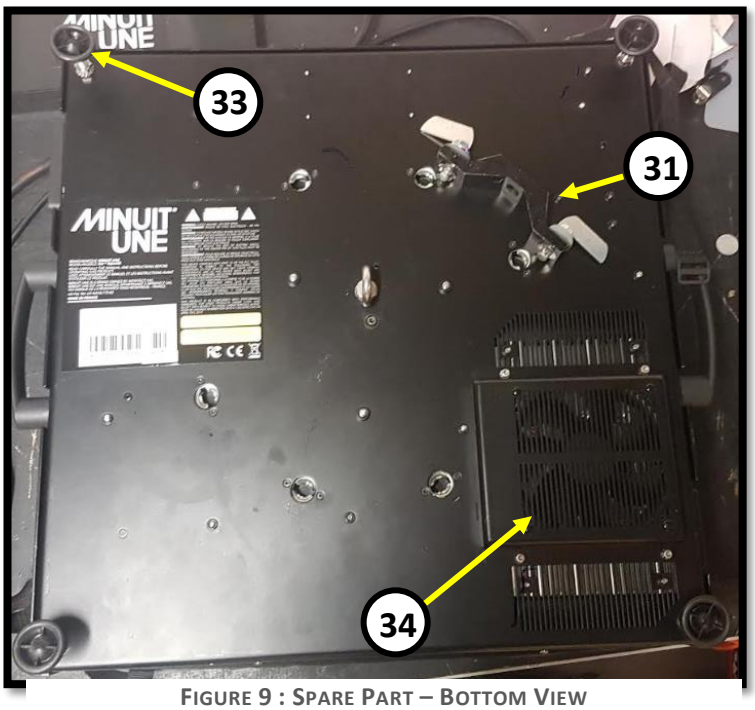


FIGURE 9 : SPARE PART – BOTTOM VIEW

Lower Spare Part list

Spare part number	Description	Reference	Section
1	Handle	PIDE-00051	NA
2a	Draw Fan – 60 mm	PIDE-00093	Replacing Fans, p.23 Fan Cleaning, p.42
2b	Draw Fan Filter handler – 60mm	PIDE-00041	Page 23
2c	Draw Fan Filter – 60 mm	PIDE-00055	Page 23, Page 42
4	Laser Board	PIDE-00089	NA
5	Mainboard V2.0	PIDE-00088	Mainboard Wiring, p.25 Remove the Mainboard, p.26
5b	Thermal Sensor	PIDE-00052	Mainboard Wiring, p.25
6	EMC filter	PIDE-00097	NA
7a	Exhaust Fan – 80 mm	PIDE-00090	Replacing Fans, p.23 Fan Cleaning, p.42
7b	Exhaust Fan Filter handler – 80 mm	PIDE-00091	Page 23
7c	Filter 80	PIDE-00094	Page 23, Page 42
8	Upper part PSU / Power supply 12V 25W	PIDE-00034	Replacing PSU, p.23
9	Lower part PSU / Power supply 12V 100W	PIDE-00035	Replacing PSU, p.23
10	Scanning Mirror Board	PIDE-00018	Scanning Mirror Board, p.28
11a	Internal Mirrors	PIDE-00045	Inside Mirror cleaning, p. 42
11b	Mirror Mount	PIDE-00101	NA
12	Scanning Mirror	PIDE-00087	Replacing Scanning Mirror, p.27
25	True-con1 socket	PIDE-00096	NA
26	Power Switch	PIDE-00031	NA
27a	DMX in	PIDE-00028	NA
27b	DMX out	PIDE-00029	NA
28	Internal profile seal	PIDE-00107	NA
29	Laser seal	PIDE-00106	NA
31	Omega bracket	PIDE-00048	NA
33	Feet	PIDE-00095	NA
34	Bottom Fan – 120 mm	PIDE-00092	Replacing Fans, p.23 Fan cleaning, p.42

Upper part

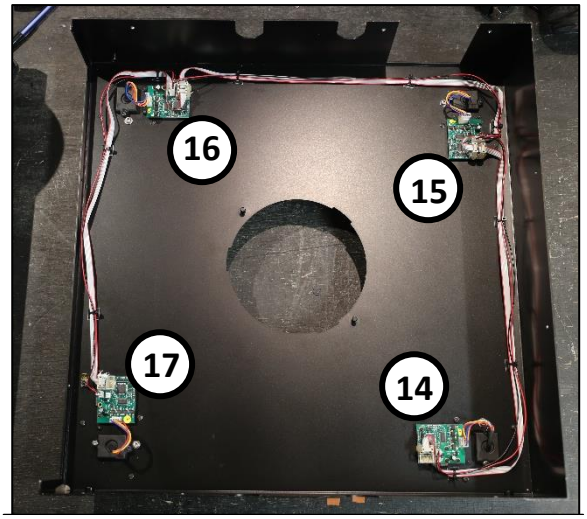


FIGURE 10 : UPPER PART – STEPPER BOARDS

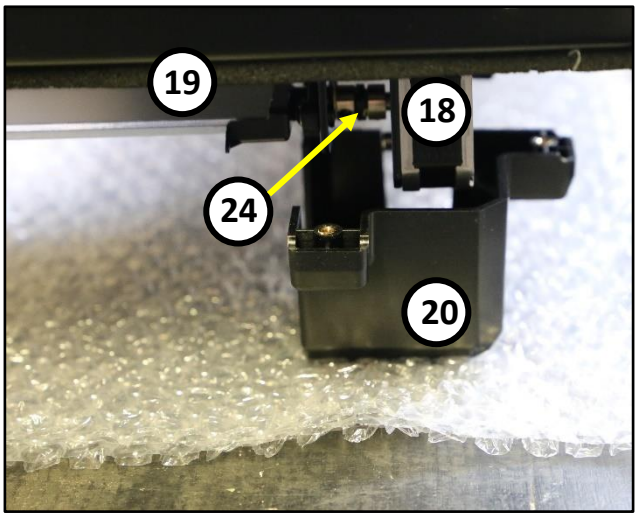


FIGURE 11 : UPPER PART – STEPPER MOTOR

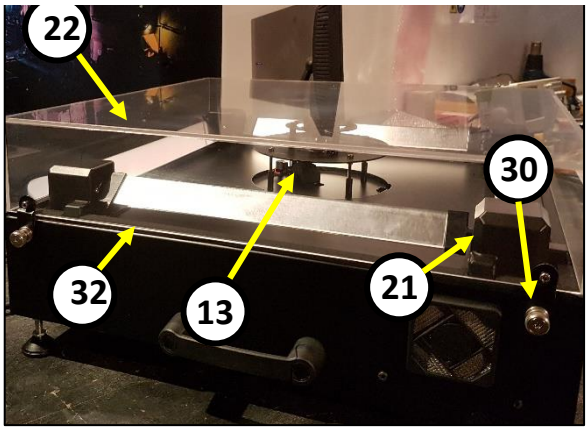


FIGURE 12 : UPPER PART – EXTERNAL VIEW

FIGURE 13 : UPPER PART – PROTECTIVE SQUARE COVER

Upper Spare Part list

Spare part number	Description	Reference	Section
13	Scanning Mirror Sensor	PIDE-00037	Replacing Scanning Mirror sensor, p.29
14	Stepper Motor Board – Tilt 1	PIDE-00026	C. Tilt Mirror Parts, p. 34 to 40
15	Stepper Motor Board – Tilt 2	PIDE-00026	C. Tilt Mirror Parts, p. 34 to 40
16	Stepper Motor Board – Tilt 3	PIDE-00026	C. Tilt Mirror Parts, p. 34 to 40
17	Stepper Motor Board – Tilt 4	PIDE-00026	C. Tilt Mirror Parts, p. 34 to 40
18	Stepper Motor	PIDE-00006	C. Tilt Mirror Parts, p. 36 to 40
19	Tilt Mirrors	PIDE-00024	C. Tilt Mirror Parts, p. 38 to 40
20	Stepper Motor cover	PIDE-00098	C. Tilt Mirror Parts, p. 36 to 38
21	Ball bearing	PIDE-00046	NA
22	Square Plexiglas shape	ACCE-00008	Service Operation, p.16 to 17 Cleaning, p.44
23	Protective Square cover	ACCE-00002	NA
30	Quarter turn cover	PIDE-00099	NA
24	Coupler	PIDE-00047	Motor-Mirror coupling, p.34
32	Cover seal	PIDE-00053	NA

TROUBLESHOOTING

In this section we will go over the potential issues you could observe on an operational product.

Never attempt to repair this product if you don't see your problem in this troubleshooting and contact us for assistance.

Never attempt to repair by yourself the product if the solution says a laser operation is needed and contact us for assistance.

If you don't succeed to repair the product following this troubleshooting, or if you have any doubt concerning the different procedure, contact us for assistance.

In order to continuously ameliorate our customer service and our product, if you manage to repair the product following this troubleshooting, we also invite you to communicate us the reference of the issue you have encountered.

Customer Service Contact:

Corinne CARREY
Customer Care Manager
+ 33 (0)6 14 33 74 33
https://vimeo.com/minuitune
www.minuitune.com

When contacting our customer service, please fill the Service Return Form which is available in annex of this service manual or in our download section on our website and attach photo and/or video to explain your problem.

Table of potential issues observed on operational product*

** Never reproduce the situations described below when the product is open or not in normal operation*

Ref. No.	Symptom	Cause(s)	Solution(s)
D0040	The product doesn't turn on (the switch LED is off)	No power to the product	Check power connection
D0041	The Scanning Mirror doesn't turn on (DMX LED is "OFF")	DMX isn't received properly	Check DMX cable / connections
D0042	The Scanning Mirror doesn't turn on (DMX LED is "ON")	DMX isn't sent properly	• Check DMX address configuration • Check DMX framework (^{2}it must be >/= "050 000 000 000") by holding the "Minus" button for 5 seconds • Check the patch settings / try with a new show file or another controller
D0023	The Scanning Mirror keeps starting ON and OFF (DMX LED is ON)	RDM is enabled	Disabled RDM on the controller
D0033	The Scanning Mirror is running but the product doesn't light up (Safety LED is "OFF")	The Scanning Mirror Sensor signal is defective	Report to the "Set the Scanning Mirror Sensor" section in page 32 and 33
D0043	The Scanning Mirror is running but the product doesn't light up (Safety LED is "ON")	Laser or optical components are defective	Laser operation is needed. Contact the Minuit Une customer service
W0002	The product doesn't light up, the green and red LEDs are ON (T°C displayed is above 53°C)	The thermal safety procedure is enabled to avoid destroy the laser diodes	Wait for the product to cool down
D0026	The Scanning Mirror tries to start and stop after 5 trials	Scanning Mirror power is defective	Check the Scanning Mirror cable on the Scanning Board If it's "passed", replace the Scanning Motor
D0005	The Scanning Mirror shakes and is really noisy	The Scanning Mirror is defective	Replace the Scanning Mirror

D0044	The light beam is weak or lower than usual (T°C = 0°C on the screen)	The thermal sensor system might be defective or disconnected	Check the thermal sensor wiring on the Mainboard.
W0003	The light beam is weak or lower than usual (T°C is between 1°C and 41°C)	The optical components are dirty The laser components are defective	Report to the "Cleaning" section and check if the Scanning or Inside Mirrors is not dirty Laser operation is needed. Contact the Minuit Une customer service
W0004	The light beam is weak or lower than usual (T°C is between 42°C and 52°C)	The thermal safety procedure is enabled to avoid destroy the laser diodes	Wait for a cooling down
D0045	The temperature of the product rises abnormally	The cooling system is defective	• Report to the Section A, page 23 to check the proper functioning of the fans. • Report to the "Fans cleaning" section to check the filters.
D0018	The light beam is split	Optical components are defective	Laser operation needed: Report to the "Customer service contact" section
W0005	The fanning system doesn't work (T°C is between 0°C and 21°C)	Energy saving procedure is enabled	Wait until the temperature reaches 21°C, 22°C to confirm that the fanning system running
D0046	One or more fans is abnormally noisy, and or the fanning system doesn't work (T>21°C)	Something rubs against the fan blades	Open the IVL (page 19) to check that nothing is touching the fan (cables, cable-ties, etc…)
D0037	RGB channels at full but final colour is different than usual	Colorimetry is defective	Laser operation is needed. Contact the Minuit Une customer service
D0047	The lighting plan isn't at the same level on the corners	The plate adjustment or the inside mirrors alignment is defective	Report to the "Set Up Plate Accessory" section in page 18
D0048	Tilt Mirror initialize when turning on the product or doing a reset, but does not work after	Data cable of the Stepper Board connections are defective	Check the Stepper Motor board data cable connections
D0049	One DMX channel active more than one Tilt mirror	The Stepper board address is wrong	Report to the section "Stepper Motor Addressing ID" to resolve the problem
D0050	Tilt mirror does not initialize/move when turning on the product or doing a reset	Power cable connexion are defective The Motor-Mirror coupling is defective	Check the stepper motor board power cable connection Report to the replacing Tilt mirror section to set the coupling properly
D0051	Tilt Mirror is noisy	The Motor-Mirror coupling is defective The Tilt mirror is blocked by the optical sensor	Report to the "Replacing Tilt Mirror" section to set the coupling properly Report to the "Replacing Tilt Mirror" section to set the mirror properly
D0052	One mirror is shaking by itself	The motor connector is defective	Check the connection of the motor on its electronic board
D0053	Tilt Mirrors are unsynchronized	The product lost its calibration The Tilt mirror is disturbed by the optical sensor during initializing	Reset the product with the power switch or report to the User manual to calibrate the Tilts Report to the "Replacing Tilt Mirror" section to set the mirror properly
D0007	All Tilt Mirrors shake by themselves The LCD screen doesn't work properly The Dimmer at 0 but a beam comes out when DMX at full One of colour beams flashes or rest residual when the size is closing Incoherent DMX control	The Mainboard is defective	Replace the Mainboard
D0028	The colour beams are unsynchronized	The colour beams lost their calibration	Try to reset the product with the power switch or Report to the User Manual to recalibrate the product

SERVICE OPERATION

Removing the Square Plexiglas shape

To remove the Square Plexiglas shape, you must loosen the 4 screws in each corner with a screwdriver.

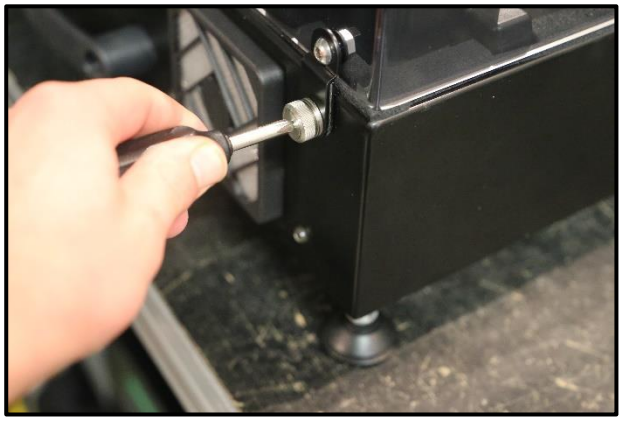


FIGURE 14 : REMOVING SQUARE PLEXIGLAS SHAPE (1/4)

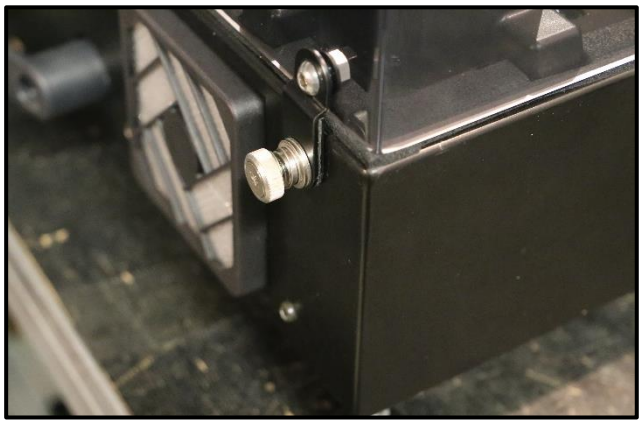


FIGURE 15 : REMOVING SQUARE PLEXIGLAS SHAPE (2/4)

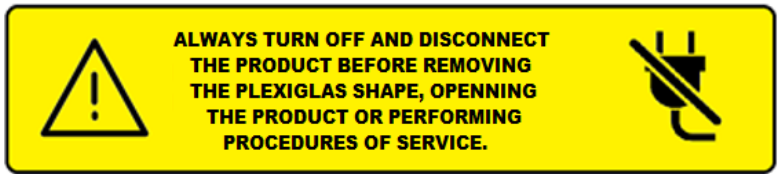
To avoid damaging the Square Plexiglas shape, always handle and store the Square Plexiglas shape with its protective cover.

When putting back the Square Plexiglas shape, always tighten the screw with a screwdriver

FIGURE 16 : REMOVING SQUARE PLEXIGLAS SHAPE (3/4)

FIGURE 17 : REMOVING SQUARE PLEXIGLAS SHAPE (4/4)

Square to Pyramid Plexiglas shape service procedure



The Pyramid Plexiglas shape is a service accessory (order ref: ACCE-000009) that you can switch with the Square Plexiglas shape to transform your IVL Square into an IVL Pyramid. According to the chosen shape, the light will spread differently in the space and will create different kinds of advanced shapes, the Pyramid-Plexiglas reinforces the decoration output of IVL Lighting.

Switching between the two configurations does not affect the 3R classification of the product.

This switch plexiglass shape service procedure is detailed below

1.Remove the Square Plexiglas shape by following the procedure describes in the previous page

FIGURE 18 : CHANGE FROM SQUARE TO PYRAMID SHAPE

2.Then, put the Pyramid shape on the IVL and close it by screwing the 4 screws in the corner and finish tightening with a screwdriver

FIGURE 19 : SCREWING THE PYRAMID PLEXIGLASS SHAPE

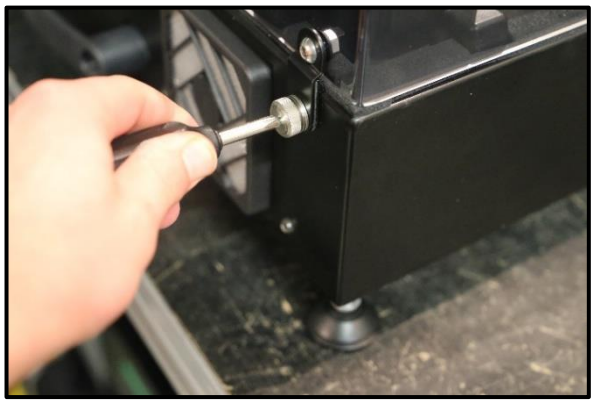


FIGURE 20 : FINISH WITH A SCREWDRIVER

Set Up Plate Service Procedure

To maintain optimal performance of the product, the light plan must be on the middle of each Tilt mirror.
If not, you must set the plate level using the Set Up Plate Accessory (order ref: ACCE-00013) according to the following procedure.

⚠ CAUTION!

Class 3R laser procedure. Avoid direct eye exposure.

1. Following the procedure in page 16 (removing the square Plexiglas shape) to replace the usual Square Plexiglas shape by the Set Up Plate Accessory (Figure 21) and screw it on the fixture.
2. On your control interface (GrandMA, DMX software on Pc, etc…), set the following parameters:
   (in DMX decimal value)
   a. CH1 at 255
   b. CH2 at 20
   c. CH3, CH4 at 255
   d. CH5, CH6, CH7 at 255
   e. CH 9 at 196 (The tilt's position must be 90° on the frost side towards the inside of the product).

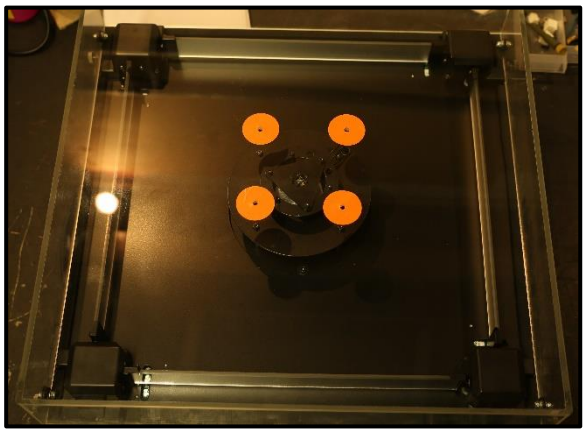


FIGURE 21 : SET UP PLATE ACCESSORY

3. ONLY when the Square Plexiglass shape is screwed on the fixture, plug the power cable and turn the fixture on.
4. Using a T3 long Allen Key, adjust the plate level circularly by applying the same settings to each angle. (Turn in the arrow direction to raise the plate, in the other direction to lower it).

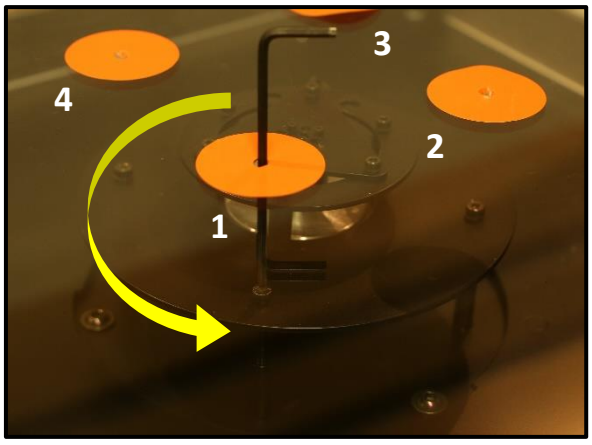


FIGURE 22 : RAISING THE PLATE LEVEL

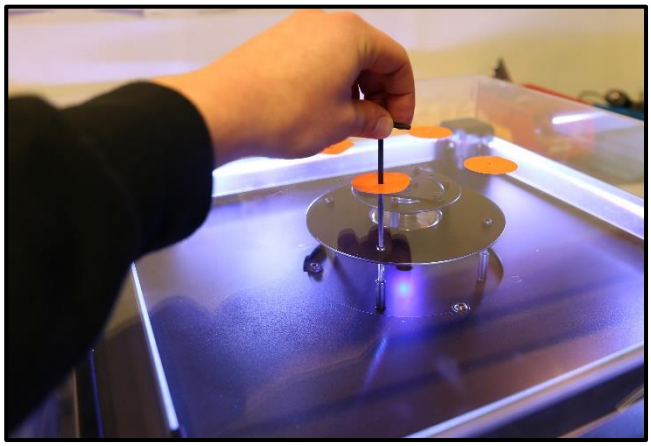


FIGURE 23 : PLATE LEVEL ADJUSTMENT

5. Repeat the operation until you have reached the correct height on all corners.

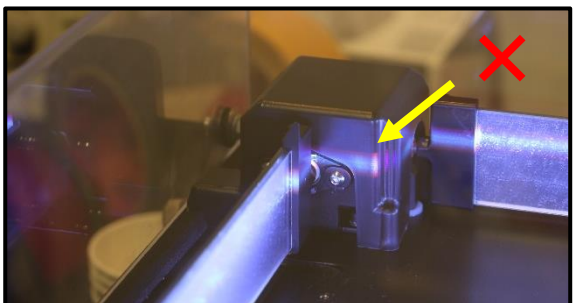


FIGURE 24 : BAD LEVEL

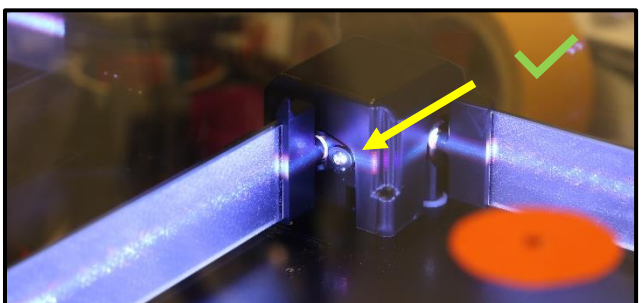
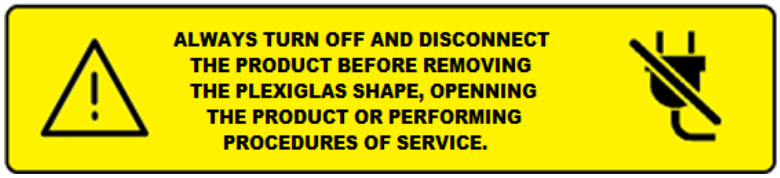


FIGURE 25 : GOOD LEVEL

Opening the IVL

Removing the Upper Part (1/2)



Make sure whether Square Plexiglass shape is removed or that the Square Plexiglass shape is locked in place before opening the product.

Remove the 10 Torx T20 screws as shown on the pictures below

FIGURE 27 : OPENING THE IVL (1/4)

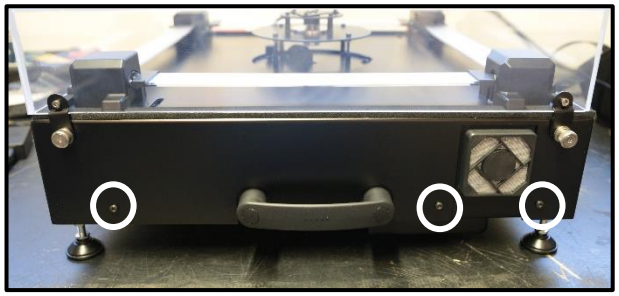


FIGURE 28 : OPENING THE IVL (2/4)

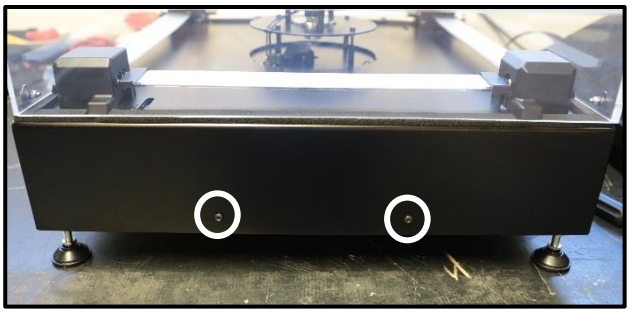


FIGURE 29 : OPENING THE IVL (3/4)

FIGURE 26 : OPENING THE IVL (4/4)

Removing the Upper Part (2/2)

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

- After the top part is unscrewed, pull it up to remove it. You must pay attention to the Earth wire (1)
- Do not put the top part as shown on figure 31 on its side, and place the cover on a soft surface.
- Unplug the Stepper Motor power cable (2) (Figure 30)

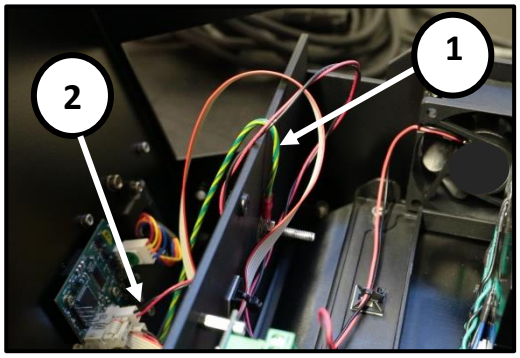


FIGURE 30 : REMOVING THE UPPER PART (1/3)

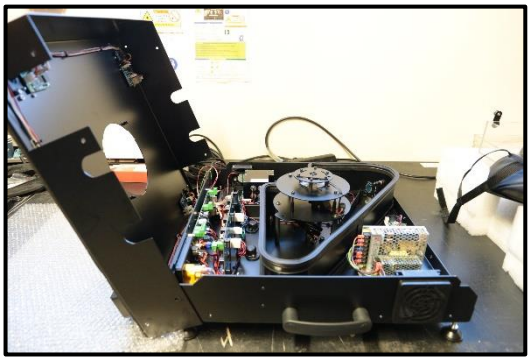


FIGURE 31 : REMOVING THE UPPER PART (2/3)

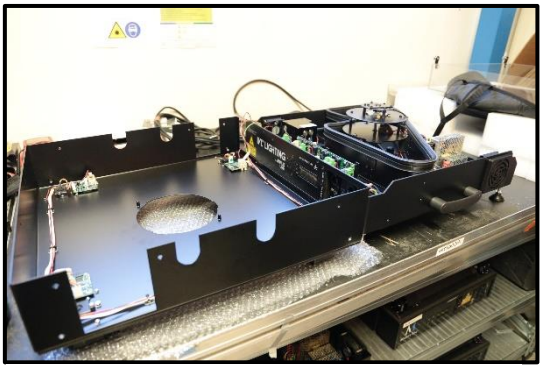


FIGURE 32 : REMOVING THE UPPER PART (2/3)

A. General parts

Check Power Supply (PSU)

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

There is two power supply parts.

The bigger one (1) supplies all the electronic boards in the lower part, and the little one (2) supplies the stepper motor boards.

If you need to know if PSUs are involved in a troubleshooting process, try to power the corresponding faulty board with an external 12Vdc power supply.

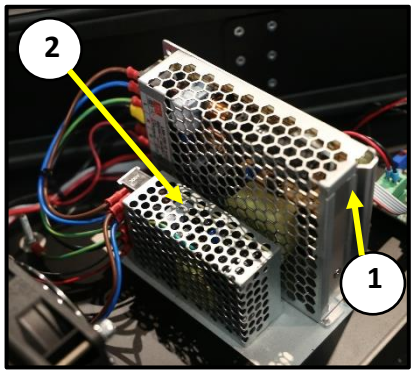
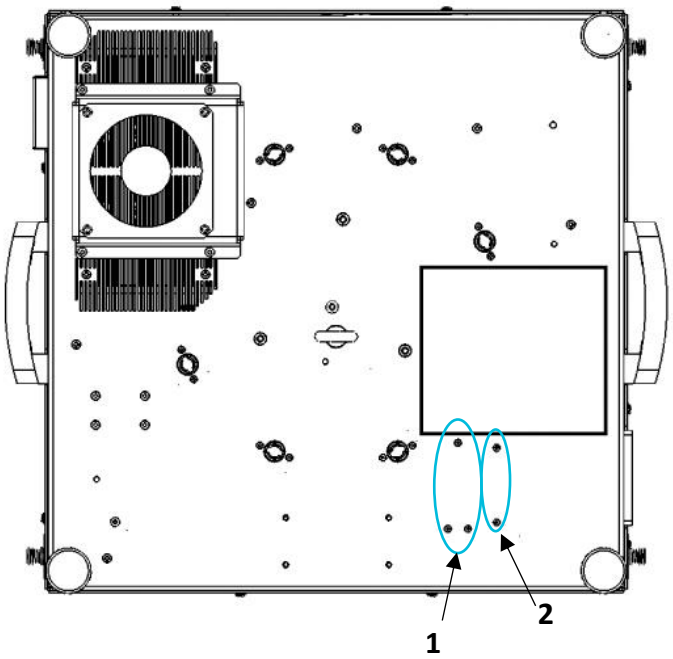


FIGURE 33 : POWER SUPPLY UNITS

Replacing Power Supply

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

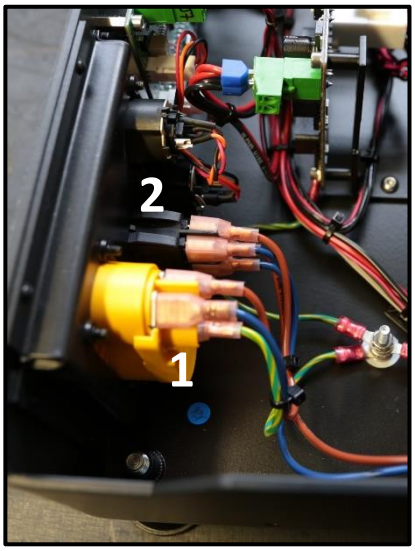
If you need to replace one of these, see the drawing below to know which are the corresponding screws.



Once the power supply has been unscrewed, you must pay attention to the wiring when replacing it.

To avoid any errors, refer to the wiring description in page 22

Power Supply wiring description



No	Connections
1	AC Power Connector
2	Power Switch
3	Upper Part PSU
4	Lower part PSU

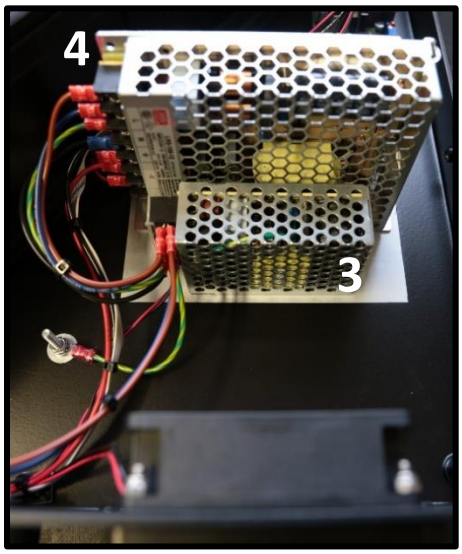


FIGURE 34: PSU WIRING DESCRIPTION (1/2)

FIGURE 35: PSU WIRING DESCRIPTION (2/2)

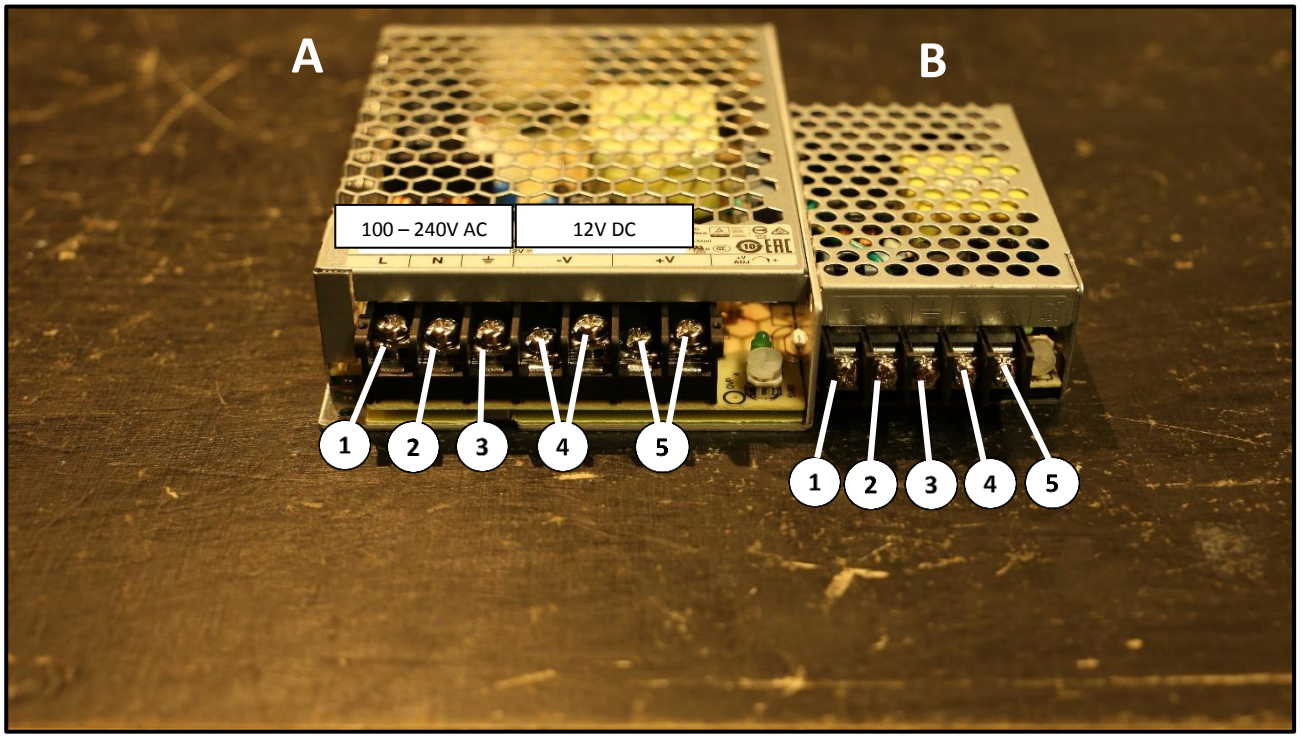
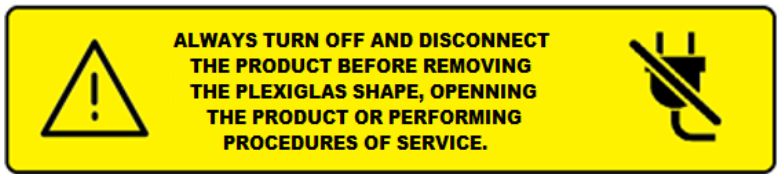


FIGURE 36: PSU PIN DESCRIPTION

Pin Description		Legend	A – Lower Part PSU	B – Upper Part PSU
1	Phase / Line		From "B" PSU	From AC Power Connector
2	Neutral			
3	Earth			
4	Ground		To Earth	To Earth
5	+12 Vdc		To Scanning Motor Board	To Stepper Motor Boards
			To Laser board	
			To Mainboard	
			To Fans	

Replacing Fans



As shown on page 10 in the Spare part view section, there are two side fans and a third one fixed under the fixture.

If you need to change one of these, you must pay attention to the rotation direction.

This is indicated by the two arrows engraved on the top side of the fan (figure 38)

A. Draw Fan

To remove the draw fan (on the left side), you must:

A.1. Remove the housing of the fan filter and the fan filter

A.2. Use an Allen key

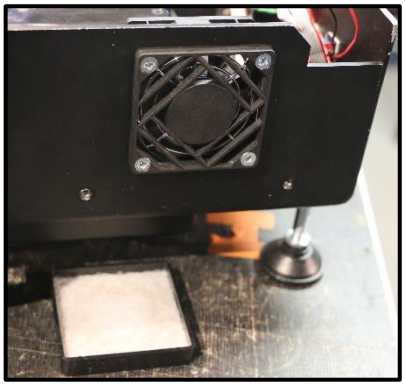


FIGURE 37: DRAW FAN

FIGURE 38: ROTATION WAY

B. Exhaust Fan

To remove the exhaust fan, you will need to have wrench key for the locknut in addition of the previous procedure.

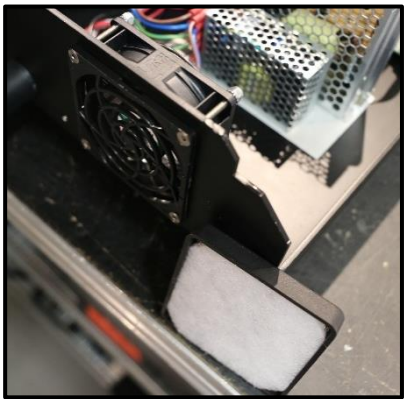


FIGURE 39: EXHAUST FAN

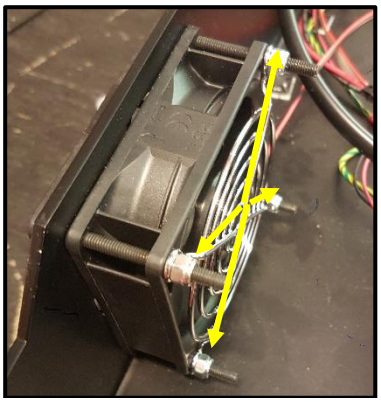


FIGURE 40: EXHAUST FAN REMOVING

Note that on the exhaust fan the safety grid is fixed last, unlike the draw fan

C. Bottom Fan

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

To replace the bottom fan (under the laser bloc), report to the pictures below using the following procedure:

C.1. Remove the metal cover by unscrewing the 4 Torx screws
C.2. Push the pins halfway to remove the fan from the metal cover
C.3. Remove only the pin without the pin insert
C.4. Unplug the fan cable

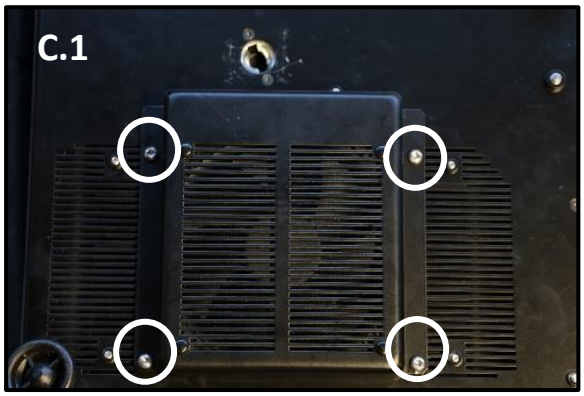


FIGURE 41: BOTTOM FAN

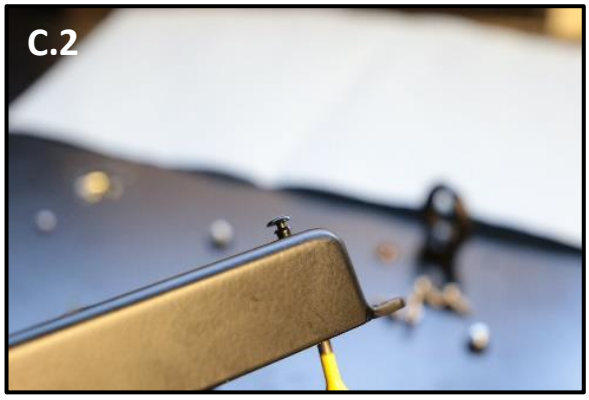


FIGURE 42: REMOVE THE PIN

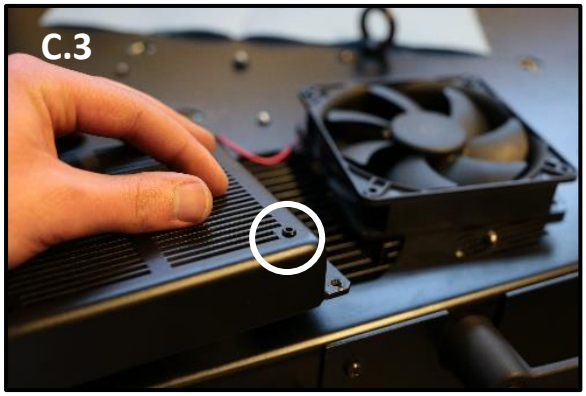


FIGURE 43: PIN INSERT

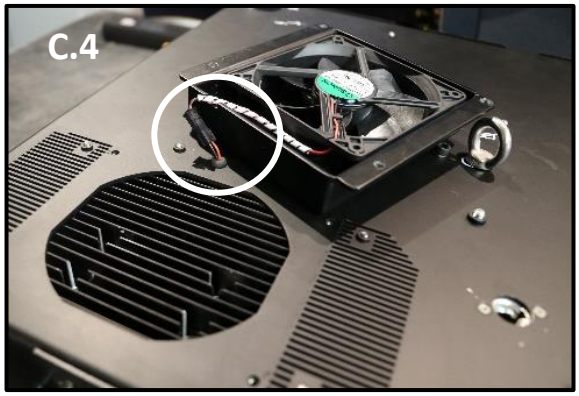


FIGURE 44: FAN CONNECTOR

Replacing Mainboard

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

Mainboard wiring

PCB Connector	Wire
1	12V
2	Laser Shutter
3	TTL Laser Signal
4	Analog Laser Signal
5	Scanning Board Signal
6	Stepper Motor Signal
7	DMX In
8	DMX Out
9	Exhaust Fan
10	Draw Fan Bottom Fan
11	Thermal Sensor

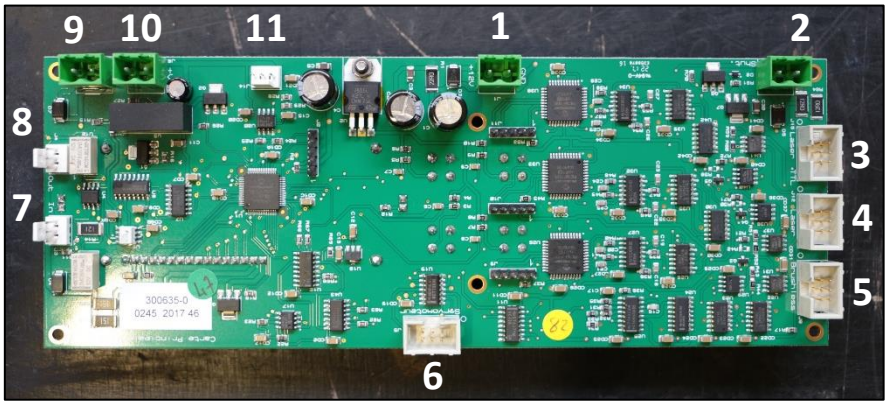


FIGURE 45: MAINBOARD WIRING

Remove the Mainboard

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

Unplug all cables before removing the Mainboard

Remove the Mainboard by unscrew the 6 Allen T2 screws (1) in Figure 46

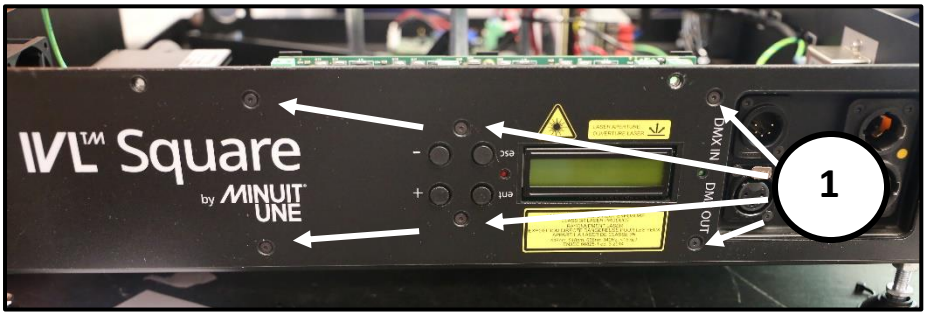


FIGURE 46: UNSCREW THE MAINBOARD

The Figure below shows an example of the screws (2) you need to hold

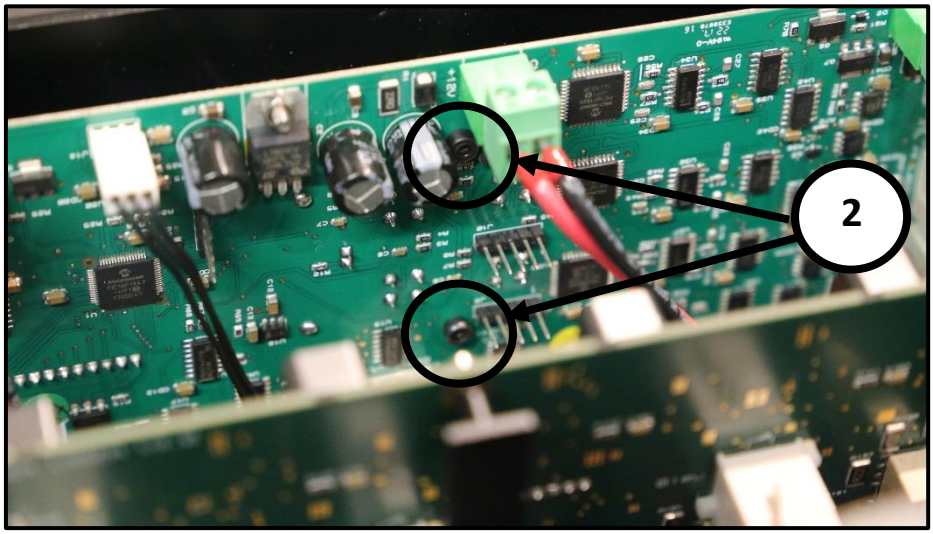


FIGURE 47: HOLD THE SCREWS INSIDE

B. Central Parts

Replacing the Scanning Motor

1. Unplug the Scanning Motor cable
2. Remove the 3 Allen T2,5 screws
3. Cut the cable tie and lift slightly the bulkhead (A) to remove the cable

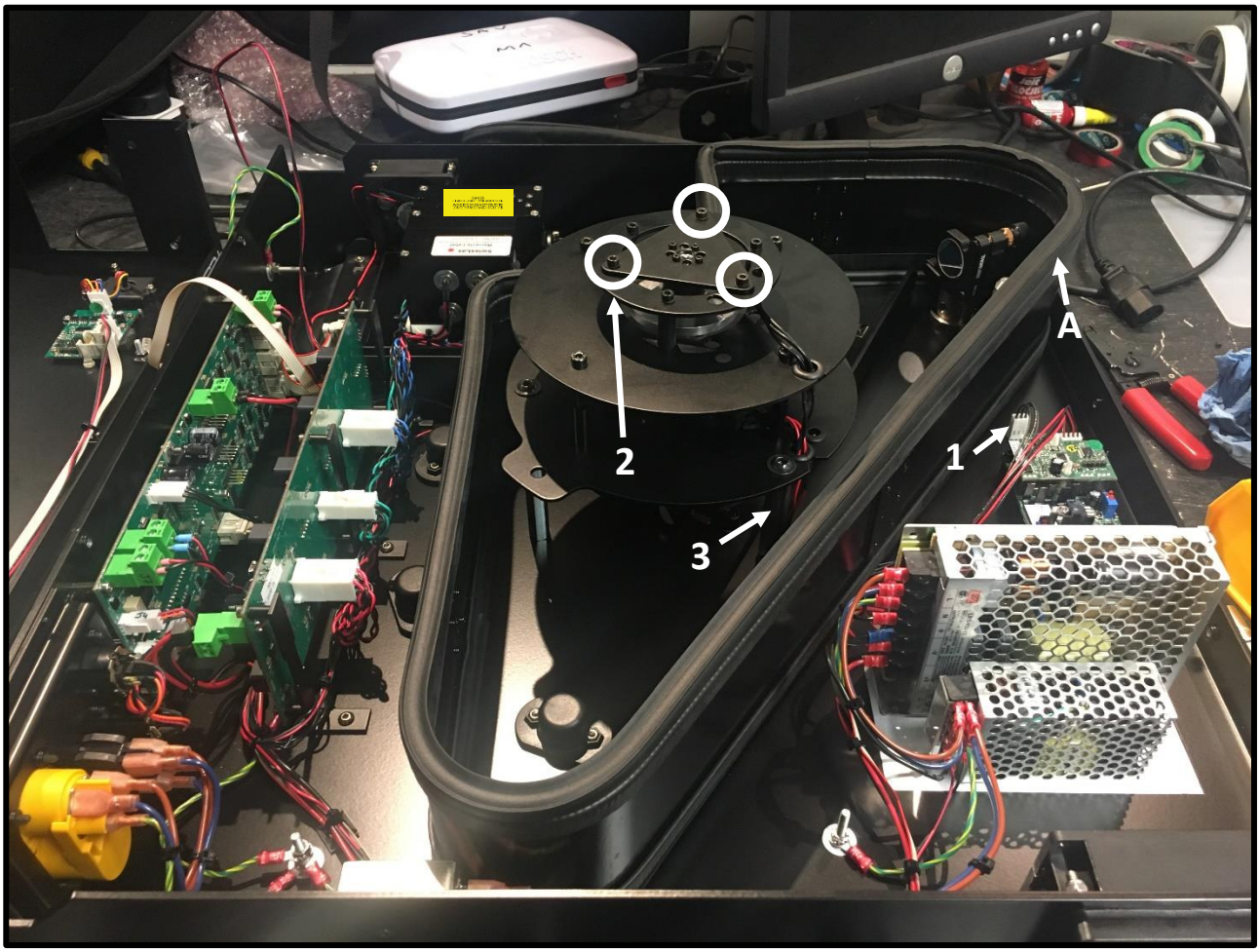


FIGURE 48: SCANNING MOTOR REMOVING

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

Replacing Scanning Mirror Board

1. Unplug all cables
2. Remove the 4 T2,5 screws
3. Replace the Scanning Mirror board
4. Screw back the Scanning Mirror board
5. Plug back all cables following the Scanning Mirror board wiring

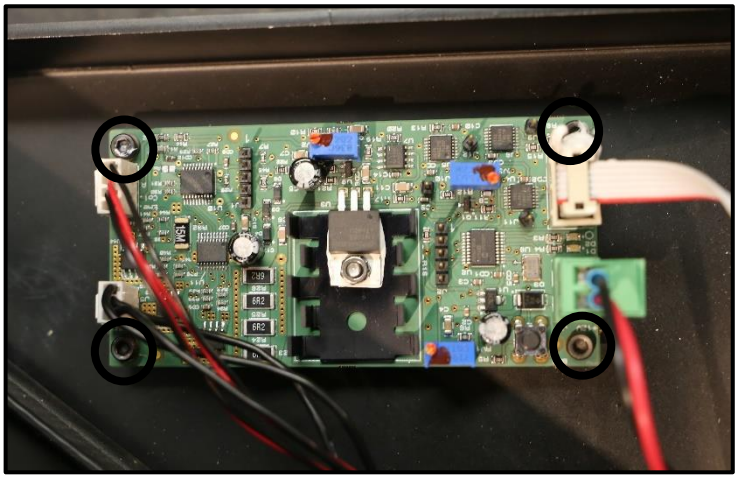


FIGURE 49: SCANNING MIRROR BOARD REMOVING

Scanning Mirror Board wiring

PCB Connector	Wire
1	12V
2	Scanning Mirror sensor Signal
3	Scanning Mirror Sensor
4	Scanning Mirror
5	Pushbutton Switch

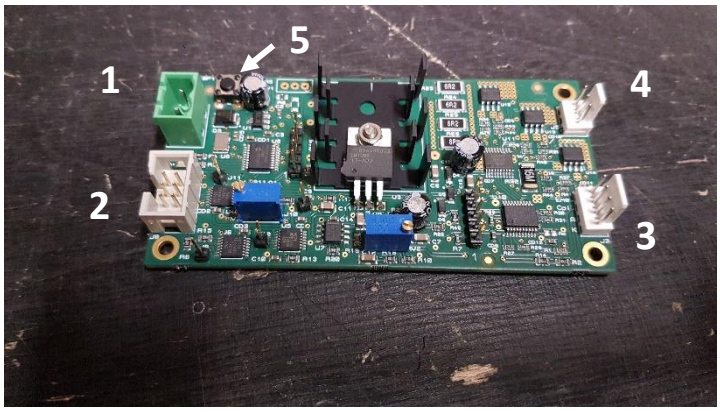


FIGURE 50: SCANNING MOTOR BOARD WIRING

Replacing Scanning Mirror Sensor

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

1. Using a T2,5 Allen key, remove the 2 screws by passing through the holes as shown in the picture above
2. Disconnect it from the scanning mirror board
3. Put the new one

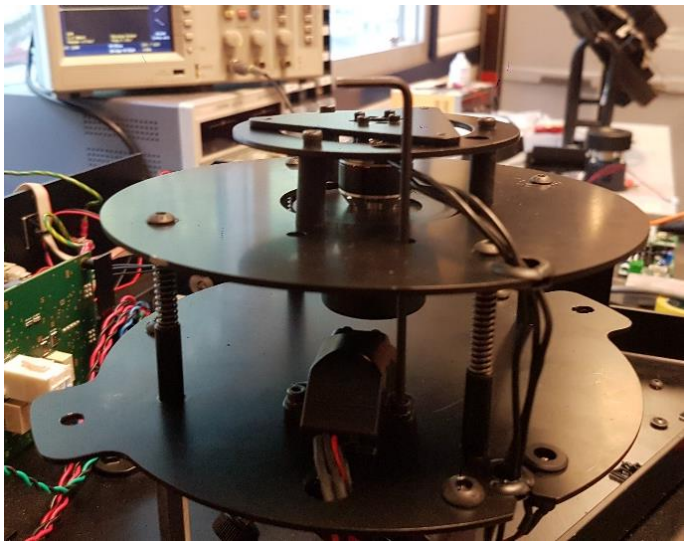


FIGURE 51: SCANNING MIRROR SENSOR REPLACING

Report to the “Set the Scanning Mirror sensor” section, in pages 32 and 33 to set it.

Start Scanning Mirror without AC Power / DMX

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

To start the Scanning Motor <u>without any AC power</u>, you must:

1. Disconnect the 12V connector on the scanning mirror board
2. <u>Use an external</u> 12Vdc power supply to feed the scanning mirror board (A)
3. Get the power connector from the product to screw it on your external 12VDC power supply cables (B)

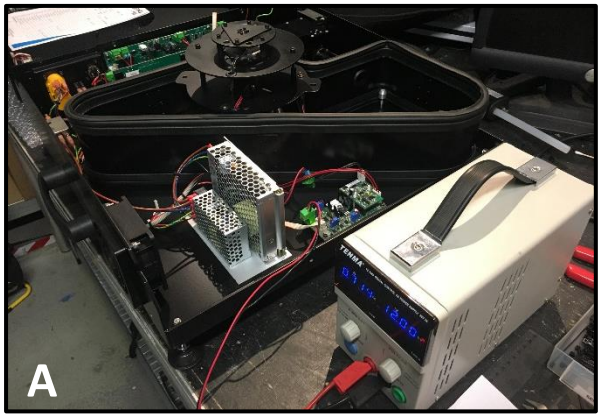


FIGURE 52: EXTERNAL +12VDC POWERING

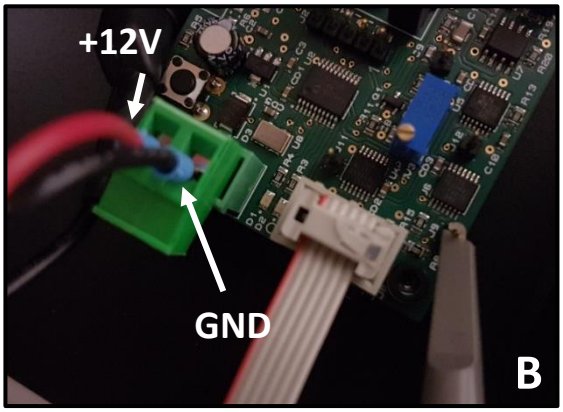


FIGURE 53: POWER CABLES DESCRIPTION

4. Press the pushbutton switch
   The green LED flashes few seconds

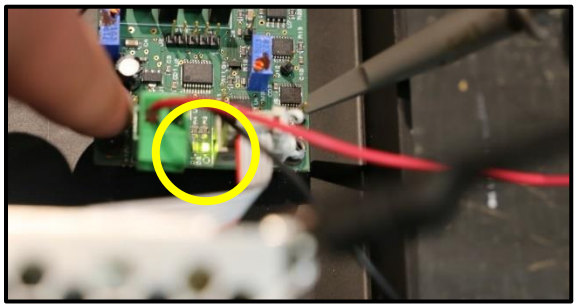


FIGURE 54: GREEN LED

5. The Red LED lights up until the Scanning Mirror signal is good.
   It means that you can use this LED status as an indicator to set the Scanning Mirror sensor signal detection without any measuring instrument.

   Report to the corresponding section in page 33 to set the Scanning Mirror sensor signal manually.

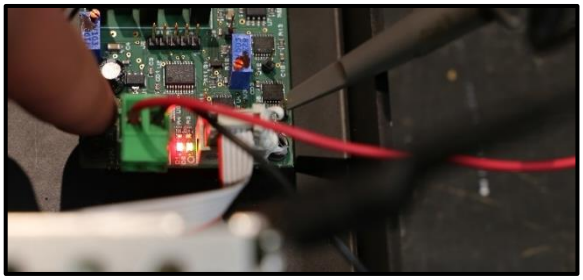


FIGURE 55: RED LED

Check / Invert the rotation way

If the rotation way is not correct (normally the Scanning Mirror rotates in a counterclockwise direction), you must apply the following procedure

1. Remove the Scanning Mirror cable
2. Using a flat nose plier, remove the polarizer
3. Put it back in the other direction, being careful not to bend the pins
4. Reconnect the Scanning Mirror cable

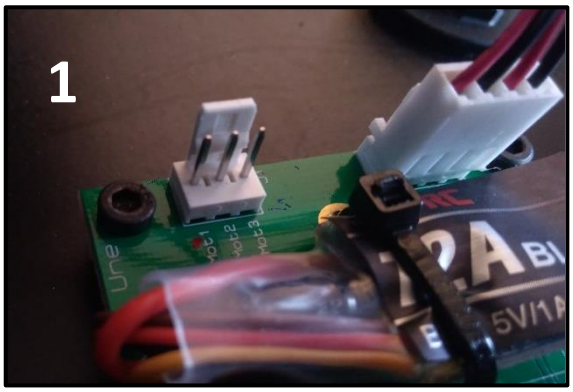


FIGURE 56: REMOVE SCANNING MIRROR CABLE

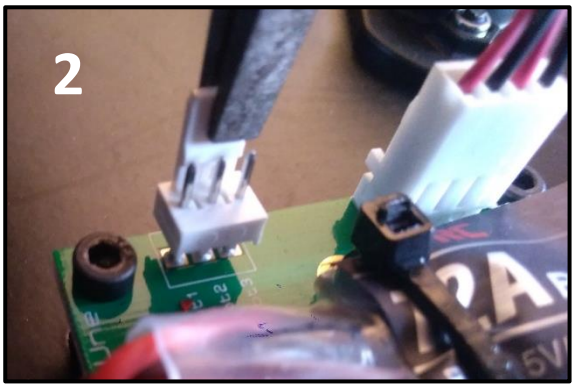


FIGURE 57: REMOVE THE POLARIZER

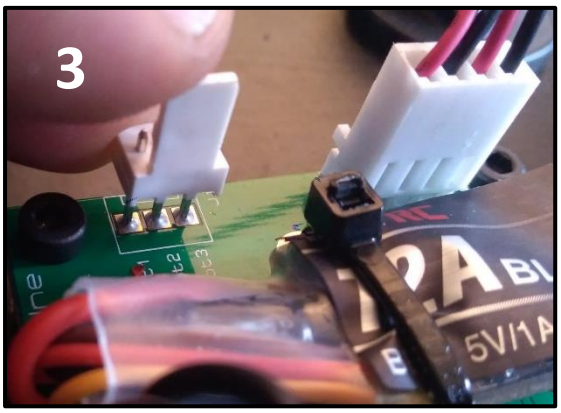


FIGURE 58: REVERSE THE POLARIZER

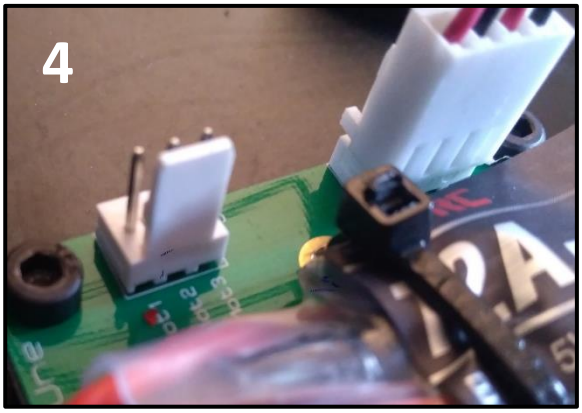


FIGURE 59: PUT THE POLARIZER BACK

Check the Scanning Mirror sensor signal with an oscilloscope

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

Run the Scanning Mirror according to procedure page 30 and:

- Connect whether a jack connector (A) or an oscilloscope probe to the “J9“pin (B)
- Set the corresponding channel of your oscilloscope
  according to the “Scanning Mirror sensor signal: Acceptance Criteria”, figure 62
- Check that the results correspond to the figures 63 and 64

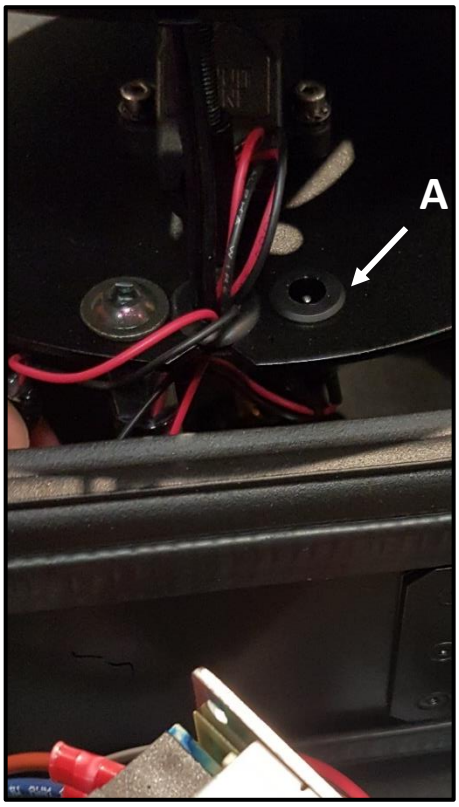


FIGURE 61: SCANNING MIRROR SENSOR SIGNAL PINOUT (FROM OUTSIDE)

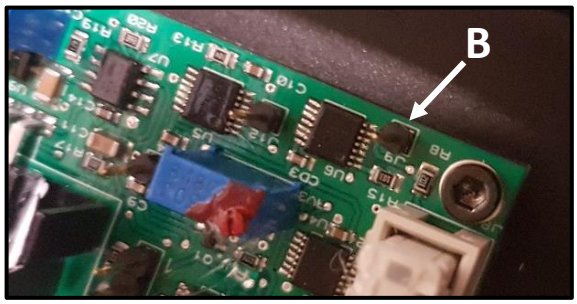


FIGURE 60: SCANNING MIRROR SENSOR SIGNAL PINOUT (FROM THE BOARD)

Scanning Mirror sensor signal: Acceptance Criteria	
1: V high	> 4,5V
2: V min	> 0.4V
3: Pulse width **Min** **Nominal**	 > 100µS @ 2V > 120µS @ 2V

FIGURE 62: SAFETY SIGNAL CRITERIA

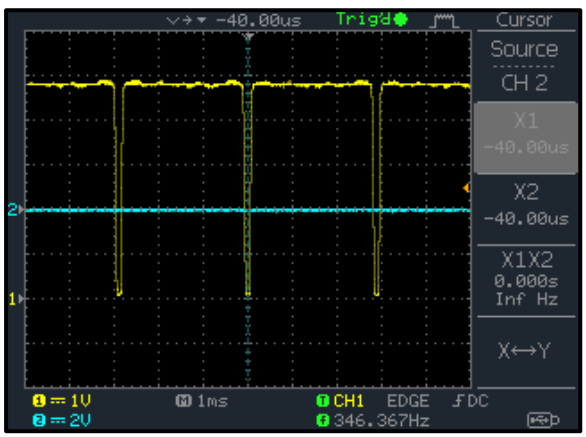


FIGURE 63: SAFETY SIGNAL WAVE

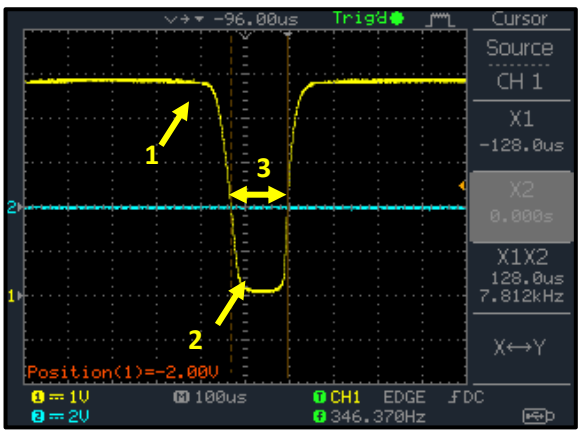
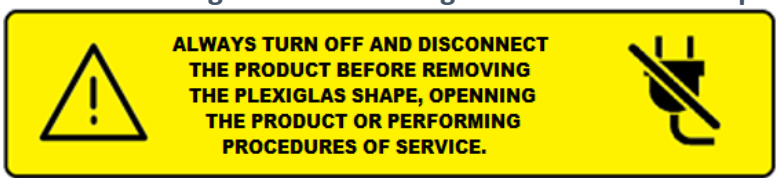


FIGURE 64: ZOOMED SAFETY SIGNAL WAVE

Set the Scanning Mirror sensor signal with an oscilloscope



Run the Scanning Mirror according to procedure page 30 and:

If you see that the Scanning Mirror sensor signal detection doesn't corresponds to the safety signal on the procedure above (figures 62, 63, 64), set the Scanning Mirror sensor position:

1. Loosen the 2 screws with a T2,5 Allen key as on the picture beside
2. Move the Scanning Mirror sensor position until you get a signal that corresponds to the safety signal described above

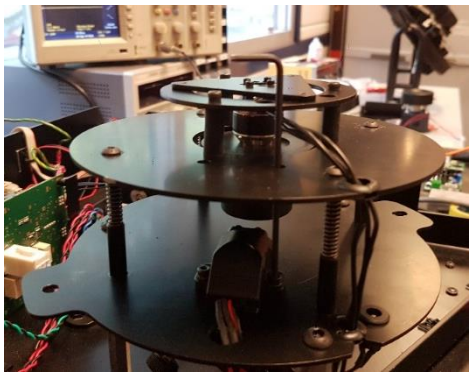


FIGURE 65: SCREW LOOSENING FOR POSITION ADJUSTMENT

Set the Scanning Mirror sensor signal without an oscilloscope

Run the Scanning Mirror according to procedure page 30.

If the Scanning Mirror sensor signal detection doesn't correspond to the safety criteria described on the previous page (figures 62, 63 and 64), the Red LED is ON and static, and the Green LED flashes

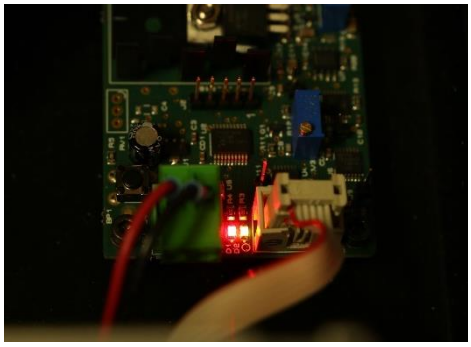


FIGURE 66: BAD SAFETY SIGNAL INDICATOR

1. Loosen the 2 screws with a T2,5 Allen key as on the picture above
2. Move the Scanning Mirror sensor position until the Red LED is OFF (The Green LED still flashing)

3. Hold the pushbutton until the Green LED stop flashing to stop the Scanning Mirror rotation.

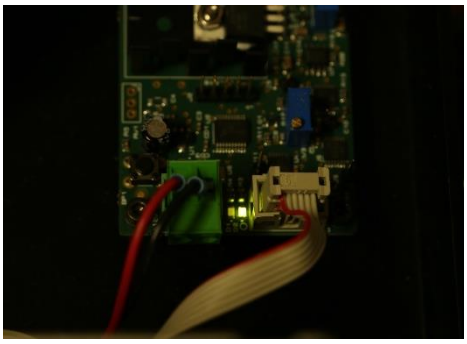
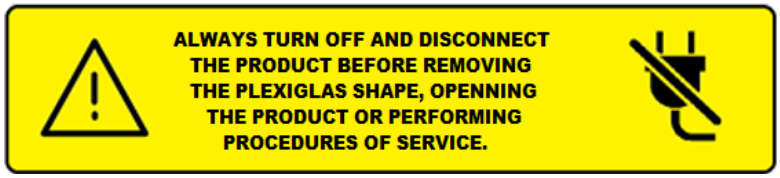


FIGURE 67: GOOD SAFETY SIGNAL INDICATOR

C. Tilt Mirror Parts



Motor-Mirror coupling

Motor-Mirror coupling is composed of three parts. Two metallic parts fixed on the motor and the mirror axes (1), and a third in plastic making the coupling (2).

This functional part may be defective after a physical choc of the product (during a hard travel for example).

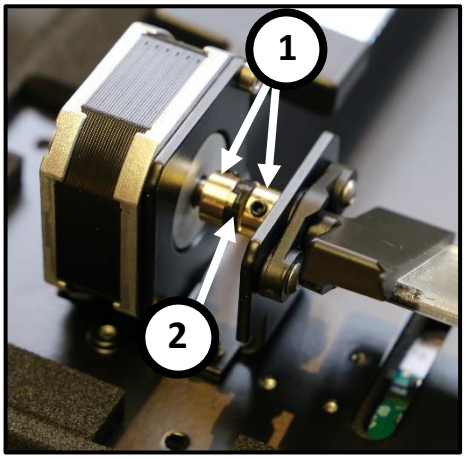


FIGURE 68: MOTOR-MIRROR COUPLING PARTS

Zero Sensor

The Zero Sensor (3) is an optical sensor that set the zero-reference position during initialization or reset.

The pin on the mirror must pass through this sensor. If not, go to the procedure in the next page.

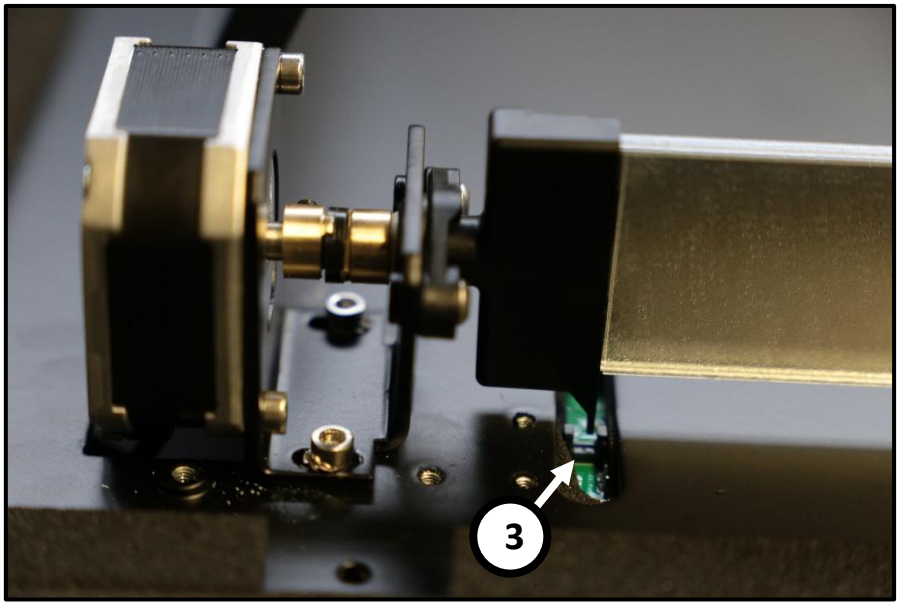


FIGURE 68: ZERO SENSOR

Zero Sensor – Tilt Detector setting procedure

a) Loosen the two screws (1)
b) Adjust the Tilt position (2) in the same time that the Stepper Motor support (3) to set the Pin in the detector
c) Screw back the two screws paying attention to the motor orientation as indicated on figures 69 and 70.

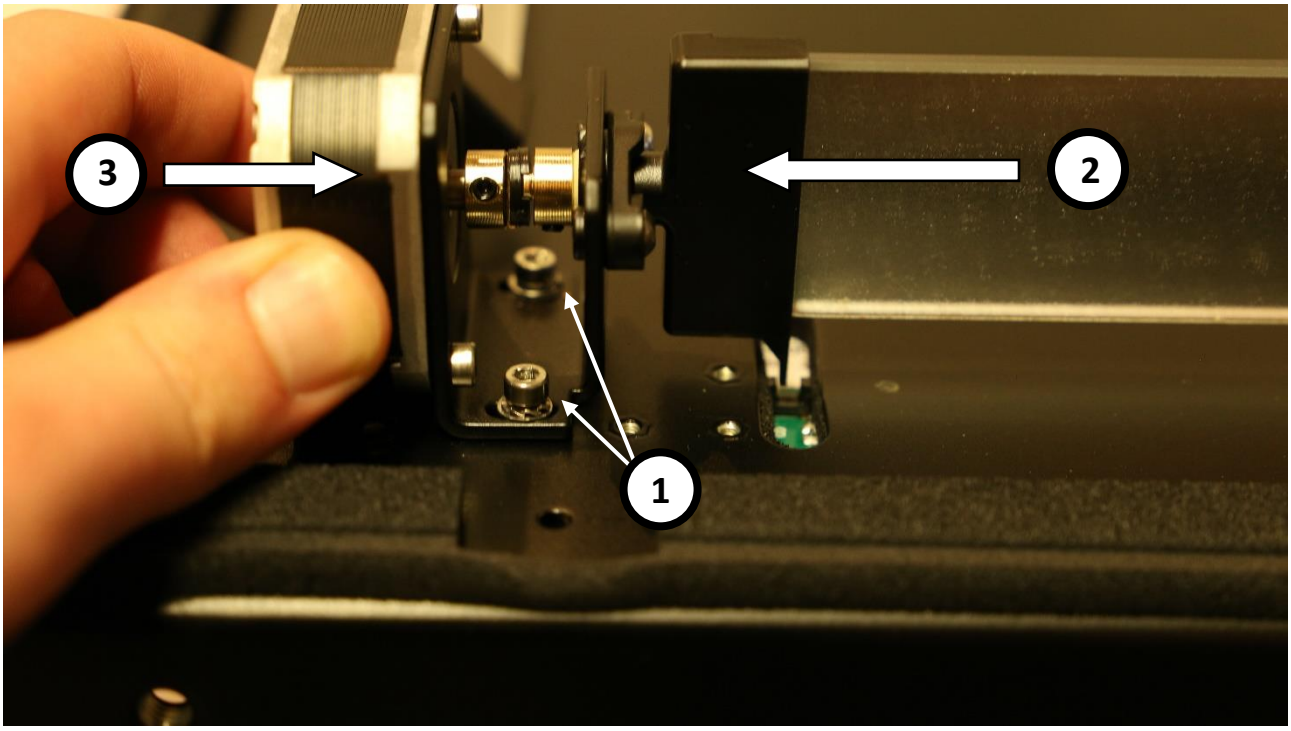


FIGURE 68: TILT DETECTION – SETTING PROCEDURE

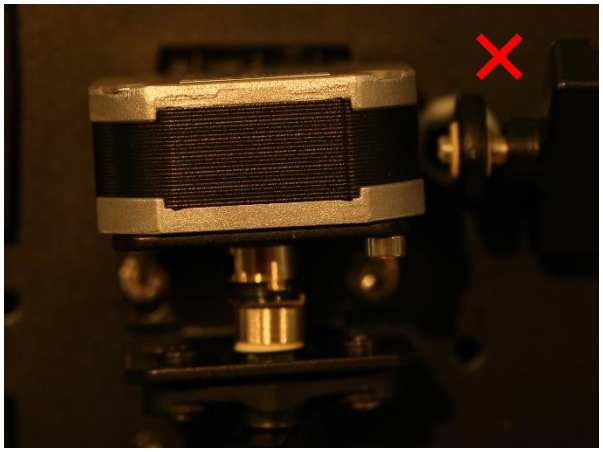


FIGURE 69: BAD MOTOR ORIENTATION

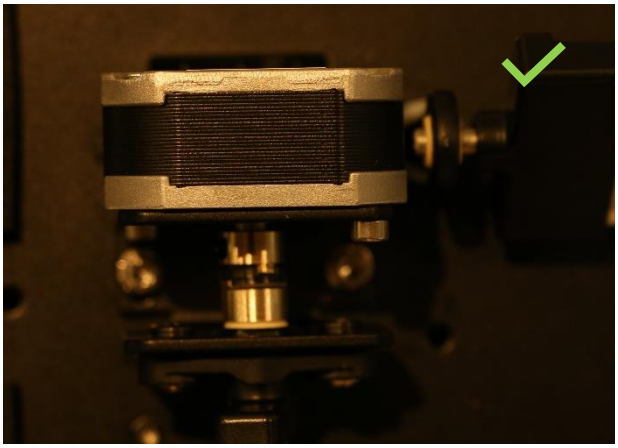


FIGURE 70: GOOD MOTOR ORIENTATION

Replacing the Stepper Motor (A)

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

A.

A.1. Place the top cover of the product on a soft surface

A.2. Unplug the Stepper Motor cable

A.3. Unscrew the Stepper Motor cover (1), (2), (3)

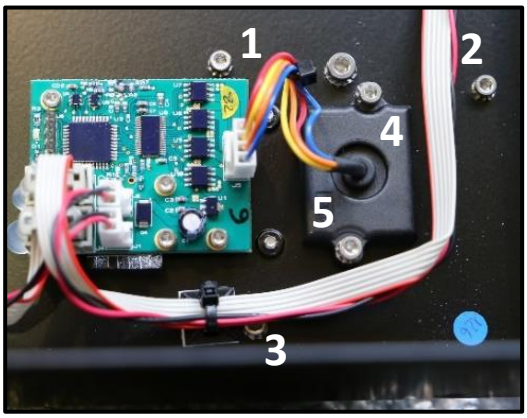
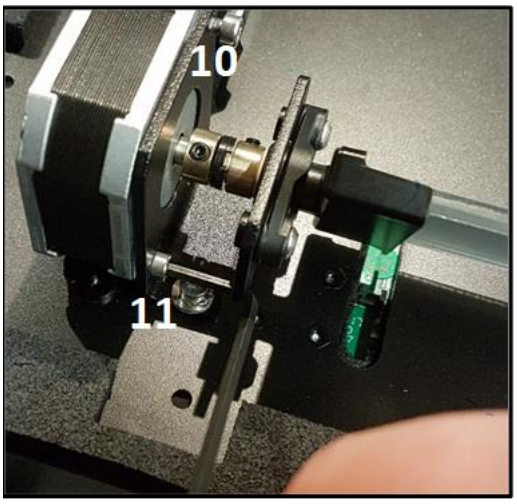


FIGURE 71: REMOVE THE MOTOR COVER AND THE WIRE GLAND

A.4. Unscrew the wire gland (4), (5)

A.5. Remove the top cover to have access to the coupling part

A.6. Unscrew the T2,5 Allen screws (10), (11) to remove the Stepper Motor



A.7. Remove the Stepper Motor by passing the wire gland through the top cover

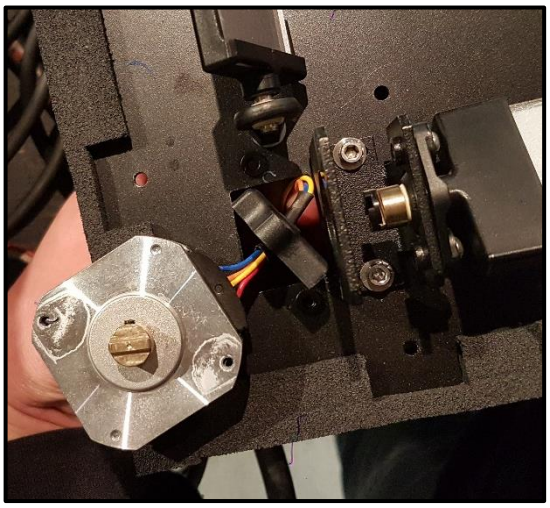


FIGURE 72: PASSING THE CABLE GLAND THROUGH THE HOLE

A.8. Reassemble the Stepper Motor by screwing it back on its support

A.9. Make sure that the coupling is well done (1) by maintaining the Tilt Mirror during reassembly

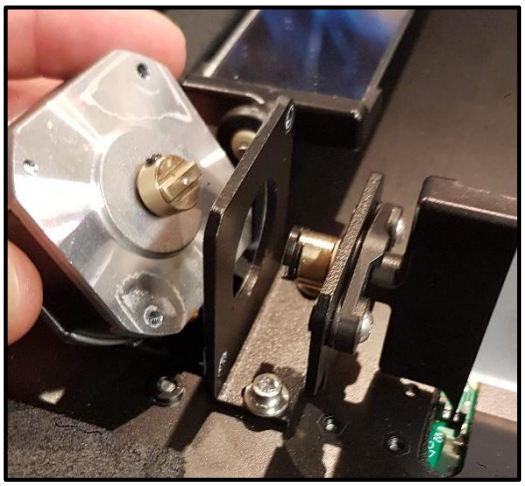


FIGURE 73: NEW STEPPER MOTOR ASSEMBLY

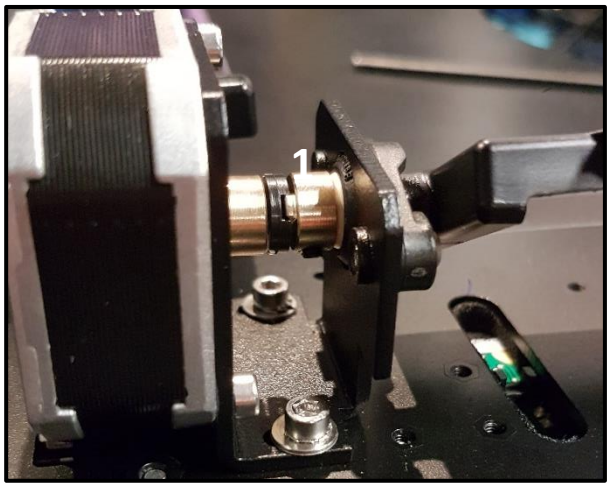


FIGURE 74: ADJUSTMENT OF THE MOTOR-MIRROR COUPLING

A.10. Be careful and note that the Tilt detector pin position is good regarding the Zero Sensor

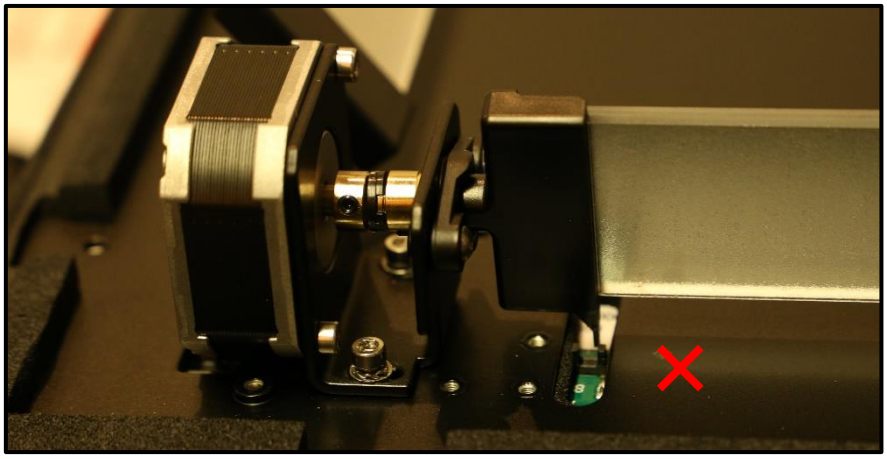


FIGURE 75: BAD TILT DETECTOR PIN POSITION

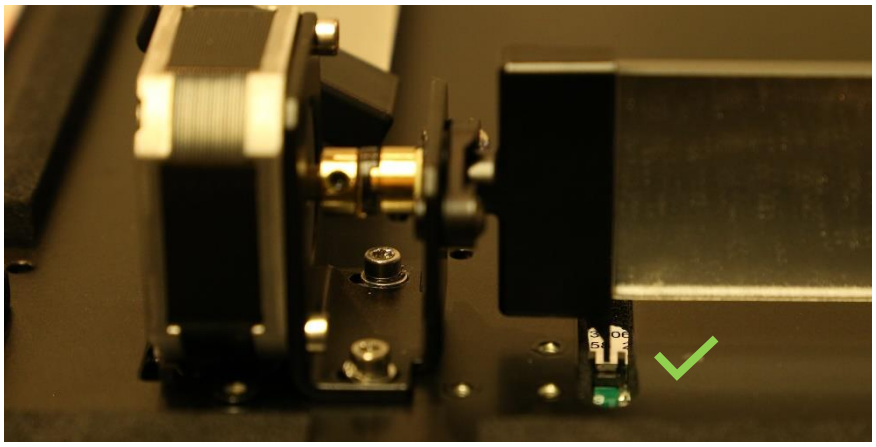


FIGURE 76: GOOD TILT DETECTOR PIN POSITION

Replacing the TILT Mirror (B)

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

B.1. Place the Upper metal part of the IVL on a soft surface
B.2. Unscrew the T2,5 Allen screws (1), (2), (3) to remove the Stepper Motor cover
B.3. Remove the Upper metal part to have an access at the coupling part
B.4. Unscrew the T2 Allen screws (6), (7) and loosen the T2.5 Allen screws (8), (9)

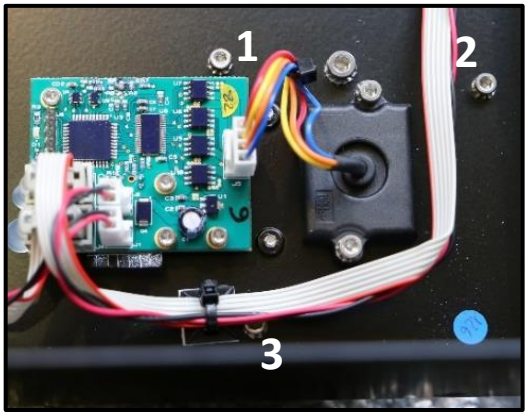


FIGURE 77: REMOVE THE MOTOR COVER

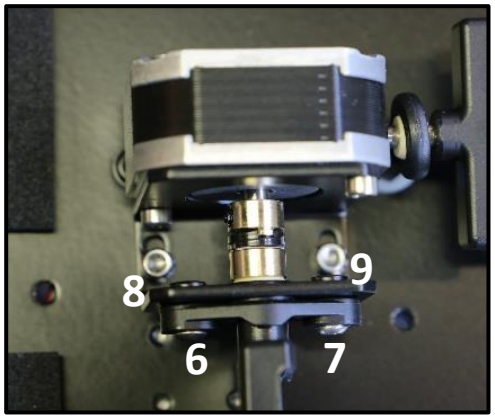


FIGURE 78: REMOVE THE TILT MIRROR FIXATION

B.5. Incline the Stepper Motor support and remove the Tilt Mirror first from the left side and then from the right side
B.6. Follow the reverse procedure to reassemble the tilt by paying attention to the Tilt detector pin position as it shown on the previous page.

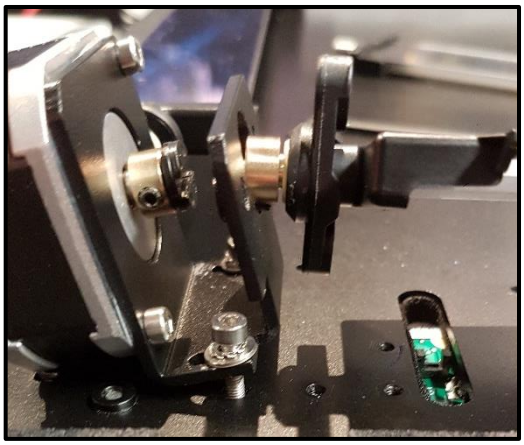


FIGURE 79: INCLINE THE STEPPER MOTOR SUPPORT

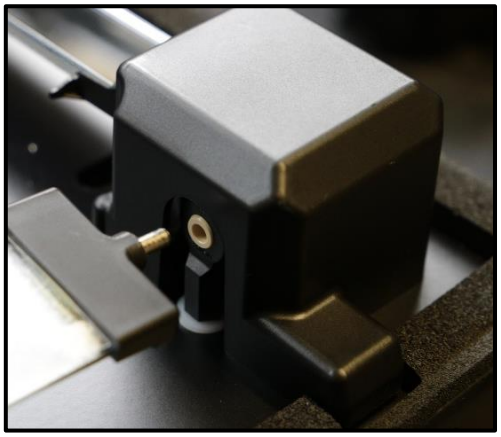


FIGURE 80: INCLINE THE STEPPER MOTOR SUPPORT

Stepper Motor Board Pinout

Connector	Description
A	+12 Vdc IN / OUT
B	Data Signal IN / OUT
C	Stepper Motor

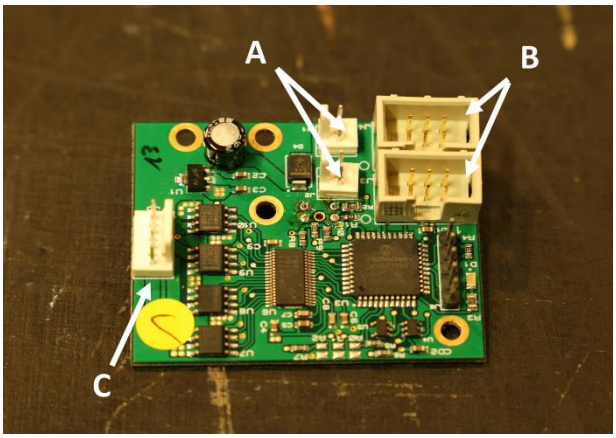


FIGURE 81: STEPPER MOTOR BOARD PINOUT DESCRIPTION

Replacing Stepper Motor Board

ALWAYS TURN OFF AND DISCONNECT THE PRODUCT BEFORE REMOVING THE PLEXIGLAS SHAPE, OPENNING THE PRODUCT OR PERFORMING PROCEDURES OF SERVICE.

The Stepper Motor Board may be replaced by removing the 4 T1,5 Allen screws (1)

NOTE:

1. Be careful that the tilt pin pass through the optical sensor when you will reassemble the Stepper Motor Board (see page 37)

2. If you need replace a Stepper Motor Board, you need to know its address ID.
   Report to the next page to see the addressing ID description

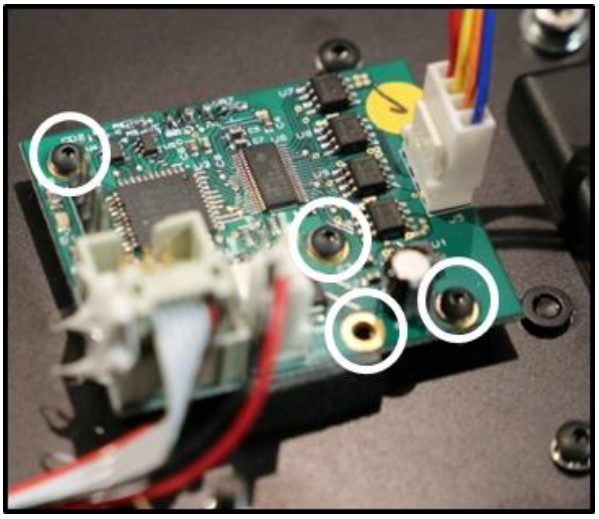


FIGURE 82: STEPPER MOTOR BOARD REPLACEMENT

Stepper Motor Board addressing ID

The Stepper Motor Boards are identified by Binary digital logic.

Each diagram below shows the binary combination required for each Stepper Board ID. The black dots represent a shunt between 2 electronic points

A shunt represents a ”0” and no shunt represent a “1”

As shown on the picture beside there are 2 shunt on the two first connections and no shunt on the third one.

So on the figure 83 the binary ID is “001” and its decimal address is “2”

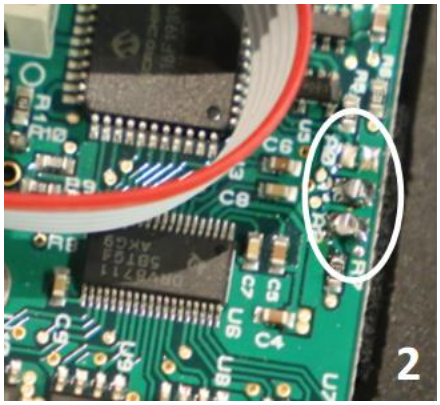


FIGURE 83: STEPPER MOTOR BOARD ADDRESSING PIN

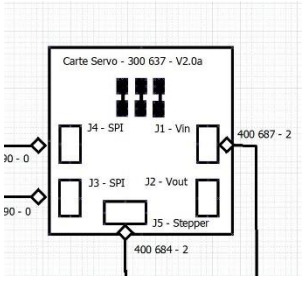


FIGURE 84: STEPPER MOTOR BOARD ADDRESS 1

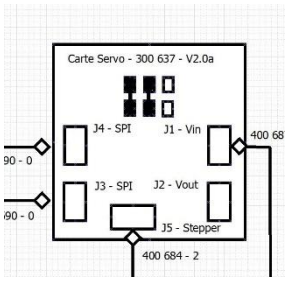


FIGURE 85: STEPPER MOTOR BOARD ADDRESS 2

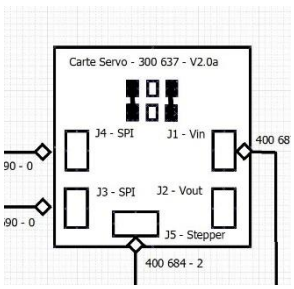


FIGURE 86: STEPPER MOTOR BOARD ADDRESS 3

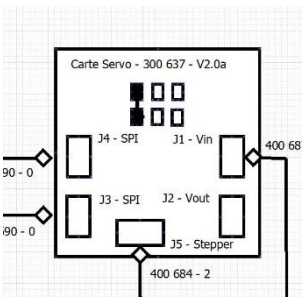


FIGURE 87: STEPPER MOTOR BOARD ADDRESS 4

Maintenance

This product does not require any regular scheduled maintenance to keep the product in compliance

Cleaning

Excessive dust, smoke particles and fog fluid residues degrade performance, causes overheating and will damage the product.

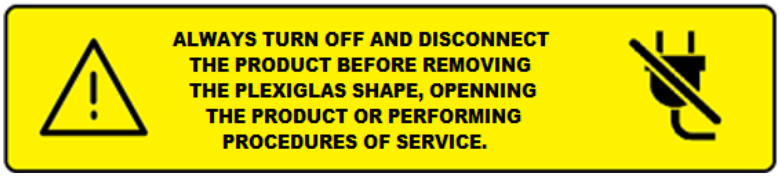
The product should be cleaned regularly to obtain maximum performance and brightness.

The frequency of cleaning depends on the environmental factor where the product is used. We advise you to do visual check on the Plexiglas shape after each use of the product to determine if a cleaning is necessary.

Always clean the product on a well-lit clean area.

Damage caused by inadequate cleaning or service is not covered by the product warranty.

Scanning Mirror cleaning



Optical components in this section have very sensitive coating and can be scratched easily if you do not use or clean in the good way. Scratched optical component is not a warranty issue.

If not cleaned regularly, brightness will decrease.

Scanning mirror and glass

A. Unscrew the scanning motor (section “B. Central Parts”, page 27)
B. Clean the Scanning Mirror (1. Figure 89) and the glass (2. Figure 89) with a soft cotton swab soaked with iso alcohol and / or drag a soft lens tissue or microfiber cloth on the mirror.

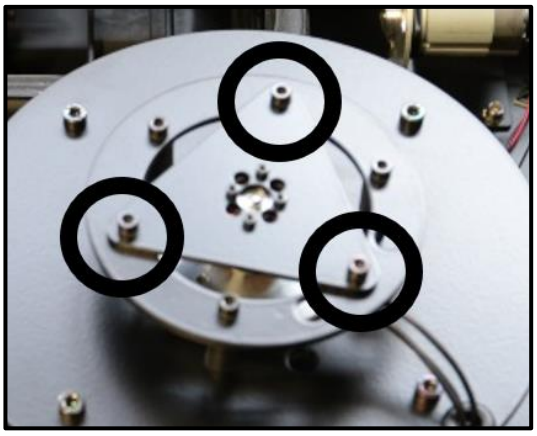


FIGURE 88: SCANNING MIRROR REMOVING

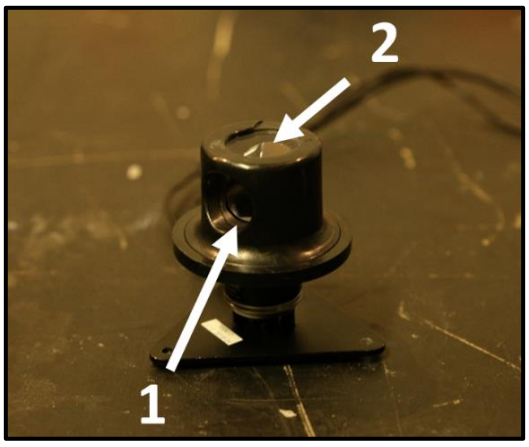
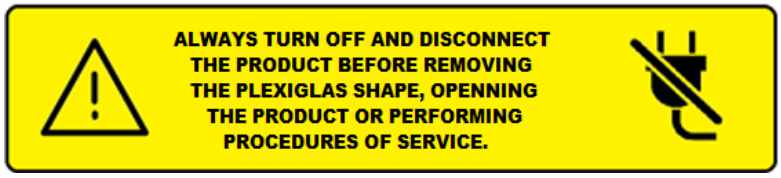


FIGURE 89: SCANNING MIRROR CLEANING

Inside mirror cleaning



A. Open the IVL (procedure page 19)
B. Do the same cleaning procedure like above for the inside mirrors.

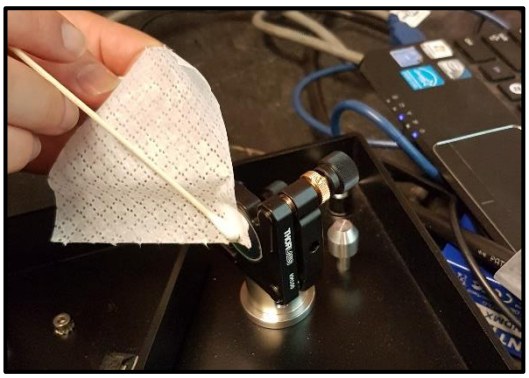


FIGURE 90: INSIDE MIRROR CLEANING

Fans cleaning

Fan 80 and 60 mm (Side Fans)

If fan filter and fan are not cleaned regularly, airflow could be obstructed and causes overheating which will degrade performance and could cause damage to the product.

Fan filter

A. Remove the housing of the fan filter and the fan filter.
B. Wash the filter with warm water with a little mild detergent until it is clean.
C. Let the filter dry completely. Do not install a damp filter as moisture damages the fixture.
D. Install the fan filter back.

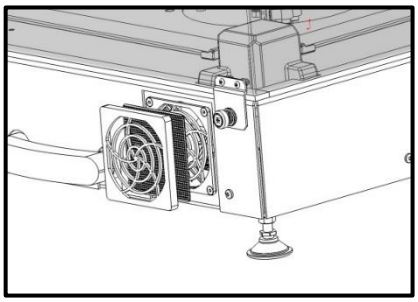


FIGURE 91: FAN FILTER CLEANING

Fan blade

If there is a lot fog fluid residues on the fan blades, this section describes how to clean the fans inside

A. Remove the housing of the fan filter and the fan filter.
B. Remove the 4 screws
C. Clean the fan blades by using a bent nose pliers with the same microfiber cloth
D. Install the fan filter back.

FIGURE 92: UNSCREW THE FILTER HANDLER

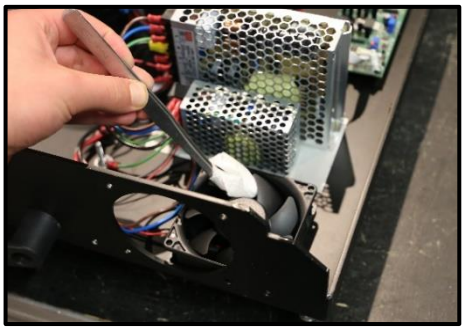


FIGURE 93: FAN BLADES CLEANING

Fan 120 mm (Bottom Fan)

Report to the part “C. Bottom” in section “Replacing Fans”, page 23, to know how disassemble the Bottom Fan

1. Take a wet cleaning paper
    a. Clean the protective cover
    b. Clean the blades
    c. Clean the heatsink

BE CAREFUL WITH HEATSINK CLEANING

Wait for a cooling down before cleaning

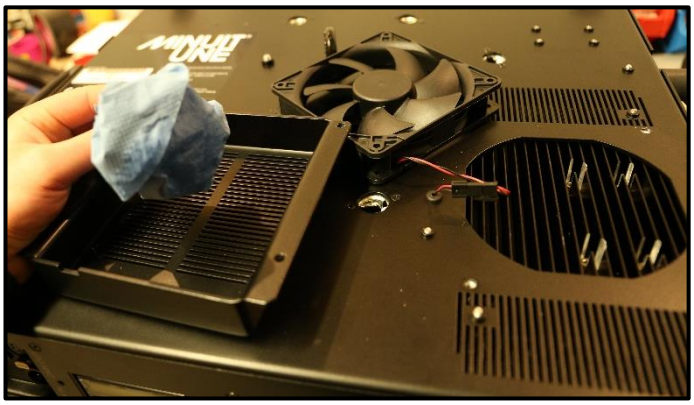


FIGURE 94: FAN 120MM CLEANING

2. If there is accumulation of greasy dust trapped in the heatsink, use a brush to remove it before cleaning with the wet paper

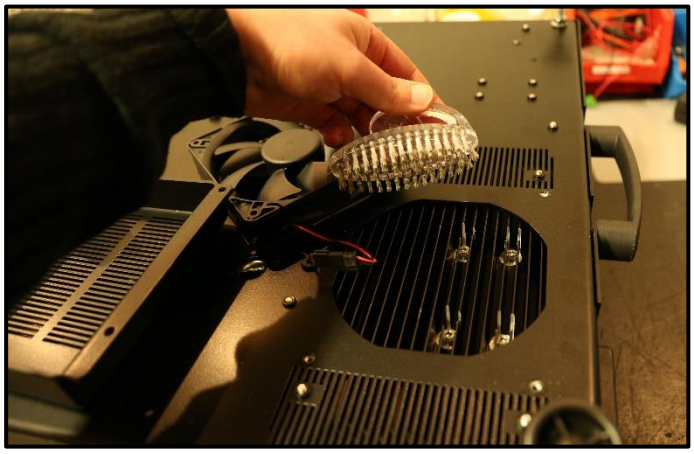


FIGURE 95: HEATSINK CLEANING

Square Plexiglass Shape and Tilt Mirrors cleaning

Square Plexiglass and Tilt Mirrors are made in Plexiglass and are really sensitive to abrasive product. **Do not use alcohol or solvent to clean those parts or you will damage them.**

If not cleaned regularly, brightness will decrease.

To clean the Square Plexiglass Shape:

Clean the external and internal parts of the Square Plexiglas Shape on a soft support.

Always clean the Plexiglass components with a soft wipe and / or standard glass cleaner without alcohol and a lint-free cloth.

Do not use products, solvents or abrasive materials for cleaning Plexiglass.

FIGURE 96: SQUARE PLEXIGLAS SHAPE CLEANING

NOTE: Be careful not to clean with a dry-cleaning paper or cloth. It could damage the Plexiglass surface.

To clean the Tilt Mirrors and the Metallic housing parts

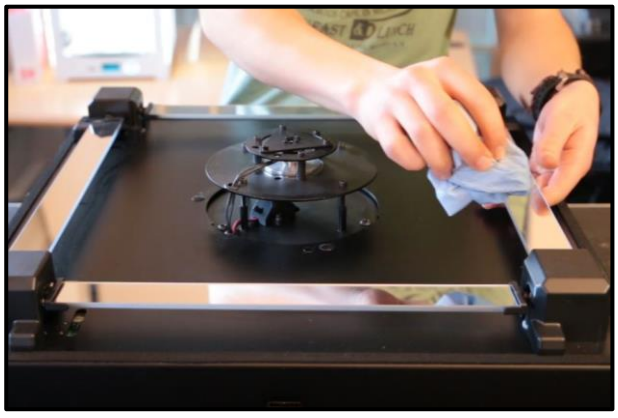


FIGURE 97: TILT MIRROR CLEANING

Apply the same procedure as the one for the Square Plexiglas described above.

Service Return Form

Your contact

Company : ……

First Name …… Last Name …….

Adresse ……
……

Country …… City ……

Telephone…… Email ……

Your product

Model:…… Serial Number :……

Buying date:…… Invoice number:……

Failure Reference (reference in the Troubleshooting Table in format D00XX or W00XX)

……

Failure description (please add photo or video to illustrate your problem):

……
……
……
……

Defective part: ……

Instructions to follow

0) In case of failure, please first contact Minuit Une to find a solution

1) If necessary and asked by Minuit Une, send back the defective part correctly packed with this sheet correctly filled in.

2) Return fees are at your charge.

3) If covered by the warranty, a new part will be sent to you for free.

4) If not covered by the warranty, an invoice will be sent to you for the new part and for its shipping.