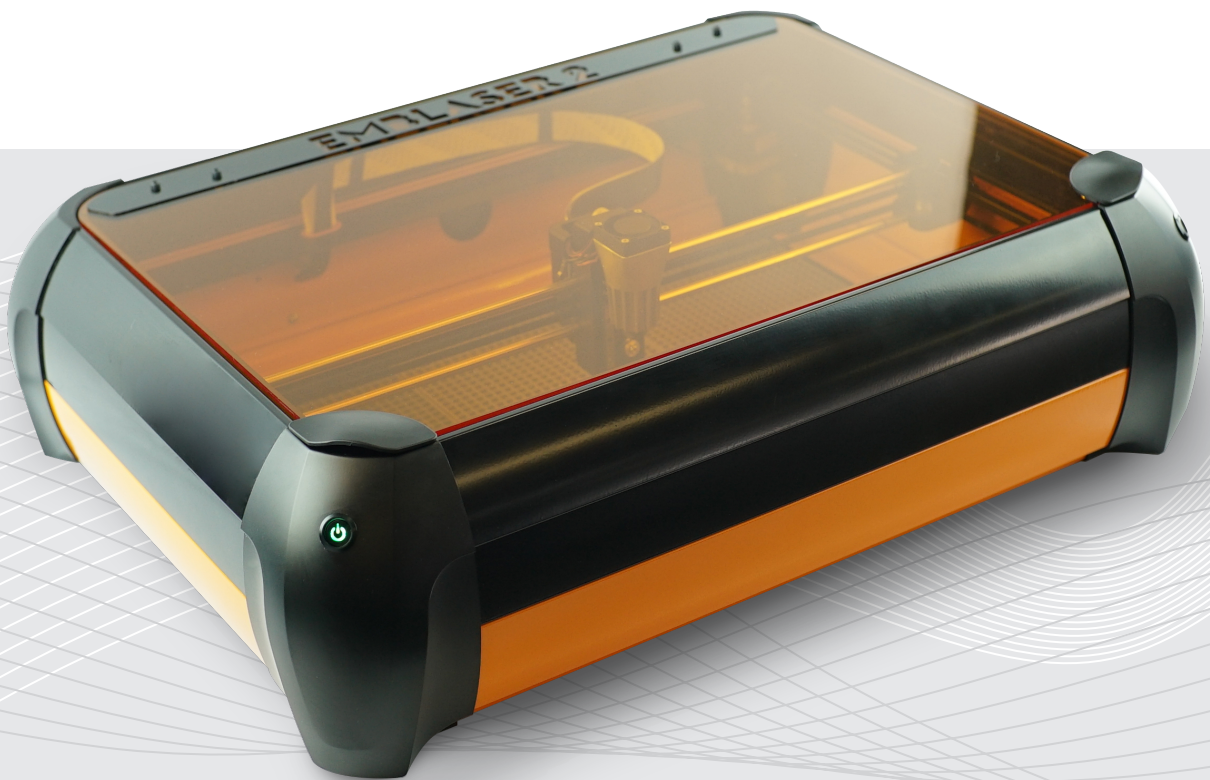


EMBLASER 2

User Manual



English

IMPORTANT



To keep your Emblaser 2 operating correctly, it is important to follow the **MAINTAINENCE SCHEDULE** in Chapter 6.

Failing to do so could result in reduced performance or damage to your machine.

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1. FOR YOUR SAFETY

To prevent damage to your Emblaser 2 or injury to yourself or to others, read the following safety precautions carefully. Keep these safety instructions where all those who use the product will read them.



WARNINGS

Do not use in wet surroundings

Water and electricity are a dangerous combination. Ensure your workspace is dry and not subject to potential wet conditions.

Always use in well ventilated area

Never use your Emblaser 2 in an enclosed area which doesn't have good ventilation and flow of fresh air.

Ensure fumes are properly vented

Fumes produced by the Emblaser 2 must be vented safely through the exhaust hose provided. This may include venting outside through a window or via the optional Fume Filtration System.

Ensure your material is safe to use

Materials react differently to laser cutting or engraving depending on their chemical or physical composition. Some materials produce harmful fumes or are more susceptible to igniting. It is important to understand how your material will react BEFORE using in the Emblaser 2. A 'Material Reaction Table' has been provided in this manual.

Never use materials containing chlorine

Materials containing chlorine will produce extremely toxic and corrosive fumes when laser cut or engraved.

Never use reflective materials

Reflective materials, such as materials with mirror surfaces, will cause the laser to be reflected and potentially causing injury to the user or damage to your Emblaser 2.

Do not use in the presence of flammable gas

Do not use your Emblaser 2 in the presence of flammable gas, as this could result in an explosion or fire.

Ensure proper supervision of children, disabled and impaired users.

The Emblaser 2 is not intended for children under the age of 15 years. Children under the age of 15 years should be supervised to ensure they do not play with the Emblaser 2. Teenagers aged between 15 and 18 years can use the Emblaser with the consent and/or assistance of their parents or persons who have parental authority over them. The Emblaser 2 is not intended to be used by persons (including children) with reduced physical, sensory or mental capabilities, unless they have been given supervision or instruction concerning use of the Emblaser 2 by a person responsible for their safety.

Do not operate the Emblaser 2 if damaged

Damage to any part of the Emblaser 2 could compromise its safety and cause injury. If any part of the Emblaser 2 is damaged, contact your reseller or Darkly Labs directly before operation.

Never run your Emblaser 2 unattended

Do not leave unattended while running. If you see flame or fire - Immediately stop the machine and extinguish. Not only could a flame grow into a larger fire, its heat will cause damage to the internal mechanisms and optics.

2. NOTICES

- No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronics, mechanical, photocopying or otherwise, without the prior written permission of Darkly Labs.
- Darkly Digital Pty Ltd (Darkly Labs) reserves the right to change the specifications of the hardware and software described in these manuals at any time and without prior notice.
- While every effort has been made to ensure that the information in this manual is accurate and complete, we would appreciate it were you to bring any errors or omissions to the attention of the Darkly Labs (info@darklylabs.com)

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Use only Darkly Labs Brand Accessories

Only Darkly Labs brand accessories certified by Darkly Labs specifically for use with your Emblaser 2 are engineered and proven to operate within its operational and safety requirements. The use of non-Darkly Labs accessories could damage your Emblaser 2 and void your warranty.

Notices for Customers in Canada

CAUTION

This Class B digital apparatus complies with Canadian ICES-003.

ATTENTION

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Notices for Customers in Europe

This symbol indicates that this product is to be collected separately.



The following apply only to users in European countries:

This product is designated for separate collection at an appropriate collection point. Do not dispose of as household waste.

For more information, contact the retailer or the local authorities in charge of waste management.

Notices for Customers in the U.S.A.

Power Cable

At voltages over AC 125 V (U.S.A. only): The power cable must be rated for the voltage in use, be at least AWG no. 18 gauge, and have SVG insulation or better with a NEMA 6P-15 plug rated for AC 250 V 15 A.

Federal Communications Commission (FCC) Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/television technician for help.

CAUTIONS

Modifications

The FCC requires the user be notified that any changes or modifications made to this device that are not expressly approved by Darkly Labs may void the user's authority to operate the equipment.

Interface Cables

Use the interface cables sold or provided by Darkly Labs for your equipment. Using other interface cables may exceed the limits of Class B Part 15 of the FCC rules.

Notice for Customers in the State of California

WARNING: Handling the cord on this product may expose you to lead, a chemical known to the State of California to cause birth defects or other reproductive harm. Wash hands after handling.

FDA Classification Information

Machine Laser Class:	Class I
Laser Diode:	Class IV
Wavelength:	445-455nm
Max. Average radiant power	5 watts

FDA Label Identification

The International Electrotechnical Commission laser safety standard IEC 60825-1:2007 mandates warning labels that provide information on the wavelength and power of emitted laser radiation, and which show the aperture where the laser is emitted. Figure 1 shows examples of these labels and their location on the Emblaser 2.

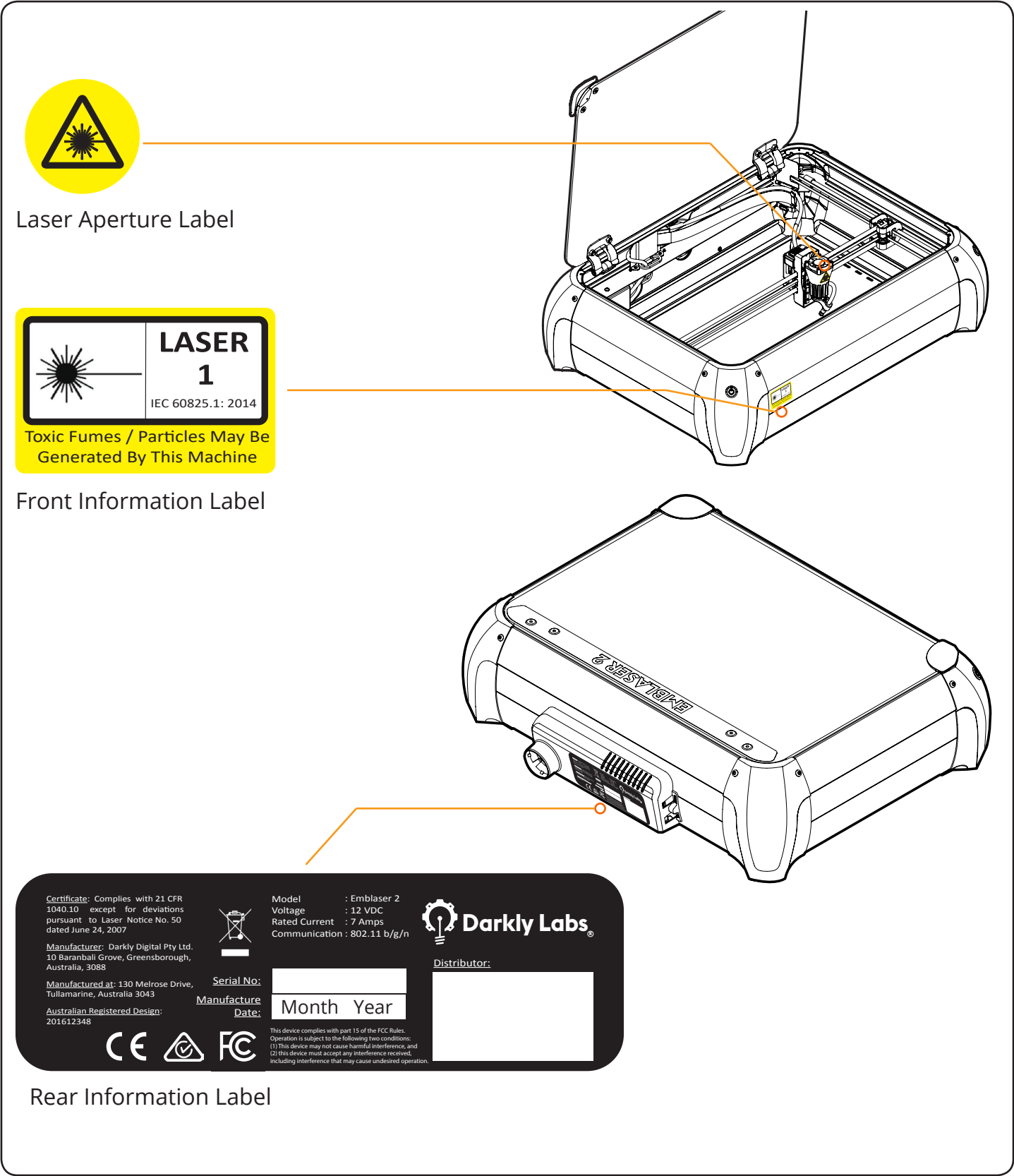
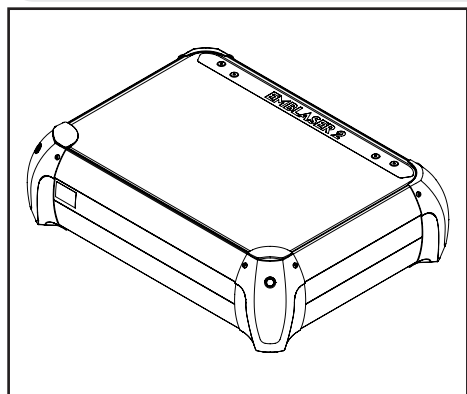


Figure 1: Warning advisory and US FDA compliance labels and their locations.

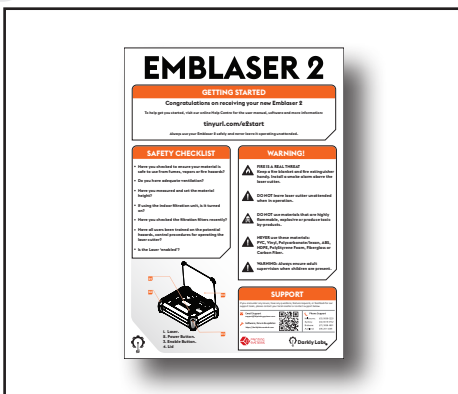
3. INTRODUCTION

What's in the box



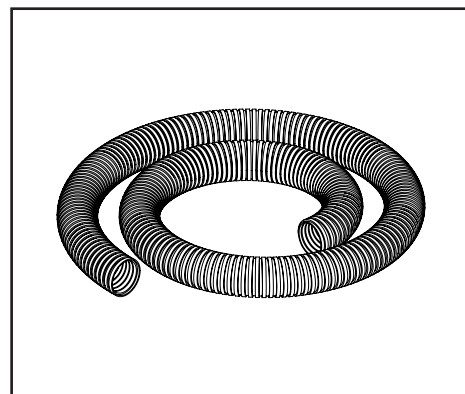
Emblaser 2

Fully assembled Emblaser 2.



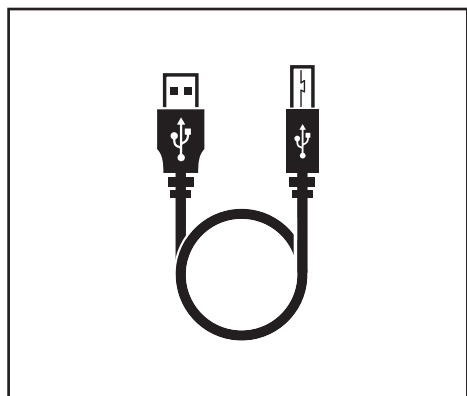
Info / Safety Card

Instructions to getting started.



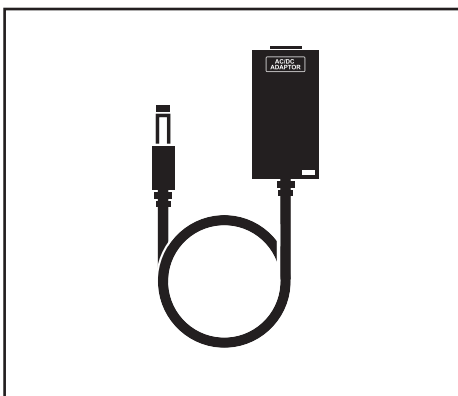
Exhaust Tube

Tube for venting fumes.



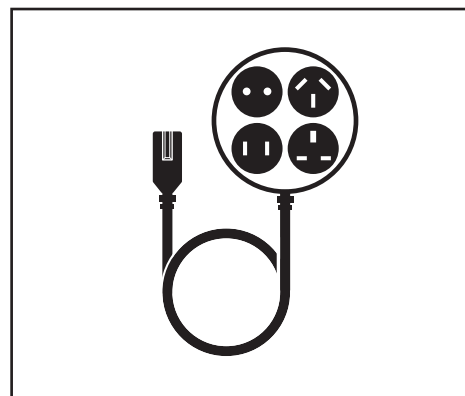
USB A-B Cable

USB cable for connecting the Emblaser 2 to a computer.



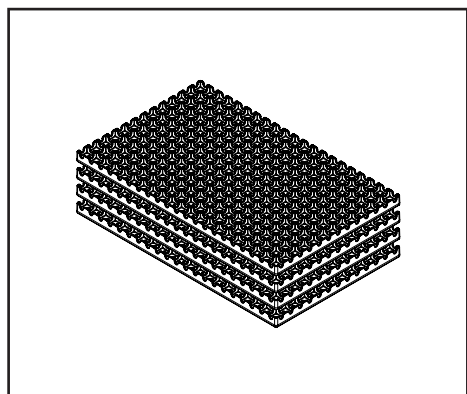
Power Adaptor

110-240v power adaptor.



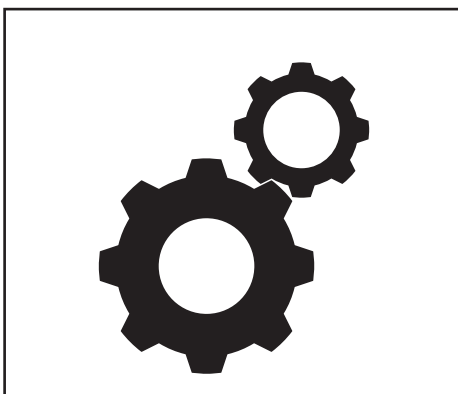
Power Lead

Country specific power lead.



Cutting Mats

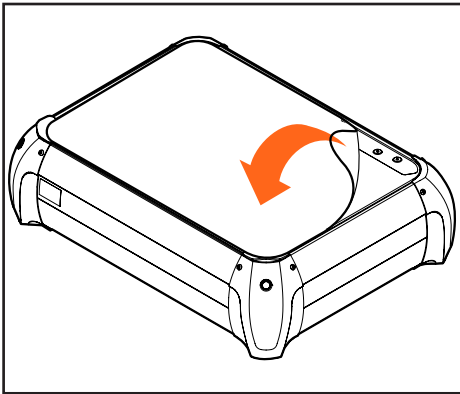
Four (4) cutting mats.



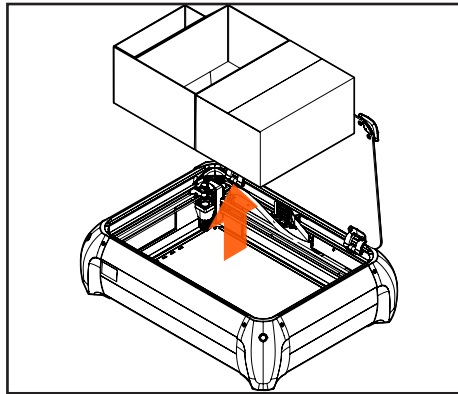
Tool / Cleaning Kit

Various tools and cleaning supplies.

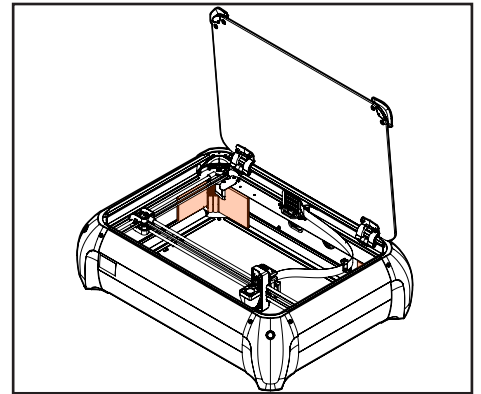
Unpacking your Emblaser 2



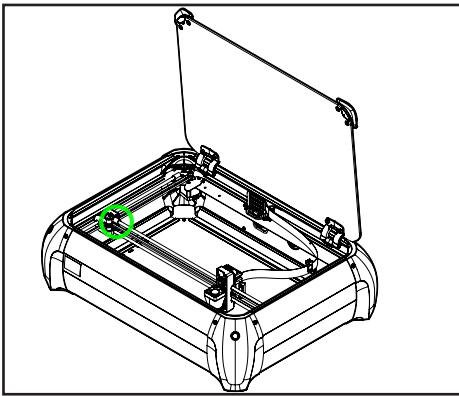
1: Peel off protective lid covering



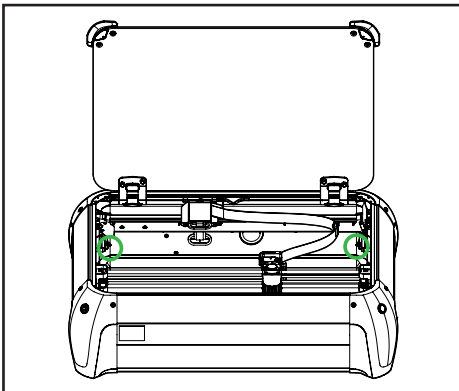
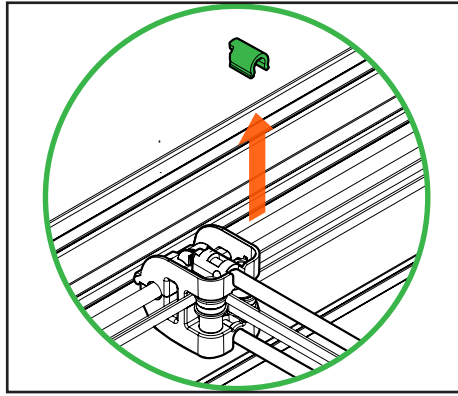
2: Remove internal spacer and accessory box.



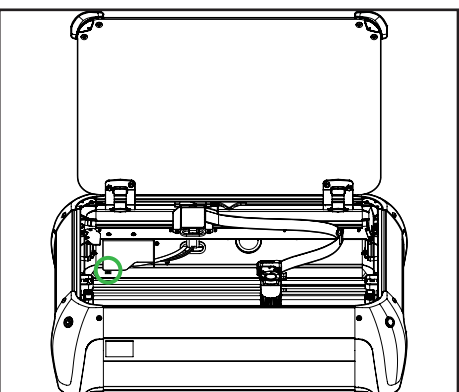
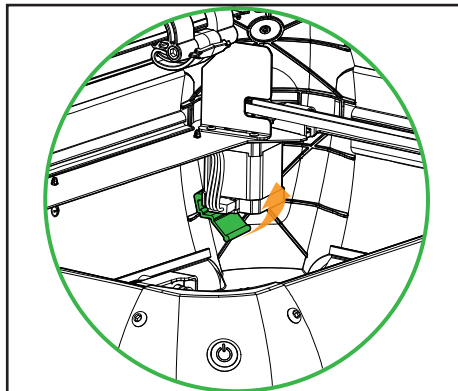
3: Remove motor packaging.



4: Remove laser carriage clip.



5: Remove motor clips (if installed)

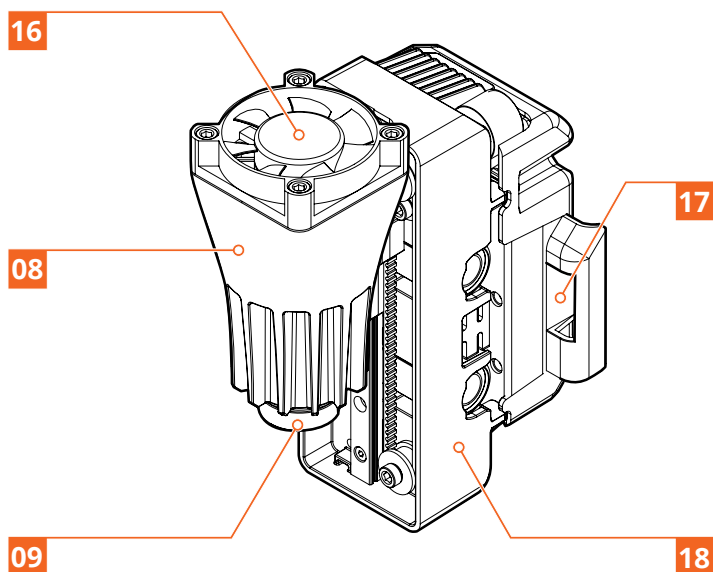
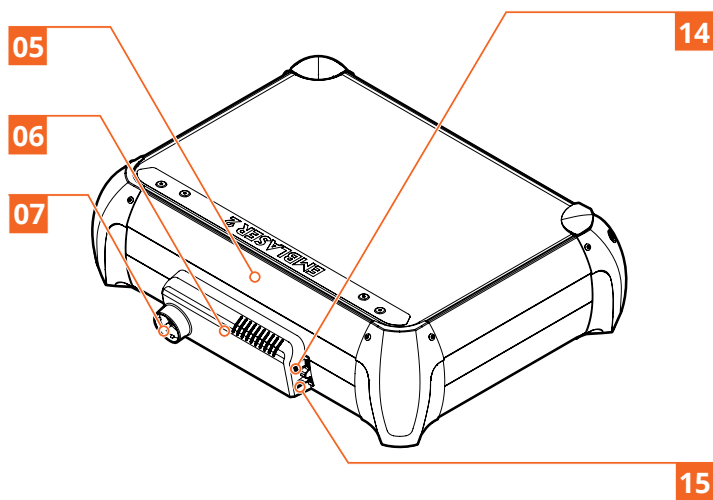
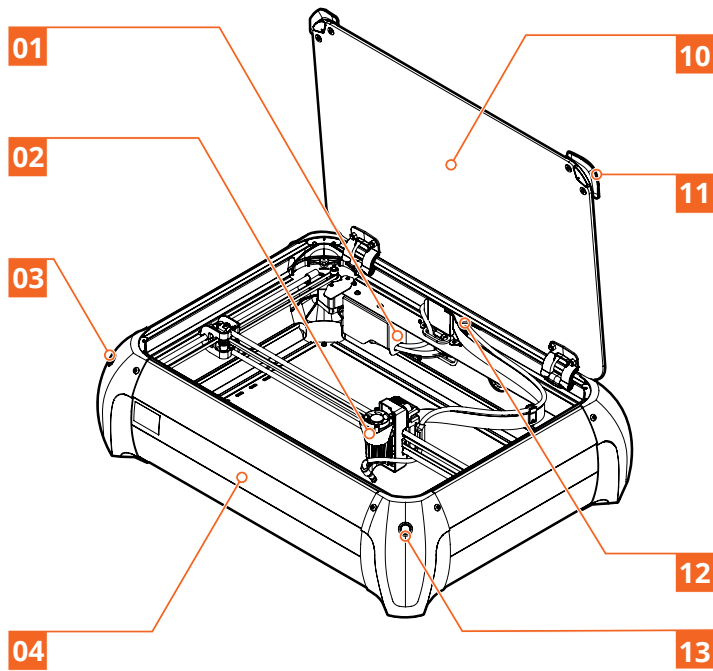


6: Remove Air-Assist clips (if installed)



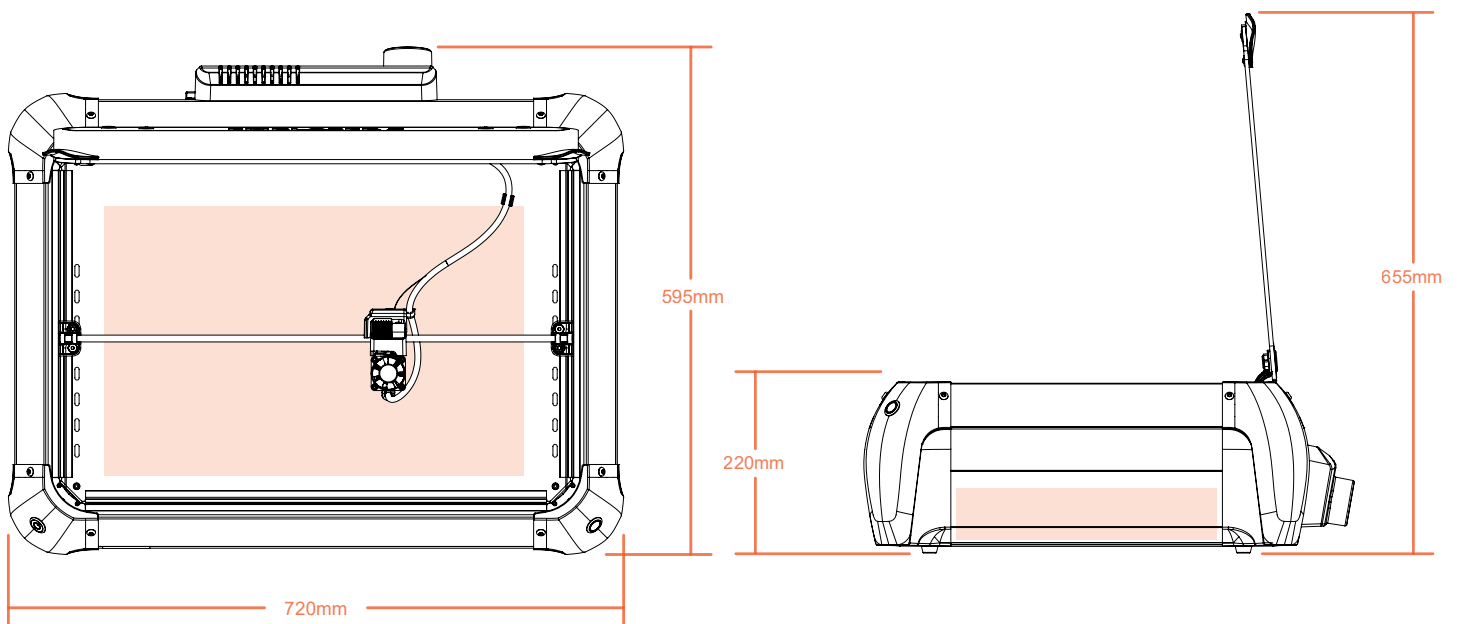
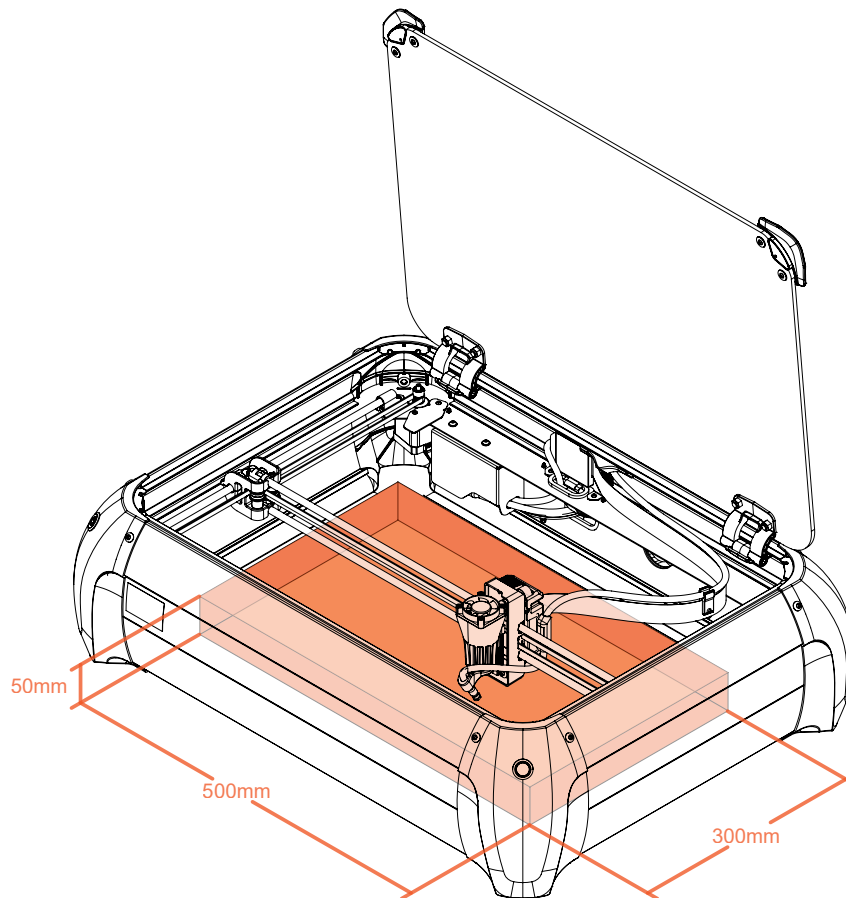
Keep all your packaging materials in case you need to return your Emblaser 2 for repair.

Getting to know your Emblaser 2



01	Air-Assist Accessory (optional)
02	Laser Unit Assembly
03	On/Off Power Button
04	Front Side
05	Rear Side
06	Electronics Pod
07	Exhaust Hose Connector
08	Laser Heat-sink
09	Laser Lens Aperture
10	Lid
11	Lid Handles
12	Workspace Camera
13	Laser 'Enable' Button
14	Power Plug
15	USB Plug
16	Laser Cooling Fan
17	Air-Assist Hose Support
18	Laser Carriage

Workspace and External Dimensions



4. FIRST STEPS

Your Creative Space

Creating a safe workspace for your Emblaser 2 is very important. We recommend reviewing the following diagram to ensure your chosen location for the Emblaser 2 is safe.

EXHAUST VENTING

Vent exhaust safely out of creative space.

FIRE BLANKET/ EXTINGUISHER

In the unlikely event of a fire incident be prepared with the necessary equipment.

SMOKE/CO2 DETECTOR

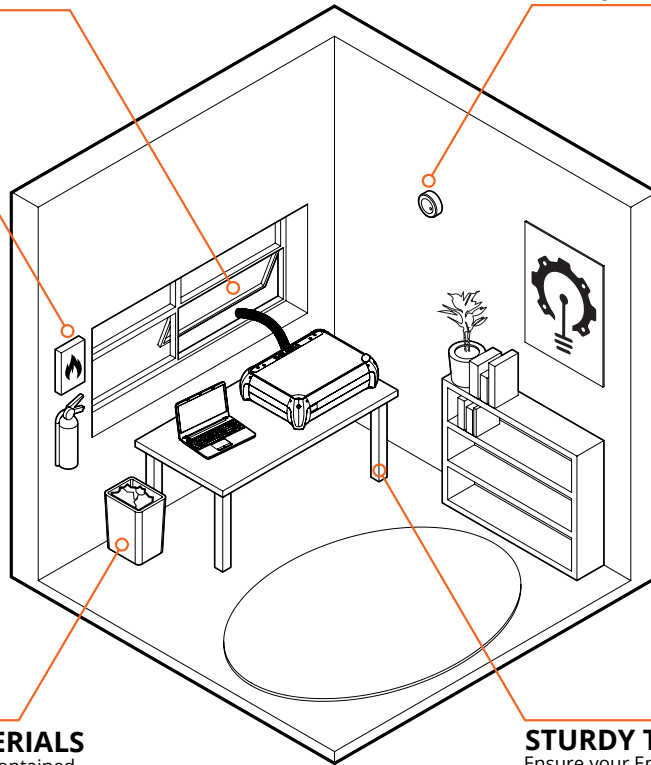
These devices provide critical early warning for dangerous situations.

FLAMMABLE MATERIALS

Keep flammable materials contained and clear of the Emblaser 2.

STURDY TABLE

Ensure your Emblaser 2 is placed on a sturdy table. Keep it away from the edge.



Overview of using the Emblaser 2

DESIGN



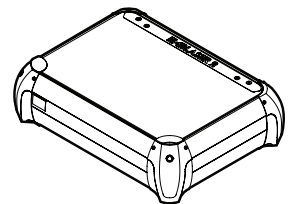
Download or create your digital design, artwork, photograph or scanned sketch.

LASERWEB



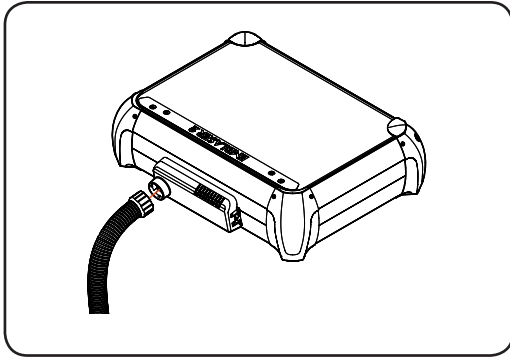
User Laserweb to instruct your Emblaser 2 on what you would like to do with your design.

EMBLASER 2



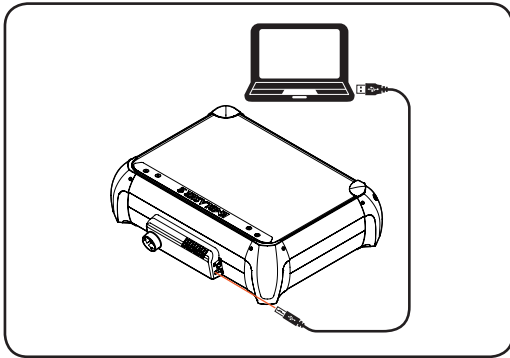
Insert your material and cut or engrave your design on the Emblaser 2.

Plugging in



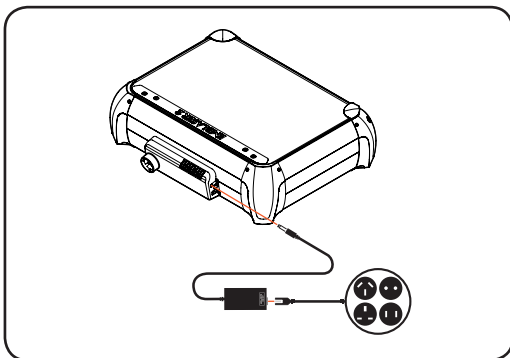
1. Attach Exhaust Hose

Attach the end of the exhaust hose to the rear connector on your Emblaser 2. Ensure the free end of the hose is placed to allow venting of fumes safely out of your creative space.



2. Plug in USB

Plug the supplied USB cable into the USB connector on the rear of the Emblaser 2. Connect this to a USB port on your computer.



3. Connect the power

Plug the supplied power adapter into the power socket on the rear of the Emblaser 2. Using the supplied power cable, plug the adapter into a 110-240V AC outlet.

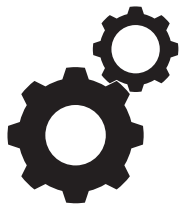
Installing the Software



1. Power up the Emblaser 2

Press the Power button on the front left corner of your Emblaser 2.

After a few seconds, a new drive will appear on your computer called 'Emblaser2'. This is the internal storage on your Emblaser 2.



2. Install the software drivers

If you are using a computer running Windows 10 (or later) or OSX, you do not need to install any software drivers.

For other operating systems, install the driver located on the Emblaser 2 internal storage. Check the Help Centre at the following link for step-by-step instructions:

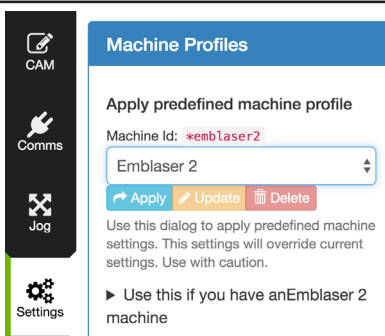
<http://tinyurl.com/e2start>



3. Install Laserweb Software

Laserweb is used for controlling your Emblaser 2. The latest version can be downloaded from the 'Getting Started' section of our 'Help Centre'.

<http://tinyurl.com/e2start>

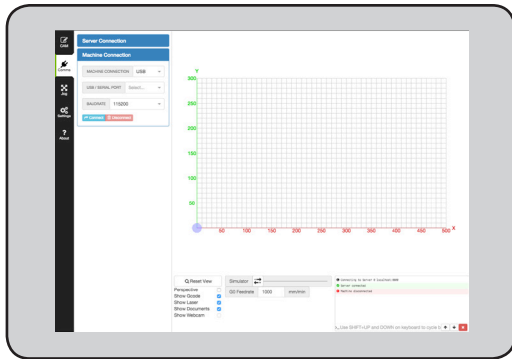


4. Apply Emblaser 2 profile

Run Laserweb and select 'Settings' tab on the left. In the 'Machine Profiles' tab, use the drop down list to select 'Emblaser2' and then press the 'Apply' button.

This will configure Laserweb to work with the Emblaser 2.

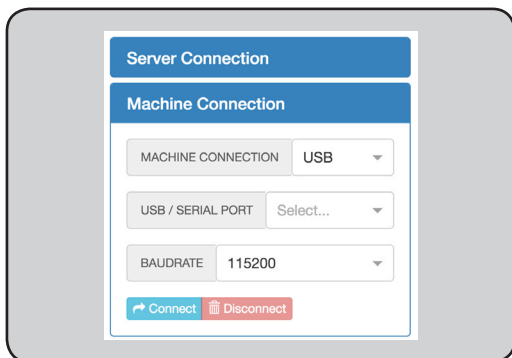
Connecting via USB



1. Start Laserweb

Double click on the Laserweb icon to run the software.

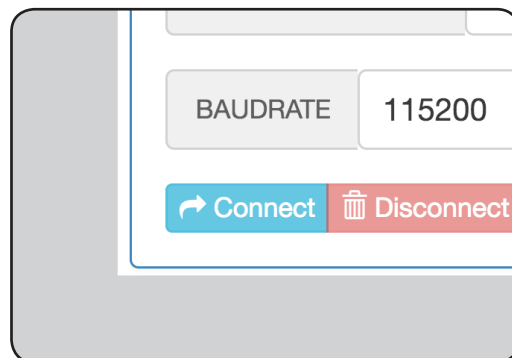
When running, click the '**Comms**' tab on the left panel.



2. Set Machine Connection

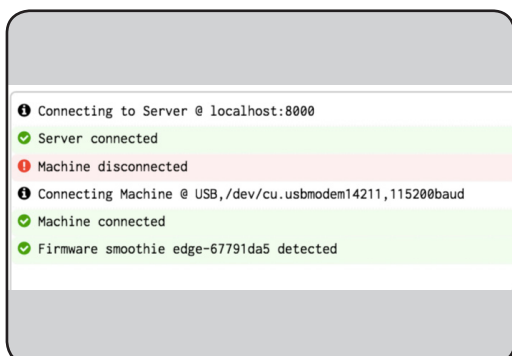
Set the following values in the Machine Connection tab.

Machine Connection: USB
USB / Serial Port: Select your appropriate port
Baud-rate: 115200



3. Click on 'Connect'

Clicking on '**Connect**' will start Laserweb communicating directly with your Emblaser 2.



4. Check for Connection

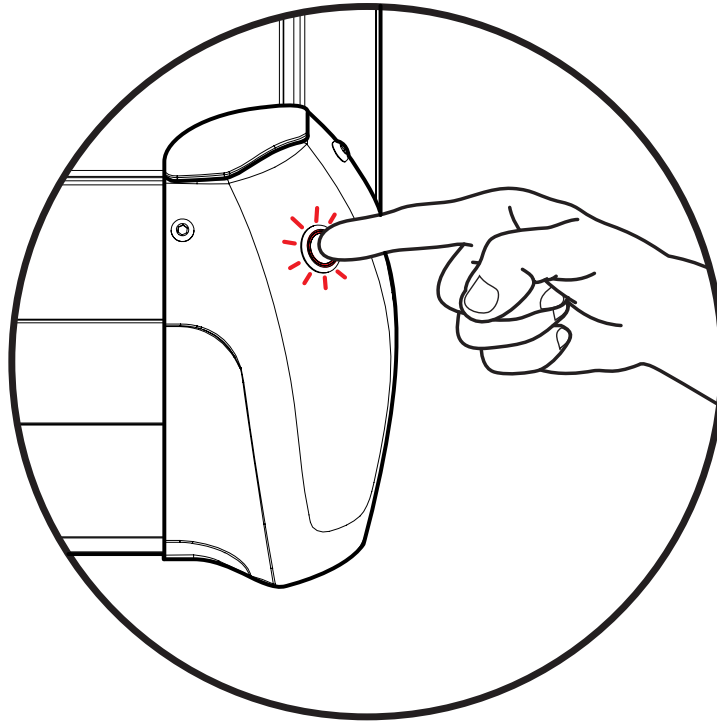
When the connection is established, the console window will report the following:

Machine Connected
Firmware smoothie edge-XXXXXXX detected

5. USING YOUR EMBLASER 2

'Enabling' the Laser

Before your Emblaser 2 will allow the laser to emit laser light, it must be manually 'enabled'. This is achieved by pressing the 'Enable' button on the front right corner of the Emblaser 2. The 'Enable' button will light up 'red' when successfully enabled.



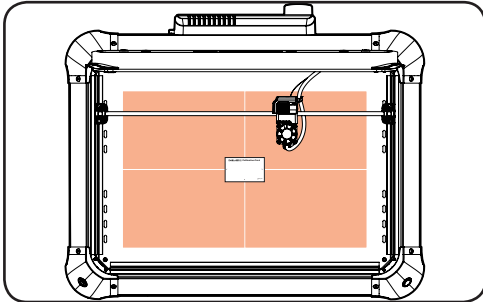
Action	Result
Upon Power Up	When the Emblaser 2 is turned on the laser is kept in a safe mode. This is indicated by the 'enable' button not lit.
Lid Closed + Enable	With the lid closed, the laser can be enabled by pressing the 'Enable' button. This is indicated by the 'enable' button being lit.
Lid Open when Enabled	The laser will immediately become 'disabled' when the lid is opened. This is indicated by the enable button light turning off.
Lid Open + Enable	The laser will not 'enable' if the lid is open.



It is recommended that you 'enable' the laser only when ready to cut or engrave. It's a good habit to 'disable' the laser at all other times.

Calibrating the optics

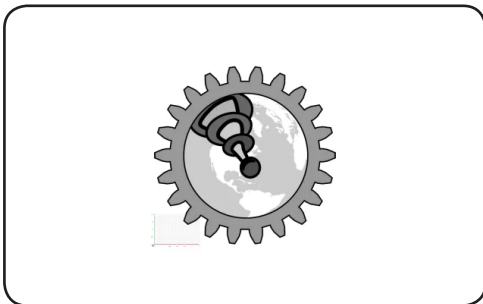
Calibration is the process to determine your Emblaser 2's optimal focus setting. An accurately calibrated optical system can assist with achieving finer detail and cutting through tougher materials.



1. Place calibration card on workspace

Place one of the supplied calibration cards in the centre of your workspace, on top of your cutting mats. Use the arrows on the card to help centre it.

If you do not have a calibration card, a sheet of white copy paper will also work.

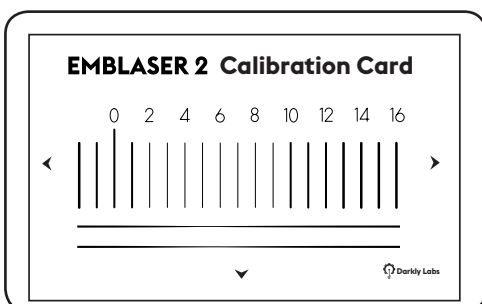


2. Run the Calibration Job

Load the calibration file 'E2_calibration.gcode' into Laserweb. This file can be found on the Emblaser 2 internal storage drive or downloaded from here:

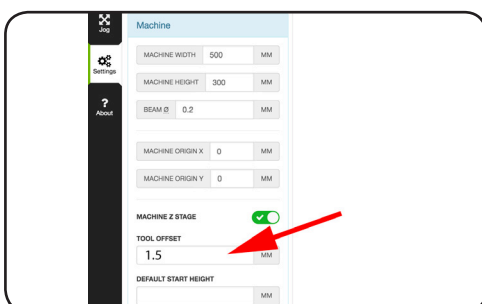
<http://tinyurl.com/e2start>

Close the lid, enable the laser and run the job.



3. Select value

Select the number that corresponds to the thinnest line. This is called the 'Tool Offset' value. You can examine the vertical and horizontal lines to help you choose.



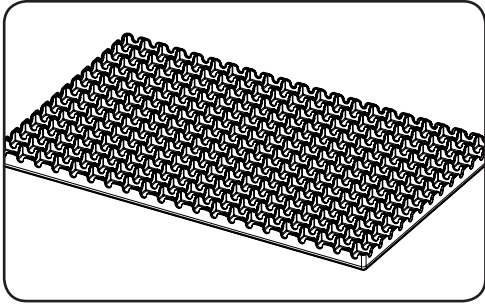
4. Enter Value into Laserweb

In Laserweb, navigate to 'Settings/Machine'.

Set the 'Tool Offset' value as determined in the previous step.

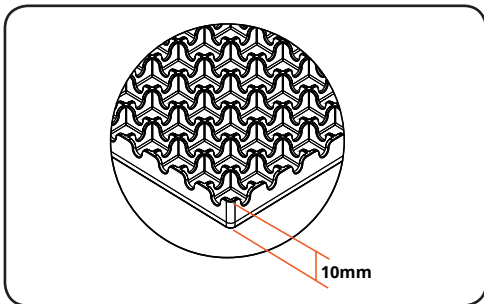
Using the Cutting Mats

The cutting mats supplied with your Emblaser 2 are designed to assist in creating cleaner cutting results and protect your Emblaser 2's baseplate from scorching. The mats are made of a material very resistant to damage from the laser.



1. Top Side

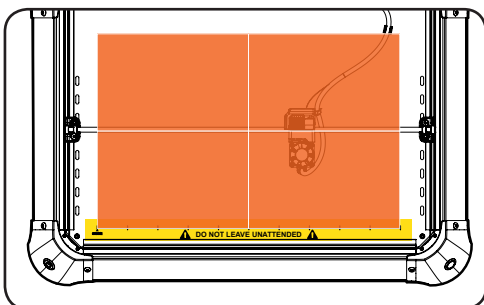
This is the top surface which faces upwards. Your material is placed on this surface.



2. Cutting Mat Thickness

The cutting mat is 10mm tall. This value needs to be added to your material thickness when working in Laserweb.

For example, if you are using 3mm material and the cutting mats, your total material thickness is 13mm.



3. Cutting Mat Placement

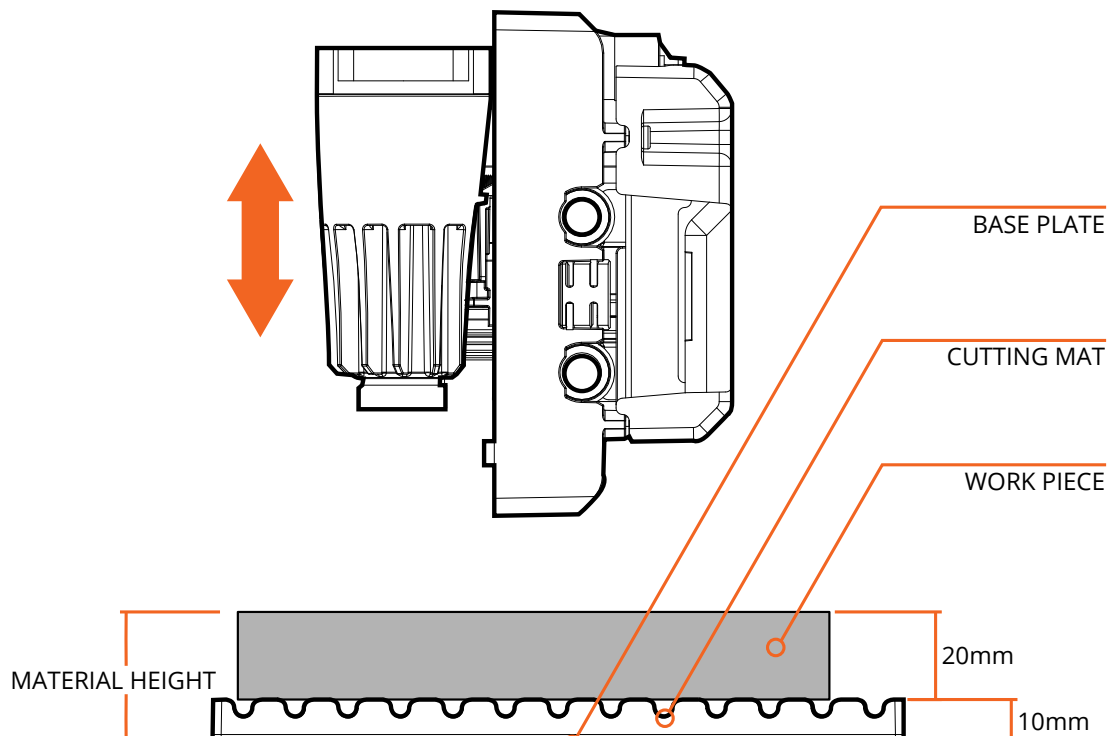
On the base-plate of your Emblaser 2 is a label illustrating the bottom edge of the workspace.

'Origin' indicates the bottom left most corner of the cutting area (co-ordinated 0,0)

Align the first cutting mat with 'Origin' and arrange the others as shown.

Laser Height Control

The Emblaser 2 has the unique ability to set the height of the laser above the workpiece via software. There is no need to manually adjust the laser height when working with materials as the software sets this for you. Laser height control also allows you to control the laser height during multi-pass jobs, changing the laser height automatically during each pass.



It's important to know the height of the top surface of your material above the base-plate. This is known as the 'material height'.

If you are using a cutting mat, as shown in the image above, its thickness would be added to the thickness of the material to determine the material height.

The material height is used within Laserweb operations to define the 'Start Height' parameter.

6. CARING FOR YOUR EMBLASER 2

Maintenance Schedule

In order to keep your Emblaser 2 performing optimally, regular maintenance is required.

After every 1-2 hours of use

- Clean the interior workspace. (see page 23)
- Perform a **Basic Lens Clean**. (see page 24)
- Check your air-assist nozzle is not blocked. (see Page 25)

After every 10-20 hours of use

- Wipe the lid. (see page 23)
- Wash the cutting mats. (see Page 23)
- Perform a **Deep Lens Clean**<http://tinyurl.com/E2LensClean>

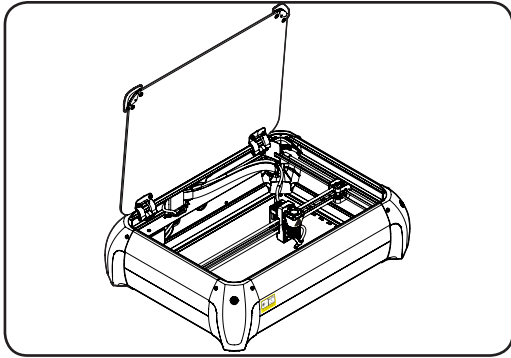


Failure to regularly perform a Deep Lens Clean could lead to permanent lens damage.

After every 30-40 hours of use

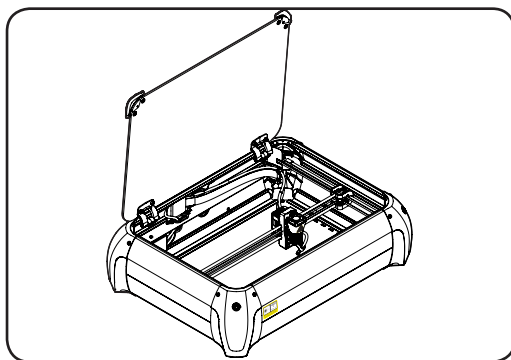
- Lubricate the rails and bearings. (see page 23)
- Re-Run the **Optics Calibration Process**. (see page 19)
- Check for any software or firmware updates.

General Maintenance



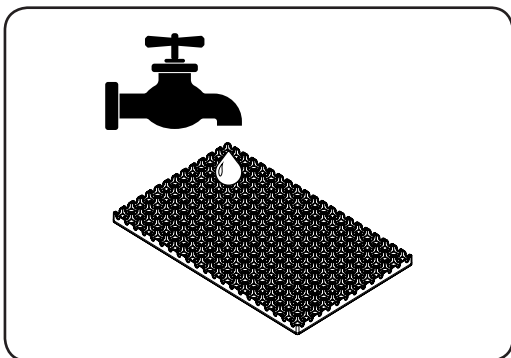
1. Workspace

Ensure you regularly clean debris and any residue build up within your workspace. Use a vacuum cleaner or cloth to remove built up debris.



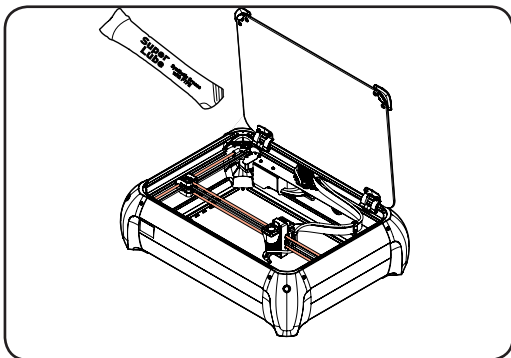
2. Lid

Use a soft lint-free cloth to clean your lid. Never use paper towel or abrasive materials on the lid as these will cause scratching.



3. Cutting Mats

The Emblaser 2 cutting mats are made from a durable silicon compound. Over time they will become scorched and stained. They can be washed in mild soapy water. Make sure they are fully dried before reinstalling them.



4. Rails & Bearings

The rails and bearings are mostly maintenance free. It's recommended that after every 30 hours of use, the rails are wiped with a lint free cloth and a small amount of the provided lubricant applied.

Basic Lens Cleaning

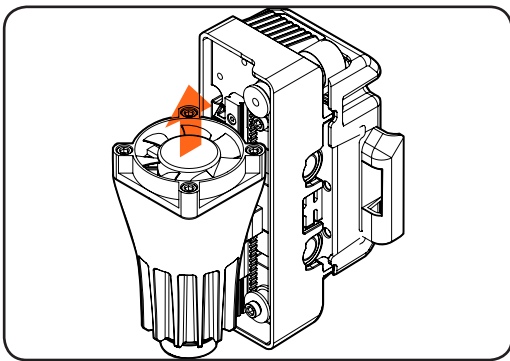
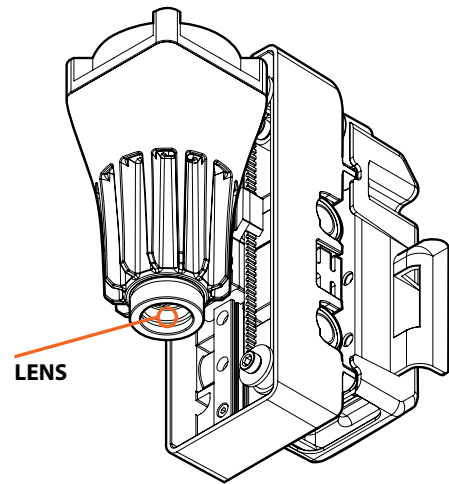
If you notice a reduction in laser performance, it may be the result of a debris buildup on your lens.

Always:

- Use the recommended cleaning kit.
- Treat the lens with care.
- Use the recommended cleaning process.
-

Never:

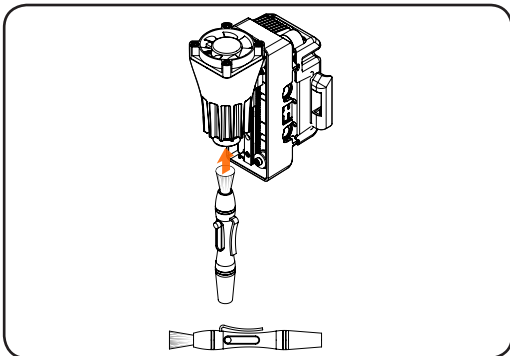
- Use paper towel or regular tissues.
- Touch the lens with your fingers.



1. Jog the laser unit up

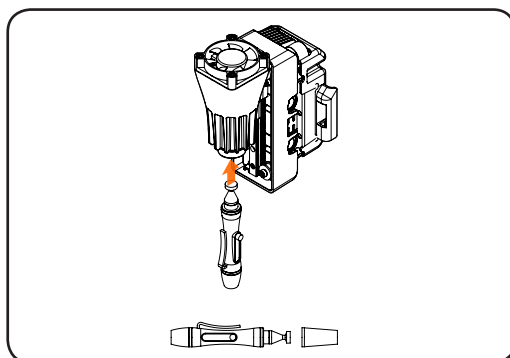
Before you begin cleaning the lens, ensure the laser unit is at its highest position. Use Laserweb to jog the laser unit to this position.

NEVER force the laser unit to move by hand.
Always use Laserweb to adjust its height.



2. Use the brush

Slide out the soft brush from your LensPen and carefully brush the lens surface to remove any loose debris and particles

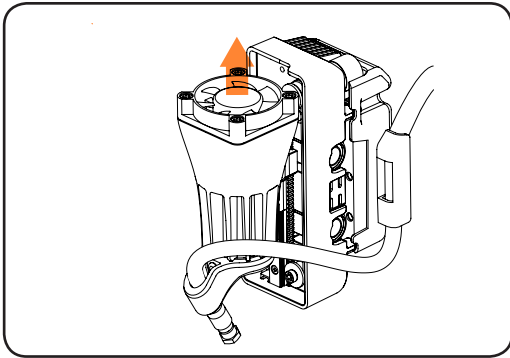


3. Use the cleaning tip

Remove the LensPen cap and, with light pressure, rub the cleaning tip over the lens surface for approximately 10-20 seconds. Work the cleaning tip over all areas of the lens.

Be sure to replace the cap on your LensPen to keep it primed and avoid contamination.

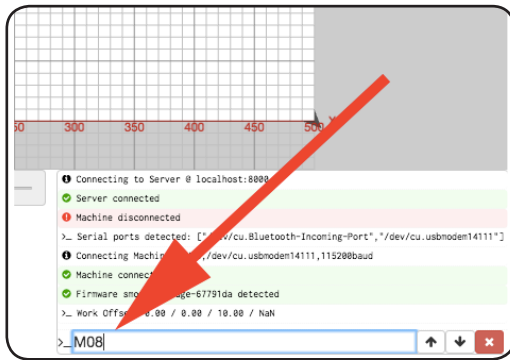
Unlocking the Air-Assist Nozzle



1. Jog the laser unit up

Before you begin cleaning the lens, ensure the laser unit is at its highest position. Use Laserweb to jog the laser unit to this position.

NEVER force the laser unit to move by hand.
Always use Laserweb to adjust its height.

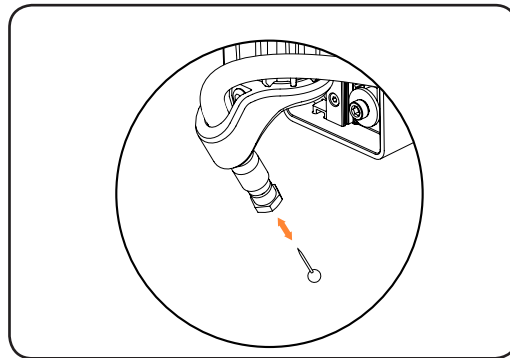


2. Start air-assist running

Connect to your Emblaser 2 via Laserweb and type the following command into the 'Console Window' and pressing 'Enter':

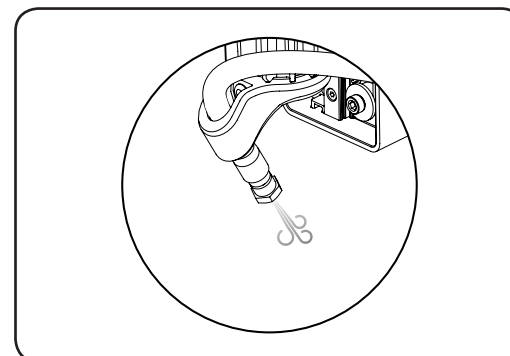
M08

This will start your air-assist running.



3. Unblock the nozzle

Insert a pin or needle into the nozzle to unblock the opening.



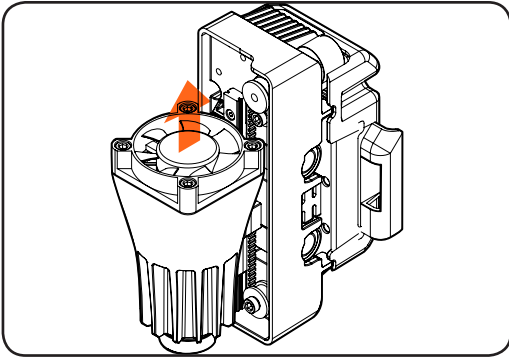
4. Stop the air-assist

Once you feel air blowing through the nozzle, stop the air-assist by typing the following command into the 'Console Window' and pressing 'Enter':

M09

This will stop your air-assist running.

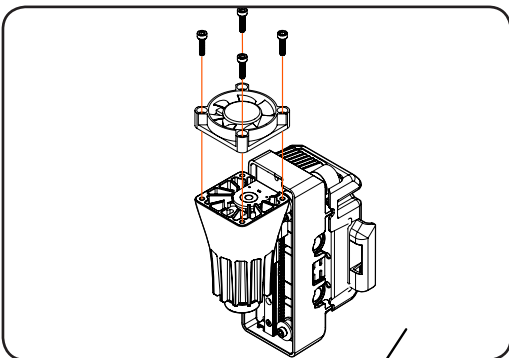
Replacing the Diode Module



1. Jog the laser unit up

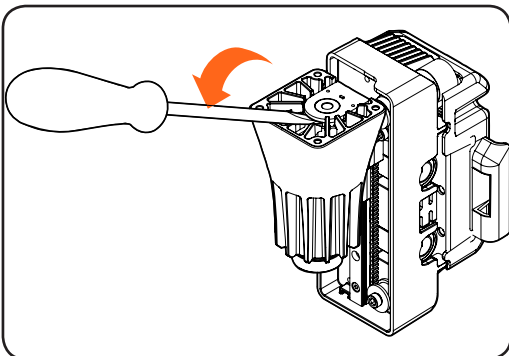
Before you begin any replacement steps, ensure the laser unit is at its highest position. Use Laserweb to jog the laser unit to this position.

NEVER force the laser unit to move by hand.
Always use Laserweb to adjust its height.



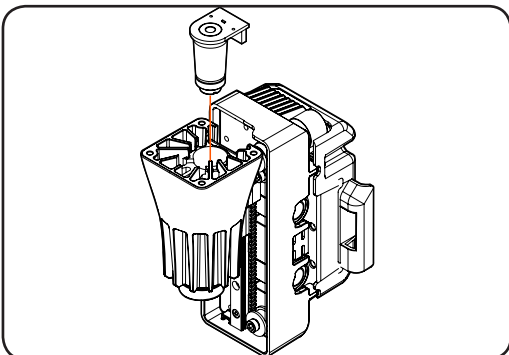
2. Remove fan

Use the provided hex wrench to remove the four (4) screws holding the fan in place.



3. Remove old diode module

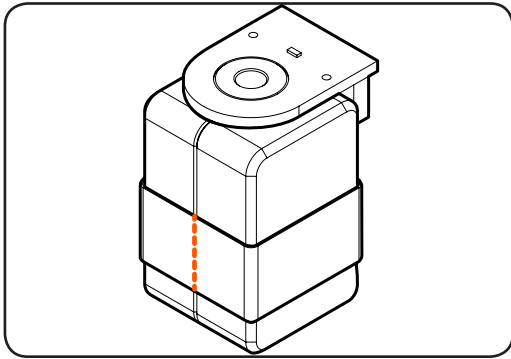
Place a flat-head screwdriver into the groove located under the diode module electronics PCB. Gently lever the diode module up and out of the heat-sink.



The old diode module will be coated in a thermal paste. Avoid touching the paste and wash your hands thoroughly if it contacts your skin.

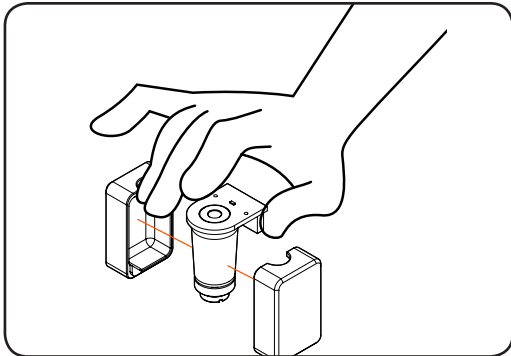
Do not remove any thermal paste from within the heat-sink.

Replacing the Diode Module (cont.)



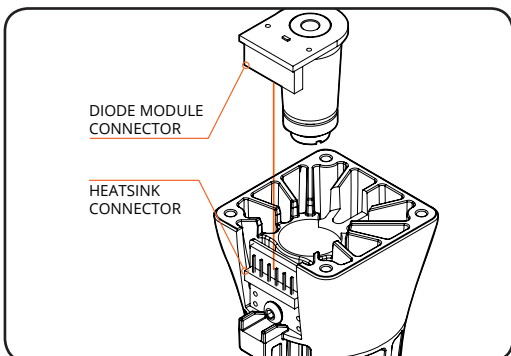
4. Prepare new diode module

The new Diode Module is supplied in a plastic casing. Carefully remove the tape holding the two sides of the casing together.



Holding the new Diode Module by the sides of the PCB, remove the casing.

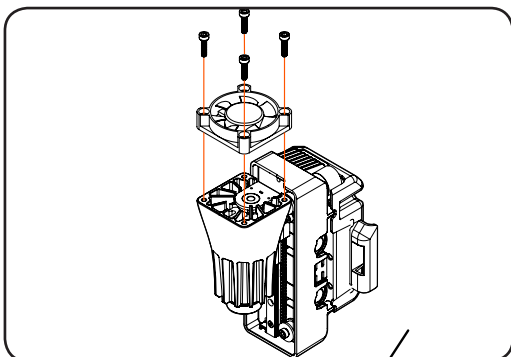
NOTE: The new diode module is covered in thermal paste. Do not remove this. Wash your hands immediately if it comes in contact with your skin.



5. Insert new diode module

Carefully insert the new diode module into the heat-sink.

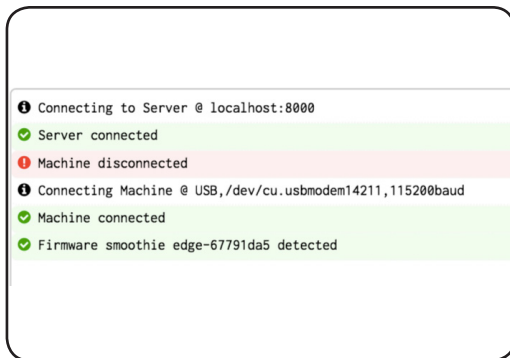
Press down gently to ensure the diode module connector correctly plugs into the heat-sink connector.



6. Re-install the fan

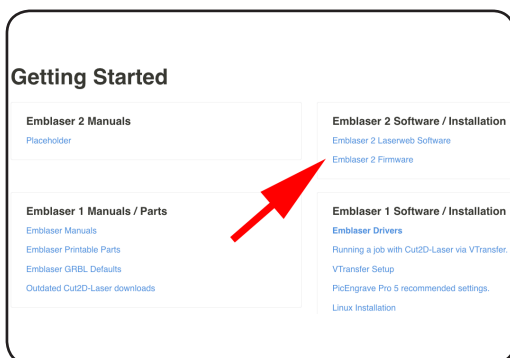
Use the provided hex wrench to fasten the four (4) screws holding the fan in place.

Updating Controller firmware



1. Find your firmware version

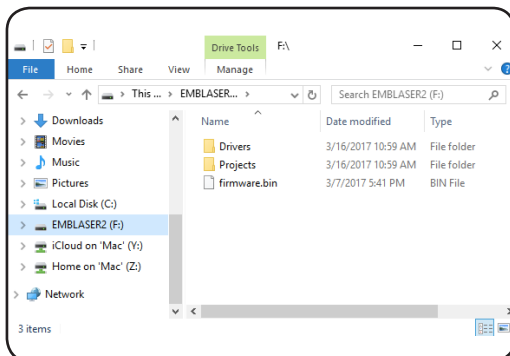
The console window in Laserweb reports the current firmware version when you connect to your Emblaser 2.



2. Download new firmware

Download the latest firmware version from the 'Emblaser 2 Software / Installation' section of the Help Centre .

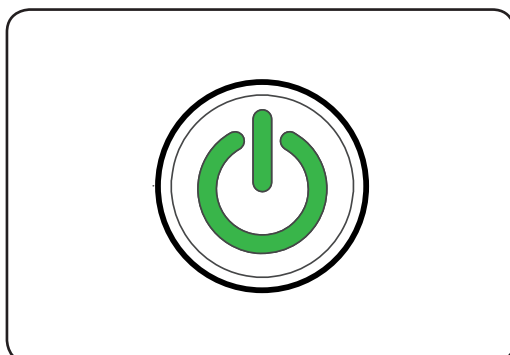
<http://tinyurl.com/darklylabs>



3. Copy onto the Emblaser 2

Copy the new firmware version onto the Emblaser 2's internal storage drive. This will appear on your computer as a drive named 'Emblaser2'.

The file must be named **firmware.bin**



4. Restart your Emblaser 2

Restart your Emblaser 2. The firmware update will only take a few seconds and will not show any indications or taking place.

Once complete your Emblaser 2 can be used as normal.

7. REFERENCE

Emblaser 2 Specifications

Mechanical

External Dimensions	<ul style="list-style-type: none">• 540mm x 720mm x 200mm• 21.25" x 28.55" x 7.8"
Material Capacity	<ul style="list-style-type: none">• 500mm x 300mm x 50mm• 19.68" x 11.81" x 1.97"
Shipping Box	<ul style="list-style-type: none">• 780mm x 650mm x 260mm• 30.71" x 25.69" x 10.24"
Weight	<ul style="list-style-type: none">• 12kg• 26.46 lbs
Shipping Weight	<ul style="list-style-type: none">• 18kg• 39.88 lbs
Operating Temperature	<ul style="list-style-type: none">• 15-32 C• 60-90 F

Electrical

AC Input	<ul style="list-style-type: none">• 100-240V
Power Requirements	<ul style="list-style-type: none">• 12VDC @ 7 amps
Connectivity	<ul style="list-style-type: none">• USB• Wi-Fi 802.11 b/g/n

Optical

Machine Laser Class	<ul style="list-style-type: none">• Class 1
Laser Diode Class	<ul style="list-style-type: none">• Class 4
Wavelength	<ul style="list-style-type: none">• 445-455nm
Max. average radiant power	<ul style="list-style-type: none">• 5 Watts

Material Property Table

POLYMER	CHEMICAL BONDS	BREAKDOWN PRODUCTS	EFFECTS
Polyolefins:			
Polyethylene	C-H	propane, propene, ethane, ethene, butene, hexene, and butene-1	Flammable
Polypropylene	C-H	pentane, pentene, heptene	Flammable
Polyacrylics:			
polyacrylonitrile (Sail cloths, ABS constituent)	N-H	ammonia, hydrogen cyanide, ketones	Potent airway irritants, toxic at high concentrations
Polyamide polymers:			
wool	O=C-N-H, S-S	carbon disulphide, carbon dioxide, hydrogen cyanide, benzene, toluene, and carbon monoxide	Toxic, irritant
polyurethane	N=C=O	nitrogen oxides, nitriles, isocyanate monomers, liquid polyols	Isocyanate pharyngitis, hypersensitivity and severe asthma in predisposed individuals
nylon	C-N, CO-CH ₂	Potential for water, carbon oxides, benzene, hydrogen cyanide (HCN), toluene, and benzonitrile, hydrogen and ammonia	Toxic, irritant
Polydienes and rubbers			
Polyisoprene (Synthetic rubber)	Isoprene, potentially other catalysts, crosslinking agents	Isoprene monomers, polymers, thermal cracking products, sulfides if vulcanised	Irritants, toxic
Polybutadiene (component of ABS)	butadiene	Butadiene monomers, cyclic compounds	toxic
Polychloroprene (Neoprene)	Chlorine	hydrogen chloride, polyene	Potent, acidic irritant of mucous membranes, corrosive, toxic

Material Property Table (cont.)

POLYMER	CHEMICAL BONDS	BREAKDOWN PRODUCTS	EFFECTS
Synthetic carbon – oxygen chain polymers			
Polycarbonate (constituent of ABS)	O-CO ₂	carbon dioxide, bisphenol A, phenol	toxic
polyethylene tetraphthalate (PET)	C-O	acetaldehyde, carbon monoxide, carbon dioxide, compounds with acid and anhydride end groups	Irritant, toxic
Phenolic resins	methylene– benzene	carbon oxides, water, aromatic compounds, methane	Toxic, flammable
Epoxy resins	complex	Varied, mostly phenolic compounds	toxic
Cellulosics			
Wood, paper	Cellulose, lignin	tars	toxic
Halogenated polymers			
PVC	Chlorine	hydrogen chloride gas, polyaromatic hydrocarbons	Potent, acidic irritant of mucous membranes, corrosive, toxic
PTFE	Fluorine	hydrogen fluoride gas, hexafluoro-propene	Potent, acidic irritant of mucous membranes, corrosive, toxic
Related vinyl polymers			
polyvinyl bromide	Bromine	hydrogen bromide	Potent, acidic irritant of mucous membranes, corrosive, toxic
polyvinyl alcohol (PVA)		Water, thermal cracking products	potential irritants
polyvinyl acetate	Acetate	acetic acid	irritant
Styrenics			
Polystyrene (also a component of ABS)	Styrene	Styrene monomers, dimers, trimers, tetramers	Irritant, toxic

Table based on “Thermal Decomposition of Polymers - Craig L. Beyler and Marcelo M. Hirschler”

Health Warning Information

Color Blindness

The small percentage of the population (0.01%) that have blue-yellow colour blindness (tritanopia) may struggle to see the Emblaser 2 indicator lights and may not realise the laser system is 'enabled'. Tritanopic users must therefore be particularly careful.

Hypersensitivity

Isocyanate exposure from thermally degraded polyurethanes has the potential to cause hypersensitivity to develop over time in predisposed individuals, which can lead to subsequent life threatening asthma like reactions on re-exposure to even trace amounts.

Recommendations:

Those with a history of asthma should avoid laser cutting polyurethanes.

If a wheeze develops during or after cutting polyurethanes in any user, further polyurethane cutting should cease and medical advice should be sought.

Isocyanate by products from decomposition of polyurethanes can remain in exhaust ducting and can still cause sensitisation with skin contact.

If you get a sore throat or eyes while laser cutting polyurethanes, you have developed isocyanate pharyngitis and your precautions are not working effectively.

Airway Irritation

Many of the chemicals liberated by laser cutting and engraving have the potential to cause airway irritation, but few, if any, permanent effects. Some of the chemicals are known carcinogens, but with appropriate local or general exhaust ventilation, exposures are unlikely to add significantly to background environmental exposures (i.e. formaldehyde from MDF furniture, benzene in fuels).

If you are experiencing airway irritation, your ventilation is not adequate.

Exposure to fumes from laser cutting

The heating which occurs during laser cutting or engraving can cause charring, pyrolysis and even combustion of the material being worked on.

Exposure to the fumes and particulates released during laser engraving or cutting can cause irritation to the airways and potentially be extremely dangerous.

For example, exposure to Isocyanate from thermally degraded polyurethanes has the potential to cause hypersensitivity to develop over time in predisposed individuals, which can lead to subsequent life threatening asthma like reactions on re-exposure to even trace amounts.

Important: See Appendix for information on chemical reactions with various materials during laser cutting and engraving. Always research the material you plan to work with to ensure it is safe to do so.

Health Warning Information (cont.)

Always follow your local Occupational Health and Safety (OH&S) rules

Ensure that you comply with local occupational health and safety legislation. Failing to do so could put you in breach of the law. Even if not being used in a business, owners may be in breach of the law if injuries occur, since injury to a member of the general public could conceivably constitute a breach of the owner's OH&S obligation under law, subject to penalties. Visit your local government website for OH&S information on laser safety requirements. Those operating the Emblaser within an established business should nominate a designated laser safety officer, responsible for the safe use, training, and upkeep of the Emblaser and associated personal protective equipment, administrative controls such as user credentialing and safe operating procedures (SOPs), and engineering controls, such as ventilation

Fire

A laser cutter / engraver works by amplifying light to such a degree as to either melt or burn material while following a designated path. The heat generated during this process could potentially cause combustion (fire) within the material being worked on.

Ideally, a smoke / fire detector should be installed in the area the Emblaser 2 is being used. A fire blanket and smoke extinguisher should always be readily accessible.

Technical support

Servicing the Emblaser 2 and Accessories

The Emblaser 2 is designed to require minimal service. Please refer to the 'Caring for your Emblaser 2' section of this manual for maintenance information.

For any problems that arise not covered in this section, please contact your reseller.



130 Melrose Drive, Tullamarine, 3043 Australia

info@darklylabs.com • www.darklylabs.com