

USER MANUAL



FabCore Mk3

USER MANUAL

Original English

Version 4



Introduction

Congratulation on your new FabCore, you are most likely itching to get cutting and engraving!

However before you jump in and get busy making, please first take the time to read these important guidelines regarding general operation and safety.

Not following these instructions on setup and safety could cause personal injury, damage to the machine and ruin your intended work.

The FabCore is labelled with the most important information and a checklist. However we recommend keeping the manual near the machine so all potential users can read it.

We are always looking to improve our content and have more planned for the future; Material settings, library and video tutorials.

We love to receive any feedback, in pictures or in text, and see what you make with your FabCore. Feel free to send us a message or post in our community; community.fabcreator.com

Lightburn License

This key provides you a with a life time license to lightburn for up to 2 devices and a year of updates.

FabCore Serial

This is how we identify your FabCore, let us know it if you ever contact support.



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Intended Use

The FabCore is intended to mark/engrave and cut a wide variety of materials. However it is only intended to be used with materials which can be safely processed with a laser.

Lasering materials which are not suited for laser processing will void warranty and potentially damage the machine and the user.

It is therefore important to be fully informed of the material you are planning to laser cut or engrave. PVC (Polyvinyl-chloride) and other materials containing chlorine are never to be lasered. When deciding if a material is safe to laser, you may consult the MSDS (Material Safety Data Sheet). This can provide good insight to whether your chosen material is safe to process with the laser. If you are in doubt your material is safe to process with your FabCore, feel free to contact us at: support@fabcreator.com

For more information on materials see page 11 section Material Safety.

CO2 lasers can be dangerous when used improperly, therefore it is important to follow the standard operating procedure. (See page 23)

The FabCore is a tool not a toy and should be treated as such. The FabCore is intended to be operated in a technically flawless condition and by those who have read the manual.

If you suspect your FabCore is not operating normally cease operation and contact: support@fabcreator.com



EC DECLARATION OF CONFORMITY

EC - Declaration of Conformity



Manufacturer Details

Brand Name

FabCreator

Address details

Nijverheidsweg 8, 5731 HZ, Mierlo, Noord Barbant, Netherlands

Product Details

Product name

FabCore

Description

FabCore

Desktop CO2 laser cutter and engraver machine.

Model- / Serial number(s)

FC-

Applied Directives

Machinery Directive (MD) 2006/42/EC

Electromagnetic Compatibility (EMC) Directive 2014/30/EU

Restriction of Hazardous Substances (RoSH) Directive 2011/65/EU

Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU

Applied Standards

EN-11252:2013: *Laser and laser-related equipment - laser device - minimum requirements for documentation.*

EN-11553-1:2020 *Safety of machinery - Laser processing machines - Part 1: laser safety requirements.*

EN-60825-1: 2014 *Safety of laser products - Part 1: Equipment classification and requirements.*

EN-60825-4: 2006 *Safety of laser products - Part 4: Laser guards.*

EN-14119: 2013 *Safety of Machinery - Interlocking devices associated with guards- principles for design and selection.*

EN-13849-1: 2015 *Safety of machinery - Safety related parts of control systems - part 1: General principles for design.*

EN-13849-2: 2012 *Safety of machinery - Safety related parts of control systems- Part 2: Validation.*

EN-12100: 2010 *Safety of machinery - General principles for design - risk assessment and risk reduction.*

EN-50689:2021 *Safety of laser products - Particular Requirements for Consumer Laser Products.*

IEC TR 60825-5:2019 *Safety of laser products- Part 5: Manufacture's checklist for IEC 60825-1.*

Declaration

We hereby declare that the above product (series) complies with the directives / standards mentioned in this declaration.

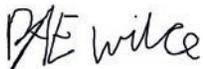
CE-responsible:

Bonne Wilce

Date:

01-06-2022

FabCreator
Nijverheidsweg 8
5731HZ, Mierlo
Tel : +31 20 225 1142
E-mail : Sales@FabCreator.com
Website : www.fabcreator.com


Signature





Laser Safety

The FabCore houses a sealed carbon-dioxide DC excited laser. Without the many protective measures included in the FabCores design this would be a Class 4 laser which emits an invisible laser radiation at a wave length of 10.6 microns.

Operating a Class 4 laser without safety precautions exposes you to the following risks:

Eyes: Burns to the cornea, can result in permanent damage to sight.

Skin: Burns.

Fire: Ignition of most organic compounds, Danger of fire.

It is important to take the following safety precautions when operating a Class 4 Laser:

- **DO NOT** Expose skin and eyes to direct, reflected, or scattered radiation
- **DO** Wear suitable laser safety protection goggles.
- **DO** Appoint a laser safety officer responsible for evaluating the use of the FabCore within your organisation.

Glasses/goggles capable of blocking the CO2 wavelength of 10.6 microns are suitable.

- According to EN 207
- OD6+ @ 9000 - 11000nm
- L-Rating: 10600nm DI LB3
- Visible Transmittance: 90%

If you would like a pair of laser safety goggles contact sales@fabcreator.com

Never stare into or interrupt the laser source, even when wearing goggles!

The FabCore is designed to mitigate the risks of a Class 4 laser and remove the need for personal protection equipment, specially trained personal and a restricted environment.

The FabCores laser source is enclosed within a metal frame, equipped with a sturdy polycarbonate door which is equipped with dual defeat safety interlocks, ensuring the Class 4 laser radiation is not accessible during normal operation.



Panels that need to be removed using tools are not to be removed during normal operation; These are for access during service. Removing any part of the FabCore potentially compromises the enclosure and could expose the user to harmful levels of laser radiation.

- **DO NOT** Remove any panels which require tools to open while the FabCore is plugged in.
- **DO NOT** Attempt to defeat the interlocks - these are installed for your safety.
- **DO NOT** Attempt to stare into the beam of the alignment laser.
- **DO** Use the machine sensibly and within its scope of intended use

When processing some materials with a CO2 laser the point of cutting may produce an intense light. While you are protected from any stray CO2 laser radiation, this bright light may cause irritation similar to when you look directly at any bright light source like an LED or the Sun.

- **DO NOT** Stare at bright cutting processes if it causes discomfort.

To help with laser alignment the FabCore has a low power secondary visible laser which is combined with the high powered invisible CO2 laser. This provides a good approximation of where the CO2 laser will hit.

This alignment laser has a wave length of 650nm with a power less than 0.4mW. While this laser is considered safe in all senarios we still recomend the following as good habit when working with any laser.

- **DO NOT** Stare directly into the visible laser beam
- **DO NOT** Suppress the eyelid closure reflex
- **DO** Close your eyes and turn away from interbeam viewing.

As a result of the encapsulated Class 4 laser and the low power visible alignment laser the FabCore is a Class 1 laser product and requires no additional personal protection equipment, controlled environment or a laser saftey officer.

Under normal operating conditions; according to EN 60825-1:2014 +A11;2021 and EN50689:2021 the FabCore is a **Class 1 Consumer Laser Product**.





Fire Safety

CO₂ lasers have the ability to ignite most materials during cutting and engraving. This is due to the amount of thermal energy present in the laser beam. As a result of this no matter what you are cutting or engraving there is a potential for a fire. It is for this reason **you must never leave your FabCore unattended.**

With that said the design of the FabCore is such to reduce the risk of fire. However it only takes one fire to destroy your machine and potentially cause further damage to you and your surroundings.

To reduce the risk of fire the FabCore should always be operated with the FabAir compressor ON. The FabAir essentially blows out any developing flames, whilst also having added benefit of creating cleaner, deeper cuts and keeping the lens clean of smoke. The FabAir is controlled by the FabCore. Once connected to the FabCore it will turn off and on automatically with your jobs.

You should also ensure your bed as well as the base of the machine are clear of debris as this can flare up and feed any potential fire.

Furthermore it is recommended to clean the bed when it begins to become saturated in oil/glue/sap as a result of cutting.

- **DO** Always operate the FabCore with the FabAir connected.
- **DO** Always keep the bed and below the bed clean of debris.
- **DO** Always have a suitable fire extinguisher nearby (we recommend CO₂).
- **DO NOT** Leave the machine unattended





Material Safety

Not all substances can be cut safely.

Some materials when laser processed, release toxic fumes not only lethal to your health, but also potentially your FabCore.

To know if a material is safe for laser cutting ask/search for its MSDS (Material safety Data Sheet). Pay specific attention to the section on thermal decomposition (Burning).

PVC/vinyl (polyvinyl chloride) releases hydrogen chloride. This is extremely harmful to you and will severely damage your machine through rapid corrosion.

Alternative: PP (Polypropylene) PVC free vinyl

Polyurethane (PUR/PU) releases hydrogen cyanide, nitrogen oxides and large amounts of carbon monoxide and should not be laser cut.

Alternative: Polyethylene (PE)

On NO occasion, should you Cut or Engrave substances containing chlorine.

- **DO** Always know what is in the material you are cutting.
- **DO** Always ensure you have good extraction.
- **DO NOT** Cut materials which contain chlorine.
- **DO NOT** Cut materials without any extraction.
- **DO NOT** Ventilate fumes outside unless safe and permissible to do so .
- **DO NOT** Place highly reflective materials on the laser bed.
- **FABTIP** Use a FabFilter to ensure proper filtration of air and compliance with local environmental regulations.



Optical Lens Safety

The lenses are made from ZnSe (Zinc Selenide), a relatively safe material while solid. However damage to the lenses can produce dust and small debris which are toxic if ingested or inhaled and pose an environmental hazard.

When a lens is broken toxic dust and vapors are formed which must not be inhaled. The dust can cause irritation to the eyes, skin and respiratory system.

A damaged lens may go through thermal decomposition which produces vapors which must not be inhaled. Signs of decomposition include deposits of red or white powder and an unpleasant smell.

Special precaution should be taken when handling and working with the lens.

- **DO** wash hands thoroughly after being in contact with a lens.
- **DO** follow the guidance given under the lens maintenance segment of the manual
- **DO NOT** continue using visibly damaged or dirty lens.
- **DO** follow the instruction given under the disposal segment of the manual.
- **DO** wear protective equipment. Face mask safety goggles and gloves.
- **DO** wipe down the surface with a damp disposable wipe.



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FabMaterials

Plywood

Plywood is one of the most common materials used in laser cutting. However not all plywood is equal. To get the best laser cutting experience its best to look for high grade interior plywood; B/BB.

The two most common plywoods for laser cutting are Birch and Poplar plywood.

MDF (Medium density fibreboard)

MDF is a very popular laser cutting material because it cuts relativity well and is very cheap. However it is important to find the right kind of MDF.

Eco MDF or MDF with a low formaldehyde content grade E1 will cut the best. Construction MDF found in most hardware stores will often cut badly and create a large amount of smoke.

Acrylic (PMMA)

Acrylic comes in many colours, opacities and finishes. It also cuts very well, making it an ideal material for all sorts of laser cutting and engraving projects.

When choosing Acrylic you will have a choice of Cast or Extruded.

Cast Acrylic

- Engraves with a frosted finish in focus or clear out of focus.
- Harder to create a flame polished cut

Extruded Acrylic

- Often cheaper
- Engraves clear
- Cuts easier with a flame polished cut.



Polypropylene (PP)

Available in thin sheets 0.5-0.8mm polypropylene is a useful material for creating foldable products or backing to fabric. It cuts relatively well but can leave a bit of a raised edge.

Polyethylene (PE)

When looking for a foam material Polyethylene works great. Available in many thickness's and colours it cuts much better than the alternatives and produces relatively little smoke and smell.

Cardboard, Card and Paper

All paper/card products cut very well, you can also cut thicker honeycomb cardboard with relative ease. However take care as cardboard is particularly susceptible to fire.

Felt (Polyester)

Felt is a great fabric to work with, often made of polyester it cuts very quickly and seals the edges to prevent fraying. It is available in a lot of colours and thickness's, you can also get ECO felt made from recycled bottles and wool felt. Natural wool felt will cut with darkened edges and does not seal like polyester.

KraftPlex

Kraftplex is comprised of a wood cellulose material formed under high pressure it bonds together without the need for glue or other additives. Making it a great ECO material. It cuts cleanly and is a strong and durable alternative to MDF.



Machine Safety Features

Full enclosure of CO2 laser radiation

The aluminium and steel frame, and thick polycarbonate door prevent any direct or scatter radiation from escaping the enclosure. (In the very rare and incredibly unlikely occasion of improper alignment or reflection, it may be possible for the direct (unfocused) laser beam to collide with the polycarbonate door. To prevent this ensure your laser is aligned by making sure the red laser is visible below the nozzle before you start a job.

- **DO NOT** Operate the laser with any access panel removed, these should never be removed during normal operation.
- **DO NOT** Stare at the cutting process, the high visible light intensity can still hurt your eyes. (Like looking at the sun!)

Note: All panels afixed with screws are only to be removable for service operations and with the machine disconnected from power. Removing these panels would compromise the enclosure and is forbidden.

- **DO NOT** Operate the laser when the enclosure is compromised.

Signage : Attached to the top of the machine is the following warning label. This is there for your information and safety. Replace lost labels immediately.



Dual defeat door interlocks

Two magnetic door sensors prevent the laser from being emitted when the door is open. The operation and functionality of these interlocks is checked and cycled every time you turn the machine on.

Upon start up you will be required to open and shut the door to ensure the interlocks are functioning and undefeated.

- **DO NOT** defeat the door interlocks.





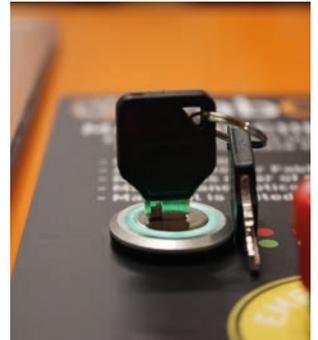
Key switch

The Key switch enables the laser's power supply unit. It is recommended to only enable the laser's PSU when you are about to start your job.

The key switch comes with two keys, we recommend keeping the spare key in a safe and secure location. While the main key should remain with the authorised operator.

The operator should never leave the unit unattended while the laser power supply is enabled.

Note: The key switch will illuminate red when disabled and green when enabled.



Laser armed indicator

To provide a visual sign of the laser's firing potential there is a indicator LED which will show the status of the laser.

When the LED is **red**, the laser cannot be operated; ensure all interlocks are closed, and the FabCool is turned on and plugged into the FabCore.

When the LED is **green**, the machine is ready to be operated, if the key switch is enabled, the laser is able to fire.

When the LED is **orange**, the laser is firing.

If the LED is not operating as expected, **DO NOT** operate the FabCore until the issue is resolved.



**IF THE LIGHT IS GREEN WITH THE DOOR OPEN YOUR INTERLOCKS ARE DEFEATED.
DO NOT OPERATE UNTIL THE ISSUE IS RESOLVED**



Emergency Stop Button

Pressing the emergency stop button cuts the electric circuit inside the machine. This brings all operations and movements to a stop.

The main function of the Emergency Stop Button is to prevent any risks to operating personnel.

The secondary function is to avoid any damage to the machine and materials

-DO NOT use the emergency stop button as an on/off switch.

The emergency stop button has a green ring to show whether the button has been pressed. Rotating the button releases the emergency stop button and will reactivate power to the FabCore.





Electrical Safety

The FabCore has enclosed all of its power systems in a compartment on the right side of the machine.

- **DO NOT** attempt to open this compartment during operation.

This compartment should only be accessed during service.

Signage: Attached to the side of the machine and panels is the following warning label. This is there for your information and safety. Replace lost labels immediately.



Power to the FabCore can be cut by pressing the main switch on the backside of the machine.

In an emergency situation, the emergency stop button will cut power to all power supplies inside the machine.

- **DO** Always be alert to avoid any electric shock.
- **DO NOT** Make or break electrical connections when there is power to the unit.
- **DO NOT** Plug in or unplug the compressor when there is power to the unit.
- **DO NOT** Access the electronics compartment when there is power to the unit.
- **DO NOT** Touch the High voltage end of the laser tube while there is power to the unit.



Extraction

A CO2 laser vaporises the material it is cutting or engraving. During this process smoke particles and possibly toxic fumes are released. These particles and fumes are harmful and should be handled either with a certified filtration system or be vented outside the building where it can be dispersed quickly into the atmosphere.

FabCreator recommends a minimum flow rate of 520m³/h for extractor fan or the FabFilter Basic or FabFilter Plus

For best results position your machine with the shortest and straightest path for the extraction solution.

A general rule is you cannot have too much extraction. Higher air flows will result in cleaner engravings and less cleaning of the optics.

- **DO** always have a extractor or filter ON while operating your FabCore.
- **DO NOT** point your extraction fan towards enclosed and/or populated areas.
- **DO NOT** run your machine if the air inside is becoming very hazy and/or smoke is coming out of the air intake.
- **DO** ensure compliance with local regulations.

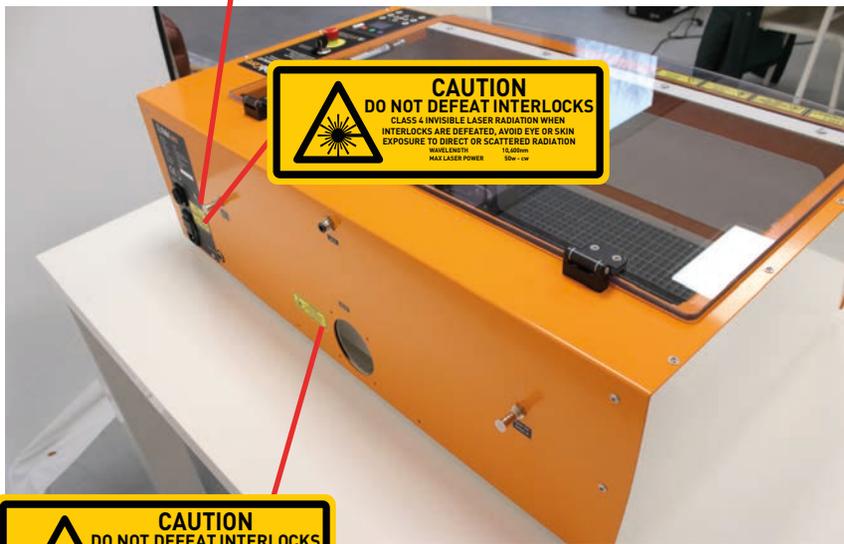
In this scenario, you either need to change your filter, increase your fan speed or your current fume extraction system is insufficient for the substance you are cutting/engraving at the speed you are cutting/engraving.



Overview of Machine Warning Stickers



Sticker is placed underneath the access panel





Unboxing your FabCore

Your FabCore will arrive in a thick and sturdy palletised cardboard box. This is to ensure the machine is not damaged in transport. Unboxing the FabCore is a two person job. We recommend first cutting the straps which hold down the chiller and filter (if ordered)

Depending on your environment, you might choose to unbox the FabCore outside or carry the shipping box inside.

Open the box,

Remove the items resting on top of the FabCore.

- Hosing (50mm or 76mm)
- Extractor fan (not present if you ordered a filter)
- FabAir compressor
- Component box.

Pull the protective foam wrap back so you can reach the FabCore.
With two people reach down and under the FabCore and lift.
FabTip lift with your knees not your back.

Carefully carry the FabCore to its installation location and place down.
Watch out for your fingers when placing it on the tabletop. Although the FabCore sits on feet your fingers might still get caught.





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Carefully carry the FabCore to its installation location and place down. Watch out for your fingers when placing it on the tabletop. Although the FabCore sits on feet your fingers might still get caught.





Packing check list

Before you start setting up its best to just double check everything that should be with you is present.

The sooner we know your missing a part the sooner we can ship it out. The component box will have a labeled checklist.



The image above shows you the standard delivery items of a FabCore standard package. If you have ordered additional extras, optional extras and different configurations they might not be shown in the images here but will be on the delivery check list.





Machine Setup

Operating Environment

You should try your best to install your FabCore in the most appropriate place available.

Ideally it should be in an area with a low humidity which is climate controlled.

The FabCore is a tool, not a toy and should be located as such. While great for home studios/offices/workshops it is not designed for your lounge or kitchen.

If you are installing your FabCore into a wood workshop ensure it has access to clean air and is not operating in an overly dusty environment.

Try and position your FabCore as close to the extraction exit as possible and operate in a well ventilated area.

First setup

Required components:

- FabCore
- FabCool Chiller and hosing
- FabAir compressor and hosing
- Extractor fan/ FabFilter and hosing
- Power cables



Unboxing the FabCool Chillers

Unbox your FabCool Active or FabCool Passive.







Connecting the Chiller

Connect the water hosing from Chiller OUT to Machine IN

Connect the water hosing from Chiller IN to Machine OUT

Connect the safety interlock cable from the FabCool to the FabCore (This ensures the FabCore will not operate without the chiller!)

- **DO** keep the hosing as short as possible.
- **DO** use the supplied clamps to attach the hose.
- **DO NOT** make the hose too short, it should be able to reach the chiller comfortably.





Connecting the compressor

Plug the power adapter into the back of the FabCore

Attach the air hosing from the compressor to the FabCore

- **DO** keep the hosing as short as possible
- **DO NOT** make the hose too short, it should be able to reach the FabAir comfortably
- **DO NOT** connect or disconnect the FabAir when the machine is turned on!



Connecting power

Plug the power cable into the FabCore, and the other side into a mains socket.

The FabCore is designed for 220-230V power.

We advise connecting the FabCore and its basic peripherals to an extension chord, this way you cannot forget to turn them all on



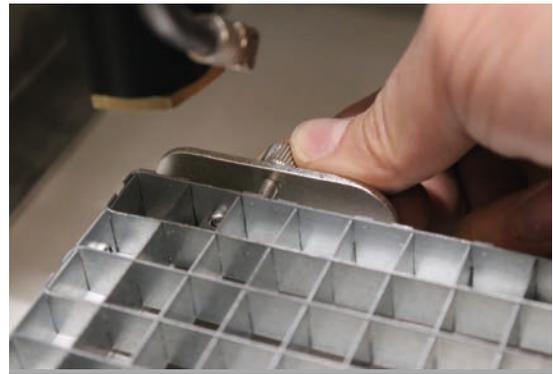


Placing the bed

Place the bed into the holder frame.

The frame holds the bed off the floor of the machine, allowing extraction of smoke and fumes.

Position the bed by tightening the thumb screws on the back and right sides





Connecting the extraction

- Attach the air outtake to the back of the machine.
- Attach the hosing to the back of the FabCore and ensure it fits tightly.
- Connect the other side of the hose to your extractor fan or FabFilter system.

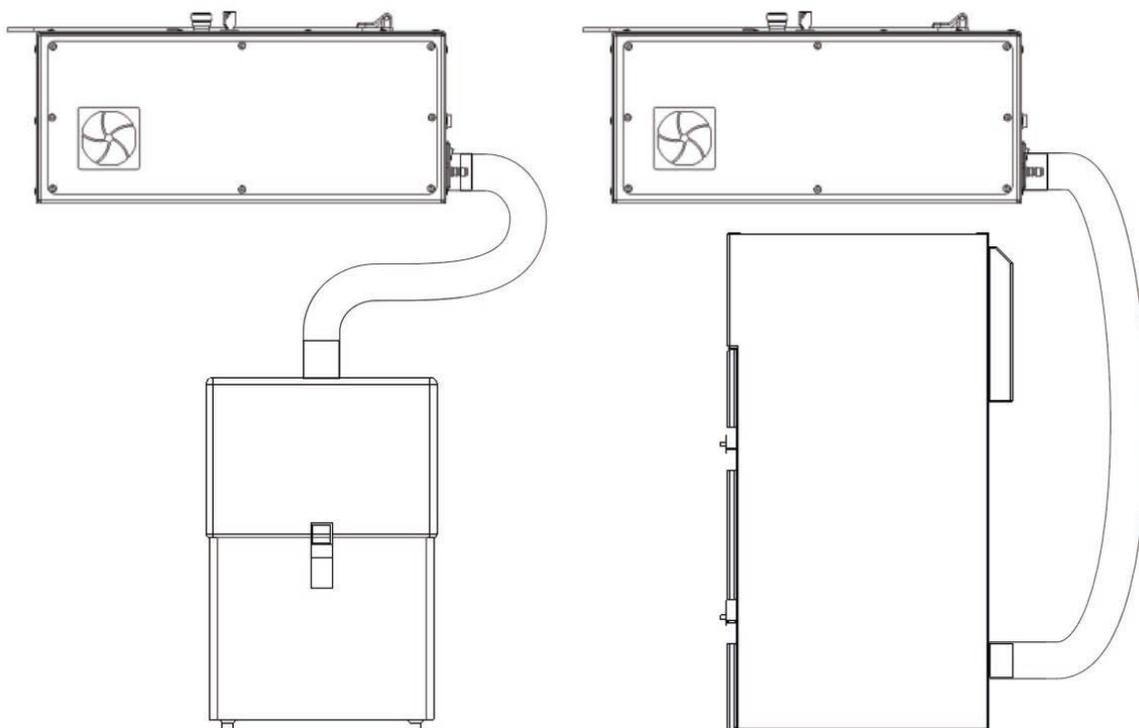
- **DO** keep the hosing as short as possible.
- **DO** keep the hosing as straight as possible.
- **DO NOT** operate the FabCore without its extraction connected.



Standard adaptor for 76mm hose.



Standard adaptor for 50mm hose.



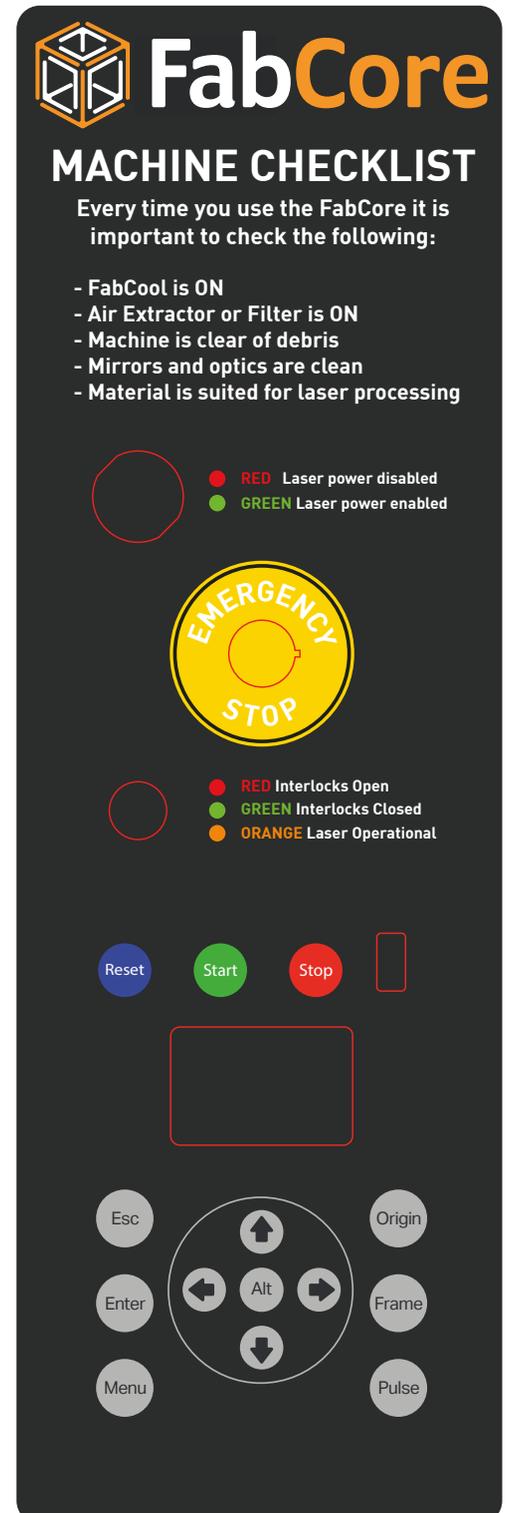


Standard operating procedure

Every time you go to use the FabKit there are a few things you should check before every use.

- **FabCool is ON**
- **Air Extractor or Filter is ON**
- **Machine is clear of debris**
- **Mirrors and optics are clean**
- **Material is suited for laser processing**

- **DO NOT** Ever leave the machine unattended.
- **DO NOT** Ever run the machine without well working ventilation.
- **DO NOT** Ever attempt to override the safety interlock system.
- **DO NOT** Ever cut PVC or any other toxic materials.
- **DO NOT** Ever plug in or unplug the FabAir whilst the machine is powered on.





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First Use

Setting Up LightBurn

The FabCore comes with a LightBurn product licence. You can find this at the front of your user manual

1. Download and install LightBurn. (lightburnsoftware.com)
2. Connect the FabCore to your PC
3. Open LightBurn - the device discovery wizard should start automatically
4. Add the FabCore by selecting the Ruida controller
5. Select "rear left" as origin
6. Select "Finish" to add the FabCore, it should now be visible under "Devices"

For a full introduction into LightBurn, we suggest visiting

lightburnsoftware.com/pages/tutorials



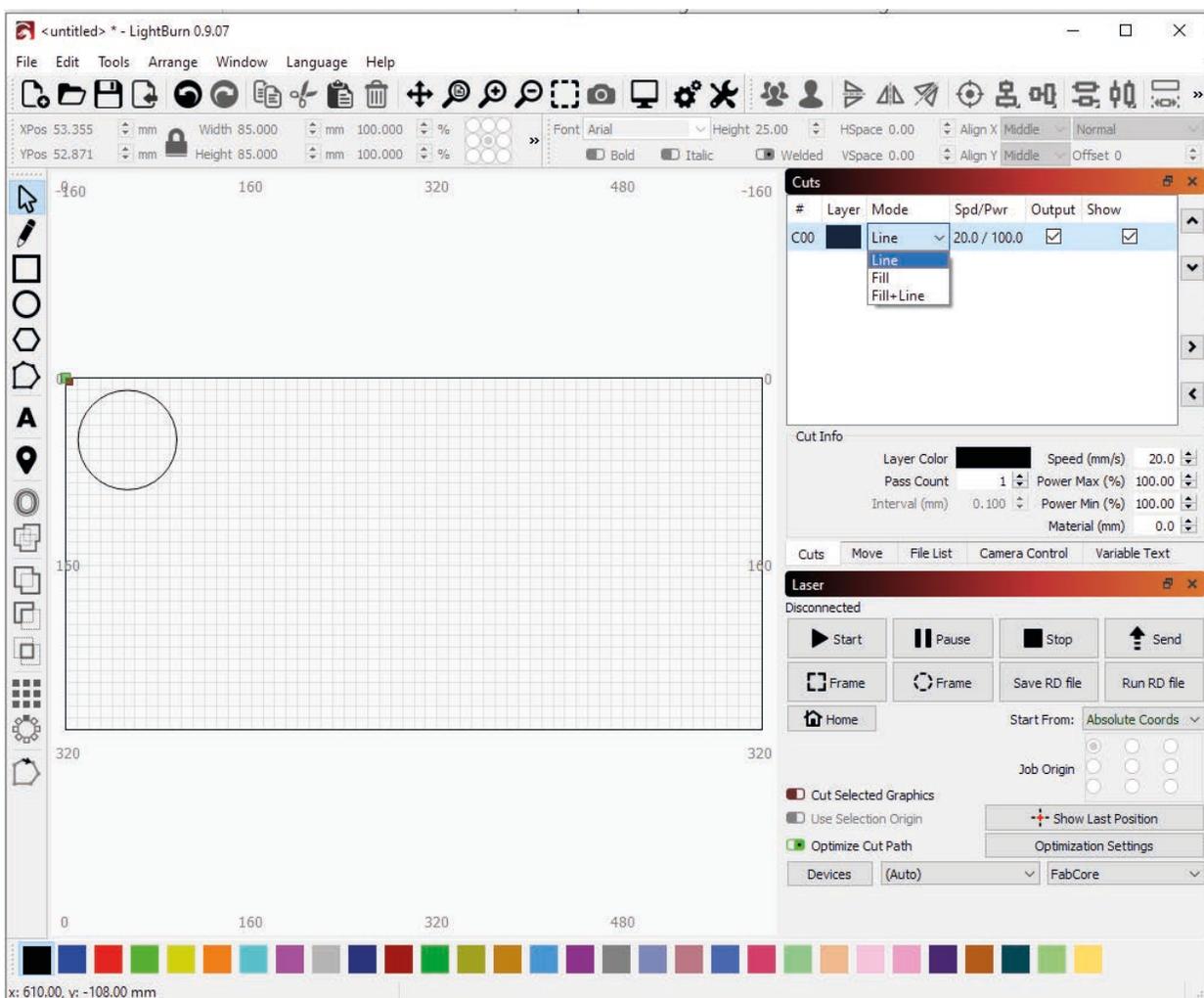
Vector Cutting and Engraving

After drawing a shape in Lightburn or importing your file, different line colours should show up as different operations in the “Cuts” tab.

For vector cutting and engraving, use the “Line” Mode of cutting.

By adjusting the speed and power you will cut or engrave your material. In general, higher speeds and lower powers will engrave, and lower speeds and higher power will cut your materials.

We advise always using a single pass for cutting, as this should result in cleaner cuts.





Raster Engraving

Raster Engraving is used for engraved filling of a larger area or burning images onto your material

It is important to add some settings into lightburn to ensure the engraving lines up nicely.

To do so go to
Edit -> Device Settings

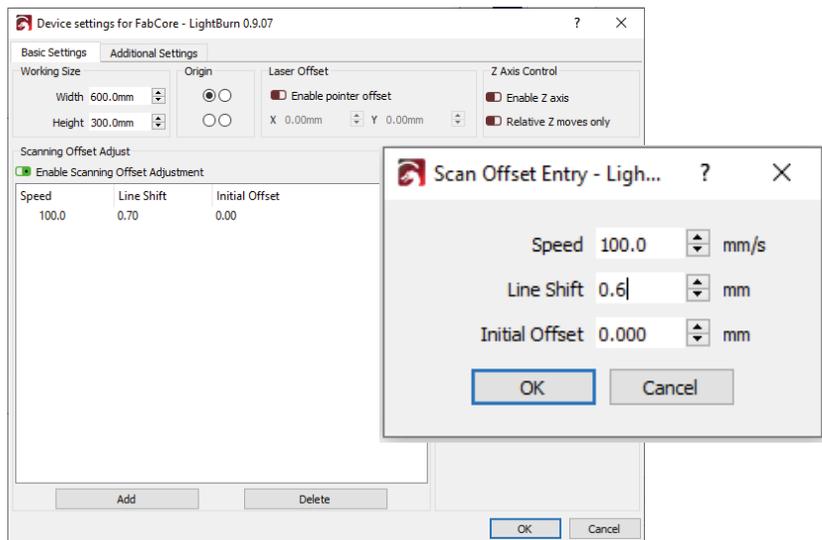
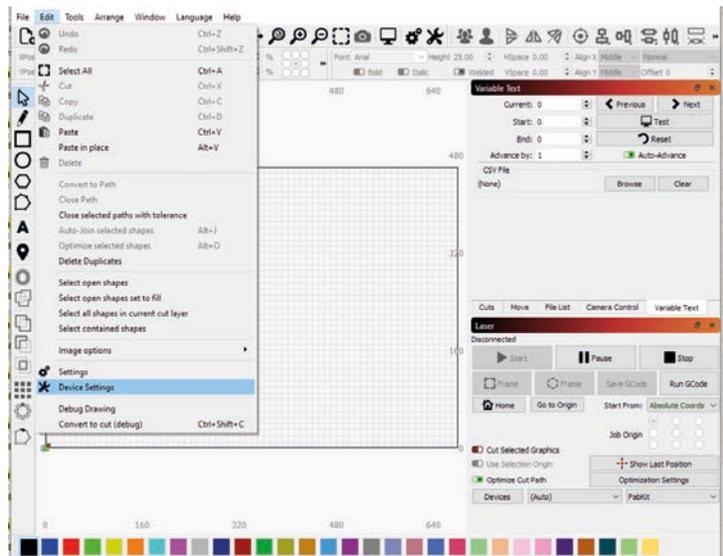
Enable the “Enable Scanning Offset Adjustment”

Press the “Add” Button

Insert Speed “100”
Line Shift “0.6”
And press OK

You should now be set up for engraving at 100mm/s

It is possible to further optimise other speeds, and we will add more information on our forum.



Full information on different operations can be found on <https://github.com/LightBurnSoftware/Documentation/blob/master/Operations.md>



Setting up the machine

To move the axis, use the left/right/up/down buttons to move the head to above your workpiece.

Press the “Origin” button to ensure the FabCore remembers its location

Use the laser alignment disc to set the height of the laser head.



Setting the head height to the material

Move the head above the material you want to cut or engrave

Place the alignment puck on top of the material

Loosen the thumb screw on the right side of the machine and carefully slide the lens holder tube up or down. The correct height is set when the nozzle rests on top of the alignment puck

Tighten the thumb screw to set the alignment.





First cuts

Connected to LightBurn directly

After setting up a job in lightburn, this can transferred straight to the FabCore using the “send file” button.

Using the “frame” button, the laser head will move to the outer positions of the job about to run.

After ensuring the extraction and FabCool are on, and the FabAir is connected, you can flip the key switch to an ‘on’ position - it should now show green.

Make sure to check the Machine Checklist, and when everything is ready, you can press play in Lightburn or “Start” on the machine controller.



- **DO NOT** ever leave the machine unattended.
- **DO NOT** ever run the machine without well working ventilation.
- **DO NOT** ever attempt to override the safety interlock system.
- **DO NOT** ever cut PVC or any other toxic materials.
- **DO NOT** ever plug in or unplug the FabAir whilst the machine is powered on.

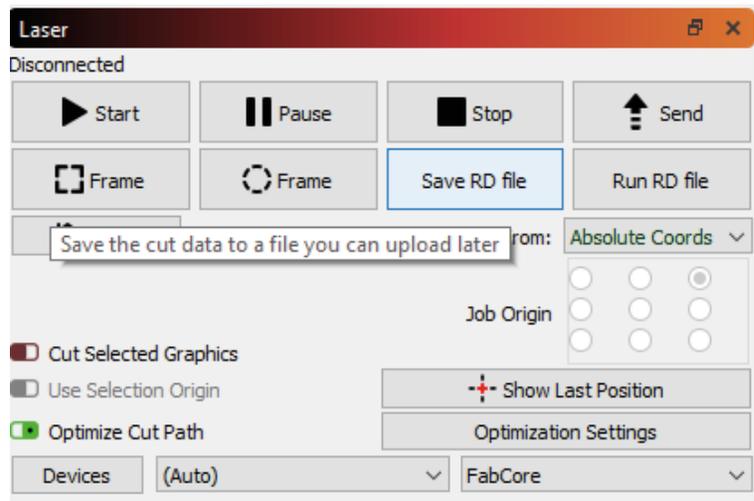


Using a USB Stick

In Lightburn

To save your laser file to a USB stick, click "Save RD File" under the laser tab.

This opens the browser and allows you to navigate to your USB stick and save your file





On the FabCore

After ensuring the extraction and FabCool are on, and the FabAir is connected, you can flip the key switch to an 'on' position - it should now show green.

Make sure to check the Machine Checklist, and when everything is ready, you can start your job

1. Place your USB stick into the slot on the FabCore interface
2. Press "Menu"
3. Using the arrows, navigate down to "File" and press "Enter"
4. Navigate down to "Udisk Files" and press "Enter"
5. Navigate to your file and press "Enter"
6. Select "To Memory" and press enter
7. The controller should inform "Copy Successful" and press "Enter"
8. Press "Esc" to navigate back to the menu in step 4
9. Navigate to "Memory Files" and press "Enter"
10. Navigate to your file using the arrow keys and press "Enter". You now have the option of running the file, Tracking the outside of the cutting job, copying the file to USB or deleting the file
11. Press "Enter" to run your file

- **DO NOT** ever leave the machine unattended.
- **DO NOT** ever run the machine without well working ventilation
- **DO NOT** ever attempt to override the safety interlock system
- **DO NOT** ever cut PVC or any other toxic materials
- **DO NOT** ever plug in or unplug the FabAir whilst the machine is powered on





Basic Maintenance

The FabCore is designed to be low on maintenance, however there are a few things you should regularly check and treat if needed.

- **DO** Always ensure the bed of the machine is clear of debris, it's a good idea to clean it regularly
- **DO** Keep it clean; dust and smoke will eventually build up on the walls of the machine and the centre carriage. Although this will not necessarily affect the machine it's a good idea to give them a wipe with a damp cloth or a dust wiper.
- **DO** regularly check your mirror and lens. Although the mirrors and lens are kept out of the flow of dirty air they will eventually get a bit grubby, check on them frequently and clean them when necessary.
Different materials, your extraction and cutting/engraving habits will dictate how often you will need to clean them.
- **DO** Keep the bearings greased to prevent corrosion and smooth movements. We recommend a Lithium based grease with a NGLI grade of 2.

Some things you should check on an occasional basis or when an issue arise.

If the laser is firing but you are not able to cut and engrave

- Your alignment may be off; check laser alignment

Skipping steps and/or squeaky movements.

- Re-grease bearings and check belts.



Cleaning the machine in general

Turn off the machine and remove the mains power.

Thoroughly remove all loose dirt and particulate on the inside of the machine (I.e use a vacuum cleaner)

Use a dry or lightly damp cloth to wipe the sides of the machine

Clean the air exhaust and check the hosing for any particulate buildup.

Clean the polycarbonate door using a soft cloth, careful as the polycarbonate may scratch when using a rough material



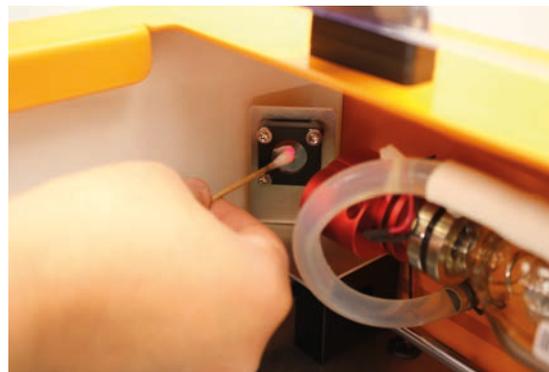


Cleaning the mirrors

Using a small cotton bud and pure alcohol, carefully wipe the mirrors. It is best to use a circular motion, working your way from the centre to the outside of the mirrors.

The mirror on the laser head is best reached by removing the metal cover

- **DO** use a new cotton bud for every mirror
- **DO** use a new cotton bud when any dirt is visible
- **DO NOT** apply a lot of pressure, you could scratch the mirrors





Cleaning the lens

A dirty lens can cause loss of performance and damage to the lens itself.

- **DO NOT** Operate with a scratched or dirty lens!

Remove the lens holder by loosening the screw on the side of the laser head and sliding it down.

If not a lot of dirt is visible, clean the lens carefully whilst it is still in the holder.

If a lot of dirt is visible, carefully unscrew the retaining ring and wearing some hygienic gloves, remove the lens

- **DO NOT** Touch the lens with bare hands.

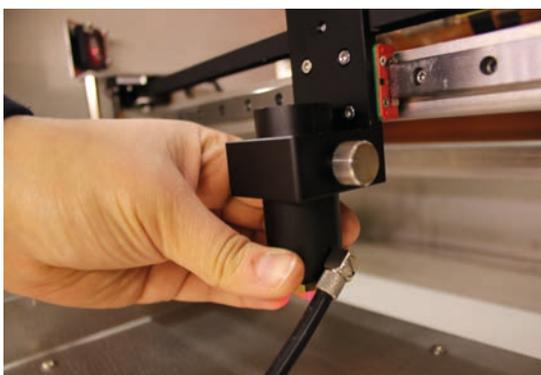
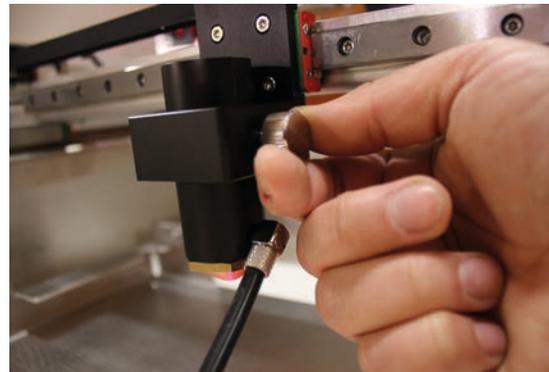
Using a small cotton bud and alcohol, carefully wipe the lens.

- **DO** Only use pure alcohol, any impurities could damage the lens.

- **DO** Use a new cotton bud when any dirt is visible.

- **DO NOT** Apply a lot of pressure, you could scratch the lens.

If your lens is broken or disintegrating, please consult the disposal of the lens section below.





Disposal

Safe disposal of old and broken lenses

The lenses are made from ZnSe (Zinc Selenide), a relatively safe material while solid. However damage to the lenses can produce dust and small debris which are toxic if ingested or inhaled and pose an environmental hazard.

Special precaution should be taken when removing a damaged lens.

- **DO** wear protective equipment. Face mask safety goggles and gloves.
- **DO** wipe down the surface with a damp disposable wipe.
- **DO** place the broken lens and disposable wipe in a sealable bag.
- **DO NOT** throw the broken lens in normal waste streams.
- **DO** dispose of the broken lens according to local regulations.

You may also mail your damaged lenses back to FabCreator. Please ensure the lens is in a hermetically sealed bag and packaged securely.

Laser tube

The laser tube mainly consists of glass with metal end which could be disposed in normal waste streams. However the end of the CO₂ laser contains a ZnSe window. (This is how the laser light leaves the tube)

- **DO NOT** throw the laser tube in household waste.
- **DO** dispose of the laser tube in accordance to local regulations.

In the unlikely event the ZnSe window at the emitting end of the laser tube broke you should treat it like a broken lens and follow the instructions above.

You may mail your damaged and/or used CO₂ laser tube back to FabCreator. Please ensure the tube is packaged securely.



Used filter material

After replacing your filters we recommend you place the old filters in the packaging the replacement filters came in. Please ensure you dispose of your waste filter cartridges in accordance with local regulations.

- **DO** wear protective equipment. Face mask safety goggles and gloves.
- **DO** place the used filters in the packaging the replacement came in.
- **DO NOT** throw the filters in household waste.
- **DO** dispose of used filters in accordance to local regulations.

Disposal of the machine and other accessories

Electronic devices must be disposed of according to the WEEE directive and other local regulations.

If you are a private consumer the FabCore should be deposited into electronic waste streams and not general waste.

If you are a business customer of FabCreator in the Netherlands the machine should always be returned to FabCreator.

If you are really considering throwing away your FabCreator laser please contact us first. FabCreator lasers are built to last and will retain value for many years to come. Think of donating your FabCreator laser to a local hackerspace or returning it to FabCreator where we will ensure it finds a new home.

- **DO** first contact FabCreator before throwing your laser cutter.
- **DO** consider donating to a local hacker or makerspace.
- **DO** ensure you dispose of the laser cutter according to local regulations.
- **DO NOT** dispose the laser cutter in normal household waste.

FabCreator is registered with The Organisation for Producer Responsibility for E-waste Netherlands (OPEN)





Storage

Ideally you should store the FabCore in a dry and warm location.

If you are planning to store your FabCore for a long period of time we recommend draining the FabCore and FabCool of fluid. This is paramount if you plan on storing it in location which may drop below freezing.



Warranty

Warranty of the machine

The FabCore comes with the standard 2 year European warranty
This includes the FabAir, FabCools, Extractor and FabFilters.

Warranty of the consumables

For items which are expected to degrade with use these do not fall under the standard two-year warranty.

These items include the following;

Laser tube

In the case of the laser tube, you can expect a 6- or 12-month warranty depending on the FabCool chiller you ordered at time of purchase.

Why different lengths of warranty?

Simply put laser tubes like to be cool, with the active chiller we are confident you will not experience problems with your laser tube for a long time.

With the passive chiller it is possible to run for extended periods of time with temps not immediately damaging to the laser tube but will decrease its life expectancy.

When we consider the expected life span of a laser tube, we imagine our users using the machine with very heavy use. In reality more moderate usage of the system will yield longer life spans. most FabCore users can expect their tube to last 2-3 years with light to moderate use.

The following two items have no warranty as the typical reason for them breaking is improper cleaning. That being said if your lens or mirrors do break unexpectedly, we will likely send you a new one.

Mirror

The mirrors are molybdenum a very durable mirror for CO2 lasers. These should last you a long time. However, this is dependent on keeping them clean. If dirt is allowed to settle on mirrors they will degrade and break. Keep them clean and you will likely never need to change them.

Lens

Lenses unlike the mirrors will not last forever even if you keep them clean. You should expect to change your lens every year or so. This time can vary depending on your usage of the machine.

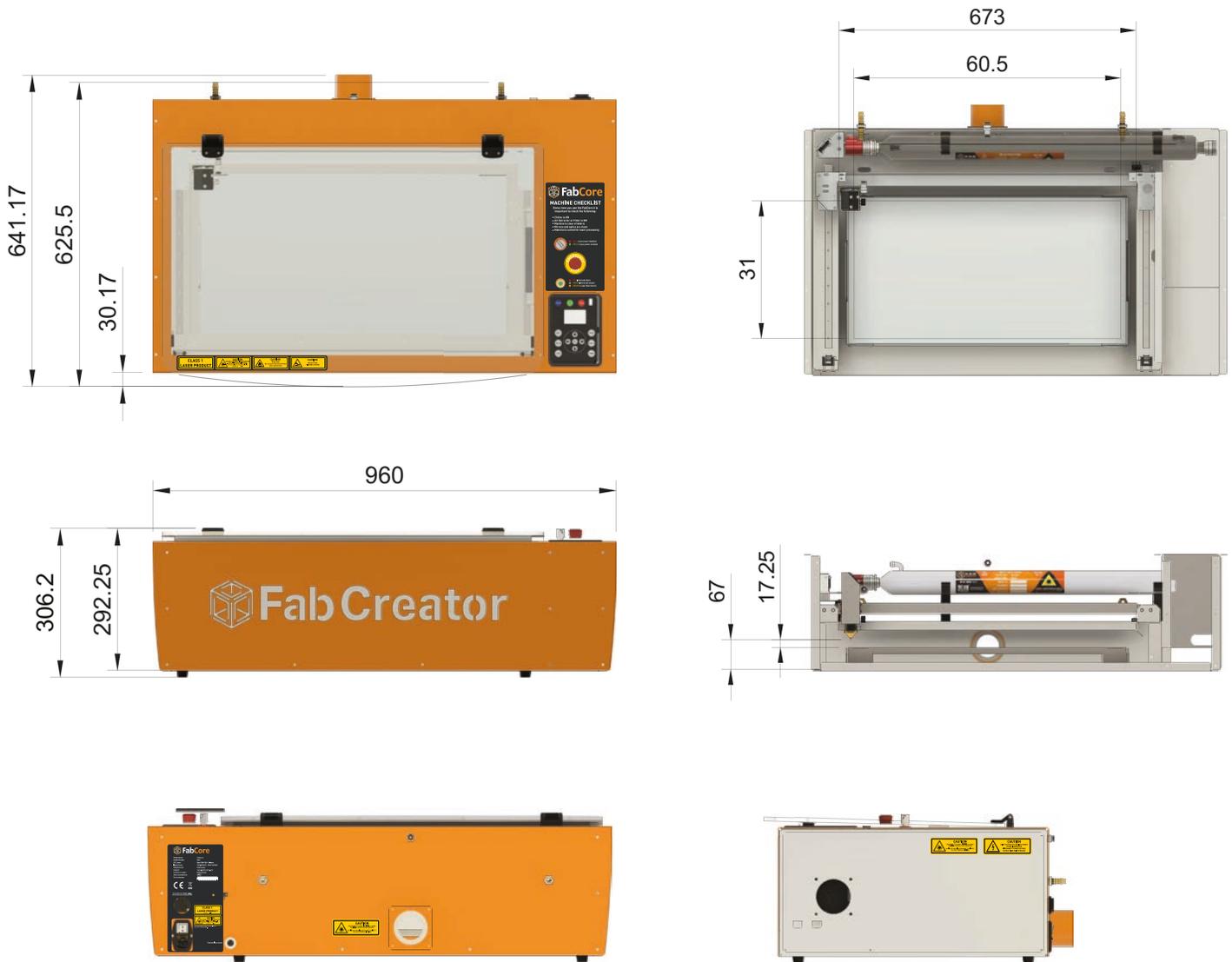
Filter material

The filter material inside the FabFilter essential and FabFilter plus will gradually fill up with the dust and debris from your laser cutting process. How long this takes depends on the material you are cutting and how heavy your usage is.



Technical Data

Technical Dimensions



Electrical Specifications

Voltage	220-240 VAC
Amperage	Max 5 Amp
Frequency	50 hz



Technical Specifications

Laser Power	40W CO ₂ laser
Machine Size	960*641*306.2mm
Weight	42.8Kg
Work Area	605*310*67mm
Max Sheet material size	670*450*17mm
Max Block material size	630*330*67mm
Focus	Manual
Work Surface	Steel Grid
Connectivity	USB Connection, USB Stick
Software	LightBurn
File Formats	SVG,DXF,Ai,PDF,BMP,PNG,JPEG

Laser Safety

Laser Safety	Consumer Laser (EN 50689:2021) Suited for freely accessible locations such as schools and libraries
Laser Classification	Class 1 (EN 60825-1:2014)
Safety System	EN 13849-1:2015 PL-d
European Directives	Machine Directive

*Please see declaration of conformity for full list of European directives and European normalised standards applied.

Laser Specifications

Wave Length	10.6 μ m
Max Power	50 Watts
Beam Mode	TEM 00
M ₂ Value	< 1.2



Trouble shooting

No power

Is the switch on the back of the FabCore on?



Is the Estop is pressed? (twist to reset)

Still no power?

Did you have a sudden power outage?



Unplug the machine and remove the fuse holder has a fuse blown? Replace with another 5amp fast acting fuse (5x20mm.)

Still no power contact FabCreator for support.

Interlocks are not green

Is the chiller on and running without alarming?



Is the chiller interlock cable connected?

Is something blocking the closing of the door?

Did you close the door evenly or from one side?



Have you open and shut the door at start up?

Have you turned the chiller off while the machine is on?

You will need to open and close the door again to confirm the interlocks.

Still not green contact FabCreator for support.



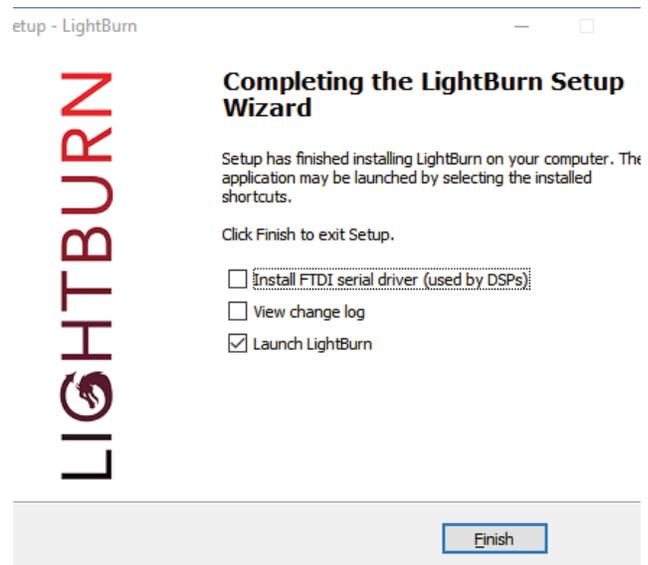
Cant connect to PC

When installing lightburn did you check install DSP serial driver.
If not reinstall lightburn and check install DSP.

Still no connection try restarting your PC.

Are you using a mac? If so you may need to install an additional driver.
<https://ftdichip.com/drivers/vcp-drivers/>

Still cant connect contact FabCreator for support



Interlocks are green but machine is in protected state

In rare scenarios the interlock indicator may show **GREEN** while the machine will call for machine protect.

In this case simply reaffirm the interlocks by opening and closing the door and continue.

Checking you close it from the center.





Changing Filters

When the FabFilters need changing they will first start flashing amber before red. Once you see a solid red you really should change the filter you will also notice a buildup of smoke in the machine.

When changing the filter, it is recommending to use personal protection equipment such as masks to prevent any inhalation of dust and fumes.

First turn off and unplug the Fabfilter. Then follow the steps below for your specific filter.

FabFilter Essentials

Unclip the two side connectors and lift the lid off.

Now you can see the exposed filter, lift it out.

If you are replacing just the pre-filter follow the next step.

After you have removed it carefully turn it on its side, so you expose the pre-filter underneath.

Carefully pry the prefilter out of the casing and insert the new prefilter in its place.

Now simply reassembly the filter in reverse to how you took it apart and you're ready to get back to laser cutting.





FabFilter Plus

To replace the filters open the front of the unit by rotating the two black knobs.

The bottom filter is the pre-filter, pull firmly on the handle and it will slide out.

Insert the new pre-filter in reverse, you will need to give it a good push at the end as the seal on the intake is tight.

The top filter is the combined filter, to remove this rotate the lever, this will disengage the filter.

Now pull on the filter and slide it out carefully as its quite heavy.

Replace the new filter in reverse, take note to rotate the lever the correct direction as otherwise the door will not shut.

Close the door and you are ready to get back to laser cutting.





FabCool Water Change

Changing the water for the FabCool Chillers is the same for both models, with the exception the FabCool Passive requires more water and does not have a fill indicator.

To drain the FabCool Chillers first disconnect it from power and the FabCore. Then we recommend moving the chiller outside near a drain or somewhere you don't mind getting wet.

Then remove the drain plug from the bottom of the chiller and let the water run out. You might want to tip the chiller a little at the end to ensure you get every last drop out.

If you cannot move it outside its best to place the chiller on a table or higher surface and hold a bucket under the drain plug. It's a good idea to have some towels on standby as you might get splashed!

After draining reconnect the drain plug and tighten it well. Reconnect the chiller to the FabCore as described earlier in the manual and fill refill with distilled water. (Or laser safe antifreeze)





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Laser Alignment Check

The FabCore arrives prealigned, our high tension compact mirrors are very sturdy and as a result we have yet to hear of a FabCore arriving missaligned!

However it remains a possibility, so the following guide will aid you in confirming if you have an alignment issue and how to correct it.

When replacing your laser tube, it may not be necessary to adjust the alignment so make sure to check first.

FabCreator laser tubes come with a prealigned alignment laser. So our first check is with the visible laser.

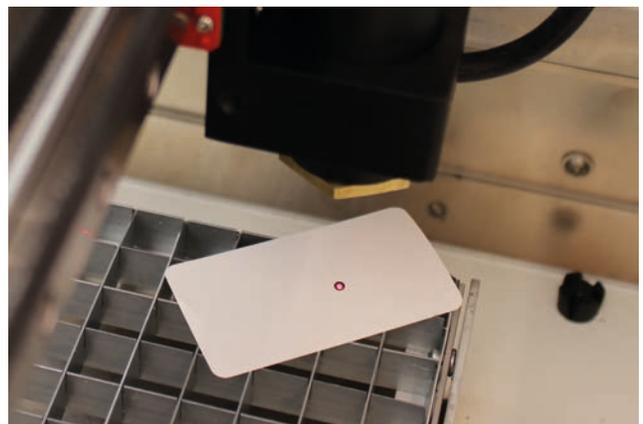
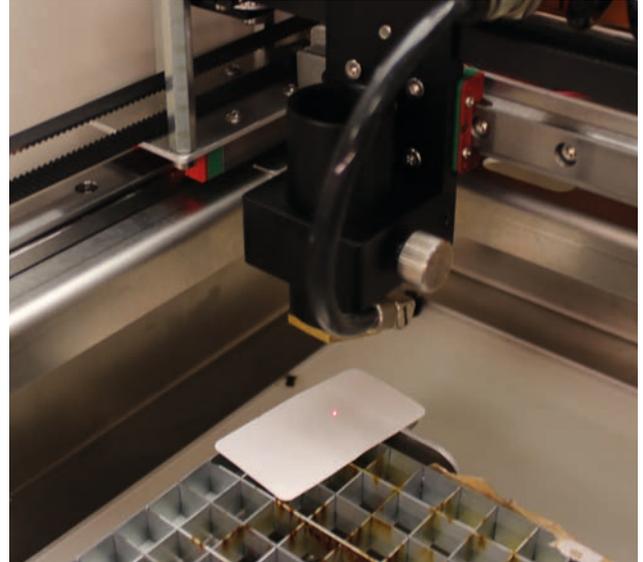
Is the red dot visible under the nozzle across the work surface?

Check each of the 4 corners.

If the red dot is visible in every corner proceed to test fire (pulse) the CO₂ laser with low power (10%) in each of the 4 corners.

If you see a nice round black dot closely aligned with the red. In every corner then your alignment is perfect.

(The red dot is never 100% perfect with the CO₂ but a very close approximation.)





If when testing the red dot in each corner, you do not see the red dot or you see a blur of red light and when you test fire a non round burn mark, like the image on the right.

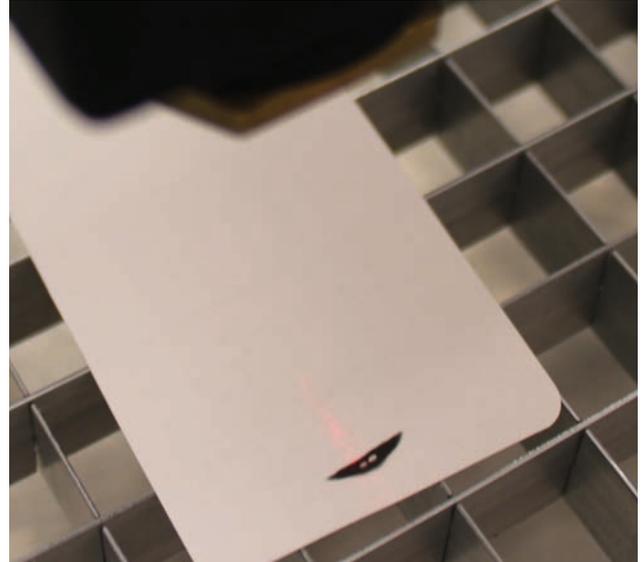
Remove the nozzle and try again.

If you see the red dot now it may be only the 3rd mirror on the laser head which has been slightly knocked out of alignment when removing the cover for cleaning and is now clipping the nozzle. (Skip to 3rd mirror alignment in the next section)

If after removing the nozzle you do not see any red dot. First check the red dot is functioning by placing a bit of paper in front of the 1st mirror.

If you do not see any red dot on the paper then the alignment laser may have failed. Contact FabCreator for a replacement.

If the red dot is functional then we will proceed with a full realignment in the next section.





Laser Alignment

With the visible alignment laser aligning the FabCore is pretty simple. However it can be a tedious and fiddly job requiring some patience and a steady hand.

FabTip: If you get completely lost and want to 'reset' the mirrors. The perfect start point is 3mm distance of the springs. Use a piece of 3mm acrylic or similar to place behind the mirror to aid in setting the distance.

FabTip: It can be useful to have a little play with the screws to get a feel of how the beam moves when you rotate each screw.

Apply some thermal paper to the 2nd mirror. (The moving one on the left)

Starting with the rear left back mirror. (1st mirror) Adjust the 3 screws so the red dot hit the 2nd mirror in the center.

Use the pulse of CO₂ laser to confirm it is correct. (use a low power 10%)

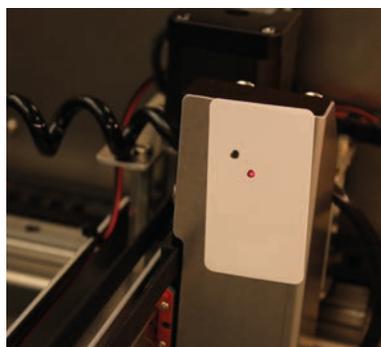
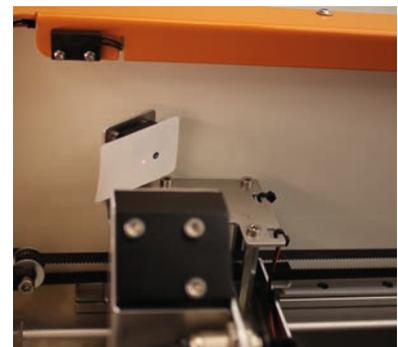
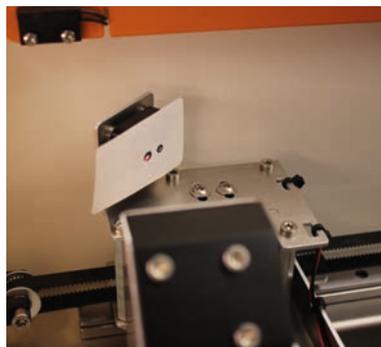
Move the Y axis to the home position and max position to ensure the beam is straight and centered along the whole distance. The pulse of the CO₂ laser acts as a great maker to help align the red dot with as you move the carriage back and forth.

Now place some thermal tape over the side of the laser head.

Adjust the 3 screws on the 2nd mirror so to center the beam and ensure it is straight at the home position and max.

Its more important to ensure the beam is stright and remains in the same spot than it is perfectly centered with the hole.

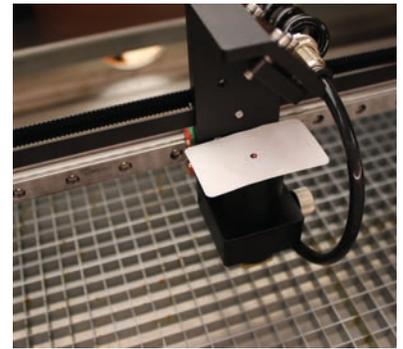
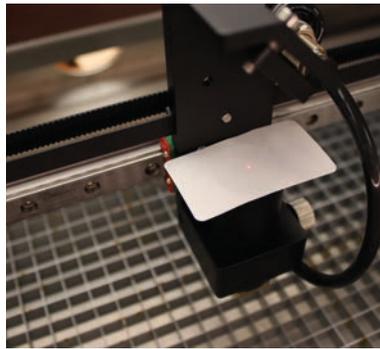
If you are really off centered you may need to redo the first step.



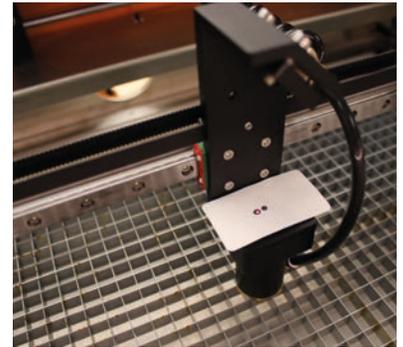


Remove the laser head cover and place thermal tape over the top of the lens tube.

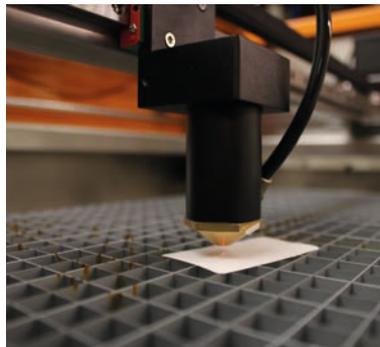
Slide the lens tube up and down and adjust the 3 screws on the 3rd mirror so the beam is straight and centered.



Now check the beam is coming out the center of the nozzle.

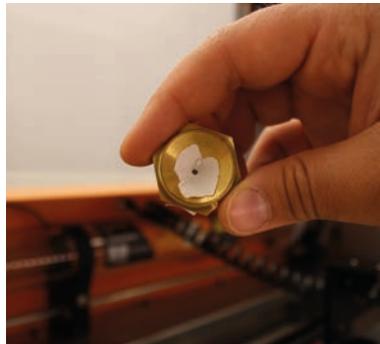


Using a bit of thermal tape you can check if it is clipping the nozzle or hitting it in the center.



Use a bit of tape on the outside of the nozzle to keep track of the direction when you screw the nozzle on and off.

If its not straight or centered continue to adjust the 3rd mirror.



If its really off center you may need to check the position of the 1st and 2nd mirror again.

Once you think its coming out straight and centered check in each of the 4 corners as discribed in the alignment check above.



If you get a nice clean dot in all corners run some test jobs and you should be good to go. If not you will need to repeat these steps.



Repairs & Service

Following from our ethos of customer ownership we deliberately design our machines to be understandable and repairable by users who deem themselves competent of such interactions.

Following from our ethos of customer ownership we deliberately design our machines to be understandable and repairable by users who deem themselves competent of such interactions.

This is not to say anyone can, should or is capable of conducting repairs and services.

In the case of the FabCore not operating as expected the first cause of action is to consult the manual, basic maintenance and trouble shooting guide. If these fail to remedy your problem, contact FabCreator directly via support@fabcreator.com



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FabCore USER Manual

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