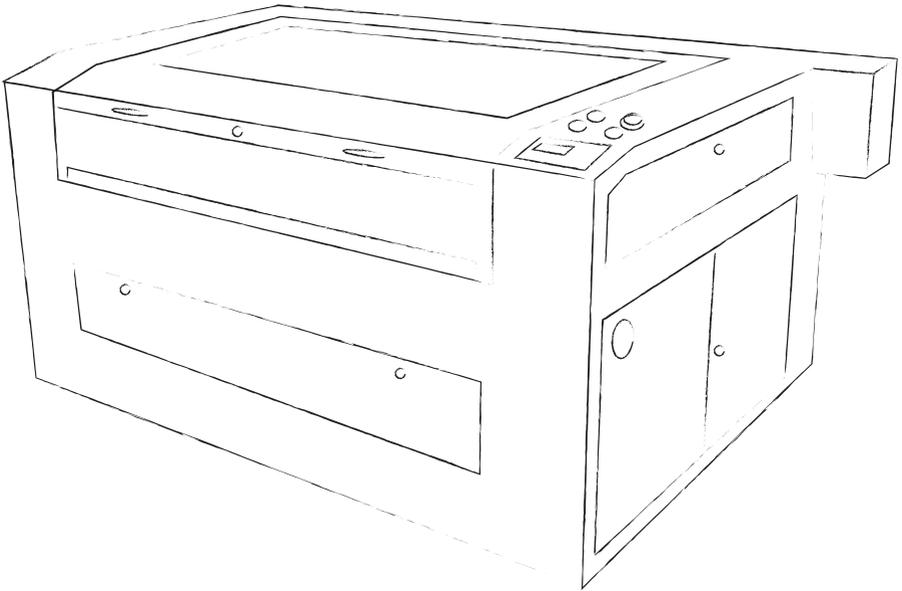




Manual BRM





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1. OBJECTIVE

The objective of this workshop is to teach you how to use the laser cutter in a safe way and without damaging the machine.

The objective is NOT to show you all functionalities of the machine, but rather to give you a starting point from where you can start testing the possibilities on your own.

2. MATERIALS

The lab has a number of materials in stock, but you are also allowed to bring your own materials. However, not all materials are allowed or possible for use in the laser cutter.

WHAT TO CUT:

- wood: triplex, MDF, balsa
- paper, cardboard
- textiles, felt, foam
- leather, fake leather
- plexi
- acrylics
- rubber
- plastics: PP, PET, PA, PE, PI, PS, etc.
(a more complete list is available)

DO NOT USE:

- PVC, polyvinylchloride, the fumes are toxic and damage the lens.
- PC, polycarbonaat, this material burns
- THERMOSETS, all plastics that are not meltable,
like PU en bakelite
- metals or other reflective surfaces without coating

When in doubt, ask for advice from a lab supervisor.

To give you an idea: a new lens costs 400 euros. Treat the machine with care.

3. THE SOFTWARE

The BRM lasers get operated from the computer next to the machine.

The software is called Lasercut 5.3.

You can start the program from the desktop.

3.1. File types

The software should be able to handle DXF-files from Autocad and .AI-files from Illustrator.

- Import:
 - PLT, AI, DXF, DST, BMP, NC, JPG, GIF, PNG, TIF, TIFF, TGA, PCX
- Export:
 - PLT > this file type does not remember speed and power settings
- Save:
 - ecp (+ INI) > this file type does save speed and power settings
- Export file:
 - MOL (+ TXT) > This file type saves speed and power settings, and machine settings.

3.2. Placing your file on the server

- On the pc, go to Network places.
- Go to FabLab on 192.168.88.201
- Log in with Username 'pro' en password 'pro'.
- In 001_USERS, make a folder with your name.
 - In this folder, you can save your files.

3.3. Importing your file

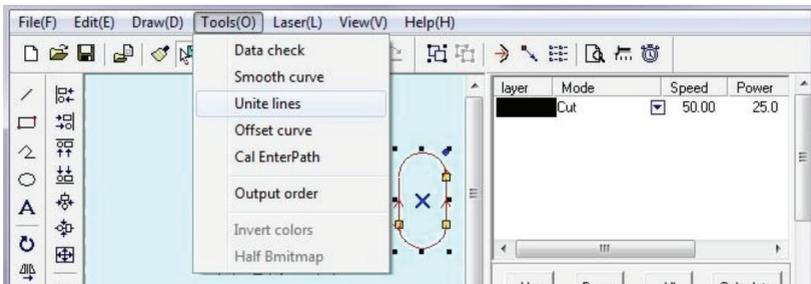
- Open LaserCut5.3 on the desktop
- Go to 'File' > 'Import'
- Open your file from your folder on the server.

4. PREPARING YOUR DRAWING

4.1. Connecting lines

It's best to first connect the lines in your drawing. This causes the laser to move more fluently, and saves you a lot of time.

- Select the lines you want to connect
- In the top menu, go to 'Tools'
- Choose 'Unite lines'.

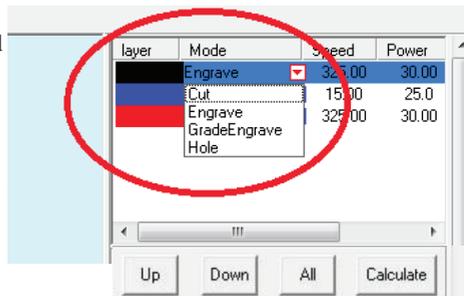


4.2. Setting speed, power and cutting order

In order to tell the machine which lines you want cut, and which you want engraved, you have to give those lines different colors. The machine follows the order of the colors from the top down. It's best to choose the colors in such a way that the machine engraves first, then cuts the smaller parts, and finishes with cutting the outlines.

You determine for each color whether you want the line to be cut or engraved by clicking the word 'Cut' next to said color, and then selecting 'cut' or 'engrave' from the drop down menu.

You can change the order of the layers with the Up and Down buttons in the right hand menu.



To set the desired speed and power, double click the Speed of the relevant layer. You can then enter the values in the pop-up menu..

- Power must never be more than 90.
- Makes show 'Always blow' is selected.
- Power en Corner Power geef je meestal dezelfde waarde.

Next to the laser you'll find a reference chart with values for some materials. If you are using a new material, **always do a small test**. If you work out good values for a new material, please add them to our list.

Before you laser a big file, it's always best to do a small test in the corner of your material. This way you can prevent wasting a piece of material because of wrong settings.

4.3. Setting the point of origin

The BRM machines don't have an 'Origin' button. The position of the laser head is the position the machine will start from.

On your drawing, you'll see a blue dot. This indicates the point of origin for your drawing. You can change the location of this point. It's best to place it in the top left hand corner of your drawing.

- In the top menu, go to 'Laser'
- Choose 'Set laser origin'
- Check 'Left-top'

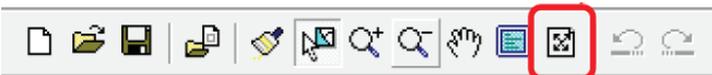
Later on, you'll have to set the origin point for the laserhead on the machine itself as well.

4.4. Some extra tips

- Selecting lines



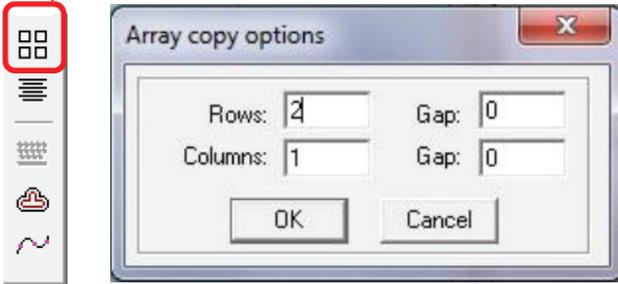
- Zoom in on the entire drawing



- Zoom out to the cutting table

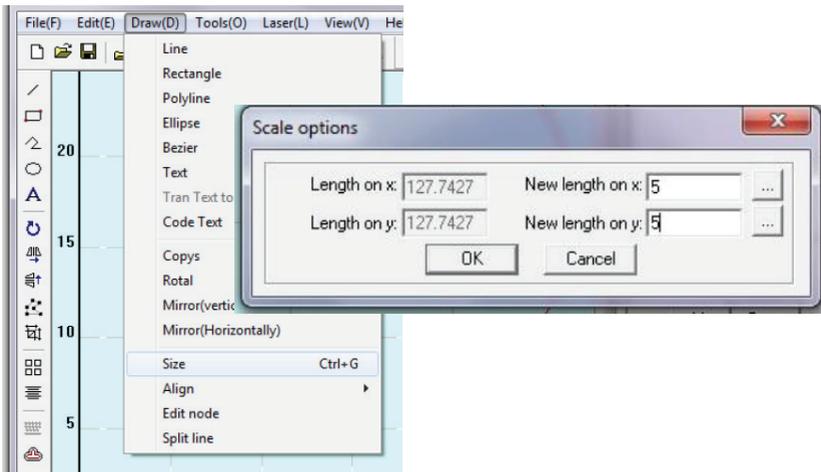


- Multiply the drawing



You can also do this by going to 'Draw' > 'Copys'.
'Gap' determines the space between your copies.

- Scaling your drawing



5. STARTING THE MACHINE

1. Turn on the switch on the electrical strip next to the small laser (on the right).
2. Connect the airtube to the compressor. (next to the small laser, on the right)
3. Press the green 'POWER ON' button on the BRM.
4. Turn the switch next to the power on button to the right.
5. Check whether the watercooler on the right side of the BRM is on.
6. Turn on the BOFA suction to the left of the BRM on.
(To turn it up or down, hold down both arrow keys next to the blue lights for a few seconds until you see a green blinking light.
Now you can use the arrow keys to turn the suction up or down.)
7. Check wheter there is airflow coming through the laserhead by keeping your finger under it. This is extremely important!!! If you don't feel any airflow, open the small vent on the right side of the machine further.

After these steps, the machine is ready for use.

If you are unsure about any of these steps, ask assistance from a lab supervisor.

6. SENDING YOUR FILE TO THE MACHINE

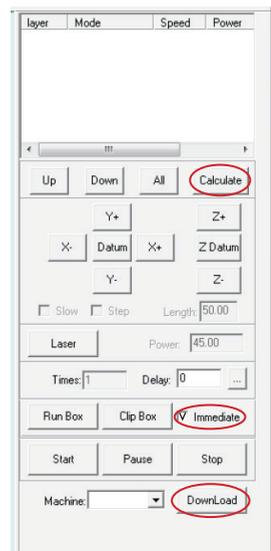
Once happy about the preparation of your file, you can send the file from LaserCut to the machine.

- Click 'Calculate' in the right hand menu.
- **Make sure 'Immediate' is selected!**
- Save your file to your folder on the server, and give it a name of your choosing.
It's best to keep the name short, since the software might otherwise not accept your file.
- Click 'Download'.

You'll now see a pop-up screen with the names of the files already sent to the laser. It's best to first erase all files with 'Del all'. If there are too many files in this screen, the machine might be unable to process them all and crash.

Now click 'Download current'.

The name of your file should now appear on the screen, and your file has been sent to the machine.



7. ON THE MACHINE

7.1. Focussing

On the machines control panel, press 'Datum'. The laserhead should move to the back. You can now place your material in the machine. Make sure your material lies flat on the bed. The exact position of the material is not important, since you will determine the starting point manually later. Do make sure your material is not on the edge of the table.

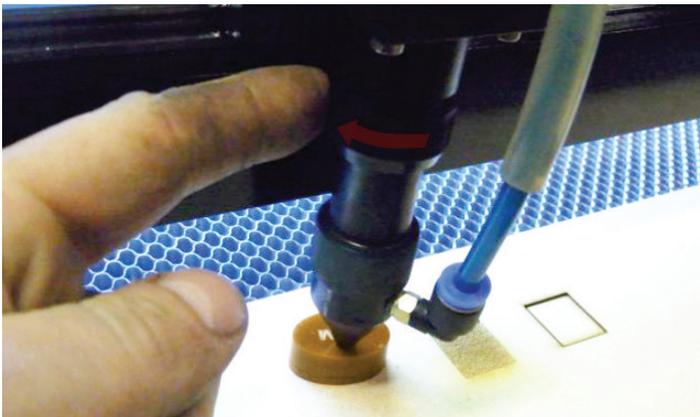
Now move the laserhead over the material by using the arrow keys on the control panel:

- Press 'Esc'
- Now you can use the arrows to move the laserhead
- Move the laserhead above the material
- Press Enter (the large, separate arrow)

The focus distance for this laser is 12mm.

On the machine you'll find a small wooden block with the word 'LaserUniek' on it. This piece has the exact right dimensions. Use it to focus:

- Place the wooden block under the laserhead
- Turn the ring with the red arrow to the left to loosen the laserhead
- Let the laserhead gently drop down until it rests on the block
- Now tighten the ring with the red arrow again
(Never tighten the ring too much, this could damage the thread)
- Remove the wooden block.
- The machine is now focussed.



7.2. Setting the machine origin

This machine always starts lasering from the position of the laserhead. This means you can choose the starting position of your cut to be anywhere above the laser bed.

Move the laserhead to your preferred position above the material with the arrow keys. If you set the origin point of your drawing to be the top left hand corner, this means you position the laserhead over the top left hand corner of your material.

- On the machine, select the file you want to cut.
The name of your file should be highlighted in black. If it's not, press Esc.
The name should now be highlighted in black.
- Press Enter
You now see the text 'SET LOGIC ORG'
- Press Enter.
The origin is now set.

Before cutting, always check whether the laser stays within the surface area of your material. Do this by pressing the 'Test' button on the control panel. The laser will then pass along the edges of the cutting area for your file. This will allow you to check whether the origin point is right and the laser stays within the edges of your material.

7.3. Cutting

Before you press 'Start', always check the following:

- Check if the origin point is right, and the laser stays within the material.
- Is the suction (Bofa) on?
- Are the compressor and the watercooler on?
- Check whether there is airflow from the laserhead nozzle.

Once you've checked all of the above, press 'Start'.

While cutting:

- **Always stay near the machine.**
- If there is too much smoke, turn the Bofa up.
- in case of flames, press 'Start/ Pauze' immediately.
This will stop the laser, but you can resume work by pressing the button again.
- Keep an eye on the watercooler. The temperature should never exceed 35°C.
If the temperature does rise above that, pause the laser until it has cooled down.

