



PURDUE UNIVERSITY
THE DAUCH CENTER
Digital Supply Chain
Manufacturing & Supply Chain

LASER CUTTER **HANDBOOK**

2025 Edition

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INTRODUCTION

TROTEC SPEEDY 100

What is the Trotec Speedy 100?

Trotec Speedy 100 is a Laser Cutter Machine, part of the Speedy series in laser solutions, made by Trotec. Its functionality lies in engraving and cutting different surfaces such as glass, wood, acrylics, and metal, through a high-powered laser beam with different intensity.

Some of the advantages of the Laser Cutter are to create unlimited and complex designs with an high accuracy, clean and smooth edges, and doesn't required much time.



Trotec speedy 100
CEO Wardiere Inc.

The laser cutter works with a computer software for preparation, design and start up stages of the job, and a state-of-the-art exhaust system called Atmos Cube for sucking off gases and smoke containing pollutants.

What will I find here?

This is an user manual focused on explaining everything you need for using the Trotec Speedy 100 Laser Cutter. In this way, you will find safety recommendations, machine settings, computer settings, visual references, step by step process, and material listed.

SAFETY RECOMMENDATIONS

1

Don't operate without supervision
(at least, in the learning progress)



Don't leave the laser unattended
while the system is operating

2

3

In case of Auditive sensibility, use
earplugs (hearing pollution)



Read the yellow cautions in the
machine

4

5

Ensure the carbon levels in the
Atmos Cube remain low



Don't put flammable materials
inside the machine or in its
surroundings

6

7

Press the "Stop Emergency"
button at the sight of any risk



Use the safety glasses during the
laser calibration and use of
reflective material

8

SAFETY

RECOMMENDATIONS

WAYS TO CANCEL A CURRENT JOB

- 1 **Directly in the laser software:** Press the “stop” button in the lower left area of the screen. It will cancel your job immediately.



- 2 **On the laser machine's control panel:** Press the “stop” button located on the keypad. It will cancel your job immediately.



- 3 Press the red **“Stop emergency”** button located next to the key.



- 4 **Open the laser machine:** If you open the acrylic cover during processing, it will interrupt the safety circuit and cancel the job.

SAFETY

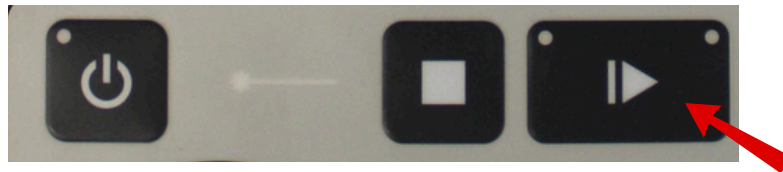
RECOMMENDATIONS

WAYS TO PAUSE A CURRENT JOB

- 1 **Directly in the laser software:** Press the “pause” button in the lower left area of the screen. To continue the job, just press the same button again.

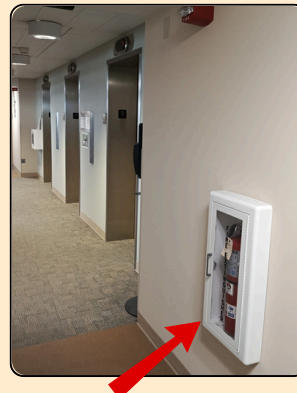


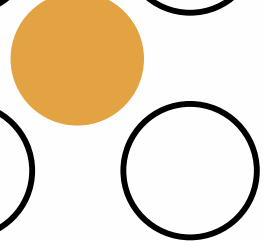
- 2 **On the laser machine's control panel:** Press the “pause” button located on the keypad. To continue the job, just press the same button again.



In Case of Emergency:

If an emergency occurs, the **fire extinguisher** is located to the **left of the elevators**.





MATERIALS

MATERIALS

Use **ONLY** Trotec-authorized materials, as each has a specific Trotec code. To ensure you are using the correct material, enter the code on the Trotec website (Reference p. 24) and review its specifications.

Note: Keep the code from the protective plastic of the material after opening it, as it may be needed for future reference.

1 Material categories

MATERIAL	CUT	ENGRAVE
ACRYLIC	✓	✓
GLASS*	✗	✓
PLASTIC SHEETS	✓	✓
LEATHER	✓	✓
METAL*	✗	✗
PAPER	✓	✓
PLASTICS	✓	✓
STONE	✗	✓
TEXTILES	✓	✓
WOOD	✓	✓

Check Trotec materials here:



**Glass is a reflective material (See p.4, recommendation 8).*

**Metal foils can be cut up to a thickness of 0.5 mm, but individual tests are recommended.*

Metal is a reflective material (See p.4, recommendation 8).

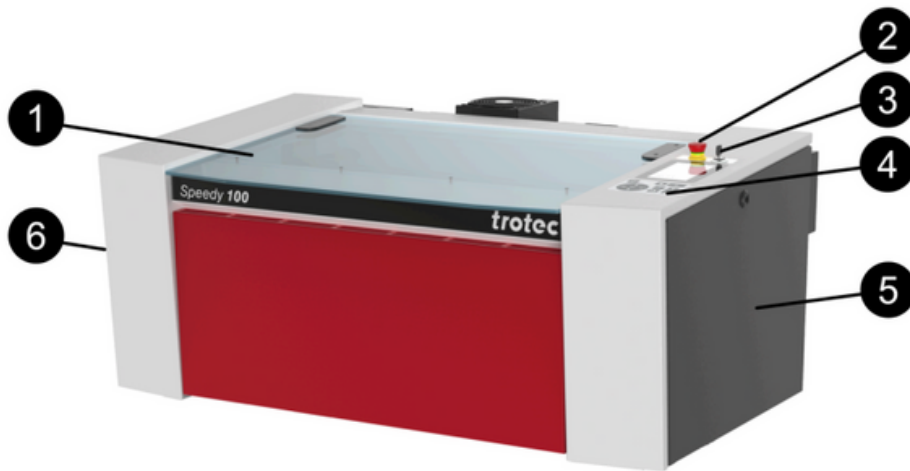
2 Available materials in the Dauch Center

- Laserable plastics
 - TroLase Ultimate Matte **1.6mm**
- Acrylic
 - AcrylicTroGlass Clear **3mm, 6mm** transparent.
 - Note: Place the material with the protective plastic side facing down.

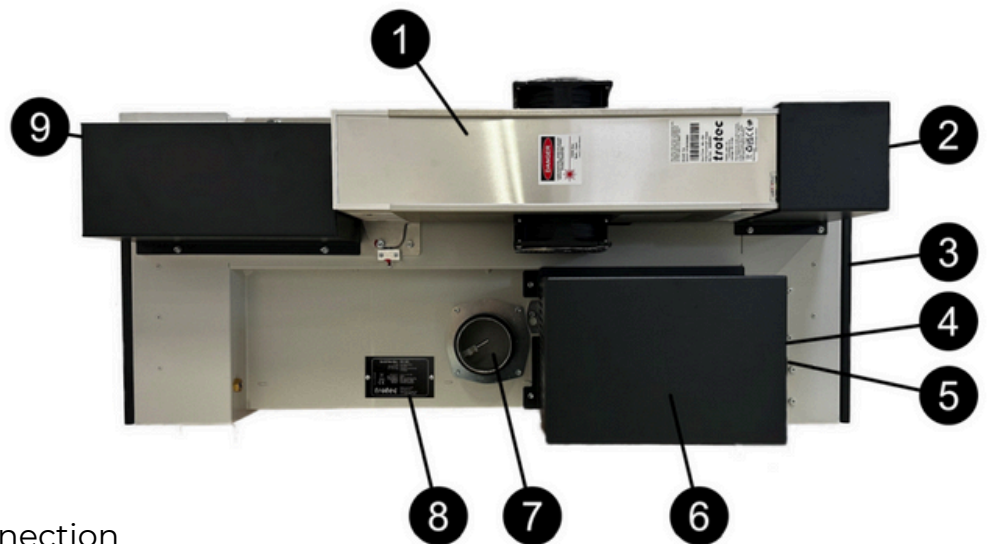


MACHINE PARTS

MACHINE

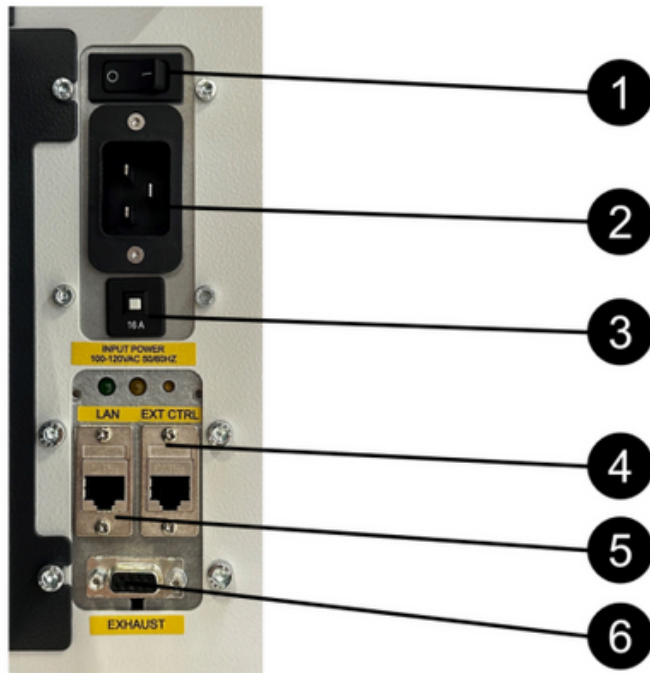


- 1. Acrylic cover
- 2. Emergency stop button
- 3. Key switch
- 4. Control panel
- 5. Side cover right
- 6. Side cover left



- 1. Laser source
- 2. Rear laser source cover
- 3. Electronics
- 4. On-Off switch/mains connection
- 5. Connection for LAN and exhaust system
- 6. Power supply units
- 7. Connection for exhaust hose
- 8. Data plate
- 9. Front laser source cover

MACHINE



1. On-Off switch
2. Grid connection
3. Fuse
4. Atmos Pure connection
5. Local area network connection
6. Connection for exhaust system
(e.g. Atmos Cube or Mono/Duo)

For more information about the machine parts, visit the Trotec website:

<https://www.troteclaser.com/static/pdf/speedy-100/8083-Speedy-100-V1-operational-manual-en-US.pdf>

POWER ON

To turn on the laser cutter, insert the key and turn it to the right, from "0" to the "On" symbol \odot at 120 degrees. The key will automatically return to the "I" position at 90 degrees.

To turn off the machine, simply turn the key to the left until it reaches "0".



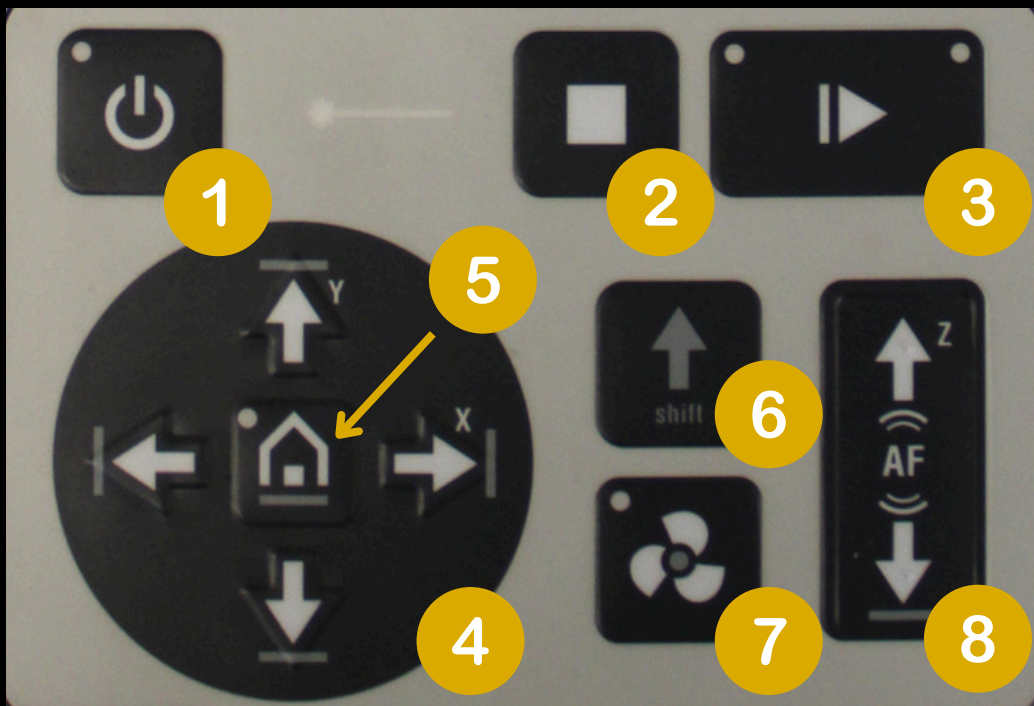
Emergency Stop Button

Next to the key, you'll find a large red emergency stop button. Pressing it will immediately shut down the machine, locking the button in a down position. To release it, turn the button slightly until it pops back up.



BUTTONS OVERVIEW

- 1 Standby-button:** LED On indicates Standby-mode
- 2 Stop button:** during any work in progress
- 3 Start/Pause/Repeat button:** green flashing for covers modes, blue and green light for starting and green for running
- 4 Laser head control button X/Y:** Move the laser, up and down in Y and left to right in X
- 5 Home-button:** Change the home position temporarily
- 6 Shift-button:** Second operating level (not commonly used)
- 7 Exhaust-button:** Turns on the ventilator. LED On indicates exhaust active.
- 8 Working table control button Z:** Move the plate up and down





USER GUIDE

NORMAL MODE
FLAT MATERIAL

USER GUIDE

1

Turn on the **Trotec laser cutter**. The machine will make a first beep then begin automatically to calibrate, and the worktable will move into position at the bottom. Once initialization is complete, you will hear a second beep, indicating that the machine is ready for use.

MACHINE

Normal mode - flat material



2

Turning on the Atmos cube: Press and hold the ON/OFF button for 2 seconds until the screen lights up.

3

Inserting the material: Open the acrylic cover and place the material on the honeycomb metal mesh. For better alignment, position the material in the top-left corner, matching the dimensions set in Ruby (in/cm).

Ruby is the software p. 15

USER GUIDE

MACHINE Normal mode - flat material

4

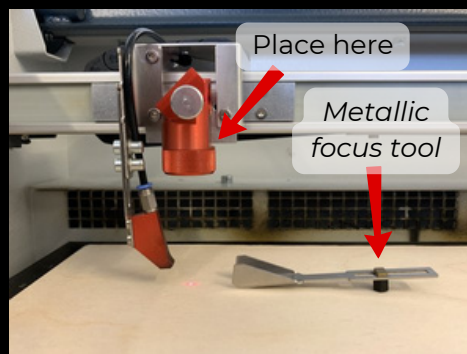
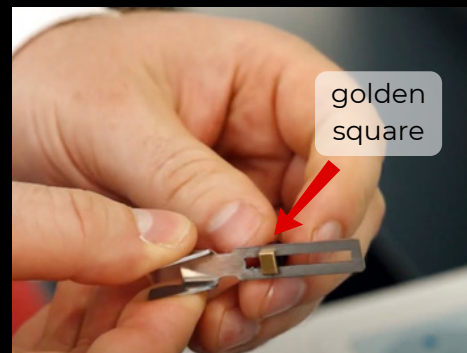
Calibrating the laser: To adjust the laser distance, position the golden square piece of the focus tool over the red border of the laser, as shown in the image on the right. Then, press the UP button on the keypad to raise the worktable until the focus tool lightly touches the material. Remember the laser doesn't change the position but the worktable does.

Video for reference: "How to use the Focus Tool" (p. 24)

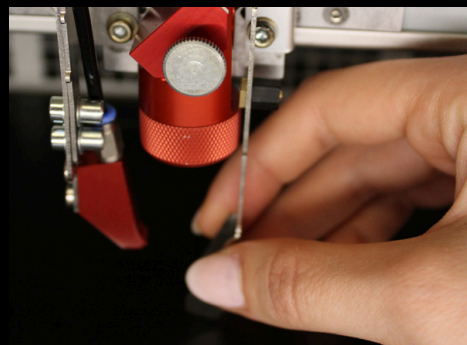
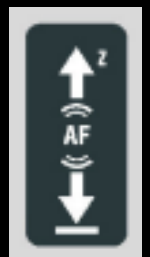
5

Remove the focus tool, set it aside, and close the cover.

Note: While you can open the cover during operation, this action will stop the process for security.



UP button



USER GUIDE

COMPUTER



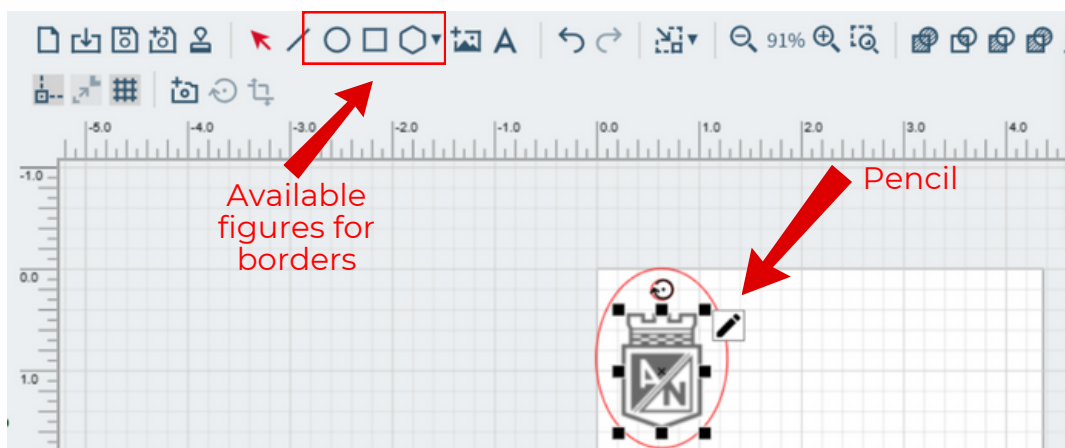
Turn on the computer and open the Ruby laser software.



Select the design you want to cut or engrave. It is suggested to use vectors or .png images.



Ruby uses grayscale to control engraving intensity. You can adjust the line intensity by clicking on the pencil icon next to the image. **Note: For engraving, it is recommended using high-contrast images for better results. For cutting, create vector shapes or outline images using a RED line.**



USER GUIDE

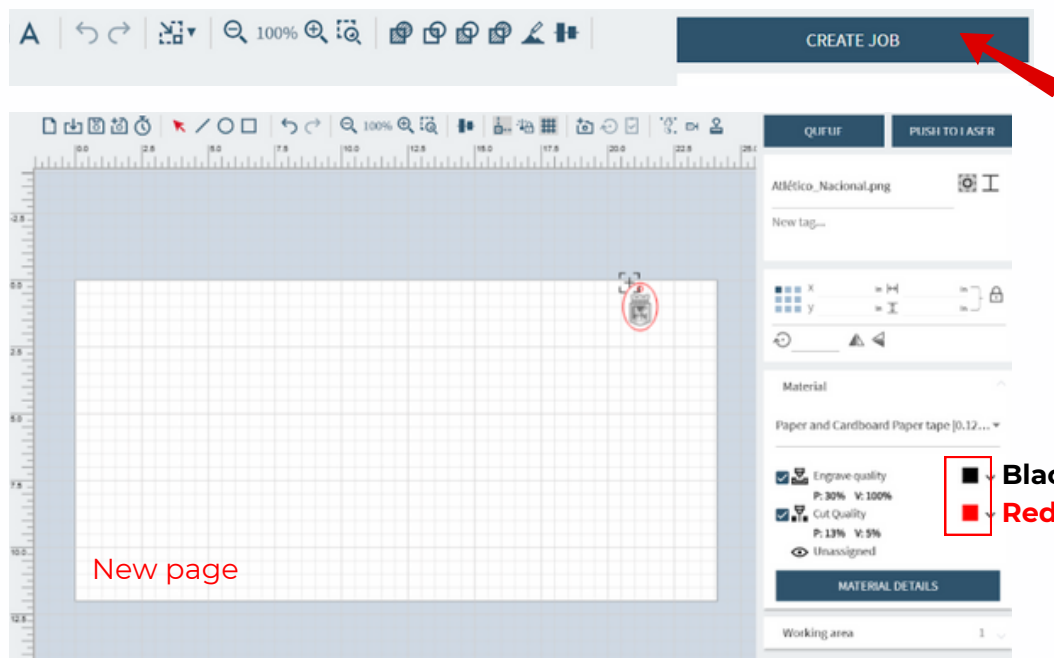
COMPUTER



If you want to cut out an outline of an image, use the outline tool in Ruby. Click the button with a mountain and pencil icon, then adjust the settings based on whether you want to cut only the outline or include inner details. Adjust the settings according to the contrast of your image.



Once your design is finalized, including size and settings for cutting and engraving, click the "Create Job" button. This will take you to the next interface called "Prepare", which looks similar to the previous one.



Note: When using the laser cutter, always set the cutting path as a red line. This ensures the machine correctly identifies where to cut.

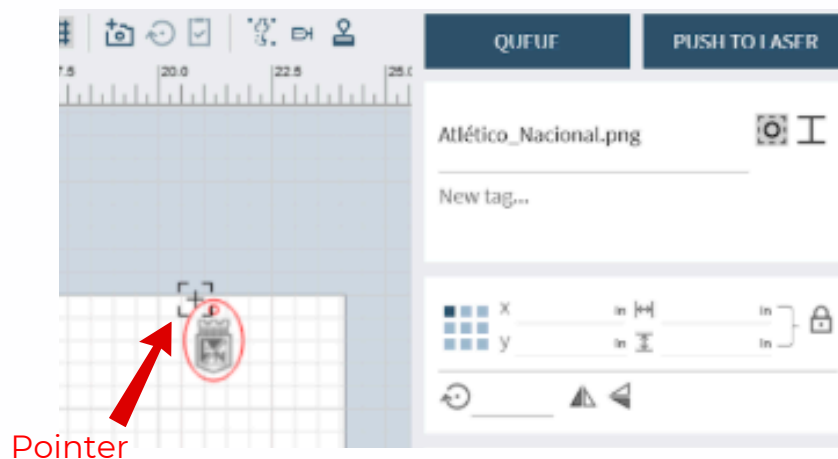
USER GUIDE

COMPUTER



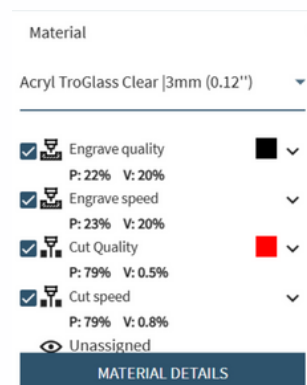
In this new interface, you will see a representation of the material sheet inside the laser cutter. You can move the design on the sheet to position it exactly where you want to cut. Make sure to **adjust the size**, take in mind the measures that you see on the program and verify that the design fits properly on the sheet.

Note: To make placement easier, you can use the laser pointer as a reference. You can adjust its position using the buttons on the laser cutter.



Once the design is positioned, ensure that the selected material in Ruby matches the actual material in the laser cutter. If needed, choose the correct material from the program's list.

Note: It is recommended not to modify the default settings provided by the program.



USER GUIDE

COMPUTER



Once everything is set and the job matches the available space on the material, press the **"Push to Laser"** button. This will open a new interface where you must press **"Start"** to begin the process. The machine will begin operating.

Warning: If anything looks unusual or if you notice excessive flames in the material, immediately:

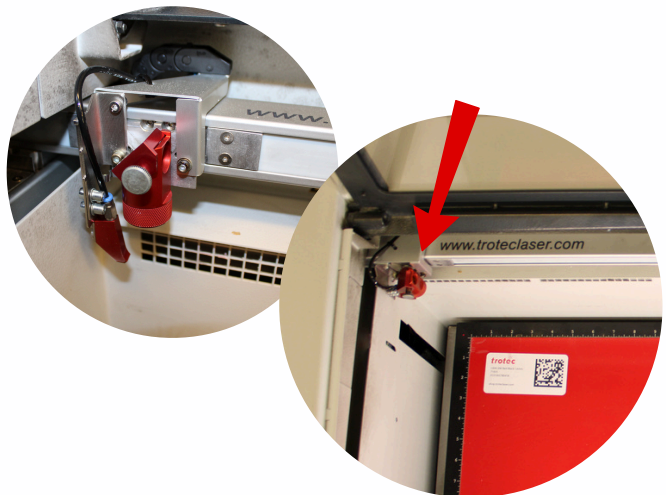
- Press the emergency stop button, or
- Use the pause button on the laser cutter or the PC.



Double-check the alignment and settings before starting.



Removing the finished design: After the process is complete, use the keypad buttons to move the laser head to one of the corners. Then, open the cover and carefully remove your design.



Turn off the machine with the key and the Atmos cube by pressing the ON/OFF button for 2 seconds. Leave the Atmos cube on for a while to ensure all fumes and smell are removed.



USER GUIDE

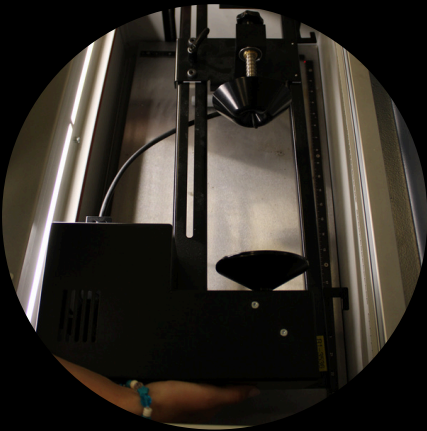
CYLINDRICAL MODE

USER GUIDE

MACHINE Cylindrical mode

To engrave on a cylindrical surface, such as bottles, follow these steps before turning on the laser cutter.

- 1 **Remove the honeycomb metallic mesh** from the worktable.



- 2 **Insert the rotary attachment** into the table, then fix it with the clamps on the rulers of the ferromagnetic engraving table.

Note: Position the attachment so that the clamps are on the top and left sides.

- 3 **Connect the rotary attachment** to the designated port located at the front of the workspace, just under the light.



USER GUIDE

MACHINE Cylindrical mode



- 4** Insert the material into the rotary attachment, using the lock on the lower left side of the attachment and simultaneously adjusting the base to position the cylinder securely.

- 5** Turn on the Trotec laser cutter and turn on the Atmos cube following the “Normal flat material” section (p. 13, step 1).

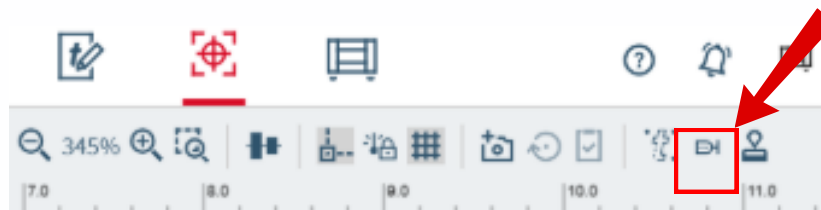


- 6** **Calibrating the laser:** to adjust the distance between the laser and the area to be marked, position the metallic focus tool as shown below. Press the ▲ UP button on the keypad to raise the worktable until the focus tool lightly touches the cylinder. Once aligned, remove the focus tool.

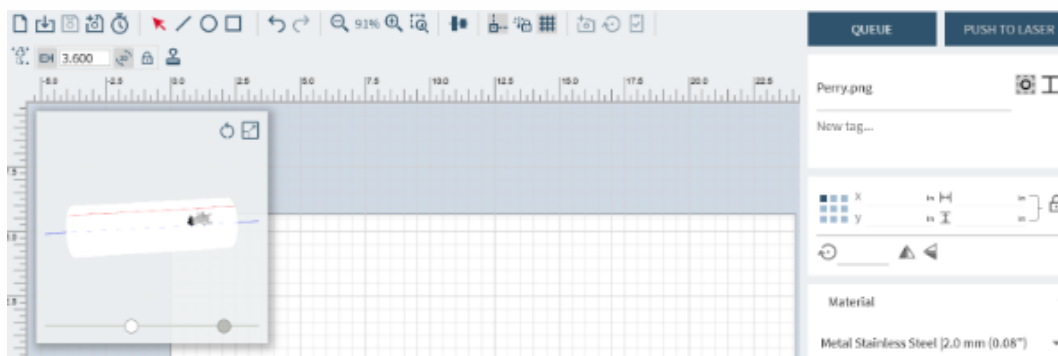
USER GUIDE

COMPUTER Cylindrical mode

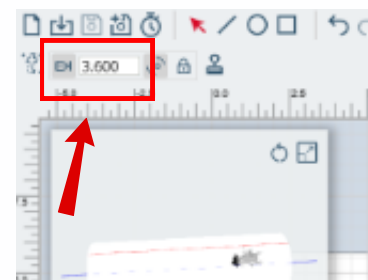
- ✓ Follow the same instructions as for **Normal flat material** until Step 5.
- ✓ In the “**Prepare**” interface, click the “**Rotary**” button, represented by a horizontally turned cup icon, located on the top right corner of the menu bar.



- ✓ Selecting **Rotary Mode** will display a preview of how the design will appear on the cylindrical surface. To ensure precise positioning on the material, it is recommended placing the design below the red line on the screen.



- ✓ Indicate the cylinder's diameter in the section above the design preview on the cylindrical surface, as shown in the image to the right.



- ✓ Then, proceed with Step 6 as you would for **Normal flat material**.



LASER CUTTER TESTING OVERVIEW

ACRYLIC TROGLASS



6 mm



3 mm

Using the default settings

TROLASE ULTIMATE MATTE

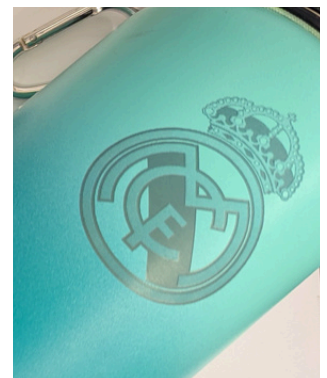


Using the default settings

STAINLESS STEEL



Using the default settings



LEATHER



Note: This engraving wasn't successful. The leather melted

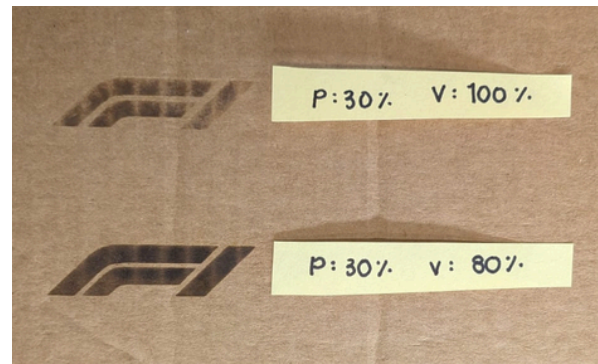
Using the default settings

WOOD



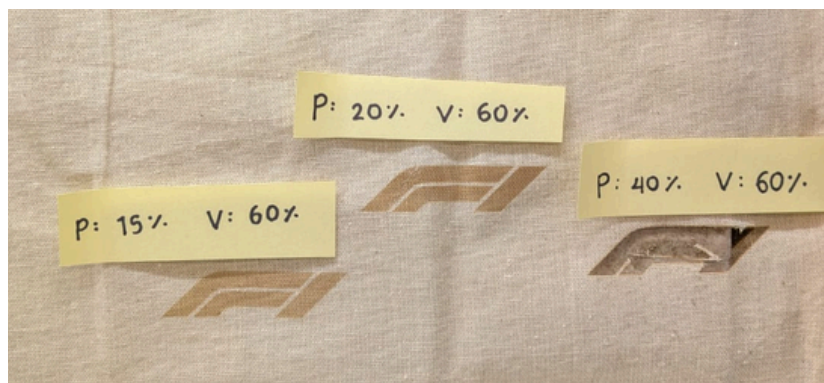
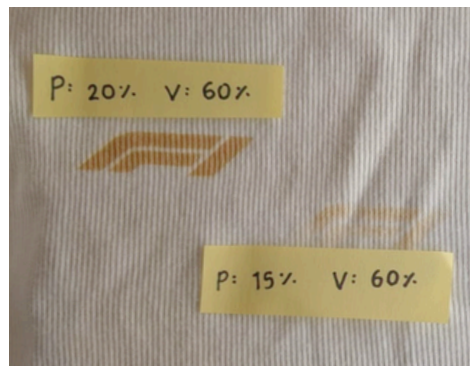
Using the default settings

CARDBOARD

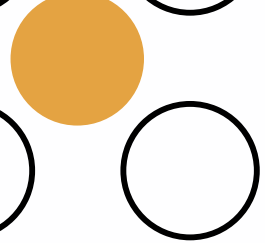


Using the power and velocity as indicated

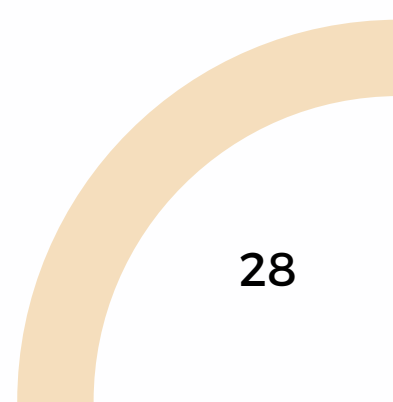
FABRIC



Using the power and velocity as indicated



TROUBLESHOOTING



TROUBLESHOOTING



Material is not cutting through

It may happen for various reasons:

- You chose the setting for engraving instead of cutting. Change the settings in the Ruby software and remember to use the red color for the cutting line.
- It could happen that the material selected in Ruby software is incorrect, maybe thinner than the actual material you're using, so the laser cutter is not deep enough to cut the material. Always double check the selected material.

Material is melting

This usually happens when the material is not suitable for cutting but only for engraving. If the laser is set to cut, the intense heat can cause the plastic to melt, potentially creating a large flame.

- Use laser-safe materials, such as cast acrylic, which cuts cleanly without excessive melting.



REFERENCES

LASER CUTTER SOURCES

If you want to go deeper into Laser Cutter knowledge, the following resources will be helpful:

Operating Manual S100

Trotec Laser GmbH. (2020). Speedy 100/R operating manual (S100/R-C8063). <https://www.troteclaser.com>



Trotec Website - Buttons

Trotec Laser GmbH. (s. f.). Laser machine tips: pause, restart or cancel your laser job. Trotec Laser GmbH. <https://www.troteclaser.com/en-gb/helpcenter/software/jobcontrol/control-laser-machine>

Trotec Website - Applications

Trotec Laser GmbH. (s. f.). Laser cutter | Trotec Laser UK. <https://www.troteclaser.com/en-gb/laser-machines/laser-cutter#c226279>



Trotec Website - Materials

Trotec Laser GmbH. (s. f.-b). Sheet Material. <https://shop.troteclaser.com/en-US/category/sheet-material/0ZG4l000000GmmLWAS>

Video - How to use the Focus Tool

BRISTON TRAPP. (2019, 23 mayo). Trotec Laser Focus Tool [Vídeo]. YouTube. <https://www.youtube.com/watch?v=pE7jednm2Do>



Video - Complete example of normal flat material usage

Boston Makers. (2021, 26 enero). Boston Makers Tool Training: Basic Laser cutting from a vector file with the Trotec Speedy 100 [Vídeo]. YouTube. <https://www.youtube.com/watch?v=oJRqLIPmxOY>

STEP BY STEP CHECKLIST



MACHINE PREPARATION

- ☐ Turn on the laser (wait for 2 beeps)
- ☐ Turn on Atmos cube
- ☐ Insert material
- ☐ Calibrate the laser using the focus tool
- ☐ Remove the focus tool
- ☐ Close the cover lid

COMPUTER PREPARATION

- ☐ Open Ruby software
- ☐ Select your design
- ☐ Prepare the design (adjust contrast, outline image or add figures)
Remember: red line for cutting, black for engraving
- ☐ Adjust design size
- ☐ Position design on the worktable
- ☐ Select the correct material
- ☐ Push to laser

FINISHED WORK

- ☐ Move the laser to one corner
- ☐ Open the cover
- ☐ Remove the material
- ☐ Turn off the laser and the Atmos cube