Laser Manual

Part 1 Fundamentals and Preparation Lasercutter Trotec Speedy 500

Fundamentals





In 1960, Theodore Mainman built the first Machine that used the concept of "Light Amplification by Stimulated Emission of Radiation". The concept allows to produce light with powe densities that are millions of times higher than the highest conventionally produced capacity and power density.

The laser is able to cut, carve and engrave different materials with low material strenght.

A lot of different materials can be used. The most common are paper, cardboard, acrylic GS and wood.

Materials

Plastics e.g. .:

- Acrylic GS max. 12 mm
- Acrylic XT max. 2 mm
- Polystyrene max. 2 mm

Wood e.g. :

- Paperwood max. 5 mm
- Balsa Wood max. 3 mm

Paper e.g. .:

- Grey cardboard max. 3 mm
- Fine cardboard max. 4 mm
- Bristol paper max. 3 mm

Not allowed are:

PVC - foils, MDF, stone, metal

Surface Area of the Laser table

1240 x 700 mm (= maximum work area)

File format

- CAD drawings (Rhino/Autocad/..)
- Pixel graphics (to engrave)

Drawing Preparation



Preparation of the Drawing (e.g. RHINO)

- Drawing in mm (in the right scale)
- Draw the frame (in the size of the plate) and draw the polylines inside the frame
- No double overlapping lines!! (a clean drawing)
- Clean up and simplify the drawing only the necessary cutting-engraving lines
- Save the drawing as **dwg**, **dxf**, **usw**... or as pdf or jpg. Save Autocad drawings in version 2007 or older

Surface area of the laser table: L: 1240 mm W: 700 mm

Layers and Colours

The laser gets the coordinates of the lines through certain colours.

Each colour is a different laser job and can be executed in a different way (engraving or cutting). The laser uses the colours in the following order:

Order (Carving and Cutting)

1. Red	>	RGB	255	0	0
2. Blue	>	RGB	0	0	255
3. Green	>	RGB	0	255	0
4. Magenta	>	RGB	255	0	255

Engraving

Flat surfaces (e.g. photos, patterns, hatches) can be engraved, whereas vector graphics (e.g. polylines) have to be either carved or cut.

Use the black colour (RGB 0 0 0) or greyscales to engrave.

Laser Manual

Part 2 Laser Operation Lasercutter Trotec Speedy 500



TU Wien / E2642 / Institut für Kunst und Gestaltung / Abteilung Modellbau Karlsplatz 13 A-1040 Wien

www.ddg.tuwien.ac.at

1. Checking the units

Titel - Rhinoceros (Not-For-Resale-Lab) - [[Drauf]		×	The drawings must be in the correct scale		
Neu Neu	enkörper Polygonnetz Bemallung Transformieren Wertzeuge Analysieren Rendern Hilfe Strg+N ₁₀₀ 🕞 🏟 🕒 🏠 🏷 💭 🎧 🎁 🥵 🖉 🖉 🖉 🖉 🖉 🖉 🖉 🖉 🖉			The drawings mast be in the concet source		
Offi	Strg+0		_	and units:		
Kompakt speichern	50 g+5		-			
Inkrementell speichern		<u> </u>				
Als Vorlage speichern		Eigenschaften Keinen - Alle Ebenen	×	• Open:		
Einfügen	Stro+I	Ansichtsfenster 🗅 🔁 × 🔺 🗸 🎘	?	- F -		
Importieren		Titel Drauf Name	Mat			
Auswahl exportieren Mit Ursneung exportieren		Höhe 732		> Datei> Figenschaften > Finheiten		
Bemerkungen	F	Projektion Parallel 💌 Aussenkontur 💡 🗗 🔲 🗌				
Eigenschaften		Kamera platte 💡 🗗 🔲 🔿				
Drucken	Strg+P	Brennwe 50.0 X-Stendet -414.851				
Arbeitsgruppenmanager	Rhino-Optionen		X	Change to matrie units in millimatore (if passagery)		
Senden Beenden				• Change to metric units in minineters (in necessary)		
1 P:\Projekte\3D.Drucker\upsortiert\Takao Seipo\20	- Dokumenteigenschaften					
2 W:\Projekte\3D.Drucker\FERTIG_gedruckt\2010.0	Elamingo	Einhoiton und Toloronzon	_			
3 C:\Dokumente und Einstellungen\/rbuchinger\Desktop	Polugopeta	Einneilen und Foleranzen				
5 F:\Fabathomeorg\fab2642-print\dr.3dm	Fisheiten	Modelleinheiten: Millimeter	7	 If the window scaling, appears confirm with No 		
6 F:\lasercutten\lasercutten file !.3dm.3dm			-	in the finite in geodancy appears, committee		
8 P:\Projekte\3D.Drucker\Delogan - Obstschale\nm_1a	B B B	Absolute <u>T</u> oleranz: 0.01 Einheiten				
9 C:\Dokumente und Einstellungen\rbuchinger\Desktop						
	Haster	<u>R</u> elative Toleranz: 1.0 Prozent				
	Bemerkungen	Winkeltoleranz: 10 Grad				
	∠usammentassung					
	Linientypen	Benutzerdefinierte Einheiten	_			
	Web-Browser		-			
		Name: Units				
	🖻 Rhino-Optionen	Einheiten nro Meter: 1.0				
	🕂 🕂 Ansicht					
	Verweise	Abstandsanzeige	-			
	🕂 Erscheinung	Dezimalzahl	Rhino	ceros 4.0 Dokumenteigenschaften		
	Dateien	O Durch				
	- Allgemein	O <u>b</u> iuch	9	Modelleinheiten ändern von Zoll auf Millimeter		
,y	- Maus	○ Fuß & Zoll		Modell um 25.4 skalieren?		
×	- Tastatur	Anzeigegenauigkeit: 1 00	1 1			
	Plug-ins		-			
If () If Perspektive Drauf / Fro			_			
🗹 End 🔽 Nächst 🔽 Punkt 🔽 Mitte	I∓⊢ Kontextmenü					
KEbene x -706.3307 y 1786.41	Auswahlmenii					
🦺 Start 🚱 📓 🌳 🌳 🌳 🙆 📓 TROTE	Benderer Support					
	Elamingo					
	BhinoScript					
	PhinoMail					
	Aldini					
		UK Abbrechen	Hilte			

2. Print Menu





As soon as the drawing is ready you can open the print menu.

Print Menu - Pay attention to the order

- 1. Open properties (Eigenschaften).
- 2. Enter the width and height of the sheet to be cut. e.g. : 1000 mm x 700 mm
- 3. Resolution 600 dpi Standard
- 4. OK
- 5. Activate the preview (Ansichtsfenster) and click on SET. Finally, click on "MOVE, in the Rhino operation column, und move the print window over the drawing. When setting the scale, make sure that it is 1:1.
- 6. PRINT
- 7. After clicking PRINT open the TROTEC Jobcontrol window.

3. Positioning of the materials and set-up of the table height.





 Place the material in the upper left corner of the table.

Control Panel

The burning point of the laser beam has to be accurate to achieve a clean cut. For that reason the distance from the lense to the material has to be adjusted. If the material thickness changes, the height has to be adjusted according to the new material.



- 2. If the material is not completely flat, use tape to fix it to the table.
- 3. Use the controlpanel to place the laser printer head in the center over the material.







4. The metalpiece (space separation tool) must be hung onto the laser printer head as shown in the image above. Then the table must be carefully moved up step-by-step until the metalpiece falls off.



Standby-Function

2 Table Height: Up Down

> Front Left - Right Back

Gas 1 (check parameters with material catalogue)

4. TROTEC JobControl



Program to start the job

The job is sent to the Laser's program (TROTEC-Engraver) by printing it.

- 1. Delete all the old jobs with the delete button.
- 2. Double-click on the chosen laser file (you can view the file in the small preview window).

The white area corresponds to the work area of the laser. The file must be placed in the upper left corner of the white area.

5. Installation of Material Preferences

TROTEC JobControl 9:3.0 - [Plate1] Date Bearbeiten Gravierer Plate Enstellungen Ansicht Fenster Hilfe		×
Vood 🔻 Phre 👻 12.00 P 0.00 V 0.00 MU 0 P 70.00 V 1.25 MU 5000 🕰 🖬		
24 6 8 10 12 44 64 95 62 54 65 66 68 70 72 74 76 78 80 82 84 96 82 54 56 66 68 70 72 74 76 78 80 82 84 96 92 54 56 66 68 70 72 74 76 78 80 82 84 66 89 93 24 46 96 62 54 56 66 68 70 72 74 76 78 80 82 86 89 93 24 46 96 62 54 56 66 68 70 72 74 76 76 80 82 86 89 93 24 46 96 62 54 56 66 68 70 70 70 70 70 70 70 70 70 70 70 70 70 70 70 70 7		Att Standard Aufforms: 600 dpi Orientierung C A C Julia 2mm 3dm 0006
		Voransicht
T		Bereit
PPI Gravur Wood - Pine	x:1055.4 y:426.1	00:14:24 NUM
🗷 Start 🕜 🚰 🌩 🌩 🍹 🔹 🕷 TROTEC JobControl 9 👔 Trotec ab 29.01.2010.0 👔 laser2.bmp - Paint		« 😏 🟐 10:25

- 1. Double click on the white area to open the material properties window. Enter the material name and thickness.
- 2. If you open the "All" (Alle) menu, you can change the values for the colors.

You can find the values in the list next to the computer.

IMPORTANT: The "Zublasung" column has to be changed to Gas1

Example:

Values for black cardboard, 2mm thickness

Leistung (Power) = 70,00 Geschwindigkeit (Speed) = 1,25 PP/Hz = 5000 Durchgänge (Stages) = 1 Zublasung (Ventilation) = Gas1 Korrektur (Correction)= 0 Z-Offset = 0,00mm

6. Vector Categorisation (optional)



If the drawings are complicated and have many lines, the vector classification (Vektorsortierung) should be used. This means that the lines will be cut in a specific order.

1. Right click on the Job window (grey or black) > Vektorsortierung

2. Start

7. Payment

Paying with Quick

The laser cutting process can be started after paying at the slot machine. 5 minutes before your time is up, the signal light turns orange, so you can estimate if you need more time to cut all your parts.

Paying with a Quick-Prepaid Card:

- 1. You can get your Quick-Prepaidcard at: PayLife, Marxergasse 1B, 1030 Wien or you can use a cash card with a Quick-function.
- 2. Put your Quick-Prepaid Card in the slot machine. On the display you see the balance of your card.
- 3. Press buttons + and to select laser 1 or 2.
- 4. Press buttons + and to debit an amount.
- 5. Press OK.
- 6. When the display says "Karte entfernen", you can remove your card.
- 7. You can start the cutting process by pressing play.



8. Starting the Laser



Once all the settings have been adjusted, the laser printer can be started.



The job can be paused if you want to remove parts. The laser can be started again by pressing II (Pause) in the Trotec JobControl Program (on the comupter).

The laser may only be used under supervision. If you leave the room, pause the printing job.