Preface

This tutorial aims at giving you the basic insights and knowledge to safely work with the Trotec Laser-cutters. Both the Speedy300 and the Speedy100 work with similar principles. The difference being work-area and power. If possible complete this tutorial using the Speedy300.

Symbols

Ask the lab-manager to supervise your progress

Be attentive, possible dangerous situation

Complete a task

Adobe Illustrator

We'll use Adobe Illustrator to send our designs to the Trotec Job-Control application. It is imperative that you have some knowledge about Illustrator when using the laser-cutters.

Template files that you can find on the website are also made in Illustrator. You can also use these as a guide when making custom plotter settings in Autocad or Vectorworks.

Autocad

When exporting designs or plans from Autocad, you'll use a custom page setting for the lasercutter and dedicated colours. How to set up this is beyond the scope of this tutorial.

Vectorworks

Be aware that the educational version of Vectorworks locks a PDF with a password when exporting. You can find PDF unlock applications online to address this issue.

01 Preparing a design in Adobe Illustrator

Using Illustrator to send designs to JobControl via a virtual printer

Adjusting the design

In your CAD application (Illustrator, Inkscape,Autocad, Vectorworks,...) you will differentiate between cutting, engraving, inner and contour lines. This will be done by assigning a distinct colour to parts of your design. Each colour will then correspond in JobControl with a specific setting and order. Engraving fills is done in grey-values, the darker the fill-color, the more power the lasercutter will output. Pay attention to the fact that this process takes a lot of time!
Your document must be set up in RGB colour-mode!

Colour-codes Trotec Speedy 300

- Raster engraving: black #000000
- Line engraving: red #FF0000
- Cutting lines in order:
- Blue #0000FF
- Petrol #336699
- Cyan #00FFFF
- Green #00FF00
- Magenta #FF00FF
- #FFFF00

(JobControl has an extended list of colours you can use. In general the colours listed here suffice. A complete list can be found in the appropriate template on the website)

Working-area

The dimensions of the design should be 700x400mm (these are the dimensions of the materials in stock and approximately the working area of the lasercutter). It is wise to keep a margin of 5mm.

Scale

Make sure your document setup is in millimetres, this prevents scaling issues when porting designs from one application to the next.

Line width

Line width should be 0, in Illustrator you should type in 0,001mm (that is a comma NOT a dot)

Fill colour

Make sure you use fill colours only where needed. Although Job-Control ignores these, other laser-cutters may interpret these differently causing double lines.

Double lines

Always check your drawings for double lines! Every line drawn will be cut. Because of this there is a potential fire-hazard!!

Text

Always convert text to **outlines**.

Saving

Save your file as **AI** or **PDF**.
When saving, make sure you know in what unit and scale your document is saved. It is wise to have a reference shape in your design in order to spot possible scaling issues. Scaling between applications is always your responsibility.

02 Checking a design in Illustrator

Adjust a design to send to JobControl

Open Document

On the desktop you can find a folder named TrotecTutorial in which you can find the *ruler.ai* file.

Open the ruler.ai file in Adobe Illustrator en prepare this for Job-Control.

Checklist

You will do the check the following:

- Is the document set in RGB colour mode?
- Is the art-board the exact size?
- Are all lines and fills coloured correctly?
  Text: filled with black, no stroke colour
  engraving lines: red
  inner cut lines: blue
  contour cut: green
- Is the stroke width correct?
- Are there any double lines?
- Position the artwork near the origin.

Speed course Illustrator

The following pages provide you with a quick course needed to accomplish the above tasks.

Document Colour-mode

Adjusting the colour-code is done via:
file-> document colour-mode -> RGB Colour

Check Art-board

Find the art-board tool.
Make sure the art-board measures 700 x 400 mm.
Select the selection tool to leave the art-board tool.

Adjust colours

Select the selection tool.
Select a text object (black).
Make the fill-colour active by clicking it once.
Go to *Select-> Same -> Fill-colour* to select all black elements.
Double-click the fill colour and make sure it is black (#000000)

Do the same for the other colours. Red should become RGB-red, green RGB-green etc. Take note that you will adjust stroke colours here instead of fill colours.

Adjust stroke width

Select a text object (black).
Go to *Select-> Same -> Stroke-colour to select all black items, these elements have no stroke colour*.
Go to *Select->Inverse* to select the inverse, hence all elements with a stroke colour.

Adjust in the upper menu the stroke width accordingly.

Position artwork

The origin of the Trotec is in the top left, move your design to the upper-left corner taking the advised margin into account. You can drag a frame around the artwork with the selection tool and next drag it to the correct position.

Call the supervisor

Ask the lab-manager to evaluate your progress.

03 Send design to JobControl Via virtual printer

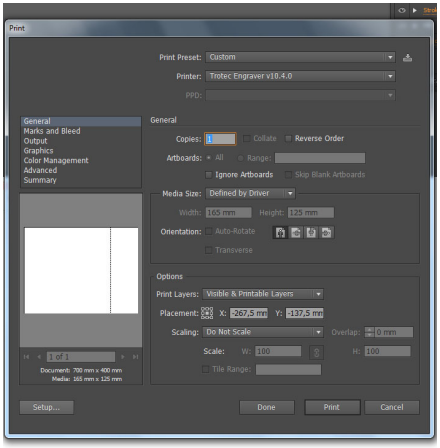
Print file

The design is now ready for the lasercutter. Sending it to the lasercutter is done via a virtual printer, which will send the job to JobControl. When printing you already set the correct material. Although you can make these adjustments in JobControl it is advised to do this now.

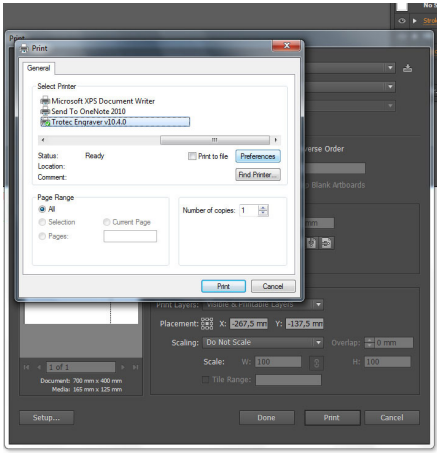
When you work with your own material for which no settings are available, you will create new settings together with the lab-manager.

Go to *File->Print* to open the dialogue window of the printer.

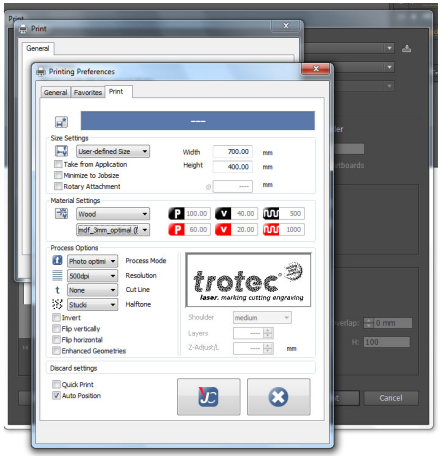
Printer Windows



File -> print opens the window shown above. Click *setup* to open the next window

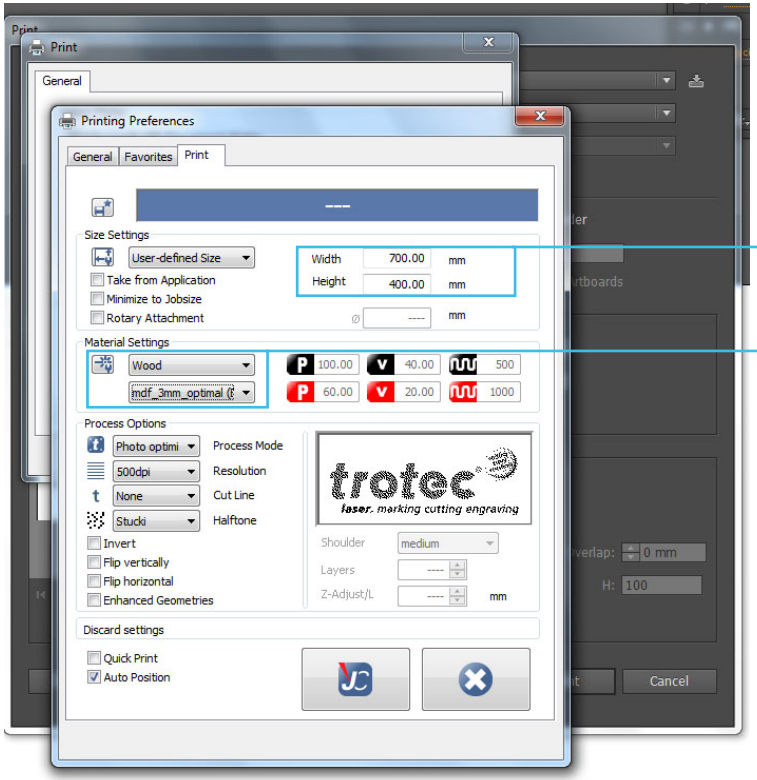


Make sure the Trotec Engraver is selected open its *Preferences*



In Printer Preferences you will select the right settings for your job.

Print file



Make sure the dimensions are set correctly. In general this will always be set to 700 x 400 mm.

Allows access to the Material Settings, divided into groups and specific materials. These are adapted for efficient use of the materials in stock, but should always be tested.

The tutorial is executed on a left-over piece of MDF. Choose in the material group *Wood* for *mdf_3mm_optimal.*
Before executing the job, call the manager.

04 Trotec JobControl & Lasercutter

Job Control

If JobControl hasn't been opened yet, open it via the JobControl short-cut on the desktop.

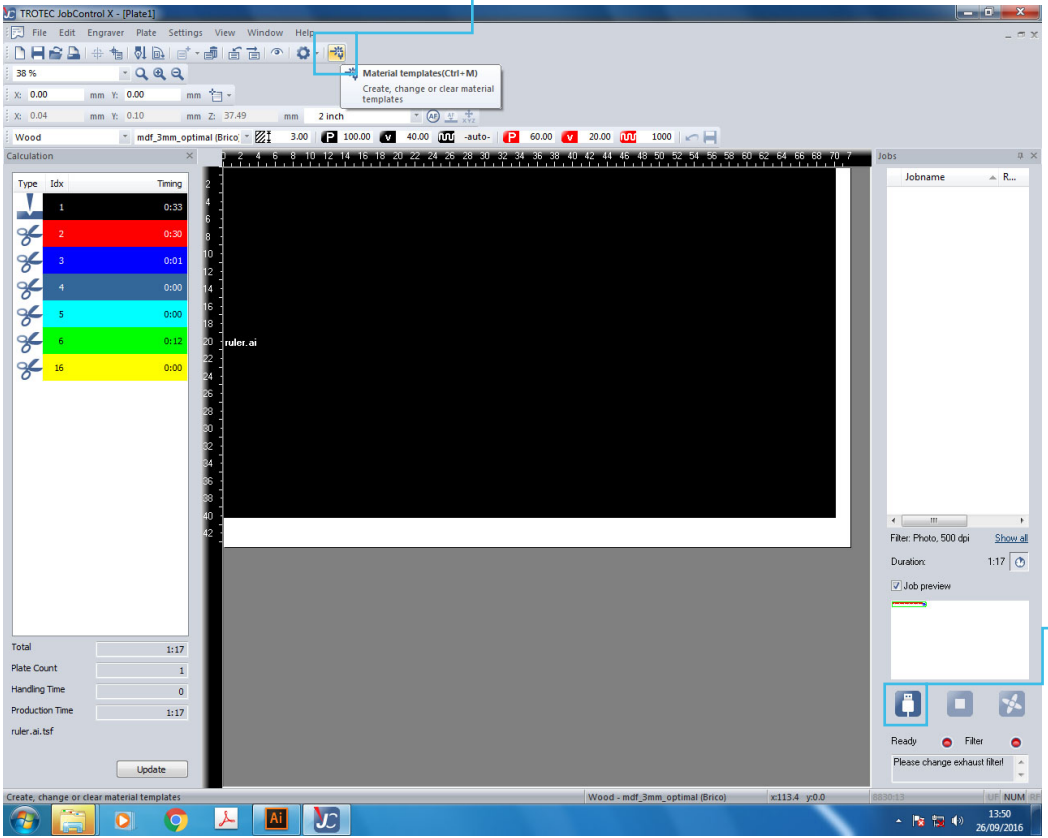
In this stage you will execute the following steps, which are explained in detail on the next pages:

Checklist

- Turn on the lasercutter with the switch left at the back of the lasercutter.
- Connect JobControl with the lasercutter via the appropriate ate button (1).
- Check material settings (2).
- Check if the job is loaded correctly.
- Optimize the job by applying vector ordering.
- Focus the lasercutter.

The following pages explain how.

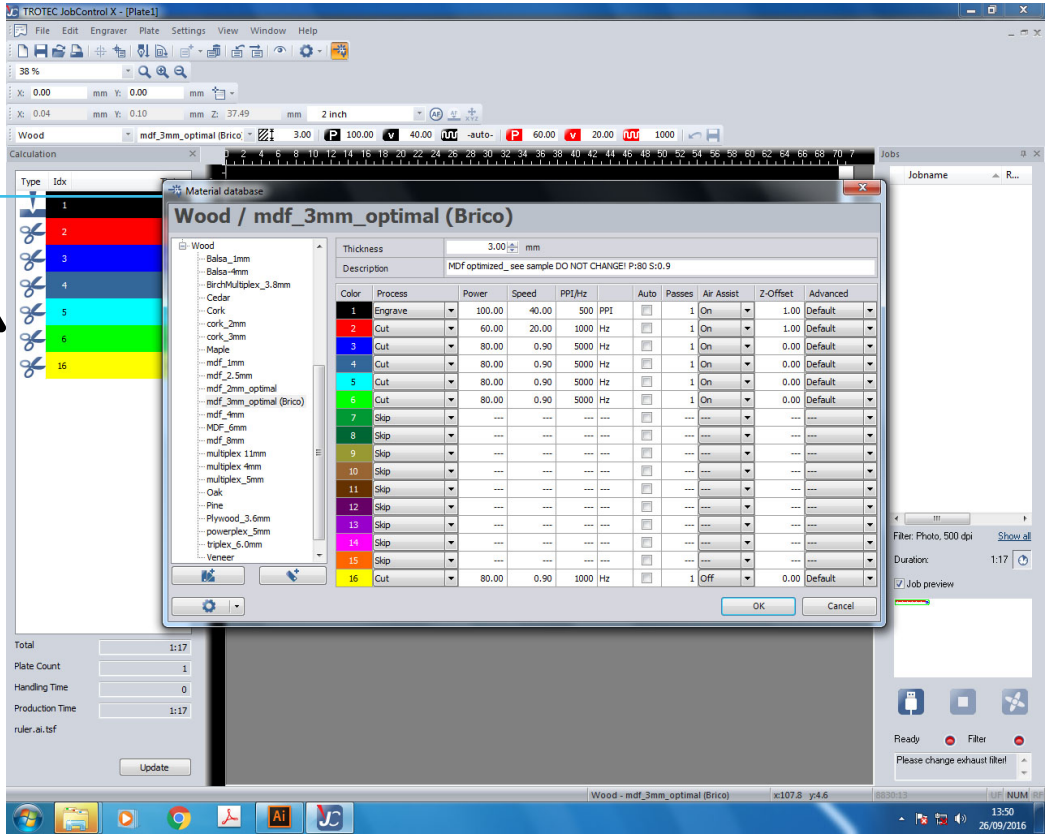
This button grants access to the material library(2)

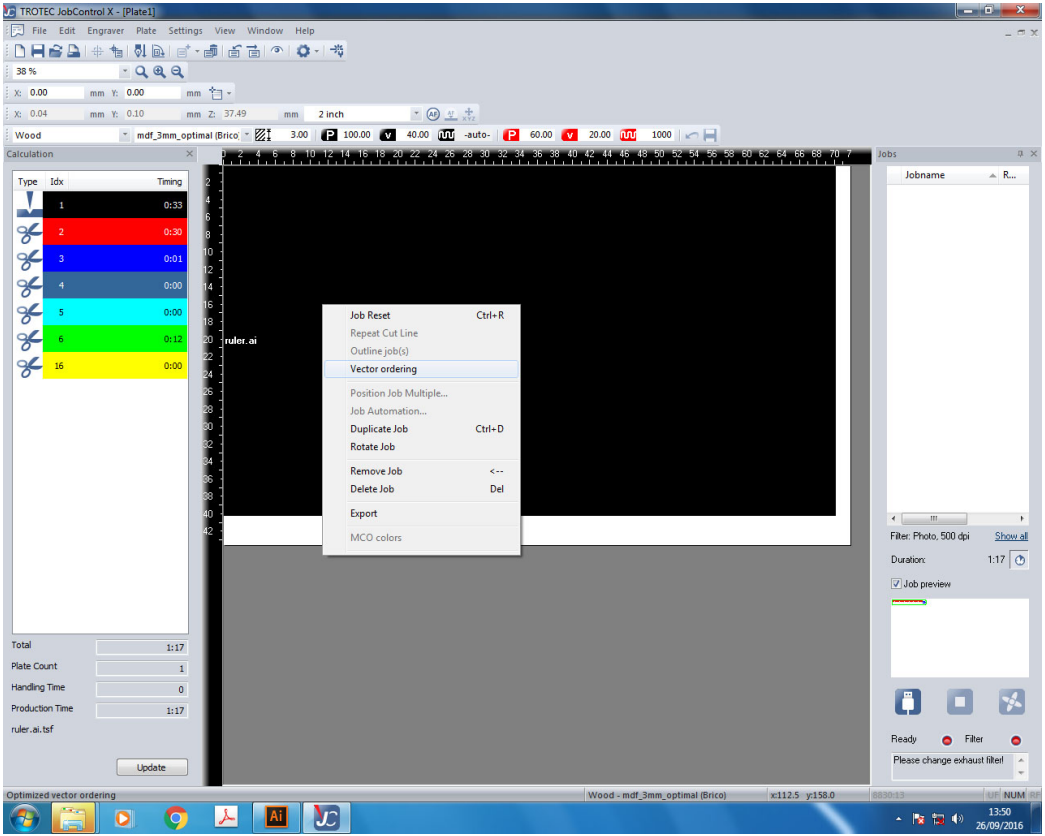


Connect JobControl software with the lasercutter (1)

The correct material was chosen in a previous step, this is only for reference.

Settings for materials not yet in the library are set with the lab-manager present

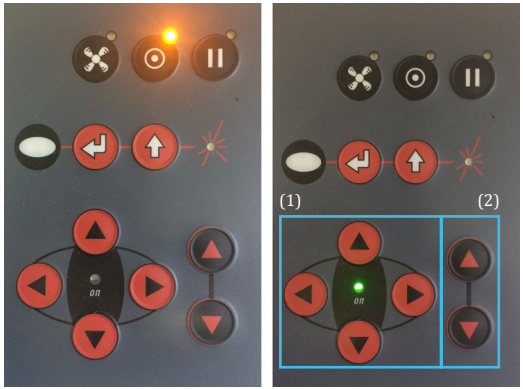




You can optimize your design by right-clicking the job and choosing *Vector Ordering*.

In the pop-up window, select *overwrite,* choose *quick ordering* and press start.

Control panel



If the orange LED near the on/off button is turned on, the machine is turned off.
Press the on/off button once to turn the lasercutter on, the orange LED turns off and the green LED indicates the machine is turned on.
When the machine is idle for a while, the machine will turn off automatically.

Position your material always in the top left corner on the honeycomb table. The table is constructed in a way that it clicks into two fixed rulers in the lasercutter. Always verify that the honeycomb table is positioned correctly.

The origin of the lasercutter lies in the top left corner.

Focus the Lasercutter

Inside the lasercutter, there's a small metal distance tool. Hook this on the lasercutter as pictured on the following page.

The lasercutter is focussed when the material touches the bottom of the measuring tool.

To focus the lasercutter do the following:

Checklist

- Turn the machine on
- Position your material correctly.
- Move the laser head on top of the material using the X and Y axis buttons on the control panel. (1)
- Hook the distance tool on the laser head, you can find this device inside the lasercutter.
- Raise the honeycomb bed until the material touches the distance tool. (2)
- Put the distance tool on its appropriate place inside the lasercutter.
- Close the lid of the lasercutter.


CAUTION
ER RADIATION WHEN OPEN
ERLOCKS DEFEATED
OR SKIN EXPOSURE TO
SCATTERED RADIATION

05 Execute design

Execute job

The only task still to execute is sending the job to the machine.

To do this, press the play button, both the lasercutter as the filter will come to life.

Make sure you are always present when the lasercutter is operational! When the lasercutter is cutting, there should always be someone present, when hefty engraving is done you may ask the lab-manager permission to leave for a moment! You should at all times notify the manager if you intend to leave the lasercutter alone.

If you do not follow this rule, your laser rights will be revoked immediately!

After the job

When the job is finished, wait until all the smoke dissipates.

Take the material out of the lasercutter. Make sure you also remove small elements from underneath the honeycomb table. To do this, lower the table and take it out. Remove all the waste material before putting the honeycomb bed in again. Make sure it snaps on the rulers.

Delete the job in JobControl by right clicking and choosing delete. Close your file in Illustrator and leave a clean workspace for your fellow students.

06 Extra info, Tips & tricks

What now?

By completing this tutorial, you have learned how to safely operate the Trotec lasercutter. This doesn't mean you're a laser-cut pro. To become one, you can always return to the MMLab to experiment and improve your skills.

You can find extra info on the website, including thickness of the laser-beam, which materials yield which result and which materials can NOT be processed. You will also find an overview of the other machines present in the MMLab.

Laser-cutters are not the only machines you can use for your prototypes and models. Cutting plotters, 3D-printers and CNC machines are also tools you can master and use. Each of these machines require a similar but different work-flow that you will be learning through tutorials. Throughout these tutorials one thing will be omnipresent, the need for an optimal vector-based file.

Knowledge about designing in CAD applications is therefore key! Remember you are always welcome at the MMLab for advice on and help with your projects, making an appointment for this is optional.

Trotec Speedy 300/100
Tutorial and Guide