

# → Operation Manual Speedy 400



©This documentation with all illustrations is intellectual property of Trotec GmbH.  
The entire documentation is given to the user for personal use only. This documentation  
must not be reproduced or made available to others without our written permission. Any  
breach of law will be prosecuted.

**Trotec Laser GmbH**

Linzer Straße 156  
A – 4600 Wels  
AUSTRIA

Tel.: ++43/7242/239-7000

E-Mail: [techsupport@troteclaser.com](mailto:techsupport@troteclaser.com)



Trotec cannot be held responsible for any direct or indirect damages, which result from using or working with the products electric circuits or software described herein. The apparatus must be used only by trained and skilled personnel. Before use the manual should be read and followed carefully.

Furthermore Trotec reserves the right to change or alter any product described herein without prior notice.



In case of failure, please check the device first according to section 5.4 Tips for Troubleshooting. If unsuccessful, please note all data of the device (year of manufacture, software version, etc.) and call us from a telephone next to the switched on device.

For queries or technical problems please contact your dealer or Trotec directly at the above address..

## TABLE OF CONTENTS

<b>1</b>	<b>GENERAL.....</b>	<b>5</b>
1.1	Operation Manual Use - General Information.....	5
1.2	Designated Use.....	6
1.3	Disposal remarks.....	6
1.4	Technical Data / Device Specification .....	7
1.5	Manufacturer's Label .....	9
1.6	EU - Declaration of conformity.....	10
<b>2</b>	<b>SAFETY .....</b>	<b>11</b>
2.1	General Safety Information.....	11
2.2	Laser Safety Information .....	12
2.3	Safety Precautions when Operating the Device.....	13
2.4	Warning and Information Labels .....	13
<b>3</b>	<b>BEFORE OPERATION .....</b>	<b>16</b>
3.1	Forklift transport.....	16
3.2	Contents of Delivery.....	17
3.3	Location.....	18
3.4	Electrical - Requirements .....	19
3.5	Exhaust System - Requirements.....	20
3.6	Computer - Requirements .....	20
3.7	Connections.....	21
3.7.1	Connecting the Mains .....	21
3.7.2	Connecting the Computer .....	22
3.7.3	Connecting the Exhaust System .....	23

<b>4</b>	<b>OPERATION .....</b>	<b>24</b>
4.1	Machine view and connections front .....	24
4.2	Machine view and connections back .....	25
4.3	ON/OFF Switch .....	30
4.4	Keypad.....	31
4.5	Tables .....	34
4.5.1	Engraving Table (Standard table) .....	34
4.5.2	Vacuum Table .....	34
4.5.3	Cutting Table .....	34
4.6	First Steps before Marking .....	35
4.7	First marking Tests .....	38
4.8	Rotary Engraving Attachment.....	40
4.9	Tips and Tricks for Laser Engraving .....	44
4.10	Tips and Tricks for Laser Cutting .....	46
4.11	Tips and Tricks for the Production of Rubber Dies .....	47
<b>5</b>	<b>MAINTENANCE .....</b>	<b>48</b>
5.1	Cleaning the System .....	48
5.2	Cleaning the Optical Parts.....	49
5.2.1	CLEANING THE LENS .....	49
5.2.2	CLEANING THE MIRRORS #2, #3 AND #4 .....	51
5.3	Maintenance Plan .....	54
5.4	Material Table .....	55
5.5	Tips for Troubleshooting.....	56
5.6	Acceptance report .....	57
5.7	TRAINING SCHEDULE .....	58
5.8	Response Form .....	59
5.9	How to create a Service File.....	60

# 1 GENERAL

## 1.1 Operation Manual Use - General Information



Caution:

Please read and follow this Operation Manual carefully, before installation and operation. Damage to persons and/or material can result from not following individual points of the Operation Manual!

Operation of the system is only permitted with equipment and spare parts supplied or listed in the spare parts and consumables lists.

Auxiliary equipment must be adjusted to the base machine (any queries to dealer or manufacturer).

The following symbols are used for easier understanding of the Operation Manual:



If the Operation Manual is not observed, this area represents a particular danger for the operating personnel or the personnel responsible for maintenance.



Caution: This component is under voltage. In these areas strictly observe the safety instructions regarding electricity. Care is to be taken in particular during maintenance and repair work



Caution: In this area pay attention to the possible dangers of the laser beam.



Note or information on individual components of the device, that simplify the use or make it more understandable.

## 1.2

## 1.2 Designated Use

The Trotec laser engraver, Speedy 400, is used for engraving and cutting of signs, stamps and suchlike.

A wide variety of materials such as rubber, acrylic, coated metal, tin, special steel, anodized aluminum, cork, cardboard, glass, leather, marble, several plastics and wood can be processed on the laser.



The working process must only be performed with a perfectly adjusted machine (see also Section 4 OPERATION).



For cutting applications with 40 W and more the use of the cutting table is absolutely necessary.



Use of the system in other areas is against the designated use. The manufacturer does not admit liability for damage to personal and/or equipment resulting from such use.



The system must only be operated, maintained and repaired, by personnel that are familiar with the designated field of use and the dangers of the machine!



Non-observance of the instructions for operation, maintenance and repair described in this Operation Manual excludes any liability of the manufacturer if a defect occurs.



Caution when processing conductive materials (carbon fibers,)! Conductive dust or particles in the ambient air might damage electrical components and lead to short circuits. Bear in mind that those defects are NOT warranted.

## 1.3 Disposal remarks



Do not dispose the machine with domestic waste!

Electronic devices have to be disposed according to the regional directives on electronic and electric waste disposal. In case of further questions, please ask your supplier. He might take care of proper disposal.

## 1.4 Technical Data / Device Specification

### ● Mechanics

Working area	1000 x 610 mm (39 x 24 in)
Loading area	Up to 1090 x 690 mm x 305 mm (42.9 x 27.1 x 12 in) - depending on working table Up to 1045 x ? x 185 mm (41 x ? x 7.2 in) - depending on working table, with pass-trough
Max. height of work piece	Up to 305 mm (12 in) depending on table configuration and lens
Work piece table	Flexible table design: engraving, vacuum and cutting table; aluminum grid; computer controlled and programmable servo z-axis
Speed of motion system	355 cm/sec. (139 in/sec)
Acceleration	4 g
Motor	Brushless DC servomotor
Encoder	Increment measuring system
Lenses	1.5", 2.0" (standard); 2.5", 4.0" (optional)
Addressable accuracy	5µm
Repeatability	< 0,015 mm (0.0006 in)
Accuracy to size of parts	According to material and process
Maximum material load	20 kgs (55 lbs) area load over the whole working area
Exhaust	Table exhaust via rear of engraving cabinet
Standard Features	Ergonomic access to working area, electro-optic autofocus, laserpointer (655nm, <0,99mWcw), coaxial air assist (without pump), 2.0" lens (can be exchanged free of charge with 1.5", 2.5" or 4.0" lens), trolley base, one working table of choice (vacuum or cutting table, black aluminum grid or engraving table), USB connection, JobControl X Expert software
Options	Harsh environment protection kit, Pass-through opening (back), rotary attachment, air assist including compressor, temperature sensor, laser power upgrade, vacuum table, engraving table, black aluminum grid, cutting table (lamellas), honeycomb table, white plastic cutting grid

### ● Options

Pass-through opening (back)	Height/width: 185 x 1045 mm (7.2 x 41 in) maximum material height 185 mm (7.2 in)
Rotary attachment	Cones, roller or combined version; tiltable
JobControl® Vision camera	Registration marks and compensation system "JobControl® Vision"; max. working area: 1000 x 610 mm (39.3 x 24 in) Engraving via JobControl with camera attached: 975 x 600 mm (38.3 x 23.6 in)
Vacuum table	Vacuum effect for thin or corrugated materials
Honeycomb table	In combination with vacuum table
Black aluminum grid	For reflection-free cutting of small objects
Cutting table	Removable aluminum lamellas

### ● Control System

Software	JobControl X Expert
Laser power	Adjustable 0 - 100%
Interface hardware	USB, RS-232 (RS-232 mandatory for TroCAM and JobControl® Vision)
Interface software	ASCII, HPGL, JobContro

● **Laser Equipment**

Laser tube	Sealed off CO2 Laser, maintenance-free, Laser Power 40 - 120 W, air-cooled
Wavelength	10,6m
Dimensions	
Width/depth/height	1400 x 950 x 1070 mm / 55 x 37.4 x 42.1 inch
Weight	Approx. 350 kgs / 770 lbs (depending on laser power)
Ambient conditions	Mandatory ambient temperature +15 to +25 C or 59 to 77 F Humidity 40% to max. 70%, not condensing Dust free environment (2nd degree according to IEC 60947-1)

● **Laser Safety**

Laser class	CDRH laser safety; CE tested Laser class 2 (Laser class 4 when operated with pass-through opening)
Interlock	Duplicate interlock safety system
Loading lid	Front side loading lid

● **Exhaust**

Required	Atmos Duo Plus or equivalent
----------	------------------------------

● **Electrical Equipment**

Power consumption	1,4 kW (60 W laser tube)
-------------------	--------------------------

Subject to change without notice. Errors and omissions excepted.

March 2012



## 1.5 Manufacturer's Label

The Manufacturer's Label is located on the backside of the machine (see picture below).



It is recommended to enter data such as serial number and year of manufacture data sheet above so that you always have this data handy if you have problems with your device or require spare parts.

## 1.6 EU - Declaration of conformity

(Machine directive 2006/42/EG, appendix II A)

**Manufacturer:**

Trotec Laser GmbH.  
Linzer Strae 156,  
A-4600 Wels

**Authorized person for the compilation of technical documentation:**

Gerhard KREMPL, Trotec Laser GmbH., Linzer Strae 156, A-4600 Wels

We hereby certify that

Speedy400  
Model N 8023 Speedy400

in its conception, construction and form put by us into circulation is in accordance with all the relevant essential health and safety requirements of the EC machinery directive 2006/42/EEC.

**Further valid guidelines/regulations for the product:**

2006/95/EG Low Voltage Directive  
2004/108/EG EMC Guideline

**Applied harmonized standards:**

- EN ISO12100 Machine Safety
- EN 60335-1/2007 Safety of Household and similar Appliances
- EN 55011 + A1/2010 Electromagnetic Compatibility
- EN 60204-1 Machine Safety - electr. Equipment
- EN 60825-1/2007, EN 60825-4/2006 and EN 60825-14/2006 Safety of Laser Equipment
- EN 61000-6-2/2005, EN 61000-3-3/2008 and EN 61000-3-2 +A1 +A2/2009 Electromagnetic Compatibility

**Place, Date:**

Wels, 02.07.2012

**Personal data of the signer:**

Stephan FAZENY, Head of Research and Development

**Signature:**

\_\_\_\_\_



## 2 SAFETY

Please read this chapter before operating or servicing a Trotec Speedy 400 laser system!

### 2.1 General Safety Information

All personnel involved in installation, set-up, operation maintenance and repair of the machine, must have read and understood the Operation Manual and in particular the "Safety" section. The user is recommended to generate company-internal instructions considering the professional qualifications of the personnel employed in each case, and the receipt of the instruction/Operation Manual or the participation at introduction/training should be acknowledged in writing in each case.

#### Safety-conscious Working

The machine must only be operated by trained and authorized personnel.

The scopes of competence for the different activities in the scope of operating the machine must be clearly defined and observed, so that under the aspect of safety no unclear questions of competence occur. This applies in particular to activities on the electric equipment, which must only be performed by special experts.

For all activities concerning installation, set-up, start-up, operation, modifications of conditions and methods of operation, maintenance, inspection and repair, the switch-off procedures that may be provided in the Operation Manual must be observed.

#### Safety Information for the User and/or Operating Personnel

- No working methods are permitted that affect the safety of the machine.
- The operator must also ensure that no unauthorized persons work with the machine (e.g. by activating equipment without authorization).
- It is the duty of the operator, to check the machine before start of work for externally visible damage and defects, and to immediately report changes that appear (including behavior during operation) that affect the safety.
- The user must provide that the machine is only operated in perfect condition.
- The user must guarantee the cleanness and accessibility at and around the machine by corresponding instructions and controls.
- Principally, no safety components may be removed or disabled (already here we emphasize the imminent dangers, for example severe burns, loss of eye-sight). If the removal of safety components is required during repair and service, the replacement of the safety components must be performed immediately after completion of the service and repair activities.
- Preparation, retooling, change of work piece, maintenance and repair activities must only be performed with equipment switched off, by trained personnel.
- It is forbidden to perform unauthorized modifications and changes to the machine. It is emphasized, that any unauthorized modifications to the machine are not permitted for safety reasons.

## 2.2 Laser Safety Information



To assess the potential dangers laser systems pose, they are classified into 5 safety classes: 1, 2, 3a, 3b and 4. Trotec Speedy 400 is a device of class 2 (USA: Class II) and class 4 (USA: Class IV) with pass through option. Please note that improper operation of the device can override the status of safety class 2 and can cause the emission of harmful radiation.



This laser engraving system contains a carbon dioxide (CO<sub>2</sub>) laser of class 4 that emits intensive and invisible laser radiation. Without safety precautions the direct radiation or even diffuse reflected radiation is dangerous!



Without safety precautions, the following risks exist with exposure to laser radiation:

Eyes: Burns to the cornea for CO<sub>2</sub> Laser

Skin: Burns

Clothing: Danger of fire



Never try to modify or disassemble the laser and do not try to start up a system that had been modified or disassembled!



Dangerous radiation exposure can result from the use of operation or adjustment equipment other than that described here, and if different operational methods are performed.



Service technicians using the service plug are required to wear standard laser safety glasses for CO<sub>2</sub> lasers (wavelength 10.6 m).

## 2.3 Safety Precautions when Operating the Device

In your Speedy 400, a closed safety system is integrated which immediately switches off the power to the laser tube when the protection cover is opened. Consequently an incomplete engraving can occur if the cover is opened during operation. Therefore, first press the "PAUSE" button, if you want to interrupt an engraving process.

Please remember the following safety precautions when working with this device:

A fire extinguisher must always be handy as the laser beam can ignite flammable materials. Do not store any flammable materials in the inside of the device or in the immediate vicinity of the device. Particularly leftovers of produced materials have to be removed to prevent fire hazard.

### **Unsupervised operation of the system is not permitted.**

Because of their low absorption polished and pure metals like un-coated aluminum, copper, silver and gold can show very weak interaction with the laser beam and lead to strong reflections. Such materials must be handled with care, as a directed reflection could harm the protection cover. The protection cover is damaged if the reflected radiation is focussed in the plane of the protection cover. By accident, this effect is almost impossible.

Adjustment of the beam path must be performed only by especially trained personnel. An improper setting can lead to uncontrolled emission of the laser radiation.

Before processing materials the user must verify, whether harmful materials can be generated and whether the filter equipment of the exhaust system is suitable for the harmful materials. We emphasize that it is the responsibility of the user, to consider the national and regional threshold values for dust, fogs and gases when selecting the filters and the exhaust system. (The values for the maximum workplace concentration must not be exceeded.)

Please refer to the manual of the exhaust system on how and in what intervals you need to replace filters.

### **PVC (polyvinyl chloride) must under no circumstances be processed with the laser.**

Should you have further questions before starting work, please contact your dealer or Trotec.

## 2.4 Warning and Information Labels





The warning and information labels are attached in such positions of the machine that could represent a source of danger during set-up and operation. Therefore, follow the information on the labels. If labels are lost or damaged, they must be replaced immediately.

Visible from outside



**5**  
**CAUTION**  
VISIBLE LASER RADIATION  
**CLASS 2**, WHEN OPENED  
DO NOT STARE INTO BEAM

**8**  
**CAUTION**  
VISIBLE AND INVISIBLE LASER RADIATION  
**CLASS 4**, WHEN OPENED AND  
SAFETY INTERLOCKS DEFEATED  
AVOID EYE OR SKIN EXPOSURE TO  
DIRECT OR SCATTERED RADIATION

**11**  
**HAZARDOUS VOLTAGE INSIDE**  
DISCONNECT POWER BEFORE OPENING

**6**  
**LASERPOINTER**  
 $P_{\max} < 0,99 \text{ mW cw}$   
 $\lambda = 655 \text{ nm}$

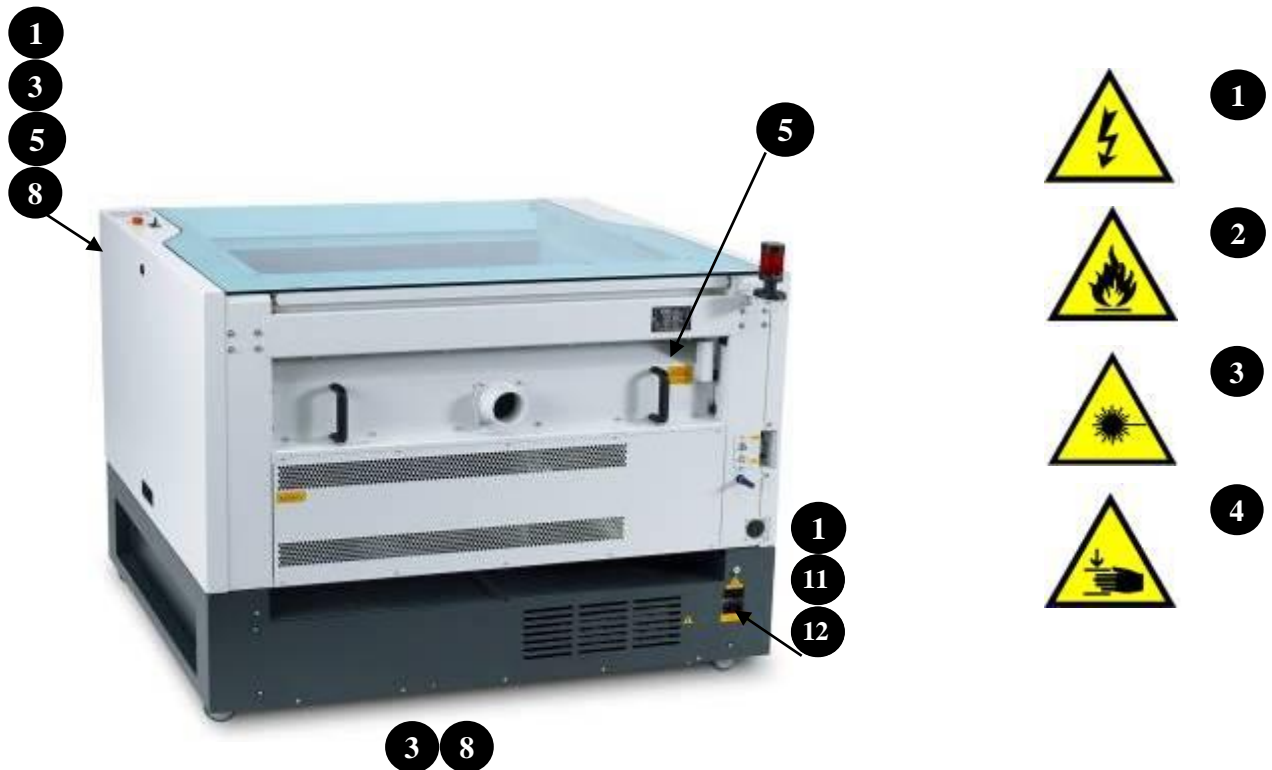
**9**  
**CAUTION**  
INVISIBLE LASER RADIATION  
**CLASS 4**, WHEN OPENED AND  
SAFETY INTERLOCKS DEFEATED  
AVOID EYE OR SKIN EXPOSURE TO  
DIRECT OR SCATTERED RADIATION

**12**  
**INPUT POWER**  
100-240VAC 50/60Hz

**7**  
**CO<sub>2</sub> LASER**  
**P = xxx W**  
 $\lambda = 10600 \text{ nm}$

**10**  
**NEVER OPERATE THE LASER SYSTEM**  
**WITHOUT CONSTANT SUPERVISION**  
**EXPOSURE TO THE LASER BEAM MAY**  
**CAUSE IGNITION OF COMBUSTIBLE**  
**MATERIALS WHICH CAN CAUSE SEVERE**  
**DAMAGE TO THE EQUIPMENT**

**13**  
**LASER APERTURE**



- |  |  |   |
|--|--|---|
| <p><b>5</b></p> <p><b>CAUTION</b><br/>VISIBLE LASER RADIATION<br/><b>CLASS 2</b>, WHEN OPENED<br/>DO NOT STARE INTO BEAM</p>           | <p><b>8</b></p> <p><b>CAUTION</b><br/>VISIBLE AND INVISIBLE LASER RADIATION<br/><b>CLASS 4</b>, WHEN OPENED AND<br/>SAFETY INTERLOCKS DEFEATED<br/>AVOID EYE OR SKIN EXPOSURE TO<br/>DIRECT OR SCATTERED RADIATION</p>               | <p><b>11</b></p> <p><b>HAZARDOUS VOLTAGE INSIDE</b><br/>DISCONNECT POWER BEFORE OPENING</p> |
| <p><b>6</b></p> <p><b>LASERPOINTER</b><br/><math>P_{\max} &lt; 0,99 \text{ mW cw}</math><br/><math>\lambda = 655 \text{ nm}</math></p> | <p><b>9</b></p> <p><b>CAUTION</b><br/>INVISIBLE LASER RADIATION<br/><b>CLASS 4</b>, WHEN OPENED AND<br/>SAFETY INTERLOCKS DEFEATED<br/>AVOID EYE OR SKIN EXPOSURE TO<br/>DIRECT OR SCATTERED RADIATION</p>                           | <p><b>12</b></p> <p><b>INPUT POWER</b><br/>100-240VAC 50/60Hz</p>                           |
| <p><b>7</b></p> <p><b>CO<sub>2</sub> LASER</b><br/><b>P = xxx W</b><br/><math>\lambda = 10600 \text{ nm}</math></p>                    | <p><b>10</b></p> <p><b>NEVER OPERATE THE LASER SYSTEM</b><br/>WITHOUT CONSTANT SUPERVISION<br/>EXPOSURE TO THE LASER BEAM MAY<br/>CAUSE IGNITION OF COMBUSTIBLE<br/>MATERIALS WHICH CAN CAUSE SEVERE<br/>DAMAGE TO THE EQUIPMENT</p> | <p><b>13</b></p> <p><b>LASER APERTURE</b></p>   |

### 3 BEFORE OPERATION

You receive your Speedy 400 packed in a wooden crate, which contains the laser and additional accessories.

A suitable fork-lift is required to unload from the courier vehicle and lift the machine off its pallet.

A powered screwdriver with cross-head bit is recommended for dismantling the wooden crate.

If possible keep the packaging in case the machine ever needs to be relocated or shipped for any reason.

#### 3.1 Forklift transport



The machine may only be lifted and transported:

- Under the guidance of a 2<sup>nd</sup> person, and
- At the points identified.



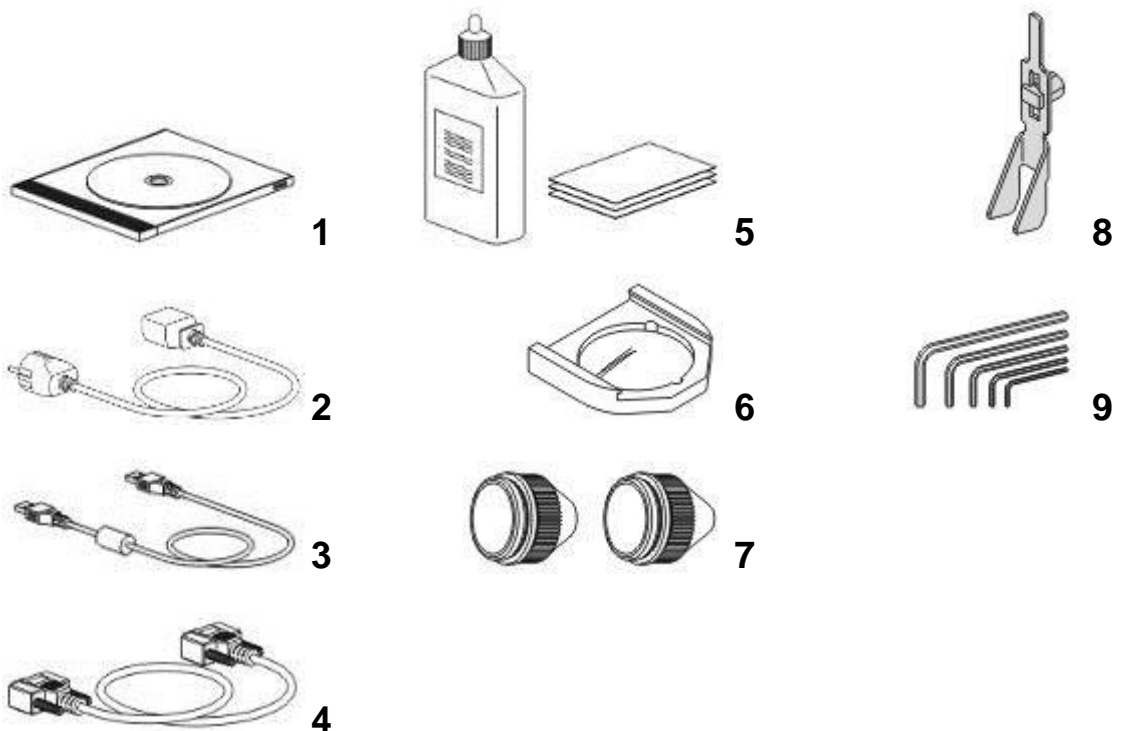
If possible keep the packaging in case the machine ever needs to be relocated or shipped for any reason.

Dispose all waste according to the applicable waste disposal law.



## 3.2 Contents of Delivery

- Transport and service packaging
- Laser including optics
- Accessories box, which contains the following parts:
  1. CD Trotec software / printer driver incl. Operation Manual
  2. Mains cable
  3. Computer connection cable USB
  4. Computer connection cable serial (optional)
  5. Cleaning kit for optics
  6. Additional lenses (optional)
  7. Air assist nozzles(s)
  8. Focus tool(s)
  9. Allen key set 1.5 - 10 mm



### 3.3 Location

Before you install the laser system, you should select an appropriate location. Follow the guidelines shown below:



Avoid locations where the system is exposed to high temperatures, dust and high humidity (The humidity must not exceed 70% and the temperature must not be close to the dew point).



Avoid locations, where the system is exposed to mechanical shocks



Fuse protection:  
Do not connect other devices via the laser fuse, as the laser system requires the full amperage.



Avoid locations with poor air circulation.



Select a location, whose room temperature is between 15 C and 25 C (59 - 77 F). Avoid higher ambient temperatures and strong exposure of the machine to the sun. Use blinds, if required.



Select a location close to ventilation (if available).



Select a location that is not more than 2.50 m away from your computer (max. cable length to avoid disturbing interferences).



Try to place a working table or a place to put things next to it. This shall avoid, that the machine is misused as a table.

### 3.4

## 3.4 Electrical - Requirements



Make sure that your electrical outlet is capable of providing the proper voltage, frequency and amperage that the laser system requires.

We recommend having individual circuits for

- Lasermachine and PC
- Extractor

Recommended fuse 10A (230V), 16A (115V).

Please install your computer to the same circuit as the laser marker to prevent electromagnetic interactions.

**DAMAGES FROM AN INADEQUATE OR INAPPROPRIATE POWER SOURCE ARE NOT COVERED UNDER WARRANTY.**

Noisy or unstable electricity as well as voltage spikes can cause interference and possible damage to the electronics of the laser system. It is better to connect the laser system to a dedicated electrical line.

It is highly recommended that you use a surge suppression plugs to protect your computer equipment.

If electrical power fluctuations, brown outs or constant power outages are a problem in your area, an electrical line stabilizer, UPS (Uninterruptible Power Supply) or backup generator might be required. If installing any of these devices, make sure that they meet the electrical requirements of the laser system.

**It is your responsibility to provide a suitable electrical supply.**

## 3.5 Exhaust System - Requirements



To guarantee the right ventilation during the engraving and cutting process, an exhaust system with a minimum suction power of 300 m/h is required. The device must be equipped with a fine dust filter as well as an activated carbon filter (neutralization of smells). Trotec advises to use the Atmos Duo Plus.

Connection - see section 3.7.3 Connecting the Exhaust System.



Do not start the machine without an adequate exhaust system.

## 3.6 Computer - Requirements

The following recommendation represents the minimum requirements.

When using a more powerful computer the graphics are generated and displayed faster and the computing times and the data transfer to the laser are reduced. To use the newest software version, you might have to abide other requirements.

- Windows 7 32/64-bit or  
Windows Vista 32/64-bit (with Service Pack 1 or later) or  
Windows XP 32/64-bit (with Service Pack 2 or later)
- Microsoft .NET framework 3.5
- Adobe Reader 9.0 or later
- Local administrative privileges (for required software installations)
- GHz processor or faster
- GB RAM or greater (Windows 7, Windows Vista) or  
1 GB RAM or greater (Windows XP)
- 80 GB hard drive or larger
- 1024 x 768 resolution monitor or greater
- true color graphics card (24-bit color depth)
- 1 free USB interface
- CD-ROM drive
- Mouse

## 3.7 Connections



Perform the connections exactly in the order described, otherwise electrostatic charging can damage your computer and/or the electronics of the laser system.

### 3.7.1 Connecting the Mains

Connect one end of the mains cable with the connection socket (1) at the rear side of the laser device (see Figure below) and the other end with a protected power outlet.



Mains voltage and operating voltage must correspond (AC 230 V/50 Hz or AC 115 V/60 Hz) - see information label beside the connection socket. Under no circumstances switch on the device if the voltages do not correspond.



**INPUT POWER**  
220-240VAC 50HZ

**INPUT POWER**  
100-120VAC 60HZ



The main fuse (2) is located below the connection socket and is accessible from the exterior.

### 3.7.2 Connecting the Computer



The computer must be switched off and connected to the mains voltage.

Connect the laser (see Figure below) to a free serial interface (1) or USB port (2) on your computer.



### 3.7.3 Connecting the Exhaust System

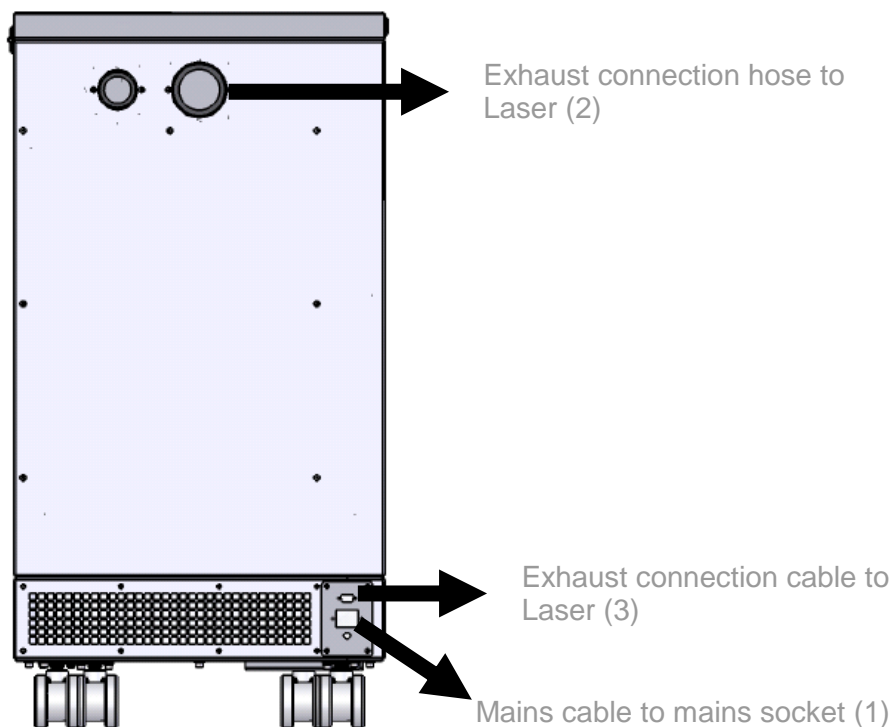
- Connect your exhaust system to the mains socket (1).



Make sure that the mains voltage corresponds with the voltage allocated for the exhaust system.

- Plug the ends of the exhaust duct into the allocated connection (2). The position of the connector depends on the type of exhaust system.
- When using the Trotec exhaust system, also connect it with the cable included to the remote control connector of the laser (3).

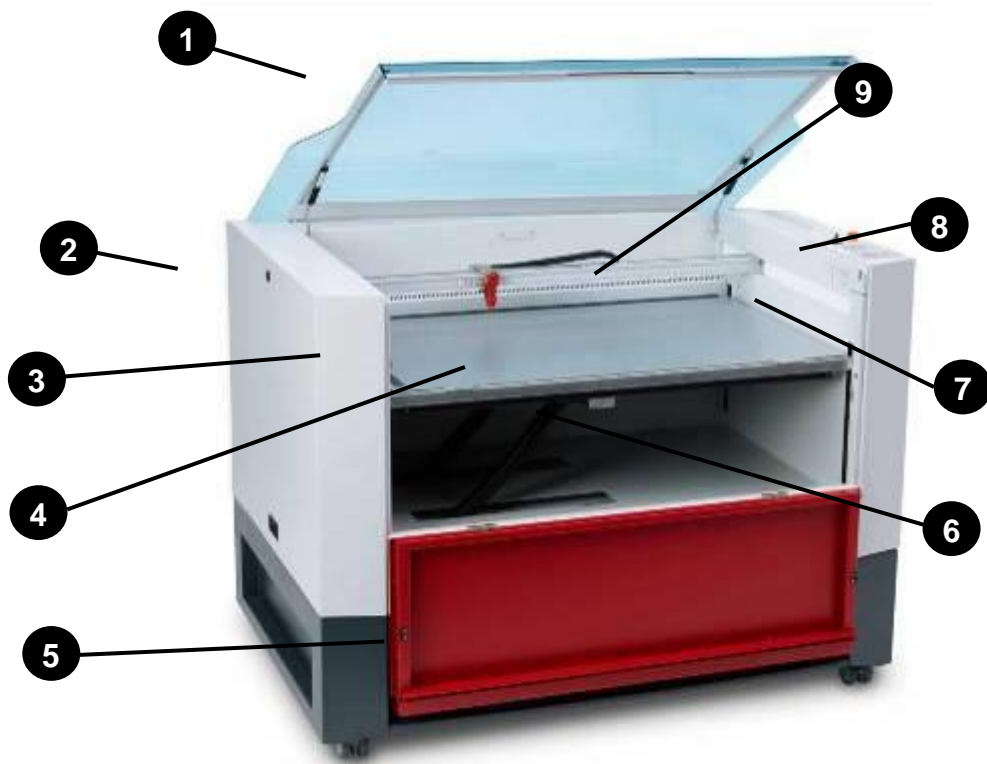
Also follow the operation and maintenance instructions in the Operation Manual of the exhaust system.





## 4 OPERATION

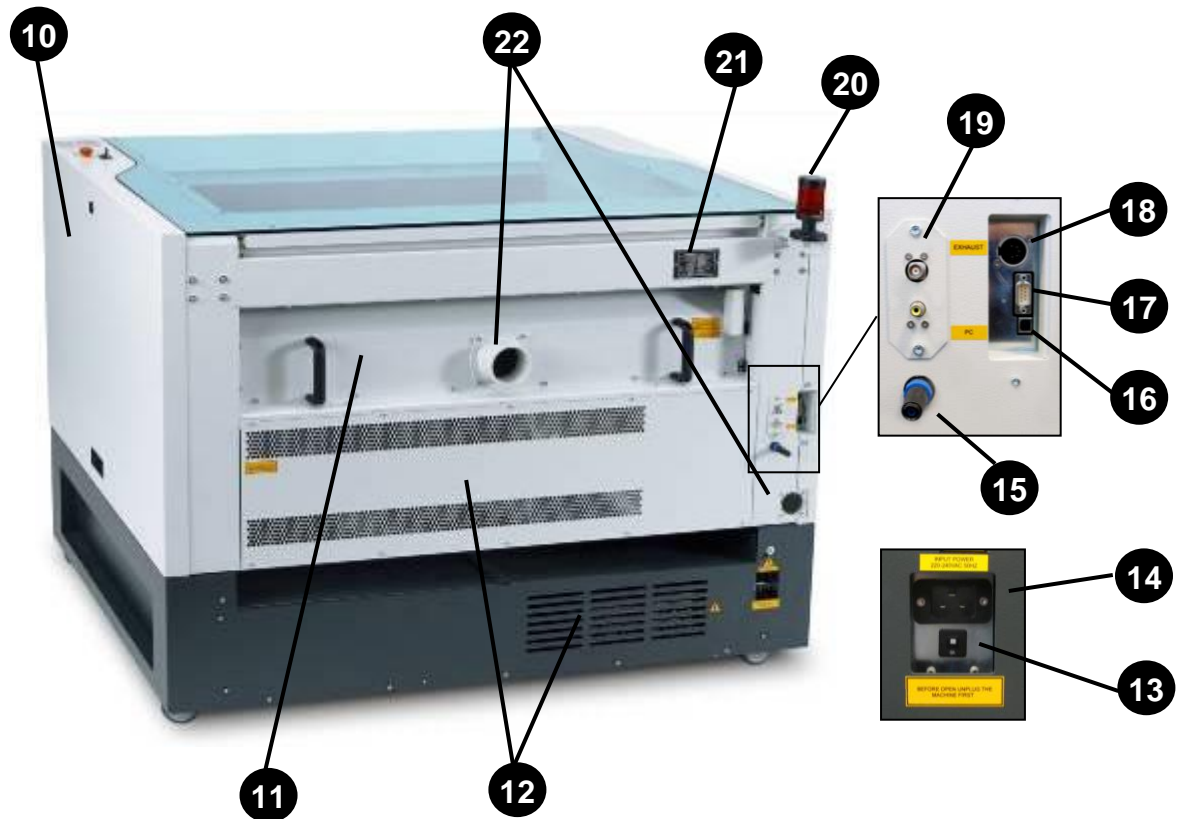
### 4.1 Machine view and connections front



1	Top lid	6	Vacuum table connection
2	Service access panel	7	Dust Protection (optional)
3	Connection Socket for Rotary	8	Keypad
4	Working table	9	X-axis
5	Front lid		



## 4.2 Machine view and connections back



10	Maintenance panel	17	Serial connector
11	Pass through cover (optional)	18	Exhaust connector
12	Laser and Power Supply covers	19	JobControl® Vision connetors (optional)
13	Fuse	20	External interlock lamp
14	Power socket	21	Manufacturer's label
15	Remote Interlock plug	22	Exhaust hose connectors
16	USB connector		

## 1 Top lid



If the Top lid is opened, no data is processed. After closing the Top lid, the device is not ready to process commands for 5 seconds. If the protection cover is opened during operation, the motion system is stopped and laser source is turned off.

Please note, that the laser tube is switched off immediately and consequently the result of the engraving is incomplete. During processing of commands the protection cover must only be opened after pressing the "Pause" button.

## 2 Service Access Panel



Only to be opened by trained technical service personnel.

## 3 Connection Socket for Rotary Attachment



Connector for the rotary attachment (option).  
Supplies the rotary attachment with the required electric signals.



Always switch the machine off when you plug in and unplug the rotary attachment.

## 4 Working Table



The work pieces to be processed are put onto the working table. To facilitate orientation, a horizontal and a vertical ruler are located on the working table. The table is ferromagnetic for easier fixation of work pieces.

## 5 Front lid (opened in the shown picture)



If the front lid is opened, no data is processed. After closing the front lid, the device is not ready to process commands for 5 seconds. If the front lid is opened during operation, the motion system is stopped and laser source is turned off.



Please note, that the laser tube is switched off immediately and consequently the result of the engraving is incomplete. During processing of commands the protection cover must only be opened after pressing the "Pause" button.

## 6 Vacuum table connection



Connection for vacuum on the table

## 7 Dust Protection (optional)

Avoids dust to get into the maintenance and service panel area.

## 8 Keypad



The Keypad contains multiple buttons and displays for controlling the device. See section 4.4 Keypad for further information.

## 9 X axis



The motion system is the part that performs the mechanical movements in X direction (horizontal) (Focusing head movement) and Y direction (vertical). The X axis is visible in the working area.

## 10 Maintenance Panel



Has to be opened with a 10mm Allen key to maintain optics.

## 11 Pass through cover (optional)



Can be opened to process larg workpieces.



Please note, that opening this cover the machine will run as class 4 system.  
See section 2.2 Laser Safety Information for further information.

## 12 Laser and Power Supply covers



Must not be opened by unauthorized persons.

## 13 Fuse(s)

## 14 Power Socket



To connect the main power according the information on the manufacturers label.

## 15 Remote Interlock Plug

## 16 USB connector



For PC connection

## 17 Serial connector



For PC connection

## 18 Exhaust cable connector

## 19 JobControl<sup>®</sup> Vision connectors (optional)

## 20 External Interlock lamp



Turns on when interlock is closed and machine is ready for processing.

**21 Manufacturer's Label**



Shows important data of the machine like serial number or manufacturing date.

**22 Exhaust hose connectors**

### 4.3 ON/OFF Switch



Before switching on the device, the user must make sure that no objects of any kind are located inside the operating space, which could limit or obstruct the mechanics of the device.



Switches the mains supply ON/OFF.

The following conditions must be fulfilled for correct start up:

- unrestricted freedom of motion of the mechanics
- no materials under the working table
- protection covers closed

If all interlock-secured covers are closed, immediately after being switched on, the device starts the referencing process. When the referencing process is completed correctly, an acoustic signal sounds and the device is ready for operation. The readiness for operation is additionally displayed by green (slow) flashing of status display.

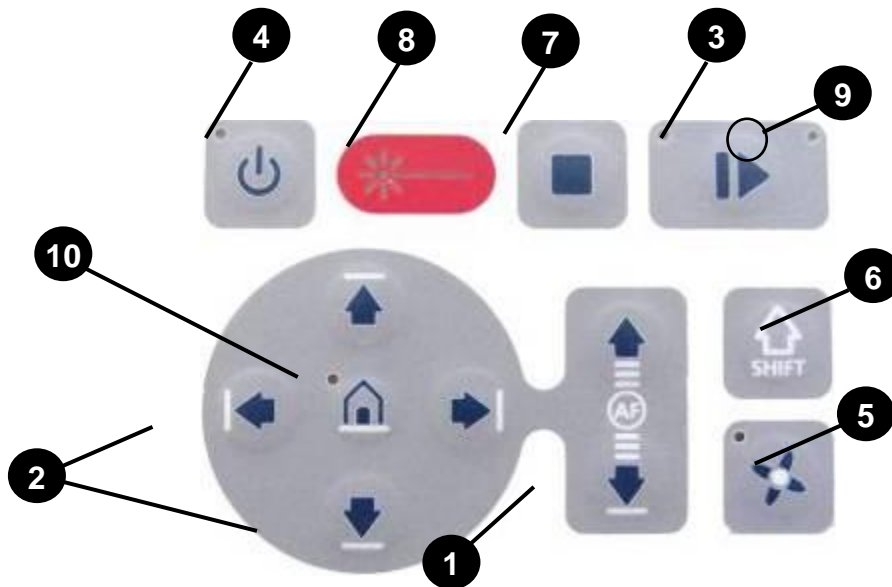
If the top lid or any other interlock secured cover (maintenance panel, front lid) is open, an acoustic signal sounds, the status display flashes fast in green and no reference movement is made.



When switching off the mains supply, all processing data is lost.

### 4.4

## 4.4 Keypad



### 1 POSITIONING KEYS Z



When pressing one of these two keys the working table moves in Z direction (upwards or downwards).

Use these positioning keys to move the table manually.

When both keys are pressed simultaneously, the material is focused automatically.

Before the autofocus- move is started, the head is moved backward in line with the light barriers. If the light barrier is broken, e.g. by an air assist nozzle, the upward move will be suppressed to prevent a collision between the nozzle and the table.



The Autofocus option might not work on transparent materials or materials which are not flat.  
Bear in mind that defects from head crashes (working head hits material or working table) are NOT warranted.

By pressing the "Shift" key and a Z- positioning key an automatic move to the corresponding end- positions is performed:

Shift + Down: the table moves down to the lowest possible position

Shift + Up: the table moves up to the autofocus- position.



Note: Shift + Up will cause the head moving backwards to the light barriers (according simultaneous pressing of both z-keys).

If any of positioning keys X and Y is pressed, no moves in Z are possible.

**An automatic move of the Z- axis can be stopped by pressing of the positioning keys (1 or 2).**

## 2 POSITIONING KEYS X/Y

Use the positioning keys to manually move the lens holder into the indicated directions.

When you press two keys simultaneously, the lens holder moves diagonally.



When you press the "Shift" key and one of the positioning keys simultaneously, a movement to the corresponding end position is performed.  
If all panels are closed, the movement is done with the maximum velocity, if opened, the speed is 1/4th of the maximum.

While the Z- axis is in movement (e.g. autofocus), no cursor moves in X and Y axis are performed.

## 3 START / PAUSE / REPEAT

Pressing the button with no Job running the actual Jobs positioned on the selected plate in JobControl are started.

Used to pause the current working process (key lights up). As soon as the last processing command is finished, the motion system stops.

If this key is pressed a second time, the key illumination goes off, the interrupted working process is continued.

Pressing the button after a Job is finished will repeat the actual Jobs positioned on the selected plate in JobControl. The Jobs will reset automatically

## 4 STANDBY



Switches the device into Standby mode (Laser ready, illumination off) - key lights up.

By pressing the key again the device is switched back to Ready mode.

If the Standby button is pressed while the Z- axis is in an automatic move (e.g. autofocus), the Standby mode is entered after finishing the Z- axis- move (Z- axis move can be stopped by pressing any of the Z- axis keys).

## 5 EXHAUST

Used to manually switch the exhaust system on and off.





The key illumination shows the status of the exhaust system. When the key is illuminated, the exhaust system is switched on.

After completing the engraving process, the exhaust system can only be switched off after some seconds (follow-up time).

## 6 "SHIFT" key for 2nd function key level



For additional Operations. When this key is pressed together with the following keys, the functions indicated are activated:

- Exhaust (5): Air assist on/off
- Positioning keys X/Y/Z (2): These keys drive the laser head to the end position

## 7 STOP



By pressing this button, the actual process running will be stopped.

## 8 STATUS INDICATOR LASER BEAM

Indicates, that a laser beam is currently being emitted.

## 9 STATUS DISPLAY



Indicates the current status of the device.

green, flashing slowly (0.5 Hz)	9	Machine is ready
green, flashing fast (2 Hz)	9	Cover has been opened
green permanent light / Pause mode	9	Data available in the machine
red permanent light	8	Laser beam is being emitted
green/red flashing alternately	8+9	Cover open during switch-on process, simultaneously acoustic signal - no referencing

## 10 HOME

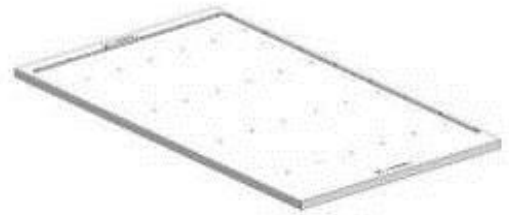


Pressing this button will change the machines homeposition temporary (Home-move to this position)

## 4.5 Tables

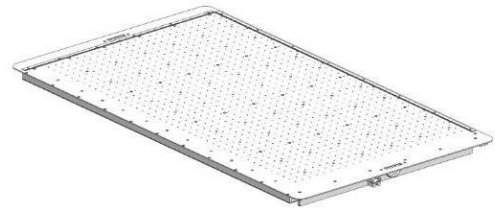
### 4.5.1 Engraving Table (Standard table)

- The engraving table rests on the base frame
- The engraving table is only for engraving heavy objects, such as metals, marble, granite, glass, heavy wood and acrylic parts.



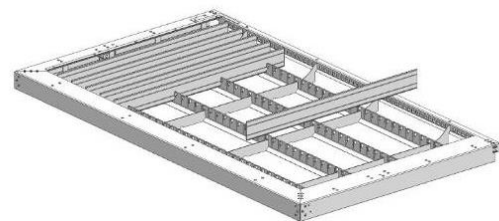
### 4.5.2 Vacuum Table

- The vacuum table rests on the base frame.
- The vacuum table is only intended for engraving and/or cutting thin and lightweight materials such as films, plastic laminates, veneers, thin sheets of wood, paper, cardboard, and similar.
- The entire surface of the vacuum table must be covered to ensure the maximum vacuum effect



### 4.5.3 Cutting Table

- The cutting table rests on the base frame.
- The entire surface of the vacuum table must be covered to ensure the maximum vacuum effect



It is not allowed to place Workpieces into the baseframe without a Table attachment (e.g. Standard-, Vacuum- or Cutting Table).

This is important so no bending on the frame and impairment of the exhaust function is possible.

## 4.6 First Steps before Marking

To prepare your laser for the first marking tests, perform the following steps:

1. Switch machine on with the ON / OFF switch.



2. Close the top cover.  
The working table automatically references in X/Y/Z direction.
3. Open the protection cover and place work piece on the working table.



Usually you position the work piece into the upper left-hand corner of the working table against the horizontal and vertical rulers. However, any other position on the working table is also possible.

4. Focusing the Laser Beam

For the laser beam in your laser system to be able to engrave and cut precisely, the energy is focused with a lens system, which is mounted on the motion system in a lens holder.



The focusing point of the laser beam depends in the installed lens. It is measured from the lens to the material surface

For optimal processing the surface of the material that you want to engrave or cut, must be adjusted to this point.

There are three methods to focus the laser beam:

- A: Manual focusing
- B: Focusing by software
- C: Automatic focusing by means of light barriers

#### **A - Manual focusing:**

A1. Move the processing head over the material to be engraved by means of the positioning keys X/Y

A2. Hang the focus tool on the external ring of the working head so that the focus tool can move unhindered. Move the working table upwards by pressing the Z positioning key. While doing this carefully observe the focus tool.



Before the focus tool reaches the work piece, move the working table upwards only very slowly and step by step by briefly tapping the positioning key, until the tool tilts to the side. Now the lens is focused onto the surface of the material.

#### **B - Focusing by software:**

Click the icon "focus laser" in the Trotec JobControl

The working table moves in Z direction.

The following values are used to determine the focus position and therefore always have to be checked before using this focus option:

- material thickness (specify the value as accurate as possible)
- table height (check if right table is selected in Options)
- lens type (specify the according lens)

### To C - Automatic focusing by means of light barriers (optional):

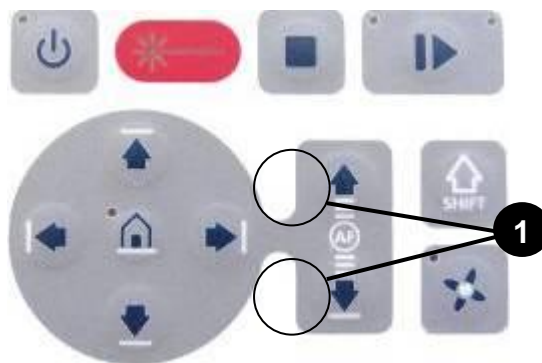


The automatic focusing is only possible if the work piece is thicker than the rulers.



The Autofocus option might not work on transparent materials or materials which are not flat.  
 Bear in mind that defects from head crashes (working head hits material or working table) are NOT warranted.

By pressing the two keys for Z positioning of the working table simultaneously, the laser beam is automatically focused onto the work piece (If you don't have the autofocus-option, the table will go down to Z = 0).



## 4.7 First marking Tests

The following steps describe, how to successfully mark a first pattern. Please follow the individual steps:

1. First switch on the computer, then the Laser.



2. Put the object to be engraved into the laser and move into the desired position on the working table. Usually the object is positioned in the upper left-hand corner. Use the rulers to determine the dimensions of the object to be engraved.
3. With the positioning keys the lens is positioned over the material to be engraved. You focus with the help of the focus tool or by auto focus (see page 34 ongoing).



4. Generate a graphic with the help of your graphics software. The size of the graphic does not matter as the printer driver adjusts it to the work piece automatically if requested.



Also consult the Software Manual for further information.

5. Select "File Print", to access the printer driver, where you can perform work piece and material settings as well as specify a job name or a job number.  
This file is automatically transferred into Trotec JobControl.
6. After the material, the engraving direction, die orientation of the work piece and the orientation of the plate have been specified in the Trotec JobControl under "Plate, Setup Plate", the job can be positioned on the plate with a double-click. If necessary, the job can be positioned at any position on the plate by dragging with the mouse. The position of the job corresponds with the engraving position on the working table.  
  
Make sure when engraving flammable materials the air assist is on!
7. Establish a connection with the engraver by clicking on the button "Establish Connection" in JobControl.
8. Switch on the exhaust system. When using an original Trotec exhaust system with installed connection cable, this happens automatically - check only, whether in the indicator "Exhaust Ready" is green in the Engraver Control of the JobControl.
9. Finally press the START button (green arrow) in the Control of the JobControl, to start the engraving process.
10. While the laser is working, you can generate the next graphic.
11. When the working is complete, the JobControl offers you the following possibilities:
  - delete the job
  - Job Reset and placing back in to the waiting list for later repeat of the working.
  - Job Reset and immediate repeat



## 4.8 Rotary Engraving Attachment



The rotary engraving option in the printer driver is used in combination of the rotary engraving attachment, to engrave cylindrical objects.

To compensate for the different diameters of different objects, the image must be adjusted. This is performed automatically by the engraving driver, by selecting the rotary engraving option and entering the diameter of the object to be engraved.



Never plug or unplug the rotary engraving attachment while the machine is turned on. If this is not observed, there is the danger of irreparable damage on the electronics.

The rotary engraving attachment is available with cones and with rolls. The rotary with cones permits engraving of cylindrical objects with a diameter of up to 270 mm, a length of up to 760 mm and maximum weight of 3 kg. The rotary with rolls permits engraving of cylindrical objects with a diameter of up to 180 mm, a length of up to 960 mm and maximum weight of 10 kg.

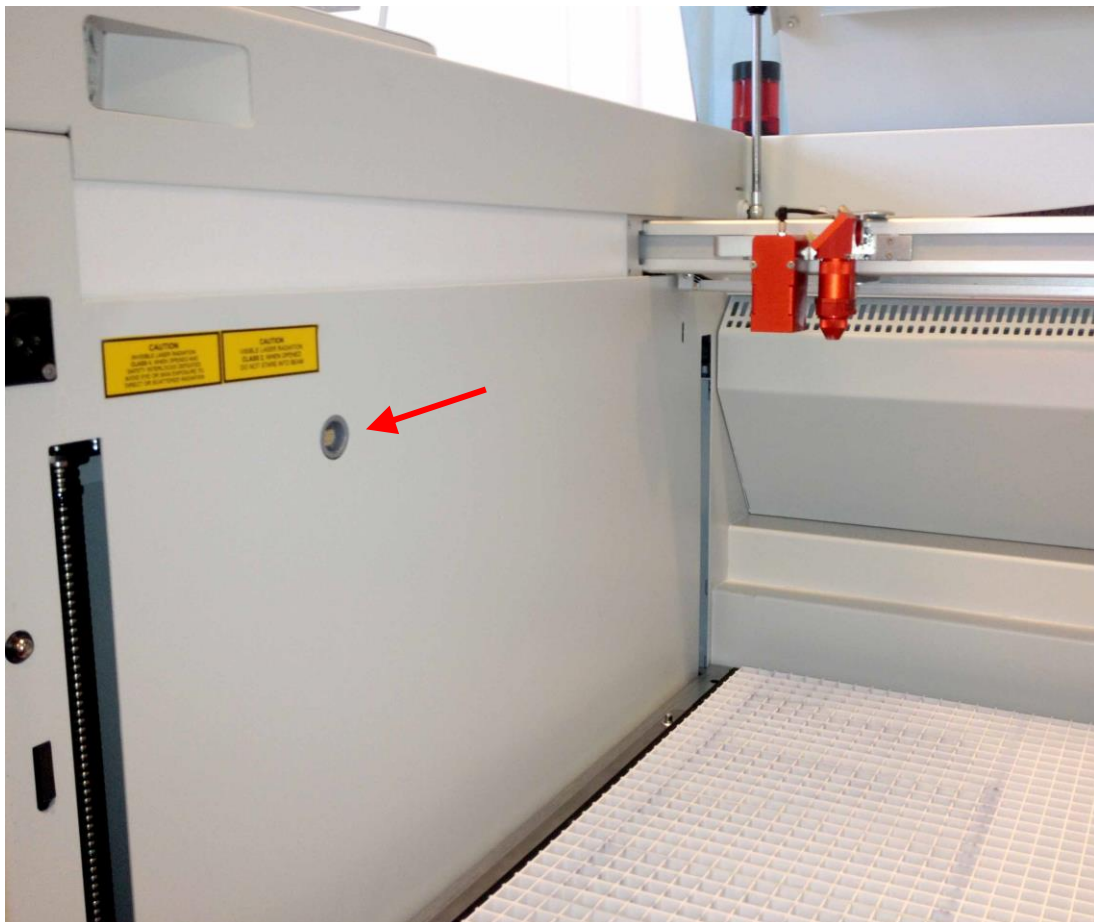
To install and set-up the rotary engraving attachment proceed as described as follows:

1. Make sure the engraving or vacuum table is installed.
2. Move the working table to the lower position, switch off the laser and open the top lid and front panel for easier loading.



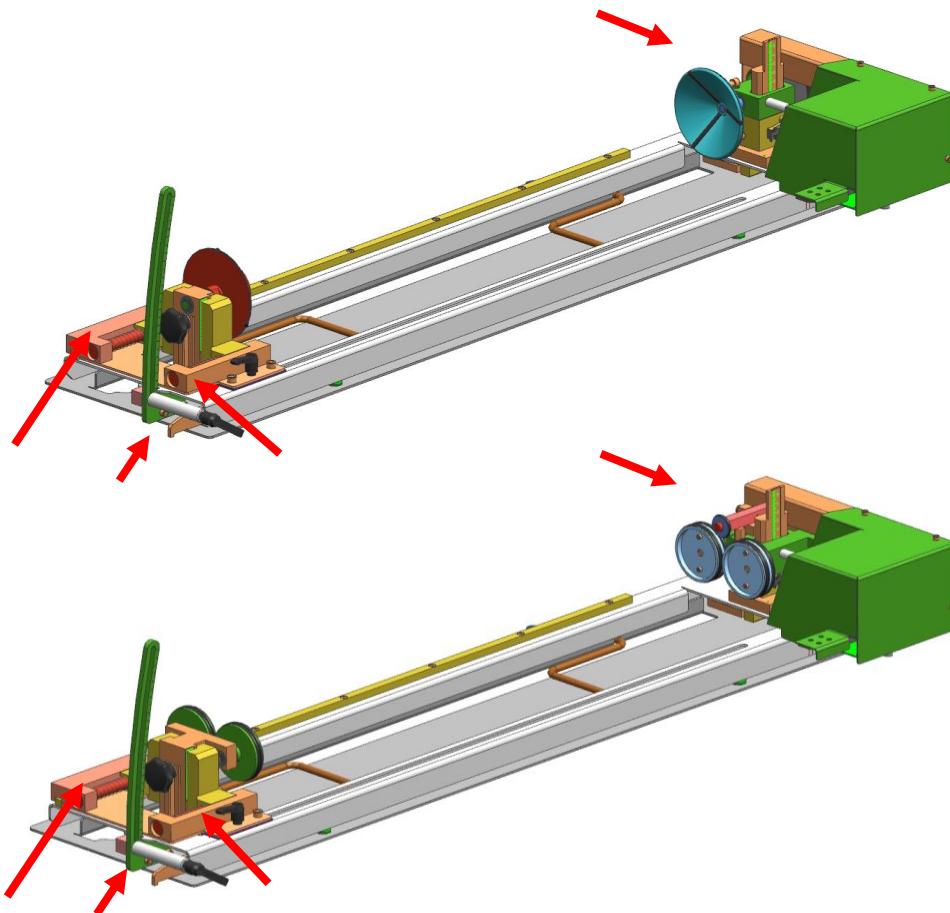


3. Put the rotary engraving attachment onto the working table and connect it to the working table. Place the rotary on the table and position its brackets to hold the rulers.
4. Connect the rotary engraving attachment via the control cable with the connector of the motion system. The connector is located inside the left front of the interior.



Mounting the work piece:

5. Before you mount the object into the rotary engraving attachment, measure the diameter of the object at the position to be engraved with a sliding caliper or a similar tool. Write down this value.
6. Adjust the height by loosening and fixing of lever 1 and screw 2 to make the work piece fitting into the rotary engraving attachment.
7. When using a rotary attachment with cones, fix the slider of the rotary with lever 3 until the work piece is fixed between the two cones. When using a rotary attachment with rolls, adjust the slider of the rotary with lever 3 until the work piece fits on it, and then place the work piece on the rolls.



8. Now check if the work piece is horizontal and, if necessary, adjust the level by lever 1 on the right side or lever 4 or screw 2 on the left side.

9. Now switch on the laser and wait until the referencing is finished. Position the working head over the object at the position, where you want to engrave. Now focus the object with the focus tool. If the object slopes too much in the area to be engraved, the rotary engraving attachment can be tilted, so that the surface of the object is running again parallel with the X axis of the motion system. To do this, lift the right-hand side of the rotary engraving attachment and place a wedge under it. Take care not to lift the rotary engraving attachment too high, as it can touch the lens holder.

#### Engraving:

Additionally consult the Software Manual for further information about the engraving process.

9. Generate a graphic with the help of your graphics software. The size is not important, as the graphic can be adjusted to the dimensions of the work piece by the printer driver.
10. Then perform the settings for size and orientation in the JobControl under "Plate, Setup Plate" and, if necessary, select the engraving material. Please note especially, that you can determine the orientation of the graphic on the object with "Job Orientation".
11. In the "Options" menu of the JobControl select "Rotary Engraving Attachment" and enter the diameter of the object.
12. Double-click on the previously generated job in the waiting list to place it on the plate.
13. Use the mouse to drag the job to the position of the plate, at which the desired engraving area is located on the object. Use the rulers in the machine and in JobControl for orientation and move the lens holder directly over the desired position, after you have connected the computer with the laser, and position the job on the screen according to the position of the lens.
14. Establish the connection to the laser.
15. Switch on the exhaust system (only necessary if you do not use an original Trotec exhaust system).
16. If you use a machine type with a water cooled laser tube, switch on the cooling system before switching on the laser.
17. Activate the START button in the Engraver Control of the JobControl and start the engraving process.

## 4.9 Tips and Tricks for Laser Engraving



The **engraving depth** can easily be varied through the laser power or the speed. To increase the engraving depth, reduce the speed or increase the power setting. This way you increase the amount of energy per area unit. Engraving too deep, however, reduces the quality of the details. With coated materials the required power depends of the kind and thickness of the coating.

With power set too high the individual lines become too thick and a sharp picture cannot be achieved. The resolution of the graphics should usually be at 500 dpi. The dpi setting (number of laser dots per inch) depends on the material. The lower this setting is, the lower the resolution of the engraved picture will be. This, however, reduces flaming and increases the energy of a pulse, which can improve the overall result (e.g. when engraving some sorts of plastic materials).



### **Protection foil:**

Remove the protection foil from the engraving area. However, leave the protection foil on the area that is not engraved, to avoid scratching of the material.



### **Plastics:**

Plastics for engraving are available in many different colors and thicknesses and with many different coatings and surfaces. The majority of available plastics can be well engraved and cut with the laser. Plastics with a micro-porous surface seem to give the best result, because less surface material

needs to be removed. As most plastic materials have a low melting point, a low ppi setting should be selected to reduce the danger of melting.



### **Acrylic:**

There are two different types of acrylic - cast and extruded. The cast acrylic becomes white or mat after engraving, the extruded acrylic remains clear. Use extruded acrylic for engravings that are filled with paint and cast acrylic for normal engravings. Cast acrylic can be best engraved without protection foil. It

is better to engrave the entire surface with a low energy setting.



### Photo Engraving:

Engraving photographs can be quite a challenge at the beginning. But as soon as you understand the basics it will become easier for you. Scan the desired picture with a resolution of 300 dpi. Adjust brightness and contrast so that lighter colors become lighter and darker colors become darker. The photo might look better if you use a filter, which sharpens the contours. The next step is the selection of a raster. Usually the software offers a selection of different rasters with a specified number of lines per inch and different raster angles. Use a raster with between 20 and 100 lines per inch. Increasing the number of lines per inch decreases the size of the points. Try which raster you think looks best. With one material large dot look better, with another material smaller points look better. If you cannot select rasters with your software, the machine will select the raster automatically.

## 4.10 Tips and Tricks for Laser Cutting



### **Distance to the Surface of the Work piece**

If you want to achieve very good results, when laser-cutting acrylic or wood, we recommend, that the plate be attached at least some millimeters above the engraving table. By doing this the smoke and the melting residuals underneath the plate can escape unhindered. A slight moistening of the plate will reduce the area of heat influence. Generally the protection foil should be removed, except when there is considerable development of fumes. During laser cutting the Hz setting (pulses per second) should be set to low, in particular for flammable materials.



### *Multiple cutting*

Often a clearer contour can be achieved by cutting twice rather than cutting only once.

## 4.11 Tips and Tricks for the Production of Rubber Dies



The various mixtures and densities of rubber plates cause a slightly varying engraving depth. The settings in the overview table give a good indication. Since engraving a standard rubber material requires a relatively high laser power, the laser power is principally set to 100% and only the speed is varied. Due to their lower density, so-called micro porous rubber materials allow a significantly higher engraving speed. Test the rubber first, to find out the correct speed setting.

The Trotec JobControl software simplifies the creation of a stamp significantly. Mirroring as well as converting is performed automatically and a cone-shaped shoulder is generated around each letter. Due to the wider base the letters are stabilized during stamping and therefore the imprint becomes clearer. If you engrave rubber dies without using this option, the letters will have no shoulders making them very thin and unstable.

To avoid flaming, we recommend a low Hz setting near 1000 Hz for cutting the rubber die. The laser pulses are set apart from each other and their edges just touch. This results in a perforation. The rubber die stays connected to the rubber plate but can be torn off easily. The advantage of this method is that there is practically no further risk of deformation or melting of the material. Furthermore, the entire plate can be removed from the laser at one time instead of having to collect all dies individually.

Engraving rubber produces a considerable amount of dust. Therefore a well-dimensioned exhaust system and its regular maintenance are very important. The appropriate Trotec exhaust system is absolutely recommended.



## 5 MAINTENANCE

### 5.1 Cleaning the System



Caution - use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.

Before device and



starting cleaning and maintenance work always switch off the unplug the mains plug.



You should check at least once a day, whether dust has accumulated in the engraving system. In case of soiling the machine must be cleaned. The cleaning interval strongly depends on the material that is being processed and the operating time of the device. Please bear in mind that only a clean machine guarantees optimal performance and reduces the service costs.



**CAUTION:** Always keep the system clean, as flammable parts in the working area or exhaust area rise the fire hazard.

#### General Cleaning:

1. Move the working table into a position in which it is easiest for you to clean the surface with a window cleaning agent and paper towels.
2. Make sure, that the device is switched off and unplugged. Open the protective cover.
3. Thoroughly remove all loose dirt particles and deposits in the interior of the machine.
4. Clean the cover of the laser tube.
5. You can clean the acrylic cover with a cotton cloth. Do not use paper towels as they could scratch the acrylic.

## 5.2 Cleaning the Optical Parts



Trotec recommends to use following cleaning material:

Lens tissues Part number 69249

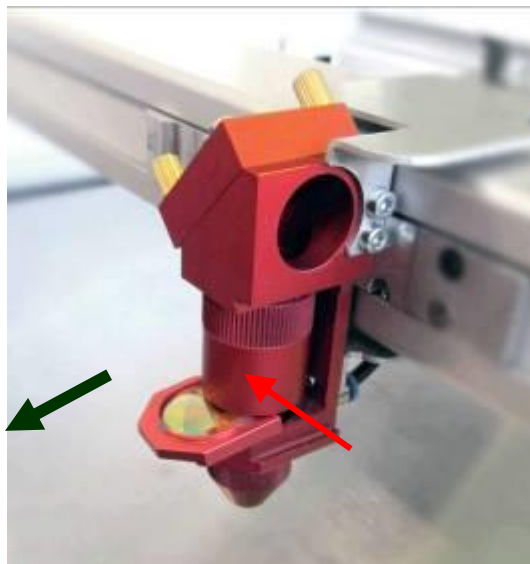
Lens cleaner Part number 69248

The lens has a durable multi-coating and won't be damaged by correct and careful cleaning. You should inspect the mirrors and the lens according the maintenance plan. If you discover a veil of haze or dirt, you must clean them.

Follow the instructions below for the cleaning of optical parts:

### 5.2.1 CLEANING THE LENS

1. Move the working table to a distance approx. 10 cm under the lens holder.
2. Move the working head into the center of the working surface and put a cloth under the lens holder (so that the lens is not damaged if it accidentally drops).
3. Now you can remove the lens by turning the fixing ring and pulling the lens assembly to the front.



4. Remove the coarse dust as good as possible by blowing air onto the lens surface.
5. Check the surface and if necessary clean the lens with the lens cleaning liquid and lens tissue.

6. Hold the lens assembly by its edge with a lens cleaning tissue and use a drop of lens cleaning liquid from the little bottle which you received as an accessory delivered with the laser. While holding the lens on an angle, flush both surfaces of the lens, to wash away coarse soiling.

7. Put the lens on a clean lens cleaning tissue. Put some lens cleaning liquid on one side of the lens. Leave the liquid to take effect for approximately one minute and then gently wipe it away with lens cleaning tissues soaked with lens cleaning liquid.

8. Finally, dry this side of the lens with dry lens cleaning tissues and repeat the cleaning process on the other side of the lens.



Never use a cleaning tissue twice. Dust accumulated in the cleaning tissue could scratch the lens surface.

9. Examine the lens. If it is still soiled, repeat the cleaning process until the lens is clean.

10. Carefully insert the lens holder with lens into the working head.



The rounded side (= convex) of the lens is facing upwards. This is guaranteed by the design of the lens holder.

11. Fix the lens holder carefully with the fixing ring.

## 5.2.2 CLEANING THE MIRRORS #2, #3 AND #4



There are two mirrors in the operating area of the laser, which may have to be cleaned if they are soiled. To clean the mirrors, follow the instructions below.

### MIRROR #2 and #3

1. The mirrors #2 and #3 are located on the right-hand side of the machine. To be able to access those mirrors, you must remove the right maintenance panel.

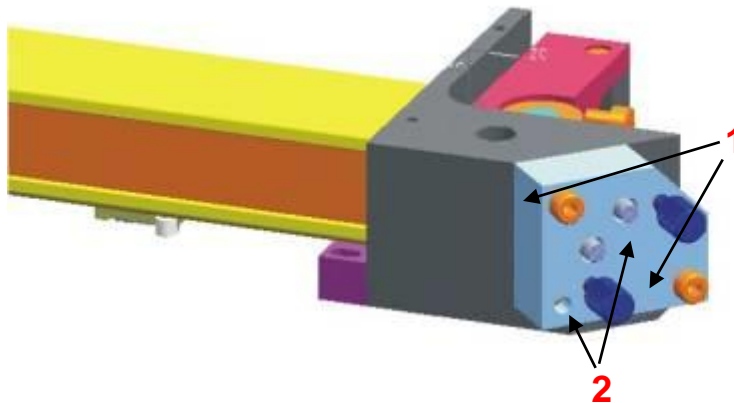


The laser must be switched off before the panel is removed!

2. The mirrors are attached by means of two Allen screws (1), which are located on the mirror holder. Open the screws and remove the lens holder together with the mirror. Do not touch the milled screws while doing this (2).



Make sure that you do not touch the mirror surface with your fingers as this reduces the mirror's working life significantly.



3. Use a drop of lens cleaning liquid from the accessories box and, while holding the mirror on an angle, flush the surface of the mirror, to wash away coarse soiling.
4. Put the mirror on a working surface. Put some drops of lens cleaning liquid on the mirror and leave the liquid take effect for approximately 1 minute.
5. Use a folded piece of lens cleaning tissue soaked with lens cleaning liquid and wipe gently over the mirror only once. Use a fresh lens cleaning tissue soaked with lens cleaning liquid each time and again wipe over the mirror only once. Then wipe the mirror dry with a

new dry lens cleaning tissue. Never use a cleaning tissue twice, as it could carry dust particles, which can scratch the mirror surface.

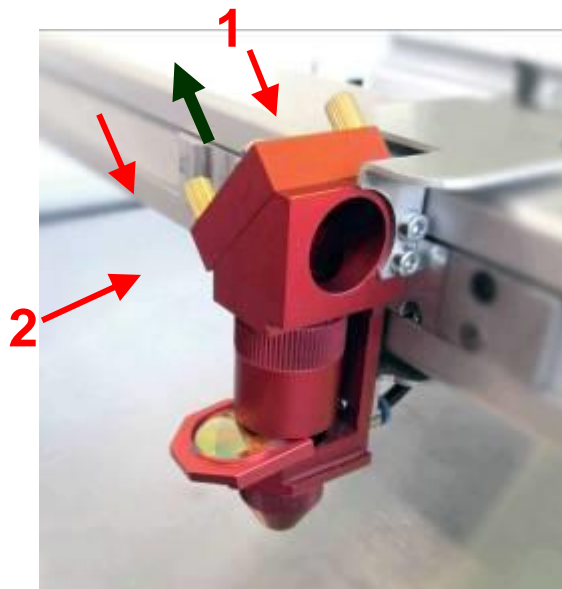
6. Examine the mirror and repeat the cleaning process, if necessary.
7. Replace the mirror and fix it again with the two Allen screws.

#### MIRROR #4

1. While holding the mirror, loosen the two knurled screws (1) and lift the mirror from the mirror holder (2).



Pay attention that the mirror doesn't grind over the mirror holder, as it can be scratched very easily.



2. Use a drop of lens cleaning liquid from the accessories box and, while holding the mirror on an angle, flush the surface of the mirror, to wash away coarse soiling.
3. Put the mirror on a working surface. Put some drops of lens cleaning liquid on the mirror and leave the liquid to take effect for approximately 1 minute.
4. Use a folded piece of lens cleaning tissue soaked with lens cleaning liquid and wipe gently over the mirror only once. Use a fresh lens cleaning tissue soaked with lens cleaning liquid each time and again wipe over the mirror only once. Then wipe the mirror dry with a new dry lens cleaning tissue. Never use a cleaning tissue twice, as it could carry dust particles, which can scratch the mirror surface.
5. Examine the mirror and repeat the cleaning process, if necessary.

6. Re-insert the mirror into the mirror holder by setting it straight onto the holder and tightening the knurled screws.

## 5.3 Maintenance Plan

	Daily	Weekly	Monthly	Yearly
<b>Laser</b>				
Lens, mirror #4	Check Cleaning if required			
Mirror #1, #2 and #3		Check Cleaning if required		
Working table and rulers		Cleaning		
Cover of the laser tube and housing		Cleaning		
Entire working area - general cleaning		Cleaning		
<b>Exhaust System</b>				
Bag filter	According to the operation manual of the exhaust system			
Filter mat				
Particle filter				
Activated carbon filter				

For detailed information on the maintenance activities on exhaust systems please refer to the respective manual.



## 5.4 Material Table



**Processing of the following materials is not permitted:**

Carbon, Polyvinyl chloride PVC, Polyvinyl butyral PVB, Polytetrafluorethylene PTFE (Teflon), carbon fiber, beryllium oxide and materials containing halogen (fluorine, chlo-rine, bromine, iodine and astatine), epoxy- or phenolic resins

**Take care when processing the following materials:**

"Manganese, chromium, nickel, cobalt, yttrium and lead. Material with the naming addition ""flame-retarding"" since it might contain bromine.



A list of material which can be processed can be found on our homepage or on your supplied installation DVD.

Any material not listed this the material list may only be processed with written approval of Trotec.

We recommend to run a material processing test with the above mentioned mate-rial using the appropriate configuration.

Trotec assumes no responsibility for any consequences of laser processing in any application such as medical or pharmaceutical applications.

## 5.5 Tips for Troubleshooting

**The machine does not react after activating the "ON" key.**

- Check the mains connection.
- Check the main fuses. They are located next to the mains connection socket. Replace defect fuses with fuses of the same type and value.

**No referencing is performed after switching on the machine. No acoustic signal can be heard.**

- Check if the top lid and other interlock-secured covers (front lid, maintenance panel) are tightly closed.

**The following error message is displayed when trying to establish a connection between JobControl and the machine: "Could not build up connection to the laser."**

- Check the cable connection between computer and machine.
- Make sure that you are actually using the correct serial interface COM 1 to COM 10 of your computer and that it is functional.
- Check the interface selection in "Options" in the "Settings" menu of JobControl.

**After starting a job the exhaust system is not switched on.**

- Check whether the exhaust system is connected with the mains socket.
- Check the cable connection between the machine and the exhaust system.

**A job, which was created with the graphics software, does not appear in the JobControl waiting list.**

- Check whether the sorting function "Kind" and "Resolution" are activated in the waiting list.
- Make sure that the directory "Spool" has been created in the directory of JobControl ("Trotec") and that the correct path to this directory has been set under "Options" in the "Settings" menu.

**A job transferred to JobControl does not contain any graphics,**

- Use the "Fit to page" option in the printer menu of your graphics software.

## 5.6 Acceptance report

Dear customer!

**We request your confirmation of properly completed transfer of the machine**

**Please transmit a copy of this document - filled out and signed by an authorized company representative - to an employee of our sales affiliate for forwarding to the manufacturer.**

**Thank you very much.**

Please check applicable items:

- ☐ Machine parts checked for shipping damage
- ☐ Machine parts checked against delivery note
- ☐ Setup of the machine discussed
- ☐ Startup of the machine discussed
- ☐ Operation of the machine discussed
- ☐ Maintenance of the machine discussed
- ☐ Electrical voltage checked
- ☐ Safety Instructions discussed
- ☐ Trial run performed
- ☐ Deficiencies determined

The machine with the  
machine designation: Speedy 400

has been checked according to the listed items and has  
been transferred properly.

---

City, Date

---

Company stamp / Signature

## 5.7 TRAINING SCHEDULE

Employee/Trainee:.....

Trainer: .....

Date of Training: .....

The above mentioned Employee received instruction on the operation of the Speedy 400 Lasersystem.

Especially the following topics are covered:

- Machine Function
- Danger Area
- Warnings
- Interlock System
- Taking into Service and Shutdown
- Work Flow
- Announcement of unexpected working result and the resulting procedure
- Announcement of Failure and instituting Procedure
- Responsibility on remedial measure
- Operation Manual and its depository for inspection
- Cleaning and Maintenance

.....  
 Signature of Trainer

.....  
 Signature of Trainee

## 5.8 Response Form

If you face any trouble with the machine, please provide the following information and add the service file (procedure on how to create a service file, is described on the following pages).

Date	
------	--

### Machine Details

Serial Number	
JobControl Version	
Driver Version	
Layout Software	
Firmware Version	

### Contact Details

First Name	
Last Name	
Country	
Phone	
Email	

### Problem Description

**Does an error message show up on the PC, if so which one?**

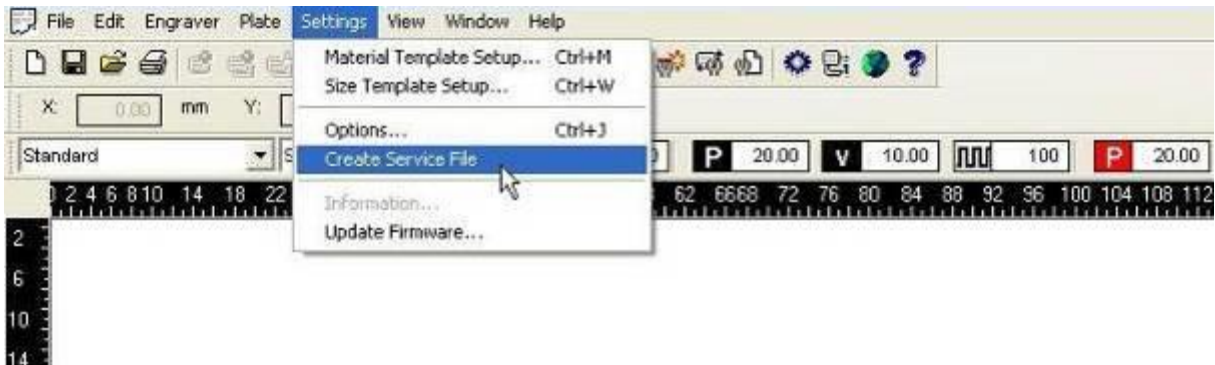
**What happened before the error appeared? (Thunder & Lightning, Windows-Update,...)**

**What was tried to solve the problem?**

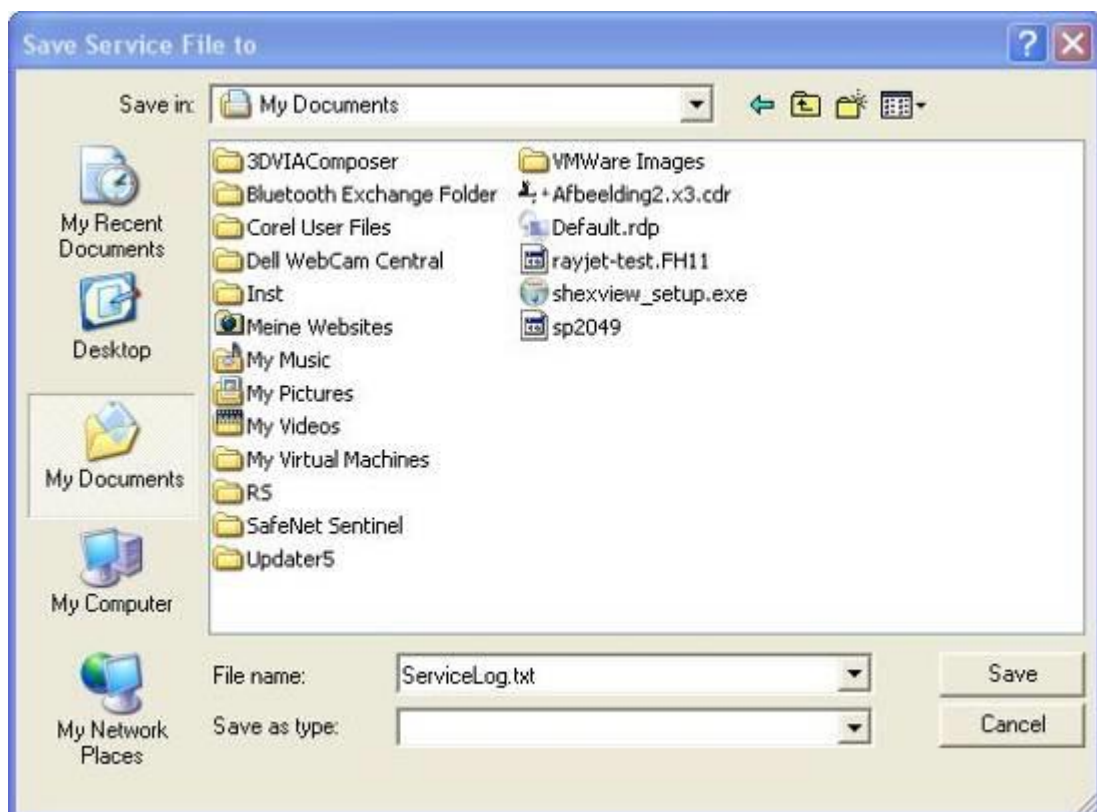
Please send the information to your sales representative or to [techsupport@troteclaser.com](mailto:techsupport@troteclaser.com).

## 5.9 How to create a Service File

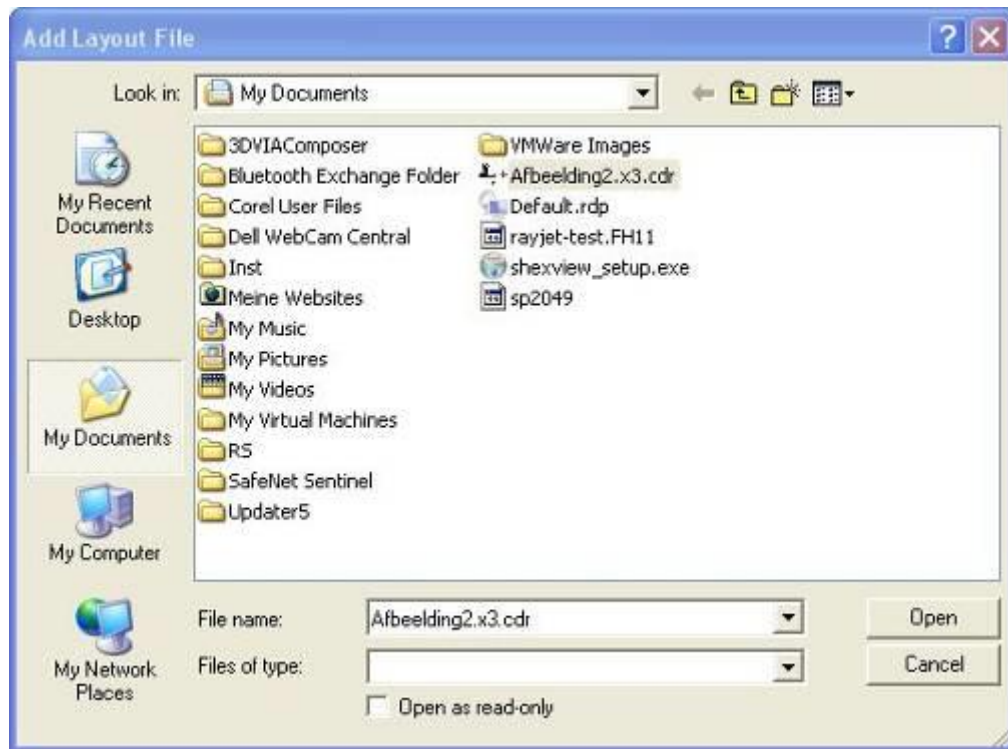
1. Start JobControl and go to Settings> Create Service File.



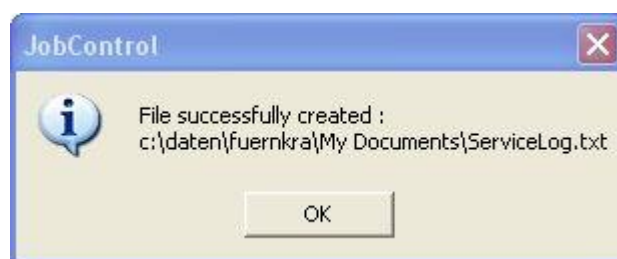
2. The window "Save Service File to" shows up. Please select a directory to save the file and click on "Save".



3. The window "Add Layout File" shows up. Please select the layout file, which was sent most recently to JobControl and possibly caused a failure (example: Corel file, Photoshop file, AutoCAD file,). Click on "Open".



4. The following window confirms, that the Service File (ServiceLog.txt) was created successfully.



5. Please send the Service File to your sales representative or to [techsupport@troteclaser.com](mailto:techsupport@troteclaser.com).

