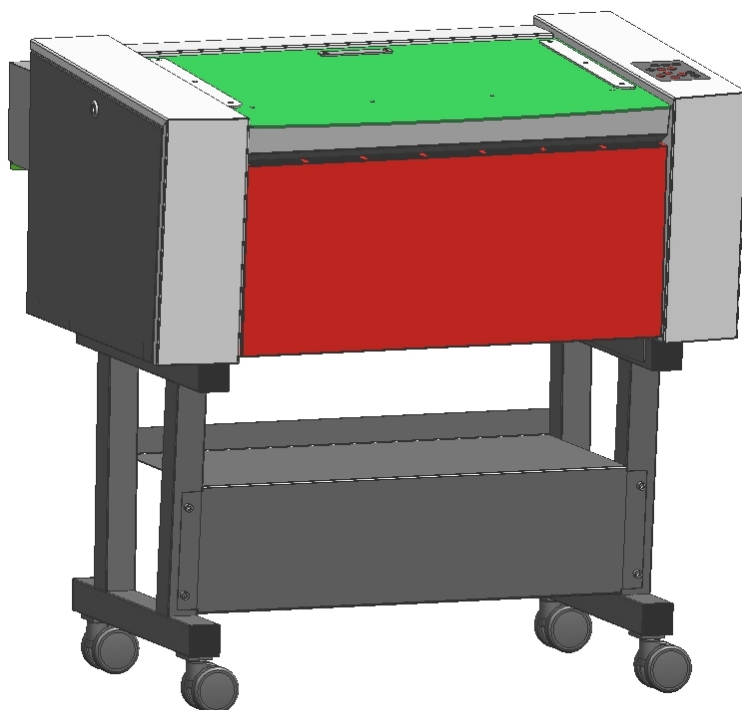




OPERATION MANUAL

8016 Trotec FP100 / 8016 Trotec FC100





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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 6.2 - 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.

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1 GENERAL

1.1 Operation Manual Use – General Information

Caution:

Please read and follow the instruction in 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, which simplifies the use or makes it more understandable.



1.2 Designated Use

The Trotec FP100 / FC100 is used for marking on metals and plastics. Many metals and most plastics will show interaction with the laser beam. However, very clean metallic surfaces which are highly polished and pure could show NO reaction. This is due to too high reflectivity at 1064nm wavelength which is given especially for silver and copper. In general, the FP model will react with more materials compared to the FC model.



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



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 possible 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!

Elektronic 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 / System Specification

Mechanic

Working area	610 x 305 mm / 24" x 12"
Max. height of work piece	ca. 125mm / app. 4.9"
Max. marking speed	200 cm/sec. / 78 inch/sec.
Motor	Brushless DC servo
Encoder	Increment
Work piece table	Solid metal (Ferro-magnetic)
Max. load of work piece	22 lb / 10 kg
Lenses available	3.2"

Features

Standard:

Red dot Laser Pointer, Ferro-Magnetic Table, 3.2" lens, USB

Optional:

Electro-Optic Autofocus, Rotary Attachment with cones, Trolley complete

Control System

Laser power	Adjustable from 0 - 100%
Interface Hardware	RS-232-C: Data Rate 19.200 -115.200 USB: Data Rate 460.800
Interface Software	ASCII, HPGL, JobControl

Laser Equipment

Laser source	FP100	Pulsed fiber laser, maintenance free, laser output: 10W, 20W
	FC100	CW-fiber laser, maintenance free, laser output: 10W, 20W
Wavelength		1062nm

Cooling System

Air cooling system	air-cooled
--------------------	------------

Electricity

Electricity	Single phase 230V/50Hz/ 6,3amps, or 115V/ 60Hz/10amps
-------------	---

Dimensions

Width/depth/height	974mm/730mm/457mm; 38.3 inches/28.8 inches/18 inches
Weight (approx.)	220 lb/ 100 kg for 10W, 20W version

Ambient Conditions

Ambient conditions	Ambient temperature +15 to +25° C, relative humidity up to max. 90%, non-condensing
--------------------	---

Laser Safety

Laser class	CDRH Laser Safety Laser Class 2 (incl. laser pointer), CE tested
Interlock	Duplicate Interlock safety system



Prerequisite for the installation:

Mains: AC voltage; 220 - 240 V; 50 Hz; 16A fuse rating

AC voltage; 100 - 120 V; 60 Hz; 15A fuse rating

Room temperature 15 ° to 25 °C

Air humidity <70%



1.5 Manufacturer's Label

The manufacturer's label is located on the back of the machine (see Figure below).



It is recommended to enter data such as serial number and year of manufacture into the manufacturer's label below so that you always have this data at hand if necessary,

trotec Laser	
Trotec Produktions- und Vertriebs Ges.m.b.H Linzer Straße 156, 4600 Wels, Austria	
Serial No:	
Model / Typ:	
Manufactured:	
	Input Power: Nominal Power: Lasertype: Wiring Diagram No: Laserdiode: <0,99mWcw, 655nm
 EN 60825-1 (2007) www.troteclaser.com	





1.6 EU – Declaration of conformity

The manufacturer

TROTEC Produktions- u. Vertriebs GmbH.
Linzer Strasse 156,
A-4600 Wels, OÖ.,
AUSTRIA

hereby declares that the following product

TROTEC 8016 FC100 / FP100
Model N° 8016 FC100 / FP100

has demonstrated conformity to the following guidelines:

2006/42/EG Directive for Machines
2006/95/EG Low Voltage Directive
2004/108/EG EMC Guideline

Applied during design and construction of this product:

- EN ISO12100 Machine Safety
- EN 60335-1/2007 Safety of Household and similar Appliances
- EN 55014-1/2006, EN 55014-2/1997 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 60950/2006 Safety of Electric Devices for Informatics including
electric Office Machines
- EN 55022/2008, EN 55024/2003 Electromagnetic Compatibility

Wels,

Trotec Produktions u. Vertriebs Ges.m.b.H



2 SAFETY

Please read this chapter before operating or servicing a Trotec FP100 / FC100 laser system!

2.1 General Safety Information

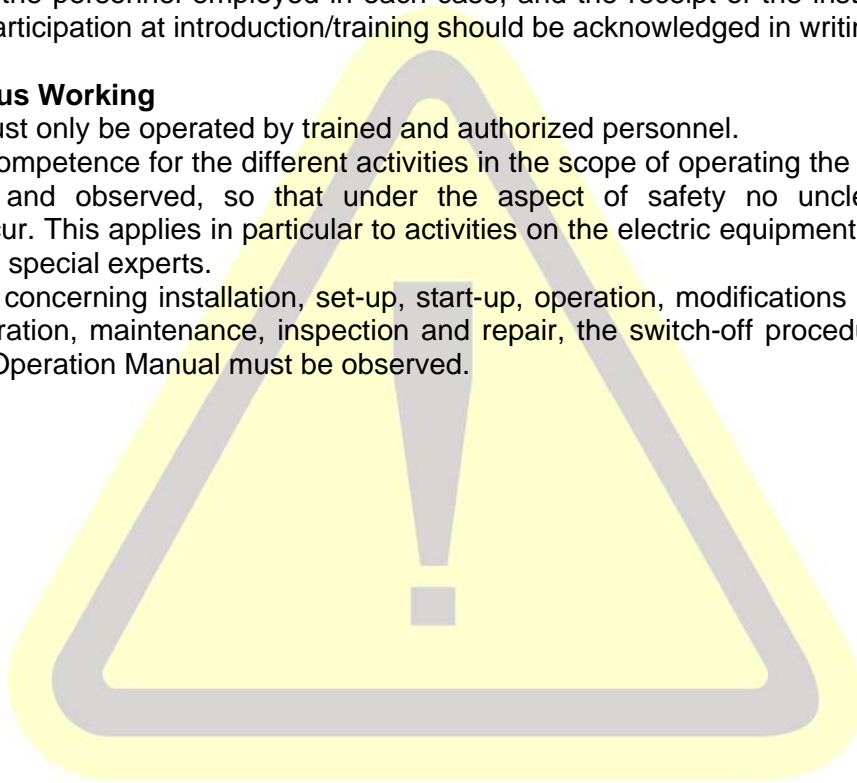
All personnel involved in installation, set-up, operation maintenance and repair of the machine, must have read and understood the Operation Manual and in particular the "SAFETY" section. The user is recommended to generate company-internal instructions considering the professional qualifications of 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 work 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 is responsible 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 by trained personnel while the equipment is switched off.
- 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 FP100 / FC100 is a machine of **class 2 (USA: Class II)**. This is guaranteed by the protective housing and the safety installations. Please note that improper operation of the machine can override the status of safety class 2 and can cause the emission of harmful laser radiation.

Class IIM laser products



Designation "M" indicates the use of magnification optics. The magnification collects additional laser radiation into the eye. Designed for benefit of expanded beams. Class 2M is for visible wavelengths safe for momentary viewing (up to 0.25 seconds) without optical aids and emission levels up to Class 3B AEL.



This laser marking system contains an **YTTERBIUM FIBER 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 retina for NIR (Near Infra Red) LASER lasers
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 are required to wear standard laser safety glasses for **NIR (Near Infra Red) LASER** lasers (wavelength 1060 nm) whenever working on open laser beam.



Dangerous radiation exposure can result from the use of materials other than described in Section 1.2 Designated Use:

In case of using highly reflecting materials like



- blank or polished metals
- metals with very high reflectivity like copper, brass, gold, silver
- any materials with highly reflecting coatings
- other highly reflecting materials,

especially in combination with high laser power, low processing speed and/or work pieces with curved or inclined surfaces, laser radiation might be reflected towards the protection cover. With a very low probability this protection cover could be damaged if the reflected radiation is **FOCUSSED** onto the surface of the protection cover.

Therefore visual inspection for point-like defects on the protection cover should be done if the aforementioned conditions are given.

The loss of yellow color on the protection cover indicates a damage of the protecting layer. If you detect such effects, immediately turn off the laser machine and take care to get a new protection cover.

Also other components inside the machine may be damaged if the aforementioned conditions are given. To improve laser safety an optional "Laser Protection Cover" is available on request.





2.3 Safety Precautions when Operating the Machine

In your Trotec FP100 / FC100, 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 marking can occur if the cover is opened during operation. Therefore, first press the "PAUSE" button, if you want to interrupt a marking process.

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

A fire extinguisher must always be at hand as the laser beam can ignite flammable materials. Do not store any flammable materials in the inside of the machine or in the immediate vicinity of the machine.

Unsupervised operation of the system is not permitted.

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 local Trotec dealer or TROTEC.

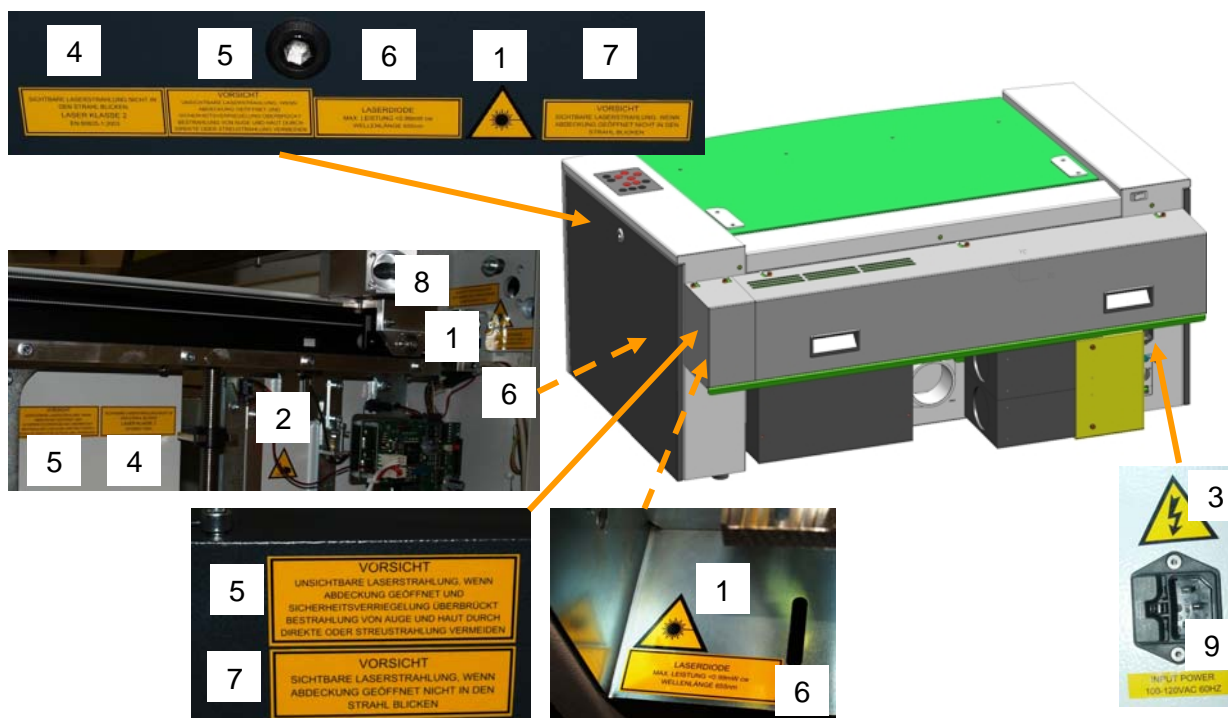





2.4 Warning and Information Labels

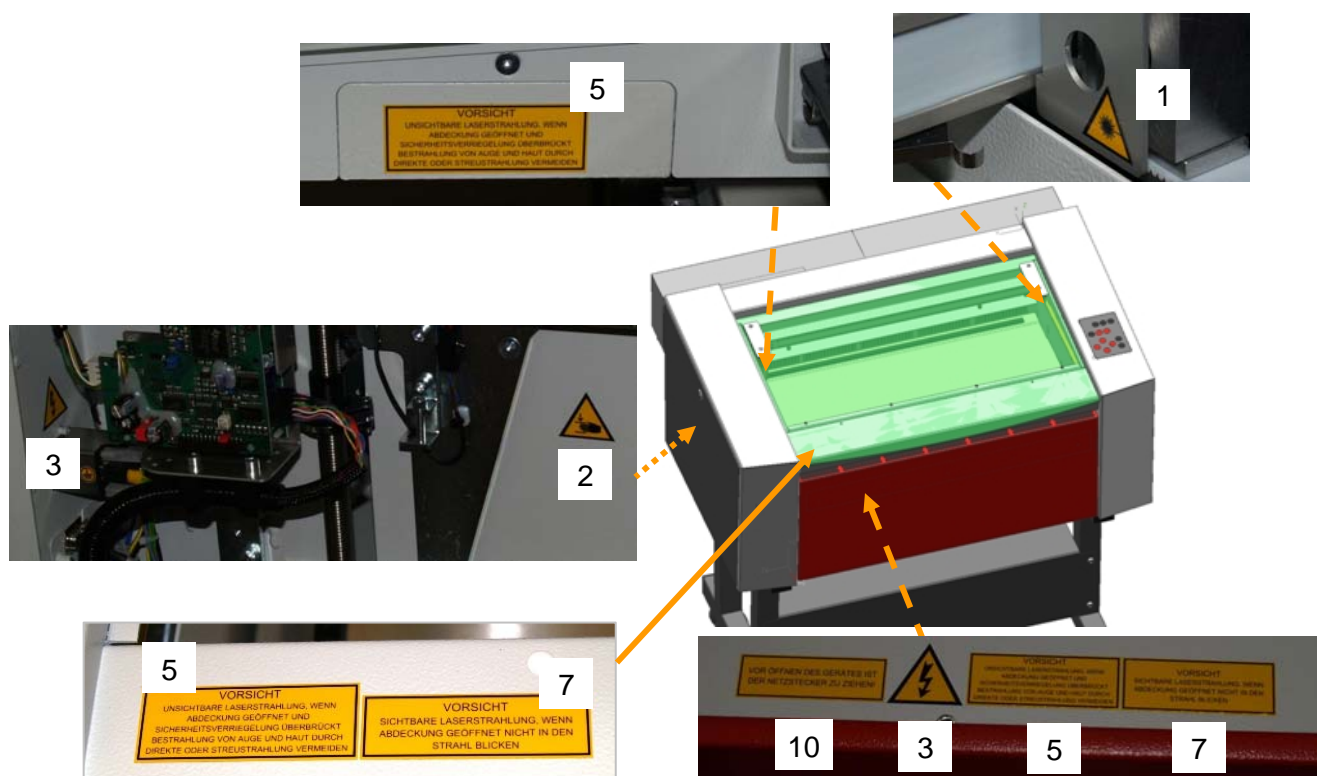


The warning and information labels are attached in such positions of the machine that could represent a source of danger during set-up and operation. Therefore, follow the information on the labels. If labels are lost or damaged, they must be replaced immediately.

1		6	LASERDIODE MAX. POWER <0.99mW cw WAVELENGTH 655nm
2		7	CAUTION VISIBLE LASER RADIATION WHEN OPEN DO NOT STARE INTO BEAM
3		8	LASER APERTURE
4	VISIBLE LASER RADIATION DO NOT STARE INTO THE BEAM CLASS 2 LASER PRODUCT EN 60825-1:2003	9	INPUT POWER 220-240VAC 50HZ
5	CAUTION INVISIBLE CLASS 4 LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION	10	BEFORE OPEN UNPLUG THE MASCHINE FIRST



1		6	LASERDIODE MAX. POWER <0.99mW cw WAVELENGTH 655nm
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5	CAUTION INVISIBLE CLASS 4 LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION	10	BEFORE OPEN UNPLUG THE MASCHINE FIRST





3 BEFORE OPERATION

3.1 Unpacking

You receive your Trotec laser machine packed in a cardboard box or wooden box, which contains the laser and additional accessories. The following steps give you an overview of the unpacking and assembly of the laser. Please follow these steps carefully.



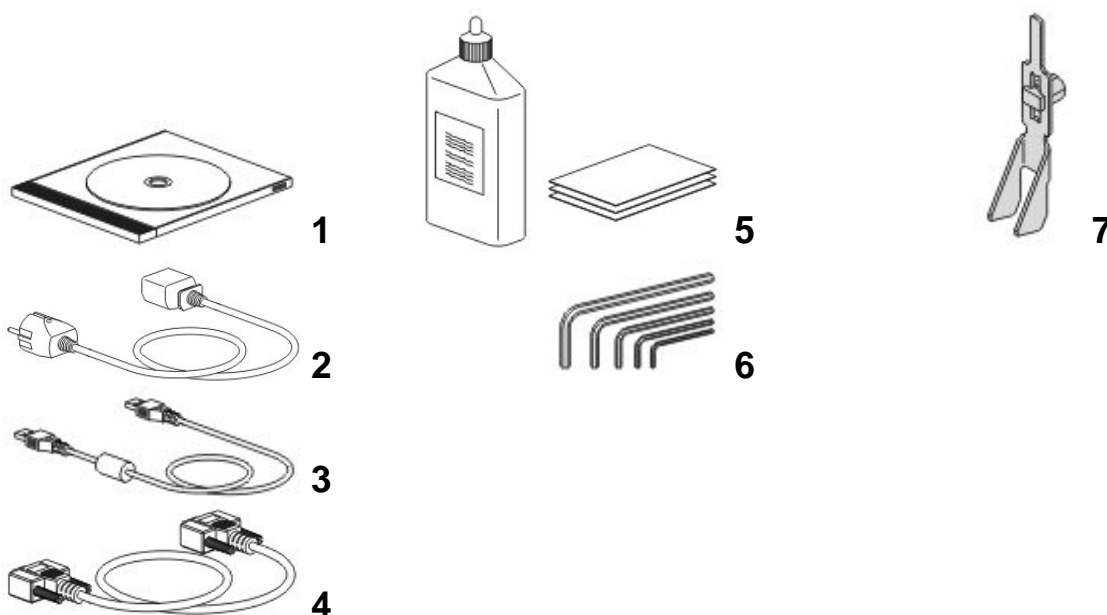
Keep the packing box. You will require it in case of a return.
Dispose all waste according to the applicable waste disposal law.

1. Remove the cover. Please do not forget to store this box in a dry place.
2. Carefully remove the foam material, which protects the viewing window of the cover.
3. Lift the laser marker out of the box. For this you will require two persons. Position the laser marker on a stable table or the delivered stand (optional).
4. Remove the accessories box which contains all parts required for the installation of the laser system.
5. Open the accessories box.



3.2 Contents of Delivery

- Transport and service packaging
- Laser inclusive optics
- Stand (optional)
- Accessories box, containing:
 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. Allen key set 1.5 - 10 mm
 7. Focus tool(s)



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 machines via the laser fuse, as the laser marker 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 marker 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 Exhaust System – Requirements



Do not start the machine without an adequate exhaust system.

3.5 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)
- 512 MB of RAM, 400 MB of hard disk space
- Pentium® 1 GHz processor or AMD Athlon™ XP
- 1024 x 768 or better monitor resolution
- 24-bit color depth graphics card
- 1 free USB interface
- Serial port RS232 (optional)
- CD drive
- Mouse



3.6 Connections



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

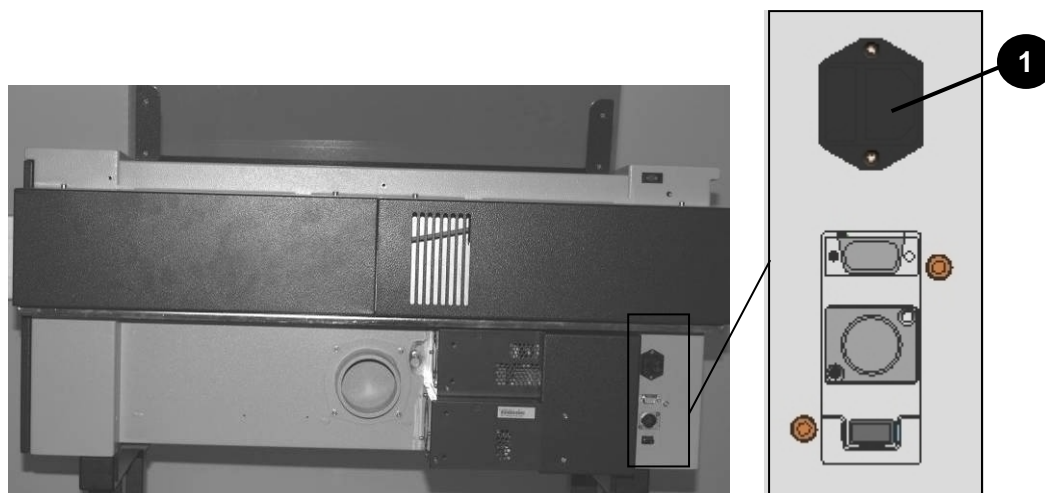
3.6.1 Connecting the Mains

Connect one end of the mains cable with the connection socket at the rear side of the laser machine **(1)** 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.

Never switch on the machine if the voltages do not correspond.



Example

INPUT POWER
220-240VAC, 3.6A, 50Hz



The main fuses are located inside the connection socket and are accessible from the exterior.



3.6.2 Connecting the Computer



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

Connect the laser to a free serial **(1)** or USB **(2)** interface on your computer using the cable from the accessories box.



3.6.3 Connecting the Exhaust System

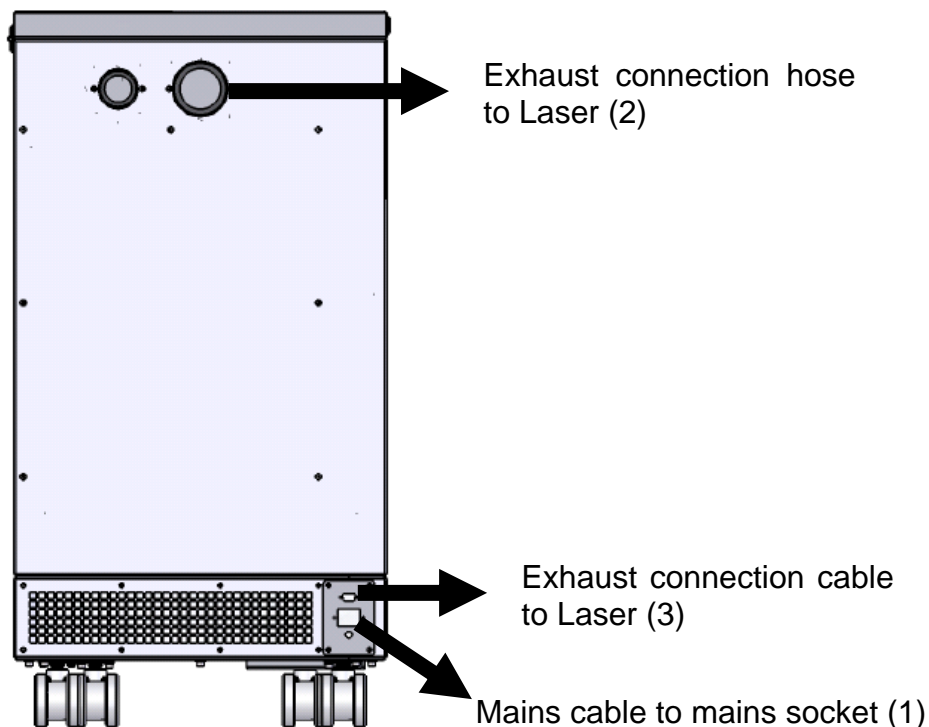
- Connect your exhaust system to the mains socket (1).



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

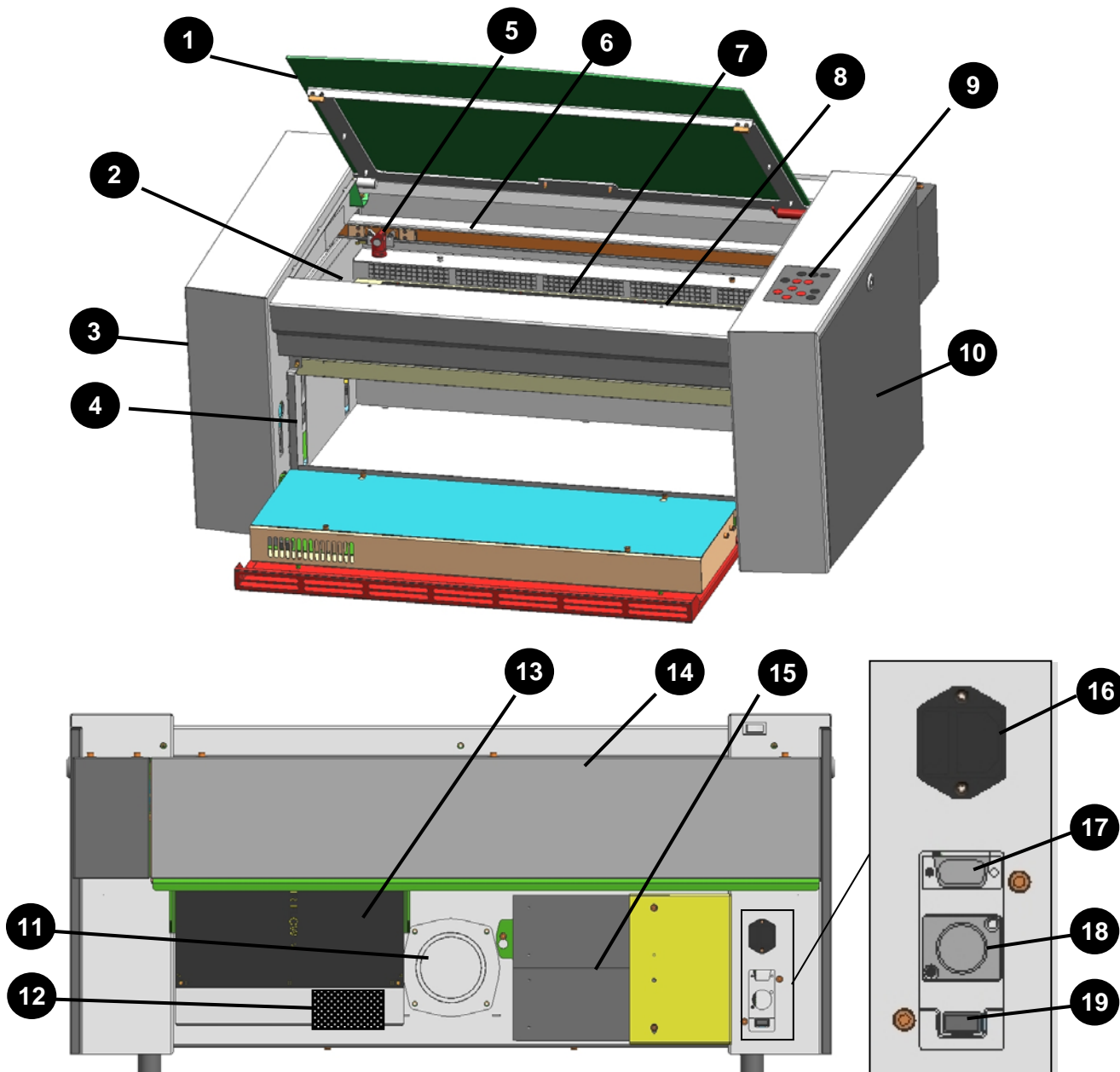
- Plug the ends of the exhaust duct into the allocated connection (2). The position of the connector depends on the type of exhaust system.
- When using the TROTEC exhaust system, also connect it with the cable included to the remote control connector of the laser (3).

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



4 OPERATION

4.1 Machine view and connections



- 1 Top lid
- 2 Autofocus sensor
- 3 Service access panel
- 4 Connection Socket for Rotary
- 5 Focusing head
- 6 X-axis
- 7 Ruler
- 8 Working table
- 9 Keypad
- 10 Maintenance panel

- 11 Exhaust hose connector
- 12 Manufacturers label
- 13 Laser module (Rack)
- 14 Laser collimator cover
- 15 Power supply
- 16 Power socket and fuses
- 17 PC connection cable (Serial)
- 18 Exhaust connection cable
- 19 PC connection cable (USB)



OPERATION

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 Light Barriers – Autofocus sensor



Used for the automatic focusing of the work piece (optional).

3 Service Access Panel



Only to be opened by trained technical service personnel.

4 Connection Socket for Rotary Engraving Attachment



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

5 Focusing head



The lens that focuses the laser beam onto the material is mounted inside the focusing head.

6 X axis



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

7 Ruler



Used to align material and measure it.



8 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.

9 Keypad



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

10 Maintenance Panel



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

11 Exhaust hose connector

12 Manufacturer's Label



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

13 Laser Module (Rack)

14 Laser collimator cover

15 Power Supply



Changes the main power to power types suitable for the mechanic and electronic parts of the machine.

16 Power Socket



To connect the main power according the information on the manufacturers label. In the Power Socket are the fuses.

17 PC connection cable (Serial)

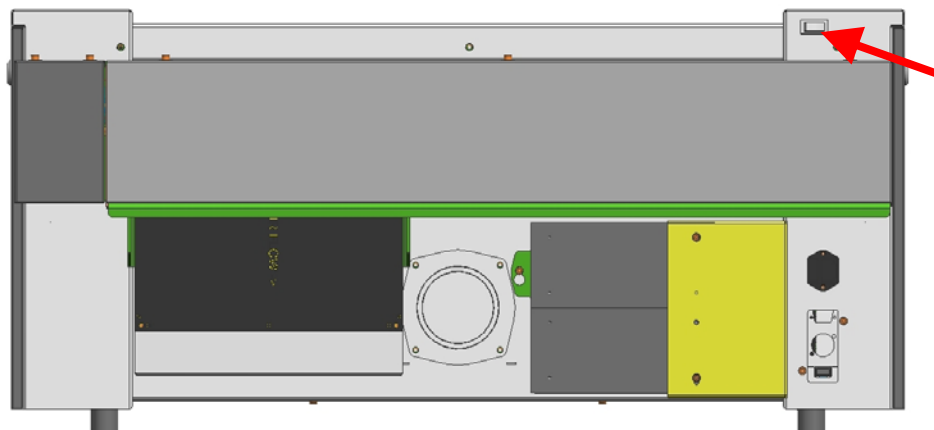
18 Exhaust connection cable

19 PC connection cable (USB)



4.2 Power switch (ON / OFF)

Switches the mains supply ON/OFF.



Before switching on the machine, 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 machine.

The following conditions must be fulfilled for correct start up:

- unrestricted freedom of motion of the mechanics
- protection cover closed

If the protection cover is open, an acoustic signal sounds and the status display (9) flashes fast in green.

Immediately after being switched on, the machine starts the referencing process.

If the referencing process is completed correctly, an acoustic signal sounds and the machine is ready for operation.

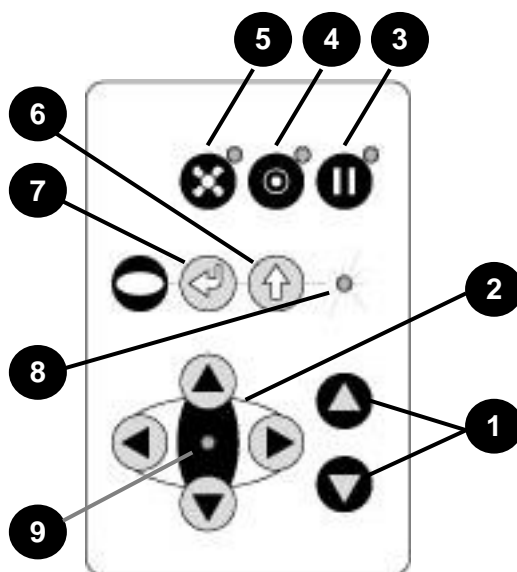
The readiness for operation is additionally displayed by green (slow) flashing of status display (9).



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



4.3 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 work piece manually.

When both keys are pressed simultaneously, the material is focused automatically (only with light barriers = option).

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 ne suppressed to prevent a collision between the nozzle and the table.

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 are pressed, no moves in Z are possible.

An automatic move of the Z- axis can be stopped by pressing any 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.

The status display (9) of the device is located in the center of the key pad.

3 PAUSE



Used to stop the current working process (key lights up). As soon as the last processing command is finished, the motion system moves to the top-left position.

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

4 STANDBY



Switches the device into Standby mode (Laser ready) – 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).



OPERATION

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” (TEST) 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
- Pause (3)
Stops the job program immediately
- Positioning keys X/Y/Z (2):
These keys drive the laser head to the end position
- Repeat
Tests the laser source for proper function (acoustic signal sounds simultaneously)

7 START (REPEAT)



By pressing “Start (Repeat)”, the jobs which are currently positioned on the selected plate in the Trotec JobControl are started.
If the jobs have been processed before, they will be reset automatically.

8 STATUS INDICATOR LASER BEAM



Indicates, that a laser beam is currently being emitted.

9 STATUS DISPLAY



Indicates the current status of the device:

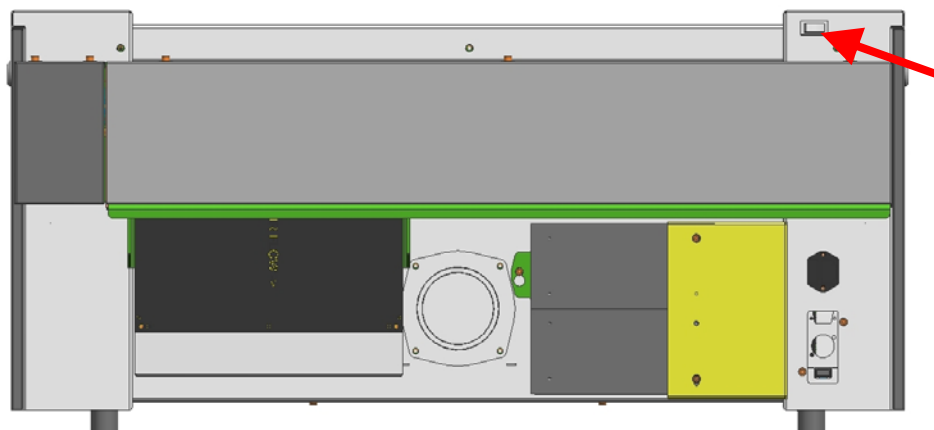
green, flashing slowly (0.5 Hz)	9	Machine is ready
green, flashing fast (2 Hz)	9	Cover has been opened
green permanent light / Pause mode	9	Data available in the machine
red permanent light	8	Laser beam is being emitted
green/red flashing alternately	8+9	Cover open during switch-on process, simultaneously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



4.4 First Steps before Marking

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

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



2. 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 marking table against the horizontal and vertical rulers. However, any other position on the marking table is also possible.

4. Focusing the Laser Beam



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

For optimal processing the surface of the material that you want to mark, must be adjusted to the focusing point.

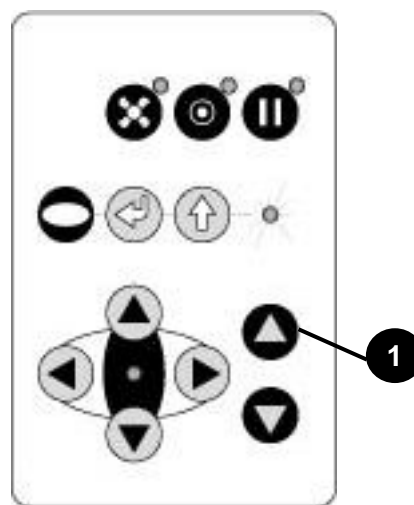


There are three methods to focus the laser beam:

- A:** Manual focusing
- B:** Focusing by software
- C:** Automatic focusing by means of light barriers (optional)

To **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 **(1)**. 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.



To **B** – Focusing by software:

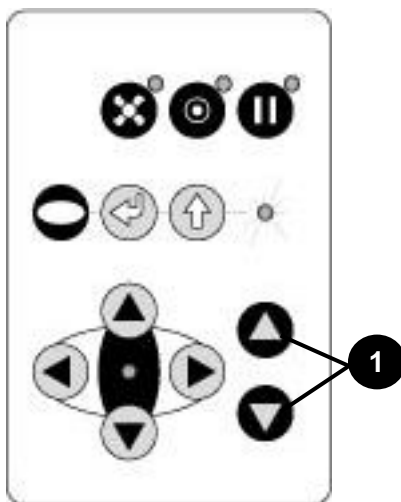
- B1. Click the icon “focus laser” in the Trotec JobControl
The working table moves in Z direction.
The following values are used to determine the focus position and therefore always have to be checked before using this focus option:
- material thickness (specify the value as accurate as possible)
 - 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.

- C1. By pressing the two keys for Z positioning **(1)** 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).



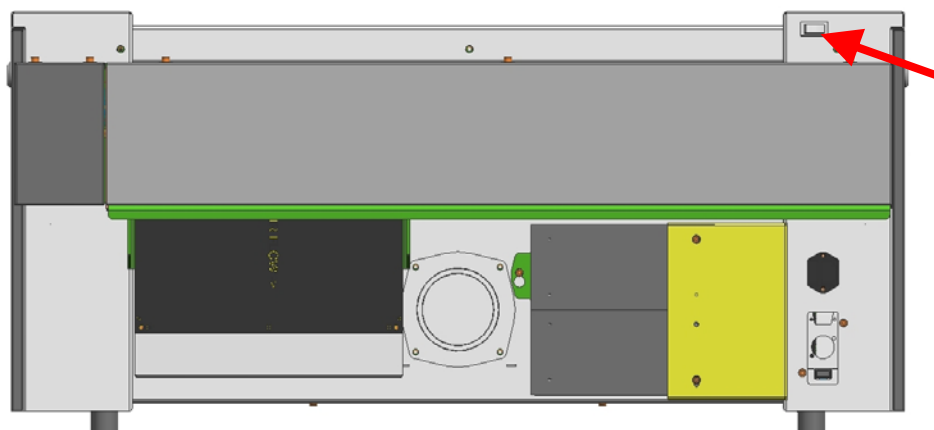
When the air assist nozzle is installed, the optical autofocus does not work.



4.5 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 machine.



2. Put the object to be marked into the laser and move into the desired position on the table. Usually the object is positioned in the upper left-hand corner. Use the rulers to determine the dimensions of the object to be marked.
3. With the positioning keys the lens is positioned over the material to be marked. You focus with the help of the focusing tool or by auto focus (see page 30 ongoing).



OPERATION

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 Trotec 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 the TROTEC JobControl.
6. After the marking material, the marking direction, the 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 marking position on the marking table.

Make sure that on marking flammable materials the air assist is on!

7. Establish a connection with the laser system 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 marking process.
10. While the laser is marking, you can generate the next graphic.
11. When the marking 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.
 - Job reset and immediate repeat.



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



You should check at least once a day, whether dust has accumulated in the marking 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 machine. 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 marking 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 machine 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 housing.
5. You can clean the viewing window 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
Lens cleaner

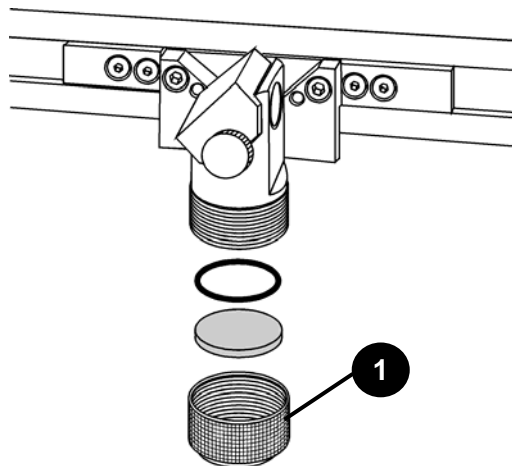
Part number 69249
Part number 69248

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 falls out of its holder).
3. Now you can unscrew the lens holder **(1)**.



4. Once positioned over a clean lens cleaning tissue, remove the lens from the lens holder by carefully turning the lens holder and letting the lens and the O-ring drop onto the cleaning cloth.
5. Examine the O-ring and, if necessary, clean it with a cotton bud and a lens cleaning tissue.
6. Remove the coarse dust as good as possible by blowing air onto the lens surface.
7. Check the surface and if necessary clean the lens with the lens cleaning liquid and lens tissue.



MAINTENANCE

8. 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.
9. 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.
10. 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.

11. Examine the lens. If it is still soiled, repeat the cleaning process until the lens is clean.
12. Carefully insert the lens into the lens holder.



Ensure, that the rounded side (= convex) of the lens is facing upwards. Then put the O-ring on top of the lens.

13. Carefully assemble the lens in reverse order.



5.2.2 CLEANING THE MIRRORS



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

1. The mirror # 2 is located on the right-hand side of the machine. To be able to access mirror #2, you must remove the right maintenance panel by using the delivered Allen key.

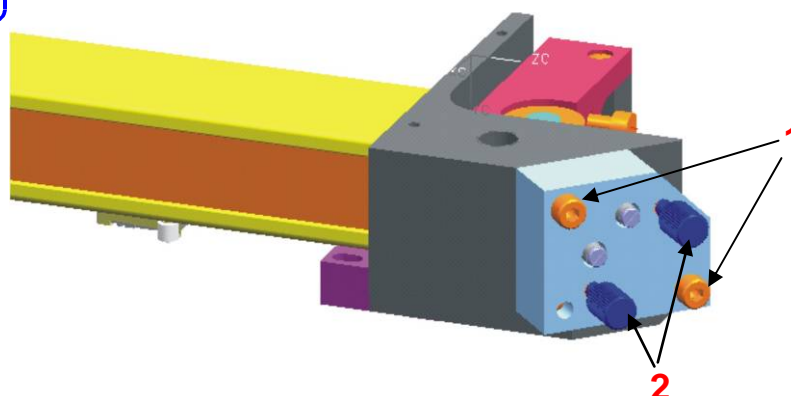


The laser must be switched off before the cover is removed!

2. The mirror # 2 is 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.



MIRROR #3

Mirror #3 is situated on the working head.

1. While holding the mirror, loosen the big screw (1) and lift the mirror from the laser head.



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 screw.





5.3 Maintenance Plan

	daily	weekly	monthly	yearly
Laser				
Lens, mirror 3	Check Cleaning if required			
Mirror 2		Check Cleaning if required		
Marking table and rulers	Cleaning			
Cover of the laser tube and housing			Cleaning	
Entire working area – general cleaning			Cleaning	
Exhaust System				
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.



6 ADDITIONAL INFORMATION

6.1 Material Table

Legend:			
Quality:		Process.	
Perfect	+++	Annealing	A
Working well	++	Engraving	E
No good quality	+	Color Change	CC
Quite bad	+-	not applicable	n/a
Not reacting	-		
Back reflection (in rare cases)	?		

	FC100		FP100	
	Quality	Process	Quality	Process
Metals:				
Aluminum:	-	n/a	++	E
Aluminum anodized:	++	E	++	E
Brass:	+	A	++	E
Brass polished:	- / ??	n/a	++	E
Chromate:	++ / ??	A	++	A / E
Copper:	- / ??	n/a	++	E
Copper polished:	- / ??	n/a	++	E
Gold:	-	n/a	++	A / E
High-speed steel:	++	A	++	A / E
Silver:	-	n/a	++	E
Stainless steel brushed:	++ / ??	A	++	A / E
Stainless steel polished:	++ / ??	A	++	A / E
Titanium:	++ / ??	A	++	A / E
Nonmetals:				
Ceramic:	-	n/a	+	CC
Food:	-	n/a	-	n/a
Glass:	-	n/a	-	n/a
Leather:	-	n/a	+	E
Mirror:	-	n/a	++	E
Paper:	-	n/a	++	E
Plastics:	+	CC	++	CC
Rubber:	-	n/a	++	CC
Stone:	-	n/a	-	n/a
Wood:	-	n/a	-	n/a



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.





6.2 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 (maintenance panel) are tightly closed.
- The following error message is displayed when trying to establish a connection between the JobControl and 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.





6.3 Acceptance report

Dear customer!

Please check applicable items:

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.

- ☐ 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

Thank you very much.

The machine with the

machine designation: FP100/FC100

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

City, Date

Company stamp / Signature





6.4 TRAINING SCHEDULE

Employee/Trainee:

Trainer:

Date of Training:

The above mentioned Employee received instruction on the operation of the FP100/FC100 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





6.5 Response Form

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

Date	
------	--

Machine Details

Serialnumber	
JobControl Version	
Driver Version	
Layout Software	
Firmware Version	

Contact Details

Name	
Country	
Phone Number	
Email address	

Problem Description

--

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

--

What happened before the error showed up? (Thunder&Lighting, Windows-Update,...)

--

What was tried to solve the problem?

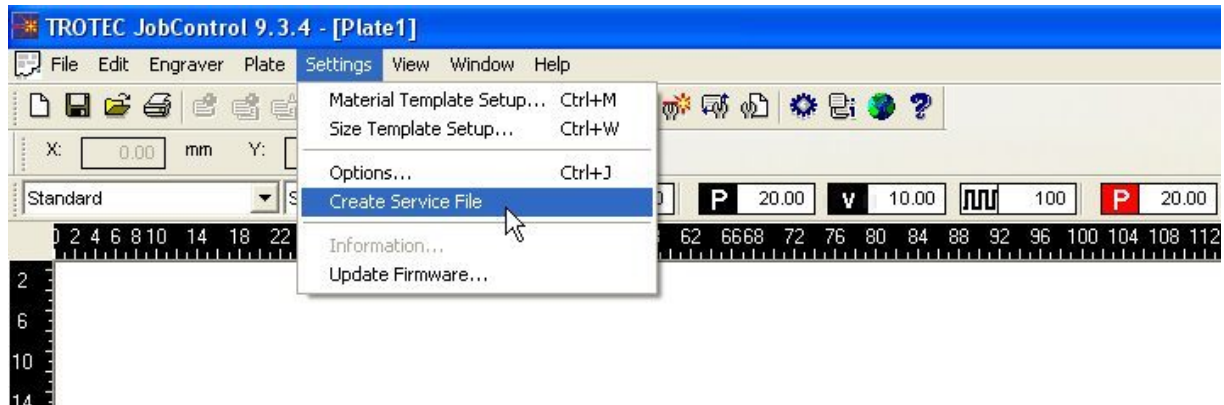
--

Please send the information to your sales representative or to techsupport@troteclaser.com.

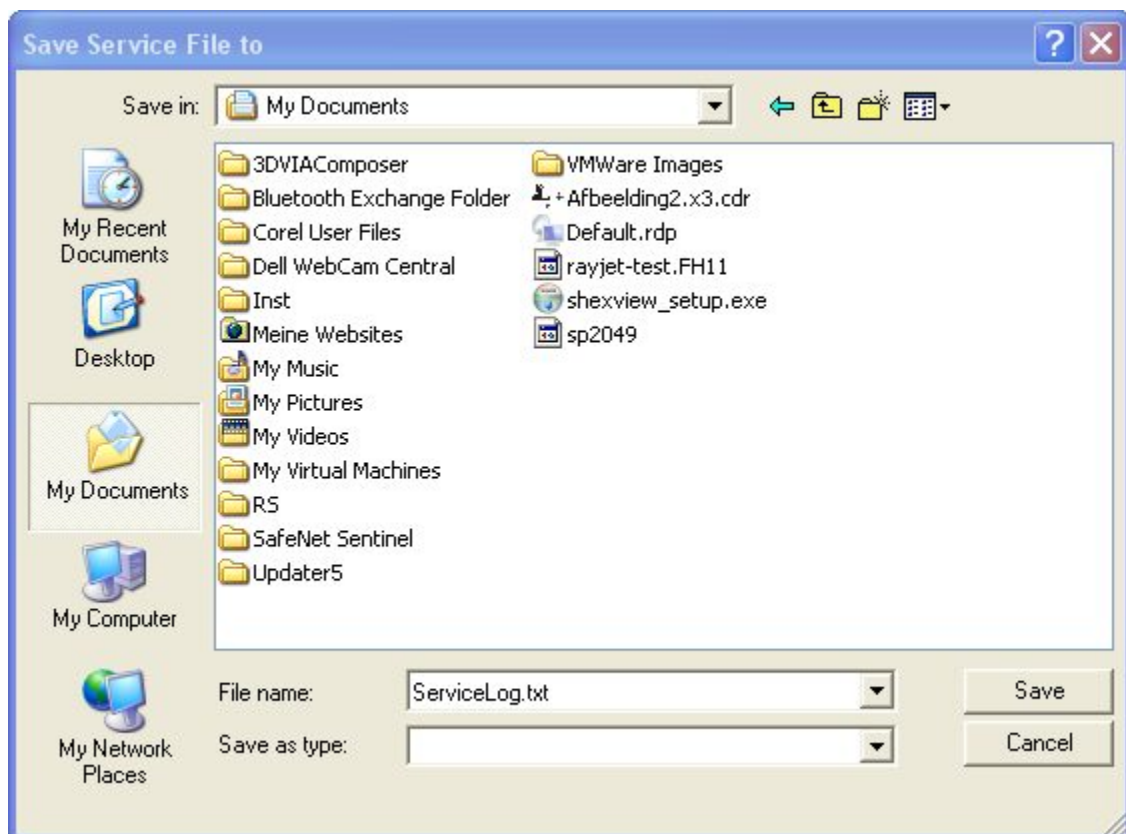


6.6 How to create a Service File

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

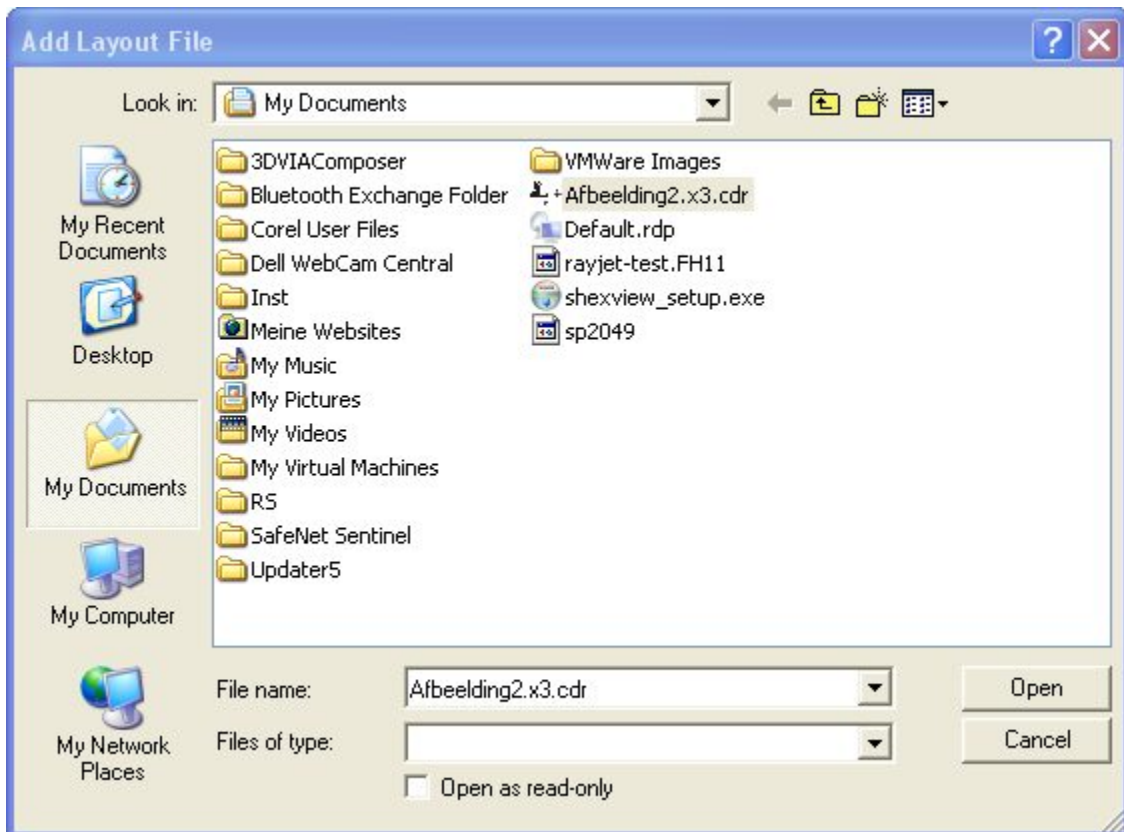


2. The window „Save Service File to“ shows up. Please select a directory to save the file and click on „Save“.

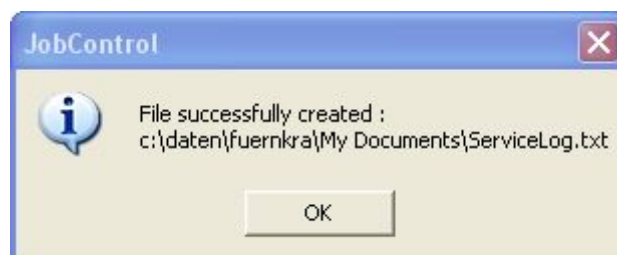


ADDITIONAL INFORMATION

- 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“.



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



- Please send the Service File to your sales representative or to techsupport@troteclaser.com.

