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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 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.

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

The TROTEC Laserati, is used for engraving and cutting of stamps. Different kinds of laser rubber can be processed such as the rubber types distributed by TROTEC and TRODAT. Other flexible Materials which could possibly be used must be approved by TROTEC before.

The engraving process must only be performed with a perfectly adjusted machine (see also Section 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 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 / Device Specification

### Mechanic
- **Working area**: 840 x 300 mm / 33” x 11.8”
- **Max. height of workpiece**: 6.3 mm / 0.25”
- **Max. engraving speed**: 150 cm/sec. / 79 inch/sec.
- **Cutting speed**: depending on material, thickness, laser power
- **Motor**: Brushless DC Servo motor
- **Encoder Increment**:
- **Work piece mounting method**: Vacuum and mechanical clamps
- **Optics, Lens**: 1.5” lens, air purged, all optic elements are covered

### Features
- **Vacuum drum(S)**, all optic elements covered(S), Mac compatibility (S), Air assist (S)

### Control system
- **Laser power**: Adjustable from 0 - 100% (typically 10% to 100%)
- **Interface Hardware**: Ethernet, USB
- **Interface Software**: PDF, EPS, PS, Bitmaps

### Laser Equipment
- **Laser tube**: One or two sealed off CO₂ Lasers (closed gas volume), maintenance free, laser output 100 or 200W
- **Wavelength**: 10.6µm

### Cooling system
- **Water cooling system**: All systems with a water cooling unit as a standard.

### Electricity
- **100 and 200 Watt version**: Three phase 230V/ 50-60Hz or 115V/ 50-60 Hz

### Dimensions
- **Width/depth/height**: 142 x 85 x 142 cm / 55.2 x 31.5 x 55.9 inch
- **Weight (approx.)**: approx. 500 kg (180 W unit)

### Ambient conditions
- **Operating temperature**: +15 to +25°C
- **Humidity**: 40% to max 70%, not condensing

### Laser Safety
- **Laser class**: CDRH Laser Safety Class 1
- **Interlock**: Duplicate Interlock safety system
1.5 Manufacturer's Label

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

![Manufacturer's Label Image]

It is recommended to enter data such as serial number and year of manufacture into the manufacturer's label 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

The manufacturer

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

hereby declares that the following product

TROTEC 8008 Laserati
Model N° 8008 Laserati C100/150/180

has demonstrated conformity to the following guidelines:

- 2006/42/EG Directive for Machines
- 2006/95/EG Low Voltage Directive
- 2004/108/EG EMC Guideline
- EN ISO12100 Machine Safety
- EN 60335-1/2007 Safety of Household and similar Appliances
- 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

cesticker.png
2 SAFETY

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 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. Laserati is a device of class 2 (USA: Class II). This is guaranteed by the protective housing and the safety installations. 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\textsubscript{2}) 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
- **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\textsubscript{2} lasers (wavelength 10.6 \textmu m).
2.3 Safety Precautions when Operating the Device

In your Laserati, 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 many metals, in particular un-coated aluminum, copper, silver and gold cannot be processed with the laser and lead to high reflections of the laser beam. Such materials must not be inserted into the beam, as a directed reflection could destroy the protection cover.

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 device 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.

![Warning and Information Labels](image)
CLASS 2 LASER PRODUCT
EN 60825-1:2007

CO2 laser
Power Range 40-400 W
Wavelength 10600 nm
CAUTION
CLASS 4 INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED
AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION

BEFORE OPEN UNPLUG THE MACHINE FIRST

INPUT POWER
380-400VAC 50HZ
CAUTION
CLASS 4 INVISIBLE LASER RADIATION
WHEN OPEN AND INTERLOCKS
DEFEATED
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

BEFORE OPEN UNPLUG
THE MASCHINE FIRST
CAUTION
CLASS 4 INVISIBLE LASER RADIATION
WHEN OPEN
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION
3 BEFORE OPERATION

3.1 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:
- laser engraver
- extractor
- water chiller

Fuse rating 16A/25A / slow characteristics.

Please install your computer to the same circuit as the laser engraver 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.
3.2 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 engraver to the sun. Use blinds, if required.

- Select a location close to ventilation (if available).

- Select a location where you can place a small table at the right side of the machine for monitor, keyboard and mouse.

- 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.
3.3 Exhaust System – Requirements

Trotec specifies the *Atmos Duo Plus* to be used for the Laserati.

**DAMAGE CAUSED TO THE SYSTEM BY THE USE OF IMPROPER EXTRACTION EQUIPMENT WILL NOT BE COVERED UNDER WARRANTY**

**NEVER** operate the laser engraving system without a properly installed and operating exhaust system. Some materials when cut or engraved can produce fumes that are hazardous in concentrated amounts.

DO NOT install forward incline, backward incline, in-line, or ventilator fans because these types of air handlers are inadequate and inappropriate for this type of installation. If your contractor has any questions concerning blower specifications or exhaust system requirements, please contact our Support Department directly before installation.

3.4 Cooling System – Requirements

For units with water-cooled laser sources the installation of a cooling aggregate is required.

3.5 Network and Computer – Requirements

The Engraver should be connected to an Ethernet network as it gets the artwork files from computers in this network. In principle it would be possible to load the files from a USB-stick but this is recommended only if the network should be not available for some special reason.

Computers used for preparing the engraving artwork files should meet the **minimum requirements** listed below:

- 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 Ethernet interface
- CD drive
- Mouse
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. Using Macintosh or Linux computers is possible by installing virtualization software like parallels or virtual box.
4 OPERATION

4.1 Machine view and connections

1 Top lid
2 Front panel
3 Service access panel
4 Maintenance panel
5 Exhaust hose connector
6 Vacuum connector for drum
7 Back panel
8 Cooling unit connector
9 Opening for cables for screen, keyboard, mouse, Ethernet and Exhaust
10 Manufacturers label
1 Top lid

If the top lid is opened, the motion system is stopped and laser source is turned off. These means, that the lid must be closed during startup of the machine, so that the motors can be initialized. If you load a picture in single job mode the lid must be closed as well, as the motors will move to their start point at that time.

Please note, that the laser tube is switched off immediately and consequently the result of the engraving is incomplete. During processing of engraving or cutting commands the protection cover must stay closed.

2 Front panel

Refer to information according Top lid above.

3 Service Access Panel

Only to be opened by trained technical service personnel. Refer to information according Top lid above.

4 Maintenance Panel

Can be opened with a 10mm Allen key to maintain optics. Refer to information according Top lid above.

5 Exhaust hose connector

The connections for the exhaust have to be connected to the proper exhaust unit.

6 Drum vacuum connector

The connection for the drum vacuum has to be connected to the proper exhaust unit.
7 Back panel

Refer to information according Top lid above.

8 Cooling unit connector

The connections for the cooling unit have to be connected to the proper cooling unit.

9 Cables for connecting screen, keyboard and mouse, Ethernet and Exhaust

The connections for screen, keyboard and mouse have to be installed.

The Ethernet connection has to be connected to your network so that the PC running Page Assembler is accessible. For remote service access to the machine your network should have an Internet connection.

The connection for the exhaust has to be connected to the proper exhaust unit.

10 Manufacturer's Label

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

For operating the machine you have to make sure that the exhaust system and the cooler are connected and switched on. In addition you need to connect at least a monitor, a keyboard and a mouse. A Network connection is needed to transfer your designs into the machine.
4.2 ON/OFF Switch

Switches the mains supply ON/OFF.
The following conditions must be fulfilled for correct start up:
- Unrestricted freedom of motion of the mechanics
- Rubber clamps on the drum closed
- Protection covers closed
If the mains supply is switched ON the built in computer starts up. A Real Time Linux Operating System is booted which lets you control the machine.

If the top lid or any other interlock secured cover (maintenance panel, service panel, front panel, back panel) is open, the motors can not initialize and the startup process can not be finished. An error message asks you to shut the covers.

If all interlock-secured covers are closed, immediately after being switched on, the internal computer starts up. After the operating system is loaded a password (initially “stempel”) must be given to start the DrumServer, which invokes the referencing process. When the referencing process is completed correctly, the main window of the user interface appears on the machine screen and the device is ready for operation.

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. It is very important that the mechanical plate clamps of the drum are closed.

(....)

Before switching off the mains supply, the internal computer of the machine has to be shut down properly. Otherwise the hard disk of the computer might get damaged.
4.3 User Interface of Drum Control Software

If you switch on the machine (do not forget to switch on the cooler before) the built in PC will boot. After some time a login window will appear. The user is already preset as “lasercon09”. The standard password (which can be changed after log in) is “stempel”. Keep in mind that sometimes booting will need a few minutes more because the hard disk is checked about every thirteenth start up. Do not switch off the machine during this time. If your password is accepted a Linux desktop appears. The version used currently is Ubuntu 10.4 Lucid Lynx.

The CyServer, which is the main program for controlling the machine, is started automatically. Its presence is indicated by the small window in the upper left corner of the screen.

After a little time the y-axis is initialized and the carriage moves to the zero point. Next the drum is initialized. If you forgot to close all covers of the machine you are asked to close them, because otherwise the machine could not be initialized.

After both axes are checked, the main window of the drum user interface shows up:
1 DRUM WORKING AREA

This panel shows the jobs (fields or pages with designs that should be engraved) loaded and their location on the Drum. The picture above shows half an A4 sheet filled with stamp designs. In single job mode the location of the sheet (blue zero mark) is defined by the position of the lens holder (Y-axis) and the drum (X-axis). If you move the lens holder or the drum, the position of the design will change accordingly.

In job list mode the jobs are shown at fixed positions, the predefined starting points.

2 POSITIONING PANEL

Use the positioning panel to move the lens holder and the drum - in the indicated directions by using the arrow keys - to a target point by specifying the coordinates - by an increment specified by a value - to a predefined start point

The start points can be saved by using the “Save” button, however they are already predefined to the positions of the four A4 sheets which can be mounted on the drum.
The “inner” arrow keys are used for slow movement, the “outer” keys for faster movement.

The column “Current” shows the current X and Y coordinates of the lens holder.

### 3 AUXILIARY PANEL

Used for different commands, settings and status displays:

- The servo control of the motors can be switched off by using the button “Servo off”. In “Servo off” mode you can move the drum manually.
- The button “Shut down System” should be used to shut down the computer safely, before you shut off the main switch.
- The check box “Shut down after Job” shuts the computer down after the next job is finished.
- There is a display for the general **machine status**, the remaining **engraving time** (during cutting: remaining number of vectors) and the lines processed (in case of engraving).
- There are two check boxes where you can disable engraving or cutting by removing the hook and one box which should be checked if you want to **stop processing after engraving before cutting**. This is helpful if you want to check the engraving before cutting or clean the rubber before cutting.

### 4 PARAMETER PANEL

Most important parameters are displayed and can be changed.

There are four check boxes to select one or two lasers for engraving or cutting.

Changed parameters may be saved by pressing “Save” or a new parameter set may be created by pressing “Save as New”. Parameters may be restored from a backup server.

### 5 EXECUTION PANEL

Used to load and process Jobs and Job lists (several Jobs which should be processed one after another).

Controls used for single Job mode:
- the “Load Job” button lets you load a job file from somewhere in the network. If another job is still loaded, it is removed.
- The file name is displayed in the box “Job file”, the resolution is also shown.
- The associated parameter file is displayed and can be changed in the box “Parameter File”.
- The button “Start Job” invokes processing of a Job. The label changes to “Emergency Stop” if a Job is being processed.
- The display “Current” shows the current position of the Laser Optics in the work field.
- You may input a coordinate into the boxes “Target”. The laser optics will move to these coordinates if you press “Go to target”. With the combo box “Start point” you can choose the coordinates of predefined targets.
- The boxes “Increment” allow you to specify increments for the movement of the optics. Positioning is invoked by pressing “Go to increment”.
- The “Exhaust” check box is used for switching the exhaust and the air assist on and off manually for testing purposes, or if the cleaning brush should be used to clean the rubber before unloading a page.

Controls used for job list mode:
- The “Add Job” button is used for loading Jobs into a job list without removing already loaded jobs. If you repetitively add jobs, they are associated to predefined start points in the order of loading. The combo box “Start points” can be used to specify the position of the loaded designs on the drum. The jobs are displayed in the working area at these fixed start points. They do not move with the lens holder as in single job mode. Keep in mind that the Jobs of a list are processed in the order of loading. The numbers of the corresponding start points do only influence the position on the drum not the order of processing.
- The check box “Use Job List” is automatically checked and job list mode is invoked if the “Add Job” button is activated. Leaving job list mode can be done only manually by unchecking the box.
- The button “Remove Job” unloads the selected job.
- The button “Remove all Jobs” unloads all loaded jobs.
- The check box “Engrave all Jobs before cutting” specifies that all jobs should be engraved first and then vector cutting of all jobs should be started. The normal procedure of the machine is finishing every job (engraving and cutting) before starting the next one.
4.4 Software and Network preparations

The TROTEC software packages CyServer, PageAsembler and JobCreator simplify the creation of a stamps significantly.

**Cyserver** controls the Laserati DT. It is preinstalled on the built in PC. It controls the engraving system and communicates via Ethernet with other parts of the system and the customer network.

**PageAssembler** serves as a front end for CyServer. It is needed to translate different image formats into the format used by the Laserati DT and may be installed on any Windows-PC in the customer’s network. Further main tasks of PA are assembling single designs to pages automatically using different algorithms and image processing (e. g. generating different types of cutting lines). In addition it supports the processing chain of graphical design production by generating several reports like bills of materials, run cards, maps for finding designs on assembled sheets and address labels. It also takes care of archiving the single designs. Together with JobCreator it provides means for locating designs easily in different production states.

**JobCreator** is mainly responsible for easiest and fastest creation of graphical designs like stamps and seals. JobCreator is recommended but not required for using PageAssembler and your Laserati DT.

### 4.4.1 Ethernet Connection of the Engraver

The Laserati DT Engraver gets its design artwork over an ordinary Ethernet connection (100Base-TX). So you should plug a twisted pair cable with a RJ45 connector into the free socket on the computer board in the machine:

1) Remove the service panel on the left side of the Laserati (10mm Allen Key).
2) Remove the protective cover of the electronics panel (2 Screws M5, 4mm Allen Key)
3) Pull the network cable through the cable opening in the back of the machine (cf. P. 23).
4) Insert the RJ-45 Connector into the free socket of the computer main board.
5) Reinstall the protective cover and the service panel.

If there is a DHCP-Server in your Network which allocates an IP-address automatically, the connection should work now. Otherwise you should allocate an address manually. Your IT-specialist may help you in this case. The machine gets its data from your windows computer. You find it at the address /home/lasercon09/network/your domain/your windows computer/pages.

When you load a page for engraving the first time, you have to find this address by stepping through the folders manually. Later the load button will directly show you the contents of this folder, as it remembers always the last used address.

### 4.4.2 Installing and configuring PageAssembler

The installation and configuration of PA is covered in detail in the PageAssembler -User-Manual. Here we only place the remark that a working installation of PA is mandatory for sending Designs to the Laserati DT engraver. PA contains parameter sets corresponding to the Drum data. Without PA only preprocessed files which are stored on the machine for test purposes can be engraved.
4.5 First Steps before Engraving

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

1. Switch the cooler on and then the machine by using the ON / OFF switch.

2. The built in PC will boot. The operating system starts the CyServer and the machine automatically references in X & Y direction. After successful referencing, the main window of the Drum User Interface appears. Make sure that the cover of the machine is closed during start up. Otherwise the motors are switched off and referencing is not possible. An error message appears and asks you to shut the cover.

3. Open the protection cover and mount a work piece on the drum.

   The capacity of the drum is four A4 sheets. Each A4 sheet is mounted with two mechanical clamps. Each clamp consists of a front clamp and a back
clamp. A special tool is used to operate the clamps simultaneously. Use the following procedure for mounting one A4 sheet:

a) Turn the drum by Hand so that the clamps are at the top.

b) Open the two front clamps by inserting the clamp tool shown below.

The horizontal part of the handle should point to the operator. Shift the tool a little bit parallel to the right. Do not tilt the tool.
c) Pull the tool upwards and take the two front clamps with you until they latch in the open position.

d) The front clamp is open now. Pull the tool out of the clamps.
e) Insert a sheet of rubber and close the front clamps by pulling the levers of the front clamps upwards (fig.xy).

f) Make sure that the rubber is fixed securely in the front clamps.
g) Then turn the drum by 360 degree with your right hand and wrap the rubber sheet around the drum. Hold the rubber in place with your left hand.

h) Open the two back clamps by inserting the clamp tool as in fig. yy.

The horizontal part of the handle should point to the back of the machine. Shift the tool a little bit parallel to the left. Do not tilt the tool.
i) Pull the tool upwards and take the two back clamps with you until they latch in the open position.

j) Pull the tool out of the clamps.

k) Place the end of the rubber sheet under the back clamps and close the clamps by pulling the levers of the clamps upwards (fig.yyw).
1. Push or pull the rubber as tightly around the drum as possible!

Check that there is no bump. Make sure that the clamps are closed tightly and that there is no protruding part.

Remark: it is possible to mount other sheet sizes than A4 (about 300 x 210) on the drum. The smallest recommended sheet size would be halve A4 (about 300mm x 105mm). To support the mounting of this sheet size a special tool is available, which opens only one clamp at a time. 8 sheets of this size fit on the drum. The advantage of a small sheet size is that you get an engraved sheet very soon (about less than a quarter of an hour if you use a DT 220) to go on with further processing steps.

On the other hand you could also mount an A3 size sheet, which could be necessary if the contents of the sheet could not be divided. Mounting of such a big sheet is more difficult however and you might need the help of a second person.

4. Mount a rubber sheet on each A4 position as described under 3. to make sure that the vacuum is effective, which is used for keeping the work piece tightly aligned to the drum surface.

If you want to use only one rubber sheet, mount some other materials like sheets of paper on the empty A4 places to keep the vacuum alive.

5. 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 (for the high-resolving lens, which is part of the delivery) is located 3.81 cm (1.5 inch) below the lens. For optimal processing the surface of the material that you want to engrave or cut, must be adjusted to this point. For setting the focus point for materials of different thickness a digital measuring gauge is provided. The gauge is calibrated so that the display shows directly the height of the focus point in relation to the drum surface. **To set the focus for a specific material thickness you have to switch on the gauge and turn the adjustment screw (fig…) until the display shows the value of the material thickness.** Now the lens is focused onto the surface of the material. The measuring gauge is battery powered, but the battery holds a very long time. To make the battery last even longer you may switch on the gauge only if you want to change the material thickness setting.

During normal operation you should **never press the zero button of the gauge** because the display would be set to zero immediately. You can recover the display if you know what the display was before. Turn the lens adjustment screw until the gauge shows the negative of the last display. Then press zero again. Now the gauge should be calibrated again and you can adjust the desired material thickness by turning the screw back. If you do not remember the display before you pressed zero, the focus point must be recovered by some other method described in the service manual.
4.6 First Engraving Tests in Single Job Mode

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

1. First switch on the cooler, then the Laser and if available the Prefilter for the exhaust.
2. Switch on the main switch of the machine.
3. Keep the cover closed during start up of the system!
4. Wait until the built in PC has booted and you are asked for the password. After the CyServer has been started and the referencing has been done, the main window of the drum user interface appears.
5. Make sure that the focus is set to the thickness of the material you want to use.
6. Make sure that a sheet of rubber is mounted at least at one of the four engraving positions and that the other 3 positions are covered to keep the vacuum.
7. We use a preprocessed test file for our first engraving job. The test files can be found in the folder /home/lasercon09/TestPages. We press the “Load Job” button in the main window of the drum user interface. A file manager window will pop up. Open the
folder /home/lasercon09/TestPages. You will find the files “drum_test_short.zip”, “drum_test_halveA4.zip” and “drum_test_A4.zip”. Engraving would need about 2 minutes, 12 minutes or 24 minutes respectively. Select one of these files and press open. (Keep the cover closed when loading a design!) The design will appear in the display of the working area and the optics and the drum will position to the starting point which was used last time. The name of the design file and the name of the parameter file associated to the design are displayed in the corresponding boxes. You will see the most important parameters in the Parameter Panel.

8. If the last starting point is correct for the position of the plate you mounted, just press “Start Job” to start engraving. If the Laser optics is not positioned at the left upper corner of the sheet to be engraved, position the optics by using the arrow keys or select the correct start point by entering coordinates and pressing “Go to Target”. Check that the working head is now positioned correctly and press “Start Job”. The drum will start to turn and after it has reached the specified speed the Laser will be turned on.

9. The machine will first engrave the sheet and then proceed with cutting. After the Job is finished it will be removed from the work field display.

10. If the machine is connected properly to the network already, your own files can be loaded now from the “pages” folder of your PageAssembler installation on your remote Windows computer for the next engraving run.

11. If you want to shut down the machine it is necessary to shut down the computer first. This is done by pressing the button “Shutdown System” in the auxiliary panel of the main program window. Some text will show up on the screen. Before you can switch off the machine you must wait until the text “System halted” appears.
4.7 Engraving in Job List Mode

1. We assume that the machine is initialized and no job is loaded. The combo box “Start point” is set to “Start point 1”. If we press “Add Job” now, the box “Use Job List” is checked automatically and a window for file selection is opened. If you choose a design now it is placed at “Start point 1” on the work field display. However the Laser optics are not moved to the Start point.

2. Press “Add Job” again. The next design is positioned at “Start point 2”. If you wanted the design to be at “Start point 3” you could have set the “Start point” combo box to “Start point 3” after adding the Job.

3. You may add more Jobs the same way, but it makes no sense to put more then one job on the same place. The first 4 predefined start points are associated to the 4 A4 locations which are possible on the drum. Start points 5 to 8 are associated to the “halve A4 positions” which you could use if you would load 8 halve A4 sheets on the drum.

4. If you press “Start List” the Jobs will be processed in the order of the job list.

5. If you want to change the start points, you should select the job number in the “Job” combo box (in the execution panel). The selected job is displayed in enhanced mode. If you now select a start point from the “start point” combo box, the design will jump the corresponding position. Keep in Mind that you only change the start point not the order of processing. As it is not possible to change the processing order after a list is entered, it is important that you enter the designs in the order you want them to be processed. Changing the order is only possible by deleting the pages with lower priority and enter them again after the page you want to be engraved first.

6. For deleting a job, it can be selected in the “Job” combo box and then the “Delete” button can be pressed. The job is only removed from the work field display; the file can not be deleted this way.

7. If you want to shut down the machine it is necessary to shut down the computer first. This is done by pressing the button “Shutdown System” in the auxiliary panel of the main program window. Some text will show up on the screen. Before you can switch off the machine you must wait until the text “System halted” appears.

4.8 Tips and Tricks for the Production of Rubber Dies

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.

The various mixtures and densities of rubber plates cause a slightly varying engraving depth. 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 to control the depth. When vector cutting stamps the speed is usually kept constant because of mechanical limitations and the cutting depth is controlled by varying the laser power.

Due to their lower density, so-called micro porous rubber materials allow a significantly higher engraving speed (about more than 2 times the speed of ordinary rubber). Test the rubber first, to find out the correct speed setting. Cutting micro porous rubber is a fire hazard, especially if relatively thick material is cut. You should use N2 as assist air and carefully chosen parameters to cut micro porous rubber. It might be helpful to reduce or remove the vacuum of the drum to prevent the back of the rubber sheet from hole burning. Never leave the machine unattended.

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.

The resolution of the graphics is recommended to be at 600 dpi for stamp engraving.
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 device and 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. Make sure, that the device is switched off and unplugged. Open the protective cover.
2. Thoroughly remove all loose dirt particles and deposits in the interior of the machine.
3. 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: 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

Check the lens before you start to work the Laserati. If you do a lot of cutting jobs, ensure that there is no dust to the lens. If there is some dust to the lens, remove it by blowing to the lens. If there is still some dust, you may have to use a cleaning tissue and some cleaning liquid. Take a tissue and drop some liquid on it. Be careful when cleaning the lens. You MUST NOT rub to the lens. Just move the tissue slightly over the surface to the lens. Repeat this cleaning as long as there is no more dust to the lens.

1. Move the working head into the center of the x-axis.

2. Remove the lens by turning the fixing ring (1) and pulling the lens assembly (2) to the front.

3. Remove the coarse dust as good as possible by blowing air onto the lens surface.

4. Check the surface and if necessary clean the lens with the lens cleaning liquid and lens tissue.
5. 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.

6. 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.

7. 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.

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

9. 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.

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

5.2.2 CLEANING THE MIRRORS

As the mirrors are totally covered by protective tubing cleaning should be necessary very seldom. The mirrors should be checked every year together with a general check of the machine.
5.3 Maintenance Plan

<table>
<thead>
<tr>
<th></th>
<th>before every shift</th>
<th>daily</th>
<th>weekly</th>
<th>monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Laser System</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus</td>
<td>Check</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lens</td>
<td>Cleaning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nozzle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum table and rulers</td>
<td>Cleaning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entire working area</td>
<td>Cleaning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoses</td>
<td>Check</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prefilter System</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual dedusting</td>
<td>Cleaning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prefilter bag</td>
<td>Change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prefilter cartridge</td>
<td>Change or when</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>blocked</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoses</td>
<td>Check</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Exhaust System</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cartridge</td>
<td>Change or when</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>blocked</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active carbon</td>
<td>Change or when</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>blocked</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoses</td>
<td>Check</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cooling System</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Check</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water fill level</td>
<td>Check</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For detailed information on the maintenance activities on exhaust and cooling systems please refer to the respective manuals.
6 ADDITIONAL INFORMATION

6.1 The Linux Desktop and some useful programs

During normal operation you do not need special knowledge concerning the Linux operating system. For invoking special programs some information is useful.

The Ubuntu desktop behaves rather similar to other graphical desktop systems. The programs behind the icons on the screen are called by double clicking the icons as usual. The following icons are available:

1. **Network**
   A file manager is opened and you can browse the network.

2. **CyServer and Applet**
   The normal start up procedure invokes CyServer and Applet (the main program window) automatically. So you do not need this icon normally.

3. **Start Applet**
   The main program window is opened. This makes sense only, if CyServer is running already. Normally it is not used.

4. **Cute Com**
   Serial communication program, used for service only
5. **Start Pictester**  
   Program used for service only.

6. **Download Firmware**  
   Program used for service only.

7. **Parameter**  
   Access to all machine parameters, normally not used by the machine operator.

8. **Helpdesk and Teamviewer6**  
   Programs for remote access to the machine

9. **CyServer and Status**  
   This Icon is used if the status information of the machine should be displayed while the control program of the machine (CyServer and Applet) is not started. Used for Service purposes.

10. **Status**  
    This is used to display the status if CyServer is running already.

11. **Logtail**  
    This Icon displays the newest part of the CyServer log file which is updated continuously. So it is possible to view the actions of CyServer and watch machine Data and interlocks in real time. It is used for service purposes.

The command bar at the top of the screen lets you invoke several programs (Applications) with only one Mouse click. There is a file browser (Places) and you have access to settings of the operation system. A click on the Firefox Icon opens the browser. The appearing site displays machine information: You have access to the complete parameter set if you press the open buttons in the next picture.
Parameter file

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filename</td>
<td>default</td>
<td>Name of parameter set</td>
</tr>
<tr>
<td>MachineName</td>
<td>TrotecDT</td>
<td>Select machine</td>
</tr>
<tr>
<td>LaserName</td>
<td>Filestar_3000Hz</td>
<td>Select laser</td>
</tr>
<tr>
<td>EngravingName</td>
<td>default</td>
<td>Select engraving parameters</td>
</tr>
<tr>
<td>CutQualityName</td>
<td>default</td>
<td>Select cutting parameters</td>
</tr>
<tr>
<td>ModeParameter</td>
<td>default</td>
<td>Select parameter</td>
</tr>
<tr>
<td>SaveParameter</td>
<td>Yes</td>
<td>Saving parameters when design program?</td>
</tr>
<tr>
<td>ParameterSaveDirectory</td>
<td>PrintServerDir</td>
<td>Directory for saving parameters</td>
</tr>
<tr>
<td>Language</td>
<td>german</td>
<td>Select program language</td>
</tr>
<tr>
<td>FileExtName</td>
<td>default</td>
<td>Select IPC</td>
</tr>
</tbody>
</table>

By using the menu on the left you can look at the Status information
The Interlocks should be all green during normal engraving operation of the machine. Only the “Laser 1 beam on” and the “Laser 2 beam on” messages are changing to a red display “Laser 1 beam off” and “Laser 2 beam off” irregularly, due to the laser modulation.
(The interlock display in the picture above shows a setting which is not realistic as it was taken without a machine connected to the computer.)

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.

- The computer of the machine does not start up correctly
  - Check the mains connection of the screen if the screen stays dark.
  - If booting takes an unusual long time, it might be that the computer is checking the hard disk. This is done about every thirtieth start and the screen stays dark during the check. You have just to wait a few minutes in this case.
  - If there is an error message that says that a proper boot device is missing, there might be a problem with the hard disk. You could try to use the back up disk. You should press the button “Restore Parameters from Backup” to get the parameters back you were currently using.

- No referencing is performed after switching on the machine.
  - Check if the top lid and other interlock-secured covers (front lid, maintenance panel) are tightly closed.
  - Check the status Display (cf. ). If the cover is indicated as closed and a motor voltage is missing probably a fuse is blown (cf. for replacement).

- 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.
6.3 Acceptance report

Dear customer!

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

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.

The machine with the machine designation: Laserati DT 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 Laserati 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).

<table>
<thead>
<tr>
<th>Machine Details</th>
<th>Contact Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serialnumber</td>
<td>Name</td>
</tr>
<tr>
<td>DrumServer</td>
<td>Country</td>
</tr>
<tr>
<td>Version</td>
<td>Phone Number</td>
</tr>
<tr>
<td>PageAssembler</td>
<td>Email address</td>
</tr>
<tr>
<td>Version</td>
<td></td>
</tr>
<tr>
<td>Layout Software</td>
<td></td>
</tr>
<tr>
<td>Firmware Version</td>
<td></td>
</tr>
</tbody>
</table>

**Problem Description**

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

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

What was tried to solve the problem?

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