

OPERATION MANUAL

8008 Trotec Laserati

C100/C180



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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 6.1 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.



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



The 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	10 mm / 0,4"
Max. engraving speed	200 cm/sec. / 79 inch/sec.
Cutting speed	depending on material, thickness, laser power
Motor	Brushless DC Servo motor
Encoder	Increment
Work piece table	Vacuum table
Optics, Lens	1,5" lens, all optic elements are air cooled and cleaned

Features

*S = Standard Feature***Vacuum table (S), compressed air on optic elements (S), Mac compatibility (S), Air assist (S)**

Control system

Laser power	Adjustable from 0 - 100% (typically 10% to 100%)
Interface Hardware	RS-232, USB
Interface Software	ASCII, HPGL, AD-Logic System

Laser Equipment

Laser tube	Sealed off CO ₂ Laser (closed gas volume), maintenance free, laser output 105 or 180W
Wavelength	10,6µm

Cooling system

Water cooling system All systems with a water cooling unit as a standard.

Electricity

105 and 180 Watt version	Single phase 230V/ 50-60Hz or 115V/ 50-60 Hz
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Dimensions

Width/depth/height	142 x 85 x 142 cm/ 55,2 x 31,5 x 55,9 inch
Weight (approx.)	approx. 400 kg (180 W unit)

Ambient conditions

Ambient conditions	Operating temperature +15 to +25° C humidity 40% to max 70%, not condensing
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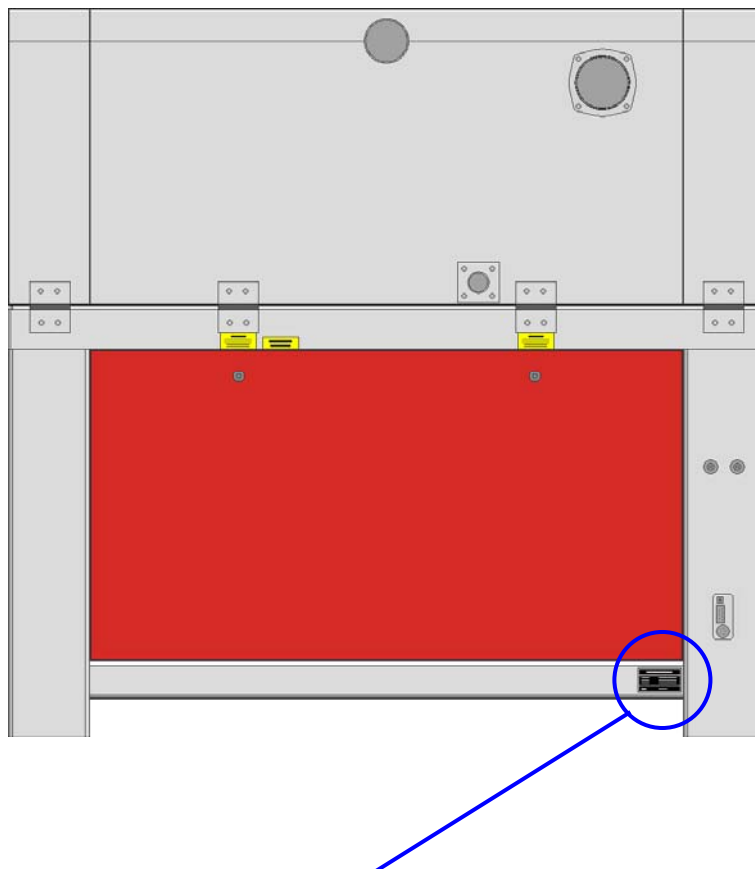
Laser Safety

Laser class	CDRH Laser Safety Laser Class 1 CE tested
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).



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

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

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 (CO₂) 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 CO₂ lasers (wavelength 10.6 µm).



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.

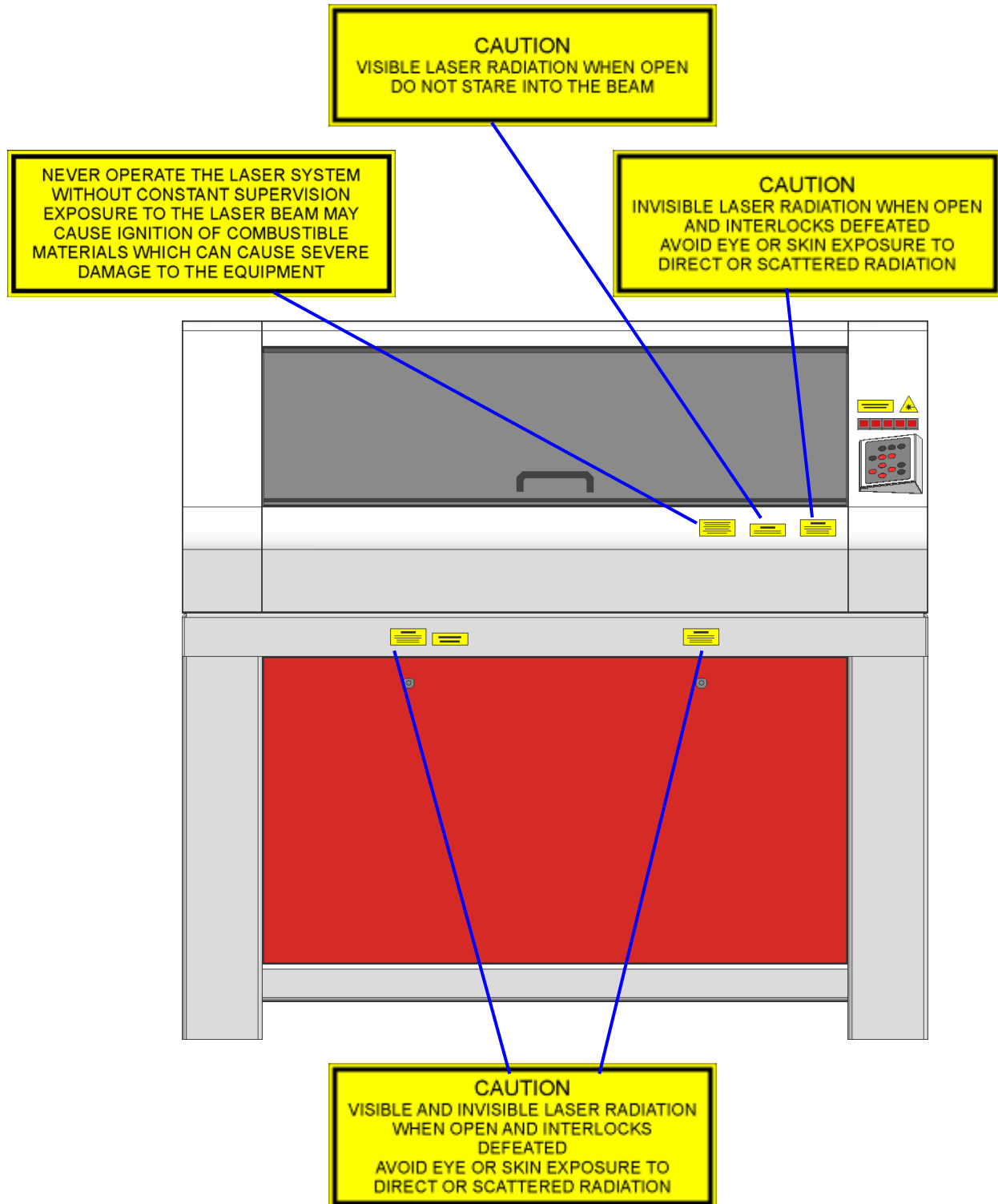
Should you have further questions before starting work, please contact your dealer or TROTEC.

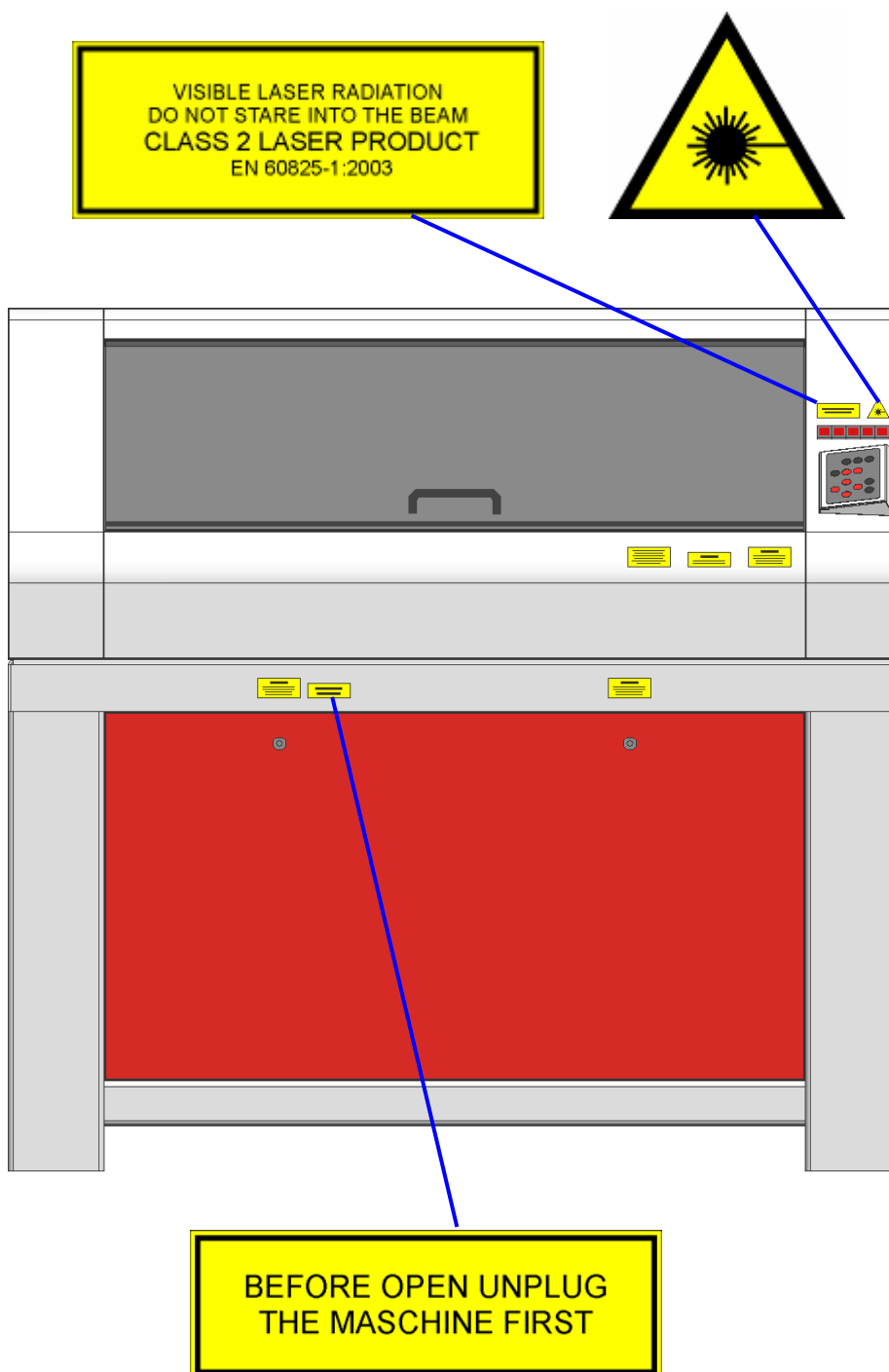


2.4 Warning and Information Labels

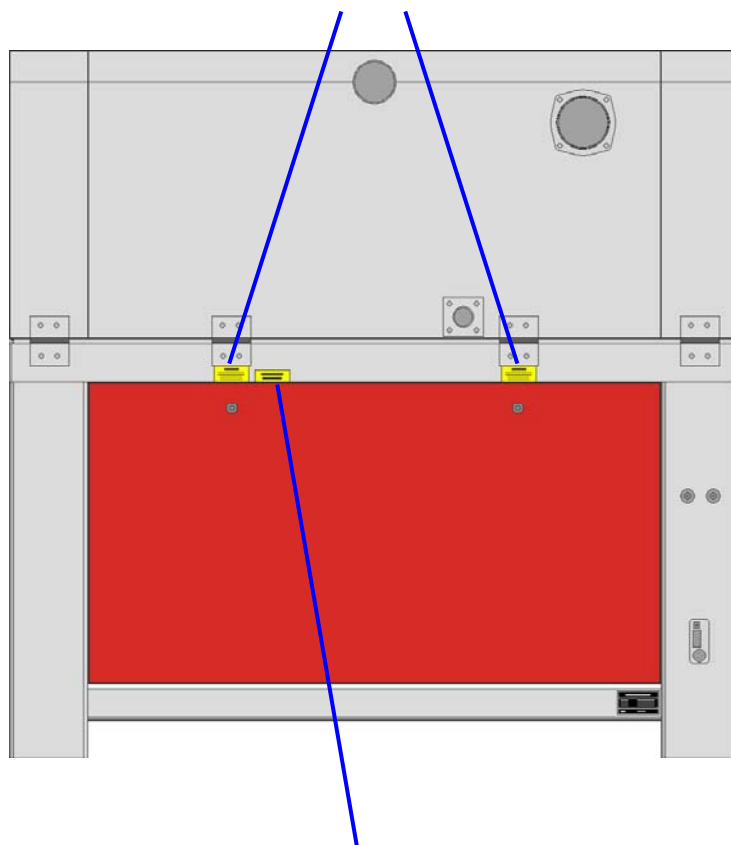


The warning and information labels are attached in such positions of the device that could represent a source of danger during set-up and operation. Therefore, follow the information on the labels. If labels are lost or damaged, they must be replaced immediately.





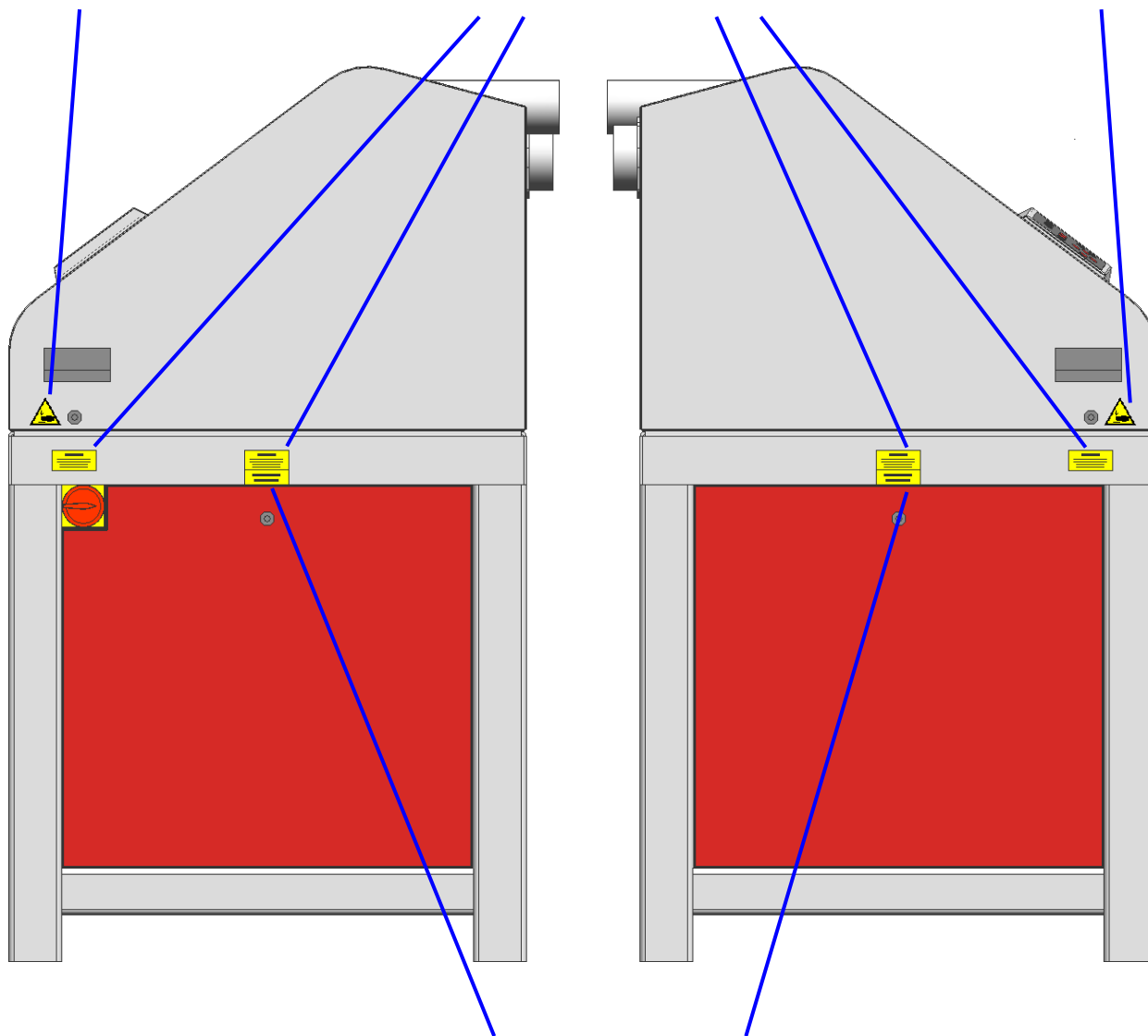
CAUTION
VISIBLE AND INVISIBLE LASER RADIATION
WHEN OPEN AND INTERLOCKS
DEFEATED
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION



**BEFORE OPEN UNPLUG
THE MASCHINE FIRST**

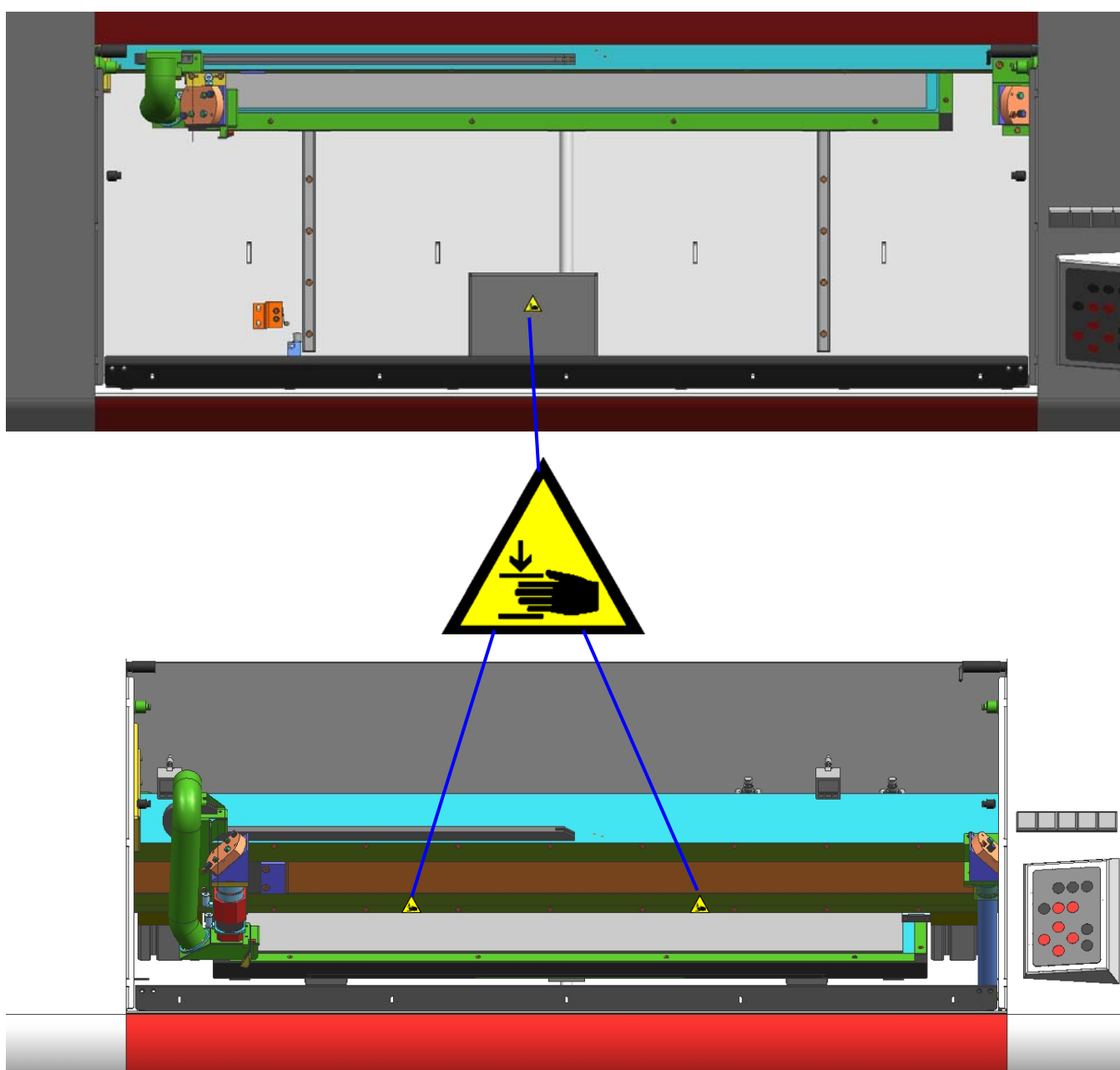
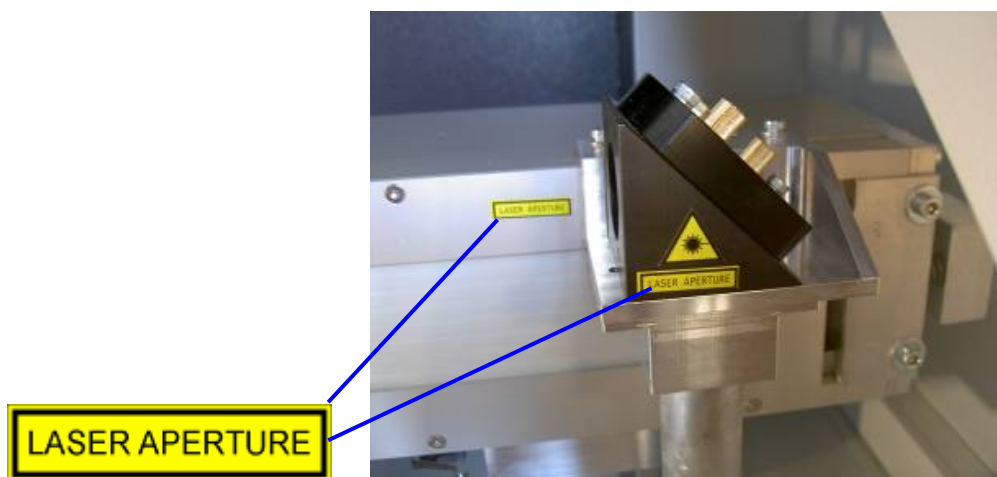


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**BEFORE OPEN UNPLUG
THE MASCHINE FIRST**





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 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.



3.3 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 Computer – Requirements



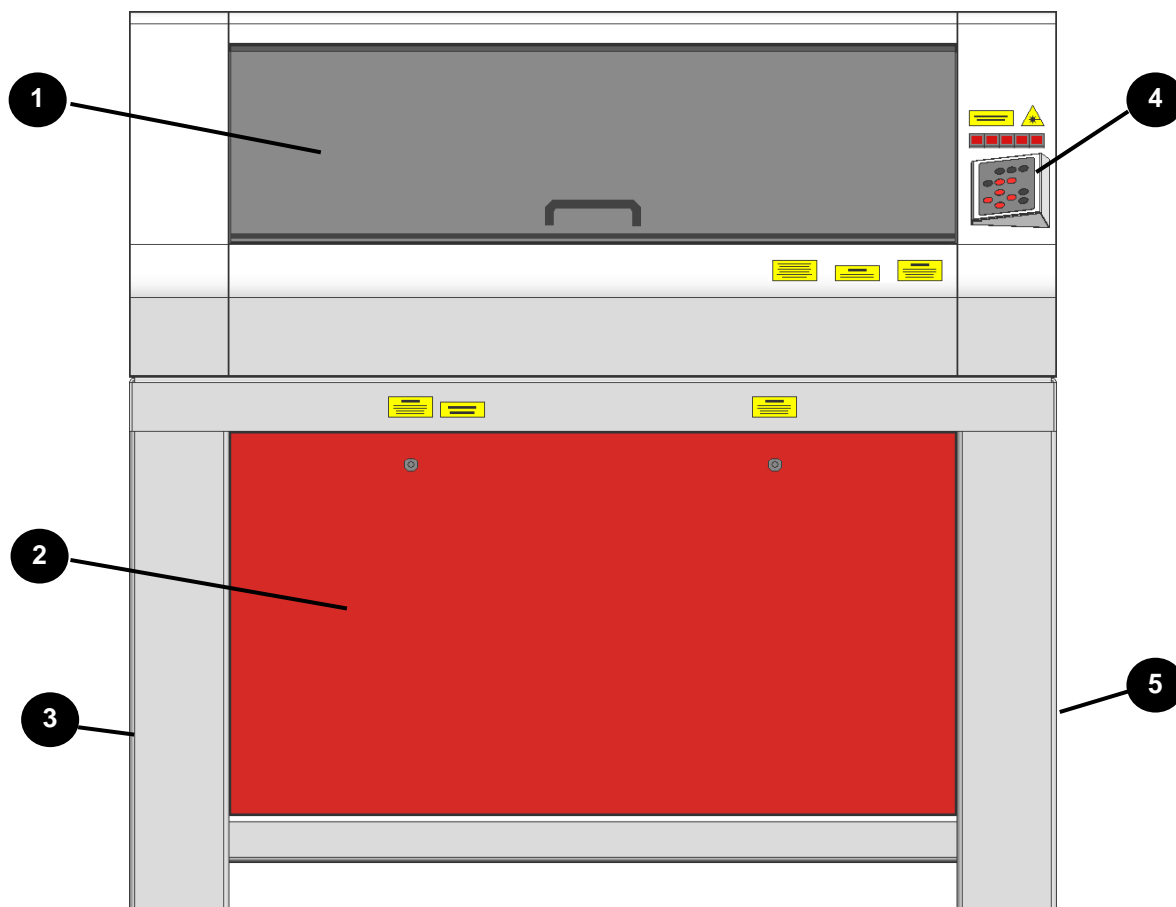
The following recommendation represents the **minimum requirements**. When using a more powerful computer the graphics are generated and displayed faster and the computing times and the data transfer to the laser are reduced. To use the newest software version, you might have to abide other requirements.

- 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
- CD drive
- Mouse

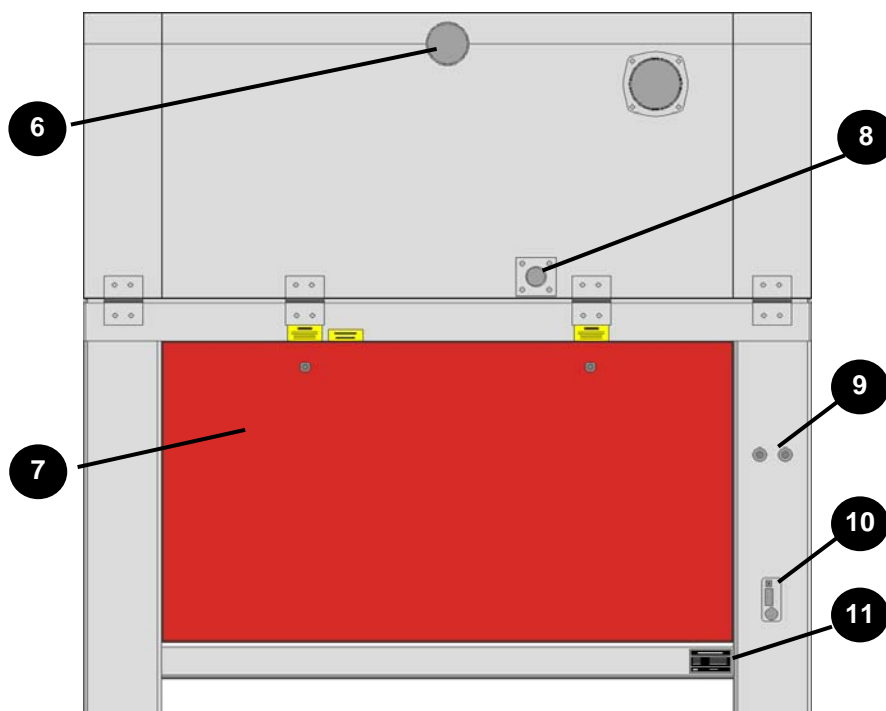


4 OPERATION

4.1 Machine view and connections



- 1 Top lid
- 2 Front panel
- 3 Service access panel
- 4 Keypad
- 5 Maintenance panel
- 6 Exhaust hose connector
- 7 Back panel
- 8 Vacuum table connector
- 9 Cooling unit connector
- 10 Exhaust and PC (USB/Serial) connection cable
- 11 Manufacturers label



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 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 Keypad



The Keypad contains multiple buttons and displays for controlling the device.
See section 4.3 Keypad for further information.

5 Maintenance Panel



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

6 Exhaust hose connector



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

7 Back panel



Refer to information according **Top lid** above..



8 Vacuum table connector



The connections for the vacuum table has to be connected to the proper exhaust unit.

9 Cooling unit connector



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

10 Exhaust and PC (USB/Serial) connection cable



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

The connection for the PC has to be connected with the PC controlling the engraver.

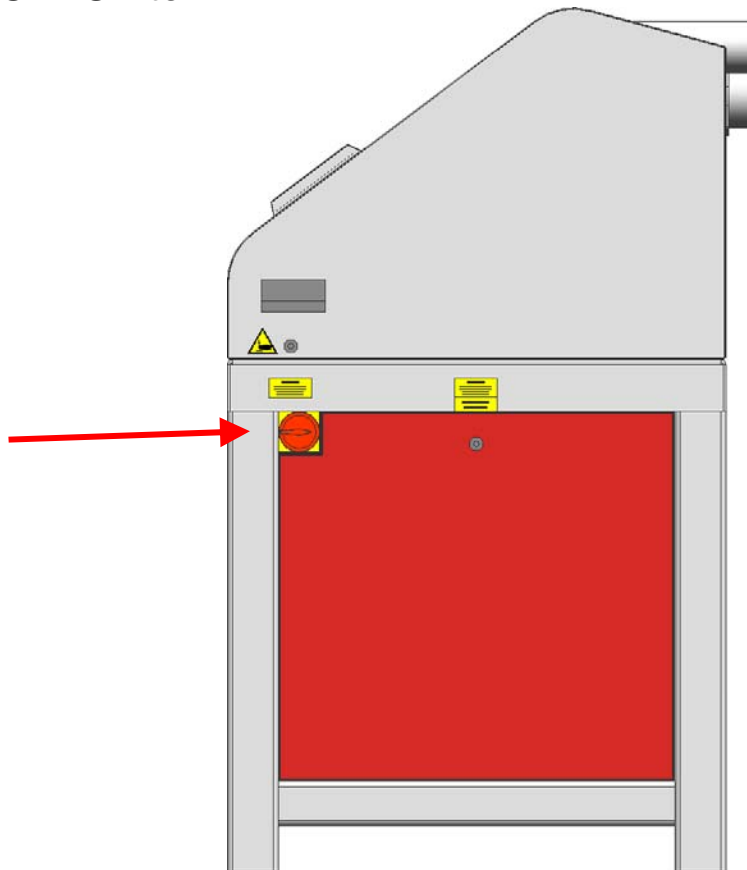
11 Manufacturer's Label



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



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
- no materials under the engraving table
- protection covers closed

If the top lid or any other interlock secured cover (maintenance panel, service panel, front panel, back panel) is open, an acoustic signal sounds and the status display (9, below) flashes fast in green.

If all interlock-secured covers are closed, immediately after being switched on, the device starts the referencing process. When the referencing process is completed correctly, an acoustic signal sounds and the device is ready for operation. The readiness for operation is additionally displayed by green (slow) flashing of status display (9).



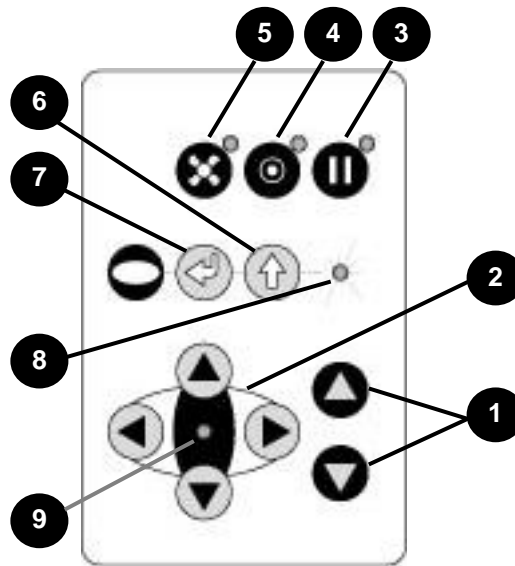
Before switching on the device, the user must make sure that no objects of any kind are located inside the operating space, which could limit or obstruct the mechanics of the device.



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



4.3 Keypad



1 POSITIONING KEYS Z

Not applicable on Laserati.

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.

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

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, illumination off) – key lights up.

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

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 (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.

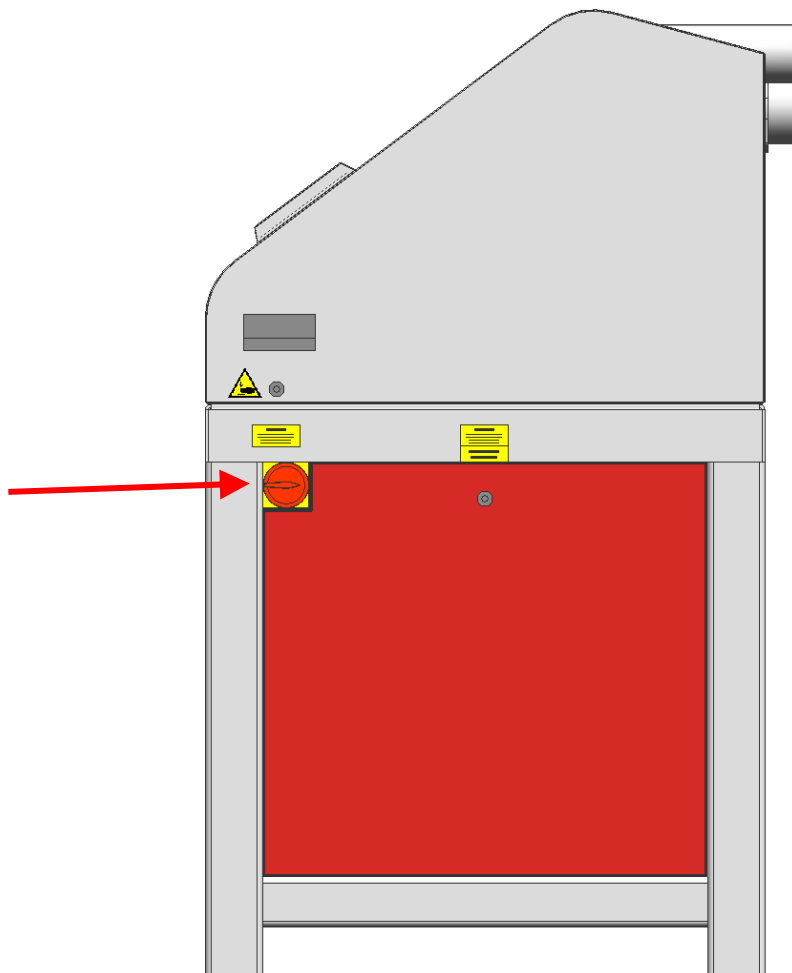
green, flashing slowly (0.5 Hz)	9	Machine is ready
green, flashing fast (2 Hz)	9	Cover has been opened
green permanent light / Pause mode	9	Data available in the machine
red permanent light	8	Laser beam is being emitted
green/red flashing alternately	8+9	Cover open during switch-on process, simultaneously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



4.4 First Steps before Engraving

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

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



2. The machine automatically references in X & Y direction.
3. Open the protection cover and place work piece on the engraving table.



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

4. Focusing the Laser Beam

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





The focusing point of the laser beam (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.

There is the following to focus the laser beam:

1. Turn off the exhaust system.
2. Move the processing head over the material to be engraved by means of the positioning keys X/Y
3. Hang the focus tool on the small aluminium part on the working head.



4. Turn the adjustment screw to lower the working head until the focus tool is just touching the material surface. It does not need to fall down.



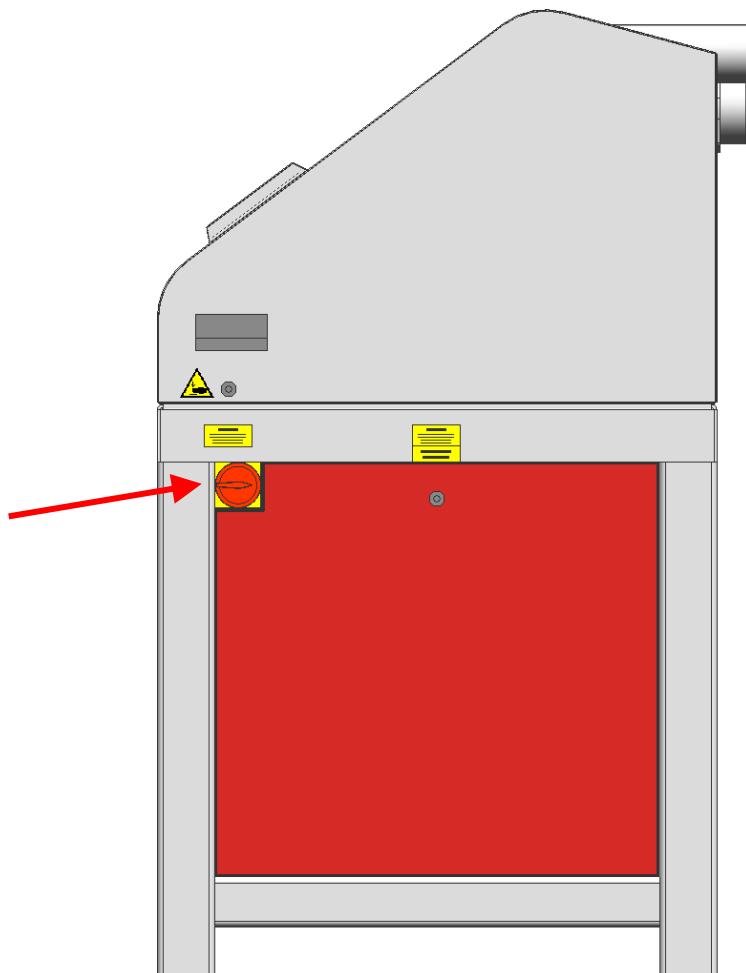
Now the lens is focused onto the surface of the material.



4.5 First Engraving Tests

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

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



2. Put the object to be engraved into the laser and move into the desired position on the engraving table. Usually the object is positioned in the upper left-hand corner. Use the rulers to determine the dimensions of the object to be engraved.
3. With the positioning keys the lens is positioned over the material to be engraved. You focus with the help of the focus tool (see page 28 ongoing).



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



Also consult the Software Manual for further information.

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



4.6 Tips and Tricks for Laser Engraving



The engraving depth can easily be varied through the laser power or the speed. To increase the engraving depth, reduce the speed or increase the power setting. This way you increase the amount of energy per area unit. Engraving too deep, however, reduces the quality of the details. With coated materials the required power depends of the kind and thickness of the coating. With power set too high the individual lines become too thick and a sharp picture cannot be achieved. The resolution of the graphics should usually be at 500 dpi. The dpi setting (number of laser dots per inch) depends on the material. The lower this setting is, the lower the resolution of the engraved picture will be. This, however, reduces flaming and increases the energy of a pulse, which can improve the overall result (e.g. when engraving some sorts of plastic materials).



Protection foil:

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



Plastics:

Plastics for engraving are available in many different colors and thicknesses and with many different coatings and surfaces. The majority of available plastics can be well engraved and cut with the laser. Plastics with a micro-porous surface seem to give the best result, because less surface material needs to be removed. As most plastic materials have a low melting point, a low ppi setting should be selected to reduce the danger of melting.





Acrylic:

There are two different types of acrylic – cast and extruded. The cast acrylic becomes white or mat after engraving, the extruded acrylic remains clear. Use extruded acrylic for engravings that are filled with paint and cast acrylic for normal engravings. Cast acrylic can be best engraved without protection foil. It is better to engrave the entire surface with a low energy setting.



Engraving photographs:

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



4.7 Tips and Tricks for Laser Cutting



Distance to the Surface of the Work piece

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



Multiple cutting (insert logo)

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



4.8 Tips and Tricks for the Production of Rubber Dies



The various mixtures and densities of rubber plates cause a slightly varying engraving depth. The settings in the overview table give a good indication. Since engraving a standard rubber material requires a relatively high laser power, the laser power is principally set to 100% and only the speed is varied.

Due to their lower density, so-called micro porous rubber materials allow a significantly higher engraving speed. Test the rubber first, to find out the correct speed setting.

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

We recommend to use at least a 10000HZ setting for cutting the rubber die.

You may also use the settings within the JobControl for getting links.

Therefore you will have to open the "Settings" and "Advanced Settings ..." to select even if you wanna get the "Links" or not. In case of Links, the rubber die stays connected to the rubber plate but can be torn off easily. The advantage of this method is, that there is practically no further risk of deformation or melting of the material. Furthermore, the entire plate can be removed from the laser at one time instead of having to collect all dies individually.

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



5 MAINTENANCE

5.1 Cleaning the System



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



Before 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. Move the engraving table into a position in which it is easiest for you to clean the surface with a window cleaning agent and paper towels.
2. Make sure, that the device is switched off and unplugged. Open the protective cover.
3. Thoroughly remove all loose dirt particles and deposits in the interior of the machine.
4. 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.

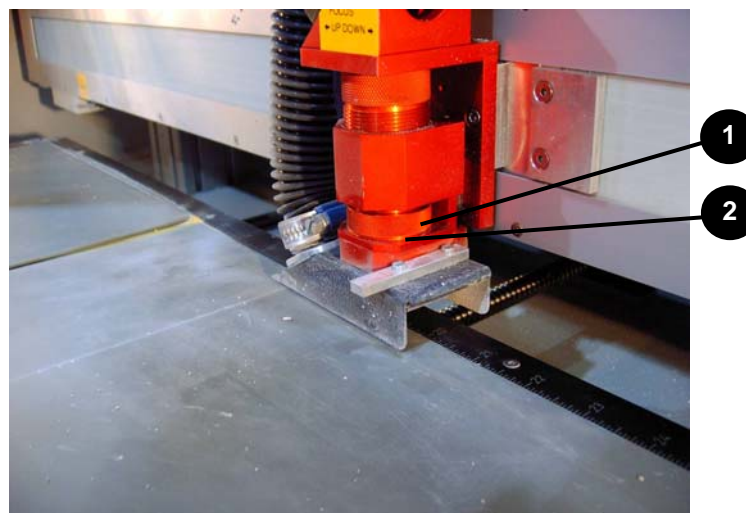
Follow the instructions below for the cleaning of optical parts:

5.2.1 CLEANING THE LENS

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 carefully 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 #2 AND #3

Check the mirrors every week if there is may be dust or some other kind of contamination to them. You will just have to check the mirror on the laser head and on the right hand side of the x-axis. Remove them carefully and just one after the other. For cleaning the same things as for the lens will come up.



Be careful and do not scratch or misalign the mirrors!
Misaligned mirrors may cause severe damage to the machine.



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 have to open the top lid.
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.



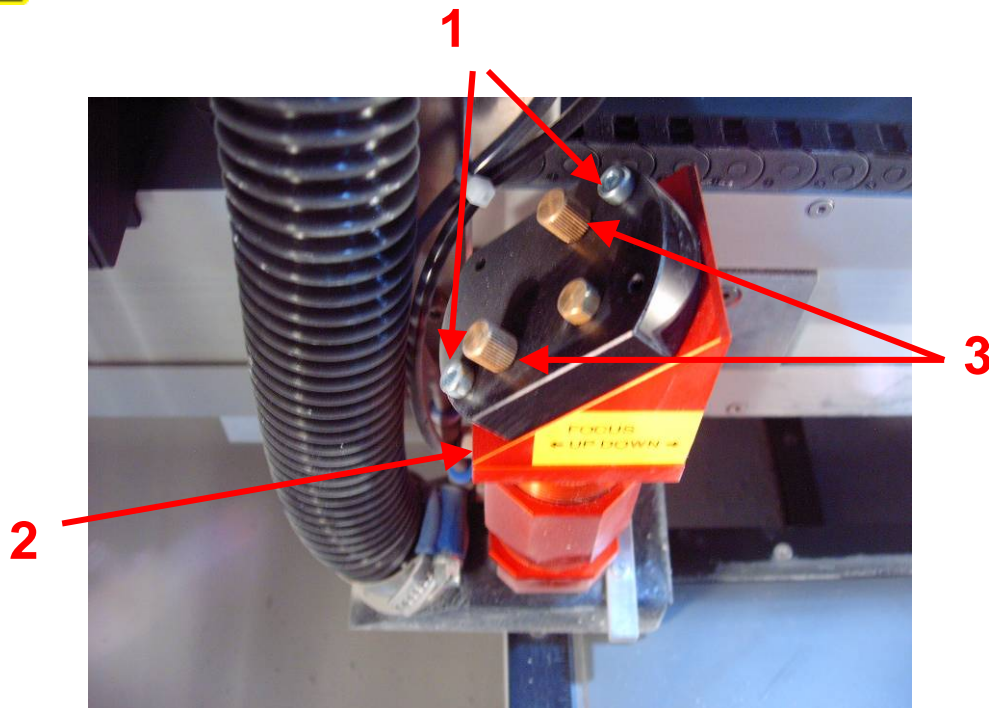
3. Use a drop of lens cleaning liquid from the accessories box and, while holding the mirror on an angle, flush the surface of the mirror, to wash away coarse soiling.
4. Put the mirror on a working surface. Put some drops of lens cleaning liquid on the mirror and leave the liquid take effect for approximately 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.
7. Replace the mirror and fix it again with the two Allen screws.

MIRROR #3

1. While holding the mirror, loosen the two Allen screws (1) and lift the mirror from the mirror holder (2). Do not touch the milled screws while doing this (3).



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 screws.



5.3 Maintenance Plan

	before every shift	daily	weekly	monthly
Laser System				
Focus	Check			
Lens, mirror 3	Cleaning			
Mirror 2			Cleaning	
Nozzle			Cleaning	
Vacuum table and rulers			Cleaning	
Entire working area			Cleaning	
Hoses		Check		
Prefilter System				
Manual dedusting	Cleaning			
Prefilter bag				Change
Prefilter cartridge				Change or when blocked
Hoses		Check		
Exhaust System				
Cartridge				Change or when blocked
Active carbon				Change or when blocked
Hoses		Check		
Cooling System				
Temperature		Check		
Water fill level			Check	

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



6 ADDITIONAL INFORMATION

6.1 Tips for Troubleshooting

- The machine does not react after activating the "ON" key.
 - Check the mains connection.
 - Check the main fuses. They are located next to the mains connection socket. Replace defect fuses with fuses of the same type and value.
- No referencing is performed after switching on the machine.
No acoustic signal can be heard.
 - Check if the top lid and other interlock-secured covers (front lid, maintenance panel) are tightly closed.
- The following error message is displayed when trying to establish a connection between 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.





6.2 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: Laserati

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

City, Date

Company stamp / Signature





6.3 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





6.4 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?

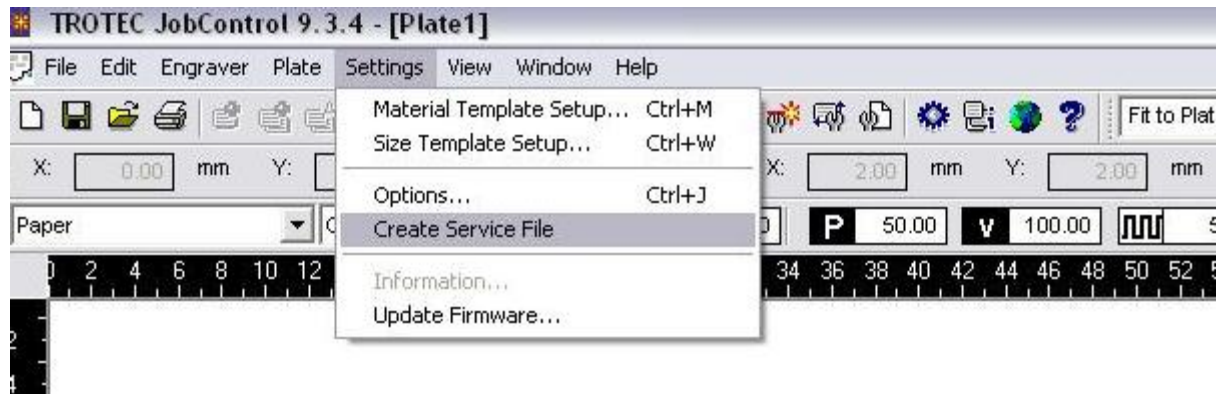
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Please send the information to your sales representative or to techsupport@troteclaser.com.

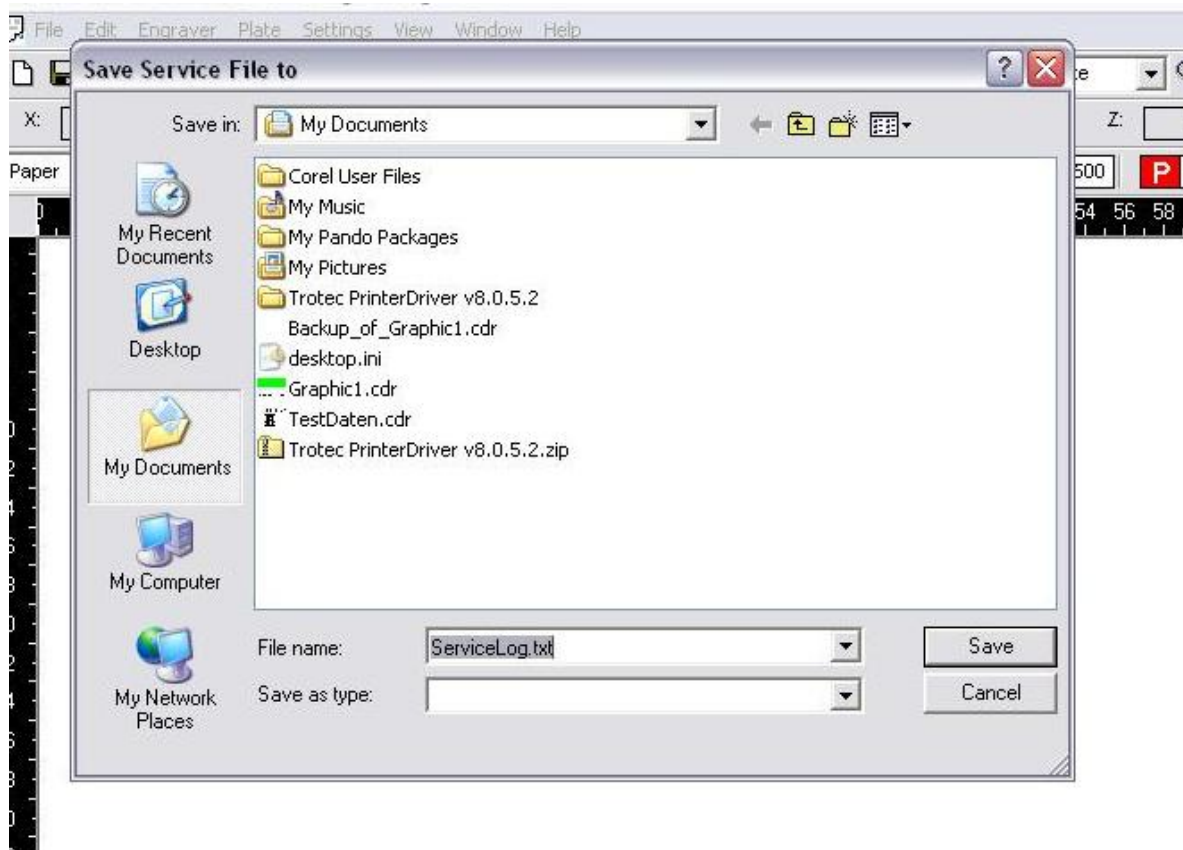


6.5 How to create a Service File

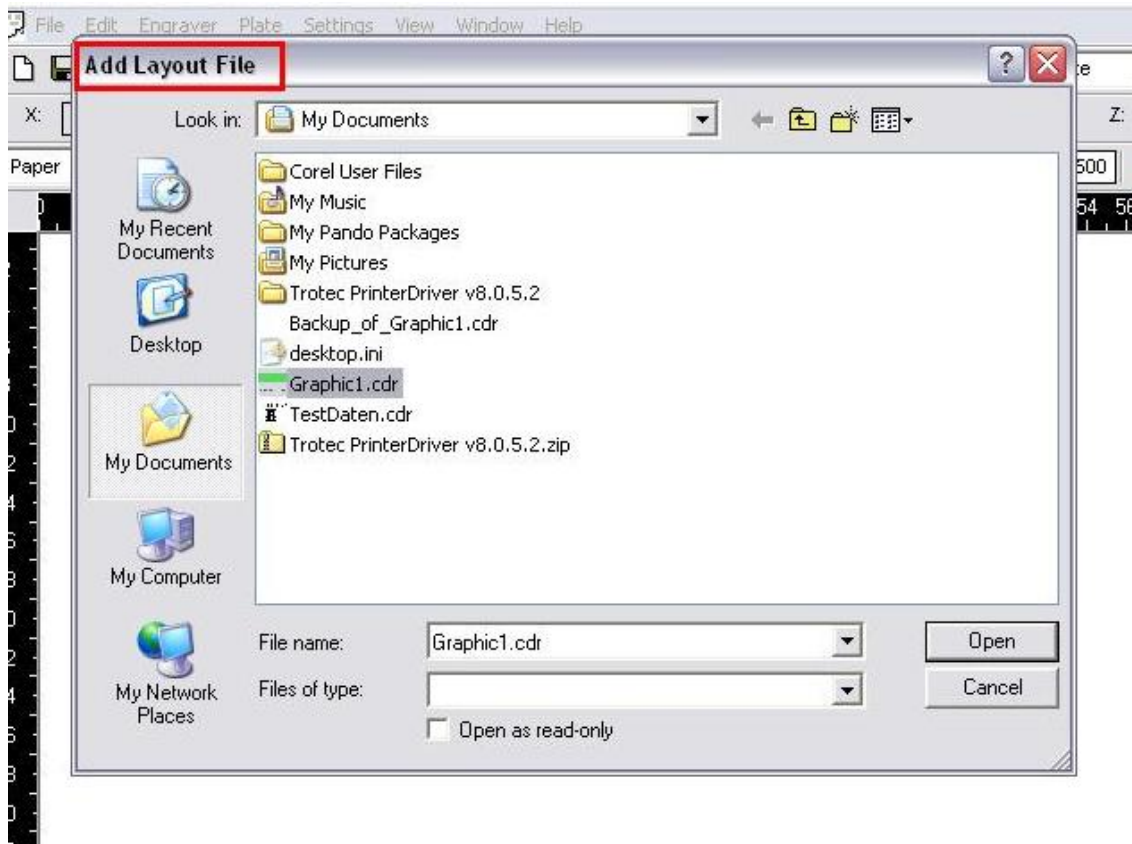
1. Start JobControl and go to Settings> Create Service File:



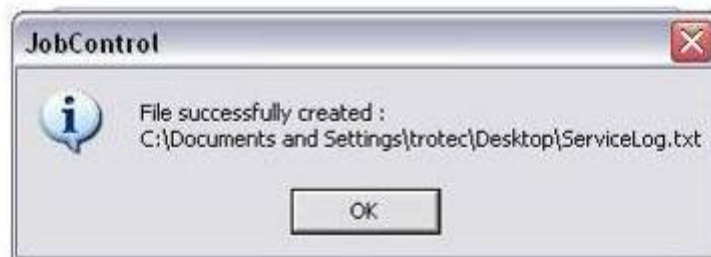
2. by clicking on create Service File the below window will appear:



- after choosing the target folder where the Service File has to be saved, the below window will show up and you should also add the layout file (example: Corel file, Photoshop file, AutoCAD file,...etc):



- after the above steps are done the message below will appear:



- Now the Service File (ServiceLog.txt) is successfully created. Please send it to your sales representative or to techsupport@troteclaser.com.

