

→ Speedy 300 flexx Operating manual



S300-X8066

OM S300-X8066_1.5_EN (09/2020)
ENGLISH (Translation)

**Trotec Laser GmbH**

+43 7242 239-7070
service-at@troteclaser.com

**Trotec Laser Canada**

+1 800 663 1149-902
techsupport@troteclaser.ca

**Trotec Laser Deutschland GmbH**

+49 89 322 99 65-13
service-de@troteclaser.com

**Trotec Laser UK**

+44 0191 4188 110
service-uk@troteclaser.com

**High Speed Laser Systems S. de R.L. de C.V.**

+52 55 5351-7252
mexico@troteclaser.com

**Trotec Laser Inc.**

+1 866 226 8505, Option 2
support@troteclaser.com

**Trotec Laser Pty Ltd**

+61 26413-5904
service@troteclaser.com.au

**Trotec Laser AG**

+41 32387-1611
service-ch@troteclaser.com
suisse@troteclaser.com

**Trotec Laser España**

+34 93 102 50 50
soporte@troteclaser.com

**Trotec Laser Srl**

+39 02 9475 5447
supporto.tecnico@troteclaser.com

**Trotec Laser B.V.**

+31 850 70 51 55
support@troteclaser.nl

**Rubber Stamp & Engraving**

+27 875 509-335
support@trodat.co.za

**Trotec Laser België
Trotec Laser Belgique**

+31 850 70 51 55
support@troteclaser.nl

**Trotec Laser GmbH**

+86 189 500 735 62
china@troteclaser.com

**Trotec Laser France SAS**

+33 1 72 62 20 94
support.technique@trotec.fr

**Trotec Laser Japan Corporation**

Tokyo: +81 42 313 0740
Osaka: +81 6 6180 2200
service-jp@troteclaser.com

**Trodat Polska Sp. z o.o.**

+48 22 339 35 39
serwis_pl@trodat.net

Trotec Laser GmbH

Freilingerstraße 99

4614 Marchtrenk, Austria

General contact to Technical Support:

Tel.: +43 7242 239-7000

E-mail: techsupport@troteclaser.com

www.troteclaser.com

Technical Changes	Technical specifications are subject to change without notice. Trotec Laser GmbH reserves the right to improve or modify any of the products without prior notice.
© Copyright	This documentation with all illustrations is intellectual property of Trotec Laser GmbH. The entire documentation is given to the user for personal use only. Reproduction, translation or any distribution to third parties is not permitted without the prior consent of Trotec Laser GmbH. Any breach of law will be prosecuted.

Content

1	General Information.....	8
1.1	Information about this manual.....	8
1.1.1	Storage of the manual.....	8
1.1.2	Complementary documentation.....	8
1.2	Explanation of symbols.....	9
1.3	Liability and warranty.....	10
1.4	Scope of delivery (standard configuration).....	11
1.5	Type plate.....	12
2	Safety.....	13
2.1	General safety notes.....	13
2.1.1	Intended use.....	13
2.1.2	Improper use.....	14
2.1.3	Residual risk.....	14
2.1.4	Machine modification.....	14
2.1.5	Operating modes.....	14
2.1.6	Applicable safety regulations.....	15
2.2	Laser safety.....	17
2.2.1	Laser classification.....	17
2.3	Areas of responsibility.....	19
2.3.1	Responsibilities of the operating company.....	19
2.3.2	Responsibilities of the operating personnel.....	20
2.4	Requirements for operating an service personnel.....	20
2.5	Machine identification (warning and safety stickers).....	21
2.6	Safety devices.....	23
2.7	Technical protective measures.....	23
2.7.1	Main switch.....	23
2.7.2	Key switch.....	23
2.7.3	Temperature sensor.....	23
2.7.4	Emergency stop button.....	23
2.7.5	Interlock safety switches.....	24
2.7.6	Acrylic top lid.....	24
2.7.7	Side cover.....	24
2.7.8	In case of safety device malfunction.....	24
2.8	Secondary (indirect) hazards.....	25
2.8.1	Fire hazard.....	25

2.8.2	Gases, fumes and dust.....	25
2.8.3	Reflection through materials.....	26
2.8.4	Information about damaged optics.....	27
2.8.5	Protective measures for damaged optics.....	27
2.9	In case of emergency.....	28
3	Technical Data.....	30
3.1	Electrical requirements of the machine.....	30
3.2	Exhaust system requirements.....	31
3.3	Computer requirements.....	34
3.4	Materials.....	35
4	Machine overview.....	39
4.1	General overview.....	39
4.2	Tables.....	40
4.3	Lens(es).....	41
5	Transport.....	43
5.1	Safety notes.....	43
5.2	Delivery state.....	43
5.3	Temperature and humidity.....	44
5.4	Required tools for unloading and transport.....	45
5.5	Place of storage.....	45
5.6	Transport inspection and reporting of defects.....	45
5.7	Unpacking the machine.....	45
5.8	Relocation of the machine.....	46
6	Setup and installation.....	47
6.1	For your safety.....	47
6.2	Temperature and humidity.....	47
6.3	Space requirements.....	48
6.4	Setup.....	48
6.5	Connections.....	49
6.5.1	Mains connection.....	49
6.5.2	Connection the PC.....	49
6.6	Connection of additional components.....	49
6.6.1	Exhaust system.....	49
6.6.2	Cooling unit.....	50
7	Operation.....	52
7.1	Before commissioning.....	52
7.2	Software.....	52
7.3	Power On/Off.....	52

7.4	Control panel.....	55
7.5	Lense placement.....	60
7.6	Switch laser source manually.....	62
7.7	Focusing methods.....	62
7.7.1	Focus tool.....	63
7.7.2	Software focus.....	64
7.7.3	Light barrier focus.....	66
7.8	Options.....	66
7.8.1	Rotary attachment (option).....	66
7.8.2	JobControl Vision.....	69
7.8.3	Temperature sensor.....	70
7.8.4	Industrial Interface.....	71
8	Maintenance.....	73
8.1	Safety notes.....	73
8.2	Maintenance schedule.....	73
8.3	Cleaning.....	74
8.3.1	Machine.....	74
8.3.2	Optics in general.....	74
8.3.3	Lens.....	75
8.3.4	Mirror.....	76
9	Troubleshooting.....	77
9.1	Error, cause and remedy.....	77
9.1.1	How to create a service file.....	78
10	Contact details.....	80
11	Disassembly.....	81
12	Disposal.....	82
13	Appendix.....	83
13.1	8066 Speedy 300X.....	87
13.2	CE 8066 Speedy 300_flexx.....	90

1 General Information

For reasons of better legibility, gender-neutral form of address (e. g. "he/she") are not used in the operating manual. It is expressly stated that in all text passages where natural persons or groups of persons are mentioned, people of all sexes are always meant.

1.1 Information about this manual

**Before beginning any work on the machine, read this manual completely and carefully.
Keep the manual for further consultation close to the machine.**

This manual describes how to operate the machine properly and safely. Be sure to follow the safety instructions given here, as well as any local accident prevention regulations and general safety regulations applicable to the field of usage. Before beginning any work on the machine, ensure that the manual, in particular the chapter entitled "Safety Information" and the respective safety guidelines, has been read in its entirety and fully understood.

1.1.1 Storage of the manual

This manual is an integral part of the machine and must therefore be kept in the direct vicinity of the machine and be accessible at all times.

1.1.2 Complementary documentation

Complementary documentation can be found on the supplied data carrier.

Software manual

Trotec Laser GmbH JobControl®

1.2 Explanation of symbols

Important technical safety notes and instructions in this manual are indicated by symbols. It is important to observe and follow these notes and instructions on workplace safety. Avoid accidents, personal injury and material damage to property by acting with extreme caution.



Danger

This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Warning

This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Warning Current

This symbol warns of potentially dangerous situations related to the electric voltage. Failure to observe the safety instructions leads to risk of serious injury or death. Particular care should be taken during maintenance and repair work.



Warning Laser

This symbol warns of potentially dangerous situations related to the laser beam. Failure to observe the safety instructions leads to risk of serious injury.



Caution

This symbol indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



Notice

This symbol indicates potential risks of damage to the supported product (or to property).
In addition, non-observance may result in damage, malfunction or failure of the machine.



Information

This symbol indicates tips and information which must be observed for efficient and trouble-free handling of the product.



Disposal

This symbol indicates notes regarding the professional disposal of the product or accessories.

1.3 Liability and warranty

Warranty periods specified in the manufacturers "warranty terms and conditions" shall be binding for the buyer. If no warranty periods are specified, the general terms and conditions of sale, delivery and payment apply.

All information, illustrations, tables, specifications and diagrams contained in this operating manual have been carefully compiled according to the current state of technology. No liability is accepted with regard to errors, missing information and any resulting damage or consequential loss.

Strict compliance with the safety procedures described in this operating manual and extreme caution when using the equipment are essential for avoiding and reducing the possibility of personal injury or damage to the equipment. The manufacturer shall not be liable for any damage and or faults resulting from nonobservance of instructions in this manual.

Nonobservance of the operation, maintenance and service instructions described within this manual absolves Trotec Laser GmbH from any liability in case of a defect.

Furthermore, Trotec Laser GmbH shall accept no liability whatsoever for damage caused by the use of non-original parts and accessories.

Additionally, Trotec Laser GmbH shall not be held responsible for any personal injury or property damage, of an indirect or specific nature, consequential loss, loss of commercial profits, interruption to business, or loss of commercial information resulting from use of the equipment described in this manual.

It is strictly prohibited to make any alterations, to prepare translations, decompile, disassemble, reverse engineer or copy the software.

Trotec Laser GmbH reserves the right to update any of the information, illustrations, tables, specifications and diagrams contained in this operating manual with regard to technical developments at any time without notice.

1.4 Scope of delivery (standard configuration)

1. Laser machine
2. Stand (optional)
3. Data carrier (with laser software, printer driver and operating manual)
4. Focusing tool(s) (according to lens order)
5. Cleaning kit for optics
6. Lenses according to order
7. Allen key kit (8-part)
8. Power cable (acc. to order)
9. USB computer connection cable
10. Exhaust connection cable (acc. to order)

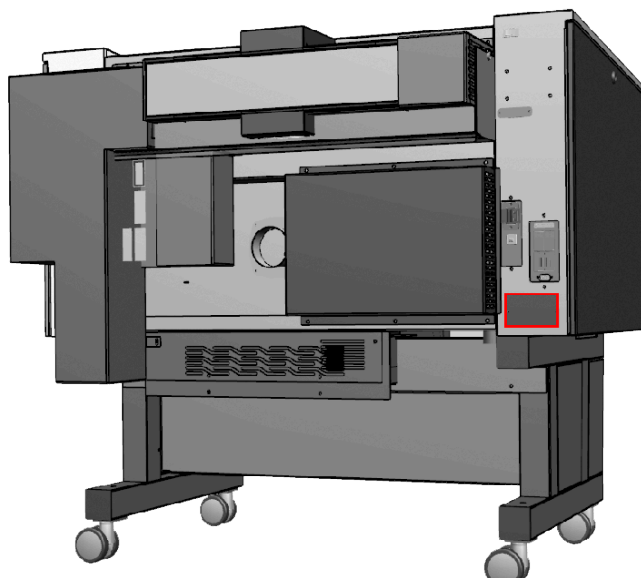
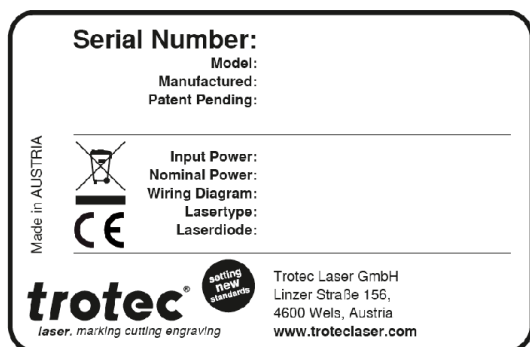
The actual scope of delivery may be different, depending on the special model, additional order options or newest technical changes.

1.5 Type plate

The type plate with the CE mark is located on the rear of the machine.

Enter the serial number, model and year of manufacture into your manual and always refer to them when contacting us for enquiries, troubleshooting or ordering of replacement parts.

Serial number:	
Model:	
Year of manufacture:	



2 Safety

TO AVOID POSSIBLE HARM READ AND FOLLOW THESE INSTRUCTIONS.

The machine is built at the time of its development and production according to applicable, established technical rules and is considered to be safe to operate.

Dangers can be caused by the machine if the machine:

- is operated by unqualified personnel,
- the personnel have not been trained,
- the machine is used improperly or not as intended,
- or if the machine is used for other intended purposes.

This chapter provides an overview of all important safety aspects that are necessary for optimum protection of persons and safe and trouble-free operation of the machine. Other chapters of this manual contain specific safety notes for the avoidance and prevention of hazards.

2.1 General safety notes

2.1.1 Intended use

The machine described in this manual is intended exclusively for laser cutting, engraving and marking of non-metal and material according to the intended use of the machine using the supplied software.

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

Operate the machine only in technically flawless condition and when it fully complies with the EC Machinery Directive.

For material details see chapter "Materials" or contact your local Trotec representative, or our Technical Support.

The intended use of this machine also includes that all personnel involved in installation, set-up, operation maintenance and repair of the machine must have read and understood the operating manual and in particular the "Safety" section, and comply with the instructions.

Organisational measures:

- Personal protective equipment
- Inspection of the laser protection wall
- Laser safety instructions/laser safety training
- Monitoring by Laser Safety Officer

2.1.2 Improper use

Use of the machine for any purposes other than those intended or described in the present manual is regarded as improper and therefore prohibited. Trotec Laser GmbH will not accept any liability for damage caused by improper use. The operator is solely liable for all damages caused by improper use.

Non-observance of the operation, maintenance and service instructions described within this manual absolves Trotec from any liability in case of a defect.

2.1.3 Residual risk

Even if all safety regulations are observed, a residual risk remains when operating the machine.

2.1.4 Machine modification

It is strictly prohibited to alter, refit or modify the machine in any way without the express consent of the manufacturer.

Likewise, it is strictly prohibited to remove, bridge or bypass any safety devices. Operating conditions and connection and setup values stated in the data sheet must be complied with at all times.

Operation of the system is permitted only with original parts and accessories by the manufacturer. Use of third-party parts affects machine safety.

2.1.5 Operating modes

Normal operation

For normal operation the following conditions must be met:

- Intended use of the machine (see chapter "Intended use").
- Operation of the machine only by trained personnel.
- Full functional and mounted safety devices.
- Machine must be in technically flawless condition.
- Processing of permissible materials according to the material list.
- Maintenance and service are not included.



Notice

During normal operation it is not necessary to wear safety glasses.

Service operation

Service activities may be carried out only by authorized, trained service technicians. If side panels as well as covers get removed and safety devices get bypassed, it can lead to direct and indirect scattered radiation. The service operation is therefore declared as laser class 4 (US: class IV) and proper precautions need to be taken (see "Laser classification").

2.1.6 Applicable safety regulations

The following directives and guidelines must be observed to avoid hazards when operating Trotec laser systems:

Guidelines/Regulations

2006/42/EC	EC Machinery Directive
2014/30/EU	EMC Guideline

Applied harmonized standards

EN ISO 12100:2011-03	Safety of machinery - General principles for design - Risk assessment and risk reduction.
IEC 60825-1:2014, EN 60825-4:2011	Safety of laser products - Part 1: Equipment classification and requirements.
IEC 60204-1:2005	Safety of machinery - Electrical equipment of machines - Part 1: General requirements.
ISO/DIS 11553-1:2009-03	Safety of machinery - Laser processing machines - Part 1: General safety requirements.
IEC 61000-6-4:2007-02	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments.
ISO 13857:2008	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs.
EN 55011+A1:2016-05	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement.
IEC 60825-4:2012-01-01	Safety of laser products - Part 4: Laser guards



Notice

Safety norms and regulations.

The general guidelines and directives listed within this manual may differ according to locality, region or country.

Therefore, always observe the directives as well as the regulations of the institutions for statutory accident insurance association applicable to you. The operator is responsible for fulfilling all safety requirements, as Trotec Laser GmbH has no influence on the proper use of the machine.

Observe the official regulations for your business location in accordance with the applicable local legal regulations (on accident prevention regulations or employee protection), e.g. DGUV regulation 11 for Germany.

2.2 Laser safety

2.2.1 Laser classification

The laser safety class indicates the risk potential from accessible laser radiation.

The laser system is a Class 2 (US: Class II) laser marking system as per IEC 60825-1 "Safety of Laser Product".

The integrated laser source is a Class 4 (US: Class IV) laser marking system according to IEC 60825-1 and identified as such.



Warning Laser

Laser radiation of Class 2 (US: class II)

For Class 2 (US: class II) laser is short term exposure (up to 0.25 seconds) harmless to the eyes and can therefore be operated without additional protective measures. However it can cause irritation of the eyes if the natural avoidance reaction (staring into the laser beam deliberately) or eyelid closure reflex is suppressed.

- Do not suppress the eyelid closure reflex.
- Do not stare directly into the laser beam.
- Close eyes, turn away.
- Never look at the laser beam directly with an optical instrument, e.g. a lens.



Warning Laser

Laser radiation of Class 4 (US: class IV)

Exposure to laser radiation of Class 4 (US: class IV) can cause injury to the eyes and skin.

- The skin and eyes must not be exposed to direct or reflected or scattered radiation.
- Wear suitable laser safety protection glasses.
- When dealing with Class 4 (US: Class IV) laser machines, it is necessary to appoint a trained laser safety officer to evaluate potential hazards and to ensure that appropriate control measures are implemented.



Notice

Laser classification

It is the responsibility of the operator to comply with the national official and statutory regulations for the operation of a class 4 (US: class IV) laser system or laser system with a build in laser source of class 4 (US: class IV).

Class 2 (US: class II)

The accessible laser radiation of Class 2 (US: Class II) laser systems does not pose any hazard for the skin. Diffuse reflections as well as any short-term irradiation of the eyes (exposure time max. 0.25 seconds) also pose no risk due to the low output power.

However, it is possible to suppress the natural eyelid closure reflex and stare into the class-2 laser beam for a time long enough for the eyes to get injured.

Class 4 (US: class IV)

Class 4 (US: class IV) high powered lasers (visible or invisible) considered to present potential acute hazard to the eye and skin for both direct and scatter (diffused) conditions.

Also have potential hazard considerations for fire (ignition) and byproduct emissions from target or process materials. It is the responsibility of the operator of the machine to take appropriate measurements to eliminate any dangers such as fire or explosions through the laser beam.

Precautions when dealing with a class 4 (US: class IV) laser machine



Warning Laser

Obligations of the operator for the operation of class 4 lasers (US: class IV):

- Observe official regulations for the business location in accordance with the applicable local legal regulations (on accident prevention regulations or employee protection), e. g. DGUV regulation 11 for Germany.
- According to DGUV regulation 11 "Laser radiation", as well as national regulations: Written appointment of a competent laser safety officer for compliance with the relevant regulations.
- Mark the danger zone as such by attaching warning lights and warning signs on the outside.
- Protect the danger zone against unauthorized access.
- Wear appropriate laser safety glasses within the danger zone that are matched to the wavelength and power of the laser.
- Install an additional and well visible warning light to warn the operator of the presence of laser radiation.

Compliance with the points above does not absolve the operator from meeting the relevant standards and guidelines for the operation of a Class 4 laser system.

2.3 Areas of responsibility

2.3.1 Responsibilities of the operating company

The operator has the following responsibilities:

- It is the responsibility of the operator to comply with the national official and statutory regulations for the operation of a class 4 (US: class IV) laser system or laser system with a build in laser source of class 4 (US: class IV).
- In addition to the safety notes and instructions stated in this manual, consider and observe the local accident prevention regulations and general safety regulations that apply at the operation site of the machine.
- A CO₂ fire extinguisher must always be at hand, as the laser beam can ignite flammable materials.
- If the machine is used industrially, the operator is subject to the legal obligations concerning industrial safety.
- All personnel involved in installation, set-up, operation, maintenance and repair of the machine must have read and understood this manual and in particular the "Safety" section. The personnel must be trained and informed about all the functions, potential dangers and safety issues of the machine on a yearly basis.
- The user is recommended to prepare company internal instructions considering the occupational qualifications of the personnel employed in each case, and the receipt of the instruction/this manual or the participation in the introduction/training should in each case be acknowledged in writing.
- Keep the manual in the immediate vicinity of the machine so that it is accessible at all times to all persons working on or with the machine.
- Authority for the individual activities relating to the application of the machine (e.g. installation, operation, maintenance and cleaning) must be clearly defined and observed, so that no unclear competencies result under the aspect of safety. This applies in particular to work to be performed on the electrical equipment that may only be performed by qualified specialists.
- Maintenance and repair work as specified in the manual must be carried out regularly.
- 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 manual must be observed.
- Provide appropriate personal protection equipment (e.g. protective goggles according to wavelength and laser power).
- The operator is responsible for the safety-related state of the machine.
- Do not store any flammable materials in the working area or in the immediate vicinity of the device. Particularly, residues of processed materials have to be removed to prevent any fire hazard.
- The operator must ensure cleanliness and accessibility at and around the machine by corresponding instructions and controls.

2.3.2 Responsibilities of the operating personnel

The operating personnel has the following responsibilities:

- Always wear personal protective equipment.
- It is the duty of the operating personnel to check the machine before start of work for externally visible damage and defects, and to immediately report any changes that appear (including behavior during operation) that may affect the safety of the machine. It must be made sure that the machine is operated only in perfect condition.
- The machine must not be left unattended while it is operating (supervised operation).
- Switch off the machine described herein at the main switch for periods of non-use.
- Operate the machine described here only with a lens in place. A missing lens may cause the unfocused laser beam to be reflected out of the housing.
- Stop this machine immediately in case of failure.
- No working methods are permitted that affect the safety of persons or of the machine.
- Always keep clean the machine and its components such as lens and mirrors.



Caution

The adjustment of the beam path may only be carried out by service personnel of Trotec Laser GmbH.

2.4 Requirements for operating an service personnel

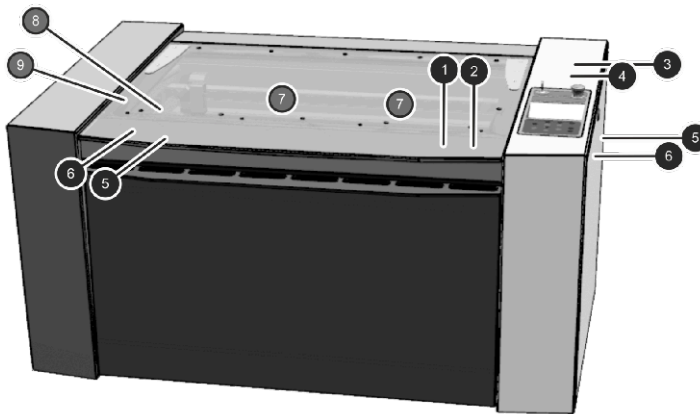
The requirements for the operating and service personnel are:

- The personnel must have read and understood this manual and in particular the "Safety" section.
- The personnel must not be under the influence of drugs, alcohol or reactivity affecting medication when working on or with the machine.
- The personnel must be familiar with using the CO₂ fire extinguisher.
- The personnel must be trained in order to be qualified to operate the machine. If the personnel lack the necessary knowledge for working on or with the machine, they must first be trained and note down the training in the training verification form.

Activity	Intended user group	Definition
Control/operation/other activities (e.g. troubleshooting, maintenance)	Qualified personnel or Trotec service technicians	Qualified personnel are those who can judge the work entrusted to them and detect potential risks based on their occupational training, knowledge and experience as well as their understanding of the relevant regulations.

2.5 Machine identification (warning and safety stickers)

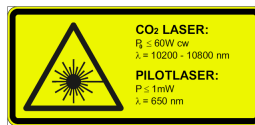
The warning and information labels are attached to the device at those points which could be a source of danger before commissioning or during operation. Therefore pay special attention to the information on the labels.



1



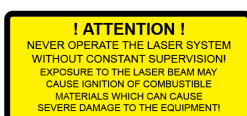
4



7



2



5



8



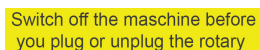
3

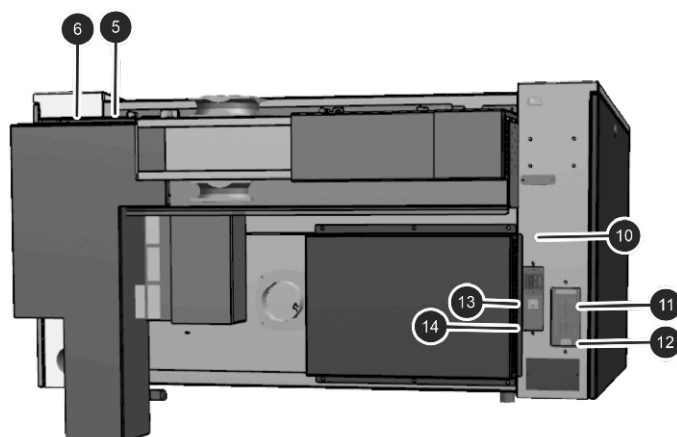


6



9





5 **CAUTION**
VISIBLE LASER RADIATION CLASS 2
WHEN OPENED
DO NOT STARE INTO BEAM
per IEC 60825 - 1:2015-07

6 **CAUTION**
INVISIBLE LASER RADIATION CLASS 4
WHEN OPENED
VOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION
per IEC 60825 - 1:2015-07

10 **ACHTUNG !**
Vor Öffnen des Gerätes ist
der Netzstecker zu ziehen
ATTENTION !
Hazardous voltage inside
Before opening disconnect mains

11 **EXHAUST**

12 **PC**

13 **Fuse**

14 **INPUT POWER**
220-240VAC 50/60HZ



Caution

Lost or damaged warning and safety stickers.

If any warning and safety stickers are lost or damaged, the user is not able identify risks anymore, and there is danger of injury.

- Replace lost or damaged labels immediately.
- Contact your Trotec Laser GmbH dealer for details.

2.6 Safety devices



Warning

Danger from laser beam.

Safety and protection devices that are not installed or are not fully functional can lead to bodily injury and material damage.

- Do not remove, modify or deactivate the interlock safety switches or protective covers on the machine. Safety and protection devices must be fully functional at all times.
- In case of assumed or presumed damage of safety devices, disconnect the machine from the mains.
- Damaged safety and protection devices need to be replaced by a Trotec technician immediately.

2.7 Technical protective measures

2.7.1 Main switch

Pressing the main switch on the backside of the machine to disconnect the machine from the mains power supply.

2.7.2 Key switch

Turning the key switch counterclockwise powers off the motor, laser source and electric system. Through the key switch, operation by non-authorized personnel can be prevented.

2.7.3 Temperature sensor

The temperature sensors ensure reliable temperature monitoring of the interior of the machine and are available as additional option.

If a preset temperature value is exceeded, an acoustic alarm continuously sounds to warn the operator of abnormal temperature trends during processing.

2.7.4 Emergency stop button

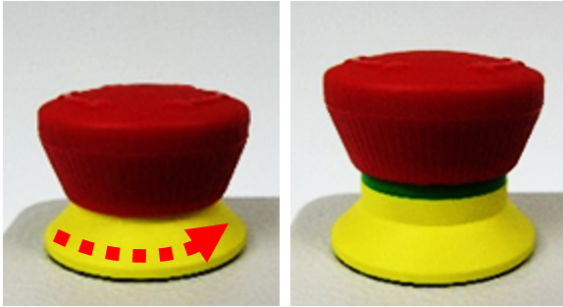
When pressing an Emergency stop button, the electric circuit immediately shuts off.

The laser beam is interrupted, and all movements are stopped.

The function of the Emergency stop button is:

- Firstly: To prevent any risks to the operating personnel.
Secondly: To avoid any damage to/destruction of the machine/material.

Emergency stop button acknowledge



1. Turn the Emergency stop button counterclockwise to unlock it (green marker is visible).
2. Reboot the laser system with the help of the key switch.

2.7.5 Interlock safety switches

Interlock safety switch query the closed status of the acrylic top lid, side panels and front door. If the safety devices are open or not present, the laser cannot be operated. However, the pilot laser stays active.

2.7.6 Acrylic top lid

The type of acrylic top lid depends on the laser type. It protects the operator from uncontrolled emission of laser radiation.

2.7.7 Side cover

The side panels protect from laser light and must always be closed and properly attached.

2.7.8 In case of safety device malfunction

Actual or presumed damage to the safety devices can cause injury or damage. Following measures must be carried out.

1. Press the emergency stop button.
2. Disconnect the machine from the mains.
3. Contact our Technical Support in your local area.

2.8 Secondary (indirect) hazards

2.8.1 Fire hazard



Warning

Fire hazard

Fire hazard from gas and processing of inflammable materials.

- Do not operate the device without supervision.
- Keep CO₂ fire extinguisher ready at hand in the immediate vicinity of the device.

If a main laser beam comes into contact with inflammable material, e.g. paper, the latter may ignite, quickly leading to fire. Therefore, before switching on the laser and after deactivating the Standby-mode you must make sure that there is no inflammable material in the path of the laser beam.

Furthermore, gases formed beneath the material being processed may ignite, especially if the extraction requirements are not met.

The risk of flaming is increased in case of insufficient care and cleaning as well.

Additionally, regularly control the air cooling system on your laser. In particular, the filters and ventilators should be checked regularly for proper function to avoid defects caused by overheating.

2.8.2 Gases, fumes and dust

Depending on the materials being processed and the parameters selected, laser processing may generate gases, fumes, aerosols or dust. Depending on the material, such by-products may be toxic. In individual cases, the reaction products may be electrically conductive dusts. If these enter electric systems, short-circuiting with personal injury and property damage may occur.

The operator is responsible for ensuring presence of a suitable extraction system and compliance with the relevant guidelines in order to protect persons and the environment. The guideline VDI 2262 1-3 "Workplace air" provides, among other things, additional remarks.

The operator must also ensure that gases, fumes or dust do not settle on the processing lens. Any dirt accumulating on the processing lens can lead to loss of performance, poor processing results and damage to the device.

2.8.3 Reflection through materials



Warning

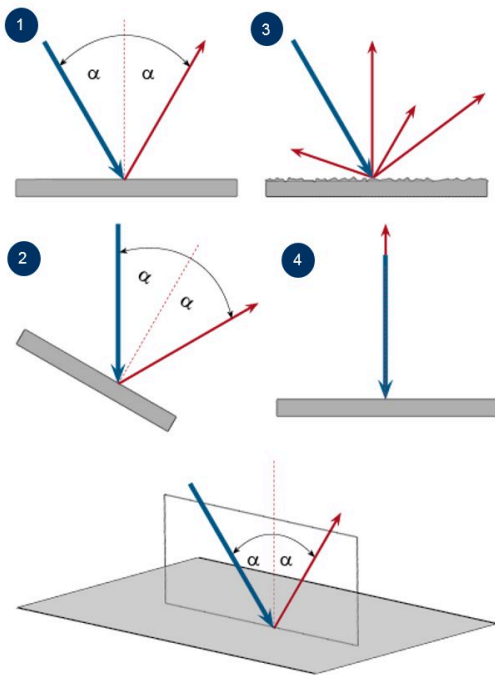
Danger from laser beam.

Invisible laser radiation of reflecting materials can cause serious injury or material damage.

- Only material according to the intended use of the machine may be used.
- Do not use material with high reflecting surfaces such as aluminum, chromium, precious metals, metal foils, stainless steel, brass, copper and titanium.
- Take special care with surfaces formed convex and concave.
- Do not leave or put objects on the work surface/working area.

Laser beam reflection

The reflecting law is valid for the reflection of the laser radiation: **Angle of incidence = failure corner**



No.	Description
1	Directed reflection: Reflected ray on smooth surface.
2	Directed reflection: Reflected ray on sloping surface.
3	Diffuse reflection: Reflected ray on rough surface.
4	Directed reflection: Horizontally reflected ray on smooth surface.

2.8.4 Information about damaged optics



Warning

Damage to optics.

Soiled optics absorb laser radiation and can thus be destroyed. Broken or damaged lenses as well as thermal decomposition of lenses release particles which cause serious damage to the health.

- The passive reflectors and optics in the area of the laser beam guidance should be cleaned regularly.
- Special care is required when handling, attaching and cleaning these elements.
- Do not exert non-uniform pressure.
- Do not use tools or hard objects to clean the surface.
- Never touch the optics with your bare fingers.
- Never use cleaning tissues twice.
- When lenses get broken, damaged or thermal decomposed follow the protective measures.
- Disposal according to regulations and laws valid in the user's country.
- **Lenses with scratches or lenses with penetrations must not be used anymore!**

Scratched or destroyed lens surface

Be aware that scratches in the coating may release small quantities of thorium, which may be harmful upon inhalation or swallowing.

Thermal decomposition

Upon thermal decompositions, vapors of selenium oxide and zinc oxide are formed. Upon inhalation or swallowing there is danger of poisoning. Indicators for thermal decomposition of ZnSe include deposits in the form of red or white powder and an unpleasant odor.

Broken lenses

When optical components of zinc selenide (ZnSe) are destroyed, toxic dusts and vapors are formed which must not be inhaled. The dust can additionally cause irritations of the eyes, skin and respiratory tract. If a lens has been destroyed during operations, care is to be taken during removal and cleaning.

2.8.5 Protective measures for damaged optics

Protective measures in case of thermal decomposition and scratched or broken lenses

- For disposal use a protective mask or respiratory filter to prevent inhalation or ingestion of thorium.
- Wash hands thoroughly after contact with a scratched coating.

Protective measures in case of a broken lens

- Upon perception of an unpleasant odor, switch off the machine.
- Hold your breath.
- Leave the area of the machine.
- Before approaching the system again, wait for at least 30 min until the reaction has abated.
- Wear proper protective clothing (respiratory protection, protective goggles, protective suit, rubber or plastic gloves).
- Provide ventilation.
- When approaching the system again, pay attention to odors.
- Remove all lens fragments.
- Avoid raising or dispersing dust.



Disposal

The ZnSe dust and the lens are to be collected drily and disposed of with fragments, broom, shovel and protective clothing into hermetically sealable containers or plastics bags as hazardous waste.

Do not dispose of optical components as domestic waste, and do not let them enter the sewer or water bodies.

Dispose of according to regulations and laws valid in the users' country.

2.9 In case of emergency

In case of malfunction

- In case of unusual operating states, open the acrylic top lid to stop working process or respectively press the Emergency stop button, if available and switch off the laser device.
- When appropriate disconnect the machine from the mains.
- Inform laser safety officer and supervisor.
- Follow the Operating manual.
- Have repair work performed by Trotec Laser GmbH service technicians only.
- In case of fire: Use only CO₂ fire extinguisher to quench the fire, insofar as this is possible without endangering yourself.



Notice

After a deletion, Trotec Technical Support must be involved before the system is put back into operation.

In case of accident, First Aid

- If due to laser irradiation eye injury has occurred (upon exceedance of the maximum allowable irradiation rate), the accident victim must immediately be presented to an ophthalmologist.
- Assumption of eye injury is justified whenever laser irradiation has occurred and the maximum allowable irradiation rate may have been exceeded.

- First aider must pay attention to self-protection.
- Power off the device.
- Remove injured person from the danger zone and provide First Aid.
- Call emergency doctor!

3 Technical Data

→ The technical data sheet can be found in the appendix of this manual.

3.1 Electrical requirements of the machine

Laser power	30 W (TL2)		45 W (TL3)		55–80 W (i156) 10–50 W (fiber)		85–100 W (i1510) 10–50 W (fiber)	105–120 W (i1512) 10–50 W (fiber)
Voltage	230 V~	115 V~	230 V~	115 V~	230 V~	115 V~	230 V~	230 V~
Fuse	8A (T)	12A (T)	8A (T)	12A (T)	8A (T)	16A (T)	12A (T)	12A (T)
Power consumption	940 W	940 W	1200 W	1200 W	1400 W	1400 W	1800 W	1800 W



Caution

Inadequate or inappropriate power sources can lead to machine damage and are not covered by any liability.

Verify that the electrical outlet is capable of providing the proper voltage, frequency and amperage required by the laser machine described in this manual.



Caution

Electrical noise, unstable power supply as well as voltage spikes in power supply can cause interference and possible damage to the electronics of the laser machine.



Notice

Use an individual circuit for the laser machine and the PC and an individual circuit for the exhaust system. Install your computer to the same circuit as the laser machine to prevent electromagnetic interactions.

Furthermore it is highly recommended that you use a overvoltage protection switch to protect your computer equipment.

If electrical power fluctuations, brownouts or power outages are a problem in your area, an electrical line stabilizer, UPS (Uninterruptible Power Supply) or backup generator are required. When installing any of these devices, ensure that they meet the electrical requirements of the laser machine.

3.2 Exhaust system requirements



Danger

Danger of emission of toxic gases, vapors or dust.

During laser operation, toxic aerosols may be produced.

- The laser system may be operated only with properly installed and operating exhaust system.
- Check with the material manufacturer for its toxic effect.



Caution

The laser may only be operated with properly installed and operating exhaust system. Damage to the system, caused by the use of not any exhaust system or improper extraction equipment, will not be covered by any liability.

The requirements for the exhaust system and recommended Trotec exhaust systems for standard applications depend on the working table installed in the machine.

Recommended exhaust systems:

Exhaust system	Speedy 300
Atmos Nano	✓ (only Speedy 300 fiber)
Atmos Cube (Atmos Compact)	
Atmos Mono	✓ (without vacuum table)
Atmos Mono Plus	✓ (without vacuum table)
Atmos Duo Plus	✓
Vent Set 300	✓ (without vacuum table)
Vent Set 400	✓
Vent Set 500	✓



Notice

Connection has to be carried out by our Technical Support.

Observe instructions for operation and maintenance according to the operating manual of the exhaust system.

Technical data of the corresponding exhaust systems::

Exhaust system	Hose connection ø [mm] (inside diameter)	Volume flow [m³/h]	Pressure [Pa]
Atmos Nano	45	200	8500 (230V)
Atmos Cube (Atmos Compact)	80 / 80 (70 / 45)	250	8500 (230V) 5800 (115V)
Atmos Mono	70 / 70 / 45	320	8500 (230V) 5800 (115V)
Atmos Mono Plus	70 / 70 / 45	320	8500 (230V) 5800 (115V)
Atmos Duo Plus	70 / 70 / 45	(2x) 320	8500 (230V)
Vent Set 300	80	max. 1000	max. 2550
Vent Set 400	100	max. 1000	max. 3800
Vent Set 500	100	max. 1200	max. 7000

Requirements for the exhaust system:

Machine	Volume flow [m³/h]	Pressure [Pa]
Speedy 300	200 (without table exhaust)	1000 (without table exhaust)
	350 (with table exhaust)	1600 (with table exhaust)

The monitoring point for flow rate and pressure is at the exhaust port at the laser machine. Pressure loss by hoses / pipes or filter parts of the exhaust system has to be determined and additionally calculated when selecting a proper exhaust system.

A powerful exhaust system keeps the lifetime of optics and mechanical components, the cutting quality and the laser power interacting with the workpiece from being impaired by fumes and dust accumulating in the machine.



Notice

The exhaust power available for the application will be reduced by e. g. bends, small hose diameters and long hoses.

You should therefore note the following:

- Avoid bends.
- Keep hose as short as possible.
- Use hose diameters as large as possible.

Applications generating large amounts of dust or fumes may require a stronger exhaust system. Use of separate exhaust systems for head and table exhaust may also be necessary.

In this case it is absolute necessary to consult your distributor.

3.3 Computer requirements

Using a more powerful computer will create graphics faster. Computing times become shorter and data transfer faster.

The following recommendation represents the minimum requirements:

- Operating systems:
Windows 10® 32/64-bit
- Microsoft® .NET framework 3.5
- Microsoft® .NET framework 4.7.2
- Adobe® Reader 9.0 or later
- Local administrator privileges (for the installation of JobControl®)
- 2 GHz processor or faster
- 2 GB RAM or greater (Windows 10)
- 80 GB hard drive or larger
- 1024 x 768 monitor resolution or greater
- True Color graphics card (24-bit color depth)
- 2 free USB interfaces

3.4 Materials

List of material										
Material EN	Material DE	Cutting			Engraving			Marking		
		CO ₂	Fiber	Flexx	CO ₂	Fiber	Flexx	CO ₂	Fiber	Flexx
Metal										
Aluminum	Aluminium					✓	✓		✓	✓
Aluminum, anodized	Aluminium, eloxiert					✓	✓	✓	✓	✓
Chromium	Chromium Verchromte Oberflächen					✓	✓		✓	✓
Precious metal	Edelmetalle					✓	✓		✓	✓
Metal foils up to 0.5mm (Aluminum, Brass, Copper, precious metal)	Metallfolien bis zu 0,5mm (Aluminium, Messing, Kupfer, Edelmetall)		✓	✓		✓	✓		✓	✓
Stainless steel	Edelstahl					✓	✓		✓	✓
Metal, painted	beschichtetes Metall (lackiert)				✓		✓			
Brass	Messing					✓	✓		✓	✓
Copper	Kupfer					✓	✓		✓	✓
Titanium	Titan					✓	✓		✓	✓

Plastic										
Acrylonitrile butadiene styrene (ABS)	Acrylnitril-ButadienStyrol-Copolymer (ABS)	✓		✓	✓		✓		✓	✓
Acrylic/PMMA, i.e. Plexiglas®	Acryl(PMMA), z.B. Plexiglas®	✓		✓	✓		✓		✓	✓
Rubber	Gummi (Stempelgummi)	✓		✓	✓		✓		✓	✓
Polyamide (PA)	Polyamid (PA)	✓		✓	✓		✓		✓	✓
Polybutylene terephthalate (PBT)	Polybutylenterephthalat (PBT)	✓		✓	✓		✓		✓	✓
Polycarbonate (PC)	Polycarbonat (PC)	✓		✓	✓		✓		✓	✓
Polyethylene (PE)	Polyethylen (PE)	✓		✓	✓		✓		✓	✓
Polyester (PES)	Polyester (PES)	✓		✓	✓		✓		✓	✓
Polyethylene terephthalate (PET)	Polyethylenterephthalat (PET)	✓		✓	✓		✓		✓	✓
Polyimide (PI)	Polyimid (PI)	✓		✓	✓		✓		✓	✓
Polyoxymethylene (POM) -i.e. Delrin®	Polyoxymethylen (POM) z.B. Delrin®	✓		✓	✓		✓		✓	✓
Polypropylene (PP)	Polypropylen (PP)	✓		✓	✓		✓		✓	✓
Polyphenylene sulfide (PPS)	Polyphenylensulfid (PPS)	✓		✓	✓		✓		✓	✓
Polystyrene (PS)	Polystyrol (PS)	✓		✓	✓		✓		✓	✓
Polyurethane (PUR)	Polyurethan (PUR)	✓		✓	✓		✓		✓	✓
Foam (PVC free)	Schaumstoff (PVC frei)	✓		✓	✓		✓		✓	✓

Miscellaneous										
Wood	Holz	✓		✓	✓		✓			
Mirror	Spiegel					✓	✓		✓	✓
Stone	Stein				✓		✓			
Paper (white)	Papier (weiß)	✓		✓	✓		✓	✓		✓
Paper (colored)	Papier (farbig)	✓		✓	✓		✓	✓	✓	✓
Food	Lebensmittel	✓	✓	✓	✓		✓	✓		✓
Leather	Leder	✓		✓	✓		✓	✓		✓
Fabric	Textilien	✓		✓	✓		✓			
Glass	Glas				✓		✓			
Ceramics	Keramik					✓	✓	✓	✓	✓
Cardboard	Karton	✓		✓	✓		✓	✓		✓
Cork	Kork	✓		✓	✓		✓	✓		✓
	Markierungsmittel (auf Metall oder Keramik/Glas) z.B. markSolid				✓		✓	✓		✓



Warning

Prohibited materials:

- Leather and artificial leather that contains chromium (VI)
- Carbon fibers (Carbon)
- Polyvinyl chloride (PVC)
- Polyvinyl butyral (PVB)
- Polytetrafluorethylene (PTFE, Teflon)
- Beryllium oxide
- Materials containing halogens (fluorine, chlorine, bromine, iodine and astatine), epoxy or phenolic resins.

Take care when processing the following materials:

- Manganese
- Chromium
- Nickel
- Cobalt
- Copper
- Lead
- any material with the naming addition “flame-retarding” since it might contain bromine.



Warning

Serious injury or material damage.

The use of prohibited or unreleased materials can cause serious injury or material damage and will not be covered under warranty.

Only use approved and released materials.



Notice

Please contact our experienced application specialists or a sales partner near you, if:

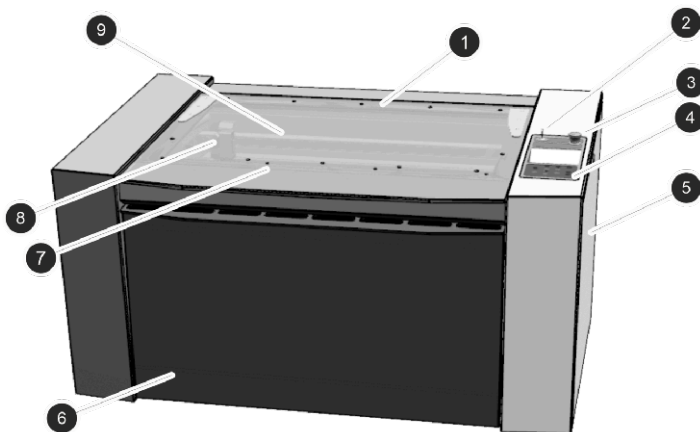
- You are unsure about the processing of a material.
- You have additions for further materials for us or in your opinion a material was not listed.

We recommend performing a material processing test with the above mentioned material, using the appropriate configuration.

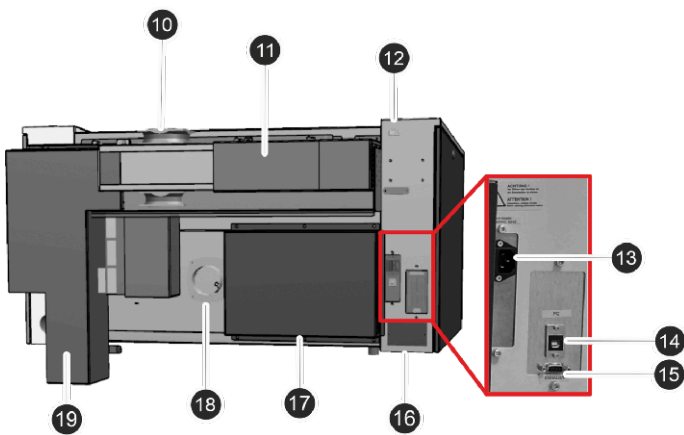
Trotec Laser GmbH assumes no responsibility for any consequences of laser processing in any application, especially with medical or pharmaceutical applications.

4 Machine overview

4.1 General overview



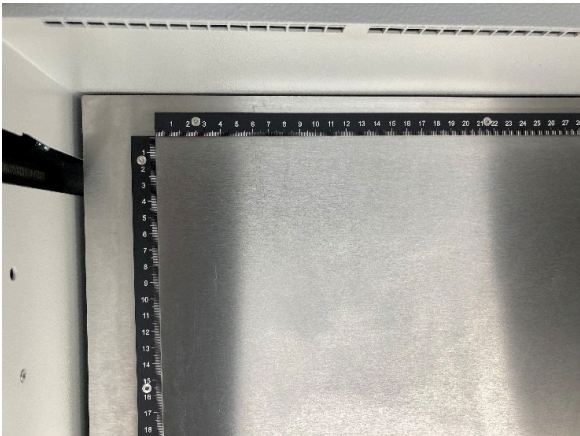
No.	Description	No.	Description
1	Top lid	6	Front cover
2	Key switch	7	Working table
3	Emergency-stop-button	8	Working head
4	Keypad	9	x-axis
5	Side cover		



No.	Description	No.	Description
10	Cooling fan	15	Exhaust connection cable (serial)
11	Cover for laser source	16	Type plate
12	Main switch	17	Power supply
13	Power socket and fuses	18	Exhaust port
14	PC connection cable (USB)	19	Cover for laser source

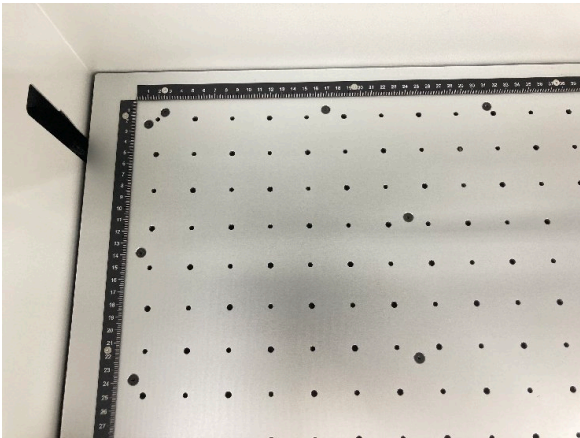
4.2 Tables

Ferromagnetic engraving table



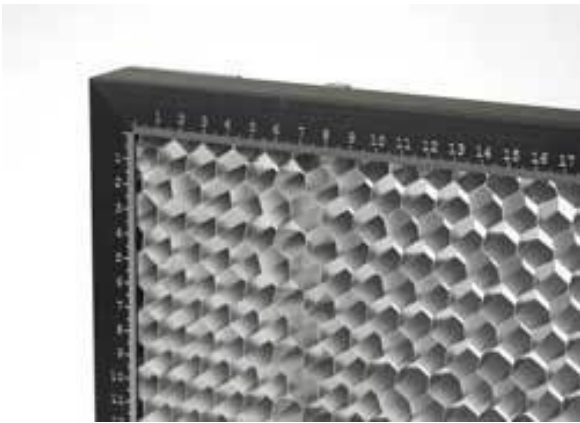
The ferromagnetic construction allows thin materials such as paper or foils to be easily fixed with magnets. A flat processing surface is an essential criterion for optimum results in laser engraving or laser marking.

Vacuum table






The vacuum table fixes the material to the processing table by means of a vacuum. This ensures correct focusing over the entire surface and even better engraving results. The vacuum table is the ideal table for thin and light materials, e.g. paper and foils that tend not to lie completely flat on the surface.



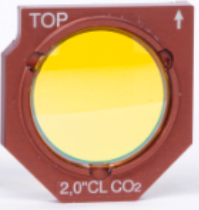

Honeycomb cutting tabletop



The honeycomb cutting tabletop is particularly suitable for applications that require minimum back reflection and best flatness, such as cutting membrane keyboards.

4.3 Lens(es)

CO ₂		Fiber		Flexx	
	1.5" red		3.2" green		2.85" gold (standard)

CO ₂		Fiber		Flexx	
	2.0" black (standard)		5.0" light blue		
	2.0" CL brown				
	2.5" silver				

5 Transport

5.1 Safety notes



Warning

Risk of injury

There is risk of injury from falling parts during transport, loading and unloading of the machine.

- Follow the safety notes.

Observe the safety notes to avoid damage to the machine from improper handling during transport:

- Always move the machine with utmost care and attention.
- Transport the machine/machine components only in its original packaging.
- Take the machine's center of gravity into account when transporting it (minimize the risk of tipping over).
- Observe the packaging symbols (e.g. transport the machine only in upright position).
- Take measures to prevent the machine from slipping sideways, tipping or falling over.
- Transport the machine as carefully as possible in order to prevent damage.
- Avoid vibrations.
- When transporting the machine overseas, the device must be packaged airtight and protected against corrosion.
- When transporting outdoors, transport only in vehicles with roof or sufficient weather protection.
- Protect the machine against transportation damage using straps and inserts, and leave sufficient gaps to other transported items.
- Do not place any other loads or items on the machine or machine components.

5.2 Delivery state

Unless otherwise agreed, the machine is delivered in a wooden crate that contains the laser machine and additional accessories. Transport the machine only in its original packaging.



Caution

Risk of injury

There is risk of injury from falling parts during transport, loading and unloading of the machine.

- Follow the safety notes.

Observe the packaging symbols:



Keep dry!



Fragile, handle with care.

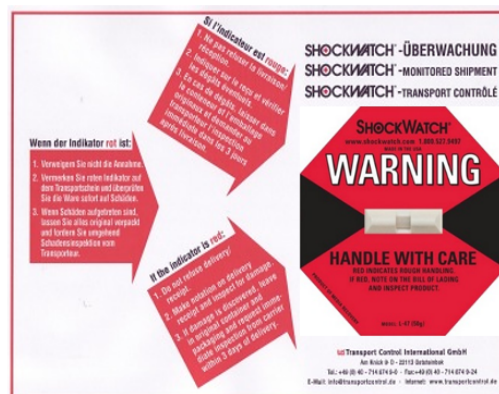


This way up!



Do not stack!

Note the shockwatch sign:



5.3 Temperature and humidity

Transport conditions

Transport temperature (ambiente temperature):	-10 °C to +40 °C (14 °F to 104 °F)
Relative humidity:	Maximum 70%, non-condensing

- Avoid high temperature fluctuations.

Storage conditions

Storage temperature (ambiente temperature):	0 °C to +30 °C (32 °F to 86 °F)
Relative humidity:	Maximum 60%, non-condensing

- Avoid high temperature fluctuations.

5.4 Required tools for unloading and transport

Required tools:

- Unloading - Forklift
- Transport - Pallet truck

5.5 Place of storage

- Keep the machine sealed in its packaging until it is assembled or installed.
- The storage location must be dry, free of dust, caustic materials, vapors and combustible materials.
- Store in a storage room or packaged with adequate weather protection.
- Avoid exposure of the machine to shocks or vibrations.
- Avoid extreme temperature fluctuations.
- Take particular care when packing away electronic components.
- When storing for a longer period, apply a coat of oil to all bare-metal machine parts.
- Regularly check the overall condition of all parts and of the packaging.

5.6 Transport inspection and reporting of defects

- Immediately after receipt inspect the delivery to ensure that it is complete and has not suffered any damage.
- If any transport damage is visible, do not accept the delivery, or accept it only with reservation.
- Record the scope of the damage on the transport documents or delivery note.
- For all defects that are not discovered upon delivery, be sure to report them as soon as they are detected, since damage claims must be filed within a certain period, as mandated by law.

5.7 Unpacking the machine

The system may only be unpacked and transported by qualified personnel. In order to prevent wooden parts from tipping over and falling down, the transport packaging must be opened carefully.



Notice

Keep the original packaging case, in case of machine needs to be transported or relocate.

Dispose all waste according to the applicable waste disposal law.



Caution

The lens unit should be unpacked only after installation of the machine. The lenses are high-quality optical components which must be kept clean in order to ensure optimum marking results. Never touch the lenses with bare fingers.

Steps:

1. Place the transport box vertically on level ground using a suitable forklift or pallet truck.
2. Remove the cover and the side parts of the packaging. Store them in a dry place.
3. Carefully remove the foam material, which protects the viewing window of the cover, and the tape that holds this cover in place.
4. Lift the laser machine out of the box. For this you will require two persons. Position the laser machine on a stable table, on the delivered stand (optional) or on the ride-on exhaust (optional).
5. Remove and open the accessories box which contains all accessory parts required for the installation of the laser machine.

5.8 Relocation of the machine

Steps:

1. Switch off the machine.
2. Disconnect the power cable.
3. Remove the exhaust system.
4. Reposition the machine (e.g. with auxiliary equipment if necessary) and place it on a level, clean floor.
5. Adjust the machine.
6. Initial commissioning of the electrical system.
7. Carry out function test.



Caution

Transport the machine only in its original packaging. Ensure the wooden crates are properly secured otherwise the crates can slip, tip or fall over during transport.

Observe the corresponding safety norms and regulations from the chapters "Safety notes" and "Transport".

- When transporting over long distances, use transport boxes including transport securing.



Notice

If you would like to relocate the machine, contact our experienced Technical Support in your local area.

6 Setup and installation

6.1 For your safety



Notice

The setup has to be carried out by Technical Support.

6.2 Temperature and humidity

Ambiente conditions

Operating temperature (ambiente temperature):	+15 °C to +25 °C (59 °F to 77 °F)
Relative humidity:	45% to 65%, non-condensing

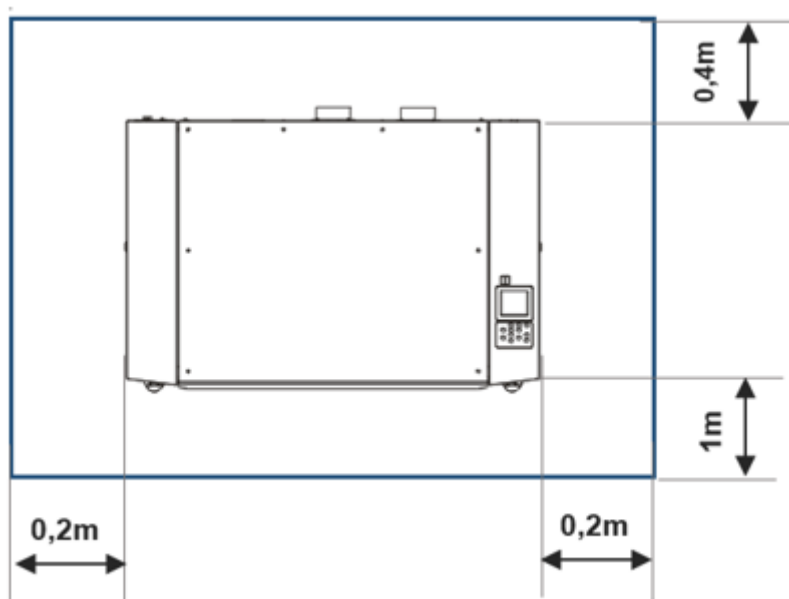
- If the system has been exposed to large temperature fluctuations, it must first be brought back to room temperature before commissioning.

Environmental conditions

- Provide sufficient illumination at the workplace.
- Ensure a dust-free environment (II° according to IEC60947-1).
- Shielding from EMC.
- Freedom of interfering electrical installations, hoses and pipe lines.
- Power supply free of fluctuations.

6.3 Space requirements

Ensure there is shielding or sufficient clearance to or from the wall and neighboring objects.



6.4 Setup

Observe the following steps:

1. Transport the machine to the installation location according to the specifications stated in the chapter "Transport".
2. Make sure all the packaging material has been removed.
3. Remove any transport protections.
4. The machine must stand horizontal.
5. Make sure the protective glass is intact.
6. Now connect the electrical components.
 1. Exhaust
 2. PC
 3. Mains
7. Install the software and register your system during the installation process.

6.5 Connections



Caution

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

6.5.1 Mains connection

- Connect the end of the mains connection cable to the main connection socket.



Warning Current

Wrong voltage can cause damage to the machine.

Do not operate the machine, if the mains voltage does not match the voltage required by the exhaust system, as this may cause damage to the machine.

Make sure that the mains voltage matches the voltage required by the exhaust system.



Notice

Depending on the laser type and region, the main fuses (6) are either covered or open next to the connector.

6.5.2 Connection the PC

1. Connect the laser to a free interface or USB port on your computer.
2. Connect the computer to the mains.
3. Switch on the computer.

6.6 Connection of additional components

6.6.1 Exhaust system



Warning Current

Wrong voltage can cause damage to the machine.

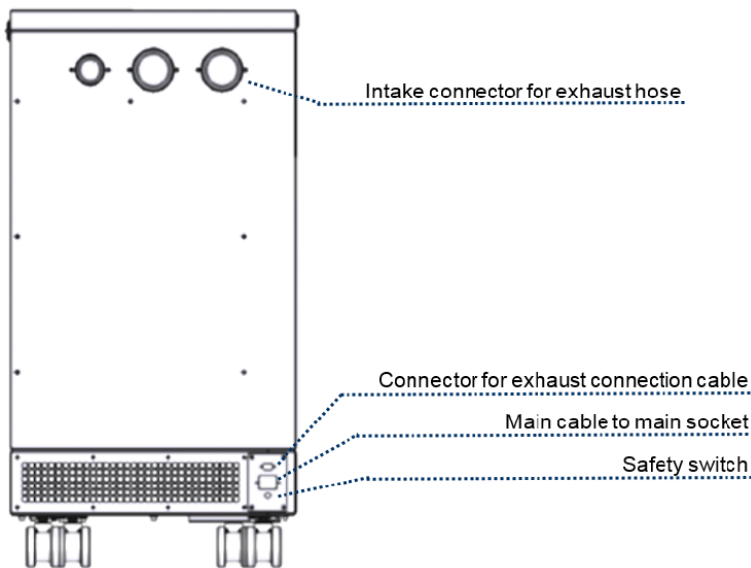
Do not operate the machine, if the mains voltage does not match the voltage required by the exhaust system, as this may cause damage to the machine.

Make sure that the mains voltage matches the voltage required by the exhaust system.

Connecting:

1. When using an original Trotec exhaust system, also connect this, using the exhaust connection cable included, to the exhaust cable connection on the laser.
2. Plug the ends of the exhaust hose into the exhaust nozzle that is intended for this purpose on the exhaust system and on the laser. The position of the connector depends on the type of the exhaust system.
3. Plug in the mains cable of your exhaust system into the mains socket.

Follow the operation and maintenance instructions in the Manual of the exhaust system.



6.6.2 Cooling unit

Water additives for the laser cooling unit

When using water-cooled laser systems, make sure that the water quality is correct in order to ensure proper operation and longevity of the laser cooling unit.

Distilled water with a special additive for corrosion and algae protection is recommended to protect the pipes and to prevent the formation of algae and limescale deposits in the cooler and laser source.

Water additive:

Watertreatment-Kit 480-WTK-10.88 50-100l cooling water system volume.



Caution

Danger of damage to the laser source.

Do not use glycol-containing additives.

Filling or water change:

- The water change must be carried out once a year.
- Order twice the amount of distilled water (one filling approx. 35-40 l), as half is required for the cleaning rinse.
- In case of extremely strong impurities the additive Nalco CCL2567 is recommended for the cleaning rinse.



Notice

The conductivity of the water must not exceed 1000 μ S. This value should not be reached if the additives are used correctly according to the enclosed instructions. A conductivity meter is available on request from Trotec Laser GmbH.

Order adress für additives:

CTA GmbH

Voithstraße 1

71640 Ludwigsburg / Germany

E-mail: service@cta-gmbh.de or slund@nalco.com

7 Operation



Warning

Personal injury or damage to property due to improper operation.

Improper operation can lead to serious personal injury or damage to property.

- Work on the laser machine may only be carried out by authorized and instructed personnel familiar with the operation of the machine, observing all safety regulations.

7.1 Before commissioning

Check the following points before commissioning:

- Completeness and technically flawless condition of the machine and safety devices.
- Order and cleanliness at the workplace.
- Cleanliness of optical components (free of dust and dirt).
- Activated exhaust system.
- Complete electrical installation.
- Correct input voltage of the electrical installation.
- Environmental conditions according to technical specification.
- Compliance with all laser safety regulations and measures.
- Fulfill and compliance with all laser safety requirements.

If errors or functional deviations should occur during the inspection of the listed points, the machine is not considered to be safe to operate and must not (no longer) be put into operation until the cause has been clarified!

If you have any questions, contact our experienced Technical Support in your local area.

7.2 Software

For information on how to use the software, please read the accompanying software manual, which you will find on the storage medium provided.

7.3 Power On/Off



Notice

In order not to restrict or obstruct the freedom of movement of the mechanics, no objects of any kind may be located in the machining area.

All safety protection covers have to be fully functional and closed.



Notice

During the referencing process, all interlocks must remain closed until the movement is completely finished.

Switch on:



1. Switch on the main power supply using the main switch on the rear of the machine.
2. Turn the key switch to the right and hold it against the spring force.
3. As soon as the machine starts, release the key switch.
4. The referencing process starts.
5. A signal tone then sounds and the system is ready for operation.

Switch off:



1. Turn the key switch to the left.



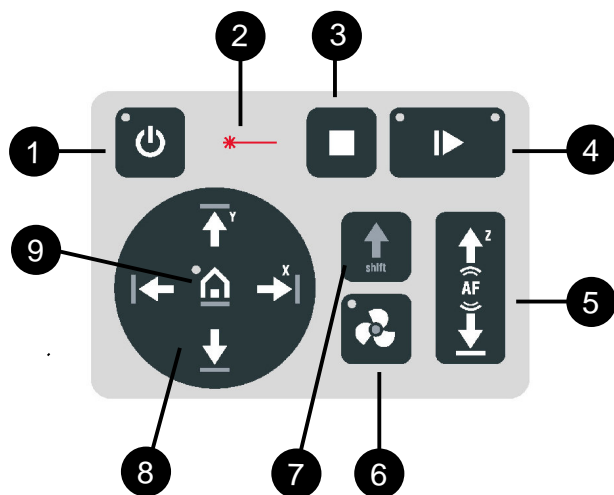
2. Use the main switch at the rear of the machine to turn off the main power.



Notice

By switching off the mains, all processing data are lost.

7.4 Control panel



The control panel refers to the entire unit of the machine control system.
The keypad is a component of the control panel.

- ❶ **Standby-button.** LED On: Standby-Mode
- ❷ **Status indicator laser beam.** LED On: The machine is processing data.
- ❸ **Stop-button**
- ❹ **Start/Pause/Repeat-button**

LED is flashing slowly green (every two seconds).	All covers are closed. Machine is ready.
LED is flashing fast green (twice per second).	Minimum one cover is open.
LEDs light up blue and green.	Data transfer complete. Pause-mode active. Job can be started.
LED lights up green.	Job is running.

❺ Working table control button Z

- Up-button
- Down-button
- Automatic focusing (AF \triangleq autofocus)

❻ Exhaust-button. LED On: Exhaust active

❼ Shift-button. Second operating level

❽ Laser head control button X/Y

- travel distance in X-direction
- travel distance in Y-direction

❾ Home-button. LED On: Temporary change of home position.

7.4.1.1 Description





Image	Button	Description
	Status indicator	LED On: The machine is processing or receiving data.
	Standby-button	<p>LED On: Standby-mode</p> <ul style="list-style-type: none"> Press this button to switch to the Standby-mode. Press the Standby-button while the working table is moving up or down (e.g. by focus automatically). The machine enters Standby-mode only after finishing the movement.
	Home-button	<p>LED On: Temporary change of home position.</p> <ul style="list-style-type: none"> Press the Home-button for 3 seconds to temporarily define the position of the laser head as home position (Marker in JobControl®). <p>To deactivate the temporary home position press the shortcut Shift-button + Home-button.</p>
	Laser head control button X/Y	<ul style="list-style-type: none"> Press one of these buttons to manually move the laser head to the right, left, front or back (travel distance in X/Y-direction). Press two of the for Laser head control buttons X/Y simultaneously in diagonal direction to move the laser in diagonal direction (X+/Y+, X+/Y-, X-/Y-, X-/Y+). Press the Shift-button together with one any desired Laser head control button X/Y to move the laser head quickly to the corresponding end position.







Image	Button	Description
	Working table control button Z	<ul style="list-style-type: none"> Press one of these buttons to manually move the working table up or down (travel distance in Z-direction). Press the Shift-button together with the Up-button. The activation of the automatic focusing starts and the working table is moving automatically upwards. Press the Shift-button together with the Down-button. The working table is moving automatically downwards to the corresponding end position. <p>By simultaneous pressing of the Up-button + Down-button, the activation of the automatic focusing starts and working table is moving automatically upwards.</p> <p>Press any button in X-, Y-, or Z-direction to stop the automatically movement.</p> <p>Activation of the automatic focusing: The laser beam gets automatically focused on the work piece (depends on the selected lens). When there is no work piece on the working area, the focus is on the table or rather on the tabletop.</p> <p><u>Light barrier:</u> Focusing on the material which is close to the sensor.</p> <p>→ For further information, see chapter "focusing" in this manual.</p>
	Stop-button	<ul style="list-style-type: none"> Press this button to stop the current working process.
	Start/Pause/Repeat-button	<p>Start:</p> <ul style="list-style-type: none"> Press this button to start a job. The job has to be on the plate in JobControl®. <p>Pause:</p> <ul style="list-style-type: none"> Press this button to pause the job (LED On) which is currently being processed. Press this button again to continue the job (LED Off). <p>Repeat:</p> <ul style="list-style-type: none"> Press this button after a job was finished to repeat the actual job.

Image	Button	Description														
	Status LEDs	Meaning of the LEDs: <table><tr><th>LED</th><th>Description</th></tr><tr><td>Green, flashing slowly (0.5 Hz)</td><td>All covers are closed. Machine is ready.</td></tr><tr><td>Green, flashing fast (2 Hz)</td><td>Minimum one cover is open.</td></tr><tr><td>Blue + Green, permanent</td><td>Data available. Pause-mode active.</td></tr><tr><td>Green, permanent</td><td>Job is running. Processing and receiving data.</td></tr></table>	LED	Description	Green, flashing slowly (0.5 Hz)	All covers are closed. Machine is ready.	Green, flashing fast (2 Hz)	Minimum one cover is open.	Blue + Green, permanent	Data available. Pause-mode active.	Green, permanent	Job is running. Processing and receiving data.				
LED	Description															
Green, flashing slowly (0.5 Hz)	All covers are closed. Machine is ready.															
Green, flashing fast (2 Hz)	Minimum one cover is open.															
Blue + Green, permanent	Data available. Pause-mode active.															
Green, permanent	Job is running. Processing and receiving data.															
	Shift-button	<p>Second operating level for further operation. Press the Shift-button simultaneous with the buttons below to activate the following function:</p> <table><tr><th>Button</th><th>Description</th></tr><tr><td>Shift + Exhaust</td><td>Air assist On/Off.</td></tr><tr><td>Shift + Laser head X/ Y</td><td>Laser head moves fast to corresponding end position (X- or Y-position).</td></tr><tr><td>Shift + Standby</td><td>Keypad locked/unlocked.</td></tr><tr><td>Shift + Working table Z, up</td><td>Working table is moving automatically upwards and the activation of the automatic focusing starts.</td></tr><tr><td>Shift + Working table Z, down</td><td>Working table is moving automatic- ally downwards to the corresponding end position.</td></tr><tr><td>Shift + Home</td><td>Deactivates temporary home position.</td></tr></table>	Button	Description	Shift + Exhaust	Air assist On/Off.	Shift + Laser head X/ Y	Laser head moves fast to corresponding end position (X- or Y-position).	Shift + Standby	Keypad locked/unlocked.	Shift + Working table Z, up	Working table is moving automatically upwards and the activation of the automatic focusing starts.	Shift + Working table Z, down	Working table is moving automatic- ally downwards to the corresponding end position.	Shift + Home	Deactivates temporary home position.
Button	Description															
Shift + Exhaust	Air assist On/Off.															
Shift + Laser head X/ Y	Laser head moves fast to corresponding end position (X- or Y-position).															
Shift + Standby	Keypad locked/unlocked.															
Shift + Working table Z, up	Working table is moving automatically upwards and the activation of the automatic focusing starts.															
Shift + Working table Z, down	Working table is moving automatic- ally downwards to the corresponding end position.															
Shift + Home	Deactivates temporary home position.															
	Exhaust-button	<ul style="list-style-type: none">Press this button to switch the exhaust On/Off. <p>LED On: Exhaust active. LED Off: Exhaust deactivated.</p> <p>After the laser process is completed, the exhaust switches off after some seconds ("Time to hold" in JobControl®) automatically or when you press the button.</p>														

7.4.1.2 Shortcuts

























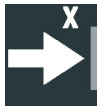




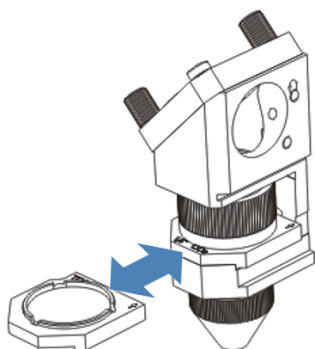
Image	Button	Description
		Shift-button + Exhaust-button Air assist On/Off.
		Shift-button + Laser head control button X/Y Laser head moves fast to corresponding end position (X- or Y-position).
		
		
		
		Shift-button + Standby-button Keypad locked/unlocked.
		Shift-button + Working table control button Z (Up-button) The activation of the automatic focusing starts and the Working table is moving automatically upwards.
		Shift-button + Working table control button Z (Down-button) Working table is moving automatically downwards to the corresponding end position.
		Working table control button Z (Up-button + Down-button) The activation of the automatic focusing starts and the Working table is moving automatically upwards. (See chapter "Description", "Working table control button Z").
		Shift-button + Home-button Deactivate temporary home position.

Image	Button	Description
		Laser head control button X/Y Laser head moves diagonal to the according direction.
		
		
		
Image	Button	Description
		Shift-button+ Stop-button LED interior lighting On/Off.

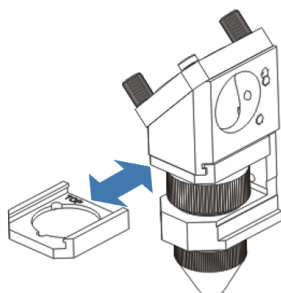
7.5 Lense placement



1. Loosen lens by turning the clamping ring inwards.
2. Remove lens.
3. Check the lens for damage.

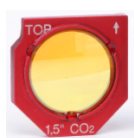


4. If necessary, clean both sides of the lens with cleaning liquid and cleaning tissue.

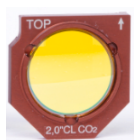


5. Insert the lens with the lettering facing up, either above or below the clamping ring depending on the lens type.
6. Fixate the lens with the clamping ring.

The following lenses must be inserted below the clamping ring:



1.5"



2.0"



Notice

All other available lenses must be inserted above the clamping ring.

7.6 Switch laser source manually



Notice

Only possible for flexx laser systems.

Switching between CO₂ laser source and fiber laser source is done either manually by pressing a shortcut on the control panel, or by making settings in JobControl®.

Procedure for manual switching between CO₂ laser source and fiber laser source:

1) After referencing the machine, press "standby".	2a) Selection: CO₂ laser source Press the marked shortcut simultaneously to switch to the CO ₂ laser source.	2b) Selection: fiber laser source Press the marked shortcut simultaneously to switch to the fiber laser source.

7.7 Focusing methods

Precise laser engraving depends on several factors. Apart from the right choice of lens, working tables and a corresponding exhaust system, correct focusing plays a key role.

The correct setting of the focus, which means the right distance between the laser head and the material to be engraved, is crucial for a perfect application result.

Manual focus mode

- Focus tool

Automatic focus modes

- Software focus (JobControl®)
- Light bar focus



Caution

If workpieces with more than 66.14 lbs (30 kg) have been placed on the table, the table must not be moved up or down anymore as this might damage the mechanics of the machine.

It is mandatory to focus on the height of the material before loading material of 66.14 lbs (30 kg) and above.



Notice

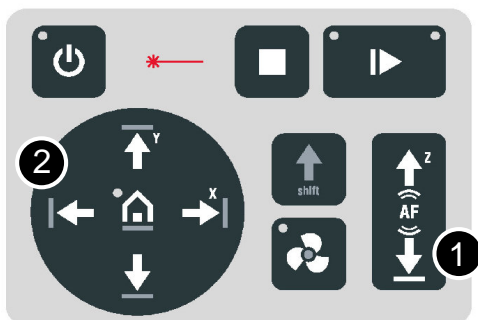
Defects from head crashes (working head hits material or working table) are excluded from warranty.



Notice

The equipment of the machine may vary depending on the model.

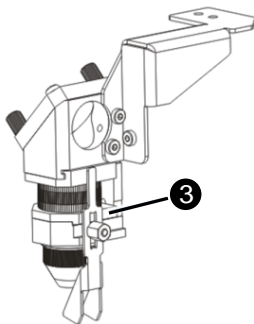
7.7.1 Focus tool



1. Move the processing head over the material to be engraved by means of the Laser head control button X/ Y (2) on the keypad.



2. Hang the focus tool (3) on the allocated space on the laser head so that the focus tool can move unhindered.
3. Move the X-axis downwards by pressing the Working table control button Z (1).



4. Before the focus tool reaches the work piece, move the working table upwards very slowly and step by step by briefly tapping the Working table control button Z (1) until the focus tool tilts to the side or falls off its position.

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



Notice

Using a flexx lens the focus point differs depending on the laser source.

Note when focusing using a focus tool, the standard focus tool supplied with a flexx lens is always adjusted for a fiber laser source. Therefore it must only be used in conjunction with a fiber laser source.

Having a machine with a CO₂ laser source use the software focus via JobControl®. A manual focusing via focus tool is not necessary. See chapter "Software focus (flexx lens)".

7.7.2 Software focus

The following values must be entered in JobControl®:

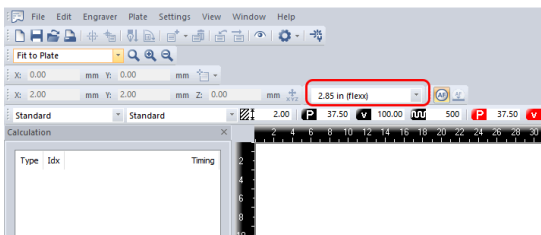
- Lens type
- Material thickness (exact measurement)
- Material process type



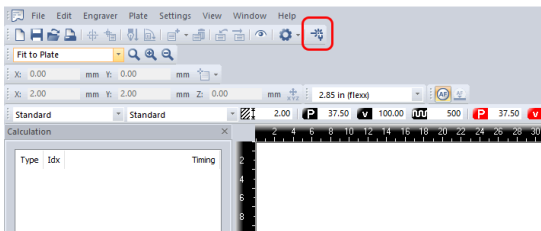
Caution

The values entered must match the material and the lens in the machine in order to avoid a head crash.

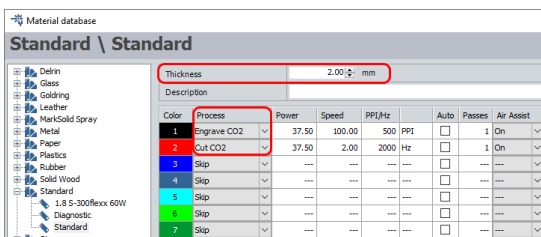
When using spacer the total material thickness is determined by the thickness of the spacer and the material.



1. Select the lens type in the menu bar.

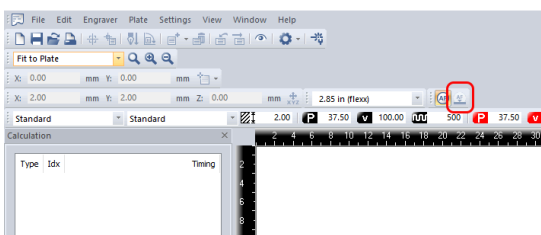


2. Click on the icon "Material database" or go to Settings/ Material database in the menu.



3. Enter the material thickness.

4. Enter the process type.



5. Click on the icon "Focus laser". The working table moves automatically to the correct position (moves in Z direction).



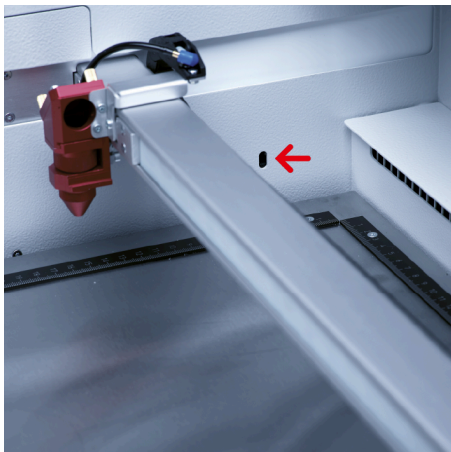
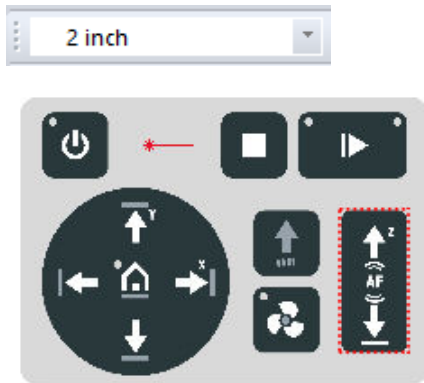
Notice

Using a flexx lens the focus point differs depending on the laser source.

When carrying out a software focus, JobControl® is going to switch to the right laser source and adjusts the focus point difference automatically as soon the lens type and processing type per laser source get entered into the material database in JobControl®. Manually switching the laser source is therefore not necessary.

Whenever the flexx lens and a CO2 laser source processing type gets selected, the table will drive down automatically ("standard" focus procedure).

7.7.3 Light barrier focus



1. Select the lens type in the menu bar of JobControl®.
 2. Make sure that the lens that is installed in the laser head is selected.
 3. At the same time, press the Away key + Down key to adjust the height of the machining table so that it moves upwards.
 4. Press the Up-button + Down-button simultaneously for the table to move up.
 5. As soon as the previously loaded material passes the light barriers, the upward movement of the table stops, and the table moves to the correct focus position.
- Focusing is then complete, and you can start the laser processing.



Notice

The light barrier autofocus is ideal for flat opaque materials of unknown thickness.

This autofocus option will not work on transparent, rough or very thin material, which is thinner as the ruler itself.

7.8 Options

7.8.1 Rotary attachment (option)

The Rotary attachment is used to engrave cylindrical workpieces. Upon selection of the option "Rotary attachment" in the JobControl® software and entering the diameter of the object to be engraved, the image size will automatically be automatically adjusted to the diameter of the workpiece to be processed.



Caution

Damage to electronics.

Inserting or removing the Rotary attachment while the machine is turned on may irreparably damage the electronics.

Switch off the machine before inserting or removing the Rotary attachment.

Rotary attachment with cones:

Max. workpiece diameter: 7.2 inch (184 mm)

Max. workpiece length cones: 19 inch (485 mm)

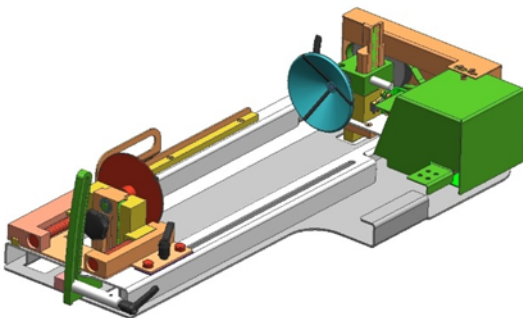


Figure 1: Rotary attachment with cones

Rotary attachment with rolls:

Max. workpiece diameter: 3.7 inch (94 mm)

Max. workpiece length: 26.7 inch (680 mm)

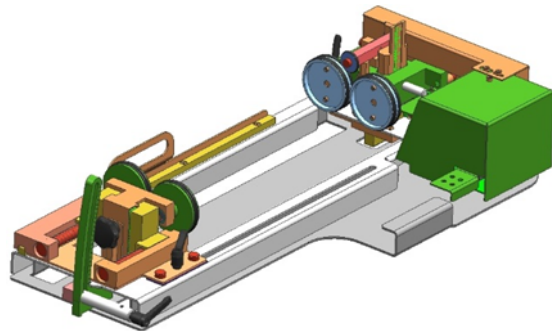


Figure 2: Rotary attachment with rolls

7.8.1.1 Installation and commissioning of the rotary attachment



1. The machine must be switched off.



Warning Current

If the rotary attachment is connected during operation, the connections and the electronics will be damaged. Such damage is excluded from the warranty.

1. Place the rotary attachment on the base frame and the metal pins provided for this purpose using the insertion handles.
2. Connect the device with the connecting cable via the connector on the left side of the housing.

7.8.1.2 Mounting the work piece in the rotary attachment

1. Measure the diameter of the workpiece.
2. Adjust the height and angle of the system by loosening and fixing the levers.

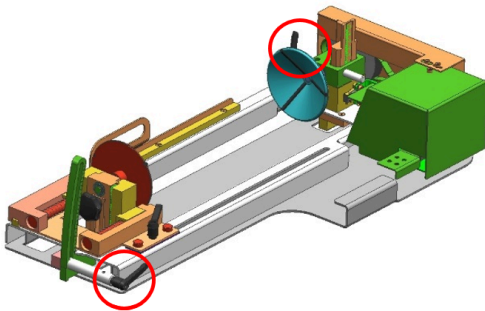


Figure 3: Levers for fixation of height and angle

3. Loosen the slider by using the lever in order to clamp the workpiece between the two cones or rolls.

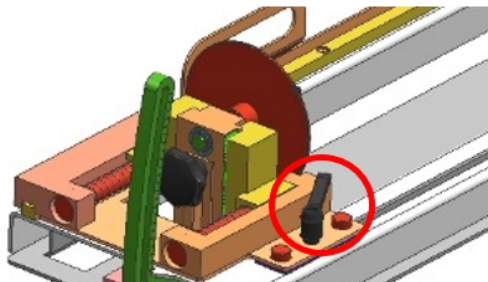


Figure 4: Slider inclusive lever

4. Switch on the laser. The axis automatically moves over the middle of the rotary attachment.
5. Position the laser head over the workpiece at the position where you want to engrave.
6. Focus the object with the focus tool. The engraving area must be parallel to the X axis. If necessary, do this with the aid of the angle adjustment. Do not touch the lens holder.

7.8.1.3 Engraving process

1. Create a graphic with the help of the graphics software. Select the printer driver and rotary attachment, and enter the diameter of the workpiece.
2. Perform the settings for size and orientation in the JobControl® menu "Plate" > "Setup Plate" and choose - if necessary - the engraving material. You can determine the orientation of the graphic on the workpiece with the option "Job Orientation".
3. In the menu "Settings" > "Options" > "Accessories", select the option "Rotary Engraving" and enter the diameter of the object (see Fig. 6). If the diameter has already been entered in the printer driver, the size is automatically transferred into JobControl .

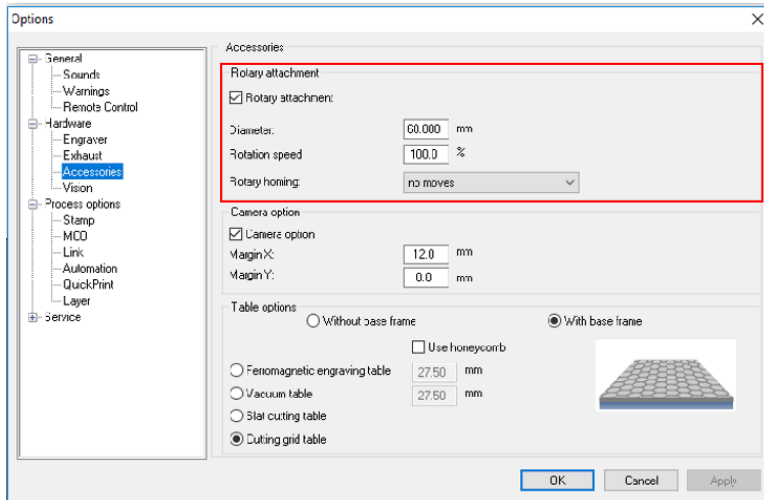


Figure 5: Einstellungen "Rundgravieren"

4. Double-click on the job in the waiting list to place it on the plate.
5. Position the laser head over the workpiece.

6. Start the engraving process.

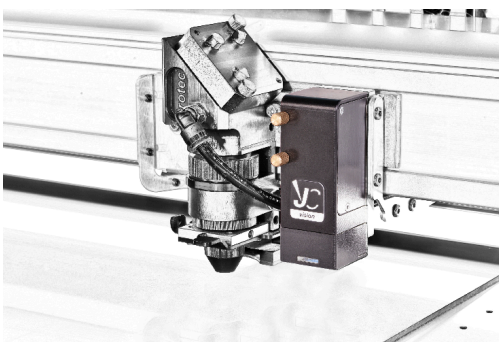


Notice

See the Software manual for additional functions.

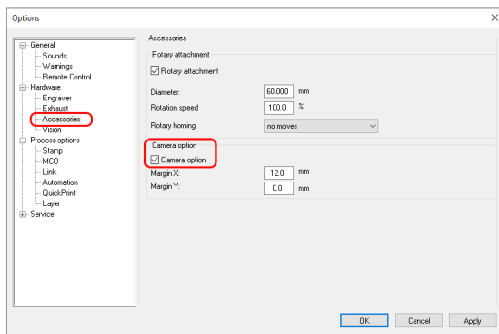
When using the Rotary attachment, the autofocus is automatically deactivated.

7.8.2 JobControl Vision



With the JobControl® Vision additional option, a camera is located at the laser working head which reads the register marks on the plate material.

This allows distortions in the print to be detected and compensated for. The material is cut to fit exactly. Production times are accelerated and cost-intensive incorrect cuts are avoided.



In JobControl®, under the Options - Hardware - Accessories tab, the Camera option must be checked in order to adapt the acceleration and travel distance to the weight on the working head.



Notice

When the camera is removed, the hook can be removed to return the speed and travel distance to maximum.

7.8.3 Temperature sensor

The temperature sensors ensure reliable temperature monitoring of the interior of the machine and are available as additional option.

If a preset temperature value is exceeded, an acoustic alarm continuously sounds to warn the operator of abnormal temperature trends during processing.



Warning

Fire hazard

The acoustic alarm upon startup of the machine indicates that the sensors are operating properly. However, the sensors do not guarantee fire prevention.

- The unit must not operate unattended despite the integrated temperature sensors.
- If the acoustic alarm does not sound when the machine is switched on, check the functionality of the sensors.
- In case of questions, contact our experienced Technical Support in your local area.

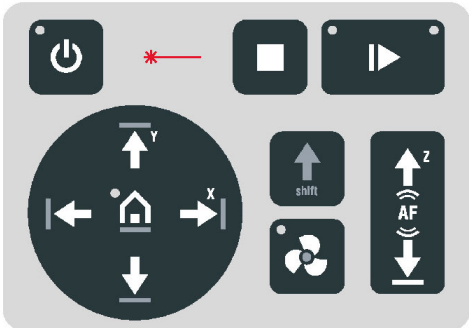
Measurement Relative Temperatures

If there is a difference of more than 6°C between the sensor in the front area of the machine and the respective other sensors, an alarm is triggered.

Measurement Absolute Temperatures

The alarm is triggered when 40°C per sensor is exceeded.

Temperature sensor alarm acknowledgement



Press any key on the keypad to acknowledge the alarm.



Notice

The signal tone sounds again and again until the temperature returns to normal. Alternatively, switch off the laser system and check the temperature sensors.

7.8.4 Industrial Interface

Information on installing the industrial interface:

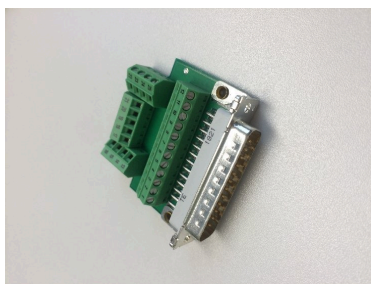
Pin Assignment of the socket housing (25 pin).



PIN #	Name	Technical specification
1	START+	Potential free +24V DC
2	START-	Potential free 0V DC
5	STOP+	Potential free +24V DC
6	STOP-	Potential free 0V DC
7	BUSY+	Potential free input, max. 100 mA, 24V DC
8	BUSY-	Potential free 0V DC
9	SIGNAL_LIGHT OUT1	Potential free +24V DC, 1A – laser ON/IDLE (green)
10	SIGNAL_LIGHT OUT2	Potential free +24V DC, 1A – laser ACTIVE (yellow)
11	SIGNAL_LIGHT OUT3	Potential free +24V DC, 1A – laser ERROR (red)

PIN #	Name	Technical specification
12	SIGNAL_LIGHT OUT4	Potential free +24V DC, 1A
13	SIGNAL_LIGHT GND	Common ground for SIGNAL_LIGHT
14	INTERLOCK 1 SEND	Connected to internal power supply
16	INTERLOCK 2 SEND	Connected to internal power supply
18	INTERLOCK 1 RETURN	Open/closed link to INTERLOCK 1 SEND
20	INTERLOCK 2 RETURN	Open/closed link to INTERLOCK 1 SEND

Included in delivery: DB25 connector with screw terminal



8 Maintenance

8.1 Safety notes



Danger

Improper maintenance can cause serious injury or damage.

Maintenance may be carried out only by authorized, trained personnel who are familiar with how to operate the machine and in strict observance of all safety notes.



Danger

Risk of fire or explosion.

Improper handling of the machine may cause fire or explosion.

- For cleaning the machine, do not use explosive or flammable substances or cleaning agents.
- No flammable or explosive liquids may be stored in or near the machine.
- Always keep the system clean, and remove flammable parts from the working area or exhaust area.



Warning Current

Danger of electrical shock.

Work on electrical fittings may be carried out only by qualified personnel and in strict observance of the safety notes.

Before any maintenance work takes place, disconnect the machine from the mains voltage and make sure the system is de-energized.

8.2 Maintenance schedule

System Components	Daily	Weekly	Monthly	Yearly
Lens, mirror #3	✓✓			
Mirror #2			✓✓	
Working table and rulers.	✓✓			
Entire working area. General cleaning.			✓	
Cover of the laser source and housing.			✓	

✓ ✓ Check and clean whenever required.

✓ Clean whenever required.



Notice

In order to ensure the maximum availability and lifetime of the system, we recommend that you regularly check the filter, ventilation and exhaust slots and keep the surrounding area clean. A visual inspection of the lenses is likewise recommended before switching on the system.

8.3 Cleaning

8.3.1 Machine

1. Move the working table into a position in which it is easiest for you to clean the surface with a window cleaning agent and paper towels.
2. Switch off and disconnect the machine from the mains.
3. Open the transparent acrylic top lid and front panel.
4. Thoroughly remove all loose dirt particles and deposits in the interior of the machine (e.g. with a vacuum cleaner or broom).
5. Clean the air guide plate and vent slots of the exhaust box inside the machine using a dry or damp cloth or brush.
6. Clean the cover of the laser source and vent slots at the back of the machine using a dry or damp cloth.
7. Clean the transparent acrylic top lid using a dry or slightly damp cotton cloth. Do not use paper towels as they could scratch the acrylic.

8.3.2 Optics in general

Trotec Laser GmbH recommends to use the cleaning set enclosed. Alternatively, use high-quality cotton swabs together with the provided cleaning liquid.



Notice

The following cleaning products are available as accessory parts:

- Lens cleaning cloth
- Lens cleaning liquid

8.3.3 Lens



Warning

Damage to optics.

Soiled optics absorb laser radiation and can thus be destroyed. Broken or damaged lenses as well as thermal decomposition of lenses release particles which cause serious damage to the health.

- The passive reflectors and optics in the area of the laser beam guidance should be cleaned regularly.
- Special care is required when handling, attaching and cleaning these elements.
- Do not exert non-uniform pressure.
- Do not use tools or hard objects to clean the surface.
- Never touch the optics with your bare fingers.
- Never use cleaning tissues twice.
- When lenses get broken, damaged or thermal decomposed follow the protective measures.
- Disposal according to regulations and laws valid in the user's country.
- Lenses with scratches or penetrations must not be used anymore.

Step1: Preparation

1. Blow away loose particles and dust by means of bellows or compressed air (according to ISO 8573:2010 class 1).
2. Get the cleaning liquid and cleaning tissues ready.
3. Move the table up and put a cloth under the lens holder (so that the lens will not be damaged if it falls out of holder by accident).
4. Loosen the lens by screwing the clamping ring inward.
5. Now remove the lens and check the surface.



Step 2: Cleaning with cleaning liquid and cleaning tissues

1. Remove the lens and rinse it with cleaning liquid to wash away coarse soiling.
2. Put some cleaning liquid onto the lens and leave the liquid for 1 minute to take effect.
3. Soak a cleaning tissue with cleaning liquid and carefully wipe off the surface.
4. Now carefully insert the lens with the lens holder into the laser head and fixate the clamping ring.



Notice

Trotec Laser GmbH recommends to use the following cleaning products, which are available as accessory parts:

Lens cleaning cloth (part number 69249) and lens cleaning liquid (part number 69248).

8.3.4 Mirror



Caution

Make sure that you do not touch the mirror with your fingers, since this would greatly reduce the service life of the mirror.

Do not touch the mirror with your fingers or with tools, and never use a cleaning tissue twice, as the surface could easily be scratched.

Cleaning the mirrors #2 and #3

1. For cleaning of mirrors #2 and #3, you must first remove the right maintenance panel.
2. Do not remove the mirror #2. It must remain in the machine for cleaning.
3. The mirror #3 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 (2) while doing this!

4. Flush the mirror with cleaning liquid to wash away coarse soiling.
5. Put some cleaning liquid onto the mirror and leave the liquid for 1 minute to take effect.
6. Soak a cleaning tissue with cleaning liquid and carefully wipe off the surface.
7. Now carefully put back the mirror and fixate it with the two Allen screws.

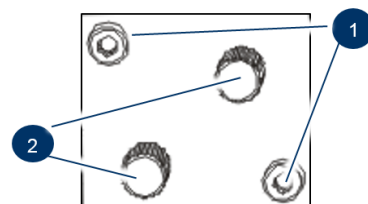


Figure 6: SpiMirror #3

9 Troubleshooting

This chapter should enable the maintenance personnel to identify and resolve operational faults based on error messages and symptoms.



Warning

Risk of fire from incorrect parameter settings.

Laser operation with incorrect parameter settings such as power settings, speed or frequency can result in flame formation.

- Laser operation permitted only under supervision.



Caution

System failures that cannot be remedied can cause damage to the machine.

- Disconnect the machine from the mains and contact your local Technical Support.

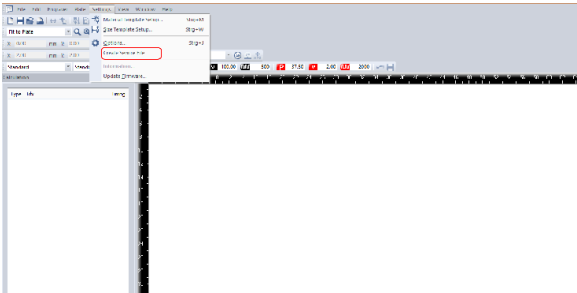
9.1 Error, cause and remedy

Problem	Possible cause	Remedy
Too low engraving depth.	<ul style="list-style-type: none"> • Imprecise focusing. • Dirty optics. 	<ul style="list-style-type: none"> • Check focus. • Clean optics.
Blurred edges.	<ul style="list-style-type: none"> • Imprecise focusing. 	<ul style="list-style-type: none"> • Check focus.
Missing cut lines.	<ul style="list-style-type: none"> • Zero passes in material database. • Line thickness in CorelDraw too big. • Color was skipped in JobControl®. 	<ul style="list-style-type: none"> • Increase the amount of passes in the JobControl® material database. • Reduce line thickness to the smallest possible value. • Set color to cutting in the JobControl® database.
Waviness of the lines.	<ul style="list-style-type: none"> • Lens is loose. 	<ul style="list-style-type: none"> • Check lens and lens holder.
No visible marking result.	<ul style="list-style-type: none"> • Too low laser power. • Too high speed. • Not focused. • Wrong focus tool. 	<ul style="list-style-type: none"> • Increase power setting. • Reduce speed. • Check focus. • Change focus tool. • When using autofocus, check the settings within the software (lens, material thickness, table).

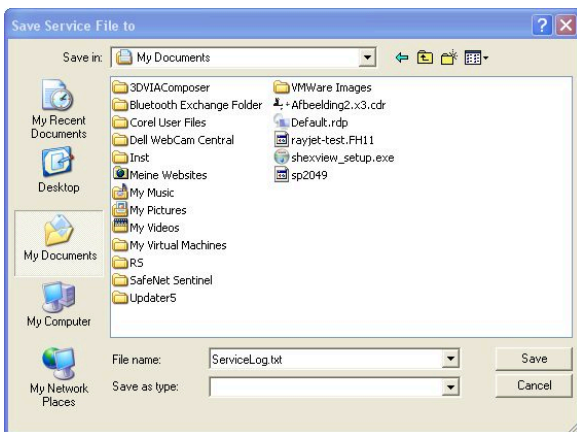
Problem	Possible cause	Remedy
Fine details on stamps are engraved too thinly.	<ul style="list-style-type: none"> Too steep shoulders. 	<ul style="list-style-type: none"> Choose other shoulder or edit (flat/medium/steep): Options/ Process Options/Stamp.
The size to be engraved or cut does not match the size in CorelDraw.	<ul style="list-style-type: none"> Raster correction ON in JobControl®. Wrong size settings in the printer driver. Wrong image position is selected in the layout tab (printing). Wrong machine is selected in the JobControl®. 	<ul style="list-style-type: none"> Switch off raster correction in JobControl® (settings/ advanced options/laser tab). Use the same size as in CorelDraw. Switch the layout settings to: as in document. Select the proper machine in JobControl®.
Corners and angles are not cut or marked.	<ul style="list-style-type: none"> Power too low. 	<ul style="list-style-type: none"> Increase the correction in JobControl® (Settings / Material Templates Setup - Correction).
No referencing after comissioning.	<ul style="list-style-type: none"> Top, front or side door not closed. 	<ul style="list-style-type: none"> Close doors.
No response upon switching on of the system.	<ul style="list-style-type: none"> Fuse blown. No electric power at power outlet. 	<ul style="list-style-type: none"> Check fuses. Check power outlet.
No communication with machine.	<ul style="list-style-type: none"> Invalid COM port selection. Communication cable defect. COM: port is in use by another program. 	<ul style="list-style-type: none"> Change selection. Check cable. Close this program, or change the COM port.
Connection to machine frequently interrupted.	<ul style="list-style-type: none"> Electromagnetic emissions. 	<ul style="list-style-type: none"> Make sure that machine and computer are connected to the same electric circuit; the original cable lengths should not be exceeded.
Offsets between engraving jobs and cut lines.	<ul style="list-style-type: none"> Speed too high. 	<ul style="list-style-type: none"> Reduce speed.
Errorcode 124	<ul style="list-style-type: none"> Interlocks open during the referencing process. 	<ul style="list-style-type: none"> Restart the machine (key switch).
Other faults.		<ul style="list-style-type: none"> Contact Technical Support.

9.1.1 How to create a service file

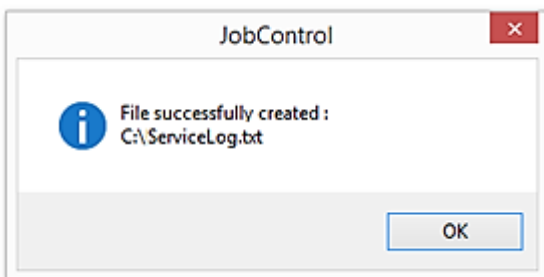
1. Start the software JobControl®.
2. Position the job on the plate.
3. Run the job.



4. Go to "Settings" and select "Create Service file".



5. The window "Save Service File to" shows up. Select a directory to save the file into and click on "Save".
6. The window "Add Layout File" appears. Select the layout file that was sent to JobControl® and possibly caused a failure (e.g.: a CorelDraw file, Photoshop file, AutoCAD file,...).
7. Click on "Open".



8. The location to which the successfully created service file was saved appears on the screen.

9. Send the service file "SeviceLog.txt", a screenshot of the error message and a detailed description to your sales representative or to techsupport@troteclaser.com.

10 Contact details

Technical Support

In case of questions, contact our experienced Technical Support in your local area.

For global service contact numbers and further information please see our website, section "Support":
www.troteclaser.com

When calling, please make sure that the machine is in your immediate vicinity, and that you have the following information ready (see response form):

- At which working process did the problem occur?
- What you have done so far to correct the problem.
- Serial no (see type plate).
- Error code.

Local Offices / Sales

Our store locator and detailed information on our offices in your area can be found on our website in section "Contact", "Local Office": **www.troteclaser.com**

Technical Documentation

For feedback or to suggest changes to this manual, contact:

Technical documentation: +43 (0) 7242 239 - 7000

E-Mail: **technical.documentation@troteclaser.com**

11 Disassembly



Warning

Danger of injury when disassembling the machine.

There is danger of injury when disassembling the machine.

Always wear suitable protective clothing (e.g. safety goggles, safety shoes, safety gloves).



Warning Current

Electric current.

The machine must be disconnected from the main power supply.



Notice

- Always use suitable tools to disassemble the machine.
- Mind the springs.
- Follow chapter "Disposal".

Process:

1. Remove all workpieces from the system.
2. Turn the key switch to switch off the machine.
3. Switch off the main switch at the back of the machine.
4. Remove the exhaust system.
5. Disconnect all cables at the back of the machine.

12 Disposal



Disposal

Do not dispose of the machine with domestic waste!

Electronic devices have to be disposed of according to the regional directives on electronic and electric waste disposal.

In case of further questions, please ask your supplier.

Use suitable tools if you have to disassemble the machine. All parts need to be sorted into the individual material types and be disposed of according to the regional directives on electronic and electric waste disposal.

Acceptance report



Dear customer!

We request your confirmation of properly completed transfer of the machine. Please transmit a copy of this document - filled out and signed by an authorized company representative - to an employee of our sales affiliate for forwarding to the manufacturer.

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 notes discussed.
- ☐ Trial run performed.
- ☐ Deficiencies determined.

The machine with the machine designation:

has been checked according to the listed items and has been handed over properly.

City, Date

(Instructed person)
Name, Position

Company stamp, Signature

Response form



Dear customer!

In case of any trouble with the machine, please provide the following information and additionally create a service file.

Contact details

Name: _____
Country: _____
Phone: _____
E-mail: _____
Date: _____

Machine data

Serial number: _____
JobControl® version: _____
Driver version: _____
Layout Software: _____
Firmware version: _____

Description of the problem

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

What happened before the error occurred? (Thunder and lightning, Windows-Update...)

What attempts were made to solve the problem?

Please send the information to your sales representative, to your local support or to following e-mail address: techsupport@troteclaser.com.

Training verification form



Trainee: _____

Trainer: _____

Date of Training: _____

The employee named above was instructed in the operation of the
laser system. Especially the following topics were covered:

- ☐ Machine function
- ☐ Danger areas
- ☐ Warnings
- ☐ Position of the Emergency stop button
- ☐ Personal protective equipment
- ☐ Operating equipment
- ☐ Workflow
- ☐ Setting-up
- ☐ Startup and Shutdown
- ☐ Reporting of unexpected working results and actions to be taken.
- ☐ Reporting of failure and actions to be initiated.
- ☐ Responsibility for troubleshooting.
- ☐ Operating manual and it's storage location for inspection.

Signature Trainer

Signature Trainee

Speedy 300 flexx

Laser engraving system

Mechanics

Working area	726 x 432 mm (29" x 17")
Max. height of work piece	200 mm (7.8") with 1.5" lens 200 mm (7.8") with 2.0" lens 187 mm (7.3") with 2.5" lens 165 mm (6.5") with 2.85" lens 169 mm (6.6") with 3.2" lens 149 mm (5.8") with 4.0" lens 123 mm (4.8") with 5.0" lens
Working table	Ferromagnetic table, honeycomb cutting tabletop
Max. processing speed	3.55 m/s (140 ips)
Acceleration	50 m/s ² (1968 ips ²)
Motors	Brushless DC servo motors
Encoder	Incremental measuring system
Optical elements	Telescope, lens and mirrors
Lens	2.85" (flexx); 1.5", 2.0", 2.5", 4.0" (CO ₂); 3.2", 5.0" (fiber)
Accuracy	+/- 0.015 mm (0.0006 in), over the whole working area
Addressable accuracy	5 µm (0.0002 in)
Accuracy to size of parts	According to material and process
Maximum material load	20 kg (44 lbs), load over the whole working area
Interface	USB

Features standard

Lens	2.85"
InPack Technology™	Protects working head and all moving parts from dust
Exhaust	For entire working area
Software	JobControl® Expert
Operating console	Keypad, safety-switch, system turnkey; PC and Monitor not included
Laser Pointer	655nm, <0,99mWcw
Autofocus	Light bar sensor and software

Work area light

LED

Options

Temperature sensor

To check temperature inside the work area.

Vacuum table

Ruler in cm or inch, instead of the standard table

Water cooling

For CO₂ laser sources with 60W or more, external cooler needed

Accessories

JobControl® Cut

Software to manipulate and optimize cut geometries

JobControl® Vision

Camera compensation system for print & cut applications

UniDrive

Supports different operating systems e.g. iOS, or multiple design stations

Rotary attachment

Available with conus, three-jaw chuck, three-jaw ring chuck or Drill chuck

TroCare

Comprehensive package of technical services

Laser

Laser system CO₂

Sealed-off laser, maintenance free, air cooled, wavelength 10.6 µm

Laser power CO₂

60, 80, 100 and 120W watts

Laser system fiber

maintenance free, air cooled, wavelength 1064 nm

Laser power fiber

20, 30 and 50 watts

Dimensions & weight

Width x Depth x Height

1130 x 943 x 1054 mm (48.8 x 37 x 60.6 in)

Weight

Approx.. 215 kg / 474 lbs (depending on laser power)

Safety & environment

Laser class

CDRH laser class 2

Interlock

Double Interlock safety system

Ambient conditions

Mandatory ambient temperature +15° to +25° C or 59° to 77° F
Humidity 40% to max. 70%, not condensing
Dust free environment (2nd degree according to IEC 60947-1)

Certificates

CE compliant, FDA listed

Exhaust

Exhaust working point	Min. 200 m ³ /h at 1.000 Pa (Min. 117.7 cfm at 4.015 in H ₂ O) With Vacuum table min. 350 m ³ /h at 1.600 Pa (min. 206 cfm at 6.424 in H ₂ O)
-----------------------	--

Cooling

Air cooling	Active air flow cooling with fan
Water cooling	Optional available for CO ₂ laser sources for 60 – 120 watts with external water cooler

Electrical

Voltage & power consumption	1 ~ AC 110-230V 50/60Hz, max. 1.4 kW (60 watts) 1 ~ AC 230V 50/60Hz, max. 1.8 kW (100-120 watts)
-----------------------------	---

Subject to change without notice.

Errors and omissions excepted.

Model identification Speedy 300X-8066

September 2020

EG-Konformitätserklärung

im Sinne der EG-Maschinenrichtlinie 2006/42/EG, Anh. II 1. A

trotec
laser. marking cutting engraving

Hersteller:

Trotec Laser GmbH
Freilinger Straße 99
4614 Marchtrenk
Österreich

Zur Zusammenstellung der technischen Unterlagen bevollmächtigte Person:

Trotec Laser GmbH
Freilinger Straße 99
4614 Marchtrenk
Österreich

Beschreibung und Identifizierung der Maschine:

Produkt / Erzeugnis	Laser Schneid- und Graviersystem
Modellbezeichnung	Speedy300 , Speedy300 flexx
Modell Identifikation	Speedy 300C-8066, Speedy 300X-8066
Seriennummer	S3-7### , X3-7###
Maschinengruppe	8066
Funktion	Anlage zum Laserschneiden und Lasergravieren

Es wird ausdrücklich erklärt, dass die Maschine allen einschlägigen Bestimmungen der folgenden EG-Richtlinien bzw. Verordnungen entspricht:

2006/42/EG	EG Maschinenrichtlinie 2006/42/EG
2014/30/EU	Richtlinie 2014/30/EU magnetische Verträglichkeit

Fundstelle der angewandten harmonisierten Normen entsprechend Artikel 7, Absatz 2:

EN ISO 12100:2010-11	Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze – Risikobewertung und Risikominderung (ISO 12100:2010)
EN 55011+A1:2018-05	Industrielle, wissenschaftliche und medizinische Geräte Funkstörungen – Grenzwerte und Messverfahren
EN 60825-1:2015-07	Sicherheit von Lasereinrichtungen - Teil 1: Klassifizierung von Anlagen und Anforderungen (EN 60825-1:2007)
EN 61000-6-2:2019-02	Elektromagnetische Verträglichkeit (EMV) - Teil 6-2: Fachgrundnormen – Störfestigkeit und Industriebereich
EN ISO 11553-1:2008	Sicherheit von Maschinen - Laserbearbeitungsmaschinen - Teil 1: Allgemeine Sicherheitsanforderungen (ISO 11553-1:2005)
EN 60204-1:2006/AC:2010	Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1: Allgemeine Anforderungen

Fundstelle der angewandten sonstigen technischen Normen und Spezifikationen:

EN 60825-4:2012-01-01	Sicherheit von Lasereinrichtungen - Teil 4: Laserschutzwände
-----------------------	--

Marchtrenk, 23. September 2020

Ort, Datum

trotec
Trotec Laser GmbH
Linzer Strasse 156, A-4600 Wels
Tel. 07242 / 239-0
www.troteclaser.com
i.A. Hagen Strasser
Leiter Forschung und Entwicklung

EC-Declaration of Conformity

According to Machine Directive 2006/42/EC, Annex II 1. A

trotec
laser. marking cutting engraving

Manufacturer:

Trotec Laser GmbH
Freilinger Straße 99
4614 Marchtrenk
Austria

Authorized person to compile the technical files:

Trotec Laser GmbH
Freilinger Straße 99
4614 Marchtrenk
Austria

Description and Identification of the machine:

Product description	Laser cutting and engraving system
Model name	Speedy300 , Speedy300 flexx
Model identification	Speedy 300C-8066, Speedy 300X-8066
Serial number	S3-7### , X3-7###
Machine group	8066
Function	System for laser cutting and laser engraving

It is declared expressly that the machine fulfills all of the following applicable EC directives and regulations:

2006/42/EC	EC Machine Directive 2006/42/EC
2014/30/EU	Directive 2014/30/EU Electromagnetic Compatibility

Reference to the harmonized standards in accordance with article 7 (2):


ISO 12100:2010-11	Safety of machinery – General principles for design – Risk assessment and risk reduction(ISO 12100:2010)
IEC 55011+A1:2018-05	Industrial, scientific and medical equipment – RF disturbance – Limits and methods of measurements
IEC 60825-1:2015-07	Safety of laser products - Part 1: Equipment classification and requirements (IEC 60825-1:2007)
IEC 61000-6-2:2019-02	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards – Immunity standard for industrial environments
ISO 11553-1:2008	Safety of machinery – Laser processing machines - Part 1: General safety requirements (ISO 11553-1:2005)
IEC 60204-1:2006/AC:2010	Safety of machinery – Electrical equipment of machines - Part 1: General requirements

Further Reference to the harmonized standards in accordance with article 7 (2):

IEC 60825-4:2012-01-01	Safety of laser products - Part 4: Laser guards
------------------------	---

Marchtrenk, 23. September 2020

City, Date


Trotec Laser GmbH
Linzer Strasse 156, A-4600 Wels
Tel. 07 24 2 / 239 - 0
www.troteclaser.com

i.A. Hagen Strasser
Head of Research and Development