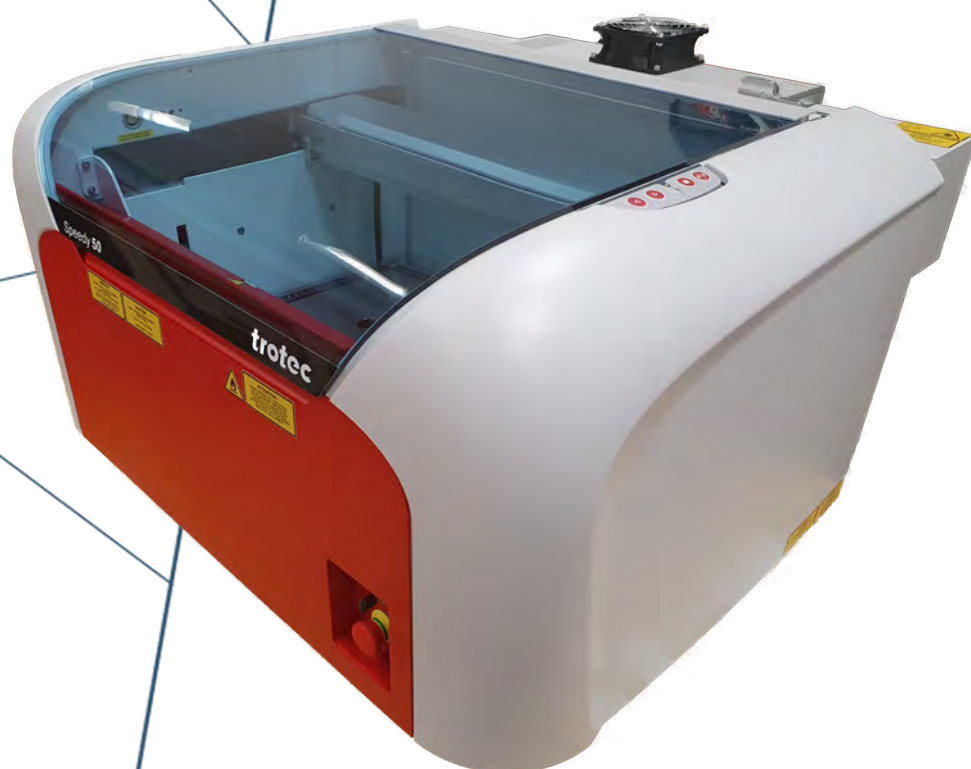


trotec

Speedy 50

Operating manual



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1 GENERAL INFORMATION

Aus Gründen der besseren Lesbarkeit wird in der Betriebsanleitung auf geschlechtsneutrale Endungen (z.B. “/innen”) verzichtet. Es wird hiermit ausdrücklich erklärt, dass an allen Textstellen, wo natürliche Personen bzw. Personengruppen erwähnt werden, immer Menschen aller Geschlechter gemeint sind.

1.1 About this manual

Read this manual completely and carefully before commissioning.

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

This manual describes the safe and proper handling of the machine. Observe the safety notes and instructions, as well as the local accident prevention regulations and general safety instructions for the area of application. Before beginning any work on the unit, fully read the manual, in particular the chapter “Safety” and the respective safety notes. The contents must have been understood.



NOTICE

Additional documentation can be found on the supplied storage medium. You can also request this from the manufacturer.

1.2 Explanation of symbols

Important technical safety information and instructions in this manual are indicated by symbols. These notes and instructions on workplace safety must be observed and followed. Avoid accidents, personal injury and property damage by acting with care.



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.



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.



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)

- Laser machine
- Focus tool (as per lens order)
- Cleaning set for lenses
- Lenses as per order
- Processing table as per order
- Exhaust connection cable (as per order)
- I/O plug
- Network cable

The actual scope of delivery may differ from the information provided here due to additional options or the latest technical modifications.

The accessory box contains the following:



- Cleaning cloths (50 pieces)
- CAT-5e LAN cable (0.5 m)
- Focus tool(s)
- Speedy Series Quick Guide

1.5 Data plate

The data plate with the CE mark is located on the back of the unit.

Transfer the serial number, model and year of manufacture to your manual and always refer to this information in case of inquiries, problems with the unit, or spare parts orders.

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 is used for cutting, engraving and marking materials with a laser machine using the software supplied.

The machine may only be operated in conjunction with a suitable and effective exhaust system. The machine may only be used while it is being supervised.

The rotary engraving attachment may only be operated with cylindrical objects.

2.1.2 Improper use

Warning against incorrect use

- Do not use any materials other than those listed in the materials list of the operating manual. Using inappropriate materials can result in fires and toxic fumes.
- Only use the machine in the manner described in the operating manual.

Common misuse

- Operating the machine either without or with modified safety devices
- Non-compliance with cleaning instructions; failure to notice signs of wear and tear damage
- Cleaning work on the machine without disconnecting it from the power supply

- Operating the machine despite visible faults
- Repair work by the customer

2.1.3 Residual risk

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

The measures required to reduce any residual risks can be found in the following sections of chapter "[Secondary \(indirect\) hazards](#)".

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 by trained operating personnel.
- Fully functioning and installed safety and protective devices.
- Machine in perfect condition.
- Processing of permissible materials according to the material lists.
- Maintenance and service are not included.



NOTICE

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

Service operation

Service activities may only be carried out by authorized, trained service technicians. If side panels and covers are removed and protective devices are bypassed, this can result in direct and indirect scattered radiation. Service operation is declared to be laser class 4 and appropriate precautionary measures must be taken (see section "[Laser classes of this machine](#)").

2.1.6 Applicable safety regulations

The following guidelines and regulations must be observed to avoid risks when operating Trotec laser systems:

Guidelines/Regulations

2006/42/EC

Machinery Directive

2014/30/EU

EMC Guideline

Applied harmonized standards

Please refer to the supplied EU Declaration of Conformity for the standards applied by Trotec. The CE labeling can be found on the type plate.



NOTICE

Observe applicable safety regulations.

Instructions and directives in this manual may differ locally, regionally, and internationally. Please observe the country-specific guidelines that apply to you.

The operator is responsible for meeting all safety requirements, as Trotec Laser GmbH has no influence on the correct use of the unit.

Adhere to official regulations for your operating site in accordance with the applicable local legal provisions (for accident prevention regulations or employee protection), e.g. DGUV regulation 11 for Germany.

Laser classes of this machine

A laser protection class characterizes the potential risk of accessible laser radiation.

The laser system complies with class 2 according to EN 60825-1 "Safety of Laser Products".

The built-in laser source is class 4 according to EN 60825-1 and is labeled as such. During operation, laser class 4 is not accessible due to the safety features of the machine.

Definition of laser classes

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.

Laser radiation warning



CAUTION

Class 2 laser

Class 2 lasers are harmless to the eye in the event of short-term exposure (up to 0.25 seconds) and may be operated without further protective measures. If natural aversion responses or the blink reflex are suppressed, this may cause eye irritation.

- Do not suppress the blink reflex.
- Do not stare directly into the laser beam.
- Close your eyes and turn away.
- Never look at the laser beam directly and/or with optical instruments, such as lenses.



WARNING

Class 4 laser

Exposure to laser radiation without using protective measures can cause injuries. This may result in burns and permanent damage to the skin and eyes.

- Avoid exposing the skin or eyes to direct radiation or scattered radiation.
- Wear suitable laser safety goggles.
- To comply with the relevant regulations, it is mandatory to appoint a laser protection officer trained in class 4 laser systems.

Laser classes



NOTICE

Laser classes

The operator is responsible for obtaining information about and complying with any national legal requirements and official regulations in respect of operating laser systems with an integrated class 4 laser source.

2.2 Areas of responsibility

2.2.1 Responsibilities of the operator

The operator has the following responsibilities:

- It is the responsibility of the operator to know the national legal regulations and official requirements (e.g. reporting obligation) for operating class 4 laser systems / laser systems with an integrated class 4 laser source and to comply with these.
- Observe the safety notes and instructions, as well as the local accident prevention regulations and general safety instructions for the area of application.
- A CO₂ fire extinguisher must be located in the immediate vicinity of the laser machine since the laser beam can ignite flammable material.
- If the machine is used in the commercial sector, the operator is subject to the statutory obligations concerning workplace safety.
- The operator must ensure that the operating personnel have read and understood this manual, in particular the "Safety" chapter. The staff must furthermore be trained on an annual basis and informed about the dangers / laser safety measures.
- The operator is advised to prepare in-house operating procedures, taking into account the professional or occupational qualifications of the respective staff deployed, and to have the receipt of such procedures, or the manual, or the participation in instruction / training sessions confirmed in writing.
- The manual must be kept in the immediate vicinity of the machine and be accessible to persons working on the machine at all times.
- Responsibility for the various activities involved in operating the machine (e.g. installation, operation, maintenance and cleaning) must be clearly defined and adhered to so that no unclear responsibilities arise in terms of safety.
- The maintenance and servicing work specified in this manual must be carried out at regular intervals. *
- For all work relating to installation, commissioning, set-up, operation, changes to operating conditions or procedures, maintenance, inspection and repair, and any shutdown procedures specified in the manual as necessary must be observed.
- The operator is responsible for the safety-related condition of the machine. The machine may only be put into operation once all safety devices have been checked and all of the safety requirements have been met. *
- Flammable and highly reflective material must not be stored in the laser processing area or in the immediate vicinity of the machine.
- The operator must ensure cleanliness and accessibility on and around the machine through the use of appropriate instructions and controls.
- The machine may only be operated with a suitable and effective exhaust system.
- The operator must ensure adequate and glare-free lighting in the area of the operating stations. Avoid direct sunlight.

* See chapter "[Maintenance](#)"

2.3 Requirements for personnel

The operator must be an adult. They must not be under the influence of intoxicating or reaction-inhibiting substances. They must be in good health to operate the machine.

Operators

An operator is a member of staff who works with the machine.

Work that operators may perform on the machine:

- Operation
- Inserting and removing items

Operators who use the machine must be instructed by an authorized person (qualified personnel) about the tasks assigned to them and the dangers of improper conduct. Operators must be trained and instructed on the necessary safety equipment and protective measures.

Qualified personnel

Work that may be carried out on the machine by qualified personnel:

- Cleaning of the lens and mirrors

Qualified personnel are those who, based on their training, knowledge and experience, as well as their knowledge of the relevant standards and regulations, are able to assess the work assigned to them and to independently recognize potential hazards. They also have knowledge of the operating manual for the machine. Qualified personnel are, for example, mechanics, electricians, mechatronics engineers.

Trotec service personnel

Work that Trotec service personnel perform on the machine:

- Installation
- Connection
- Initial commissioning

Unauthorized persons

Unauthorized persons must not be allowed near the machine.

2.4 Warning and information labels

The warning and information stickers are affixed to the unit at those points which pose a potential source of danger before commissioning and during commissioning. Pay special attention to these labels.



CAUTION

Lost or damaged warning and safety stickers.

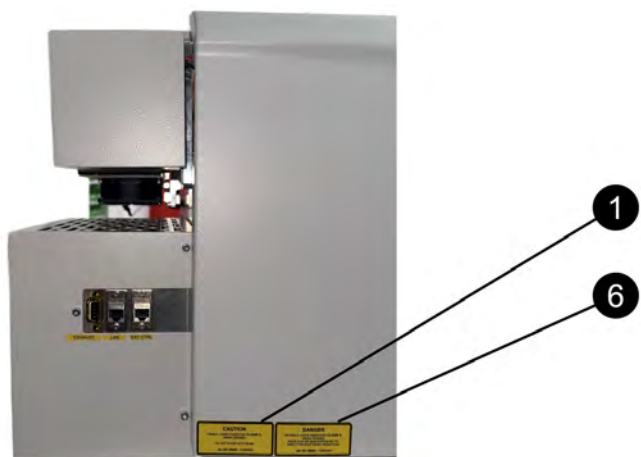
If any warning and safety stickers are lost or damaged, the user is not able identify risks anymore, and there is danger of injury.

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

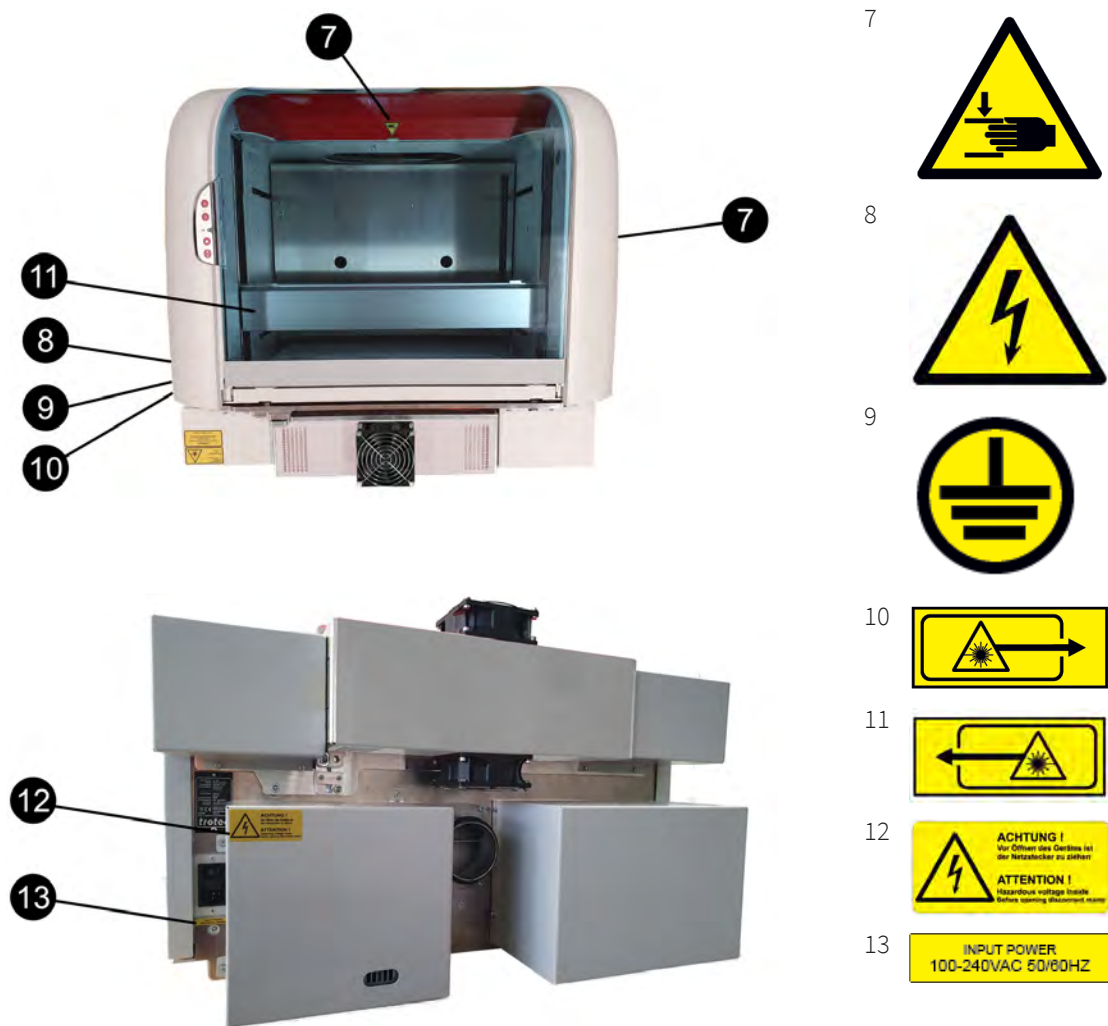


NOTICE

Warning and information stickers 1 to 7 are attached inside the control panel and maintenance panel.



- 1
- 2
- 3
- 4
- 5
- 6



2.5 Safety devices



WARNING

Danger from laser beam.

Personal injury and damage to property may occur if the safety devices and protection devices are not fully functional.

- 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.

2.6 Technical protective measures

2.6.1 Main switch

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

2.6.2 Key switch

Turning the key switch to the “0” position de-energizes the motor, laser source, and electronics. It causes the machine to instantly stop and the laser source to switch off. Operation of the machine by unauthorized persons can be prevented by removing the key switch.

2.6.3 Emergency stop button

Pressing the emergency stop button instantly stops the machine and switches off the laser source.

The laser beam is interrupted and all movements are stopped.

Reset the emergency stop button



NOTICE

Eliminate the hazard before resetting the emergency stop button.



1. Turn the emergency stop button counterclockwise to unlock it so that the green marking is visible.
2. Restart the laser system using the key switch.

2.6.4 Interlock safety switches

The closed position of the acrylic lid and the side lid on the right are monitored using interlock safety switches. It is not possible to start up the machine if the safety guards are open or not in place. However, the pilot laser remains active.

2.6.5 Acrylic top lid

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

2.6.6 Side cover

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

2.6.7 In case of safety device malfunction

If damage to the safety or protective devices is suspected or detected, this may result in personal injury or damage to the machine. Therefore, the following measures must be applied:

1. Press the emergency stop button.
2. Disconnect the machine from the main power supply.
3. Contact our technical support team in your area.

2.7 Secondary (indirect) hazards

See also "[Residual risk](#)".

2.7.1 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 hits easily flammable material, e.g. paper, this may ignite and a fire can quickly occur. Therefore, before switching on the laser, you should make absolutely sure that there is no easily flammable material in the beam path.

Furthermore, gases that can form below the material to be processed may ignite. Especially if the extraction requirements are not met.

Inadequate care and cleaning of the system increases the risk of flame formation.

Regularly check the cooling slots of the cooling system.

2.7.2 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. Find out about local guidelines.

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.

2.7.3 Hazards due to damaged optics



WARNING

Damage to the lenses.

Dirty lenses absorb laser radiation, which can destroy them. Broken or damaged lenses and thermal decomposition of lenses release particles that are hazardous to health.

- Clean the deflection mirror and lenses in the laser beam guidance area regularly.
- Take particular care when handling, attaching and cleaning.
- Always apply even pressure to the lens and do not apply pressure to one side only.
- Do not use tools or hard objects to clean the surface.
- Do not touch the lens surface with your fingers.
- Only use cleaning cloths once, never repeatedly.
- In the event of broken or damaged lenses or thermal decomposition of lenses, follow the appropriate protective measures (see the following chapter).
- Disposal must be in accordance with local laws.
- Scratched lenses or lenses with a burn mark must not be used!

Scratched or damaged lens surface

Please note that scratches in the surface coating may produce small amounts of toxic emissions that are hazardous to health if inhaled or swallowed.

Thermal decomposition

Thermal decomposition produces smoke from selenium and zinc oxides. There is a risk of poisoning if inhaled or swallowed. Indicators of thermal decomposition of ZnSe (zinc selenide) are deposits in the form of white or red powder and an unpleasant odor.

Broken lenses

When optical components made of ZnSe (zinc selenide) are destroyed, toxic dust and vapors are produced, which must not be inhaled. The dust can also cause irritation to the eyes, skin and respiratory system. If a lens is destroyed during operation, extra care must be taken when removing and cleaning it.

2.7.4 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 dryly 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.



WARNING

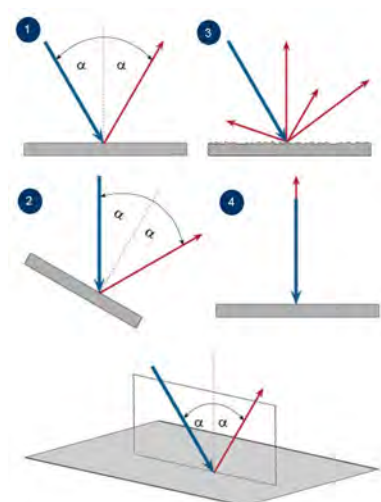
Danger from laser beam.

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.

Reflection of laser radiation

The law of reflection applies to the reflection of laser radiation: **Angle of incidence = angle of reflection**



No.	Description
1	Directed reflection: Reflected laser beam on a smooth surface.
2	Directed reflection: Reflected laser beam on an inclined surface.
3	Diffuse reflection: Reflected laser beam on a rough surface.
4	Directed reflection: Horizontally reflected laser beam on a smooth surface.

2.8 In case of emergency

What to do in the event of a malfunction

- In the event of unusual operating conditions, press the emergency stop button and switch off the machine.
- If necessary, disconnect the machine from the main power supply.
- Inform the laser safety officer and your supervisor.
- Repair work must only be carried out by Trotec Laser GmbH service technicians.
- In the event of fire: Fight the fire with a CO₂ fire extinguisher if it is safe to do so.



NOTICE

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

What to do in the event of an accident; first aid

- If eye damage occurs due to laser radiation, the casualty must be immediately seen by an ophthalmologist.
- The first aider must always ensure that they protect themselves.
- De-energize the unit and secure it against restarting:
 - Remove the key switch.
 - Unplug the mains cable.
- Remove the injured person from the danger zone and provide first aid.
- Call an ambulance!

3 TECHNICAL DATA

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

3.1 Dimensions and weight



	Description	Dimensions
A	Width	726 mm
B	Depth	672 mm
C	Height	447 mm
D	Weight	approx. 53 kg

3.2 Noise emissions

The machine's noise emissions are below 80 dB. It can be operated without hearing protection.

3.3 Computer requirements

Using a more powerful computer will create graphics faster.

Computing times become shorter and data transfer faster

- Windows 10® 64-bit
- Local administrator rights (for the installation of Ruby®)
- 4 GB RAM or greater
- 10 GB free space or more
- Full HD resolution
- Chromium browser (Chrome or Edge)
- 1 free USB interfaces
- The setup and first login of Ruby® requires internet connection

3.4 Network connection

Recommendations PC

Client

- Operating system: Windows 64-bit
- Screen Resolution: min. 1920x1080 (FullHD)
- Browser: latest Google Chrome
- RAM: min. 4GB
- Processor: Min. i7 or comparable

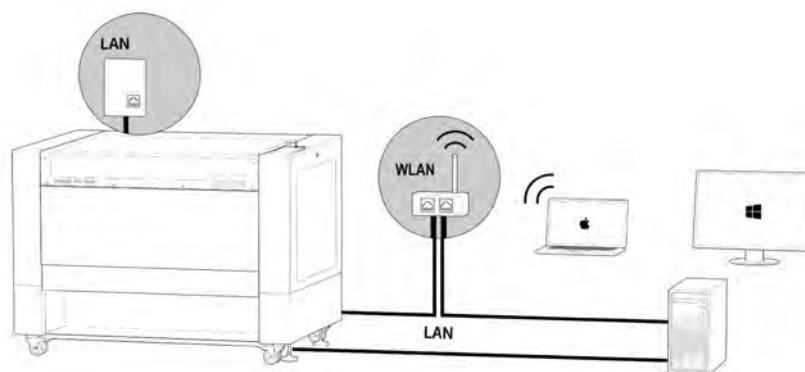
Network

- DHCP Active
- 100Mbit Speed
- CAT5e or higher
- Wifi: 2,4GHz or 5GHz

3.5 Computer connection

Connect the machine to the local network connection or directly to the computer using a network cable (["see chapter Machine overview"](#)).

The network settings must be configured when the machine is started up for the first time.



Illustration, as an example



NOTICE

You can find information on the connections in chapter ["Unit overview"](#).

3.6 Requirements for the electrical connections of the machine



NOTICE

- Ensure that the socket outlet can supply the correct voltage, frequency, and current for the laser system.
- Use separate circuits for the laser engraving machine and exhaust unit.
- Install the computer on the same circuit as the laser engraving machine to avoid electromagnetic interactions.
- Recommended fuse: 16 A (230 V), 15 A (115 V)

Damage from an insufficient or unsuitable power supply is not covered by the warranty.

Noisy or unstable current and voltage peaks can lead to faults as well as damage to the electronics of the laser system. It is preferable to connect the laser system to a dedicated electrical line.

Surge protection connectors are strongly recommended to protect the computer equipment.

If fluctuations in power supply, brownouts and/or blackouts occur frequently in your area, a stabilizer, UPS (uninterruptible power supply) or backup generator may be required. When installing such units, ensure that they meet the electrical requirements of the laser system.

3.7 Exhaust system requirements



DANGER

Risk of emission of toxic gases, vapors or dust.

During material processing, toxic and harmful gases, vapors and dusts may be produced.

- Only operate the unit with a working exhaust system that is suitable for the materials to be laser-processed.
- Ask the manufacturer about the toxic effects of the material.



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 processing table installed in the machine. We recommend consulting with a qualified Trotec technician.

Recommended exhaust systems

Exhaust system	Speedy 50
Atmos Pure 300	✓
Atmos Cube	✓



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 for the exhaust systems

Exhaust system	Hose connector ø [mm] (internal diameter)	Volume flow rate [m³/h]	Pressure [Pa]
Atmos Pure 300	(3x) 80	352 (115V) 378 (230V)	6500 (115V) 8000 (230V)
Atmos Cube	80	320	5800 (115V) 8500 (230V)

Requirements for the exhaust system

Machine	Volume flow rate [m³/h]	Pressure [Pa]
Speedy 50	Min. 200	1000

The exhaust connection on the side of the machine is used as the measuring point for volume flow and pressure. Pressure losses through hoses or pipes or filters in the exhaust system must be determined and taken into account when selecting the exhaust system.

A powerful exhaust system prevents a reduction in the service life of the lenses and mechanical components, the cutting quality and the laser power acting on the workpiece caused by vapors and dust remaining in the machine.

To ensure proper ventilation while engraving rubber, an exhaust system with a suction capacity of at least 300 m³/h is required.

The unit must be equipped with a fine dust filter (formation of rubber dust) and an activated carbon filter (neutralization of odors). Efficient

filtering of the exhaust air is also required when cutting plastics or engraving wood. If only Elox plates are engraved, the suction power can be reduced.



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.



WARNING

Non-approved materials:

- Leather and vinyl with chrome (VI)
 - Carbon fibers (carbon)
 - Polyvinyl chlorides (PVC)
 - Polyvinyl butyral (PVB)
 - Polytetrafluorethylenes (PTFE /Teflon)
 - Beryllium oxide
 - Materials containing halogens (e.g. fluorine, chlorine, bromine, iodine and astatine), epoxy and phenolic resins.
-



NOTICE

Ask a Trotec Laser representative about the suitability of any materials that are not on the list to avoid any potential risks arising from a chemical reaction, and to preserve the warranty. For detailed information, please contact Trotec Laser Technical Support. Unless written approval is given, Trotec Laser accepts no liability and the warranty will be void.

Care should be taken with the following materials:

- Manganese
- Chrome
- Nickel
- Cobalt
- Copper

- Lead
- and when processing materials with the label “flame-retardant”, as they often 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.

3.8 Materials list

CO₂

Material	Cutting	Engraving	Marking
Metals			
Anodized aluminum			✓
coated metal (lacquered)		✓	

Material	Cutting	Engraving	Marking
Plastics			
Acrylonitrile butadiene styrene copolymer (ABS)	✓	✓	
Acrylic (PMMA), e.g. Plexiglas®	✓	✓	
Rubber (stamp rubber)	✓	✓	
Polyamide (PA)	✓	✓	
Polybutylene terephthalate (PBT)	✓	✓	
Polycarbonate (PC)	✓	✓	

Material	Cutting	Engraving	Marking
Plastics			
Polyethylene (PE)	✓	✓	
Polyester (PES)	✓	✓	
Polyethylene terephthalate (PET)	✓	✓	
Polyimide (PI)	✓	✓	
Polyoxymethylene (POM) e.g. Delrin®	✓	✓	
Polypropylene (PP)	✓	✓	
Polyphenylene sulfide (PPS)	✓	✓	
Polystyrene (PS)	✓	✓	
Polyurethane (PUR)	✓	✓	
Foam material (PVC free)	✓	✓	

Material	Cutting	Engraving	Marking
Other materials			
Wood	✓	✓	
Stone		✓	
Paper (white)	✓	✓	✓
Paper (colored)	✓	✓	✓
Foodstuffs	✓	✓	✓
Leather	✓	✓	✓
Fabrics	✓	✓	
Glass		✓	
Ceramics			✓
Cardboard	✓	✓	✓
Cork	✓	✓	✓
Marking agent (on metal or ceramic/glass) e.g. markSolid		✓	✓

3.9 Service life of the machine

The machine is designed for a service life of 10 years. If it is to be operated for longer, a general overhaul must be carried out by the manufacturer.

4 MACHINE OVERVIEW

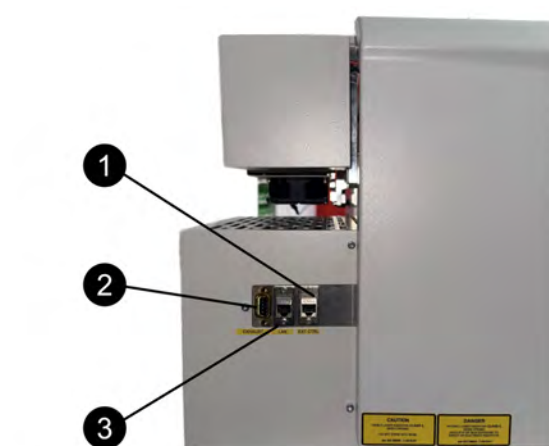
4.1 Overview of unit



No.	Description	No.	Description
1	Keypad	3	Acrylic cover
2	Side cover left	4	Side cover right



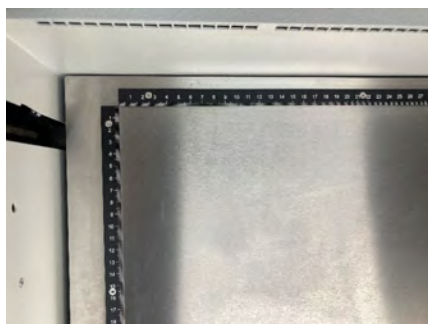
No.	Description	No.	Description
1	Front laser source cover	6	Power supply units
2	Rear laser source cover	7	On/off switch / mains connection
3	Electronics	8	Data plate
4	Connection for Ethernet and exhaust system	9	Laser source
5	Connection for exhaust hose		



No.	Description	No.	Description
1	Ethernet connection exhaust system	3	Local area network connection
2	Sub-D9 connection for exhaust system		

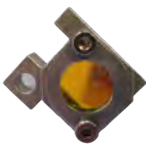
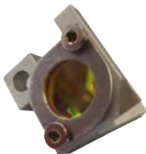
4.2 Tables (multifunctional table concept)

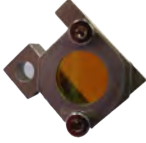
Ferromagnetic engraving table



The ferromagnetic construction allows thin materials, such as paper or film, to be easily attached with magnets. A flat processing area is an essential criterion for optimum results in laser engraving and laser marking.

4.3 Lens(es)

CO ₂	
	1.5" Part No. 32550
	2.0" Part No.: 32551

CO ₂	
	2.5" Part No. 32553

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 contractually agreed, the appliance is delivered in a wooden packaging crate. This includes the laser machine and all accessories. Transport the machine only in the original packaging.



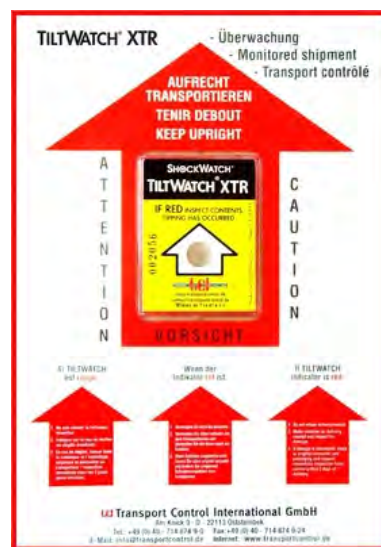
CAUTION

The transport crate can slip or fall over during transportation if not adequately secured.

Symbols for handling on the packaging:



Pay attention to shockwatch:



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 the machine in a storage room or ensure it is adequately packed and protected from the weather.
- 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



CAUTION

Emissions hazardous to health.

Scratches on the coating of the lens can cause toxic emissions.

- The lens unit may only be handled by Trotec service personnel.

The lens unit may only be unpacked after installation.



CAUTION

Risk of crushing.

The laser engraving machine can tip over.

- The laser engraving machine must be lifted by two people.



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.

The machine is supplied in a cardboard box or wooden crate containing the laser system and accessories. The following steps give you an overview of unpacking and assembling the laser system.

1. Remove the cover and store the crate in a dry place.
2. Carefully remove the foam material that protects the viewing window of the cover.
3. Work with another person to lift the laser engraving machine out of the box. Position the laser engraving machine on a stable table or the stand optionally available.
4. Remove the accessory box, which contains all the parts required to install the laser system.
5. Open the accessory box.

5.8 Relocation of the machine



CAUTION

Risk of injury

Only transport the machine components in their original packaging. Secure the transport crates adequately so that they do not slip or fall over during transportation.

Observe the applicable safety regulations in the chapters “Safety instructions” and “Transportation”.

- When transporting over long distances, use transport crates that include transport locks.



NOTICE

The machine may only be installed by Trotec Technical Support.

- If you wish to relocate the machine, contact Trotec Technical Support.

Please observe the following steps:

1. Switch off the machine.
2. Disconnect the power cable.
3. Remove exhaust system.
4. Reposition the machine (e.g. with the aid of auxiliary equipment if necessary) and on a level, clean floor.
5. Align the machine.
6. Commission the electrical system for the first time.
7. Carry out a function test.

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

Environmental conditions:

The machine is not designed for use in damp or potentially explosive environments or for use above 1000 meters above sea level.

Ambient temperature:	+15 °C to +25 °C (59 °F to 77 °F)
Relative humidity:	45 - 65 °C, not condensing



NOTICE

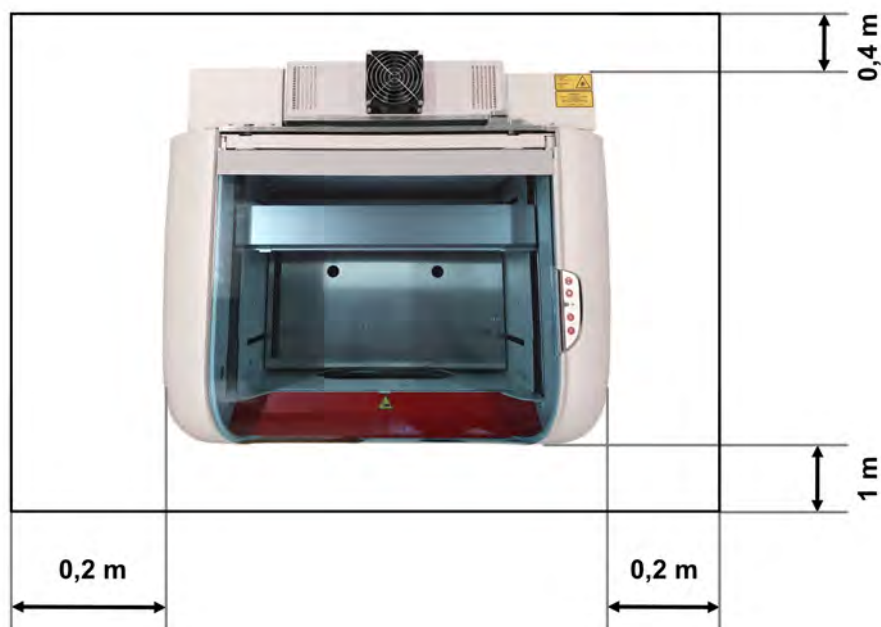
If necessary, an air conditioning unit must be used to ensure the appropriate temperature.

The following conditions must be met:

- Adequate glare-free lighting at the workstation.
- No direct sunlight.
- No contamination from dust (2 degrees IEC60947-1), acids or corrosive gases.
- No interfering electrical installations, hoses and pipes.
- Fluctuation-free power supply.

6.3 Space requirements

Ensure shielding / sufficient distance from the wall and neighboring objects.



6.4 Setup



NOTICE

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

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. Install the two exhaust connectors at the rear of the machine.
They have been removed for safety reasons and for transport through doors.
5. The machine must stand upright.
6. Make sure the protective glass is intact.
7. Now connect the electrical components.
8. Set up the network connection to the machine.

6.5 Connections

6.5.1 Mains connection

Connect the end of the mains cable to a fused socket.



WARNING

Damage to the machine in the event of incorrect voltage values.

Only commission the appliance if the mains voltage matches the voltage intended for the machine to avoid damage to the exhaust system.

7 CONNECTION OF ADDITIONAL COMPONENTS

7.1 Exhaust system



WARNING

Damage to the machine in the event of incorrect voltage values.

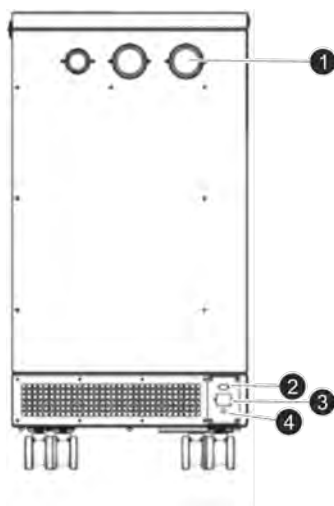
Only commission the appliance if the mains voltage matches the voltage intended for the machine to avoid damage to the exhaust system.

Ensure that the mains voltage matches the voltage intended for the exhaust system.

Connection:

1. When using an original Trotec exhaust system, use the enclosed connection cable to connect it to the laser machine.
2. Insert the ends of the extraction hose into the connection sockets provided on the exhaust system and on the laser system. The position will depend on the exhaust system.
3. Connect the exhaust system to the mains socket.

Observe the operating and maintenance instructions in your exhaust system manual.



- ❶ Suction nozzle
- ❷ Connection cable to the laser machine:
Ethernet preferred (if available);
other wise use the Sub-D9
- ❸ Mains connection
- ❹ Safety switch

Illustration, as an example. The schematic representation may differ from the exhaust system used.

8 OPERATION



WARNING

Fire hazard.

Unmonitored operation of the machine can lead to fire.

- Only use the machine in supervised operation.
- Keep a CO₂ fire extinguisher to hand.



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.



NOTICE

Unauthorized persons must not be allowed near the machine.

8.1 Before commissioning

Before commissioning, check the following points:

- For completeness and technically perfect condition of the machine and safety equipment, see chapter ["Maintenance"](#).
- Order and cleanliness in the workstation.
- Cleanliness of optical components (free of dust and dirt).
- Activated exhaust system.
- Complete electrical installation.
- Correct input voltage of the electrical installation.
- Environmental conditions based on technical specification.
- For compliance with all regulations and laser safety measures, see chapter ["Safety"](#).
- Ensure compliance with all laser safety precautions as per chapter ["Safety"](#).

If any faults or functional deviations occur while checking the points listed, the machine is not considered to be safe to operate and must not be used until the fault has been rectified!

If you have any questions, please contact our experienced technical support team in your area.

8.2 Power On/Off

The following conditions must be met for correct commissioning:

- Unrestricted freedom of movement of mechanical parts
- Protective cover closed



CAUTION

Before switching on the unit, the user must ensure that there are no objects in the working area that could restrict or hinder any mechanical parts of the unit.



NOTICE

To avoid restricting or hindering the mechanics in their range of movement, there must be no objects of any kind in the processing area.

All protective covers must be fully functional and closed.

Immediately after switching on, the unit starts the initializing process. When the initializing process has been correctly completed, an acoustic signal is heard and the unit is ready for operation. Operational readiness is also indicated by the (slow) green flashing of the status display.

Switch on the laser:



1 Green LED

2 Red LED

1. Switch on the main power supply using the main switch on the back of the machine.

- ✓ The start process is indicated by the lighting up of red and green LEDs on the keypad. Once the red and green LEDs have gone out, the machine is ready for initialization.

The Ruby server starts simultaneously. This process can take a few minutes.



2. To start the machine, turn the key switch briefly to the right.
- ✓ The initialization process starts.
3. A signal tone is heard when the initializing run of the axes is complete.
4. To connect to the Ruby software, open your browser (Chrome or Edge).
5. Enter the URL according to the sticker on the left-hand side of the laser source cover or the information on the control panel.
- ✓ A login screen opens.
6. Log in with your login data.
- ✓ The machine is ready for operation.



NOTICE

Additionally the ready-to-use state is indicated through the slow flashing of the green status LEDs.

To switch off the machine:



1. Turn the key switch to the left.
- ✓ The power supply to the axes and the laser source is interrupted.
2. Switch off the main power supply to the machine by pressing the main switch on the rear of the machine.



8.3 Control panel



1 Start/Pause/Repeat button

2 Stop button

3 Status / emissions indicator LED lights up: The machine processes data. Laser power can be emitted.

4 Processing table control key Z

- Up button
- Down button



Start/pause button

Start:

- Press the Start button to start a job.

Pause:

- Press the pause button to pause the current processing.
- Press the pause button again to resume processing.

Meaning of LEDs:

LED	Description
Green, flashing slowly (0.5 Hz)	Cover closed. Machine is ready.
Green, flashing rapidly (2 Hz)	Cover is open.
Green, steady / pause mode	Data available. Pause mode is active.
Red, steady	Laser radiation is emitted.
Green/red, flashing alternately	Cover open during switch-on process. Acoustic signal sounds at the same time - no initializing



Working table control button Z

- Press one of the buttons to manually move the processing table up or down (travel in z-direction).



Stop-button

- Press this button to stop the current working process.

8.4 Lense placement



1. Open cover.



2. Fully unscrew the knurled screw.



3. Remove lens.



4. Check lens for damage.
5. Clean both sides of the lens with a cleaning agent and cleaning cloth if necessary.
6. Insert the lens with the curved (=convex) side facing upwards.
7. Fix the lens in place by turning the knurled screw.
8. Close lid.

8.5 Focusing methods

8.5.1 Focusing the laser beam

To be able to engrave and cut precisely, the laser beam must be focused. The energy is focused with a lens system mounted on the movement system in a lens holder.



NOTICE

The focus of the laser beam (for the high-resolution lens included in the scope of delivery) is 5.08 cm (2 inches) below the lens.

For optimum processing, set the surface of the material you want to engrave or cut as follows:



NOTICE

The exhaust system must be switched off during focusing.



NOTICE

Risk of material damage due to collision.

If the table is moved too far upwards during focusing, there is a risk of collision when working with the rotary engraving attachment.

- Only move the table upwards step by step,
- using the dimensions of the workpiece as a guide for this.



Focus tool on the X-axis

1. Place the focus tool over the material on the X-axis housing.
 2. Move the table upwards using the “up” button for the Z-axis on the keyboard. It is not necessary for the focus tool to be removed.
- ✓ The correct focus is set when the focus tool touches the engraving material.

8.6 Options

8.6.1 Rotary engraving attachment

The rotary engraving attachment is used for engraving cylindrical workpieces.



NOTICE

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.

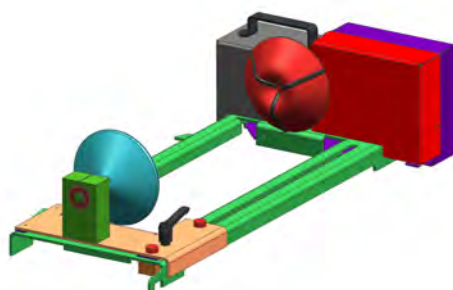
Device with cone:

Max. workpiece diameter:

- 1.5" lens: 139 mm
- 2.0" lens: 115 mm
- 2.5" lens: 89 mm

Max. workpiece length: 285 mm

Max. workpiece weight: 7 kg



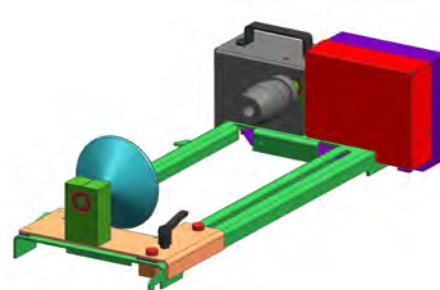
Device with cone

Device with drill chuck:

workpiece diameter: 1-13 mm

Max. workpiece length: 214 mm

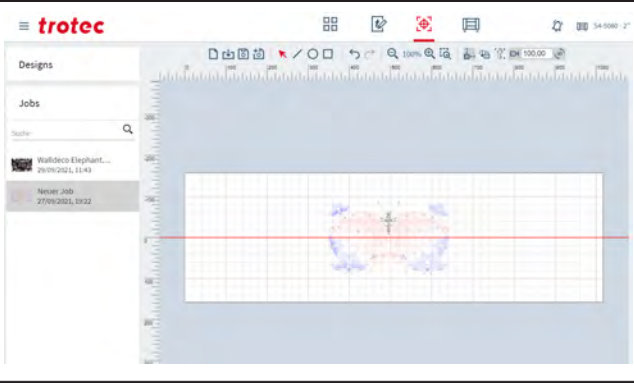
Max. workpiece weight: 7 kg



Device with drill chuck

8.6.2 Rotary engraving process

1. Create a graphic using the graphics software.	
2. Select the Rotary engraving option from the menu bar and specify the diameter of the item.	

3. Select the job from the list and place it in the marking field.	
4. Add the job to the processing list.	
5. Press the start button on the device to start the selected job (see chapter "Control panel").	

8.6.3 Installation and commissioning

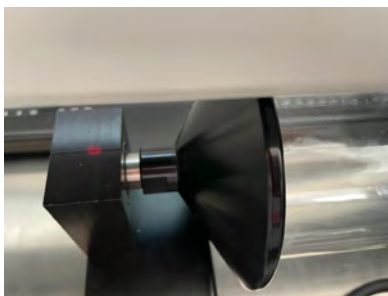
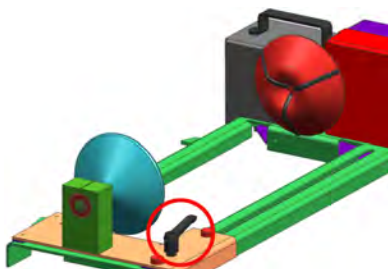


The processing table must be mounted and positioned in the lowest position. The laser machine must be switched off (key switch in position 0).



1. Place the rotary engraving attachment on the processing table using the insert handles.
 2. Position the device so that the clamps hook correctly onto both of the rulers.
 3. Use the connection cable to connect the device to the connector plug on the left front side of the housing.
- ✓ Both LEDs light up until the rotary engraving attachment is configured.

8.6.4 Mounting the work piece in the rotary attachment



1. Measure the diameter of the workpiece.
2. Loosen the slide control to clamp the workpiece between the two cones or between the cone and the drill chuck.
3. Switch on the laser machine and wait until the initializing process is complete.
✓ Initializing is complete when the green LED flashes slowly.
4. To focus with the focusing tool, position the X-axis housing manually over the workpiece (see chapter ["Focusing methods", page 50](#)).

5. Manually position the X-axis housing over the workpiece to the position at which you want to engrave.

- ✓ The red laser beam of the pilot laser is located on the marking of the rotary engraving attachment.

8.7 Tips for laser engraving

The engraving depth can easily be varied via the laser power or speed. To increase engraving depth, move the power and speed control setting to the right. In this way, the energy per unit area can be increased.

However, if the engraving is too deep, the quality of detail is reduced. For coated materials, the required power depends on the type and thickness of the coating. If the energy setting per area is too high, the individual lines become too thick and a sharp image is not achieved.

The resolution of the graphic should generally be 500 dpi. The PPI value (number of laser pulses per inch) depends on the material used. The lower the setting, the lower the resolution of the engraved image. However, this reduces flame treatment and increases the energy of a pulse, which can improve the overall result.

8.8 Tips for the production of rubber countersinks

The different compounds and densities of rubber sheets lead to slightly varying engraving depths. The settings in the overview table provide a useful indication.

Standard rubber material requires relatively high laser power. The TROTEC management software considerably simplifies the creation of a stamp.

Mirroring and conversion are performed automatically, and a cone-shaped edge is created around each letter. The wider base stabilizes the letters during die-cutting, which makes the print clearer. If you engrave rubber tools without this option, the letters will have no edges and will appear thin and unstable.

Engraving rubber generates considerable amounts of dust. A well-dimensioned and maintained exhaust system is therefore very important. It is also important to regularly clean the machine.

9 MAINTENANCE

9.1 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

Fire and explosion risk.

Improper handling of the machine can cause a risk of fire and explosion.

- Do not use any flammable and/or explosive substances or cleaning agents to clean the machine.
- No containers with flammable or explosive liquids may be present in the processing room.
- Clean the machine regularly and remove flammable components in the interior and extraction area.



DANGER

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.



NOTICE

Ensuring machine safety.

The safety devices (e.g. interlock contacts, emergency stop) of the laser system must be replaced by an authorized technician after 10 years of use at the latest due to component aging / frequent operation (e.g. > 72,000 cover cycles / year), otherwise safety can no longer be guaranteed. Without appropriate measures, the operating license expires.

9.1.1 Service life of safety-relevant components

The safety-relevant components have a service life of ten years from the date of initial commissioning.



NOTICE

After ten years, an authorized technician must be contacted to check the safety-relevant components and replace them if necessary (e.g. emergency stop, interlock sensors, cover, etc.).

Otherwise, safety is no longer guaranteed due to component ageing and/or frequent actuation.

The operating license expires if the safety-relevant components are not checked.

9.2 Maintenance schedules

	Before every shift	Daily	Weekly	Monthly	Annually	Chapter
Laser system						
Checking the safety circuit		✓				"Daily inspection of the safety circuits", page 58
Lens, Mirror #3	✓✓					"Cleaning", page 58
Mirror #2				✓✓		"Cleaning mirror #2", page 61
Spindles					CG	
Laser tube cover, safety cover and housing.			✓			
Entire engraving area. General cleaning.			✓			
Extraction slots (machine interior)		✓✓				
Processing table and rulers		✓✓				
Exhaust system						
Compact filter unit				✓✓		
Hoses			✓✓			

✓✓ Check and clean as necessary.

✓ Clean as necessary.

CG Clean and grease.



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.

9.3 Daily inspection of the safety circuits

Before starting work: Checking the safety switch:

1. After initializing, open top cover
 - The LED on the keyboard's Start button should be flashing quickly (2 Hz)
2. Close the lid
 - The LED on the keyboard's Start button should be flashing slowly (0.5 Hz)

→ Check completed

Checking the emergency stop button:

1. Press the emergency stop button
 - LEDs on the membrane keyboard are switched off
 - Axes are freely movable
2. Release the emergency stop button
 - Machine must be restarted using the key switch

→ Check completed

9.4 Cleaning

9.4.1 Machine



WARNING

Risk of injury from electrical voltage.

There is a risk of injury from electric shock if live parts are touched.

- Disconnect the mains plug from the power supply.

**NOTICE**

Cleaning may only be carried out by qualified personnel.

1. Bring the processing table to a position where you find it easy to clean the surface with window cleaning agents and paper towels.
2. Switch off the unit and disconnect it from the mains.
3. Open the acrylic lid and the front lid.
4. Thoroughly remove all loose dirt and deposits from the inside of the machine (e.g. with a brush or vacuum cleaner). To do this, it is necessary to remove the table and the table tray.
5. Clean the air baffle and suction slots of the suction box in the interior with a dry or slightly damp cotton cloth or a brush.
6. Clean the laser tube cover and ventilation slots on the back of the machine with a dry or slightly damp cotton cloth.
7. Clean the acrylic lid with a dry or slightly damp soft cotton cloth. Do not use paper towels as these could scratch the acrylic.

9.4.2 Optics in general

**CAUTION****Emissions hazardous to health.**

Scratches in the coating of the lens can cause small amounts of toxic emissions. These emissions can be hazardous to health if they are inhaled or swallowed.

- The lens and mirrors may only be cleaned by qualified personnel.

The lens has a durable multi-coating and cannot be damaged by correct and careful cleaning. You should check the mirrors and lens at least once a week. If you discover a layer of haze or dirt, it must be cleaned off.

9.4.3 Lens

Danger from damaged optics see chapter "[Hazards due to damaged optics](#)"

Step 1: Preparation

1. "Blow away" lint and dust (with bellows) or compressed air (according to ISO 8573:2010 Class 1).
2. Prepare cleaning agents and cloths.
3. Move the processing table up and place a cloth under the lens holder (the lens will not be damaged if it falls out of the holder).

4. Turn the fixing ring to loosen it.
5. Now remove the lens. Do not touch the lens surface with your fingers!



Step 2: with cleaner and cloths

1. Remove the lens and rinse with cleaning fluid so that any dirt is rinsed off.
2. Put a drop of cleaning fluid on the lens and leave it to work for approx. 1 min.
3. Lightly moisten the cleaning cloth with the cleaning fluid and wipe the surface of the lens without applying pressure.
4. Carefully push the lens holder back into the processing head and secure it with the fixing 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).

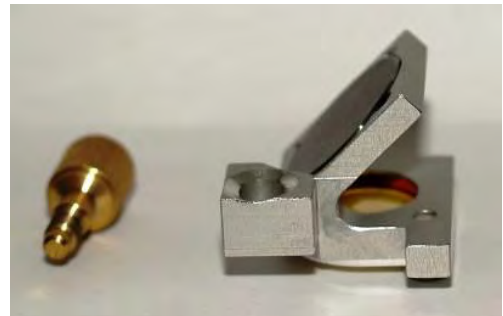
9.4.4 Cleaning the lens and mirror #3



NOTICE

Cleaning may only be carried out by qualified personnel.

Check the lenses and mirror #3 before you start working with the Speedy 50. If you process a lot of cutting jobs, make sure that there is no dust on them. Remove any dust by blowing on the lens and mirror. If this does not remove all of it, clean the parts as described below.



1. Loosen the screw that secures the lens and mirror holder to the X-axis and carefully remove the assembly.
2. Hold the assembly and use the optical cleaning fluid included as an accessory with the laser system.
3. Place the assembly on a cloth on the work surface. Apply some lens cleaning fluid to one side of the lens. Leave the liquid to act for about one minute and wipe it off carefully with a cotton bud or lens cleaning cloth soaked in lens cleaning fluid.
4. Finally, dry this side of the lens with a dry cotton swab or lens cleaning cloth and repeat the cleaning process on the other side of the lens and the mirror.



NOTICE

Cotton buds or lens cleaning cloths may only be used once. Accumulated dust could otherwise scratch the lens surface.

5. Check the lens and mirror. If you still detect any dirt, repeat the cleaning process until the lens and mirror are clean.
6. Replace the assembly and secure it again with the screw.

9.4.5 Cleaning mirror #2



NOTICE

Cleaning may only be carried out by qualified personnel.

Mirror #2 on the right-hand side of the X-axis must be checked on a weekly basis for dust and any other type of contamination. To do this, carefully remove it from the magnet holder. The same applies to cleaning as for the lens and mirror #3. Be careful not to scratch the mirror.



WARNING

Risk of injury from electrical voltage.

There is a risk of injury from electric shock if live parts are touched.

- Disconnect the mains plug from the power supply.

1. Mirror #2 is located on the right of the machine. To access it, open the top cover, loosen the two screws on the right (as depicted in the illustration) and remove the side cover on the right.

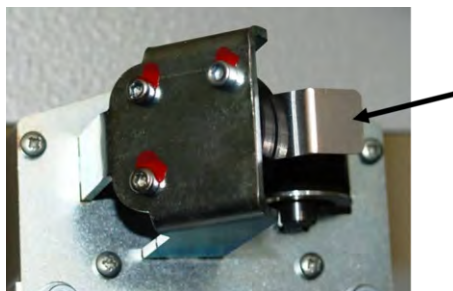


2. The mirror is held in place by magnetic pins located on the mirror holder. Carefully remove the mirror by pulling on the metal plate marked below.



NOTICE

Ensure that you do not touch the mirror surface with your fingers, as this reduces the service life of the mirror.



3. Use a drop of the lens cleaning fluid from the accessory box and, holding the mirror at an angle, rinse the surface of the mirror to wash off any coarse dirt.
4. Place the mirror on a work surface. Apply a few drops of lens cleaning fluid to the mirror and allow the fluid to act for approx. 1 minute.
5. Use a folded piece of lens cleaning cloth soaked in lens cleaning fluid and gently wipe the mirror once. Use a fresh lens cleaning cloth soaked in lens cleaning fluid each time and again, wipe over the mirror just once. Then dry the mirror with a fresh dry lens cleaning cloth. Never use a cleaning cloth twice, as dust particles on it may scratch the mirror surface.
6. Inspect the mirror and repeat the cleaning process if necessary.
7. Place the mirror back in the mirror holder unit and reinsert the maintenance panel.

10 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.



NOTICE

Material damage.

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

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

10.1 Error, cause and remedy

Problem	Possible cause	Remedy
Engraving depth too shallow.	• Inaccurate focusing. • Dirty lenses.	• Check focus (see chapter "Focusing methods", page 50). • Clean the lenses.
Blurred edges.	• Inaccurate focusing.	• Check focus.
Missing cutting lines.	• 0 passes in the material database. • Line thickness too thick in Corel-Draw. • Color was skipped in the software.	• Increase the number of passes in the material database. • Reduce line thickness. • Set color in the material database to "cut".
Wavy lines.	• Loose lens.	• Check lens and lens position.

Problem	Possible cause	Remedy
No visible markings.	• Laser power too low. • Speed too high. • No focusing. • Use of wrong focus tool.	• Increase laser power. • Reduce speed. • Check focus (see chapter "Focusing methods", page 50). • Change focus tool. • When using autofocus: Check the settings in the software (lens, material thickness, table).
Details are engraved too thinly when stamp engraving.	• Stamp shoulder too steep.	• Change the shoulder or select a different one (flat/medium/steep): Options/Process options/Stamps.
The size to be engraved or cut is not identical to the size in Corel-Draw.	• Grid correction enabled in the software. • Incorrect size setting in printer driver. • Incorrect graphic position in layout tab (print). • Wrong machine selected in software.	• Switch off grid correction in software (Settings/Define material template/Advanced). • Use same size as in CorelDraw. • Change layout setting to: As in document. • Choose correct machine in software.
Corners or angles are not marked or cut.	• Insufficient laser power.	• Increase correction in software (Settings/Define material template/Advanced).
No initialization after starting.	• Front or side door of acrylic cover not closed.	• Close all safety covers.
The machine is unresponsive after starting.	• Blown fuse. • No current at power connection.	• Check fuse. • Check power connection.
No connection to the machine.	• Invalid COM port. • Defective connecting cable. • COM port is being used by another program.	• Change port. • Check cable. • Close the program or change COM port.
Connection to the machine is frequently interrupted.	• Electromagnetic radiation.	• Ensure that the machine and computer are connected to the same power circuit. The original cable length should not be exceeded.
Cutting edge and engraving lines are offset.	• Speed too high.	• Reduce speed.
Other faults.		• Contact Technical Support (see chapter "Contact details", page 65).

10.2 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 you call, stay close to the machine and have the following information to hand (see "[answer form](#)"):

- At which working process did the problem occur?
- What you have done so far to correct the problem.
- Serial number (see "[General Information \(data plate\)](#)").
- 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**

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

Electric current.

The machine must be disconnected from the main power supply.



NOTICE

- Disassemble the unit into individual parts using suitable tools.
- Watch out for springs.
- Observe the “Disposal” chapter.

Process:

1. Remove all workpieces from the machine.
2. Switch off the machine using the key switch.
3. Switch off the main power supply using the main switch on the rear of the appliance.
4. Remove the exhaust system.
5. Disconnect all electrical supply lines and all other cables on the rear of the appliance.

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.

In case of disassembly, use suitable tools to dismantle the unit into individual parts. Sort the individual parts and have them disposed of professionally. Legal regulations must be adhered to.

13 APPENDIX

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

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



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: _____
Layout Software: _____

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.

14 ACRONYMS

Acronym	Description
AC	Air-cooled
AC	Alternating current
API	Application programming interface
BAT	Beam alignment tool
CAT	Category
CCL	Critical closed loop
CE	European Conformity
CO ₂	Carbon dioxide
COM	Communication
CPU	Central processing unit
dB(A)	A-weighted decibel
DC	Direct current
DGUV	Deutsche Gesetzliche Unfallversicherung (German Statutory Accident Insurance)
DHCP	Dynamic host configuration protocol
DIN	Deutsches Institut für Normung (German Institute of Standardization)
DNS	Domain name system
I/O	Input/output
EC	European Community
EMC	Electromagnetic compatibility
EN	European standard
GPU	Graphical processing unit
HD	High definition
IEC	International Electrotechnical Commission
IP	Ingress protection
IP	Internet protocol
ISO	International Organization for Standardization
LAN	Local area network
LASER	Light amplification from stimulated emission of radiation
LC	Liquid-cooled
LED	Light emitting diode
MPC	Maximum permissible concentration
MPR	Maximum permissible radiation

Acronyms

Acronym	Description
NW	Nominal width
OEM	Original equipment manufacturer
OPC UA	Standard for data exchange as platform-independent, service-oriented architecture (open platform communications)
Pa	Pascal (printing unit)
PC	Personal computer
PCB	Printed circuit board
PIN	Personal identification number
RAM	Random access memory
RFID	Radio frequency identification
SONAR	Sound navigation and ranging
T	Time delay (slow release)
TPU	Tensor processor
URL	Uniform resource locator
USB	Universal serial bus
UV	Ultraviolet
VDI	Verein deutscher Ingenieure (Association of German Engineers)
VDP	Vision Design&Position
W	Watts
WC	Water cooled
Wifi	Wireless network
WLAN	Wireless local area network
WTK	Water treatment kit
ZnSe	Zinc selenide

Speedy 50

laser engraving system

Mechanics

Work surface	457mm x 305 mm (18 x 12 inches)
Max. workpiece height	140.9 mm (5.5 inches) with 1.5 inch lens 128.2 mm (5.0 inch) with 2.0 inch lens 115.5 mm (4.5 inch) with 2.5 inch lens
Processing table	Ferromagnetic metal table
Max. processing speed	1.5 m/s (60 ips)
Max. acceleration	35 m/s ² (1378 ips ²)
Motor	Stepper motor (Y+Z) + brushless DC servo motor (X)
Encoder	Incremental measuring system
Optical elements	Telescope, lens and mirror
Lenses	1.5 inch, 2.0 inch, 2.5 inches
Repeat accuracy	+/- 0.015 mm (0.0006 inch), over the entire work surface
Addressable accuracy	5 µm (0.0002 inch)
Accuracy to size of parts	According to material and process
Max. load on the processing table	8.5 kg (18.7 lbs), load over entire work surface
Interface	Ethernet

Standard equipment

lens	2.0 inches
Software	Ruby®
Exhaust system	for entire working area
Operating console	Keypad, key switch, emergency stop switch; PC and monitor not included
Laser pointer	655 nm, <0.99 mWcw
Air assist	Set of valve and pump
Other standard equipment	OptiMotion™, smart electronics, protected laser beam, quick change table, quick-change laser tube

Accessories

Rotary engraving attachment	Available with cone, three-jaw chuck drill chuck
Trolley base	Trolley base or integrated (ride on) exhaust system

Tabletop

Honeycomb cutting table

TroCare

Customized service package

Laser machine

Laser system

Sealed-off CO₂ laser machine, maintenance-free, air-cooled, wave length 10.6 µm

Laser power

30 W

Dimensions & weight

Width x height x depth

726 x 447 x 672 mm (28.6 x 17.6 x 26.5 inches)

Weight

approx. 53 kg / 117 lbs

Safety & environmental conditions

Laser class

CDRH laser class 2

Interlock

double interlock safety system

Environmental conditions

Mandatory ambient temperature +15° to +25° C Humidity 40% to max. 70%, non-condensing
Dust-free environment (2nd degree in accordance with IEC 60947-1)

Conformity

CE compliant, FDA listed

Exhaust system

Working point of the exhaust system

Min. 200 m³/h at 1,000 Pa (min. 117.7 cfm at 4.015 in H₂O)

cooling

Air cooling

Active cooling with ventilators

Electrics

Power requirement

1 ~ AC 110-240V 50-60Hz, 800 W

Subject to change without notice, errors and omissions reserved. Model identification 8087
Speedy 50C April 2024

EC-Declaration of Conformity

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

trotec

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	Speedy 50
Model identification	8087 Speedy 50C
Serial number	S23-7###
Machine group	8015 , 8087
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 11553-1:2020	Safety of machinery – Laser processing machines Part 1: General safety requirements
ISO 12100:2010	Safety of machinery – General principles for design - Risk assessment and risk reduction
ISO 13849-1:2018	Safety of machinery – Safety related parts of control systems Part 1: General principles for design
IEC 60204-1:2018	Safety of machinery – Electrical equipment of machines Part 1: General requirements
IEC 60825-1:2022	Safety of laser products - Part 1: Equipment classification and requirements
IEC 61000-3-2:2019	Electromagnetic compatibility - Part 3-2: Limits for harmonic current emissions
IEC 61000-3-3: 2013 +A1:2019	Electromagnetic compatibility - Part 3-3: Limitation of voltage changes / fluctuations and flicker
IEC 61000-6-2:2019	Electromagnetic compatibility - Part 6-2: Immunity standard for industrial environments
IEC 61000-6-4:2019	Electromagnetic compatibility - Part 6-4: Emission standard for industrial environments

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

IEC 60825-4:2012	Safety of laser products - Part 4: Laser guards
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Marchtrenk, 07 Mai 2024

City, Date

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