

→ **Operation Manual**

SpeedMarker 700

SpeedMarker 700 RT



Trotec Laser GmbH

Linzer Straße 156
A – 4600 Wels
AUSTRIA

Tel.: ++43/7242/239-7000
E-Mail: techsupport@troteclaser.com
www.troteclaser.com

© 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. This documentation must not be reproduced or made available to others without our written permission. Any breach of law will be prosecuted.



Trotec Laser GmbH cannot be held responsible for any direct or indirect damages, which result from using or working with the products electric circuits or software described herein. The apparatus must be used only by trained and skilled personnel. Before use the manual should be read and followed carefully. Furthermore Trotec Laser GmbH reserves the right to change or alter any product described herein without prior notice.



In case of failure, please check the device first. If unsuccessful, please note all data of the device (year of manufacture, software version, etc.) and call us from a telephone next to the switched on device. For queries or technical problems please contact your dealer or Trotec Laser GmbH directly at the above address.

Inhalt

| | | |
|----------|---|-----------|
| 1 | Introduction | 5 |
| 1.1 | Scope of SpeedMarker 700/700 RT | 5 |
| 2 | General Information | 5 |
| 2.1 | Operation Manual Use..... | 6 |
| 2.2 | Intended Use | 6 |
| 2.3 | Disposal Remarks..... | 7 |
| 2.4 | Manufacturer's Label | 7 |
| 2.5 | EU – Declaration of Conformity | 8 |
| 3 | Safety Information | 9 |
| 3.1 | Laser Classification..... | 9 |
| 3.2 | Safety regulations | 10 |
| 3.3 | General Safety Information..... | 10 |
| 3.3.1 | Safety-Conscious Working..... | 10 |
| 3.3.2 | Safety Information for the User and/or Operating Personnel..... | 11 |
| 3.4 | Laser Safety Information..... | 11 |
| 3.5 | Warning and Information Labels..... | 12 |
| 3.6 | Risks | 14 |
| 3.7 | Gases, Fumes and Dust..... | 15 |
| 4 | Technical Data | 16 |
| 4.1 | Dimensions | 16 |
| 4.1.1 | Interior (Standard version)..... | 16 |
| 4.1.2 | Interior (with software controlled Z- and X-axis)..... | 17 |
| 4.1.3 | Interior (with Rotary table) | 18 |
| 4.1.4 | Exterior dimensions..... | 18 |
| 4.1.5 | Drilling T-slot table..... | 19 |
| 4.1.6 | Drilling Rotary table | 20 |
| 4.2 | Setup..... | 20 |
| 4.3 | Datasheet | 21 |
| 5 | Transport and Installation | 24 |
| 5.1 | Unloading, Inspection and Reporting Faults | 24 |
| 5.2 | Scope of Supply (Standard Configurations) | 24 |
| 5.3 | Transport and Packaging Case | 25 |
| 5.4 | Transport inspection and reporting faults | 26 |
| 5.5 | Unpack the Machine | 26 |
| 5.5.1 | Transportsicherung | 27 |
| 5.6 | Storage and Packaging | 27 |
| 5.7 | Plant-internal transport (Repositioning the System)..... | 27 |
| 6 | System Overview | 28 |
| 6.1 | General System Overview of SpeedMarker 700/700 RT | 28 |
| 6.1.1 | Supply connections | 29 |
| 6.2 | Processing Area Layout..... | 30 |
| 6.2.1 | SpeedMarker 700 with software controlled Z- and X-axis | 30 |
| 6.2.2 | SpeedMarker 700 with software controlled Z- X- and Y-axis..... | 31 |
| 6.2.3 | General axis design..... | 31 |
| 6.3 | Controls Elements | 31 |

| | | |
|------------|--|-----------|
| 6.3.1 | Control Rack | 32 |
| 6.3.2 | Laser Rack | 32 |
| 6.3.3 | Industrial PC | 32 |
| 6.4 | Safety Devices | 33 |
| 6.4.1 | Main Switch | 33 |
| 6.4.2 | Emergency Stop Device | 34 |
| 6.4.3 | Safety switches inside the safety door | 35 |
| 6.4.4 | Laser protection glass | 35 |
| 6.4.5 | Light barriers..... | 35 |
| 6.4.6 | Laser protection shutter..... | 35 |
| 6.4.7 | Cover plate | 35 |
| 6.5 | Control Elements | 36 |
| 6.5.1 | LEDs on the Keypad | 36 |
| 6.5.2 | Tastaturfeld SpeedMarker 700/700 RT | 37 |
| 6.5.3 | Emergency Stop and Automatic Start Button..... | 37 |
| 7 | Installation..... | 38 |
| 7.1 | General installation setting | 38 |
| 7.2 | Installation SpeedMarker 700/700 RT | 38 |
| 7.2.1 | Power supply of the laser rack | 38 |
| 8 | Operation..... | 39 |
| 8.1 | Before operation | 39 |
| 8.2 | Marking software | 39 |
| 8.3 | Power On/Off | 40 |
| 8.4 | Manual Mode | 41 |
| 1.1.1 | Safety door (only at SpeedMarker 700) | 41 |
| 8.4.1 | Software controlled X and Z-axis (optional: Y-axis) | 42 |
| 8.5 | Automatic mode..... | 43 |
| 8.5.1 | Automatic mode sequence..... | 43 |
| 8.6 | Setting up the Focus..... | 44 |
| 8.7 | Positioning the Workpiece | 44 |
| 9 | Maintenance..... | 45 |
| 9.1 | Safety instructions | 45 |
| 9.2 | Maintenance schedule..... | 45 |
| 9.3 | Maintenance work..... | 46 |
| 9.3.1 | Cleaning the lenses..... | 46 |
| 9.3.2 | Replacing the laser rack and industrial-PC filter mats | 47 |
| 9.3.3 | Observation window | 47 |
| 10 | Troubleshooting | 48 |
| 10.1 | Error Analysis | 48 |
| 10.2 | Common Errors | 48 |
| 10.3 | Software Errors..... | 50 |
| 11 | Disassembly..... | 51 |
| 11.1 | Sequence..... | 51 |

1 Introduction

In choosing the SpeedMarker 700/700 RT, you have selected a second generation high-quality galvo laser marking system. The Yb fiber laser source means the system has an extremely **long life-cycle** and **minimal maintenance costs**.

The combination of a high quality galvo scanner and a fiber laser produce **highly precise marking results** in **short marking times**.

This, together with the marking software and the available interfaces, provides a **flexible** and **productive** marking solution of the highest quality standards.

1.1 Scope of SpeedMarker 700/700 RT

This operational manual is valid for all construction stages and different options of SpeedMarker 700/700 RT.

- SpeedMarker 700 with Software controlled Z- and X-Axis
- SpeedMarker 700 with Software controlled Z, X- und Y-Axis
- SpeedMarker 700/700 RT with Software controlled Z-Axis

For detailed information see chapter "Technical Data".

2 General Information

Strict compliance with the safety procedures described in this Operationmanual and exercising extreme caution when using the equipment are essential for avoiding and reducing the possibility of personal injury or damage to the equipment.

All information, illustrations, tables, specifications and diagrams contained in this Operationmanual have been carefully compiled according to the art current at the time of going to press. No liability is accepted with regard to errors, missing information and any resulting damage or consequential loss.

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

Any software incorporated in this equipment should only be used for the purpose for which it was supplied by Trotec Laser GmbH. It is strictly prohibited for the user to undertake any alterations, conversions, translations into another computer language or copies (except for any essential back-up copies). Trotec Laser GmbH is not responsible for any personal injury or material damage, of either an indirect or specific nature, consequential loss, loss of commercial profits, interruption to business, or loss of commercial information resulting from the use of the equipment described in this manual.

2.1 Operation Manual Use



- Please read and follow this Operation Manual carefully, before installation and operation.
- Ensure the operation manual is accessible at all times.
- Damage to persons and/or material can result from not following individual points of the Operation Manual!!

Operation of the system is only permitted with equipment and spare parts supplied or listed in the spare parts and consumables lists.

The following symbols are used for easier understanding of the Operation Manual:



If the Operation Manual is not observed, this area represents a particular danger for the operating personnel or the personnel responsible for maintenance.



Caution: This component is under voltage. In these areas strictly observe the safety instructions regarding electricity. Care is to be taken in particular during maintenance and repair work.



Caution: In this area pay attention to the possible dangers of the laser beam.



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

2.2 Intended Use

The SpeedMarker 700/700 RT is intended exclusively for laser marking using the supplied marking software.

The following points should also be observed as part of the intended use:



- Only mark approved materials using suitable parameters
- Non-observance of the instructions for operation, maintenance and repair described in this Operation Manual excludes any liability of the manufacturer if a defect occurs..
- The system must only be operated, maintained and repaired, by personnel that are familiar with the designated field of use and the dangers of the machine!
Perform maintenance and service according to the specifications in this operation manual
- Use a suitable extraction system to remove fumes, dust or other reaction products
- Operation of the system is only permitted with equipment and spare parts supplied or listed in the spare parts and consumables lists.
- Use of the system in other areas is against the designated use. The manufacturer does not admit liability for damage to personal and/or equipment resulting from such use.

2.3 Disposal Remarks



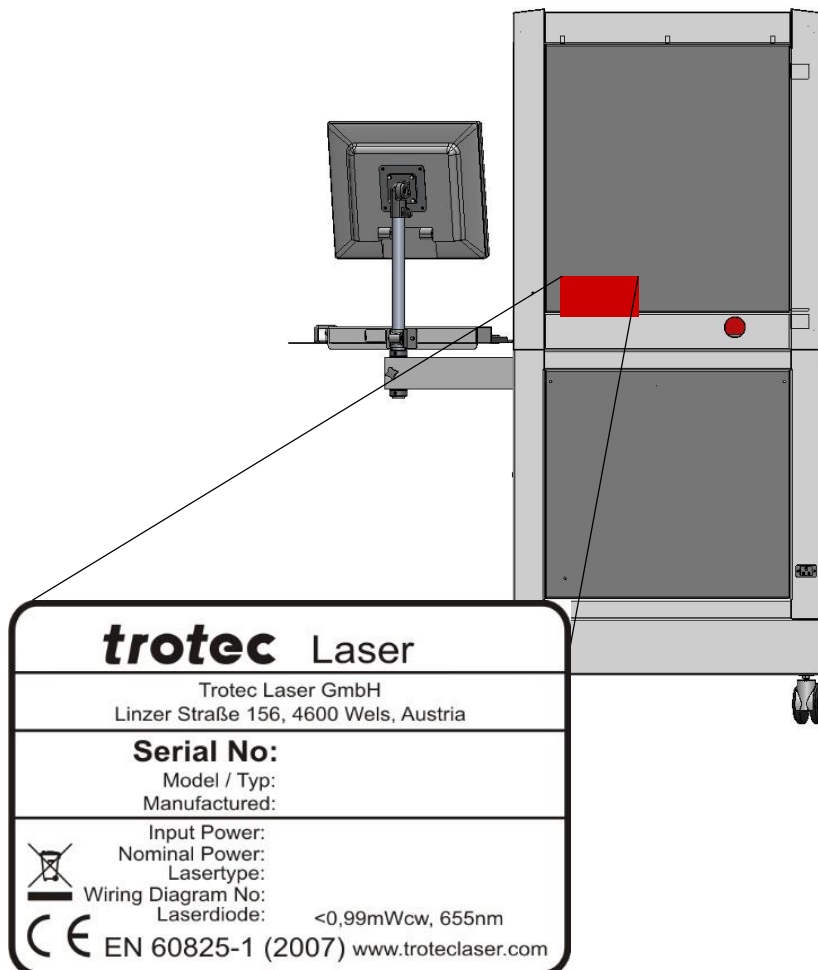
Do not dispose the machine with domestic waste!

Electronic devices have to be disposed according to the regional directives on electronic and electric waste disposal. In case of further questions, please ask your supplier.

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

2.4 Manufacturer's Label

The Manufacturer's Label is located on the backside of the machine.



Enter the serial number, model and year of manufacture from the manufacturing label here. This information is important for troubleshooting problems and ordering replacement parts.

2.5 EU – Declaration of Conformity

EC–Declaration of Conformity

(Machine directive 2006/42/EG, appendix II A)

Manufacturer:

TROTEC Laser GmbH
Linzer Straße 156,
A-4600 Wels

Authorized person for the compilation of technical documentation:

Eva-Maria HEIGL, TROTEC Laser GmbH, Linzer Straße 156, A-4600 Wels

We hereby certify that

SpeedMarker 700
Modell N° SM700

in its conception, construction and form put by us into circulation is in accordance with all the relevant essential health and safety requirements of the EC machinery directive 2006/42/EEC.

Further valid guidelines/regulations for the product:

2006/95/EG Low Voltage Directive
2004/108/EG EMC Guideline

Applied harmonized standards:

- EN 60204-1 Machine Safety – electr. Equipment
- EN 60825-1/2007, EN 60825-4/2006 and EN 60825-14/2006 Safety of Laser Equipment
- EN ISO 11553-1:2008 Safety of machinery - Laser processing machines
- EN ISO 13849-1:2008 Safety of machinery - Safety-related parts of control systems
- EN 61000-6-4:2007/A1:2011 Electromagnetic compatibility (EMC)
- EN ISO12100 Safety of machinery - General principles for design

Place, Date:

Wels, 24.10.2015

Personal data of the signer:

Stephan FAZENY, Head of Research and Development

Signature:



3 Safety Information

3.1 Laser Classification

The laser safety class indicates the risk potential based on the level of accessible laser radiation. The SpeedMarker 700/700RT is a Class 2 laser marking system as per DIN EN 60825-1 "Safety of laser products".



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. Any short-term radiation of the eyes also poses no risk due to the low level output. In the event of longer, more intensive radiation, the eye is protected by the natural lid reflex.

The SpeedMarker 700/700RT uses a Class 2 (US: class II) pilot laser. In order to prevent irritation of the eyes during operation, the operator should not look directly at the laser source.

Diffuse reflections of the pilot laser are entirely harmless.

Integrated laser source is a:

Speedmarker FL , Class 4 (US: class IV) laser marking system identified according to DIN EN 60825-1.



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 (intrabeam) 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.



When dealing with class 4 (US: class IV) laser follow the following precautions:

- **According to BGV B 2 „Laser Emission“ a trained laser safety officer has to be appointed to evaluate potential hazards and to ensure that appropriate control measures are implemented.**
- The laser controlled area shall be posted with appropriate warning signs or warning lamps.
- The laser controlled area shall be defined to contain the laser radiation.
- Also it must be protected against unauthorized access.
- The operator of class 4 laser systems always has to wear appropriate safety glasses.
- An indicator (typically a light) to provide a warning of laser emission in advance of and during the emission time.

3.2 Safety regulations

The following directives and ordinances must be observed to avoid hazards when operating Trotec laser systems.

- EN 60825-1 Safety of Laser Products - Part 1: Equipment Classification, Requirements and User's Guide
- EN 60950 Safety of Information Technology Equipment
- EN 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use; General Requirements
- BGV B2 (VBG93) Laser beam
- UL 60950 Standard for Safety for Information Technology Equipment
- UL 31011-1 Electrical Equipment for Laboratory Use - Part 1: General
- 21 CFR 1040.10 Performance Standard for Light Emitting Products - Specific Laser Products
- 21 CFR 1040.11 Performance Standard for Light Emitting Products – Specific Purpose Laser Products



The general ordinances and directives listed above may differ according to locality, region or country. Therefore, always observe the directives applicable to you.
The customer is always responsible for carrying out all safety requirements as Trotec Laser GmbH has no influence over the proper use of the machine.
The system integrator is responsible for observing the directives listed above when integrating our laser systems

3.3 General Safety Information



All personnel involved in installation, set-up, operation maintenance and repair of the machine, must have read and understood the Operation Manual and in particular the "Safety" section. The user is recommended to generate company-internal instructions considering the professional qualifications of the personnel employed in each case, and the receipt of the instruction/Operation Manual or the participation at introduction/training should be acknowledged in writing in each case.

3.3.1 Safety-Conscious Working



- The machine must only be operated by trained and authorized personnel.
- The scopes of competence for the different activities in the scope of operating the machine must be clearly defined and observed, so that under the aspect of safety no unclear questions of competence occur. This applies in particular to activities on the electric equipment, which must only be performed by special experts.
- For all activities concerning installation, set-up, start-up, operation, modifications of conditions and methods of operation, maintenance, inspection and repair, the switch-off procedures that may be provided in the Operation Manual must be observed.

3.3.2 Safety Information for the User and/or Operating Personnel



- No working methods are permitted that affect the safety of the machine.
- The operator must also ensure that no unauthorized persons work with the machine (e.g. by activating equipment without authorization).
- It is the duty of the operator, to check the machine before start of work for externally visible damage and defects, and to immediately report changes that appear (including behavior during operation) that affect the safety.
- The user must provide that the machine is only operated in perfect condition.
- The user must guarantee the cleanness and accessibility at and around the machine by corresponding instructions and controls.
- Principally, no safety components may be removed or disabled (already here we emphasize the imminent dangers, for example severe burns, loss of eye-sight). If the removal of safety components is required during repair and service, the replacement of the safety components must be performed immediately after completion of the service and repair activities.
- Preparation, retooling, change of work piece, maintenance and repair activities must only be performed with equipment switched off, by trained personnel.
- It is forbidden to perform unauthorized modifications and changes to the machine. It is emphasized, that any unauthorized modifications to the machine are not permitted for safety reasons.

3.4 Laser Safety Information



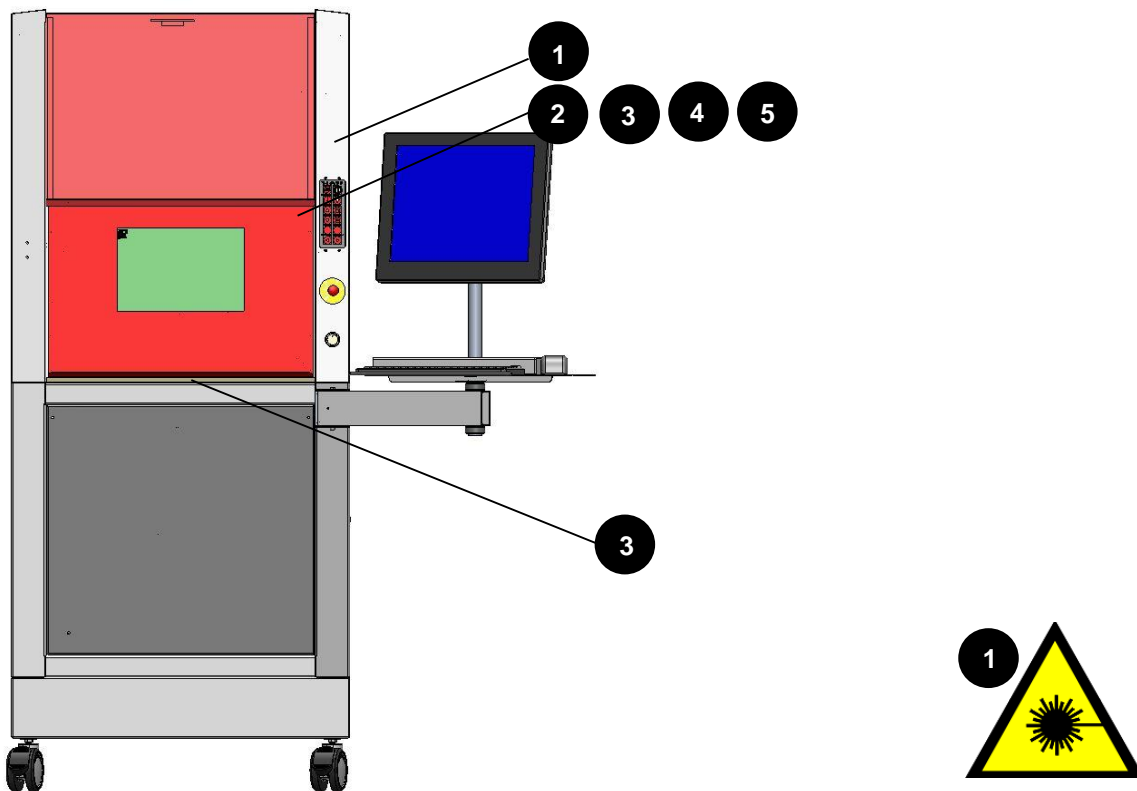
- Without safety precautions, the following risks exist with exposure to laser radiation:
 - Eyes: Burns to the retina for **NIR (Near Infra Red) LASER**
 - Skin: Burns
 - Clothing: Danger of fire
- The laser beam must never be directed onto persons or animal!
- Never try to modify or remove the safety devices or cover of the laser head!
- Never try to modify or disassemble the laser and do not try to start up a system that had been modified or disassembled
- **Dangerous radiation exposure can result from the use of operation or adjustment equipment other than that described here, and if different operational methods are performed.**

3.5 Warning and Information Labels



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

Front View



2

YTTERBIUM FIBER LASER
 $P_0 < 60 \text{ W}$, $P_p < 30 \text{ kW}$, $E_p < 2 \text{ mJ}$
 $\lambda = 1050 \dots 1200 \text{ nm}$
LASERPOINTER
 $P_{\text{max}} < 0,99 \text{ mW cw}$, $\lambda = 655 \text{ nm}$

3

CAUTION
 VISIBLE AND INVISIBLE LASER RADIATION
CLASS 4, WHEN OPENED AND
 SAFETY INTERLOCKS DEFEATED
 AVOID EYE OR SKIN EXPOSURE TO
 DIRECT OR SCATTERED RADIATION

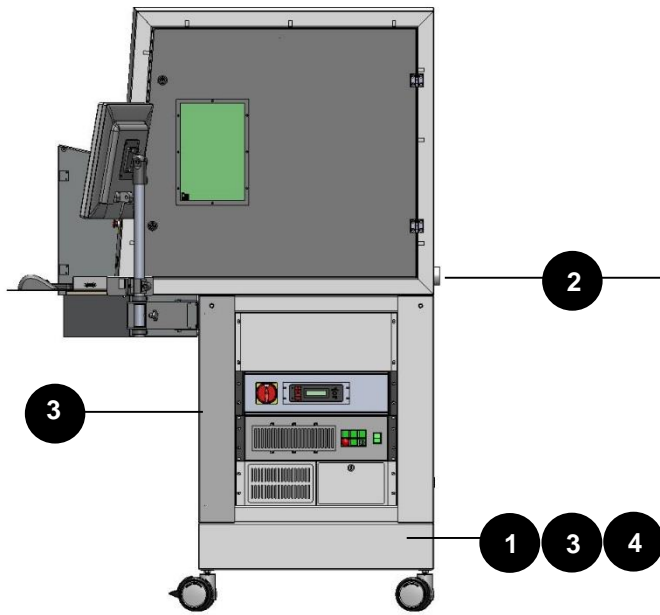
4

CAUTION
 VISIBLE LASER RADIATION
CLASS 2, WHEN OPENED
 DO NOT STARE INTO BEAM

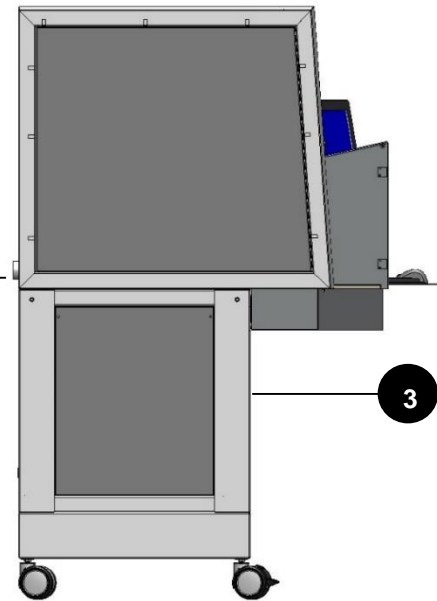
5

NEVER OPERATE THE LASER SYSTEM
 WITHOUT CONSTANT SUPERVISION
 EXPOSURE TO THE LASER BEAM MAY
 CAUSE IGNITION OF COMBUSTIBLE
 MATERIALS WHICH CAN CAUSE SEVERE
 DAMAGE TO THE EQUIPMENT

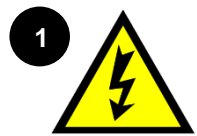
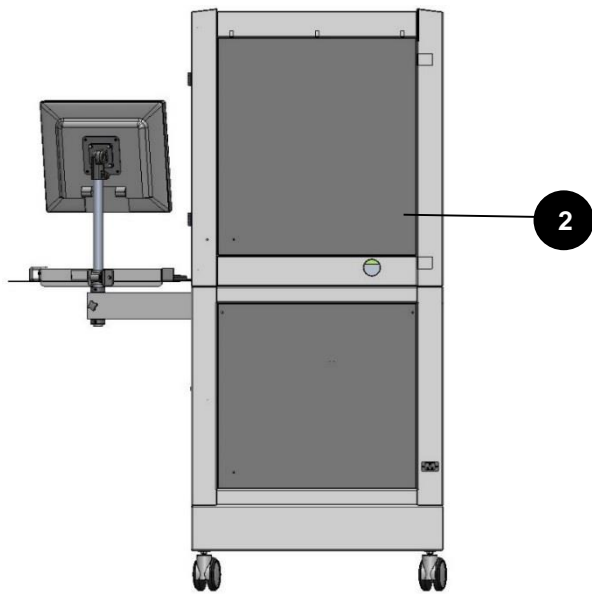
Right Side View



Left Side View



Rear View



2

CAUTION
VISIBLE AND INVISIBLE LASER RADIATION
CLASS 4, WHEN OPENED
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

3

HAZARDOUS VOLTAGE INSIDE
DISCONNECT POWER BEFORE OPENING

4

INPUT POWER
100-240VAC 50/60Hz

3.6 Risks



Risk posed by the incorrect actions of untrained individuals!

The improper use of the machine can lead to injury and/or damage to the machine.

- Inform personnel about the machine's function and any other risks and record this in the training records. Observe official regulations regarding the operation of machines and accident prevention regulations



Risk posed by missing, faulty or bridged safety installations and machine components!

Faulty or missing safety installations and machine components can lead to death, injury and/or damage to the machine.

- Check carefully that safety installations and machine components are functioning properly and are fault free.
- The specified actions should be undertaken immediately if parts are faulty or defective.



Risk posed by incorrect operation (in particular in setup-mode)!

Setting and operating the machine with limited knowledge of its function can lead to injury and/or damage to the machine.

- Read and observe the operating and safety instructions before commissioning the machine!



Risk posed by incorrect operation by unauthorised individuals!

Setting and operating the machine with limited knowledge of its function can lead to injury and/or damage to the machine.

- Never leave the machine unattended while in operation.
- When the machine is not used prevent unauthorized access (turn off key switch or main switch).



Risk posed by missing machine signage!

Making the wrong assumptions can lead to the risk that the machine is operated incorrectly.

- Replace missing machine signage.



Risk posed by non-repairable faults!

Any non-repairable fault may damage the machine.

- Turn off the machine and call customer service!



Risk posed by using inferior spare parts or parts of other manufacturers!

The use of inferior spare parts or parts produced by other manufacturers impairs the safety of the machine and invalidates the Declaration of Conformity (CE) supplied with it.

- Wear parts or damaged mechanical, safety or electrical components should be replaced by original spare parts.



Risk posed by missing protective equipment!

- Wear the appropriate workwear.
- Wear safety glasses (**class 4/USA: Class IV**)
- Use a suitable extraction system.



Risk posed by laser marking reaction products!

A suitable extraction system must be used when laser marking due to the possible generation of gases, fumes and any other partially toxic by-product.

In individual cases, the reaction products may consist of static dust. If this enters any electrical systems it can cause short circuits leading to personal injury and material damage.



Risk posed by flammable or explosive materials!

Class 4 laser radiation such as that emitted by the SpeedMarker 700/700RT may ignite materials or cause explosions. Among others it should be ensured that:

- Parameters are selected so that the material does not overheat
- The system is monitored if necessary
- Dust is extracted safely

There is no accumulation of any flammable residues or remnants in the workspace.

3.7 Gases, Fumes and Dust

Depending on the materials being marked and the parameters selected, laser marking may generate gases, fumes, aerosols or dust.

The toxicity of such by-products depends on the material.

The operator is responsible for ensuring a suitable extraction system is in place and for compliance with the relevant guidelines in order to protect individuals and the environment.

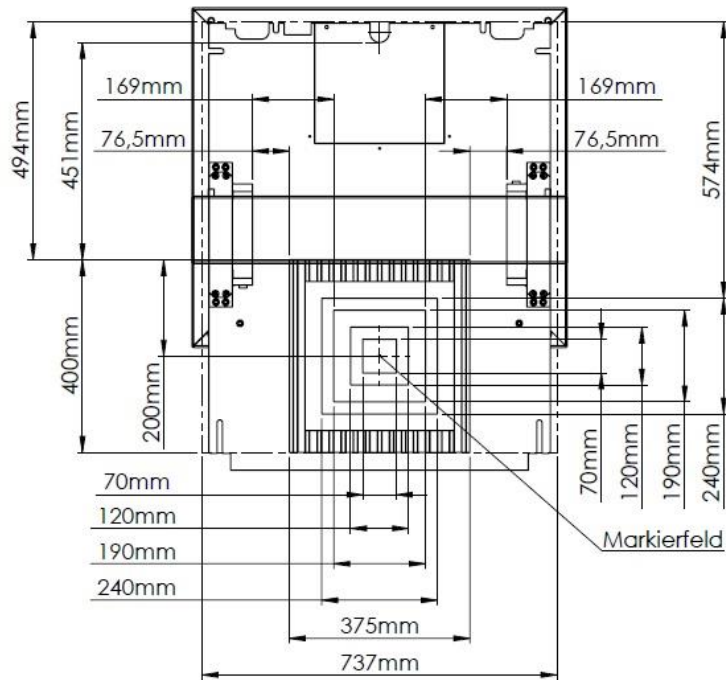
The guideline VDI 2262 1...3 "Workplace air " provides, among other things, additional remarks.

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 a loss of performance, poor marking results and damage to the device.

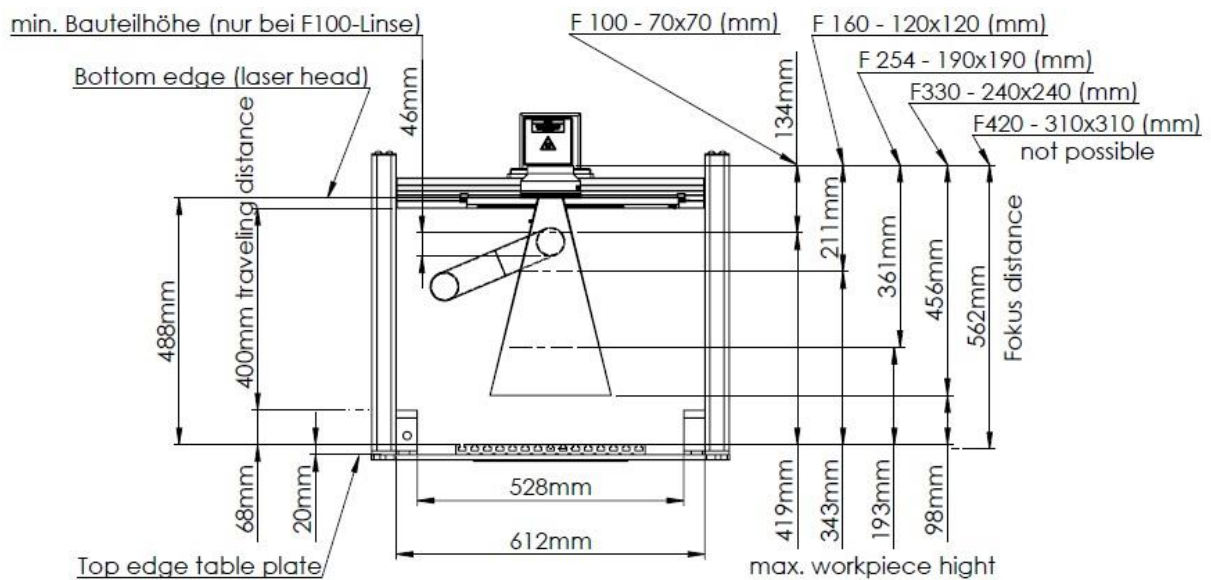
4 Technical Data

4.1 Dimensions

4.1.1 Interior (Standard version)

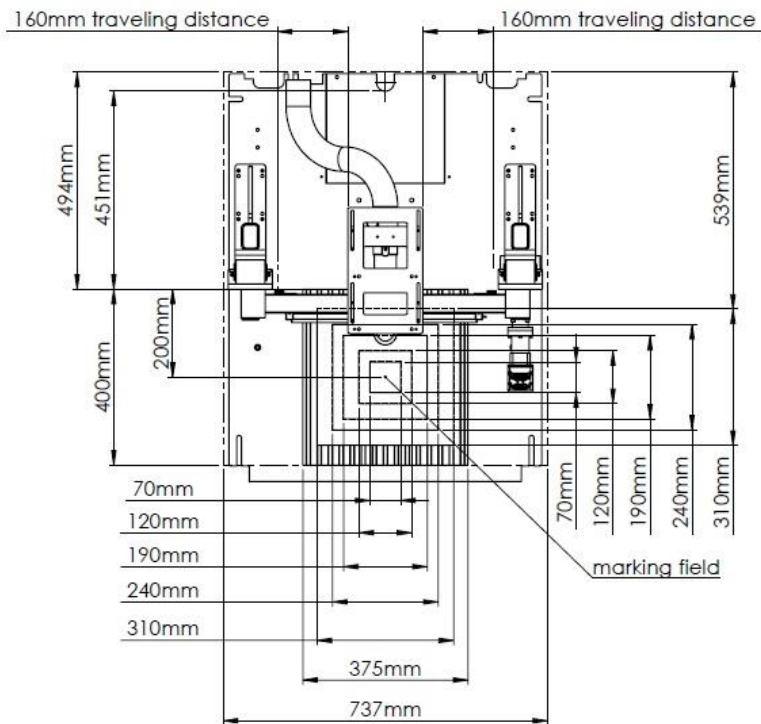


Top view – standard version with fiber laser and motorized Z-axis

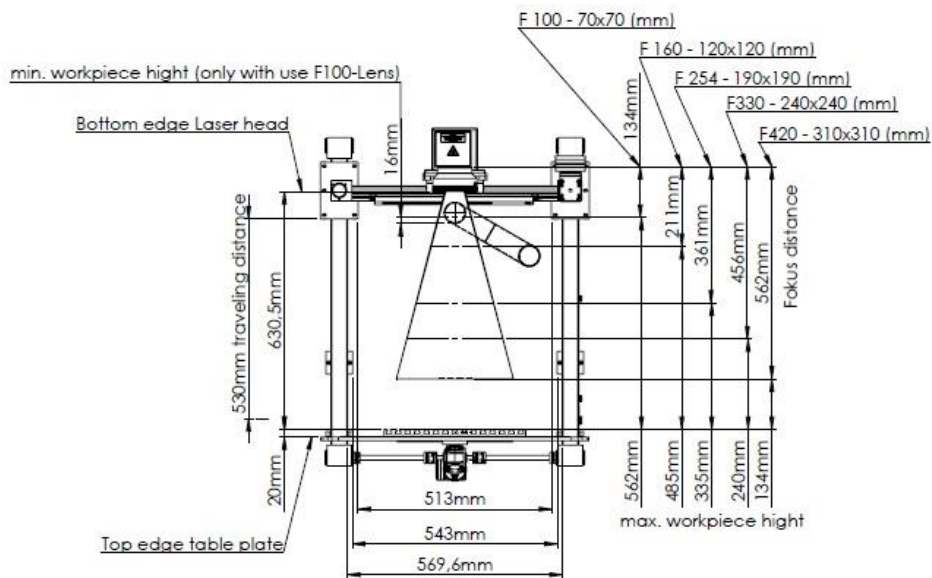


Top view – standard version with fiber laser and motorized Z-axis

4.1.2 Interior (with software controlled Z- and X-axis)

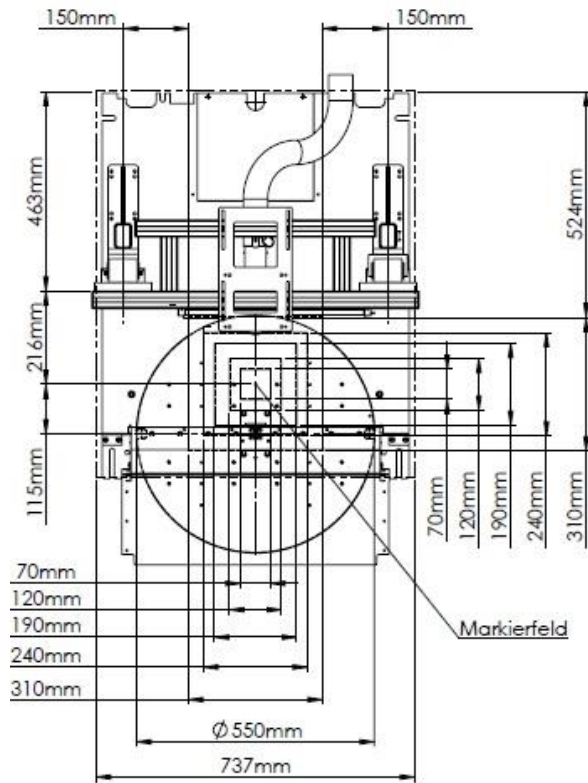


Top view with software controlled Z- and X-axis



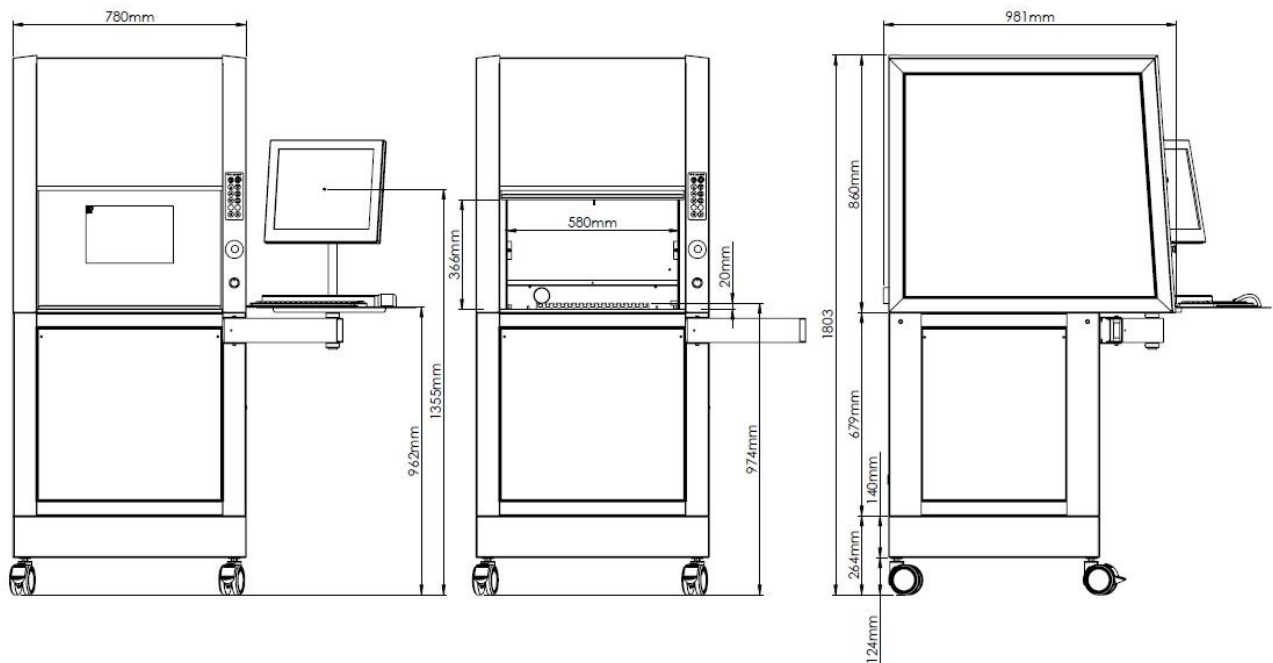
Front view with software controlled Z- and X-axis

4.1.3 Interior (with Rotary table)

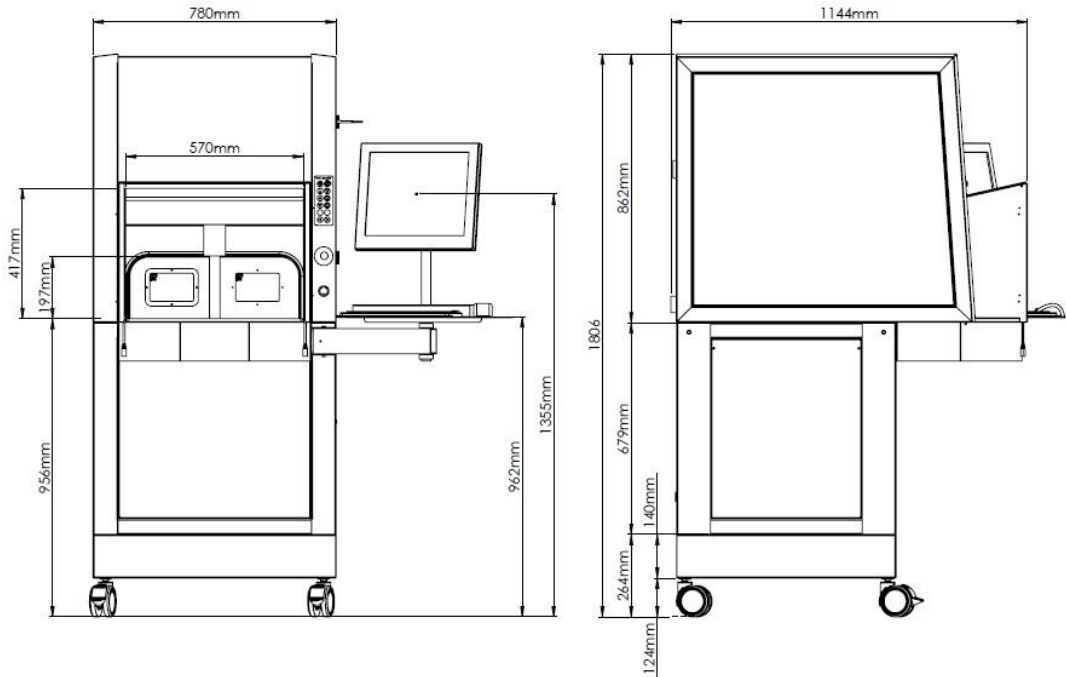


4.1.4 Exterior dimensions

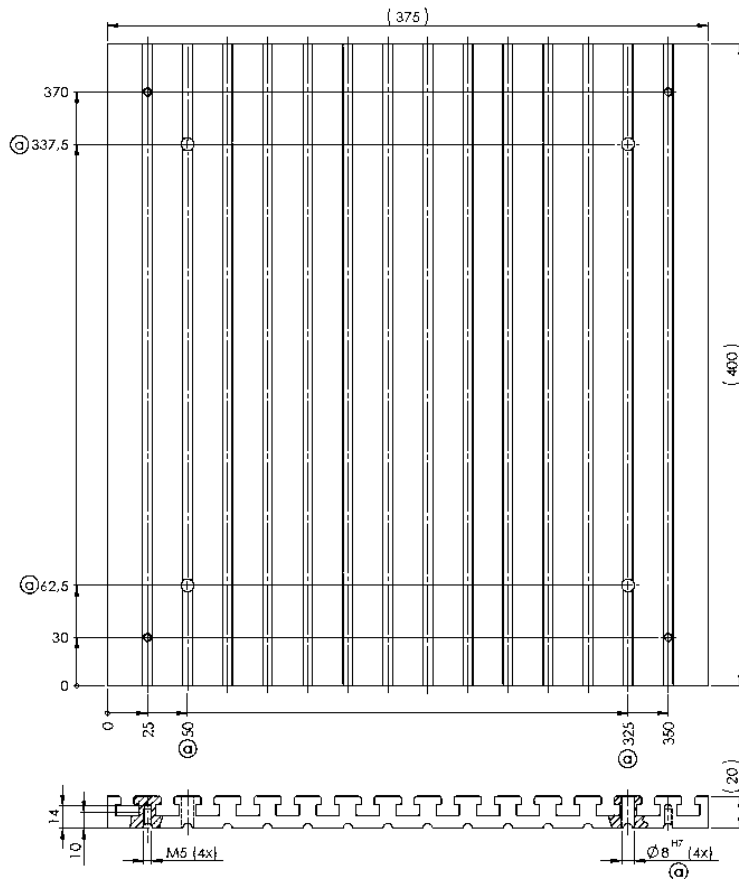
SpeedMarker 700



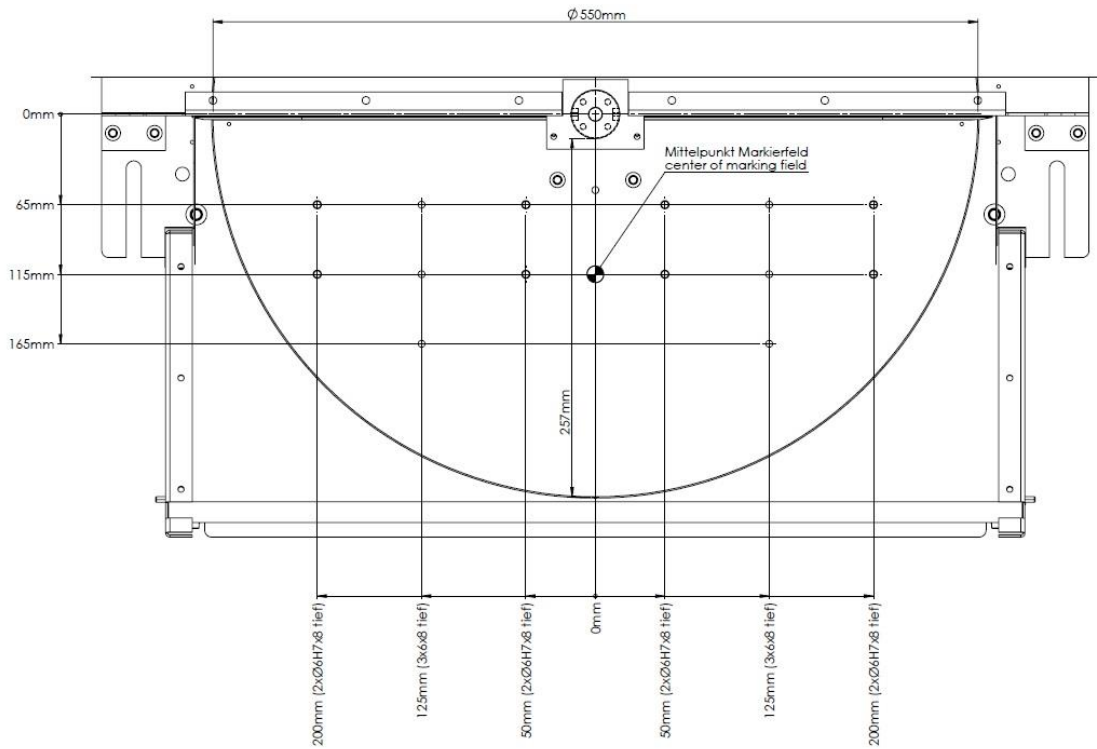
SpeedMarker 700 RT



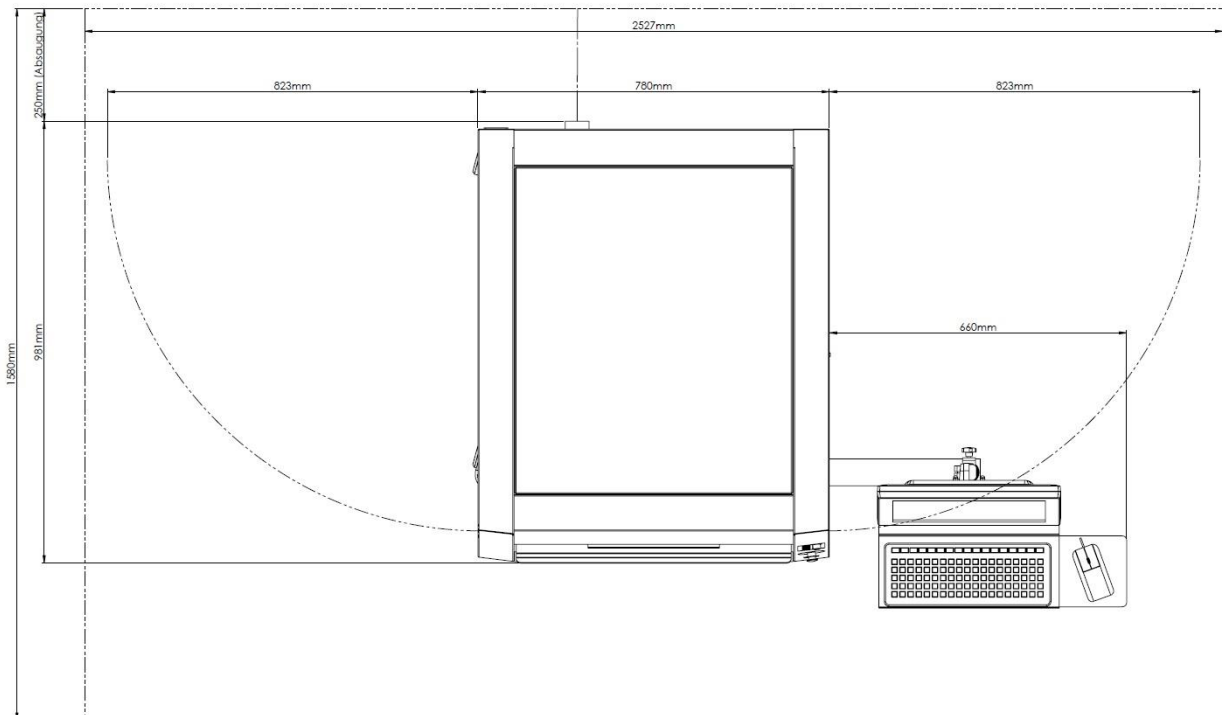
4.1.5 Drilling T-slot table



4.1.6 Drilling Rotary table



4.2 Setup



4.3 Datasheet

Fiber Laser

| | | | | |
|---------------------------|---|-----------|-----------|-----------|
| Laser | Q-switched Yb-fiber laser, maintenance free | | | |
| Wavelength | 1064 nm ± 8 | | | |
| Pulse duration | 100 ns ± 20 | | | |
| Beam quality | M ² < 1,5 | | | |
| Power stability | better ± 5% | | | |
| Cooling | air cooled | | | |
| Laser type | FL 10 | FL 20 | FL 30 | FL 50 |
| Max. average output power | 10 W | 20 W | 30 W | 50 W |
| Max. pulse energy | 1 mJ | 1 mJ | 1 mJ | 1 mJ |
| Pulse repetition rate | 2-200 kHz | 2-200 kHz | 2-200 kHz | 2-200 kHz |
| Integrated pilot laser | ✓ | ✓ | ✓ | ✓ |

CO₂ Laser

| | | |
|---------------------------|---|----------------------|
| Laser | Sealed-Off CO ₂ -laser, maintenance free | |
| Wavelength | 10,6 μm ± 0,05 (30 W) | 10,2 μm ± 0,1 (45 W) |
| Beam quality | M ² < 1,2 | |
| Power stability | better ± 5 % | |
| Cooling | air cooled | |
| Max. average output power | 30 W | 45 W |
| Pulse repetition rate | CW-50 kHz | CW-50 kHz |
| Integrated pilot laser | ✓ | ✓ |

Galvo-System (Fiber Laser)

| | | | | | |
|---|--|---------------------------|-----------|-----------|-----------|
| Lens / Focal length | F-100 | <i>Standard:</i> F-160 | F-254 | F-330 | F-420 |
| Marking area [mm x mm] | 70 x 70 | 120 x 120 | 190 x 190 | 240 x 240 | 310 x 310 |
| Focus diameter | ~ 27 μm | ~ 45 μm | ~ 68 μm | ~ 88 μm | ~ 112 μm |
| Max. marking speed (Option high-speed scan head) | 800 cps – 1 mm single line with F = 160 mm (900 cps – 1 mm single line with F = 160 mm) | | | | |
| Max. positioning speed (Option high-speed scan head) | 12.000 mm/s with F = 160 mm (15.000 mm/s with F = 160 mm) | | | | |

Galvo-System (CO₂ Laser)

| | Standard | | | | | |
|---|--|----------|----------|----------|----------|----------|
| Lens / Focal length | F-100 | F-150 | F-200 | F-250 | F-300 | F-400 |
| Marking area [mm x mm] | 70x70 | 105x105 | 140x140 | 175x175 | 210x210 | 280x280 |
| Focus diameter | ~ 170 µm | ~ 220 µm | ~ 270 µm | ~ 320 µm | ~ 373 µm | ~ 480 µm |
| Max. marking speed (Option high-speed scan head) | 450 cps – 1 mm single line with F = 200 mm (600 cps – 1 mm single line with F = 200 mm) | | | | | |
| Max. positioning speed (Option high-speed scan head) | 7.000 mm/s with F = 200 mm (9.000 mm/s with F = 200 mm) | | | | | |

Control

| | |
|------------------|---|
| Computer | Industrial PC as 19" rack unit, 3RU high, Windows [®] 7 |
| Interfaces | USB, Ethernet, RS232, |
| Interfaces laser | Laser-interlock, marking-start (24 VDC), marking-stop (24 VDC), E-stop, error-reset, laser-busy, optional digital I/O's (24 VDC), |
| Software | SpeedMark (fiber laser) / WeldMark (CO ₂ laser) |

Workstation

| | | | | | | |
|---|---|----------------------------|---------------------------|-------------------|-----------------|-----------------|
| Interior dimensions (W x D) | 737 x 894 mm ² | | | | | |
| Door opening (W x H) | 580 x 365 mm ² (on base plate) | | | | | |
| Door | Manual and/or automatic; Optional rotary table | | | | | |
| Maximum part size (W x D) | See drawings – depends on shape of component and on machine configuration | | | | | |
| Maximum part height with fiber laser + standard Z-axis | 420 mm F-100 | 343 mm F-160 | 193 mm F-254 | 98 mm F-330 | -- F-420 | |
| Maximum (minimum) part height with CO ₂ laser + standard Z-axis | 481 mm (107 mm) F-100 | 432 mm (58 mm) F-150 | 379 mm (5 mm) F-200 | 330 mm F-250 | 280 mm F-300 | 181 mm F-400 |
| Maximum part height with fiber laser software-controlled Z-axis *8 mm less with optional X-axis **24 mm less with optional Y-axis | 570 mm F-100 | 493 mm F-160 | 343 mm F-254 | 248 mm F-330 | 142 mm F-420 | |
| Minimum part height for combination fiber laser + F-100 lens | 46 mm Standard | 26 mm Z-axis | 16 mm Z/X-axis | 16 mm Z/Y-axis | | |
| Rotary table (only FL): Maximum / minimum part height | Maximum part height: 195 mm (limited due to partition panel) Caution: With F-100 and F160 lens it is not possible to focus onto the surface of the rotary table due do collision with the partition panel. This needs to be considered for flat parts (carrier might be needed). Minimum height for F-100 lens: 140 mm Minimum height for F-160 lens: 68 mm | | | | | |
| Maximum load | 50 kg (30 kg with Y-axis; 20 kg with RT version with symmetric loading) | | | | | |
| Working table | T-slot plate (Isel PT 25): 375 x 400 mm ² optional: 700 x 375 mm ² Version with rotary indexing table: Diameter 550 mm; Height of partition panel: 200 mm | | | | | |

| | | | | | |
|--|--|-----------|-----------|-----------|-----------|
| Axis systems with fiber laser | Standard: Motorized Z-axis (traveling distance: 400 mm) Option: software-controlled Z-axis (travel. distance: 530 mm) Option: software-controlled X-axis (travel. distance: 320 mm) Option: software-controlled Y-axis (travel. distance: 325 mm) | | | | |
| Axis systems with fiber laser and rotary indexing table | Standard: software-controlled Z-axis (travel distance: 450 mm) No X- and Y-axis available | | | | |
| Axis with CO ₂ laser | Standard: motorized Z-axis (Traveling distance: 400 mm) No software-controlled Z-, X- and Y-axis available | | | | |
| Maximum working area with X-axis* [WxD in mm] *Option | 390 x 70 | 440 x 120 | 510 x 190 | 560 x 240 | 630 x 310 |
| Maximum working area with X- and Y-axis* [WxD in mm] *Option | 390 x 360 | 440 x 410 | 510 x 480 | 560 x 530 | 630 x 600 |
| Color | RAL 3002, RAL 7016, RAL 7035 | | | | |

Tolerance on dimensions: 1%

Options / Accessories

| | |
|------------------------------------|--|
| Optional lenses and galvo Scanners | <u>Fiber laser:</u> F-100, F-160, F-254, F-330, F-420 High-speed scan heads with lenses (no F-420 lens in combination with high-speed scanner) <u>CO₂ laser:</u> F-100, F-150, F-200, F-250, F-300, F-400 High-speed scan heads with lenses |
| Axis systems | Software controlled X- and Y-axis (not possible in combination with CO ₂ laser and rotary indexing table. Y-axis only in combination with x-axis) |
| Focus Finder | Second pilot laser for precise and user friendly adjustment of working distance |
| SpeedMark Vision – Smart Adjust | Integrated camera system for positioning support: Camera image is shown in the operator GUI and permits a user friendly and very precise positioning of the marking directly onto the work piece. Different camera lenses with different image sizes and resolutions are available --> please refer to the datasheet "SpeedMark Vision – Smart Adjust" . |
| Software | DirectMark printer driver: Laser marking as easy as printing. Independent from software |
| Extended I/O interface | Additional in- and outputs, 24 VDC (only in combination with fiber laser and SpeedMark software) |
| Rotary indexing table | Only in combination with fiber laser |
| Additional optional accessories | <ul style="list-style-type: none"> • Rotary unit with different chucks • Foot switch for efficient and user friendly control of the system • Exhaust systems |
| Industrial PC – high performance | Optional and more performant version of industrial PC (CPU, HDD, RAM, graphics card) for graphical applications. |

Dimensions / Installation / Laser Safety

| | |
|---|---|
| Dimensions (W x H x D) * Reduced height of working table | With fiber laser: 780 x 1802 (1662*) x 981 mm ³ With fiber laser and rotary table: 780 x 1802 (1662*) x 1144 mm ³ With CO ₂ laser: 780 x 1802 (1662*) x 1188 mm ³ |
| Weight | App. 260 kg (app. 300 kg with rotary table) |
| Ambient conditions | Operating temperature range +5 to +35°C (to +25°C for CO ₂ laser) Relative humidity max. 90 %; non-condensing |

| | |
|-------------------------|--|
| Electrical requirements | 230 VAC, 16 A, 50/60 Hz, 1/N/PE |
| Power consumption | < 1100 W |
| System protection | Marking head: sealed against spray water (IP 54) Laser rack unit: dust protected (IP20) |
| Laser class | CDRH laser safety Laser class 2 CE tested |

5 Transport and Installation

5.1 Unloading, Inspection and Reporting Faults

After unloading:

- Inspect the machine and machine components for transportation damage.
- Check screws and screw joints
- Check the delivery for completeness.
- Remove all transport packaging.

In the event of transportation damage or incomplete delivery:

- Record all details in writing immediately.
- Note all claims on the transportation documents.
- Photograph any damage.
- Send report to Trotec.



CAUTION

The lens unit should only be uncovered following installation. 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!

5.2 Scope of Supply (Standard Configurations)

- 1x SpeedMarker 700/700 RT
- 2x key for SpeedMarker 700/700 RT
- 2x key for Industrial PC
- 2x key for laser rack
- 1x CD with marking software
- 1x Windows Backup
- 1x lens cleaning kits
- 1x Allen key set
- 1x IEC connector
- 1x extraction system connection cable (optional)

5.3 Transport and Packaging Case

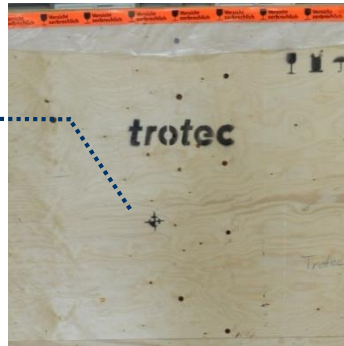
The System may only be transported in the original packaging and must be secured against slippage and tipping. Unload the transport case with a suitable forklift.



CAUTION

During transport the transport case can slip, tip or fall over.
Always secure the transport case and take into account the center of gravity of the box.

Center of gravity



Tilt

Shockwatch



5.4 Transport inspection and reporting faults



ATTENTION

Avoid unnecessary stretching or bending of the optical fiber cable in the black protective tube of the laser control.



ATTENTION

The lens unit should only be uncovered following installation. 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!

Upon arrival, 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 only accept it with reservation. Record the scope of the damage on the transport documents/delivery note. Initiate the complain process. For all defects that are not discovered upon delivery, be sure to report them as soon as they are recognized as damage claims must be filed within a certain period, as granted by law.

5.5 Unpack the Machine

Only trained and authorised personned are permitted to transport and unpack the machine. To avoid that any wooden parts are falling off or the machine is tipping, be very careful when opening the transport case. Two persons are needed to unpack the machine.



Top

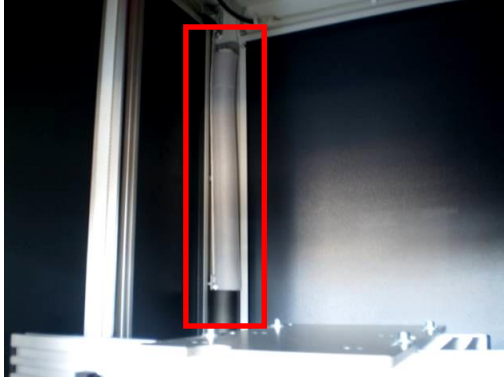
Screws
for crossbar

Vertical
tightening straps

1. Position the transport case on level ground (use suitable forklift).
2. Remove vertical tightening straps.
3. Remove the top of the transport case.

5.5.1 Transportsicherung

Available for SpeedMarker 700:



Interior protection on the door mechanism

1. Remove wooden packaging.
2. Remove the plastic foam from the front of the machine.
3. Remove the plastic foam at the door mechanism.

5.6 Storage and Packaging

Keep the package closed until installation.

- The storage location must be free of caustic materials, vapors and combustible materials. In storage room or packaged with adequate weather protection.
- Storage conditions:
 - Storage temperature: +0 bis +40°C (+0 to 104°F)
 - Relative humidity: max. 85%
- Avoid high temperature fluctuations .
- Special care when packaging and storage of electronic components.
- Oil all bare machine parts if there is a longer storage. Control regularly the general condition of control parts and the packaging.

5.7 Plant-internal transport (Repositioning the System)

The LWS needs to be transported in an upright position; avoid any strong vibrations.

1. Shut off the machine using the main switch.
2. Unplug the electrical supply.
3. Remove the exhaust system.
4. Use an appropriate fork lift to slightly lift the System,
5. Reposition and park the System on clean, solid level ground again.
6. Adjust the machine, setup the electrics and carry out a performance test.



CAUTION

When transporting the System over great distances the original transport box including interior protection needs to be used.

6 System Overview

6.1 General System Overview of SpeedMarker 700/700 RT

Front view:

SpeedMarker 700

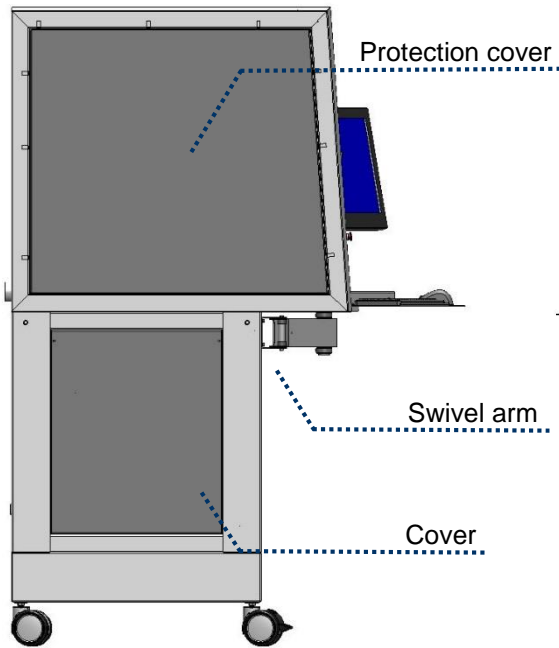


SpeedMarker 700 RT

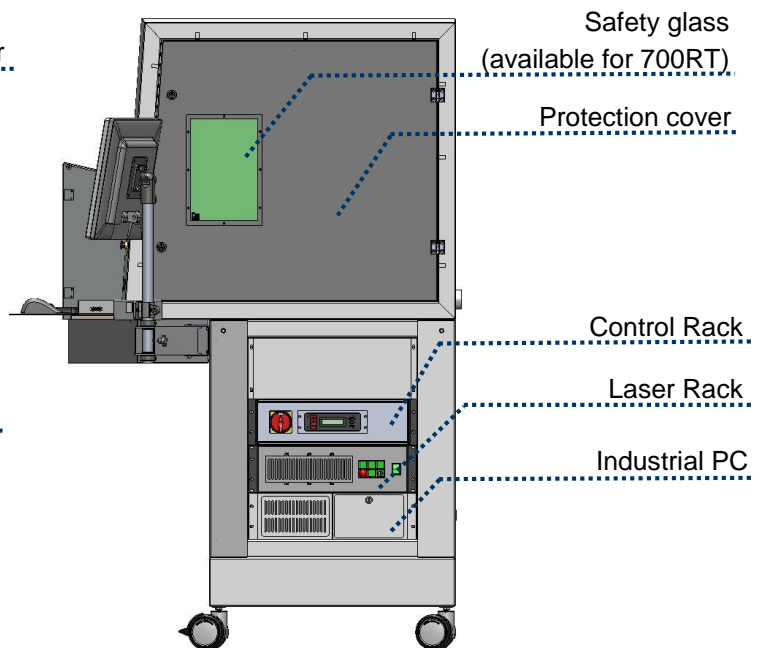


| | |
|-----------|-----------------------------|
| 1 | Safety glass |
| 2 | Safety door |
| 3 | Feet |
| 4 | Keypad |
| 5 | Monitor, keyboard and mouse |
| 6 | Emergency Stop button |
| 7 | Start button |
| 8 | Light barriers |
| 9 | Laser protection shutter |
| 10 | Rotary table |

Ansicht linke Seite



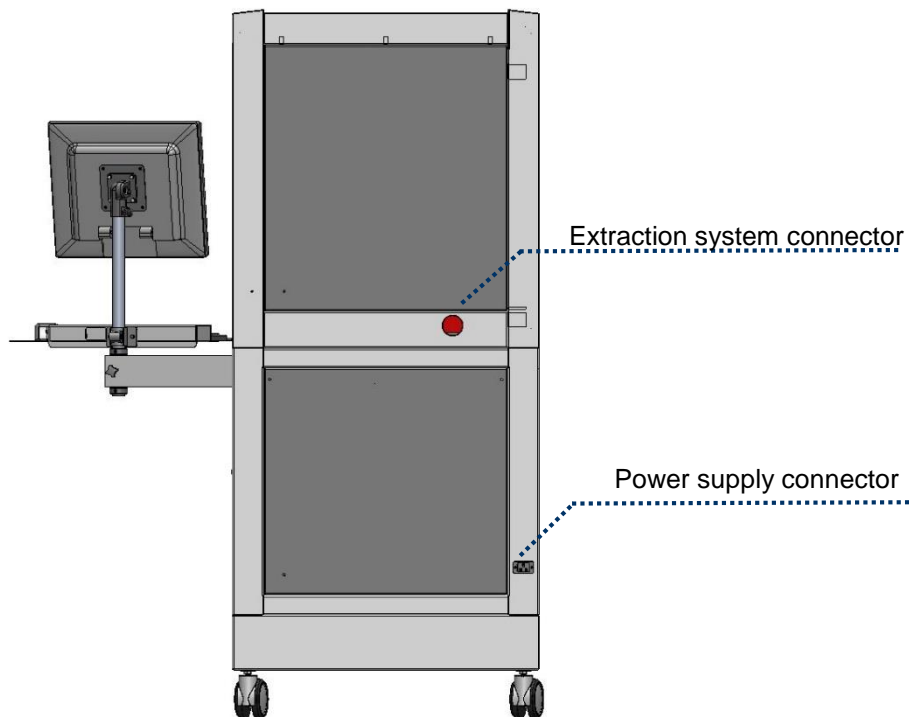
Ansicht rechte Seite



6.1.1 Supply connections

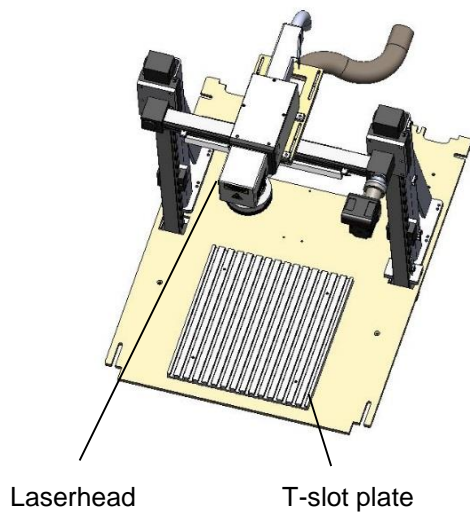
Rear view:

- The power cord can be connected via an IEC connector.
- Use an extraction tube with nominal width of 0mm.

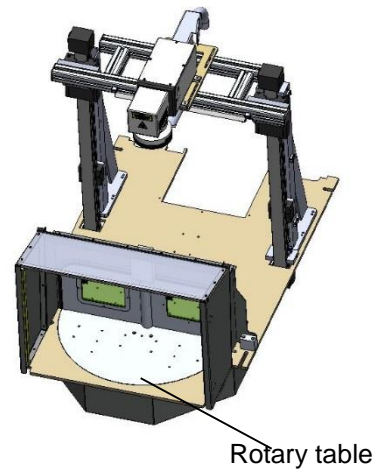


6.2 Processing Area Layout

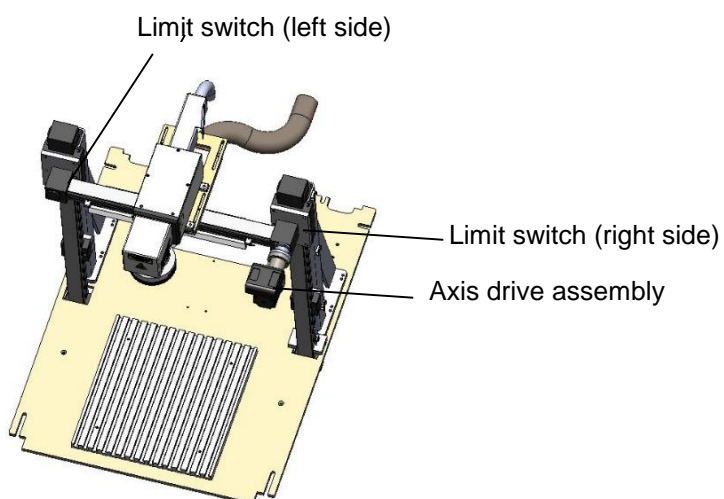
The processing area contains the axis system.
The processing area is closed during the marking process.
SpeedMarker 700



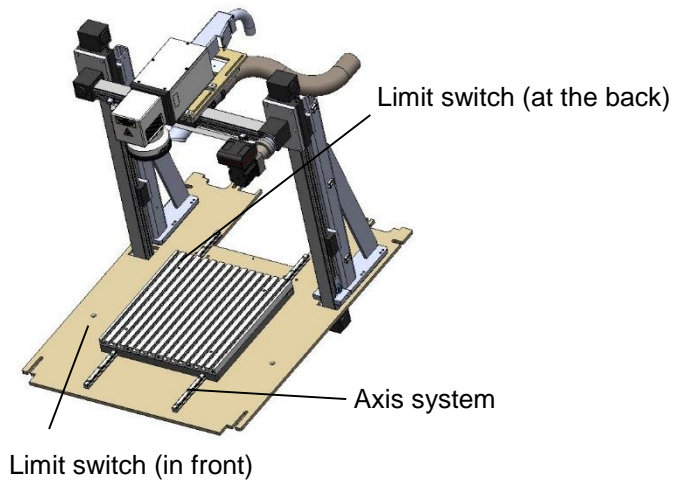
SpeedMarker 700 RT



6.2.1 SpeedMarker 700 with software controlled Z- and X-axis



6.2.2 SpeedMarker 700 with software controlled Z- X- and Y-axis



6.2.3 General axis design

- Each axis system consists of a linear servo axis with precision.
- Z- and Y-axis with tandem-axis and the X-axis have two limit switches and two mechanical stops.
- The laser head is mounted above the adapter plate on the X-axis. The X-axis is mounted on the Z-axis.
- The Y-axis is a movable table where objects can be placed.
- Each of the three axes is limited by two limit switches and two mechanical stops.

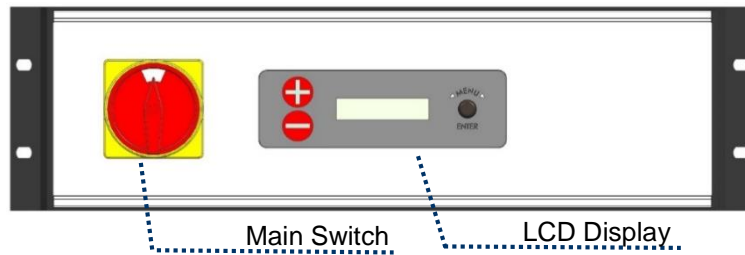
6.3 Controls Elements

The control elements consist of:

- Control Rack
- Laser Rack
- Industrial-PC

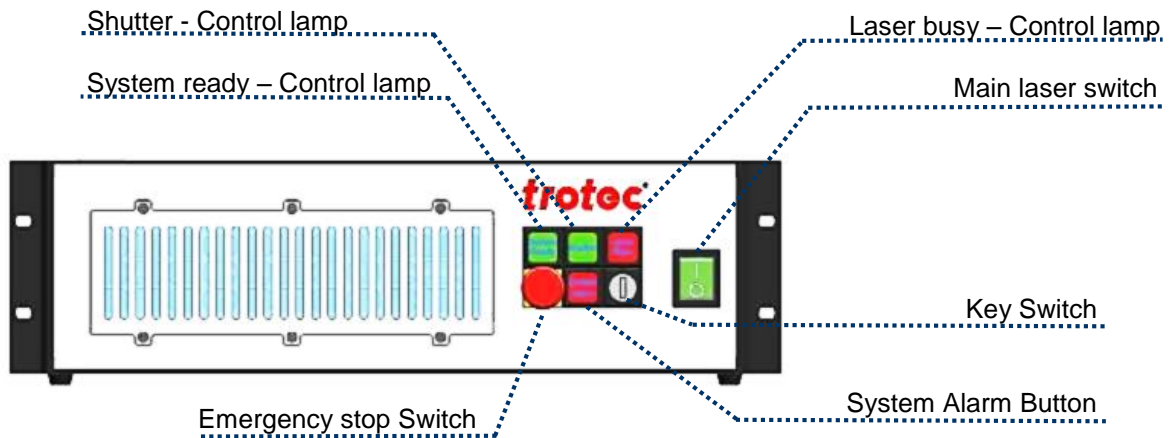
6.3.1 Control Rack

The control module takes over the control of the safety door, the automatic sequence and security. The LCD display serves to technical fault display.



6.3.2 Laser Rack

The laser rack controls the laser head and laser source.



6.3.3 Industrial PC



6.4 Safety Devices

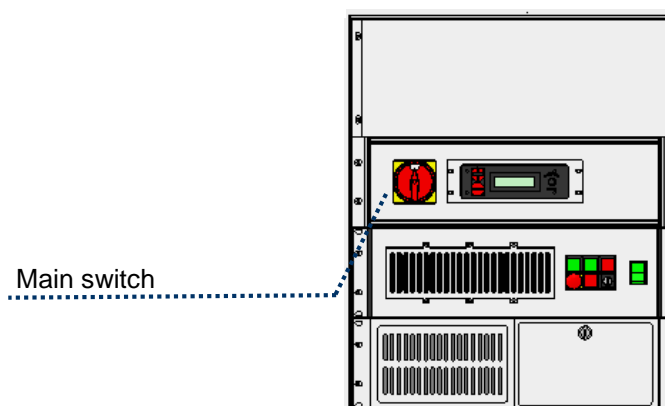
- Main switch
- Emergency stop button
- Safety switches on the safety doors
- Observation window of laser protection glass
- Laser protection shutter
- Cover plates



Do not alter or deactivate the safety switches or protective covers on the laser head or the machine. All safety and protection devices must be installed and fully functional every time the machine is put into operation.

6.4.1 Main Switch

The main switch is situated at the system control unit at the lower part of the machine. With the main switch the entire machine but also the laser get switched off.



6.4.2 Emergency Stop Device


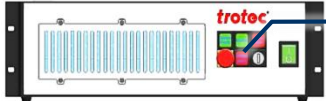
Emergency stop button: 1. on the front
2. on the laser module

The function of the emergency stop device is

Firstly: to prevent any risks to the operating personnel.

Secondly: to avoid any damage to/destruction of the machine/material.

The emergency stop automatically shuts off the electric circuit. The laser beam is interrupted by the shutter. All movements are stopped. When the emergency stop function is triggered, an error message is displayed.

| | | |
|---|---|--|
| <p>1. Unlock the emergency stop button</p> | <p>Press the "Emergency stop" button</p> |  <p>Keypad "ON" button</p> <p>Emergency stop button</p> |
| <p>2. Acknowledge the emergency stop error message</p> | <p>Press the "ON" button on the keypad</p> | |
| <p>3. Acknowledge the laser error message</p> | <p>Press the "ON" button on the keypad</p> <p>OR: Press the "System alarm" button on the laser rack module</p>  <p>"System alarm"</p> | |

6.4.3 Safety switches inside the safety door

Available for SpeedMarker 700.

The monitoring to determine whether a safety guard is open or closed is performed by two protective switches. The marking process can not be started when the safety doors are open. However the pilot laser stays active.

6.4.4 Laser protection glass

Available for SpeedMarker 700.

The light green observation window in the front door is made of laser protection glass in accordance with DIN EN 201. The glass consists of a special material depending on the type of laser used and which absorbs the laser radiation. The glass should be replaced if it becomes damaged.

6.4.5 Light barriers

Available for SpeedMarker 700 RT.

The light barriers at the front of the speed marker 700 RT serves as a safety device. Do not place objects between the light barriers place, otherwise the rotational movement comes to a standstill.

6.4.6 Laser protection shutter

If a safety circuit in the laser cell is open, the laser protection shutter shuts momentarily. For reasons of safety this disconnection functions via safe components. The laser is interrupted mechanically. An error message is issued.

6.4.7 Cover plate

Cover plates protect from laser light.



ATTENTION

All protection plates must be mounted all times.

6.5 Control Elements

Control Elements on the Front of the machine.









6.5.1 LEDs on the Keypad

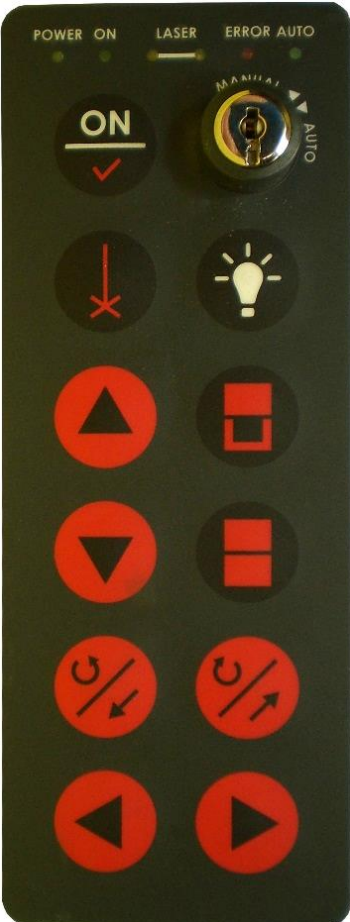
The LEDs on the control panel have the following meanings:



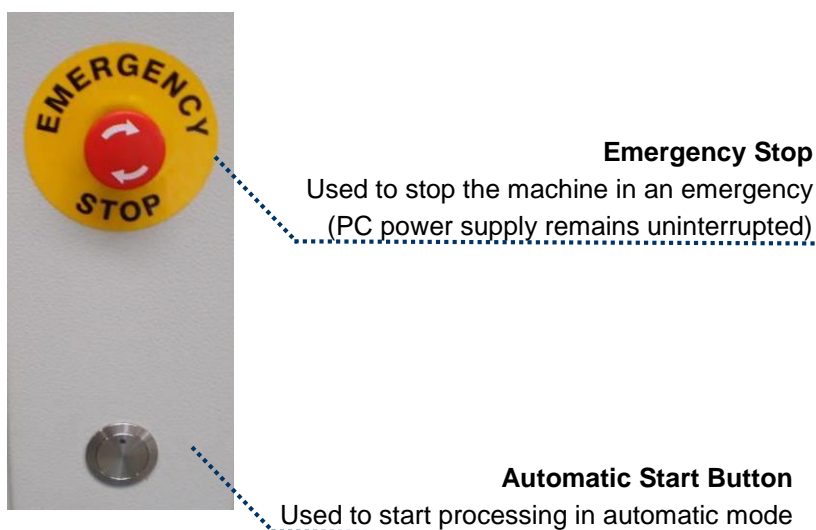
| | |
|----------------------|--|
| Power | The power supply is switched on. |
| ON | The control mechanism is switched on |
| Laser – Laser | The laser marker is active. |
| Error | There is an error which has not yet been acknowledged. |
| Auto | Automatic mode is active. |

6.5.2 Tastaturfeld SpeedMarker 700/700 RT

| | | | | |
|--|---|---|--|--|
| Used to acknowledge the system once it has been switched on, or after an emergency stop or fault | ON button |  | Key switch | Used to select either automatic or manual mode |
| | No function |  | Light | Used to switch the lighting in the processing area on or off |
| Used to move the Z-axis upwards | Z axis move up |  | Open safety door | Used to open the safety doors |
| Used to move the Z-axis downwards | Z axis move down |  | Close safety door | Used to close the safety doors |
| Used to move the Y-axis forwards/ Rotary table | Y axis move forward <i>(optional)</i> |  | Y axis move backward <i>(optional)</i> | Used to move the Y-axis backwards/ Rotary table |
| Used to move the X-axis left | X axis move left <i>(optional)</i> |  | X axis move right <i>(optional)</i> | Used to move the X-axis right |



6.5.3 Emergency Stop and Automatic Start Button



7 Installation

7.1 General installation setting



- The ambient air temperature must be between +5°C und +35°C and the relative air humidity not exceed 90% (non-condensing).
- If the system has been subject to significant temperature variations, it must be brought back to room temperature before being commissioned.
- A laser system consists of high quality electrical and optical components. Mechanical stresses, vibrations and impacts must always be avoided.
- There must be sufficient air supply to both 19" modules. The accumulation of heat due to covered ventilation slots or filter pads can damage the system.

7.2 Installation SpeedMarker 700/700 RT

1. Remove the entire packaging material.
2. Remove all transport protection.
3. The machine must stand upright.
4. Check if the laser protection glass is intact.

7.2.1 Power supply of the laser rack

1. Check if the supply voltage and frequency are correct.
2. Check if the power cable and power plug are intact and undamaged, replace them if necessary.
3. Plug in the power supply at the back of the laser rack and industrial-PC.



The configuration of the laser module is given on the warning- information label above the power supply connector.

The laser rack is fitted with different main fuses depending on the configured supply voltage:

115V AC - 1 X 6.3 A "T" speed/time-delay

230V AC - 2 x 4 A "T" speed/time-delay

The main fuses are located behind the cover, immediately adjacent to the IEC connector. The same main fuse is used for all supply voltages on the PC.

8 Operation



WARNING

Improper operation may lead to severe physical injury or material damage. For this reason, work may only be carried out by authorised, trained personnel who are familiar with how to operate the machine and in strict observance of all safety instructions.

8.1 Before operation

Before commissioning, the following points should be checked:



- Check the electrical installation is complete and the input voltage is correct.
- Ensure that the optical components are free from dust and dirt.
- Have the protective covers been removed from the focusing objective lens?
- Check the environmental conditions against the technical specification.
- Are you familiar with the laser safety regulations?
- Have all laser safety measures been fulfilled?
- The system may then only be switched on once all provisions for complying with laser safety have been checked by an authorised individual and confirmed to have met the standards.

8.2 Marking software

The marking software is already installed on the supplied PC. It is also included in the setup on the accompanying software CD.

For information on using the software, please read the accompanying software manual.

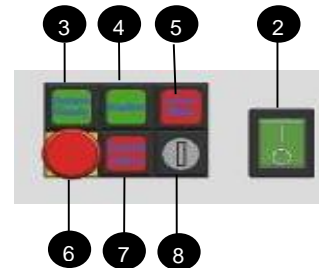
8.3 Power On/Off

Power ON:

1. Turn the main switch (1) on the laser rack module 90° to the right.



2. If necessary press the master switch "I/O" (2) situated on the laser rack module. The switch will light up green.



3. Put the key in the key switch (8) and turn 90° to the right.

4. If necessary unlock the emergency stop button.

See chapter "Emergency Stop Device".

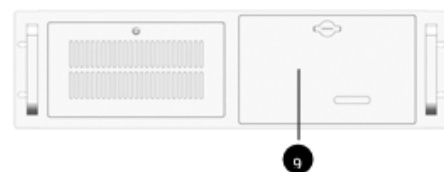
5. Press the button "ON" on the keyboard for two times until the "Error light" turns off and the "ON light" is lightening.



When operating the system for the first time it may be necessary to check the master switch (10) on the reverse side of the industrial-PC (10). In its normal state the master switch can remain in the "ON" position.



6. The industrial-PC turns on automatically. The main switch is located on the front behind the PC protective cover (9).



7. Now start the marking software on the PC.

8. Select the operating mode (manual or auto) with the key switch „Manuel/Auto“ on the control panel.



9. The SpeedMarker 700/700 RT is now ready for operation.



- If an error occurs, the “System Error” button (7) will illuminate. Press the button (7) to reset the error and continue working.
- Opening the door, while a marking process is running, will interrupt the laser beam immediately. The “System Error” button (7) will light up and must be reset before you can continue with your marking.
- We recommend using only the key switch (8) to pause the laser

Power OFF:

1. Close the software on the PC.
2. Shut down the PC.
3. Switch off the main switch (1) on the system control by turning the switch 90° to the left.
4. The SpeedMarker 700/700 RT is now switched off.

8.4 Manual Mode



When turning the key switch to manual mode all functions of the machine can be carried out manually. Manual mode is used to check the machine and test the marking. Marking is only possible when the safety door is closed. Please note the safety door can be opened and closed manually.

The functions are:

- Open and close the safety doors - Turn rotary table/laser protection shutter
- Move the axis manually.
- Start the marking process.




1.1.1 Safety door (only at SpeedMarker 700)

Use the “Open safety doors”  and “Close safety doors”  buttons on the keypad to

open and close the safety doors.

8.4.1 Software controlled X and Z-axis (optional: Y-axis)

Use the following buttons to move the axis manually:

| | | | | |
|-----------------------------------|--|---|--|-----------------------------------|
| Used to move the Z-axis upwards | Z move up |  | Y axis move forward <i>(optional)</i> | |
| Used to move the Z-axis downwards | Z move down | | Y axis move backward <i>(optional)</i> | Used to move the Y-axis backwards |
| Used to move the Y-axis forwards | X axis move left <i>(optional)</i> | | X axis move right <i>(optional)</i> | Used to move the X-axis right |
| Used to move the X-axis left | | | | |

- The axis are restricted by the upper and lower limit switches.
- When travelling down- or upwards, take care that the objective does not collide with the workpiece.
- After starting the SpeedMarker 1300 or carrying out an emergency stop acknowledgement a reference run needs to be performed. Referencing can be started manually within the marking software or automatically when starting the marking software.
- In automatic mode the axis are controlled by the Industrial PC.



CAUTION

Risk of crushing when moving the axis.

8.5 Automatic mode

When the key switch is set to auto mode all functions of the machine will be carried out automatically. Auto mode is used for an automatic production process. Marking is only possible when the safety door is closed.

8.5.1 Automatic mode sequence

SpeedMarker 700:

1. Open the door in the manual mode.
2. Use the "Automatic Start button" to start the marking process.
3. The safety door closes.
4. The marking process is carried out automatically.
5. The marking process is completed.
6. The safety doors open.
7. Use the "Automatic Start button" to start a new marking process.



SpeedMarker 700RT:

1. Use the "Automatic Start button" to start the marking process.
2. Rotary Table/ Laser protection shutter turns.
3. The marking process is carried out automatically.
4. The marking process is completed.
5. Use the "Automatic Start button" to start a new marking process.



INFO

The key switch needs to be set to AUTO and the laser rack control software has booted up

8.6 Setting up the Focus



It is absolutely essential to maintain the correct focal distance for every laser marking process. Only when in focus will the laser beam achieve the power density necessary for permanent and clearly legible marking.



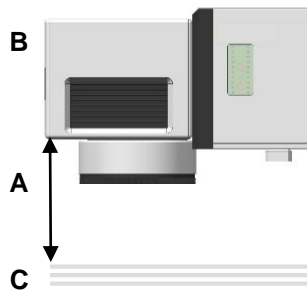
CAUTION

Risk of injury when working with mechanical components.

Prior to any marking it is therefore necessary to set the correct focal distance between the marking head and the workpiece. An incorrect focal distance is the most common cause of poor or even indistinguishable markings.

Position the laser by moving the Z-axis until the ideal marking result has been reached.

The focal distance (**A**) is measured between the lower edge of the galvo head (**B**) and the upper surface of the workpiece (**C**). The correct focal distance depends on the lens used (focal length).



| Lens | Focal distance (A) |
|-------|--------------------|
| F-100 | ~134,6 mm |
| F-160 | ~211,6 mm |
| F-254 | ~361,6 mm |
| F-330 | ~456,59 mm |
| F-420 | ~562,59 mm |

8.7 Positioning the Workpiece

Use the “Border Mark” function in the marking software to indicate the marking field with the pilot laser. Move the workpiece under the laser until it is in the correct marking position.

9 Maintenance

9.1 Safety instructions



CAUTION

Improper maintenance can cause serious injury or damage. For this reason, this work may only be carried out by authorized, trained personnel who are familiar with how to operate the machine and in strict observance of all safety instructions. Using explosive or flammable cleaning agents present a risk of fire or explosion: No flammable or explosive liquids are allowed to be stored near the machine.



CAUTION

Before any maintenance work takes place, ensure that the power supply has been switched off and the system is de-energised.

9.2 Maintenance schedule

| | Daily | Weekly | Monthly | Annually |
|---|---|--------|---|----------|
| System Component | | | | |
| Lenses | Check If necessary clean | | | |
| Guide bar for door weights | | | | Clean |
| Entire working area – general cleaning | Clean | | | |
| Visual inspection of laser protection glass for integrity | Check if necessary replace | | | |
| Function check of every individual emergency stop devices | | | | Check |
| Visual inspection of the safety door cables for integrity | | | Every 6 month Check If necessary re- place | |
| Filter mat of laser rack and industrial-PC | | | Check If necessary re- place | |
| Exhaust System | | | | |
| Filter | According to the operation manual of the exhaust system | | | |
| Filter mat | | | | |
| Activated carbon filter | | | | |



INFO

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

9.3 Maintenance work

9.3.1 Cleaning the lenses



INFO

Laser optics are highly sensitive and their surfaces are not as hard as traditional glass. They can also be easily damaged by cleaning. It is therefore necessary to ensure that any dirt is removed using a suitable suction device and that the surrounding area is cleaned regularly.



ATTENTION

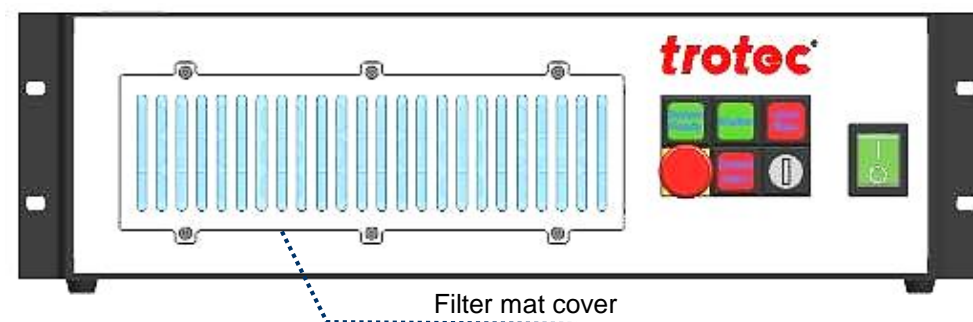
- Never touch the optical components with your fingers! Oily or dirty hands may damage the lens surfaces.
- To remove larger pieces of dirt, only use a soft lens cleaning cloth in conjunction with high proof (min. 98 %) alcohol or special lens cleaning liquid.
- Do not dip the cleaning cloth into the cleaning solution. This contaminates the solution and makes it unusable. Place drops of the solution on the cloth!
- Apply the cleaning solution carefully in order to avoid scratching the surface of the lens.
- Do not use any tools or hard objects to clean the surfaces. Scratches cannot be repaired.
- Small bellows should be used to remove dust.
- Do not use compressed air as it contains small quantities of oil and water.
- Distribute the cleaning fluid carefully using small circular motions. Start at the centre of the lens and move outwards to the edge. Keep moving the cloth until the entire surface is clean.
- Do not exert any pressure on the lens.

9.3.2 Replacing the laser rack and industrial-PC filter mats

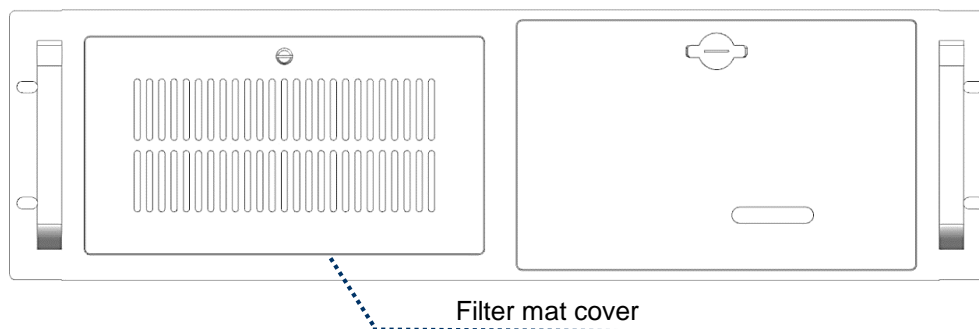
This laser system is fitted with a ventilation system. A filter mat is used to protect the electronic components from dust and dirt in the ambient air.

This filter mat should be checked and replaced at regular intervals in order to ensure optimum cooling. The filter mat is located behind the ventilation slots on the front of the laser rack or industrial-PC.

Filter mat laser rack



Filter mat industrial-PC



9.3.3 Observation window

The observation window is made of a special, coloured plastic. In order not to damage it, it should only be cleaned with clean water and possibly a little detergent if necessary. Use a soft cloth in order not to scratch the surface.



ATTENTION

Benzene, alcohol, acetone, solvent or similar cleaning agents will damage the laser protection glass, which must be replaced immediately.

Scratches must also be avoided. The laser protection glass must be replaced immediately if it becomes scratched.

10 Troubleshooting

This chapter should assist maintenance personnel with the identification and resolution of operational faults based on error messages and symptoms.



ATTENTION

Repairing faults incorrectly can cause serious injury or damage. For this reason, this work may only be carried out by authorized, trained personnel who are familiar with how to operate the machine and in strict observance of all safety instructions.



INFO

Movements and functions may only be performed when there are no errors and all devices are ready for operation. This state is prerequisite for starting the SpeedMarker 300. If this state changes during operation, the laser cell stops. The error must be acknowledged using the “ON” button on the keypad.

10.1 Error Analysis

If an error occurs, the “Error LED” light flashes on the keypad. The error may be read on the display.



| Possible Error Messages at Control Rack | Troubleshooting |
|---|---|
| Emergency stop button | Unlock the emergency stop button and acknowledge the error |
| Safety door error | Start the safety door again in manual mode; if necessary, check the safety doors for heaviness/lack of movement |
| Output error | The electronic output of the cell control system has been overloaded; switch the main switch off and on again. |

10.2 Common Errors

| Problem | Possible Cause | Resolution |
|--------------------------------------|--|---|
| Not possible to turn on laser module | System switched off | Turn on main switch |
| | The key is missing from the key switch on the laser module or is in the vertical position. | Place the key in the switch on the laser module and turn to the horizontal position |
| | Emergency stop button has been activated | Release the emergency stop button |
| | System power plug not installed correctly | Check the System power plug has been installed correctly |

| Problem | Possible Cause | Resolution |
|--|---|---|
| Not possible to turn on laser module | Incorrect or no voltage supply to the System | Check the System 230/110V power supply |
| | Laser module power plug not installed correctly | Check the laser module power plug has been installed correctly |
| | Faulty fuse in laser power supply | Replace fuse |
| Not possible to turn on SpeedMarker 1300 | Emergency stop button has been activated | Release the emergency stop button |
| | System power plug not installed correctly | Check the System power plug has been installed correctly |
| | Incorrect or no voltage supply to the System | Check the SpeedMarker 1300 230/110V power supply |
| Error message on loading the program | Plug or cable not installed correctly | Check the plug and cable are installed correctly Check the installation |
| | Laser power supply switched off | Turn on main switch |
| | Software not installed correctly | Re-install software |
| | Software terminated irregularly | Restart PC |
| No laser beam | Laser not in focus | Check working distance |
| | Shutter is closed | Open shutter - if not possible check interlock circuit |
| | Incorrect laser parameters | Check the parameters in the program. Use suitable parameters for the material and application |
| | Focussing lens dirty | Check the lens for dirt and clean as required. |
| Insufficient laser output | Laser not in focus | Check working distance |
| | Incorrect laser parameters | Check the parameters in the program. Use suitable parameters for the material and application |
| | Focussing lens dirty | Check the lens for dirt and clean as required. |
| Missing symbols | Focussing lens dirty | Check the lens for dirt and clean as required. |
| | Surface of the material dirty | Clean material surface |
| | The marking plane is not parallel to the focussing lens | Ensure that the entire marking surface is parallel to the focussing lens |
| Other faults | | Contact TROTEC Support |

10.3 Software Errors

Below is a list of possible errors which may be detected by the system. These will appear in the software as messages on the display.



The Reset signal (on X11 Connector) or the reset button on the laser module are used to acknowledge an error. In order for the system to be reset, the error or the corresponding input signal must be acknowledged.

System errors which cannot be reset or which indicate a hardware error should only be resolved by Trotec Laser GmbH trained service personnel.

| Störmeldung | Ursache |
|---------------------------------------|--|
| Card off line | Software has lost connection to the TLC2 controller |
| Scanner not connected | No connection to the galvo |
| Scanner X error | The galvo X-axis has identified an error |
| Scanner Y error | The galvo Y-axis has identified an error |
| Signal cable not connected | No connection to the marking head |
| External abort | External abort signal identified on X11 |
| External stop | External stop signal identified on X11 |
| Voltage error (15V) | +/- 15V power supply not functioning correctly |
| Voltage error (24V) | 24V power supply not functioning correctly |
| Laser power supply error | Faulty laser source power supply |
| Shutter error | Shutter has not reached intended position |
| Cover connector opened during marking | ICL1 and ICL2 were opened during the marking process |
| External sum alarm | External error signal identified on X11 |
| System locked by key switch | Key switch on laser module locked |
| Laser temperature | Laser source overheated |
| Laser power | 24 V power supply outside the permissible tolerance zone |
| Laser not ready for emission | e.g. key switch not activated |
| Laser back reflection | Back reflection of the laser beam |
| Laser system error | Laser power supply voltage is too high or too low |
| Emergency stop button | Emergency stop button activated |
| System Failurer | |

11 Disassembly



CAUTION

Injury may occur when disassembling the machine. Therefore always wear suitable protective clothing (Safety glasses, safety shoes, and so on).



CAUTION

The machine must be disconnected from the power supply.

11.1 Sequence

1. Remove all work pieces from the processing area.
2. Press the "Emergency stop" button.
3. Shut of the laser souce module
4. Switch off the main switch.
5. Remove the exhaust system.
6. Disconnect the power supply.



INFO

Always use suitable tools to disassembly the machine. Mind the springs!



Follow the special disposal instruction!