OPERATION MANUAL

8012 Trotec Speedmarker CL

30W, 45W, air cooled
60W, 100W, 200W, water cooled
Trotec Laser GmbH
Linzer Strasse 156
A – 4600 Wels
AUSTRIA

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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 reserves the right to change or alter any product described herein without prior notice.

In case of failure, please note all data of the device (year of manufacture, software version, etc.) and call us from a telephone next to the switched on device.

For queries or technical problems please contact your dealer or Trotec directly at the above address.

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1 GENERAL

1.1 Operation Manual Use – General Information

Caution:

Please read and follow this Operation Manual carefully, before installation and operation. Damage to persons and/or material can result from not following individual points of the Operation Manual!

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

Auxiliary equipment must be adjusted to the base machine (any queries to dealer or manufacturer).

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

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

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

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

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

The SpeedMarker CL is a laser class IV device.

The Trotec Speedmarker CL, is an industrial apparatus with a high level of security. To guarantee a safe operation it is necessary to know potential dangers and avoid risks. The dangers can be classified in two categories:

Dangers caused by the laser beam

Dangers caused by electricity

The SpeedMarker CL is designed for open laser beam operation, and may be integrated into a production line. In this particular case is the responsibility of the integrator or end user to guarantee a safe operation via Federal or Local guidelines.

Caution when processing conductive materials (carbon fibers,...)! Conductive dust or particles in the ambient air might damage electrical components and lead to short circuits. Bear in mind that those defects are NOT warranted.

1.3 Disposal remarks

Do not dispose the machine with domestic waste! 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. He might take care of proper disposal.
### 1.4 Technical Data / Device Specification

#### Galvo Scanner

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working area</td>
<td>Standard: 140 x 140 mm (50x50mm – 850x850mm possible)</td>
</tr>
<tr>
<td>Angular repeatability</td>
<td>&lt; 22 µrad</td>
</tr>
<tr>
<td>Focal length</td>
<td>Standard: 200 mm (100mm – 1200mm possible)</td>
</tr>
<tr>
<td>Beam diameter</td>
<td>Standard: 269 µm, 171µm (100mm lens), 1409µm (1200mm lens)</td>
</tr>
<tr>
<td>Distance of object</td>
<td>Standard: 190 mm (distance from lower edge of scanhead to marking area), ~88mm (100mm lens), ~1210 (1200mm lens)</td>
</tr>
<tr>
<td>Resolution</td>
<td>&lt; 4 µm</td>
</tr>
<tr>
<td>Marking speed</td>
<td>&gt; 800 cps possible (depending on character height and type)</td>
</tr>
<tr>
<td>Options</td>
<td>Laser pointer, marking on the fly, rotary encoder, rackserver-PC, alternative galvo speeds, power stabilizer</td>
</tr>
</tbody>
</table>

#### Laser

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser power</td>
<td>30 to 200 Watts CO₂</td>
</tr>
<tr>
<td>Wave length</td>
<td>10,6 µm</td>
</tr>
<tr>
<td>Laser pointer</td>
<td>wavelength: 650nm, power: &lt;0,99W, laser class II</td>
</tr>
</tbody>
</table>

#### Computer

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements</td>
<td>Windows XP, 256 MB RAM</td>
</tr>
<tr>
<td></td>
<td>Free 5V PCI slot, hard disk: min. 600 MB free space</td>
</tr>
<tr>
<td>Application software</td>
<td>WeldMark</td>
</tr>
</tbody>
</table>

#### Cooling system

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air cooling system</td>
<td>30W, 45W</td>
</tr>
<tr>
<td>Water cooling system</td>
<td>60W, 100, 200W</td>
</tr>
</tbody>
</table>

#### Electricity

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power requirements</td>
<td>30W: 230V, 50 Hz, 700W, 16A</td>
</tr>
<tr>
<td></td>
<td>110V, 60 Hz, 700W, 20A</td>
</tr>
<tr>
<td></td>
<td>45W: 230V, 50 Hz, 1000W, 16A</td>
</tr>
<tr>
<td></td>
<td>110V, 60 Hz, 1000W, 20A</td>
</tr>
<tr>
<td></td>
<td>60W: 230V, 50 Hz, 1300W, 16A</td>
</tr>
<tr>
<td></td>
<td>110V, 60 Hz, 1300W, 20A</td>
</tr>
<tr>
<td></td>
<td>100W: 230V, 50 Hz, 3000W, 16A</td>
</tr>
<tr>
<td></td>
<td>200W: 400V, 50 Hz, 4000W, 16A</td>
</tr>
</tbody>
</table>
### Dimensions

<table>
<thead>
<tr>
<th>Dimensions L x W x H [mm]</th>
<th>30W: 832.2 x 278 x 175.5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>45W: 832.2 x 278 x 211</td>
</tr>
<tr>
<td></td>
<td>For the bending radii of the cables calculate at least additional 60mm in length.</td>
</tr>
<tr>
<td></td>
<td>60W: 1432.5 x 278 x 211</td>
</tr>
<tr>
<td></td>
<td>100W: 1182.5 x 280 x 175.5</td>
</tr>
<tr>
<td></td>
<td>200W: 1659.8 x 308 x 227.5</td>
</tr>
<tr>
<td></td>
<td>For the bending radii of the cables and water hoses calculate at least additional 100mm in length (60W, 100W &amp; 200W).</td>
</tr>
</tbody>
</table>

### Weight Laserhead / Rack [kg]

<table>
<thead>
<tr>
<th></th>
<th>30W: 27 / 26.5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>45W: 27 / 28.5</td>
</tr>
<tr>
<td></td>
<td>60W: 40 / 30</td>
</tr>
<tr>
<td></td>
<td>100W: 45 / 31.5</td>
</tr>
<tr>
<td></td>
<td>200W: 55 / 35</td>
</tr>
</tbody>
</table>

### Ambient conditions

| Ambient conditions | Operating temperature +10 to +30° C, relative humidity up to max. 80%, non-condensing |

### Laser Safety

| Laser class | CDRH laser safety Laser Class 4 CE certified |

Subject to change without PRIOR notice!
1.5 Manufacturer's Label

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

It is recommended to enter data such as serial number and year of manufacture into the manufacturer's label below so that you always have this data handy if you have problems with your device or require spare parts.

![Manufacturer's label](image-url)
1.6 EU – Declaration of conformity

The manufacturer

Trotec Laser GmbH.
Linzer Strasse 156,
A-4600 Wels, OÖ.,
AUSTRIA

hereby declares that the following product

Trotec 8012 Speedmarker CL
Modell N° 8012 Speedmarker CL 30/45/60/100/200

has demonstrated conformity to the following guidelines:

2006/42/EG Directive for Machines
2006/95/EG Low Voltage Directive
2004/108/EG EMC Guideline

Applied during design and construction of this product:

- EN ISO12100 Machine Safety
- EN 60335-1/2007 Safety of Household and similar Appliances
  Safety of Laser Equipment
- EN 55022/2008, EN 55024/2003 Electromagnetic Compatibility

Wels,
Trotec Laser GmbH
2 SAFETY

2.1 General Safety Information

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

Safety-conscious Working

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

Safety Information for the User and/or Operating Personnel

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

Processing may only be carried out on a machine that has been properly installed.

The system may only be used for processing of materials. Using the system in other areas (e.g. for medical purposes) is absolutely forbidden and is considered to be improper use. The manufacturer shall not be liable for any resulting damages to persons or property and the warranty will be voided.

The laser beam may not be shut off by the user. This is to be done exclusively by specially trained service personnel.

Direct contact of the laser beam with the skin or the eyes could cause serious injuries.

The system may only be operated, serviced and repaired by personnel that are familiar with the intended use and with the machine's potential risks.

The non-observance of the operating, maintenance and repair instructions provided by the manufacturer in this operating manual shall exclude the manufacturer from any liability in the case of malfunction.

The laser beam could ignite the material to be processed. For this reason, a fire extinguisher should be placed in the direct vicinity of the SpeedMarker CL. Flammable materials may not be placed in the direct vicinity of the SpeedMarker CL.

Because of their low absorption of the laser beam, many materials such as aluminium, copper, silver and gold may not be processed with the SpeedMarker CL. Most of the laser beam’s energy is reflected. Such materials should also not be present in the area of the laser beam.

Should you have any additional questions, please contact your integrator or Trotec!
2.2 Laser Safety Information

To assess the potential dangers laser systems pose, they are classified into 5 safety classes: 1, 2, 3a, 3b and 4. Speedy 300 is a device of **class 4 (USA: Class IV)**. The safety is to be guaranteed through the **Integrator**.

This laser engraving system contains a Class 4 carbon dioxide (CO₂) laser that emits **intensive** and **invisible** laser radiation. Without protective gear, direct radiation, diffusely reflected radiation, or even stray radiation could be dangerous!

Anyone who is exposed to laser radiation without protective gear is subjected to the following risks:

- **Eyes:** Burns to the cornea
- **Skin:** Burns
- **Clothing:** Danger of fire

For this reason, never attempt to dismantle or rebuild the laser under any circumstances, and do not attempt to operate a system that has been dismantled or rebuilt!

If any operating or calibration devices other than the ones specified here are used, or any other procedural methods are followed, dangerous exposure to radiation could occur.

Service technicians are required to wear standard laser-safety goggles for CO₂ lasers (wavelength 10.6 µm).
2.3 Safety precautions during switch-on and operation

1. Power On/Off switch – main switch
   Using the main switch on the left hand side, switch the SpeedMarker CL on and off. The key for key switch can only be removed while in the 12 o’clock position. The control circuit is activated in the 3 o’clock position and the laser can be switched on using button 3.

   Button 3 must be activated with the first switch-on.

2. Power-On Reset switch – button
   Press button 3 in order to reset the voltage.

   Laser radiation will not be emitted:
   1. when the power is turned off and turned back on again (power supply error) while the main switch is turned on to "position 1"
   2. when the circuit for the earthing contact (hard interlock) was open and is closed again.

   The user must push button 3 in order to proceed, i.e. laser emissions are possible when button 3 is illuminated

3. During operation, the software shows on the screen that laser radiation is being emitted. The laser is active!

Should you still have questions regarding safety prior to starting operations, please contact your supplier or Trotec.
2.4 Warning and Information Labels

Warning and information labels have been placed on the machine in every location that could represent a source of danger prior to start-up or during operation. Please pay special attention to the instructions on the labels. Should any of the labels become damaged or lost, please replace them immediately.

30-watt SpeedMarker CL

Scanner
3 Prior to commissioning – Scope of delivery

The following basic parts are included:
1. Laser source including scanning unit
2. Rack
3. Cabling
4. SP-ICE interface card
5. WeldMark user software, incl. dongle
Prior to start-up and operation of the system, this manual is to be carefully read and the instructions within observed!

The SpeedMarker CL is an industrial laser system with a high standard of safety. In order to operate the laser system, it is a prerequisite to know the potential dangers and risks. The dangers and risks can be separated into 2 categories:

- Danger from laser beam
- Danger from electricity

The SpeedMarker CL is intended for open beam use when integrated into a production line. In this case, it is the responsibility of the integrator or the end user to ensure its safe operation and any additional certification required.
4.1 Machine view and connections

60-watt SpeedMarker CL water-cooled model

Rack
5 MAINTENANCE

5.1 Cleaning the System

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

Before starting cleaning and maintenance work always switch off the device and unplug the mains plug.

You should inspect at least once a day whether any dust has collected on the focusing lens. Should there be any dust, the lens must be cleaned. Cleaning intervals will greatly depend on the type of material that you are working with, and on the length of use of the machine. Remember that a clean, well maintained unit will provide the best performance and will minimize service costs. If the laser beam passes through an unclean lens, the lens can be easily damaged since the dust will most often absorb the CO₂ laser's beam. A very dirty housing on an air-cooled laser will lead to overheating and thus to the laser's breakdown.

General cleaning:

1. Switch off the machine.
2. Clean the lens on the underside of the scanner.
3. Clean the housing for the laser source.

5.2 Cleaning the Optical Parts

Trotec recommends to use following cleaning material:

- Lens tissues Part number 69249
- Lens cleaner Part number 69248

The lens is of high quality and will not be damaged when cleaned carefully and correctly.

Use each cleaning cloth one time only.

Cleaning instructions:

Use oil-free, water-free air pressure in order to remove all particulate from the surface of the lens.

This guarantees that the lens will not be scratched during the subsequent cleaning with cleaning cloths and fluid.
### 5.3 Maintenance Plan

<table>
<thead>
<tr>
<th></th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Annually</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Laser system</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lens</td>
<td></td>
<td>Inspect, clean if necessary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing for laser tubes and general housing</td>
<td></td>
<td></td>
<td>Cleaning</td>
<td></td>
</tr>
<tr>
<td>Entire processing area – general cleaning</td>
<td></td>
<td></td>
<td>Cleaning</td>
<td></td>
</tr>
<tr>
<td>Correct functioning of the Interlock system</td>
<td></td>
<td></td>
<td>Inspect</td>
<td></td>
</tr>
<tr>
<td><strong>Water-cooled system</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For water-cooled laser tubes</td>
<td></td>
<td></td>
<td>Check water pressure acc. to instructions</td>
<td></td>
</tr>
<tr>
<td><strong>Extraction system</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter matte</td>
<td></td>
<td></td>
<td>See operating manual for the extraction system</td>
<td></td>
</tr>
<tr>
<td>Filter for particles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter for active carbon</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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