

## MACHINE FOR AUTOMATED LASER POLISHING OF PARTS UP TO 1 KG

State of the art for the polishing of many small parts with free-form surfaces is manual polishing. Due to time-related and financial reasons, there is a high demand for automated polishing techniques for complexly shaped 3D surfaces. Therefore, a laser polishing machine for automated laser polishing of parts up to a mass of 1 kg was developed at Fraunhofer ILT.

Polishing with laser radiation is based on remelting a thin surface layer of the workpiece and subsequent smoothing of the surface roughness due to surface tension. The innovation of laser polishing lies, compared to conventional grinding and polishing processes, in the fundamentally different active principle: remelting instead of abrasion.

### The Machine

This is the first machine that contains a 6-axis robot instead of a conventional 5-axis system. The robot is used for the positioning of the workpiece during the polishing process as well as the transport of the parts. The optical system is located above the process chamber and the control technology in the control cabinet in the base frame. The machine features an antechamber, so that the shielding gas atmosphere is kept permanently, even when parts are placed in or taken out of the process chamber. Currently, a solid state laser with pulse durations in the range of 100 - 500 ns is used.

1 Laser polishing machine.

2 Detailed view of process chamber (without front cover).



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### Technical Data

- Dimensions: 1900 x 2200 x 900 mm<sup>3</sup>
- Process chamber: 1190 x 740 x 700 mm<sup>3</sup>
- 6-axis robot
- Maximum mass of workpiece: 1 kg
- 3-axis laser scanner (v up to 10 m/s, a up to 1,000 m/s<sup>2</sup>)
- Laser: pulse duration 100-500 ns, max. output power 400 W
- Triangulation sensor for detection of workpiece orientation
- Glovebox principle, therefore maintaining of shielding gas atmosphere

### Options

- Laser beam source with other pulse duration or laser power (also for other laser based manufacturing processes)
- Gas purification system
- CAM-NC software

### Process Testing

The machine is available for process testing and polishing of your parts at Fraunhofer ILT.

### Contact

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