SYNOVA

Laser Cutting System

Powered by
Synova Laser MicroJet®

LCS 305

Cool Laser Machining

www.synova.ch

Highly Dynamic 5-axis Laser Machining Center

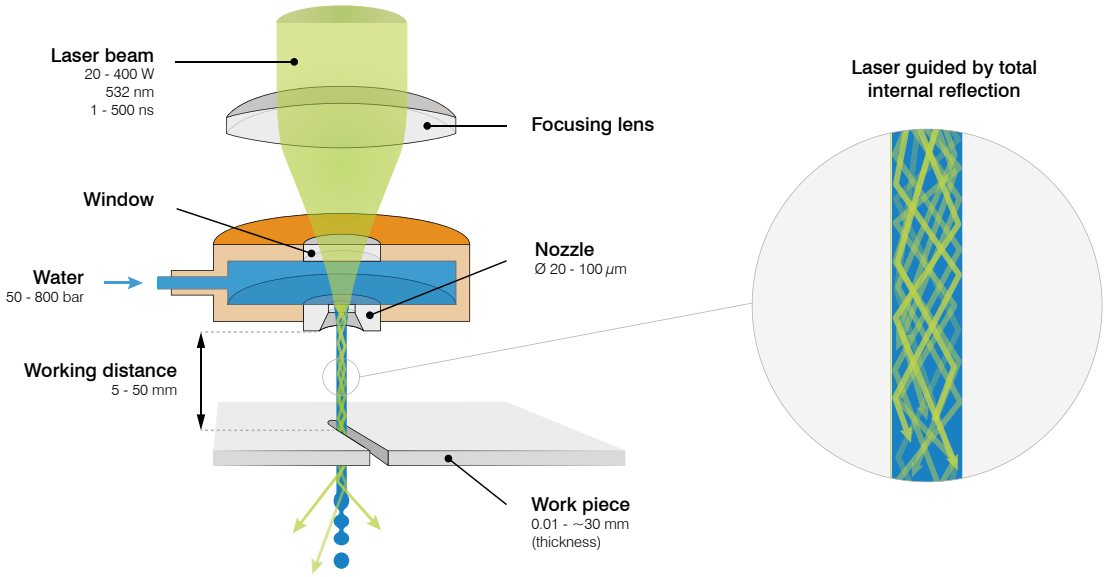
The LCS 305 with integrated water jet guided laser technology (Laser MicroJet®) is specifically designed for the automatic production of large and small diamond cutting tools. The CNC machine with five synchronous axes is characterized by a particularly intelligent machine concept and highly dynamic axes for maximum precision and speed.

The LCS disposes of consistent temperature control with water-cooled linear and torque motors (+/- 0.1°C) and a mineral casting machine bed for more stability and reduced vibrations. A fully automatic offset calibration system integrates laser-nozzle alignment, automatic jet angle correction, laser power meter and touch probe. Tools can be exchanged with a very high accuracy thanks to the HSK 63 tool holder.

Synova Laser MicroJet® Technology

The Laser MicroJet® is a hybrid method of machining, which combines a laser with a “hair-thin” water jet that precisely guides the laser beam by means of total internal reflection in a manner similar to conventional optical fibers. The water jet continually cools the cutting zone and efficiently removes debris.

As a “cold, clean and controlled laser”, Synova’s LMJ technology resolves the significant problems associated with dry lasers such as thermal damage, debris deposition, taper and lack of accuracy.



Materials & Operations

Ultra-hard materials: Polycrystalline CBN (PcBN), polycrystalline diamond (PCD), single crystalline diamond (SCD), CVD diamond, natural diamond, tungsten carbide (WC)

Metals: Superalloys, stainless steel, aluminium, copper, nickel, titanium etc.

Ceramics: Ceramic-matrix composites (CMCs), silicon carbide (SiC), silicon nitride (SiN), zirconia (ZrO2), HTCC/LTCC, aluminium nitride (AlN), aluminium oxide (Al2O3)

Operations:
3D cutting and shaping, drilling, slotting, grooving, trenching, milling, slicing, edge grinding (K-land edges, single or multiple clearance angles), engraving, profiling

Key Benefits

Sharp and Smooth

- Smooth cutting surfaces and sharp edges (Ra as low as 0.2 μm)
- Cylindrical beam resulting in parallel kerfs (no V-shape)
- Virtually no heat impact thanks to water jet cooling capability

Fast and Accurate

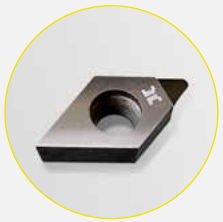
- Finish cutting of 1.6 mm PCD and cemented carbide in 3 mm/min.
- High mechanical precision with a tolerance of +/- 5 μm
- Very small kerf width (down to 30 μm)

Clean and Easy

- Clean surfaces and no depositions
- No post treatment required
- No focus control necessary due to long working distance

LCS 305 with utilities cabinet (incl. laser source, water pump, water treatment system)

Main Industries and Applications



Tool Manufacturing
Shaping of tool inserts

Tool Manufacturing
3D cutting of rotation tools

Aerospace
Hole-drilling of turbine blades

Automotive
Machining of automotive parts

Micro-Machining
3D cutting of precision parts

General Specifications		LCS 305
Axes		
Working volume	mm (H x Ø)	260 x 130
Linear axis XYZ		Linear motor
Rotary axis A (+135° to - 20°)		Torque motor
Rotary axis C (360°)		Torque motor
Maximum stroke	mm (X, Y, Z)	500 x 380 x 380
Accuracy*	µm (X, Y, Z)	+/- 5
Repeatability*	µm (X, Y, Z)	+/- 2
Maximum XY speed	mm/s	500
Maximum Z speed	mm/s	500
Maximum A speed	RPM	200
Maximum C speed	RPM	500
Acceleration	G	1
CNC control (Bosch-Rexroth)		5-axis
Laser		
Laser types		Diode pumped solid state Nd: YAG, pulsed
Wavelength	nm	532
Average power	W	100-400
Beam transmission (optical fibre)	µm (core diameter)	150-300
Water Pump		
Water flow for jet	l/h (average)	1
Water pressure	bar (max.)	500
Nozzle diameter	µm	30-100
Utilities		
Electrical power	VAC	3 x 400
3 phases	Hz	50/60
Power consumption (total)	kVA	30
Compressed air, oil free	bar (min.)	6
Dimensions/ Weight		
Dimensions (machine)	mm (W x D x H)	1800 x 1950 x 2610
Dimensions (utilities cabinet)	mm (W x D x H)	700 x 2300 x 1600
Weight (machine)	kg	5500
Weight (utilities cabinet)	kg	700-750
Options		
		• CAD CAM software 3D Tooling • Chiller • Automatic calibration and alignment • Touch probe • Motorized vision • Power meter

*only if temperature controlled room

The specifications are subject to change without notice due to technical changes. The LCS machines incorporate the worldwide patented technology of water jet guided laser, invented at the Swiss Federal Institute of Technology in Lausanne, Switzerland. These machines conform to CE regulations.

SYNOVA

CORPORATE HEADQUARTERS

SYNOVA SA
Route de Genolier 13
1266 Duillier
Switzerland

Phone: +41 21 55 22 600
sales@synova.ch
www.synova.ch

MICRO-MACHINING CENTERS, SUBSIDIARIES AND DISTRIBUTORS IN: CHINA, GERMANY, INDIA, ITALY, JAPAN, RUSSIA, SINGAPORE, SOUTH KOREA, TAIWAN, TURKEY, UAE, USA

Contact information available at: www.synova.ch

FLY_ENG007_062018CH, lesur.ch, Printed on FSC paper