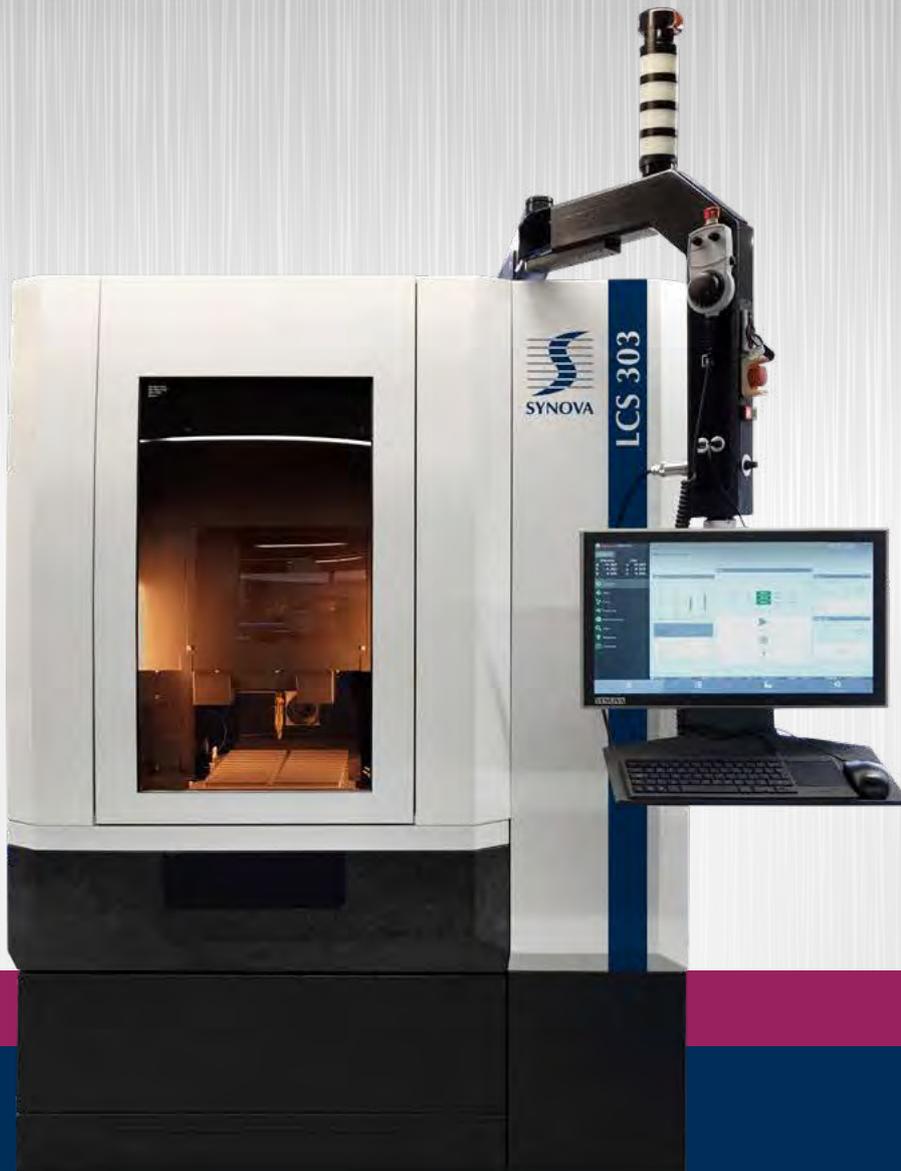


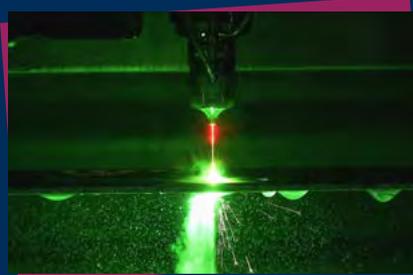


Laser Cutting System

Powered by
Synova Laser MicroJet®



LCS 303



Cool Laser Machining



Workshop Workhorse LCS 303

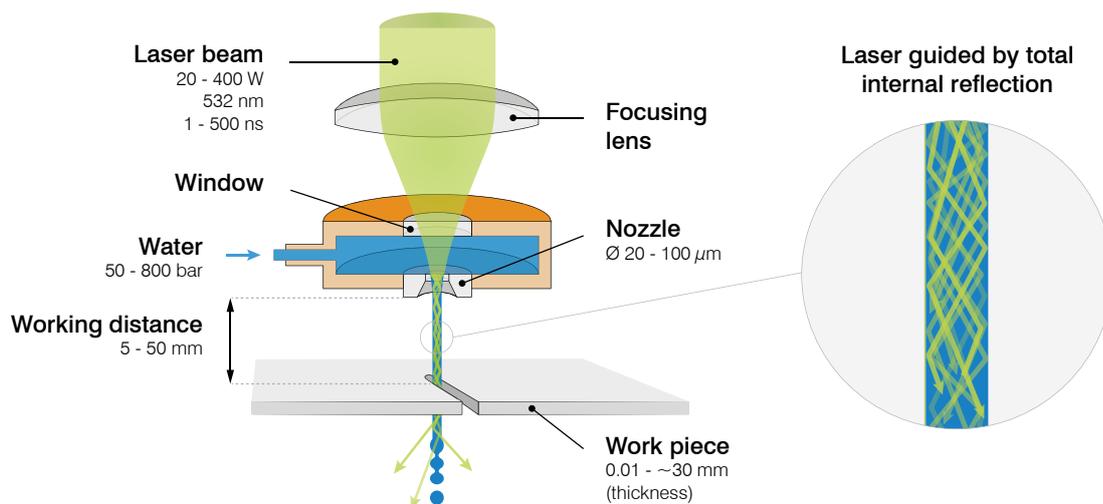
The 3-axis LCS 303 with water jet guided laser technology (Laser MicroJet®) is a highly accurate and reliable laser cutting system. It can process a wide variety of materials, from metals to ultra-hard and brittle materials such as diamond or ceramic, to complex composites. Applications include high precision machining of watch components, medical devices and tools, electronic and other high-tech parts.

The machine with a working area of 300 x 300 mm uses linear motor axes. The work piece is fixed on a T-Nut table. An optional B rotary axis can be mounted on the table allowing to position the work piece with a different rotation angle. The state-of-the-art CNC machine system includes a high-power green laser, a compact high-pressure water pump with an ultra-pure water unit, a touch-screen control panel and a vision system with motorized zoom. The automated offset calibration system integrates laser-nozzle alignment, jet angle correction, laser power measurement and jet stability control (all optional).

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

Metals: Stainless steel, Durnico, Phynox, CuBe, copper, brass, gold, aluminium, shape-memory alloys (Nitinol, cobalt-chrome), titanium, nickel, superalloys etc.

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

Ceramics & Composites: Silicon carbide (SiC), silicon nitride (SiN), ceramic-matrix composites (CMCs), CFRP, Zirconia (ZrO₂), HTCC/LTCC, aluminium nitride (AlN), aluminium oxide (Al₂O₃)

Operations: 2D cutting, drilling, slicing, slotting, grooving, trenching, milling, engraving, profiling



Key Benefits

Sharp and Smooth

- Smooth cutting surfaces and sharp edges (Ra as low as $0.15\ \mu\text{m}$)
- Cylindrical beam resulting in parallel kerfs (no V-shape)
- Virtually no heat impact thanks to water jet cooling capability

Fast and Accurate

- Cutting of 4 mm CVD diamond in 5 mm/min.
- High mechanical precision with a tolerance of less than $\pm 3\ \mu\text{m}$
- Very small kerf width (down to $30\ \mu\text{m}$)

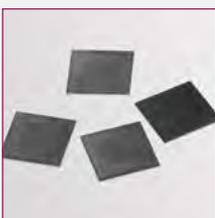
Clean and Easy

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



LCS 303 with utilities cabinet (laser source, water pump, water treatment system)

Main Industries and Application Examples



Synthetic Diamond:
Slicing of CVD diamonds



Consumer Electronics:
Cutting of CuBe connectors



Medical:
Machining of Nitinol implant components



Watchmaking:
Cutting of functional & decorative parts



Micro-Machining:
Cutting of high-precision parts

General Specifications

LCS 303

Axes

Working volume	mm (W x D x H)	300 x 300 x 100
Linear axis XYZ		Linear motor
Maximum stroke	mm (X, Y, Z)	560 x 400 x 100
Positioning accuracy	μm	+/- 3
Repeatability	μm	+/- 2
Maximum XY speed	mm/s	500
Acceleration	G	0.8
CNC control (Bosch-Rexroth)		3-axis

Laser

Laser type		Diode pumped solid state Nd: YAG, pulsed
Wavelength	nm	532
Average power	W	20-400
Beam transmission (optical fibre)	μm (core diameter)	100-200

Water Pump

Water flow (water consumption)	l/h (average)	1 (10)
Water pressure	bar (max.)	800
Nozzle diameter (water jet)	μm	25-80

Utilities

Electrical power	VAC	3 x 400
3 phases	Hz	50/60
Power consumption (total)	kVA (max.)	12
Compressed air, oil free	bar	7-10

Dimensions/ Weight (incl. peripheral equipments)

Dimensions (machine without arm, screen and signal tower)	mm (W x D x H)	1500 x 1100 x 2430
Dimensions (utilities cabinet)	mm (W x D x H)	700 x 2300 x 1600
Weight (machine)	Kg	2000
Weight (utilities cabinet)	kg	700 - 750

Options

- Rotary axis (B)
- Automatic jet angle correction
- Auto focusing (Automatic laser-nozzle alignment)
- Breakthrough detection, integrated in laser
- Vision + Pattern recognition software
- CAM
- Positioning sensor, integrated
- Jet stability sensor
- Integrated power meter
- Jet Protection System
- Chiller for laser

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.



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Contact information available at: www.synova.ch