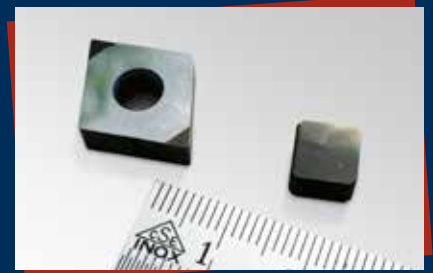




Laser Cutting System

Powered by
Synova Laser MicroJet®

LCS 50



Cool Laser Micro-Machining

www.synova.ch



High-Precision Laser Cutting System

The LCS 50 is Synova's most compact and cost-efficient Laser MicroJet® (LMJ) machine. The LCS 50 is designed for machining industrial diamond tools and other small work pieces that require precision cutting, drilling, grooving or slicing.

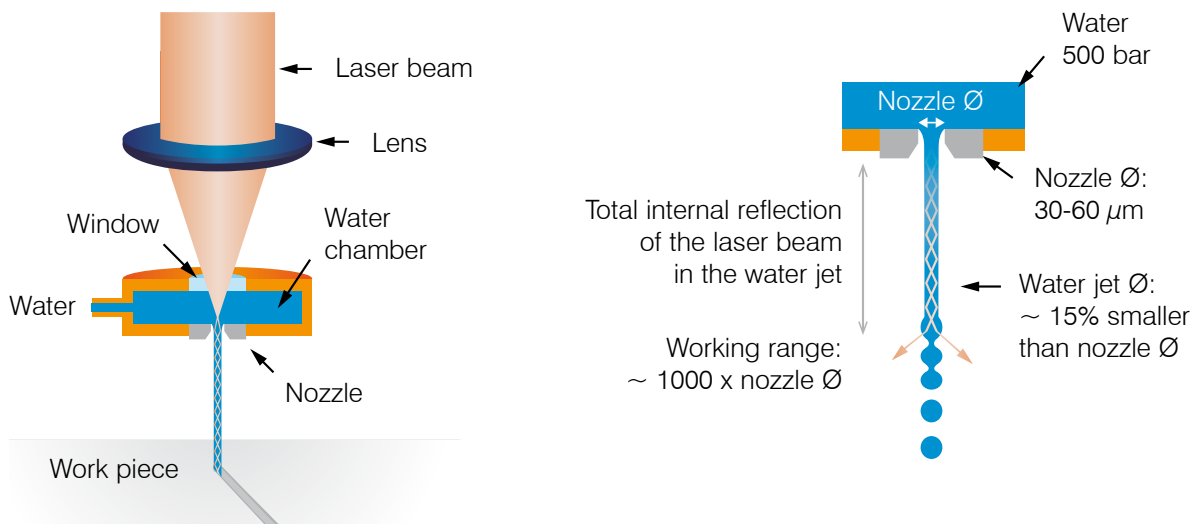
The machine uses linear motor axes (LCS 50-3) and additional B and C rotary axes with torque motors enabling 3D cutting and shaping (LCS 50-5).

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 13-inch touch-screen control panel and a vision system with motorized zoom.

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

Hard materials: Polycrystalline CBN (PcBN), polycrystalline diamonds (PCD), monocrystalline diamonds (MCD), chemical-vapor-deposition diamonds (CVD), natural diamonds (ND), tungsten carbide

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

Operations:

- **3-axis machine:** 2D cutting, drilling, slicing, grooving
- **5-axis machine:** 3D shaping, cutting, drilling, slicing, edge grinding (K-land edges, single or multiple clearance angles), grooving, milling, chip breaker trenching, engraving, profiling



Key Benefits

Sharp and Smooth

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

Fast and Accurate

- Finish cutting of 1.6 mm PCD and cemented carbide in 5 mm/min.
- High mechanical precision with a tolerance of $\pm 3 \mu\text{m}$
- Very small kerf width (down to $30 \mu\text{m}$)

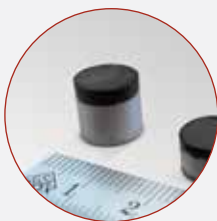
Clean and Easy

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



LCS 50 with Utilities Cabinet

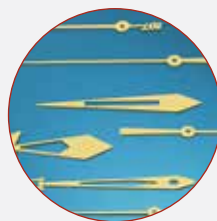
Main Industries and Applications



Tool Manufacturing
Cutting drill bits (PCD)



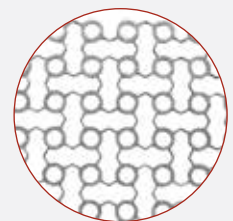
Tool Manufacturing
Edge grinding of inserts (PCD)



Watchmaking
Cutting of watch hands (brass)



Watchmaking
Cutting of escape wheels (CuBe)



Medical
Cutting of medical implants (titanium)

General Specifications

		LCS 50 - 3	LCS 50 - 5
Axes			
Working volume	mm (W x D x H)	50 x 50 x 50	50 x 50 x 50
Linear axis XY		Linear motor	Linear motor
Linear axis Z		Ball screw + AC motor	Ball screw + AC motor
Rotary axis B (+102° to -12°)		-	Torque motor
Rotary axis C (360°)		-	Torque motor
Maximum stroke	mm (X,Y,Z)	250 x 60 x 109	250 x 60 x 109
Accuracy	μm	+/- 3	+/- 3
Repeatability	μm	+/- 1	+/- 1
Maximum XY speed	mm/s	500	500
Maximum Z speed	mm/s	300	300
Maximum B speed	RPM	-	200
Maximum C speed	RPM	-	1200
Acceleration	G	0.4	0.4
CNC control (Bosch-Rexroth)		3-axis	5-axis
Laser			
Laser type		Diode pumped solid state Nd: YAG, pulsed	Diode pumped solid state Nd: YAG, pulsed
Wavelength	nm	532	532
Average power	W (max.)	50	50
Beam transmission (optical fibre)	μm (core diameter)	100/150	150
Water Pump			
Water flow	l/h (average)	1	1
Water pressure	bar (max.)	500	500
Jet nozzle diameter	μm	30-60	40-60
Utilities			
Electrical power	VAC	3 x 400	3 x 400
3 phases	Hz	50/60	50/60
Power consumption	kVA (max.)	2.5	2.5
Compressed air, oil free	bar	5-6	5-6
Dimensions/Weight			
Dimensions (machine)	mm (W x D x H)	800 x 1200 x 1650	800 x 1200 x 1650
Dimensions (utilities cabinet)	mm (W x D x H)	700 x 2300 x 1600	700 x 2300 x 1600
Weight (machine)	kg	730	750
Weight (utilities cabinet)	kg	700	700
Options			
		CAD CAM software 2D	CAD CAM software 3D Tooling
		Automatic jet angle correction	Automatic jet angle correction
		20 W laser	100 W laser
		High-pressure water pump (800 bar)	

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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