

General Specifications

Axes

Maximum stroke (working volume)	mm (X, Y, Z)
Vision field	mm (X, Y, Z)
Linear axis XYZ	
Positioning accuracy (X, Y), after compensation	µm
Repeatability (X, Y)	µm
Maximum speed (X, Y)	mm/s
Acceleration (X, Y)	G
CNC control (Bosch-Rexroth)	

Laser

Laser type	
Wavelength	nm
Power	W
Beam transmission (optical fibre)	µm (core diameter)

Water Pump

Water flow/Water consumption	l/h (average)
Water pressure	bar (max.)
Nozzle diameter	µm

Utilities

Electrical power	VAC
3 phases	Hz
Power consumption (total)	kVA (max.)
Compressed air, oil free	bar

Dimensions/Weight

Dimensions (machine without arm, screen and signal tower)	mm (W x D x H)
Dimensions (utilities cabinet)	mm (W x D x H)
Weight (machine)	kg
Weight (utilities cabinet)	kg

Options

LCS 150

	200 x 200 x 100
	125 x 200 x 100
Linear motor, ironless	
	+/- 3
	+/- 2
	1000
	1
2-, 3- or 4-axis	

Diode pumped solid state Nd: YAG, pulsed	
532	
20-200	
100-150	

1/10	
600	
25-100	

3 x 400V + N + PE	
50/60	
20	
6-10	

1050 x 1200 x 1880	
700 x 1800 x 1600	
1400	
700	

- Rotary axis (B)
- Z-axis with automatic jet angle correction
- Vision + pattern recognition possible
- CAD CAM software
- Breakthrough detection
- Jet protection system
- Chiller for laser
- Chuck with vacuum

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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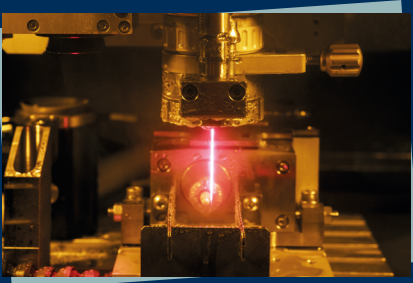
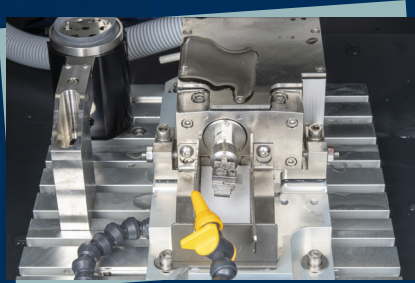
Contact information available at: [www.synova.ch](http://www.synova.ch)



Laser Cutting System

Powered by  
Synova Laser MicroJet®

LCS 150



Cool Laser Machining



## 3-axis CNC Laser Cutting System with Highly Dynamic Axes

The LCS 150 with integrated water jet guided laser technology (Laser MicroJet®) is a universal system for high-precision, non-contact processing of a wide variety of materials such as metals, composites or difficult-to-cut materials such as ceramics or diamond.

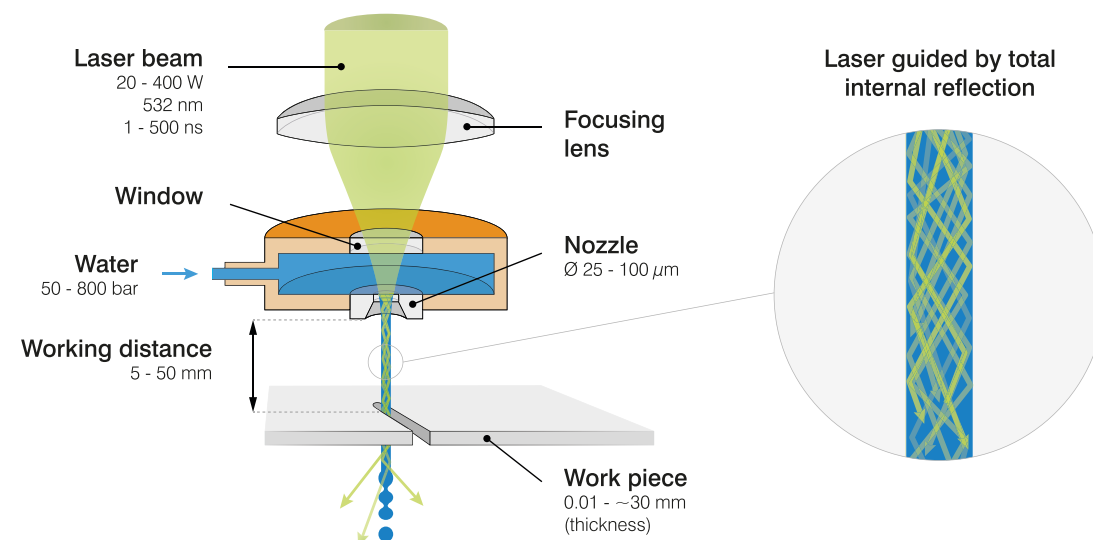
The new generation LCS 150 laser machine is characterized by highly dynamic axes for maximum precision and speed, a granite base for greater stability and reduced vibrations as well as a larger and space-optimized electrical cabinet at the rear of the machine. The T-slot table facilitates easy workpiece fixation. The machine includes the new Synapse HMI software and has an intuitive, fully integrated system control interface with touchscreen functionality.

The CNC machine uses ironless linear motor axes, an additional positioning rotary axis can be mounted. The system includes a high-power green laser and a compact high-pressure water pump with an ultra-pure water unit. For added precision and functionality, the LCS 150 offers optional Industry 4.0 features.

## 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 significant problems associated with dry lasers such as thermal damage, debris deposition, taper and lack of accuracy.



## Materials & Operations

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

**Ceramics & Composites:** Silicon carbide (SiC), silicon nitride (SiN), ceramic-matrix composites (CMCs), CFRP, Zirconia (ZrO<sub>2</sub>), HTCC/LTCC, aluminium nitride (AlN), aluminium oxide (Al<sub>2</sub>O<sub>3</sub>)

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

**Operations:** 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 µm)
- 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 µm)

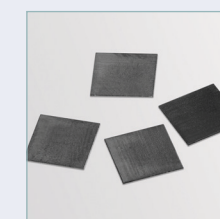
### Clean and Easy

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

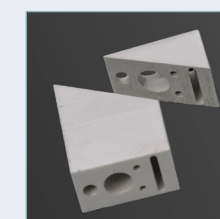
LCS 150 with utilities cabinet  
(laser source, water pump, water treatment system)



## Main Industries and Application Examples



**Synthetic Diamond:**  
Slicing of CVD diamonds



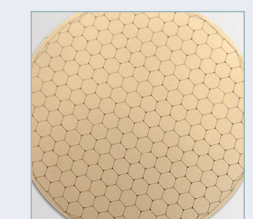
**Technical Ceramics:**  
Processing of thin and thick parts



**Consumer Electronics:**  
Cutting of CuBe connectors



**Micro-Machining:**  
Cutting of high-precision components



**Semiconductor:**  
Singulation of silicon wafers