

## Laser Cutting System

Powered by  
Synova Laser MicroJet®

**LCS 800**



Cool Laser Machining

# Precise Laser Cutting System for Large Components

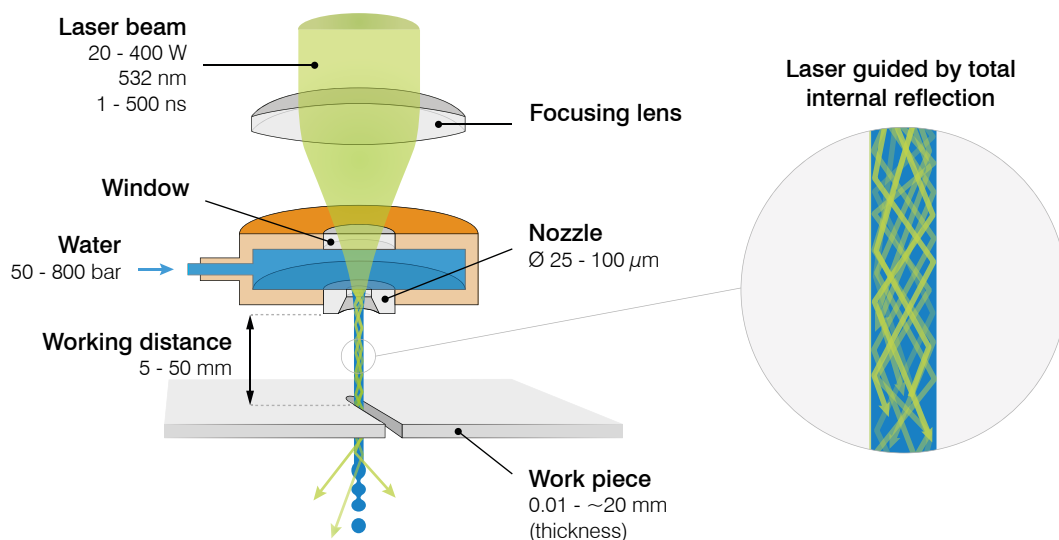
The 3-axis laser cutting machine LCS 800 with integrated Laser MicroJet® technology is a robust and versatile system conceived for a multitude of high-precision cutting and drilling applications in different industrial sectors. The large mounting table allows processing of virtually any part size and is suited for small series and prototypes but also for large volumes. Main applications include machining of semiconductor equipment sub-assemblies, metal masks and other components made of metal, ceramics or composites (e.g. silicon carbide, CFRP).

The LCS 800 has an intuitive and fully integrated system control interface with touchscreen functionality. The offset calibration system integrates automatic laser-nozzle alignment, automatic jet angle correction (both optional) and laser power control.

## 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

**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>)

**Metals:** Stainless steel, aluminium, copper, nickel, titanium, superalloys, etc.

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

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



# Key Benefits

## Sharp and Smooth

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

## Fast and Accurate

- Cutting of 10 mm CBN in 26.5 mm/min.
- High mechanical precision with a tolerance of less than  $\pm 5 \mu\text{m}$
- Very small kerf width (down to  $30 \mu\text{m}$ )

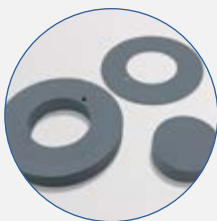
## Clean and Easy

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

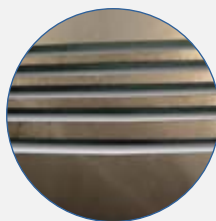


LCS 800 with Utilities Cabinet  
(laser, water pump, water treatment system)

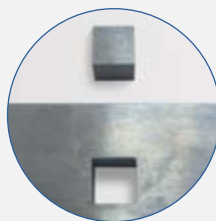
## Main Industries and Application Examples



**Semiconductors:**  
Cutting of SiC disks



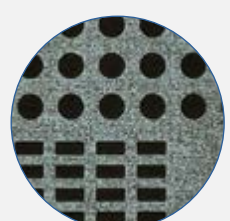
**Semiconductors:**  
Machining of equipment consumables (SiC)



**Metalworking:**  
Cutting of thick metal parts



**Ceramics:**  
Cutting and Drilling (Alumina)



**Digital Displays:**  
Cutting of OLED evaporation masks

## General Specifications

## LCS 800

### Axes

Working volume	mm (W x D x H)	690 x 630 x 100
Linear axis XY		Linear motor
Linear axis Z		Linear motor
Maximum stroke	mm (X, Y, Z)	820 x 630 x 100
Accuracy	$\mu\text{m}$	+/- 5
Repeatability	$\mu\text{m}$	+/- 2
Maximum XY speed	mm/s	1000
Acceleration	G	1
CNC control (Bosch-Rexroth)		3-axis

### Laser

Laser type		Diode pumped solid state Nd: YAG, pulsed
Wavelength	nm	532
Average power	W	20-200
Beam transmission (optical fibre)	$\mu\text{m}$ (core diameter)	100-200

### Water Pump

Water flow (water consumption)	l/h (average)	1(10)
Water pressure	bar (max.)	600
Nozzle diameter	$\mu\text{m}$	30-100

### Utilities

Electrical power	VAC	3 x 400/1 x 230
3 phases	Hz	50/60
Power consumption (total)	kVA (max.)	12
Compressed air, oil free	bar	5-6

### Dimensions/ Weight

Dimensions (machine w/o arm, screen and signal tower)	mm (W x D x H)	1960 x 1650 x 2000
Dimensions (utilities cabinet)	mm (W x D x H)	700 x 2300 x 1600
Weight (machine)	Kg	3500
Weight (utilities cabinet)	Kg	700-750

### Options

- Chiller
- Automatic jet angle correction
- Automatic laser-nozzle alignment
- CAM software + Automatic workpiece alignment

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.



#### 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, MALAYSIA, RUSSIA, SINGAPORE, SOUTH KOREA, TAIWAN, THAILAND, UNITED KINGDOM, USA

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