



# SYNOVA



## Diamond Cutting System

Powered by  
Synova Laser MicroJet®

**DCS 50**



Cool Laser Machining

[www.synova.ch](http://www.synova.ch)



# High-Precision Laser Diamond Cutting System

The DCS 50 is Synova's most compact Laser MicroJet® (LMJ) machine designed for machining large and small diamonds. It also offers a cost-efficient solution for mid-size stones.

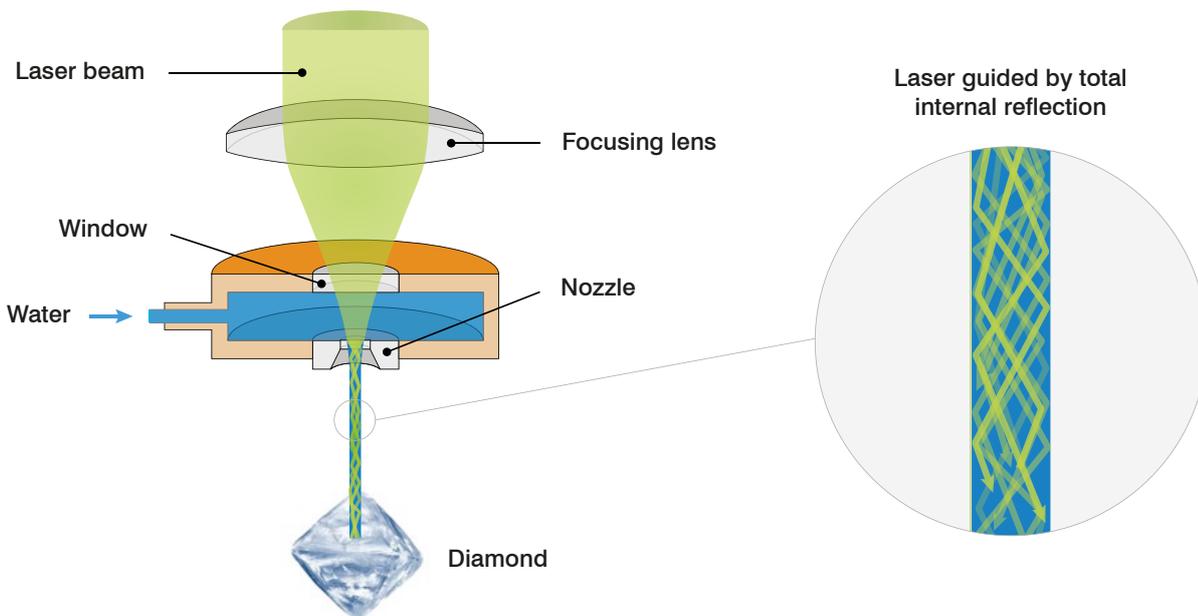
The machine uses linear motor driven X-, Y- and Z-axes (DCS 50-3) with additional B and C rotary axes enabling accurate 5P diamond machining (table, crown, girdle, pavilion, facets) (DCS 50-5).

The state-of-the-art CNC machine system offers a high-power green laser, a high-pressure water pump with an ultra-pure water unit, a 21.5-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, taper and lack of accuracy.



## Materials & Operations

Gem diamonds, lab-grown diamonds (CVD, HPHT)

**3-axis machine:** Sawing, coring, slicing

**5-axis machine:** Sawing, pie cutting, fancy and round bruting, coning, blocking/faceting, drilling  
Coring and slicing



# Key Benefits

## Straight and Smooth

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

## Easy

- No focus control necessary due to long working distance
- No blackening, no opening, no double sawing needed
- Very little post treatment required

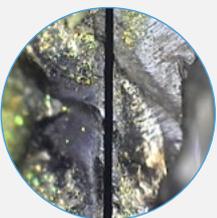
## Profitable

- Minimal weight loss and low risk of breakage
- Fast cutting time and easy processing
- Diamond sawing in mass production



DCS 50 with Utilities Cabinet

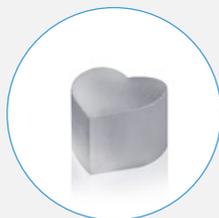
## Main Applications



Sawing



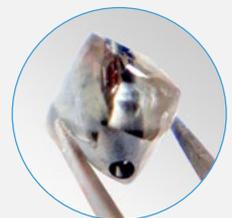
Pie cutting



Fancy shaping



Faceting



Drilling

## General Specifications

		DCS 50 - 3	DCS 50 - 5
<b>Axes</b>			
Working volume	mm (W x D x H)	175 x 50 x 50	50 x 50 x 50
Linear axis XY		Linear motor	Linear motor
Linear axis Z		Ball screw motor	Ball screw 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
<b>Laser</b>			
Laser types		Diode pumped solid state Nd: YAG, pulsed	Diode pumped solid state Nd: YAG, pulsed
Wavelength	nm	532	532
Maximum power	W	50	100
Beam transmission (optical fibre)	μm (core diameter)	100/150	150
<b>Water Pump</b>			
Water flow/ water consumption	l/ h (average)	1/ 10	1/ 10
Water pressure	bar (max.)	500/800	500
Nozzle diameter	μm	30-50	50-60
<b>Utilities</b>			
Electrical power	VAC	3 x 400/ 1 x 230	3 x 400/ 1 x 230
3 phases	Hz	50/60	50/60
Power consumption (total)	kVA (max.)	14	19
Compressed air, oil free	bar	5-6	5-6
<b>Dimensions/Weight</b>			
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
<b>Options</b>			
Sawing cassette			

The specifications are subject to change without notice due to technical changes. The DCS 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

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