



LSS Series

Laser Stencil System

Powered by Laser MicroJet®

Expand your capabilities with the latest development in Laser Technology



The Laser MicroJet[®]



Cold Laser Power for:
Cutting, Grinding,
Drilling, Grooving and
Scribing

Contained within a hair-thin water jet through total internal reflection, the Laser MicroJet[®] beam surpasses today's laser and water cutting technologies.

During machining, the work pieces are cooled by the water jet at the cutting interface, resulting in "cold laser cutting", with little or no thermal damage and very few material changes.

At the same time, low water-jet pressure ensures that virtually no mechanical force is exerted during processing, allowing rapid, damage-free production of delicate and composite parts.

As a result, the Laser MicroJet[®] achieves a precise cut over the entire depth of the work piece, leaving a fine, clean surface.

This exceptionally high quality of cut is made possible by the long working distance and constantly focused parallel laser beam.

In the field of metal masks for the electronic, semiconductor and display industries, stringent requirements for fine pitch and very small apertures demand a new process: Laser MicroJet[®] is the solution.

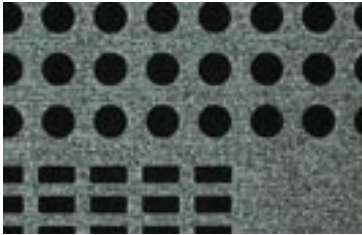
Choose Laser MicroJet[®] and expand your micro-machining capabilities today.



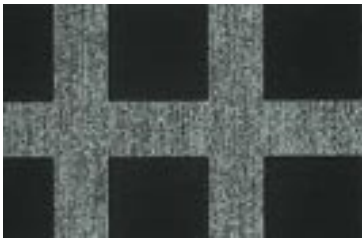
Founded in 1997, Synova is an experienced supplier of state-of-the-art laser solutions for industrial micro-machining applications, serving the semiconductor, electronic and medical markets. Each Synova machine features the unique Laser MicroJet[®] technology which was invented by Synova. With its headquarters in Lausanne, Switzerland, Synova is a privately owned company with subsidiaries in North America and in the Asia/Pacific region.

Fast & Accurate

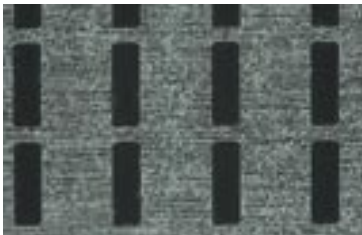
The LSS offers high mechanical precision with a tolerance of less than $\pm 5\mu\text{m}$. Almost any aperture shape can be created with the very small beam diameter of $28\mu\text{m}$. A stencil-scanning solution is integrated, including through-cut check and repair functions. High speeds of up to 20 apertures per second can be achieved. For example a $60\times 60\mu\text{m}$ square in $50\mu\text{m}$ thick SST can be cut at a rate of 5 apertures per second.



$225\mu\text{m}$ diameter holes in $150\mu\text{m}$ thick stainless steel with an aspect ratio of 1.5:1. $120\times 150\mu\text{m}$ rectangular apertures with an aspect ratio of 0.8:1. The same ratios can be achieved for the whole range of stencil thickness, from 50 to $150\mu\text{m}$.



$600\times 600\mu\text{m}$ square apertures in a $150\mu\text{m}$ stainless steel sheet. The cutting speed was equivalent to 5,000 holes per hour. As in all of the examples, the cut edges are very clean and there is no visible heat damage.



$100\times 300\mu\text{m}$ rectangular apertures in a $50\mu\text{m}$ stainless steel sheet. The cutting speed is equivalent to 20,000 holes per hour. (OLED display)



$40\mu\text{m}$ diameter apertures in a $40\mu\text{m}$ thick stainless steel sheet. In this case the cutting speed is equivalent to 40,000 holes per hour.

Clean & Gentle

Thanks to water jet cooling, there is no heat-affected zone, no warping of the stencil, no oxidation and no discoloration, nor is there any mechanical damage. The water also prevents contamination and burrs. There are no gas emissions and all waste products are removed in the water flow.

Easy to use

The working distance is very long, so focus control is unnecessary. Neither cutting gas, nor protective layers are required. Post treatment is simplified or in some cases eliminated, all that is necessary is to filter the wastewater. Running costs are low as water consumption is negligible and there is no tool wear.

Versatile & Modular

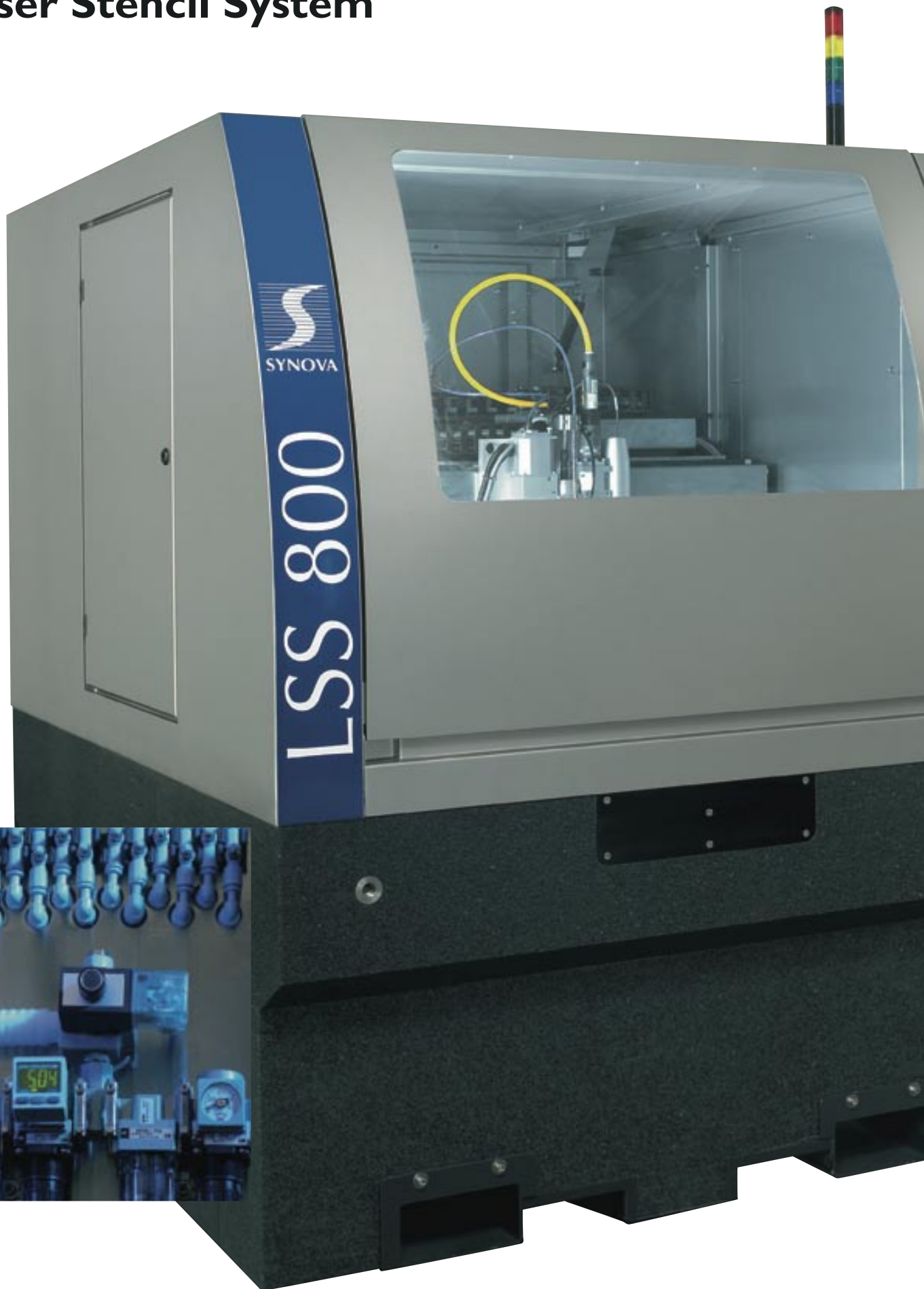
The process is compatible with stainless steel, nickel, molybdenum and polyimide stencils without changing the laser source. In addition to the standard working area, extended working areas are also available. The machine is upgradeable because of its modular construction. Various other options are available, including chillers, transformers, individual stencil fixations and an ultra-high-speed fiber laser option for thin stencils.

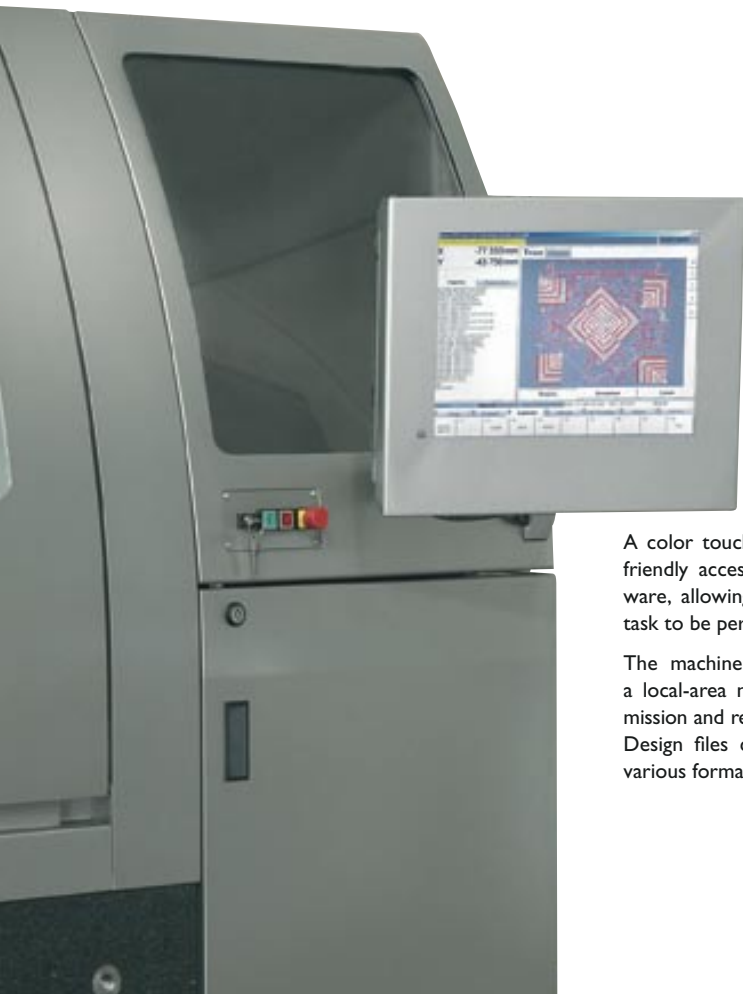
Quality Material

Each machine is assembled with the greatest of care using only the best available materials. Many Swiss high-precision components are used. The laser source, which has been used for many years in 24-hour production, is extremely reliable. The worldwide service package includes local support and service in North America, Europe and Asia.



Laser Stencil System



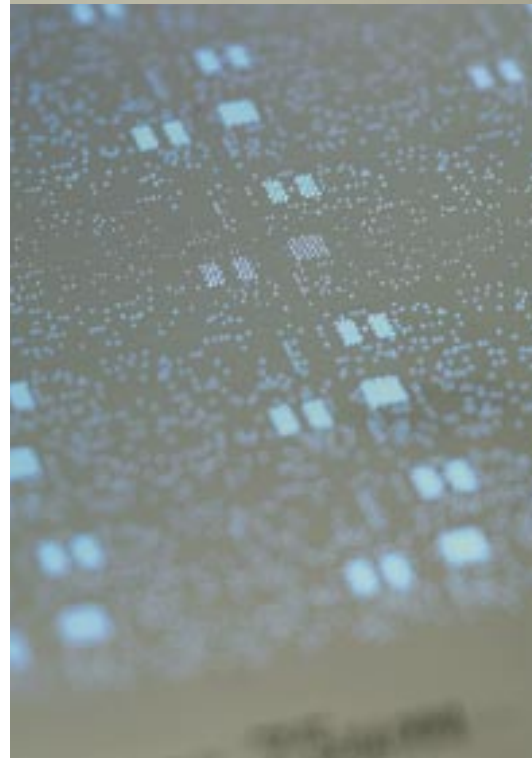
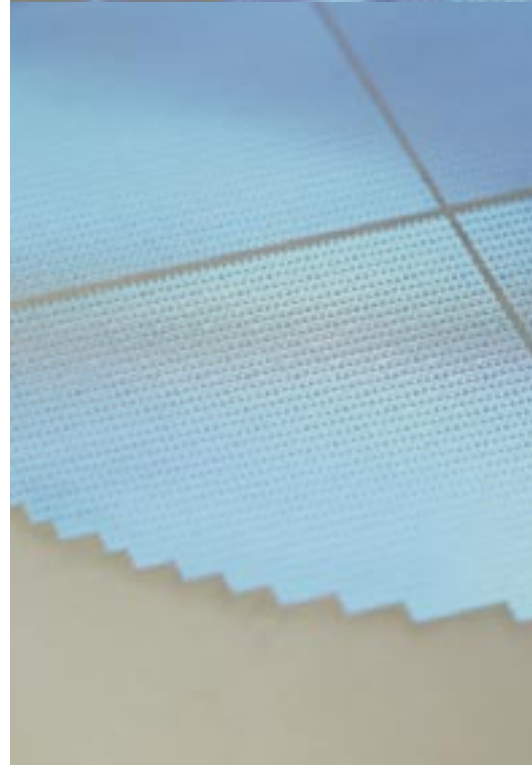
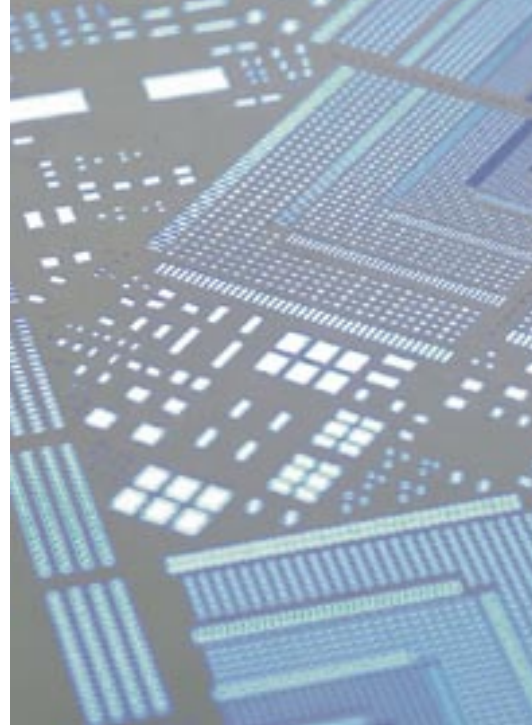


A color touch screen provides user-friendly access to the machine software, allowing visual control of the task to be performed.

The machine can be connected to a local-area network for data transmission and remote diagnostic service. Design files can be converted from various formats.

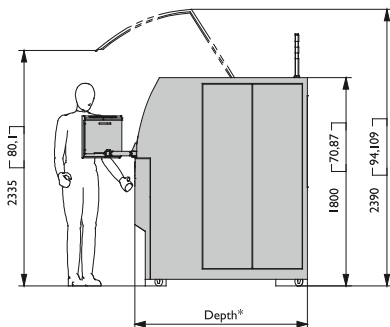
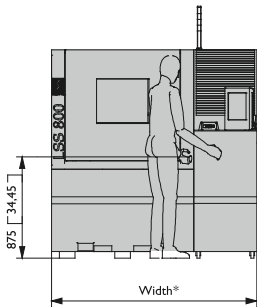
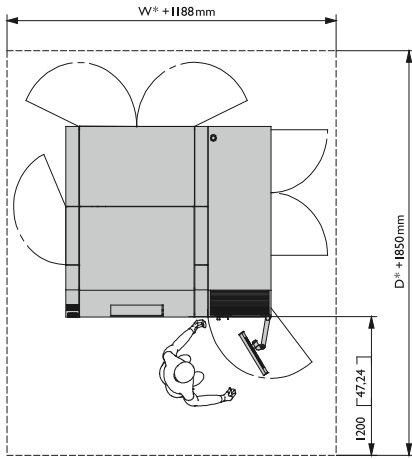


The cutting head is at the heart of the machine, where the laser is coupled into the water jet. This includes the coupling unit and a camera for automatic alignment. The head is also equipped with a zoom for positioning and visual inspection.



General Specifications

LSS 800 · LSS 1000 · LSS 1200



* = see specifications

Axes

Type	XY-table, separated axes on granite base		
Drive	Linear motors		
Useable working area	630 x 850mm	830 x 1050mm	830 x 1250mm
Maximum stroke	700 x 900mm	900 x 1100mm	900 x 1300mm
Precision	+/- 5 µm		
Repeatability	2 µm		
Maximum axis speed	1000mm/s		
Acceleration	1 G		
Control	DeltaTau		

Laser

Laser types	Solid state Nd: YAG, fiber laser, pulsed
Wavelength	1064 nm
Average power	50W or 100W (fiber laser)
Pulse rate max.	2000 Hz or 50 kHz (fiber laser)
Pulse duration	30 µs or 500 µs (fiber laser)
Beam transmission	Optical fibre, core diameter 100 µm

Water Pump

Type	Two-cylinder pressure amplifier
Water flow	max. 0.05l/min
Water pressure	20-500 bars
Pressure transmission	Flexible water hose
Jet nozzle diameter	30, 35, 40, 50, 60, 75 and 100 µm

Utilities

Electrical power	3 x 400V or 3 x 200V with transformer 50-60 Hz
Power consumption	17kVA
Air pressure	5-6 bars, oilfree
Water flow for cooling	max. 18l/min, max. 16°C, industrial water (chiller optional)
Water flow for cutting	max. 0.05l/min, de-ionised, filtered, degassed
Helium	50 l bottle required, flow rate: 150-200 l/h

Dimensions/Weight

Dimensions (WxD)	approx. 2000 x 1650 mm	2200 x 2050 mm	2400 x 2050 mm
Weight	approx. 3500 kg	4500 kg	5000 kg

CAM – Software

Gerber converter for Windows 2000/XP

Options

Transformer
Water treatment system
Chiller
Reference Scale
Rotary axis, z-axis

The above specifications are subject to change without notice due to technical improvement. The Laser Stencil Cutting System incorporates the worldwide patented technology of water jet guided laser, invented at the Swiss Federal Institute of Technology, Lausanne, Switzerland.

This machine conforms to CE regulations.



CORPORATE HEADQUARTER

Synova SA
Chemin de la Dent d'Oche
CH-1024 Ecublens
Tel (41) 21 694 3500
Fax (41) 21 694 3501
info@synova.ch

NORTH AMERICA

Synova USA Inc.
Delaware
USA
Email: info@synova-usa.com

ASIA PACIFIC

Synova Asia Pacific
Hong Kong
Email: info@synova-asia.com

ENTIRE ADDRESSES ARE
AVAILABLE ON:

<http://www.synova.ch>