



SYNOVA

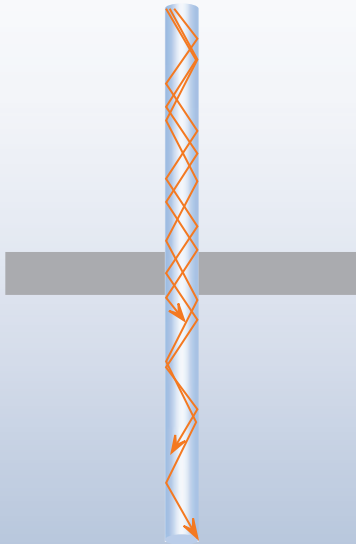
LASER STENCIL SYSTEM

Incorporating Laser MicroJet® Technology

LSS 800

Expand your Capabilities with the Latest Development in Laser Technology

The Laser Microjet[®]



The Laser Microjet[®] surpasses laser cutting and water cutting technologies. The laser beam is contained within a hair-thin water jet through total reflection.

Machined parts are cooled by the water jet at the cutting face, producing what is effectively "cold laser cutting". The resulting minimal thermal damage ensures that almost no material changes occur during machining.

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

Precise cutting is achieved over the entire depth of the workpiece, leaving a fine, clean surface.

Constant high cutting quality possible due to the long working distance and constantly focused, parallel laser beam.

In short, the Laser Microjet[®] significantly expands your micro-machining capabilities, especially with difficult-to-machine parts.

In the field of metal masks for the electronic and semi-conductor industries, where demands such as fine-pitch and very small apertures require a new process. The Laser Microjet[®] is the solution.

Cold Laser Power for:

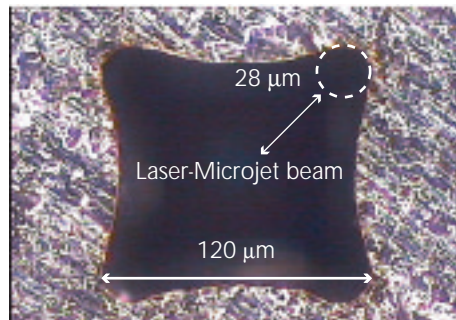
Cutting

Grinding

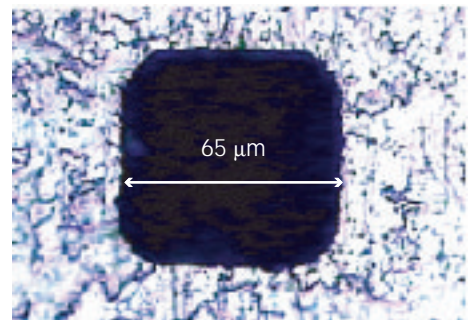
Drilling

Grooving

Scribing



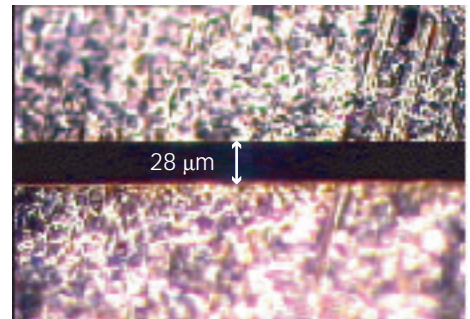
The 120 µm concave hole has been made in only 300 ms with a beam radius of only 14 µm



Because of the very small tool radius (14 µm), small squares can be easily cut. A 65 µm external diameter square hole can be drilled in only 200 milliseconds.



500 µm wide hole drilled in 150 µm thick stainless steel in 330 ms .



28-µm-wide cutting of stencils, 80 µm thick

Ultra Speed Laser Stencil System at a glance

Process

- ✓ High speed, from 1 to 20 holes per seconds (example: 5 holes/s for 60 x 60 μm square hole in 50 μm)
- ✓ Virtually no burrs, very clean cut
- ✓ Simplified post treatment
- ✓ No heat affected zone thanks to the cooling by the water jet
- ✓ No warping of the stencil due to the absence of heat
- ✓ Extremely closed apertures without damages (fine pitch)
- ✓ No oxidation, no discoloration
- ✓ Very small beam radius of only 14 μm , sharp corners of apertures
- ✓ Very long working distance because of absence of focal point
- ✓ No cutting gas, the molten material is removed by the water jet
- ✓ Very low mechanical force on the stencil, the water jet applies a much lower mechanical force than cutting gas
- ✓ No suspended products in the air because the cut debris is absorbed in the water
- ✓ No scratching on back side due to absence of debris
- ✓ Compatible for stainless steel, nickel, molybdenum or polyimide stencils without changing the laser source

Machine

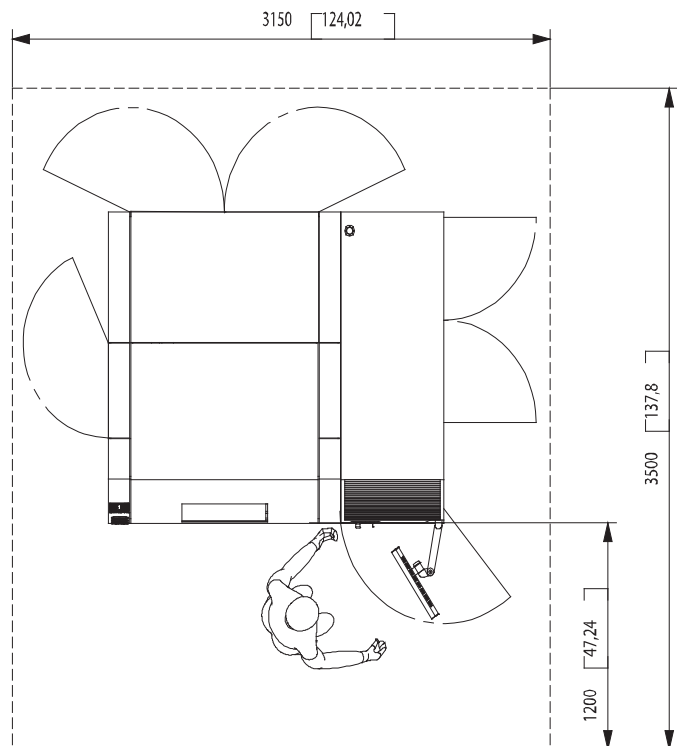
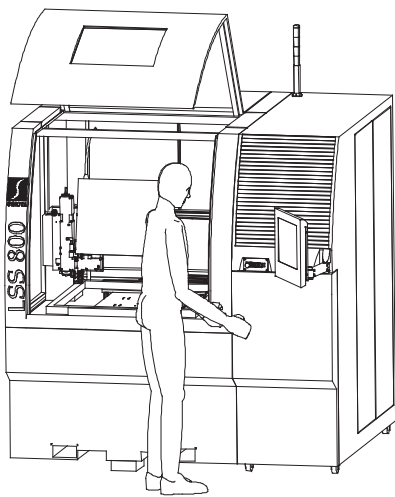
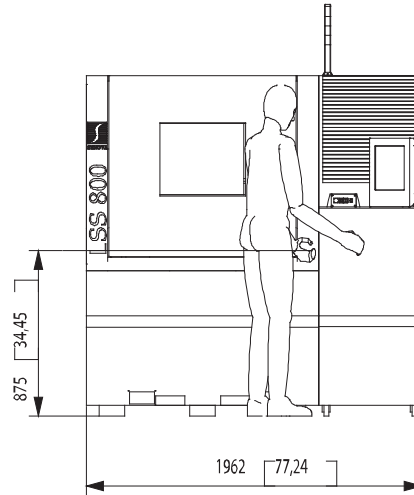
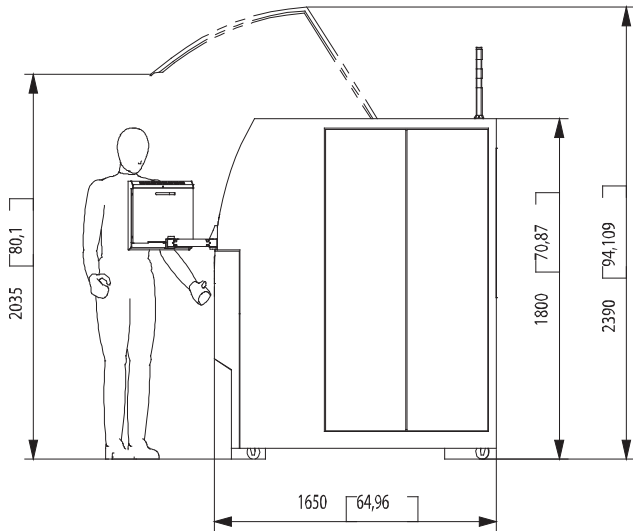
- ✓ Entire machine is assembled in Switzerland, components are made in Switzerland, Germany, Japan and the USA
- ✓ 2004-state-of-the-art machine and software
- ✓ Only the best components available on the market are integrated : Water-cooled linear motors from Etel, scales from Heidenhain, linear guiding from THK, CNC control from DeltaTau
- ✓ High speed connection through fiber-optic cable between controller and drives
- ✓ Large working area of 630 x 850 mm
- ✓ Other working area available 800 x 1000 mm or 1000 x 1200 mm



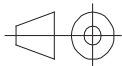
- ✓ Speed of 1 m/s, acceleration greater than 1 G
- ✓ High mechanical precision on work piece of below +/- 5 μm
- ✓ Stage-mapping with 2-dimensional 1-micron-reference-scales
- ✓ Very reliable laser source, used in 24-hour production since many years; worldwide service net
- ✓ Fiber transmission between laser source and cutting head
- ✓ Heavy machine base (2.5 tons precision-lapped granite structure)
- ✓ Various options available (chiller, transformer, individual stencil fixation, ultra-high-speed option for thin stencils)
- ✓ Low running costs (water consumption negligible)
- ✓ Upgradeable due to modular system (laser source is connected with fiber)
- ✓ Automatic alignment to any type of fiducial due to image processing
- ✓ Quality check, automatic measurement of apertures by image processing in μm - precision
- ✓ Integrated stencil-scanning with through-cut check and repair function
- ✓ Fast and precise fixation of stencil frame
- ✓ Any frame from 175 x 175 mm up to 900 x 900 mm useable, thickness between 10 and 40 mm
- ✓ Quick-exchange-frame for fixation of loose foil with adjustable expansion force, mountable outside of the machine
- ✓ Waste water is filtered
- ✓ Laser-class-1 machine with full stainless-steel enclosure
- ✓ Use not limited to stencils, the LSS 800 can be used for hundreds of other applications
- ✓ Gerber software, any standard data format
- ✓ Fast post-processor
- ✓ Local service and support in USA, Europe and Asia (Japan, Korea, Taiwan, China)

The Water Jet - Guided
Laser System

Dimensions



1:50



.....mm [....."]



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General Specifications

AXES

Type	XY-Table with separate axes on granite base
Drive	Linear motors
Useable working area	630 x 850 mm
Maximum stroke	700 x 900 mm
Precision	+/- 5 µm
Repeatability	2 µm
Maximum axis speed	1000 mm/s
Acceleration	1G
Control	Delta Tau

LASER

Laser type	Solid state Nd:YAG, pulsed
Wavelength	1064 nm
Average power	60 W
Pulse rate max.	1000 Hz
Pulse duration	80 µs
Beam transmission	Optical fibre, core diameter 100 µm

WATER PUMP

Type	Two-cylinder pressure amplifier
Water flow	max. 0.05 l/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 400 V or 3 x 200 V with transformer 50 - 60 Hz
Power consumption	9 kVA
Air pressure	5 - 6 bars, oilfree
Water flow for cooling	max. 9 l/min, max 16°C, industrial water (chiller optional)
Water flow for cutting	max. 0.05 l/min, de-ionised, filtered, degassed

DIMENSIONS/WEIGHT

Dimensions	1962 x 1650 mm
Weight	approx. 3000 kg

SOFTWARE

CAM	Gerber converter, for Windows 2000/XP
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OPTIONS

Transformer
Water treatment system
Chiller
Reference Scale

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.