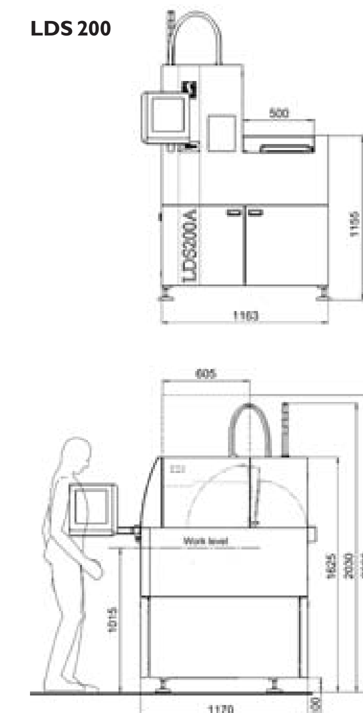
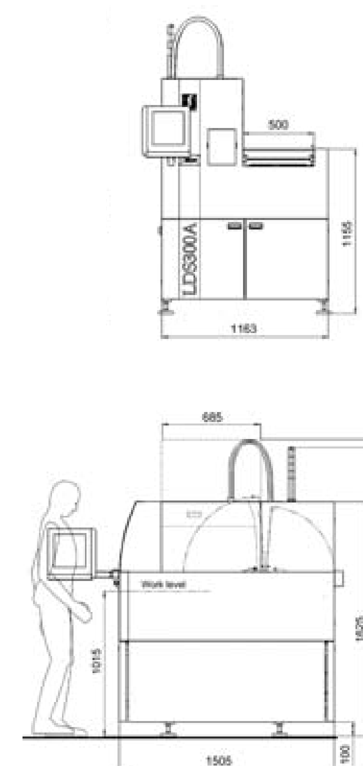
Laser Dicing System

General Specifications · LDS 200 · LDS 300

LDS 200



LDS 300



Axes

Type	XY-Table with separate axes on granite base
Drive	Linear motors
Useable working area	240 x 240 mm
Maximum stroke (X x Y)	600 x 400 mm
Precision	< 3 µm
Repeatability	< 1 µm
Maximum axis speed	1000 mm/s
Acceleration	10 m/s^2
Index	0.0001 mm

Optical Head

Type	Transmission of laser light from fiber to water jet nozzle
Image ratio	4:1, 6:1 or 8:1
Nozzle diameter	25µm, 30µm, 35 µm, 40µm, 50µm, 60µm, 75µm or 100µm
Alignment	Vision controlled

Laser

Laser type	Solid state Nd:YAG, pulsed
Wavelength	1064 nm or 532 nm
Average power	100 W, optional 200 W
Beam transmission	Optical fiber 100 µm - 200 µm, length 10 m

Water Pump

Type	Two-cylinder pressure amplifier
Water flow	max. 1 l/min, DI-water, particles < 3 µm
Average water flow for cutting	0.05 l/min
Water pressure	50 to 500 bars (5 to 50 MPa)
Pressure transmission	Flexible water hose
DI-Water flow for cleaning	Max. 1 l/min, DI-water, particles < 3 µm

Utilities

Electrical power	400V/230V, 50/60 Hz
Power consumption	10 kVA
Air pressure	5-6 bars, oil free
Water flow for cooling	Max. 8 l/min, max 16°C, industrial water
Water flow for cutting	0.05 l/min, < 0.3 µm, degasified

Work piece

Wafer size	1" to 8" (LDS 200) to 12"(LDS 300)
Applicable tape	Among others Lintec 611 and 628, LaserTape®
Applicable tape frame	6" (LDS 200), 8" or 12"(LDS 300)

Dimensions/Weight

Basic machine (W x D x H)

LDS 200 M: 1163 x 950 x 1625 mm
LDS 200 C: 1163 x 1170 x 1625 mm
LDS 200 A: 1163 x 1170 x 1625 mm

LDS 300 M: 1163 x 950 x 1625 mm
LDS 300 C: 1163 x 1505 x 1625 mm
LDS 300A: 1163 x 1505 x 1625 mm

Weight

LDS 200 M / 200 C / 300 M / 300 C: 850 kg

LDS 200A: 900 kg LDS 300A: 950 kg

Laser (W x D)	1500 x 750 mm	177.5 kg
Water pump (W x D)	1340 x 750 mm	350 kg

Vision System

Type	Pattern matching
Magnification	Two-level (high/low magnification)
Illumination	Coaxial LED light
Automatic alignment method	Image processing, alignment time < 5 s
Quality control	Kerf check by image analysis

Cleaning Station LDS 200 C/A

Cleaning	Megasonic and high pressure water jet
Drying	Front and backside with Nitrogen

Loading Station LDS 200 A

Cassettes	6" (LDS 200), 8" or 12" (LDS 300)
Frames	Single frame drawer

Options

200V transformer
Vacuum pump
Uninterruptible power supply

The above specifications are subject to change without notice due to technical improvement.
The Laser Dicing 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.

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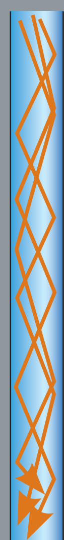
Laser Dicing System

Powered by Laser MicroJet®

Expand your capabilities with the latest development in Laser Technology

Discover the Synova

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.

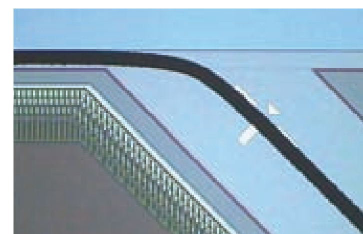
As a result, the Laser MicroJet® achieves a precise cut over the entire depth of the work piece, leaving a fine, clean surface.

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

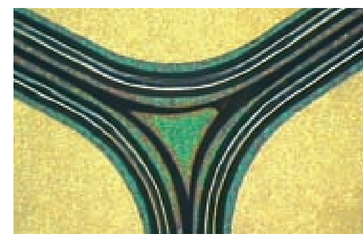
In the field of high-precision machining of sensitive materials, stringent requirements for fine and small structures demand a new process: Laser MicroJet® is the solution.

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

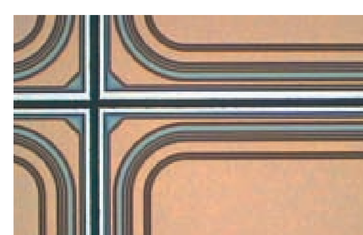
Founded in 1997, Synova is an experienced supplier of state-of-the-art laser solutions for industrial micro-machining applications, serving the semiconductor, electronic and medical markets. Each Synova machine features the unique Laser MicroJet® technology which was invented by Synova. With its headquarters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



A 725-µm thick silicon wafer cut for a X-ray image sensor chip. The through-cut is clean, chip-free and smooth. Absolute sensor surface cleanliness can be achieved without using a protection film.



A high-power hexagonal diode chip. The LDS can cut 33% more chips per wafer with curved edges compared to an abrasive saw that can only cut straight lines. The rounded corners alleviate stress typically experienced with sharp edges increasing device reliability.



This silicon wafer, cut with a 30-µm nozzle, has a 27-µm kerf. Generally, 50- to 250-µm thick wafers can be cut with a kerf smaller than 30-µm.

A silicon wafer diced with a 50-µm kerf. A fully automatic kerf check ensures maximum precision.

1 Fast & Accurate

The LDS's stable structure and linear motors are key to achieving high precision, high speed and accuracy in wafer dicing. Integrating the latest image processing software, the LDS provides quick and accurate wafer alignment and ensures fast and reliable dicing. This is particularly critical when working with thin wafers where damage potential and loss of throughput are primary concerns. The LDS eliminates these problems. In fact, the LDS has demonstrated unprecedented speeds, resulting in a significant increase in throughput, without the damage typically associated with using conventional lasers and diamond blade saws.

2 Easy to Use

A large color TFT flat screen with a touch panel provides a user-friendly interface to operate all machine functions. Using the latest generation of real-time processors creates an entirely new concept in CNC control and man-machine communication. Moreover, with the software's ability to quickly and precisely handle wafer alignment, the LDS reduces the need to manually adjust the work piece.

3 Versatile & Modular

Based on Synova's innovative Laser MicroJet® technology, the LDS has the ability to perform multi-directional cutting. This cutting versatility and flexibility provides process engineers with the power to create new chip shapes spanning T-cuts and circular designs. Essentially any contour desired can be cut with the same precision and quality as with standard die patterns.

4 Reliable

Synova only works with top quality component suppliers – each one a market leader within their own field – making LDS a start-of-the-art machine with superior uptime. Additionally, the LDS is equipped with a vast array of sensors for 24/7 online diagnostic control.

5 Low Cost of Ownership

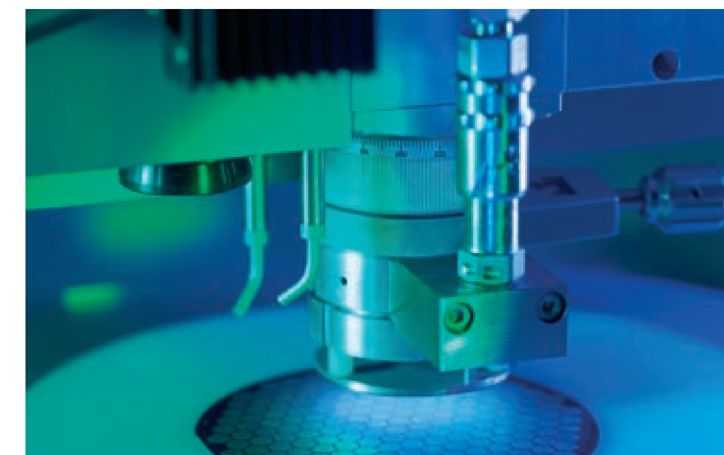
The tool's high throughput capability combined with its damage-free technology allows customers to realize cost benefits by increasing yields. Additionally, the LDS's long production-worthy lifetime, compared to conventional cutting technologies, such as diamond blade saws that require constant replacement, makes this a low cost-of-ownership tool.

6 Top-Notch Quality

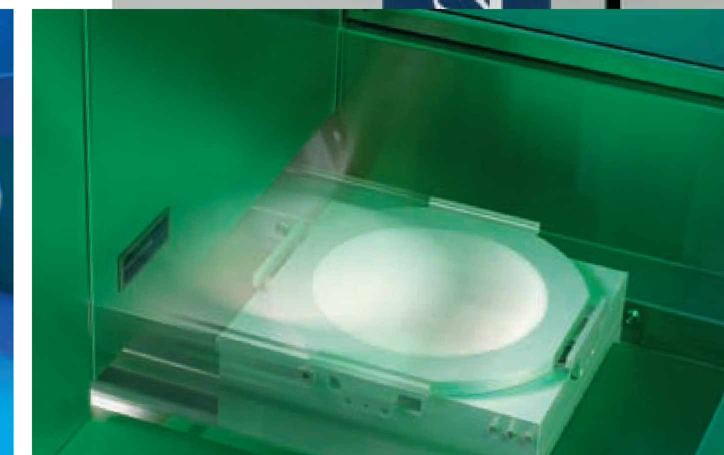
Each tool is assembled in Switzerland, integrating top quality, high-precision components. The production-proven laser source used in the LDS is extremely reliable. In addition to our tool offering, the system includes a worldwide service package consisting of local support and service in the US, Europe and Asia.

Laser Dicing System

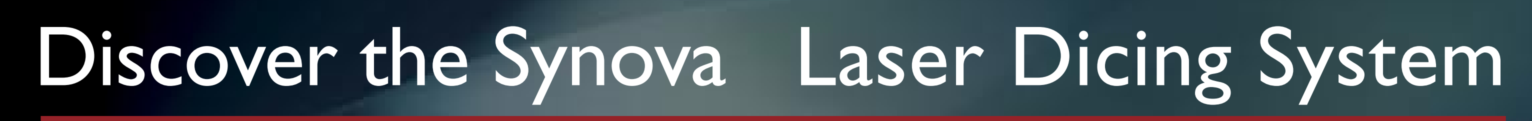
The Laser Dicing System (LDS) offers 200-mm and 300-mm wafer processing with the LDS 200 and LDS 300, respectively. The system also hosts different configurations to address manufacturing needs. The LDS M is equipped with a manual loading unit while the LDS C includes a cleaning station. The LDS A is Synova's fully automatic system, which integrates a cassette loading unit, a cleaning station and a manipulation system to tailor to any automation demands. All systems have an axis speed of up to 1000 mm/s and an absolute precision of +/- 3 µm.



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.



This loading unit can easily be adapted to handle frame sizes from 6- to 12-inches and consists of a precision machined glass that is suitable for handling ultra-thin wafers.


Discover the Synova Laser Dicing System