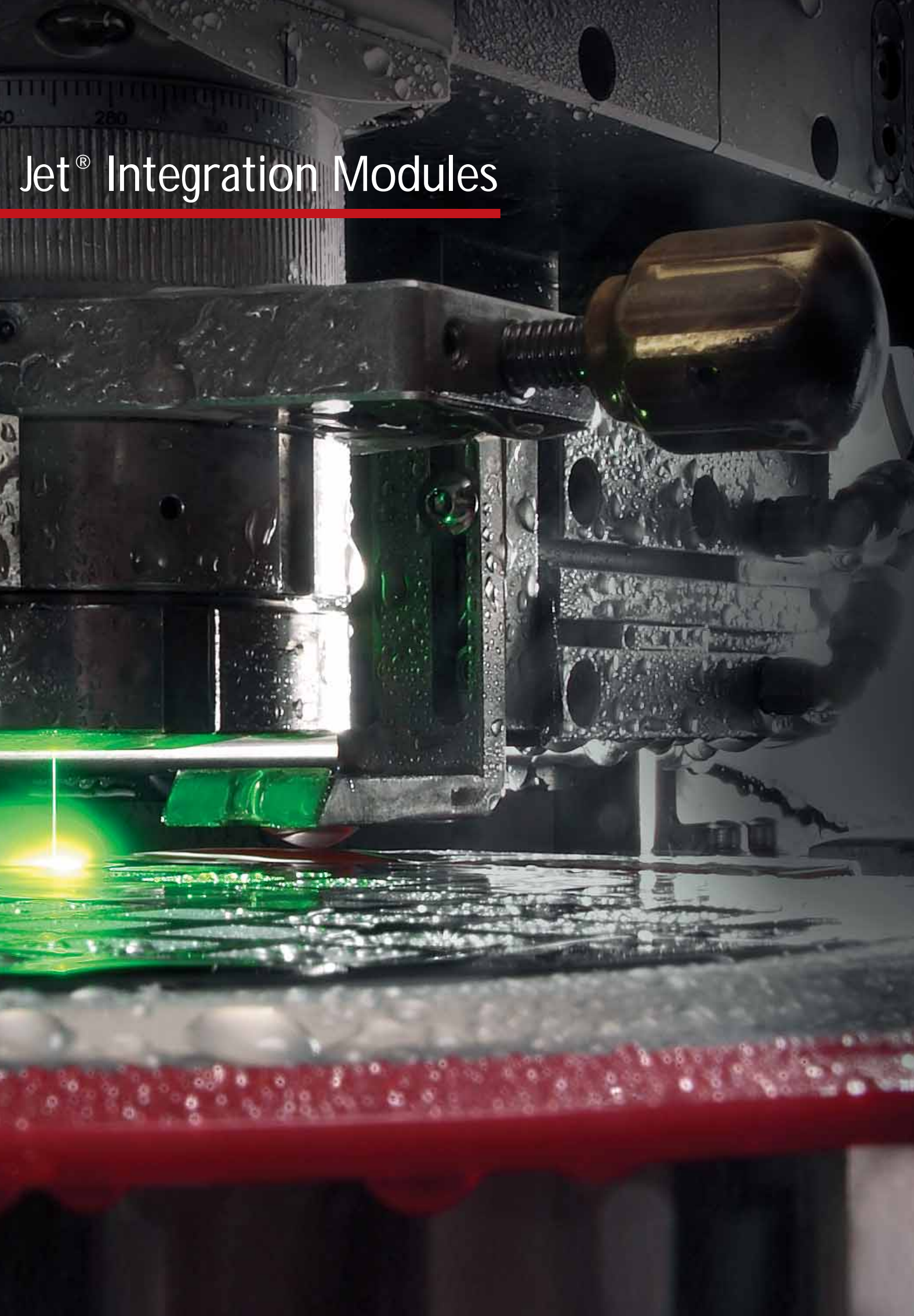


Jet® Integration Modules



Discover the Laser Micro



LMJ-iP

Laser MicroJet® Integration Package

LMJ-iP specifications

Laser

Laser type Solid state Nd: YAG, pulsed
Wavelength 1064, 532 and 355 nm
Average power 10W, 50W, 100W, 150W, 200W
Beam transmission Optical fiber 100 – 200 µm, length 10 m

Water Pump

Type Pressure transmitter two-cylinder water pump
Water flow 0.1, 0.25 and 0.5 l/min
Water pressure 20-500 bars
Inlet water pressure approx. 4 bars
Pressure transmission Flexible water hose

Optical Head

Type Transmission of laser light from fiber to water-jet nozzle
Image ratio 4:1, 6:1 or 8:1
Nozzle diameter 30, 40, 50, 60, 75 or 100 µm
Laser alignment Vision controlled, motorized, programmed by user (optional software)

Vision System (optional)

Type 12x zoom manual or motorized
Illumination Coaxial LED light

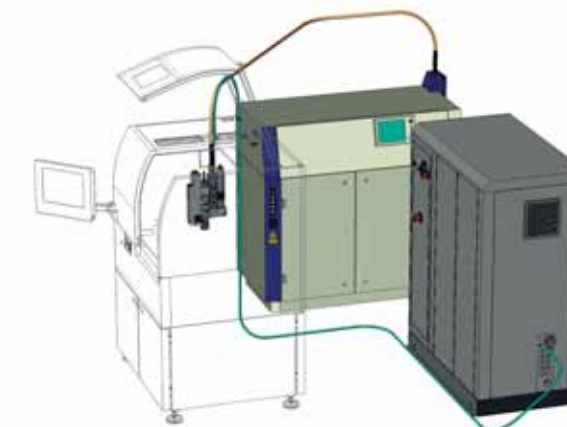
Utilities

Electrical power 12V for laser alignment system and camera power
Power consumption ~5W
Air pressure 5-6 bars, oil free, dry
Water flow for cooling max. 8-15 l/min (depending on the laser power)
Water flow for cutting max. 0.5 l/min
Electrical power 400V/230V, 50/60 Hz

Options

Stand alone software for laser alignment
Stand alone software for displaying vision system image
Chiller

The above specifications are subject to change without notice due to technical improvement.
The Integration Package incorporates the worldwide patented technology of water jet-guided laser, invented at the Swiss Federal Institute of Technology, Lausanne, Switzerland.
The system conforms to CE regulations.



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Expand your capabilities with the latest development in Laser Technology



The Laser MicroJet®

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, enabling "cold laser cutting", with little or no thermal damage and negligible material changes, resulting in an exceptional high quality cut.

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.

The Laser MicroJet® achieves a precise cut over the entire depth of the work piece, leaving a fine, clean surface thanks to a long working distance and constant 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.

The Laser MicroJet® Integration Package (LMJ-IP)

In response to heightened customer demands, Synova offers manufacturers a flexible, alternative solution to its complete turnkey systems with the Laser MicroJet® Integration Package (LMJ-IP). The LMJ-IP offers customers the opportunity to purchase the core components of the Laser MicroJet® technology, which comprise an optical head, laser-source and water pump, affording users the flexibility to integrate the modules directly into their production systems.

Benefits

The integration package offers customers access to a proven, proprietary technology with a more individual approach compared to a complete Synova turnkey system. It also provides the flexibility to integrate the LMJ-IP into existing or planned production facilities, including systems from other suppliers and technologies. These advantages, combined with those offered by the LMJ processing alone (combination of high precision, quality, speed and flexibility), can translate into lower manufacturing costs per unit – especially for high-volume manufacturing – and increased yield even when the LMJ-IP is used as a stand-alone module. As a result, LMJ-IP offers customers with a low cost-of-ownership solution.

LMJ-IP Components

Synova's integration package is a system comprising:

- Optical Head
- Laser Source
- Water Pump

Optical Head

The Laser MicroJet® optical head is the central element that enables the coupling of the laser beam – transmitted over a fibre optic cable from the laser light source – into a series of lenses and mirrors that precisely focus and position the beam through the centre of the nozzle and into the laminar water jet. Available in several modules, this integrated system includes a motorized video-controlled laser-beam focusing unit and a water-jet coupling unit with an available cutting nozzle ranging from 25-100µm.

With a camera-housing site available, the nozzle can be illuminated and imaged with an attached CCD camera, permitting users to adjust the alignment and focus using imaging software.

LMJ head coupled with customised combinations of modules...

Laser Source

The laser source is hosted separately from the optical head. With several types of lasers available, the LMJ-IP offers users the flexibility to select the laser source that best meets the process customer requirements. Available laser types for integration include pulsed diode-pumped solid – state (DPSS) Nd: YAGs operating at 1064, 532 or 355 nm. The system can accommodate either single or double laser units for throughput increase, and can be modified depending on the application. While process dependent, all laser sources are fiber-coupled and remote controlled.



Water Pump

The water pump systems are located independently from the optical head with two different systems available – a large system capable of supplying water to maximum five machines and a small-pump for a single-machine installation. The pumps include a water treatment system which supplies de-ionized and degassed water, so that only standard tap water is needed.



...for a wide range of applications

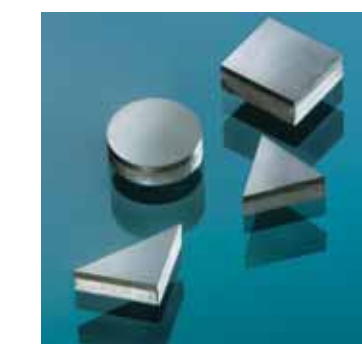
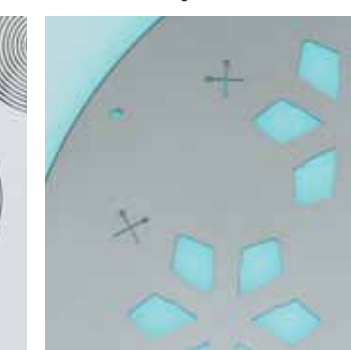
Aside from the unrivaled performance results the Laser MicroJet® offers, another key technology factor is its wide range of applications in numerous industries.

The technology's primary target applications include: dicing and edge grinding of semiconductor wafers; organic light-emitting diode (OLED) mask cutting for flat-panel displays; inkjet printer-head slotting; cutting of hard materials such as polycrystalline diamond, cubic boron nitride, etc., as well as many others. Synova is also moving into leading-edge fields such as solar cell manufacturing for the photovoltaic market and medical instrumentation.

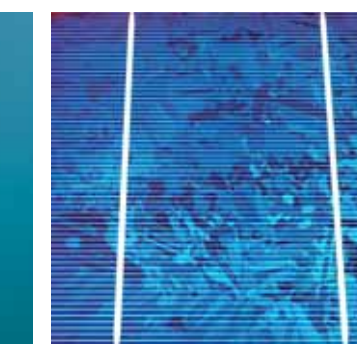
Precision Parts – Watch Spring
130µm thick, 50µm wide silicon
10 mm/s cutting



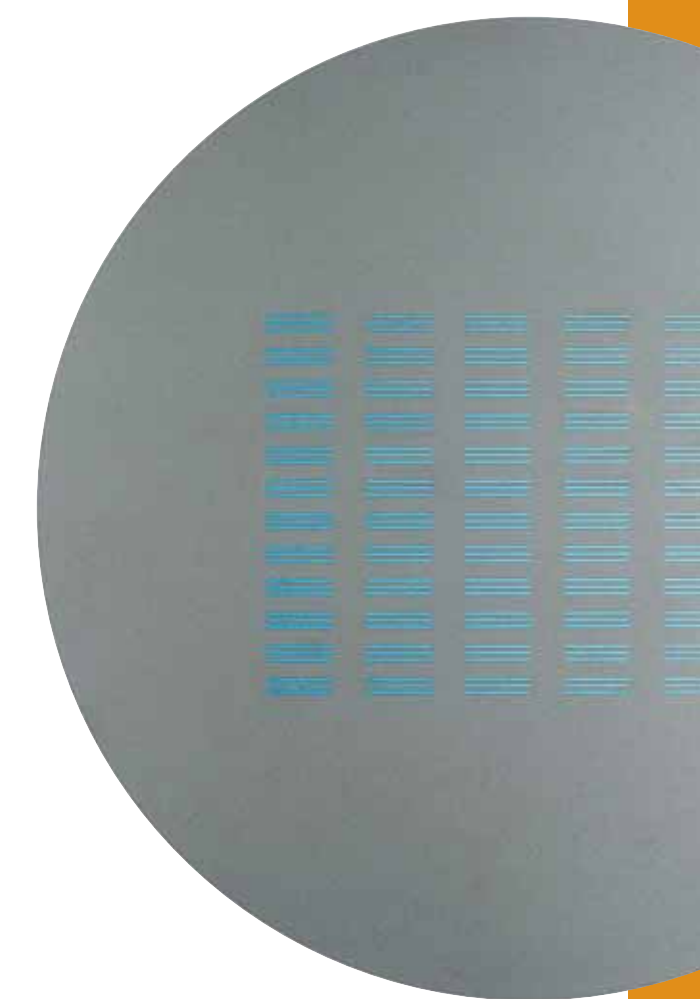
Medical – Scalpel
720µm silicon wafer
20 mm/s cutting



Tool inserts
1.6 mm PCD/WC
15 mm/min cutting



Energy – Solar Cell
350µm silicon
80 mm/s cutting



Electronics – Slotting
725µm silicon wafer
3 seconds per slot



Automobile – Fuel Injection Nozzle
160µm stainless steel
3 mm/s cutting/2.5 seconds per hole



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



Founded in 1997, Synova is an experienced supplier of state-of-the-art laser solutions for industrial micro-machining applications, serving the semiconductor, electronic, medical, automotive, watch and solar 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.

