



SIGMA[®] LS

Laser Micromachining Subsystem

The SIGMA LS Laser Micromachining Subsystem is a femtosecond laser-integrated module designed for high-precision processing versatility. The small form factor and integration-ready design make SIGMA LS ideal for machine builders and system integrators, as well as for contract manufacturers, job shops, and R&D laboratories.

SIGMA LS offers processing solutions for a broad range of femtosecond laser micromachining applications requiring optimal quality, minimal thermal effects, and high stability and dimensional accuracy – applications like precision milling, selective ablation, drilling, surface texturing, scribing, and marking.

With femtosecond laser options in IR, green, or UV wavelengths, multiple optical component combinations, laser power levels up to 80 W, and flexible designs with motorized focusing options, SIGMA LS can be designed with the optimal configuration for applications spanning the medical device, aerospace/defense, electronics, energy/battery, and automotive industries. All critical components are included to allow SIGMA LS to be integrated seamlessly into a production line machine or work cell, or to be used to support laser process prototyping and development.

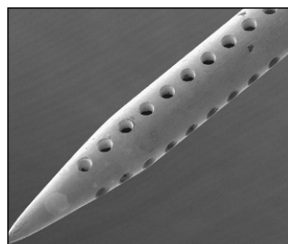
SUBSYSTEM INCLUDES

- Femtosecond laser
- Beam delivery optics
- Scan head or cutting head
- Focus lens
- Camera
- Controller/software

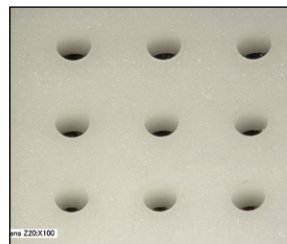
HIGHLIGHTS

- Ready-to-integrate subsystem with sensitive laser and optical components pre-installed
- Optional motorized focusing adjustment capabilities
- Fully optimized laser process included
- Installation support and application training provided on-site
- Ideal for precision micromachining of metals, metal alloys, polymers, ceramics, and glasses
- Tooling and part handling guidance provided

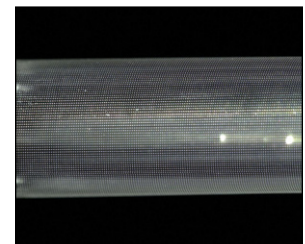
TYPICAL APPLICATIONS



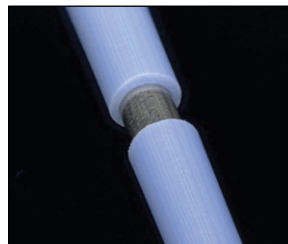
Hole drilling in stainless steel cannula



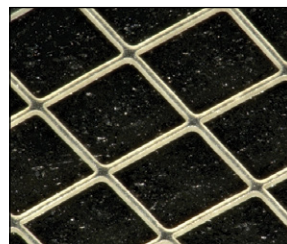
Hole drilling in ceramic microfluidics



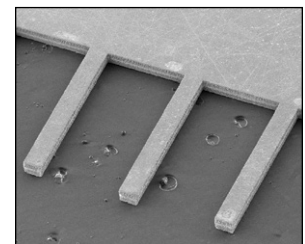
Texturing metals, polymers, ceramics



Selective polymer ablation on metal



Micromachining polymer filter screen



Micromachining metal struts and filaments

SIGMA LS SUBSYSTEM DESIGN VARIATIONS AND OPTIONS



Fixed Focus Position



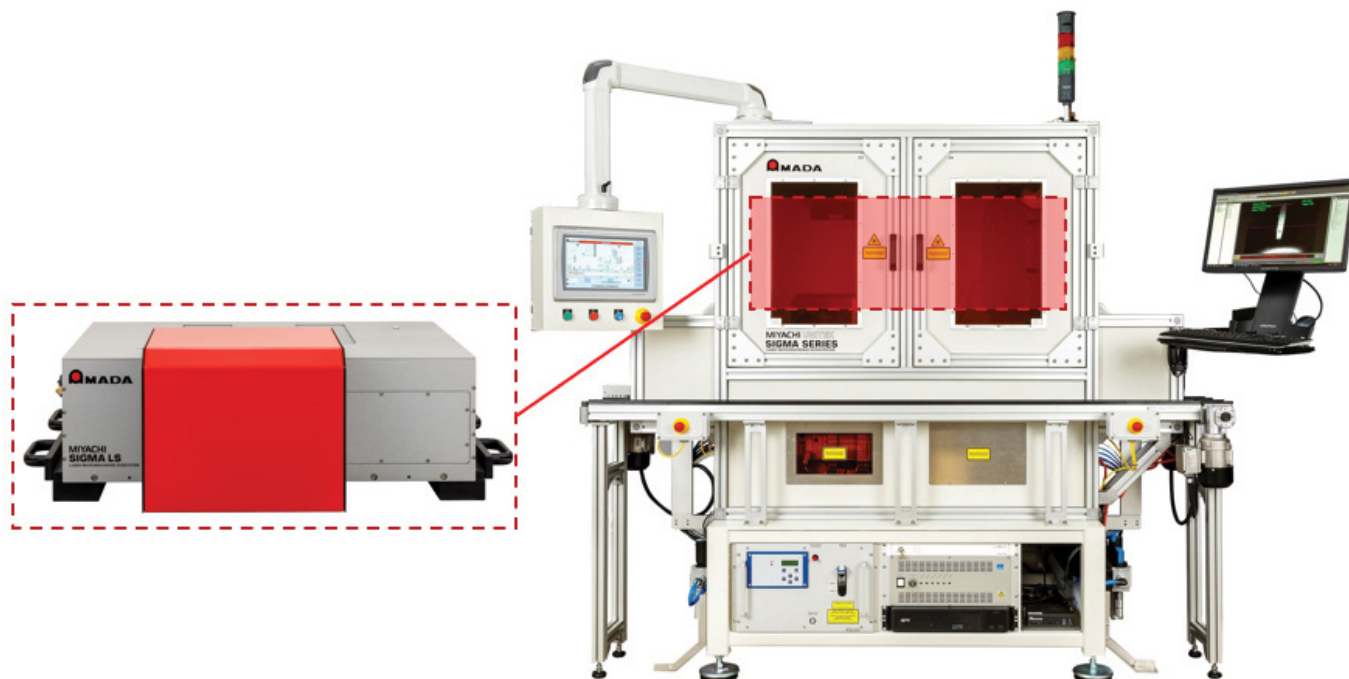
Motorized Focusing Capability



Vertical Mounting Layout

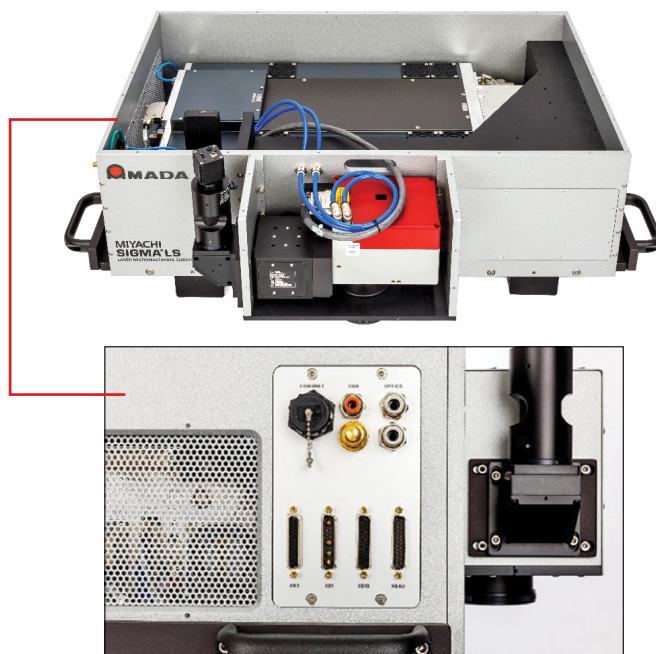
The SIGMA LS Subsystem is offered in multiple configurations to suit a variety of integration requirements. In the base system, the beam delivery head is fixed in position for the most rigid overall design. The optional motorized focusing upgrade provides the ability to adjust the focal point position through the software, expanding the subsystem's functionality. For systems or production lines with limited space, a vertically oriented SIGMA LS is offered. Both vertical and horizontal beam delivery are available, based on the processing needs.

SIGMA LS integrates into larger systems, enclosures, and production lines to provide femtosecond laser micromachining in a nearly limitless range of machines. Even existing systems may be upgraded with the SIGMA LS to provide the high-quality and high-precision capabilities of femtosecond laser processing.



KEY FEATURES AND COMPONENTS

- Femtosecond laser options from 5 W to 80 W
- IR, Green, or UV wavelength laser options
- Air-cooled or water-cooled laser options
- Easy-access utilities panel for communications with common industrial control systems
- Sensitive optical components contained in positive-pressure environment to prevent contamination
- Galvanometer scan head with multiple lens options for accurate, high-speed beam delivery
- Scanner and laser control software with GUI tailored to the application
- Optional fixed-optic focus head
- On-axis (through-the-lens) and off-axis vision options
- Rigid aluminum structure with protective sheet metal enclosure



Utilities panel for communications, cooling, and air-purge

TECHNICAL SPECIFICATIONS

Laser and Motion Parameter	Specification (Base SIGMA LS Model)	
Laser	Femtosecond laser options 5 W to 80 W; IR, Green, or UV wavelength	
Focused Spot Size	< 10 µm achievable	
Beam Delivery	Galvanometer 2D scan head options Fixed-optic focus head options Motorized focus adjustment options	
Tooling	Direction and concept testing provided upon request	
Input Power	Laser + Scan Head: Scan Controller: Chiller:	100 - 110 VAC, 50/60 Hz, 12 A or 208 - 240 VAC, 50/60 Hz, 7 A 85 - 240 VAC, 50/60 Hz, 2 A (5 W and 6 W laser) – Air-cooled (no chiller) (20 W – 40 W laser) 110 - 110 VAC, 50/60 Hz, 10 A or 208 - 240 VAC, 50/60 Hz, 4 A (80 W laser) 100 - 115 VAC, 50/60 Hz, 11 A or 208 - 240 VAC, 50/60 Hz, 6.5 A
Communications	EtherNet/IP™, TCP/IP, RS-232, Direct I/O; configurable	

Note: Input power, dimensions, weight, and communications protocols dependent on final system configuration.

WEIGHT & DIMENSIONS

Model	Subsystem (Base SIGMA LS Model)	Control Box (not shown)
Dimensions (W x D x H)	37.5 in (with handles removed) x 26.3 in (including scan head) x 14.1 in (including camera) (952.5 mm x 668.3 mm x 357.1 mm)	19.0 in x 13.0 in x 8.7 in (482.6 mm x 330.2 mm x 220.7 mm)
Weight	~ 255 lb (~116 kg)	~ 30 lb (~ 14 kg)



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