GF Machining Solutions

LASER S

500
500 U

Becoming better every day – since 1802

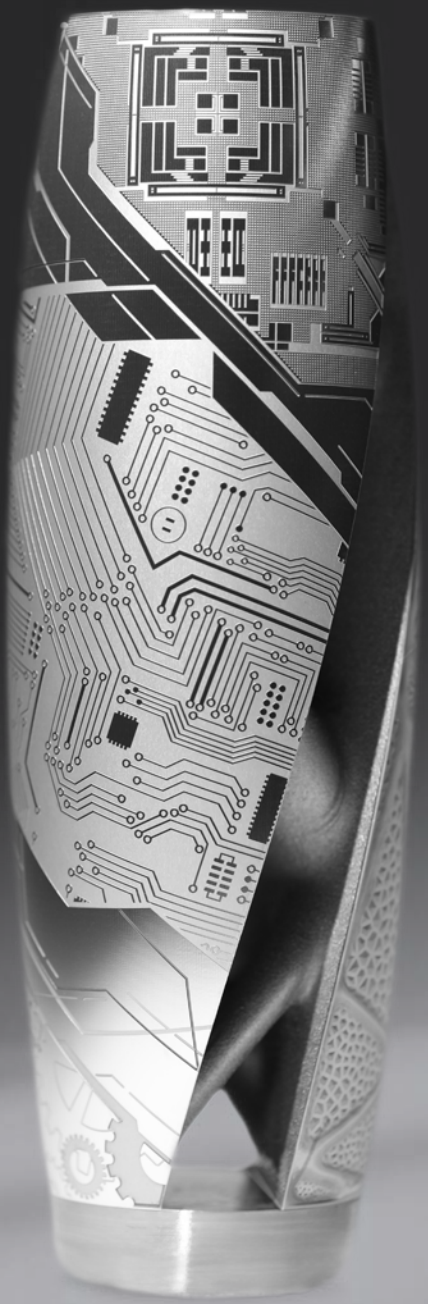
GF Machining Solutions
When all you need is everything, it's good to know that there is one company that you can count on to deliver complete solutions and services. From unmatched Electrical Discharge Machining (EDM), Laser Texturing, Laser Micromachining, Additive Manufacturing and first-class Milling and Spindles to Tooling and Automation, all of our solutions are backed by unrivaled customer service and expert GF Machining Solutions training. Our AgieCharmilles, Microlution, Mikron Mill, Liechti, Step-Tec and System 3R technologies help you raise your game—and our digital business solutions for intelligent manufacturing, offering embedded expertise and optimized production processes across all industries, increase your competitive edge.

Contents

LASER S 500 (U) overview

The ultimate Laser ablation tool

Designed to deliver top-tier features for Texturing and Micromachining applications, the new LASER S 500 (U) consolidates our 15 years of experience and represents a revolutionary leap in Laser ablation technology, meticulously designed to deliver unparalleled accuracy and performance.



Our Laser DNA: your applications drive our innovations.

2009
The acquisition of AF Laser technology introduced GF Machining Solutions' first 5-axis Laser machines, addressing mold texturing needs in the automotive and packaging industries.

2012
LASER P 4000, the world's largest 5-axis machine, is developed to tackle large molds texturing in automotive and aerospace applications.

2015
LASER P 400 is launched with the first femtosecond Laser source for structuring and micro-engraving.

2019
First 3D high-speed scanner machines, featured on the LASER S series, offer enhanced productivity for mold and die makers in the automotive, packaging, and ICT industries.

2020
Integration of the first femtosecond laser with dual wavelengths (40 W IR-GR) for added engraving and micro-engraving capabilities for watch and micro-mold makers.

2021
The LASER S 2500 is created, with high dynamics and thermo-stabilized features ensuring accuracy and productivity for large mold makers in the automotive and aerospace industries.

2024
LASER S 500 (U) is born, consolidating 15 years of history to meet the most challenging Micromachining and Texturing needs.

+GF+
Responsible Machining

More with less

Sustainability was key in designing the LASER S 500 (U): boosted productivity decreases the energy required per part while the overall energy consumption is reduced. Optional water-water chillers reduce the need for air conditioning and provide a thermally stable workspace.

Ultraprecision
Experience unrivalled precision for micromachining application

Efficiency
Discover efficient features to serve an extreme quality

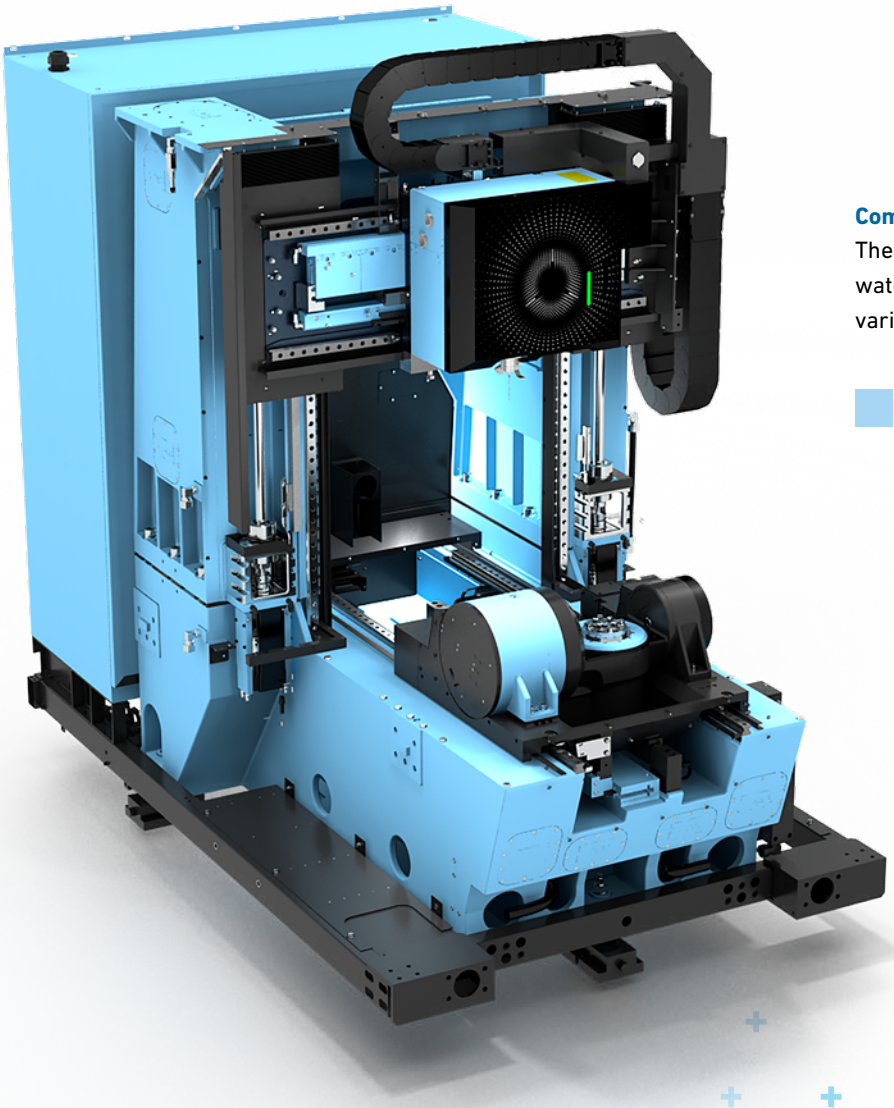
Flexibility
Envision a new era where flexible and versatile machining become reality

Digital excellence
Streamline your manufacturing capabilities with our all-in-one dedicated software

Unrivalled precision for micromachining

Ensuring accuracy and guaranteeing repeatability

The LASER S 500 (U) integrates cutting-edge design, kinematics and drives to attain unparalleled accuracy and repeatability, even during the longest jobs. Rest assured, it is the right tool to achieve excellence in your production.



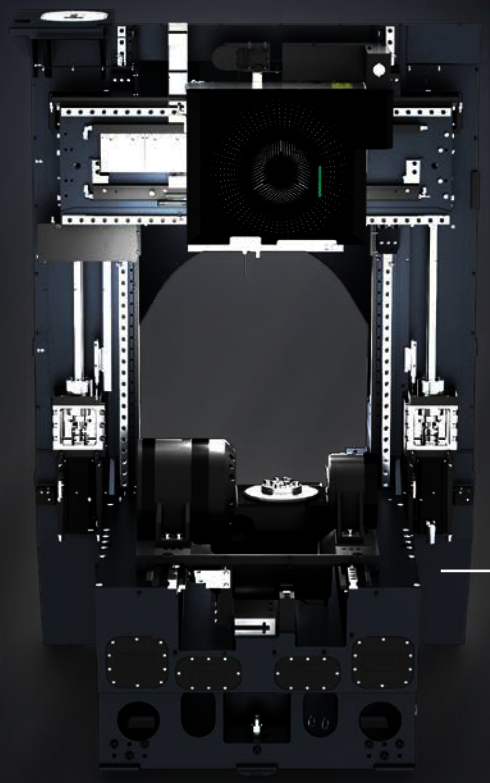
Complete thermostabilization
The core components of the machine are water-cooled to prevent temperature variations and maintain a perfect accuracy.

Water-cooled elements

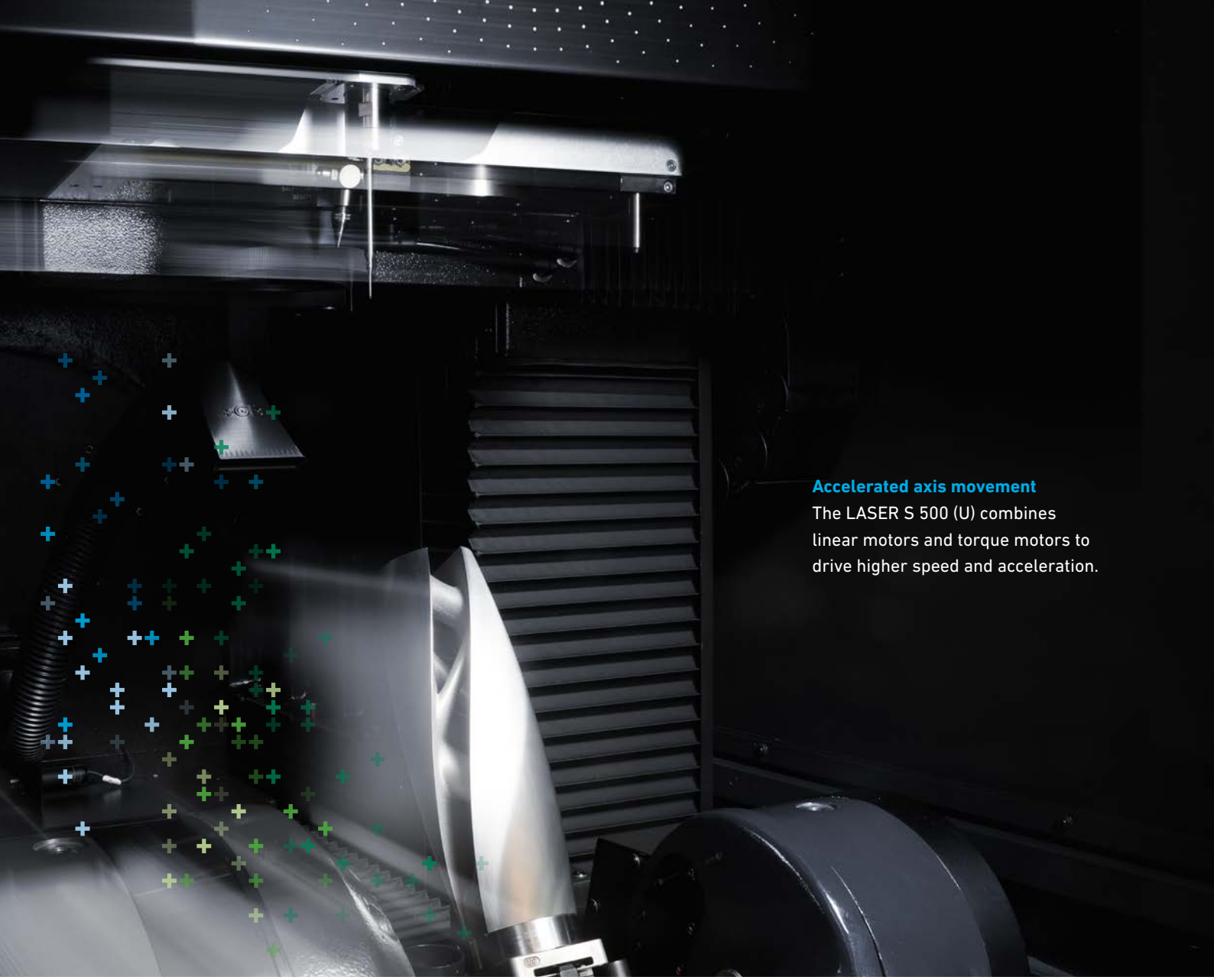
Unique GF Laser head dedicated to accuracy

The new LASER S 500 (U) Laser includes special elements dedicated to accuracy:

- A digital 3-axis scanner is coupled with the tailor-made water-cooled housing which is key for stabilization.
- An integrated touch probe in the head ensures the most accurate measurements on the X, Y and Z axes.
- An optional optical probe can be added into the camera



Sturdier mechanical design
The overall design is highly robust, with a perfect symmetry of the axis, preventing any vibrations on the machine.



Accelerated axis movement
The LASER S 500 (U) combines linear motors and torque motors to drive higher speed and acceleration.

Efficiency for exceptional results

Powerful components to elevate your productivity

Improving machine productivity is of critical importance in the manufacturing world, where no compromise can be made on maintaining excellent results within a reduced lead time. Be ready for ultrafast production.

Max. Z optical stroke

25 mm

Marking field

Up to

50 mm

with the lens type F130

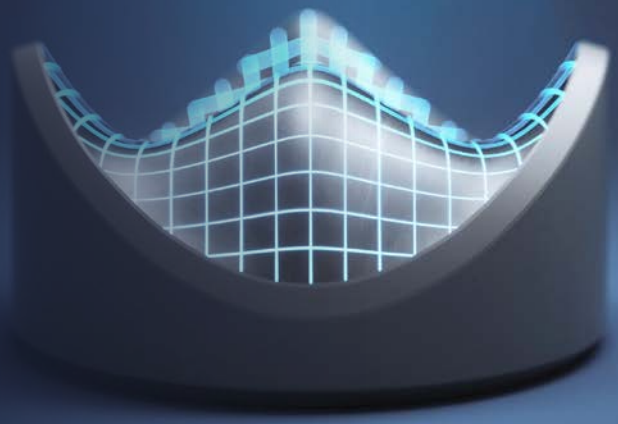
Up to

74 mm

with the lens type F163

Speed
Boost your lead time with faster Laser operations.

Advanced optical 3D high-speed scanner
The new LASER S 500 (U) integrates the latest generation of 3D scanner achieving up to 3500 mm/s scanning speed.
The marking field will match any complex 3D shapes at the speed of light to shorten even more your machining time.



Automation capability

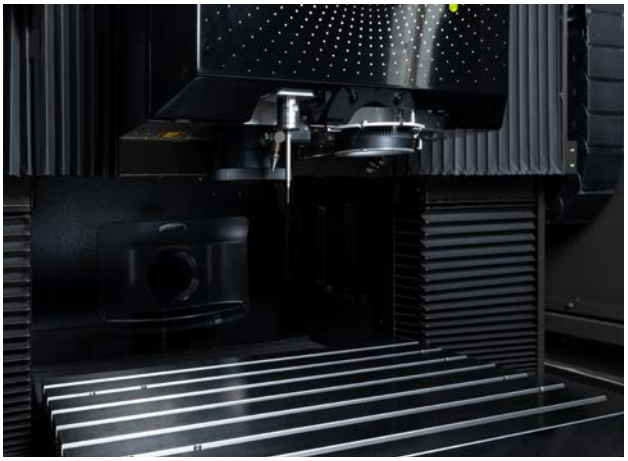
The machine is designed to accommodate automation on from the front, left or right doors through dedicated options.

Process flexibility

Various configurations to offer a versatile machining

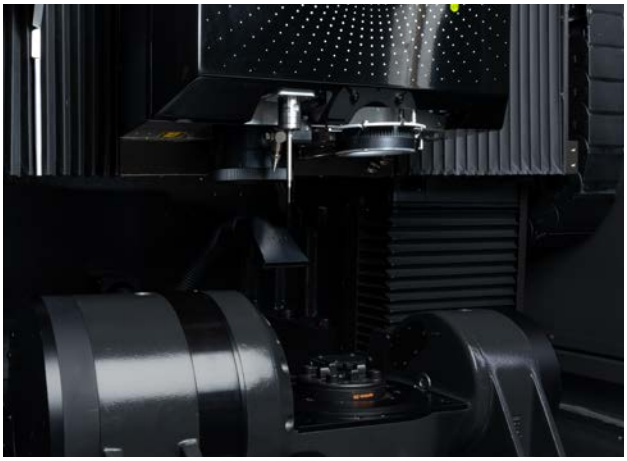
The new LASER S 500 (U) offers the flexibility to handle a wide range of parts of different sizes and weights. From our state-of-of the art Laser sources to our different configurations, you can now tackle diverse machining tasks with ease.

3-axis configuration



Maximum loading capacity: 60 kg

5-axis configuration



Maximum loading capacity: 15 kg

Tailored Laser options

From nano to femto and even dual Laser sources, pick the most appropriate source to tackle your operational option for ultimate flexibility.

Femto Laser sources
GF Femto Flexipulse 20 W IR
GF Femto Flexipulse 40 W IR
GF Femto Flexipulse 40 W IR/GR

Nano Laser sources
50 W Flexipulse
100 W Flexipulse

Dual Laser Sources possible combination
GF Femto Flexipulse 20 W IR + 50 W Flexipulse
GF Femto Flexipulse 20 W IR + 100 W Flexipulse
GF Femto Flexipulse 40 W IR + 50 W Flexipulse
GF Femto Flexipulse 40 W IR + 100 W Flexipulse

Different lenses for different applications

		Field size (mm)		Theoretical spot size (µm)	
Type	Size	IR	GR	IR	GR
F70 TEL	M85	25 x 25	20 x 20	18	9
F130 TEL	M85	50 x 50	40 x 40	34	17
F163 FΘ	M85	74 x 74	–	~ 50	–

Key services for your Laser machine

We offer dedicated Success Packs offerings for Laser machines. For added peace of mind, our packs give you full warranty coverage for up to 5 years. You can ensure optimum performance with our regular maintenance and get back to business quickly through fast and efficient repair services.

Extended warranty

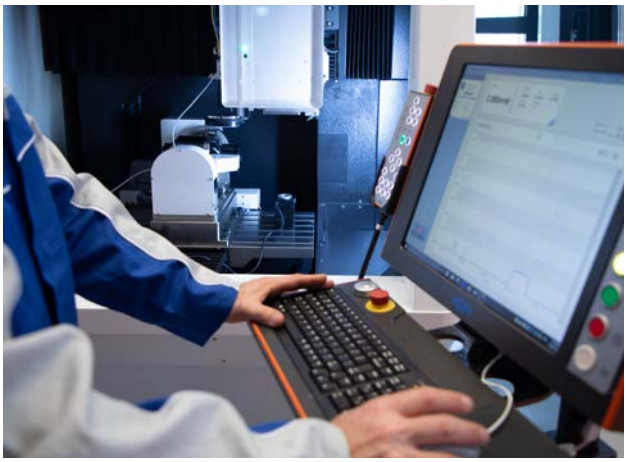
- Included in Silver+ Success Pack
- One-year full machine warranty including laser source and labor costs

Preventive maintenance

- Included in Silver Success Pack
- Annual scheduled intervention on site including an OEM certified maintenance kit and labor costs

Fast repair services

- Included in Bronze / Bronze+ Success Packs
- Advanced diagnosis, 24/5 support through My rConnect digital platorm



Digital excellence

Brand-new HMI to push the limits of machining even further

With SPOT, our new Laser machine interface, we've strived to create an advanced Human-Machine Interface (HMI) and controller that meet the demands of even the most complex applications.

Flexibility
Enhanced programming, loop and variable management, operation management and code completion offer the flexibility to tailor programs to specific application requirements.

Machine tool DNA
SPOT delivers advanced frame management, tool management, software corrections, measurement cycles, calibration wizards and G-code capabilities.

Ergonomics and user friendliness
Single-click laser switch, embedded controls, and intuitive features set SPOT as the industry standard for a user-friendly interface.

User account management
User account management enhances security and control with customizable permissions and access levels.

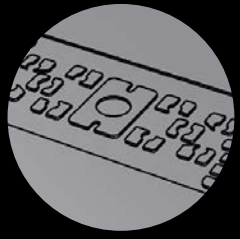

+GF+
MANUAL
MANAGER
PREPARATION
EXECUTION
Control
Laser
Camera
Program
X 102.057
Y 162.292
Z 353.704
B 0.720
C 0.000
Lights
Probes
Air treatment
Air
Front door
Lateral door
Laser
Machine status
MDI

LaserSUITE360

The most powerful Laser software package

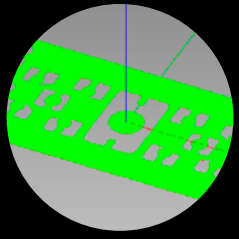
GF Machining Solutions' LaserSUITE360 optimizes your job with precise Laser parameters, toolpath generation, visualization and anti-collision simulation. Maximize the LASER S 500 (U)'s potential and achieve excellence in accuracy-driven applications.

Example of LaserCAM™ workflow



1. Import your 3D model

2. Fine-tune the machine strategy



3. Calculate and visualize the tool path before exporting to the machine

Example of LaserDESIGN™ workflow

1. Import the 3D model

2. Import the texture file

3. Map the texture onto the 3D surface

4. Laser toolpath gets computed

LaserTOOLBOX package

LaserCONTROL
Safely prepare your Laser and scanner parameters on and off the machine.

LaserVIEWER
Visualize your toolpath and patching strategy

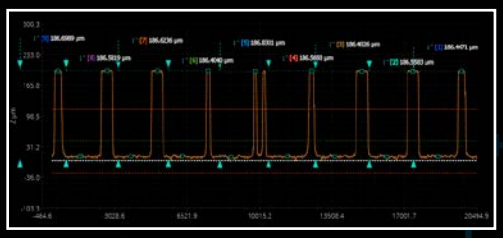
LaserSIMULATOR
Simulate your machining program with anticollision checks to ensure crash-free operations

LaserPMT (optional)
Efficiently find ideal laser parameters and create your own parameter catalog

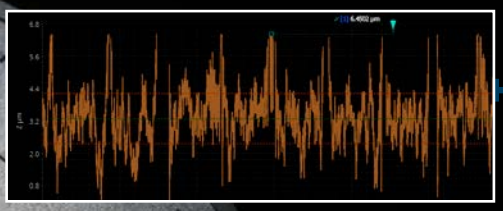
Application capabilities

Overview of the different applications made with the LASER S 500 (U)

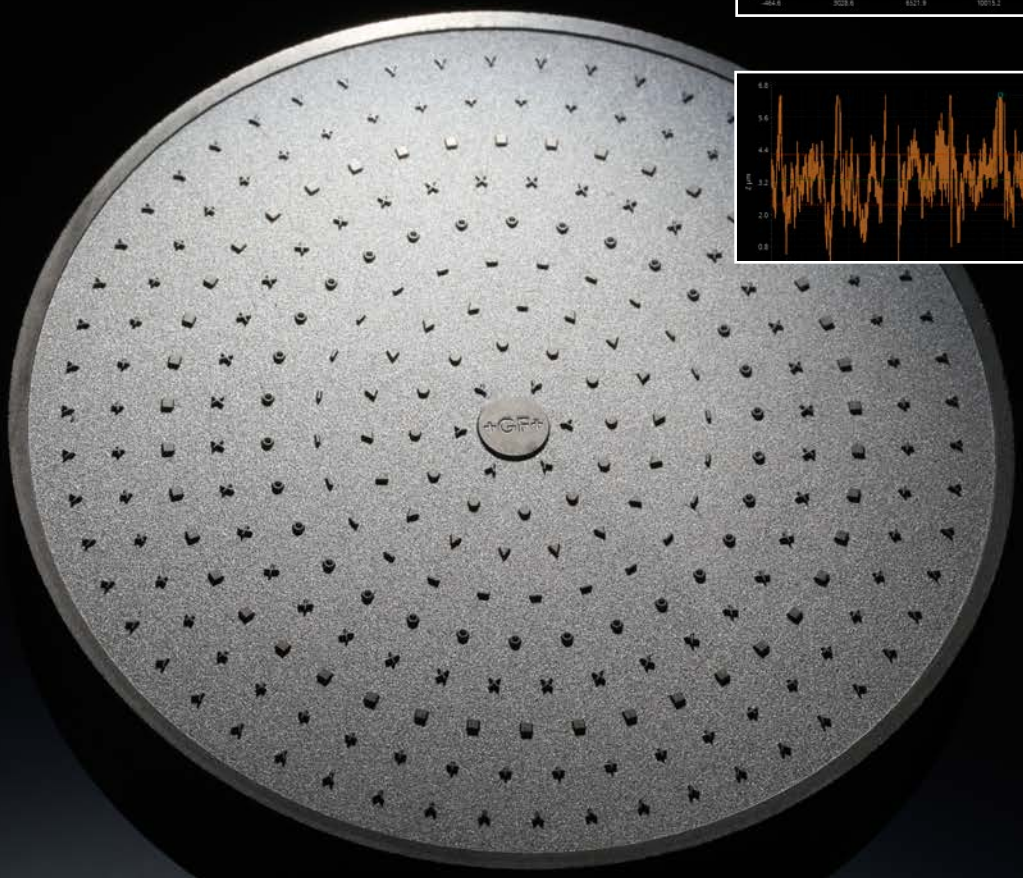
Wafer chuck



Surface flatness



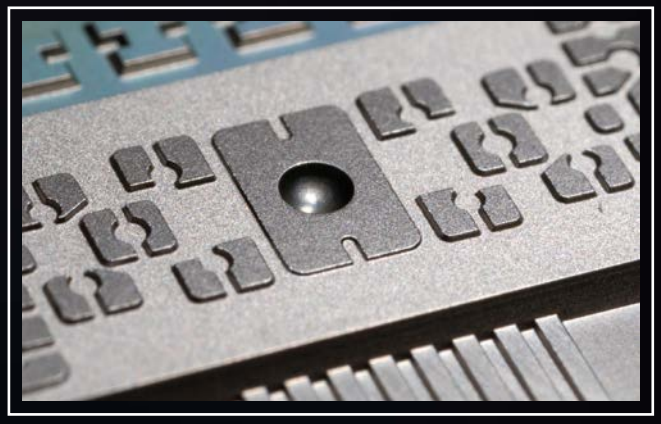
Average depth measurements

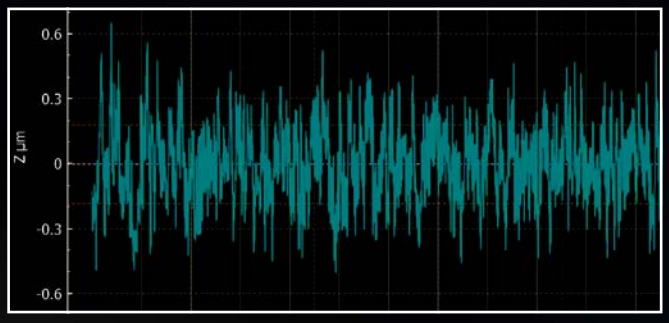


Performance results

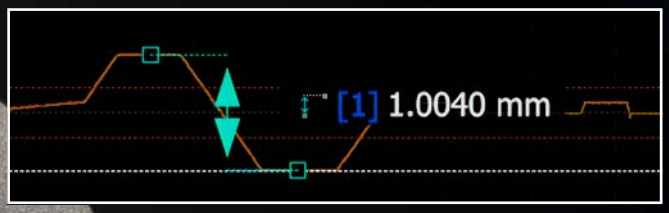
Market segment	Semiconductors
Material	Silicon carbide
Laser (type/power)	Nano 50 W Flexipulse
Software	LaserCAM™
Surface flatness	Targeted: ± 0.005 mm Measured: 0.003 mm
Depth	Targeted: ± 0.185 ± 0.005 mm Measured: 0.186 mm

ICT connectors

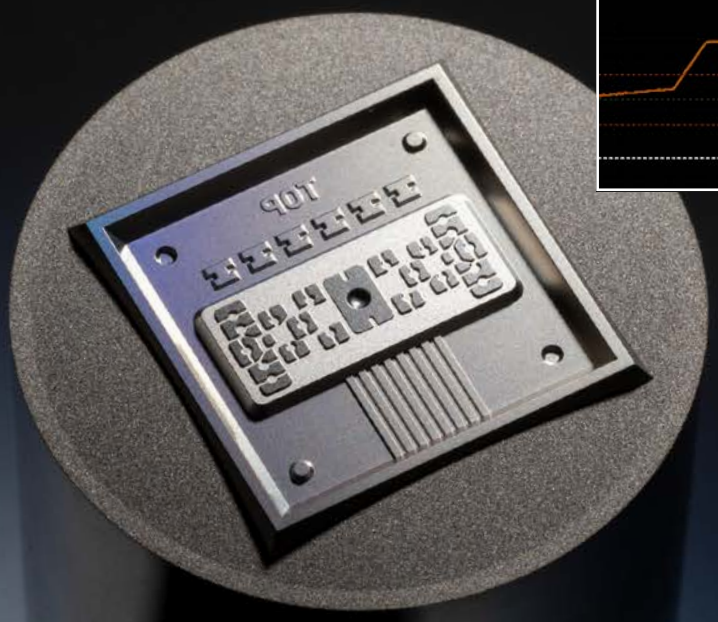




Roughness for the entire surface



Part max depth



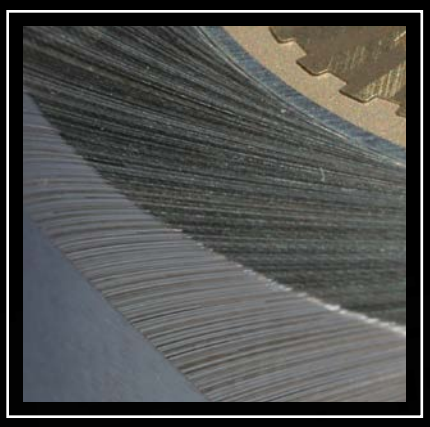
Performance results

Market segment	ICT
Material	Tungsten carbide
Laser (type/power)	GF Femto Flexipulse 40 W IR
Software	LaserCAM™
Depth	Targeted: 1.000 ± 0.005 mm Measured: 1.004 mm
Surface roughness	0.15 µm

Application capabilities

Overview of the different applications made with the LASER S 500 (U)

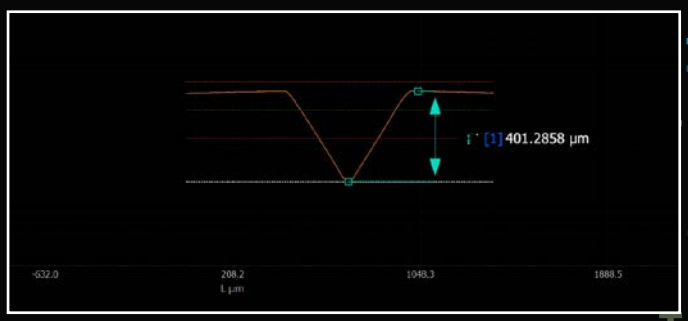
Watch case decor



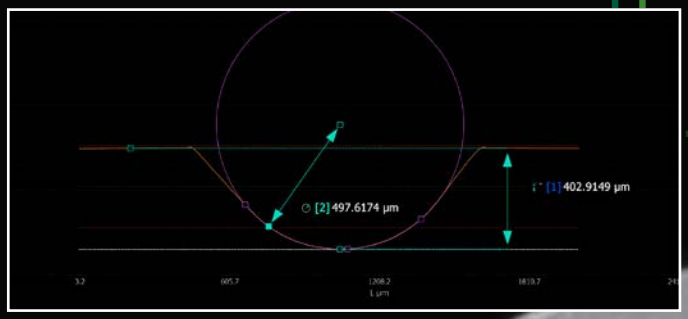
Performance results

Market segment	Watch
Material	Stainless steel
Laser (type/power)	GF Femto Flexipulse 40 W IR
Software	LaserCAM™ and LaserDESIGN™
Aesthetic achievement	5 axis engraving, brush continuity, brilliant effect in brass

Bottle cap



Stripes depth measurements

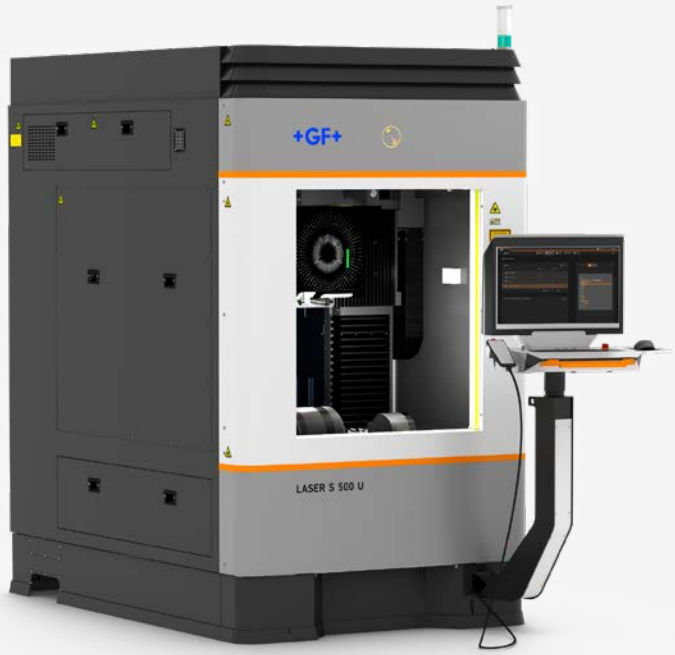


Thread depth measurements

Performance results

Market segment	Packaging
Material	Stavax
Laser (type/power)	GF Femto Flexipulse 40 W IR
Software	LaserDESIGN™
Stripes depth	Targeted: 0.400 ± 0.015 mm Measured: 0.401 mm
Thread depth	Targeted: 0.400 ± 0.015 mm Measured: 0.402 mm

Technical specifications



		LASER S 500 / LASER S 500 U
Dimensions		
Machine dimensions *	mm (in)	2174 x 1387 x 2556 (85.59 x 54.60 x 100.63)
Approx. machine weight (with coolant)	kg (lbs)	4000 (8818)
Machine footprint	mm (in)	3600 x 2500 (141.73 x 98.42)
Electrical supply		
Nominal power	kVA	15
Pneumatic supply		
Air pressure	bar/MPa	6 to 8 / 0.6 to 0.8
Required output flow	l/min	Max. 300
Operation control		
Type	–	Beckhoff Industrial PC (C6640)
Operating system	–	Microsoft Windows 10 IoT Enterprise 2019 LTSC
Screen	–	Multi-Touch LED 21.5'' display
User interface	–	SPOT
Table		
Table dimensions **	mm (in)	590 x 470 (23.23 x 18.50)
Table T Slots (number, dimensions)	–	Check layout
Dist. table/Found. plate	mm (in)	LASER S 500: 818 (32.20) / LASER S 500 U: 764 (30.08)
Movement		
Number of axes	–	3 (LASER S 500) / 5 (LASER S 500 U)
X travel	mm (in)	550 (21.65)
Y travel	mm (in)	400 (15.75)
Z travel	mm (in)	500 (19.68)
B-axis travel	°	-110/+110 (LASER S 500 U)
C-axis travel	°	0/+720 (LASER S 500 U)

* Width x depth x height ** Width x depth

LASER S 500 / LASER S 500 U

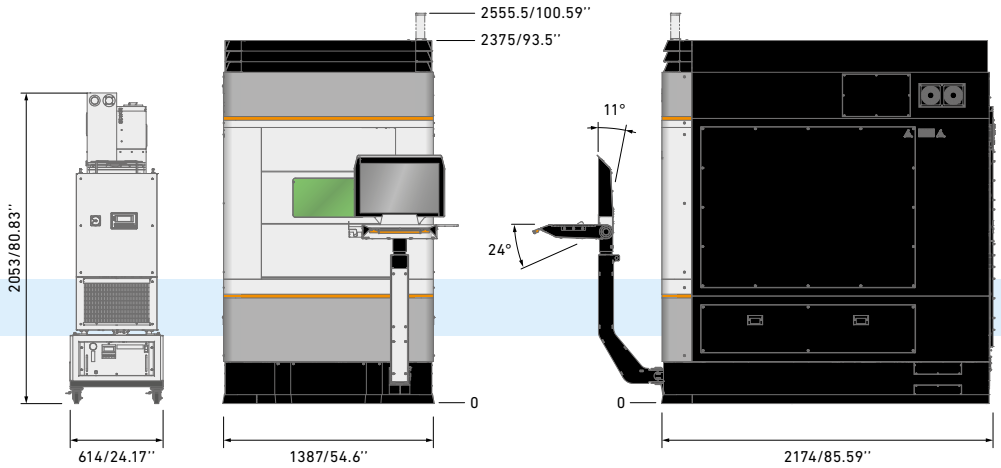
Working area

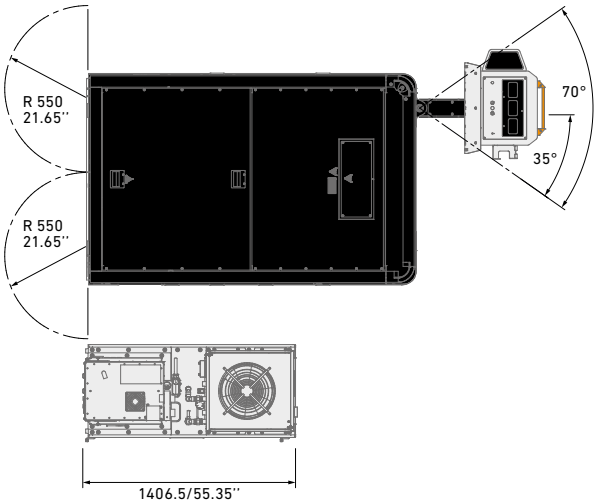
Max. workpiece LASER S 500	kg (lbs)	60 (132)
Max. workpiece LASER S 500 U	kg (lbs)	15 (33)
Max. workpiece dim. (3-axis) Max. workpiece dim. (5-axis)	mm (in)	Depends on the lens type – contact your GF Machining Solutions sales specialist
Max. permissible inertia (5-axis)	$kg.m^2$	0.17

Specific equipment available in configurator for this machine

M85 IR Lens	–	F163
M85 IR/GR Lens	–	FSTC70/FSTC130
Number of Laser sources	–	1 or 2 (1 Femto IR only + 1 Nano IR)
Laser GF Femto Flexipulse™	–	20 W IR/40 W IR/40 W IR-GR
Laser Nano Flexipulse™	–	50 W IR/100 W IR

LASER S 500 (U)





About GF Machining Solutions

Multi–technology solutions provider

Our commitment to you and your specific applications is proven by the value-adding intelligence, productivity and quality delivered by our multi-technology solutions. Your success is our chief motivator. That's why we are continuously advancing our legendary technical expertise. Wherever you are, whatever your market segment and whatever the size of your operation, we have the complete solutions and the customer-centric commitment to accelerate your success—today.

EDM (Electrical Discharge Machining)

Wire-cutting EDM
GF Machining Solutions' wire-cutting EDM is fast, precise and increasingly energy efficient. From ultraprecise machining of miniaturized components down to 0.02 mm to powerful solutions for demanding high-speed machining with respect to surface accuracy, our wire EDM solutions position you for success.

Die-sinking EDM
GF Machining Solutions is revolutionizing die-sinking EDM with features like iGAP technology to dramatically boost machining speed and reduce electrode wear. All of our die-sinking systems offer fast removal and deliver mirror finishes of Ra 0.1 µm (4 µin).

Hole-drilling EDM
GF Machining Solutions' robust hole-drilling EDM solutions enable you to drill holes in electrically conductive materials at a very high speed—and, with a five-axis configuration, at any angle on a workpiece with an inclined surface.

Milling

Milling
Precision tool and mold manufacturers enjoy a competitive edge with our Mikron MILL S solutions' fast and precise machining. The Mikron MILL P machines achieve above-average productivity thanks to their high performance and Automation. Customers seeking fastest return on investment benefit from the affordable efficiency of our MILL E solutions.

High Performance Airfoil Machining
Our Liechti turnkey solutions enable the highly dynamic manufacturing of precision airfoils. Thanks to the unique performance and our expertise in airfoil machining, you increase productivity by producing at the lowest cost per part.

Spindles
As part of GF Machining Solutions, Step-Tec is engaged in the very first stage of each machining center development project. Compact design combined with excellent thermal and geometric repeatability ensure the perfect integration of this core component into the machine tool.

Advanced manufacturing

Laser Texturing
Aesthetic and functional texturing is easy and infinitely repeatable with our digitized Laser technology. Even complex 3D geometries, including precision parts, are textured, engraved, microstructured, marked and labeled.

Laser Micromachining
GF Machining Solutions offers the industry's most complete line of Laser micromachining platforms optimized for small, high-precision features to meet the increasing need for smaller, smarter parts to support today's leading-edge products.

Laser Additive Manufacturing (AM)
GF Machining Solutions and 3D Systems, a leading global provider of additive manufacturing solutions and the pioneer of 3D printing, have partnered to introduce new metal 3D printing solutions that enable manufacturers to produce complex metal parts more efficiently.

Tooling and Automation

Tooling
Our customers experience complete autonomy while maintaining extreme accuracy, thanks to our highly accurate System 3R reference systems for holding and positioning electrodes and work pieces. All types of machines can easily be linked, which reduces set-up times and enables a seamless transfer of workpieces between different operations.

Automation
Together with System 3R, we also provide scalable and cost-effective Automation solutions for simple, single machine cells or complex, multi-process cells, tailored to your needs.

Software

Digitalization solutions
To drive its digital transformation, GF Machining Solutions acquired symmedia GmbH, a company specialized in software for machine connectivity. Together, we offer a complete range of Industry 4.0 solutions across all industries. The future requires the agility to adapt quickly to continual digital processes. Our intelligent manufacturing offers embedded expertise, optimized production processes, and workshop Automation: solutions for smart and connected machines.

Service + Success

We take you to new heights
Our Success Packs are designed to maximise you return on investment and empower you in your quest for success across all industrial segments. Our subscription packs feature a comprehensive range of services that guarantee the access and support you need to get the most out of your assets today, while preparing for the challenges of tomorrow. Our trusted experts backed by our latest cutting-edge, intelligent Digital Solutions, provide a full range of services.

eCatalog
Keep your equipment operating at peak precision and performance with our wide range of certified consumables and original wear parts. Our online catalog has it all (ecatalog.gfms.com).

Worldwide for you

Our locations

Switzerland

Headquarters
Biel/Bienne +++

Losone ++
Geneva ++
Langnau ++

Europe

Schorndorf, Germany ++
Coventry, United Kingdom ++
Agrate Brianza (MI), Italy ++
Barcelona, Spain ++
Marinha Grande, Portugal +
Massy, France +
La Roche Blanche, France +
Lomm, Netherlands ++
Altenmarkt, Austria ++
Warsaw, Poland ++
Brno, Czech Republic ++
Budapest, Hungary ++
Vällingby, Sweden +

America

USA
Lincolnshire (IL) ++
Chicago (IL) ++
Huntersville (NC) ++
Irvine (CA) ++

Toronto (Vaughan), Canada ++
Monterrey, Mexico ++
São Paulo, Brazil +
Caxias do Sul, Brazil +

Asia

China
Beijing +++
Changzhou ++
Shanghai ++
Chengdu ++
Dongguan ++
Hong Kong +

Yokohama, Japan ++
Taipei, Taiwan +
Taichung, Taiwan ++
Seoul, Korea ++
Singapore, Singapore ++
Petaling Jaya, Malaysia ++
Bangalore, India ++
Pune, India +
Hanoi, Vietnam ++

+ Plant + Center of Demonstration + Sales company

www.gfms.com

GF Machining Solutions

At a glance

We enable our customers to run their businesses efficiently and effectively by offering innovative Milling, EDM, Laser, Additive Manufacturing, Spindle, Tooling and Automation solutions. A comprehensive package of services completes our proposition.

www.gfms.com