

LASER S

500 / 500 U



 **CHARMILLES**

A member of UNITED MACHINING SOLUTIONS

THE ULTIMATE LASER ABLATION TOOL

Designed to deliver top-tier features for Texturing and Micromachining applications, the new LASER S 500 (U) consolidates our 25 years of experience and represents a revolutionary leap in Laser ablation technology, meticulously designed to deliver unparalleled accuracy and performance.

OUR DNA CARRIES A LEGACY: YOUR APPLICATIONS DRIVE OUR INNOVATIONS.

2001

First market introduction of a 5-axis Laser texturing machine by AF Laser.

2009

Thanks to the acquisition of AF laser technology, implementation in GF portfolio of 5-axis Laser machines for mold texturing in automotive and packaging industries; first LASER P 600 U exhibited at EMO.

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

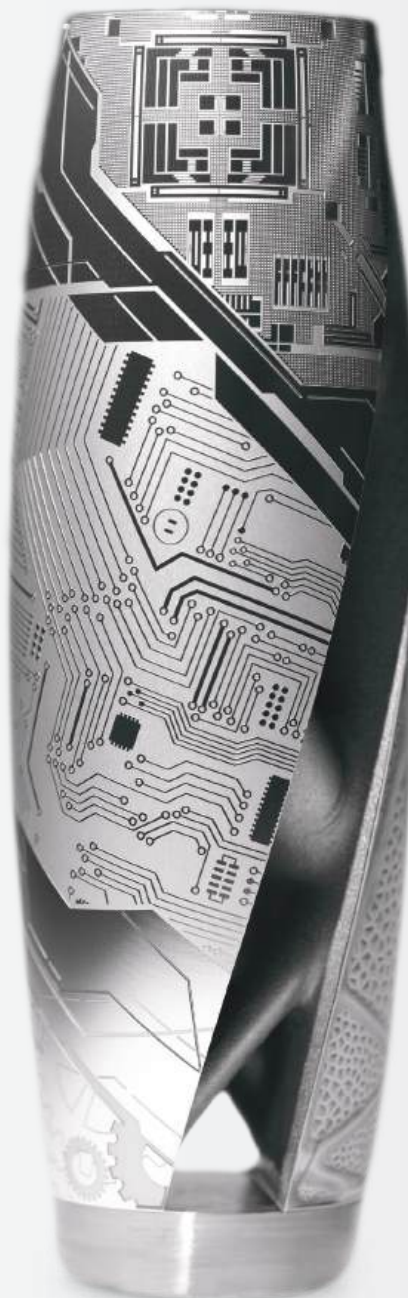
The LASER S 2500 is created, with high dynamics and thermo-stabilized features ensuring accuracy and productivity for large mold makers in the automotive and aerospace industries.

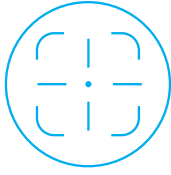
2024

LASER S 500 (U) is born, consolidating 25 years of history to meet the most challenging micromachining and 3D surface processing needs.

2025

CHARMILLES wins the Green Impact Award of Machine Tool Innovation (MTI) Awards hosted by CECIMO, for sustainable innovation with "Precision redefined with LaserCAM 3DShaping and LASER S 500 U".





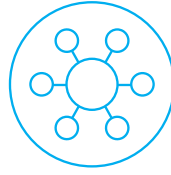
Ultraprecision

Experience unrivalled precision for micromachining application



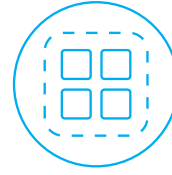
Efficiency

Discover efficient features to serve an extreme quality



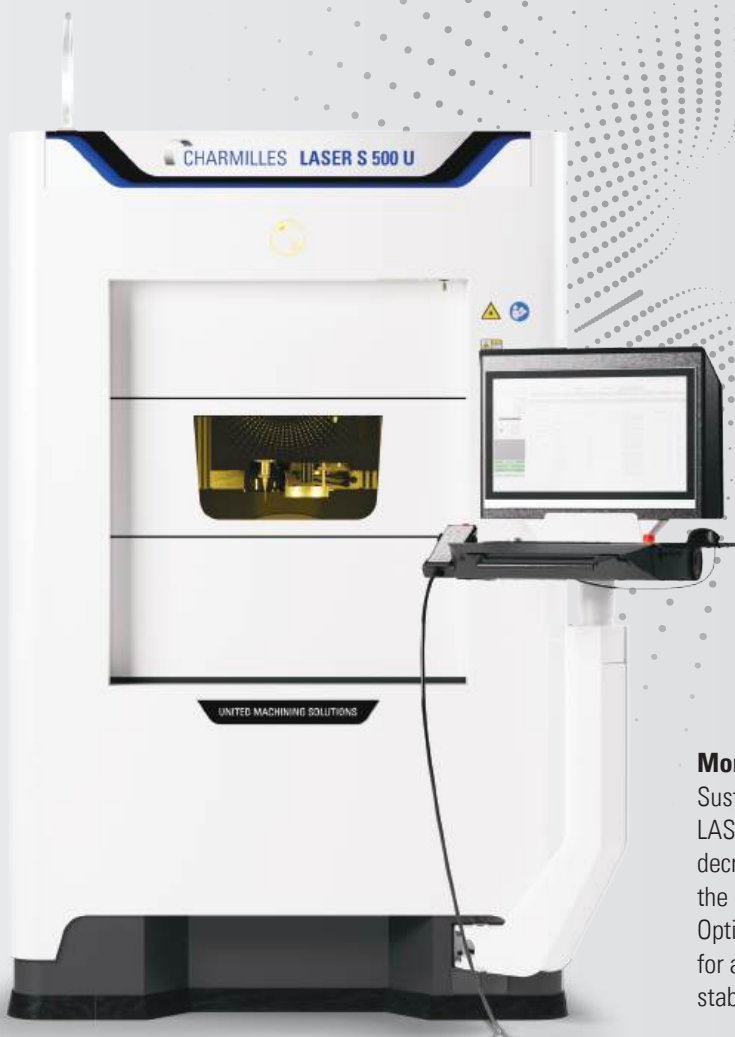
Flexibility

Envision a new era where flexible and versatile machining become reality



Digital excellence

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

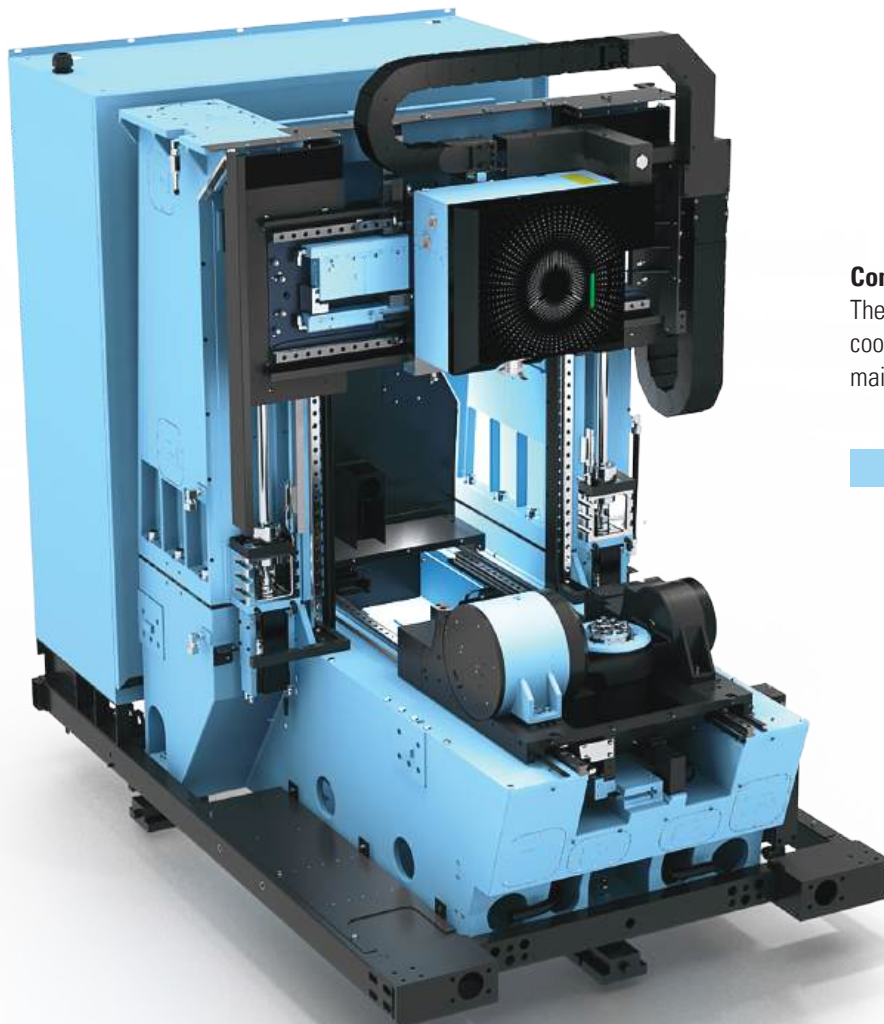


More with less

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.

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 CHARMILLES LASER HEAD DEDICATED TO ACCURACY

The new LASER S 500 (U) head 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.

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.

Automation capability

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



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.

Max. Z optical stroke

25_{mm}

Marking field

Up to

50_{mm}

with the lens type F130

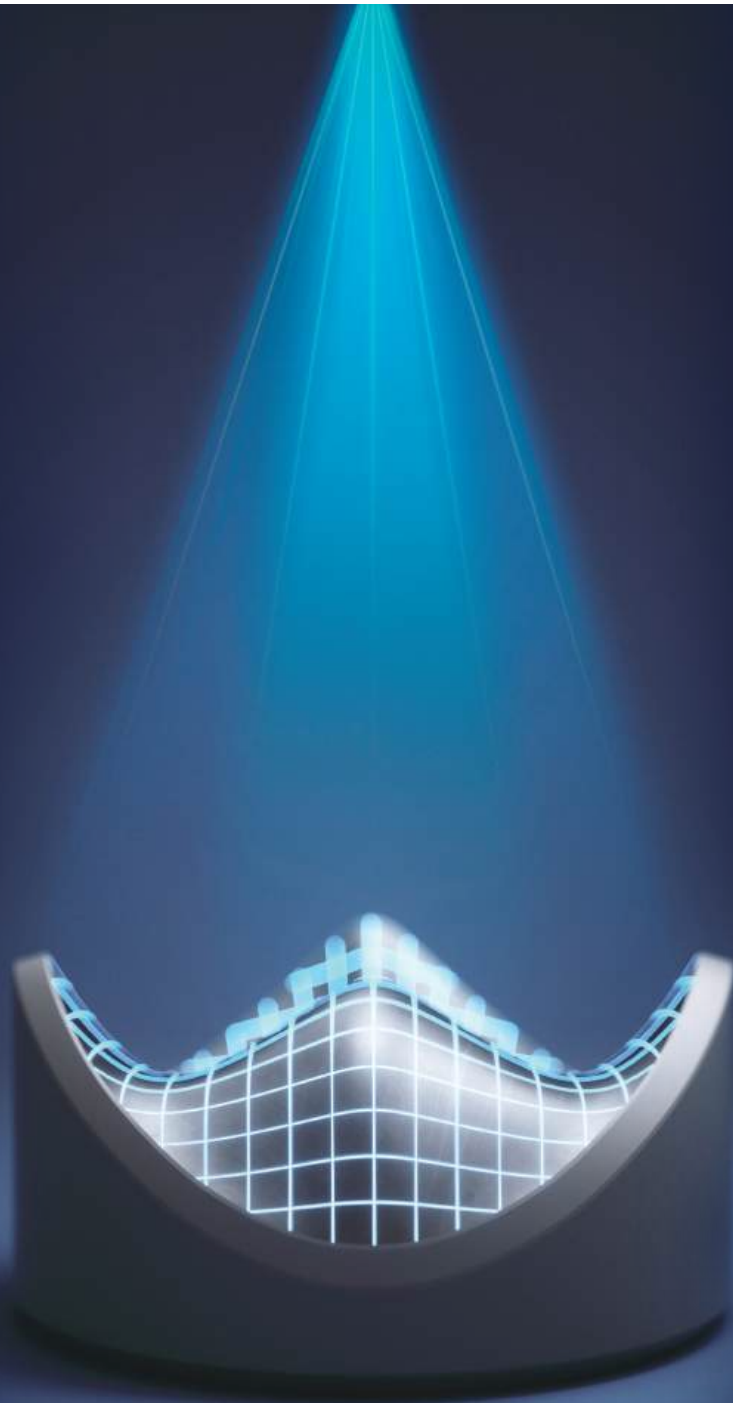
Up to

74_{mm}

with the lens type F163

Speed

Boost your lead time with faster Laser operations.

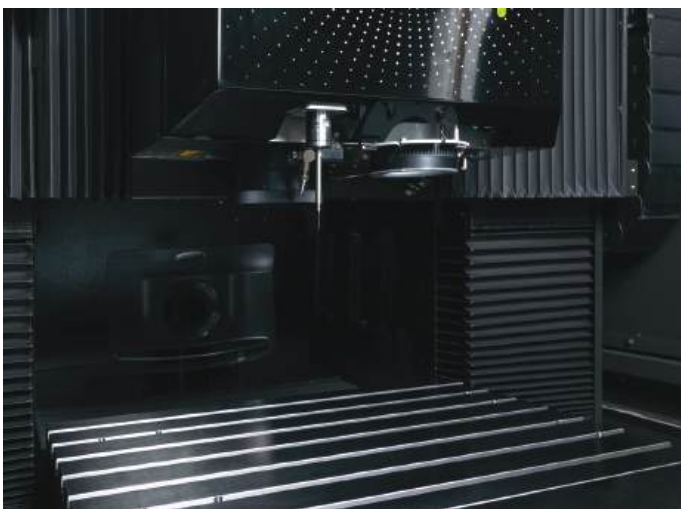


VARIOUS CONFIGURATIONS TO OFFER A VERSATILE MACHINING

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-the-art Laser sources to our different configurations, you can now tackle diverse machining tasks with ease.

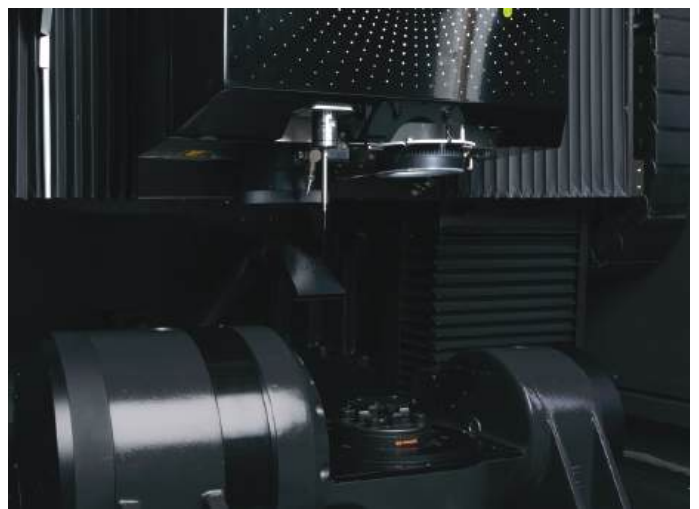


3-axis configuration



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

CHARMILLES Femto Flexipulse 20 W IR
CHARMILLES Femto Flexipulse 40 W IR
CHARMILLES Femto Flexipulse 40 W IR/GR

NANO LASER SOURCES

50 W Flexipulse
100 W Flexipulse

DUAL LASER SOURCES POSSIBLE COMBINATION

CHARMILLES Femto Flexipulse 20 W IR + 50 W Flexipulse
CHARMILLES Femto Flexipulse 20 W IR + 100 W Flexipulse
CHARMILLES Femto Flexipulse 40 W IR + 50 W Flexipulse
CHARMILLES Femto Flexipulse 40 W IR + 100 W Flexipulse



Different lenses for different applications

TYPE	SIZE	FIELD SIZE (mm)		THEORETICAL SPOT SIZE (μm)	
		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

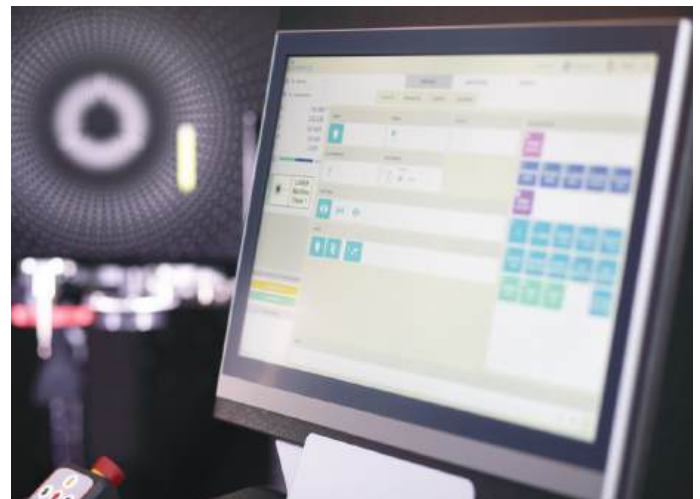
- Included in Gold Success Pack
- One-year full machine warranty including laser source and labor costs

Preventive maintenance

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

Fast repair services

- Included in Bronze, Silver, Gold Success Packs
- Advanced diagnosis, 24/5 support through My rConnect digital platform





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.



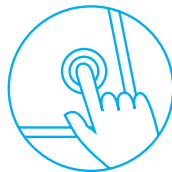
Flexibility

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



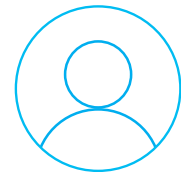
Machine tool DNA

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.

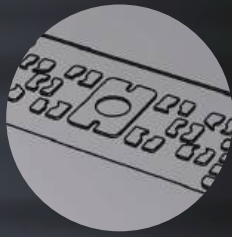


User account management

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



Example of LaserCAM™ workflow



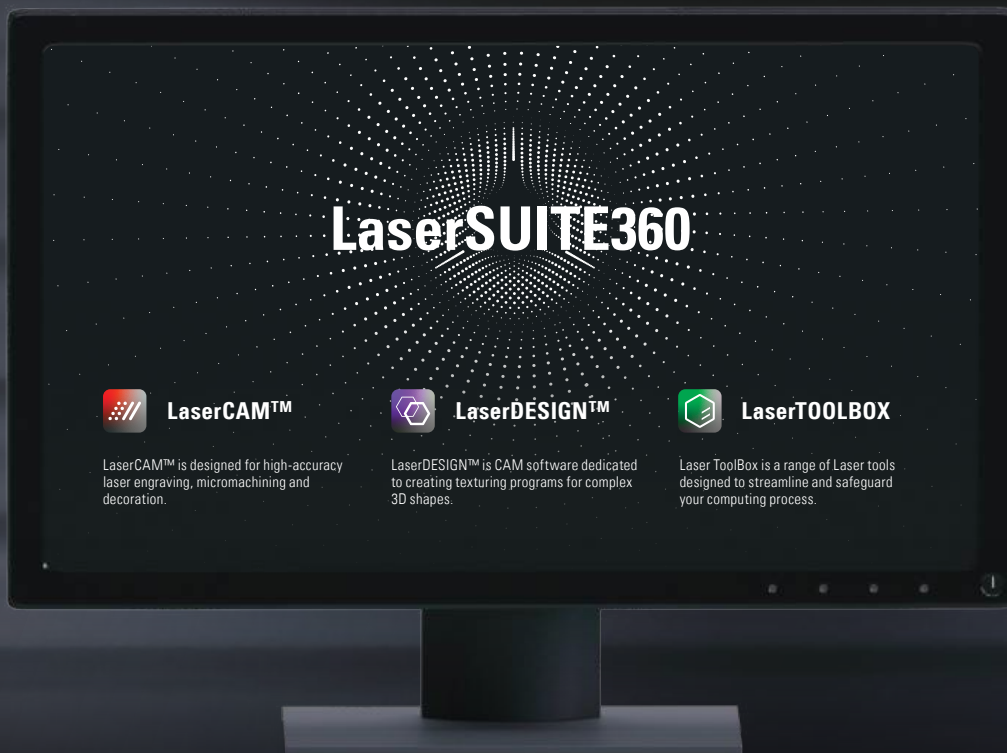
1. Import your 3D model



2. Fine-tune the machine strategy



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



THE MOST POWERFUL LASER SOFTWARE PACKAGE

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



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

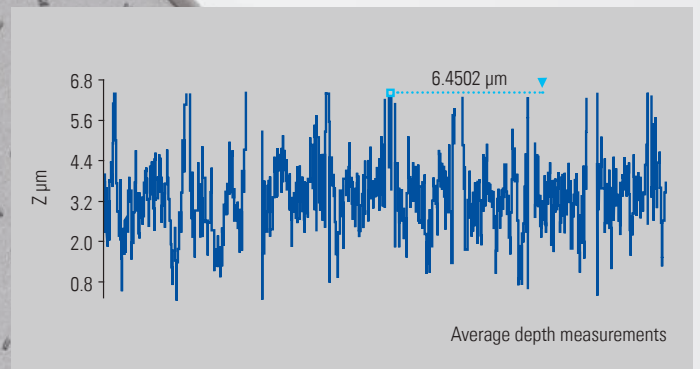
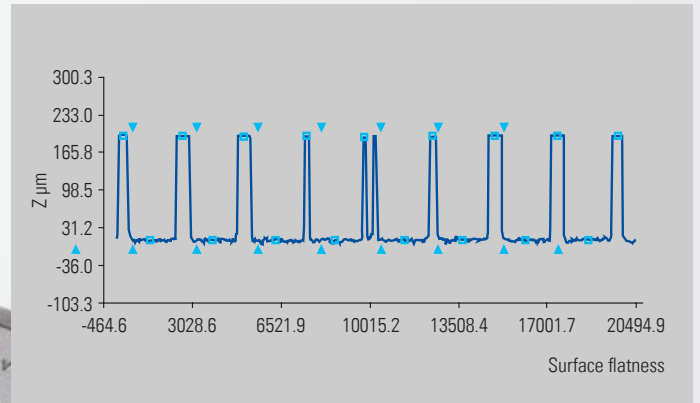


LaserPMT (optional)

Efficiently find ideal laser parameters and create your own parameter catalog

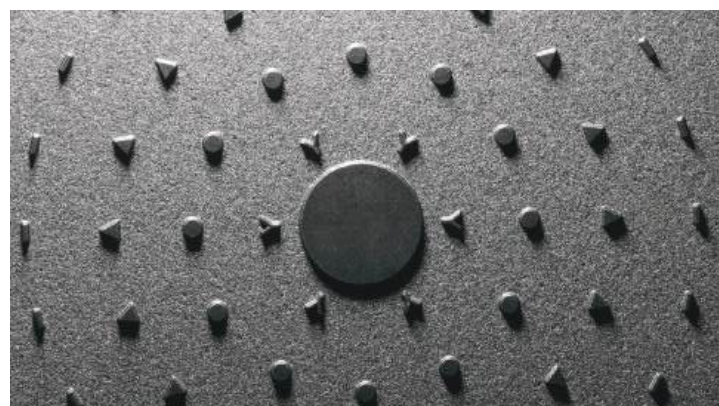
OVERVIEW OF THE DIFFERENT APPLICATIONS MADE WITH THE LASER S 500 (U)

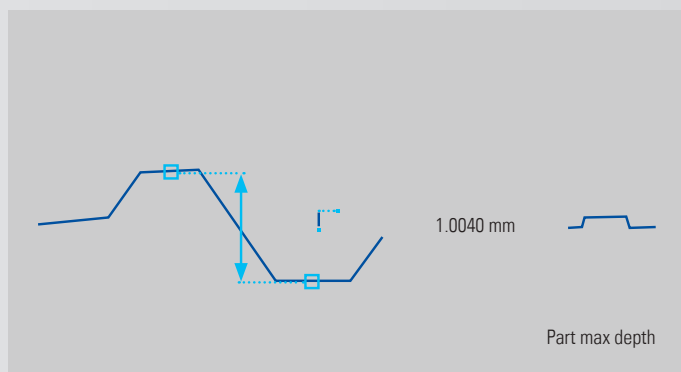
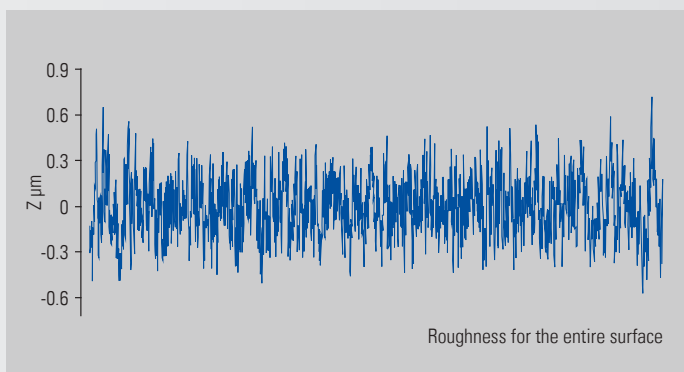
Wafer chuck



PERFORMANCE RESULTS

Market segment	Semiconductors
Material	Silicon carbide
Laser (type/power)	Nano 50 W Flexipulse
Software	LaserCAM™





ICT
connectors



PERFORMANCE RESULTS

Market segment	ICT
Material	Tungsten carbide
Laser (type/power)	CHARMILLES Femto Flexipulse 40 W IR
Software	LaserCAM™



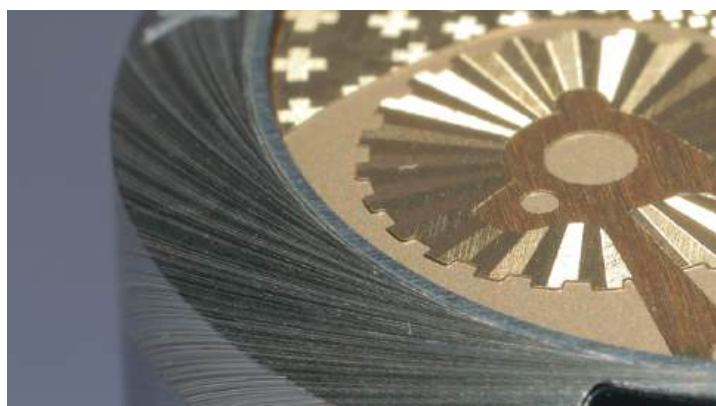
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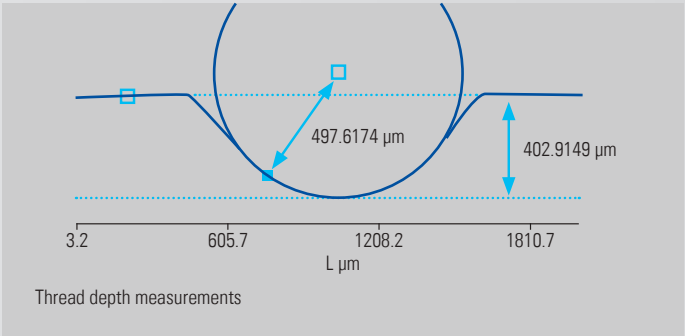
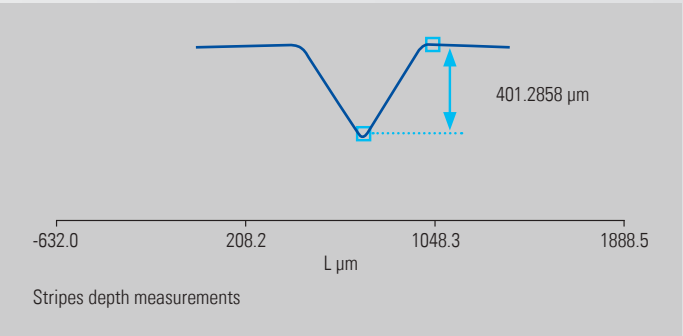
Watch case decor



PERFORMANCE RESULTS

Market segment	Watch
Material	Stainless steel
Laser (type/power)	CHARMILLES Femto Flexipulse 40 W IR





Bottle cap



PERFORMANCE RESULTS

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



CUSTOMER CARE

Our Customer Care experts deliver end-to-end support with proactive expertise, digital tools, and hands-on service to ensure your machines perform at their best throughout their life cycle.

Secure your sustainable machining success

A huge network of highly-trained experts delivering preventive maintenance and advanced support

Grow your people skills

Performance oriented training academy with a human-centric and hands-on approach of knowledge transfer

Realize the full potential of your equipment

Advanced diagnostics, certification, upgrades, training, and financial solutions



My rConnect



One portal to maximize your production performance — anytime, anywhere.

My rConnect is your central service platform for managing your machines from a single place. Standard features include secure connectivity and remote access to machines, helping to minimize production downtime. Optimize your responsiveness in production with real-time monitoring and instant notifications.



SUCCESS PACKS: TAILORED SERVICE SOLUTIONS FOR EVERY NEED

Success Packs are three annual subscription levels designed to support your machines throughout their life cycle. Whether you aim to reduce downtime, prevent issues, or avoid unexpected repair costs, there's a plan to match your needs.

BRONZE

For full responsiveness

Fast reply services to ensure machines are swiftly back up and running

SILVER

For peak performance

Periodic maintenance services to keep your machines in optimal condition

GOLD

For guaranteed peace of mind

Extended warranty coverage to mitigate financial risks and focus on your core business



CHOOSE YOUR PACK



Speedy Access

Fast track for support via My rConnect



Extended Remote Support

24/5 expert support via My rConnect



Machine Live Data

Real-time machine insights via My rConnect



Certified Preventive Maintenance

Annual machine service performed under UNITED MACHINING standards



Core Components Diagnosis

Annual checkup on the core machine components



Discounts

Preferred prices for parts and labor



Extended Warranty

For up to five years



TECHNICAL SPECIFICATIONS

DIMENSIONS

Machine dimensions *	2174 x 1387 x 2476 mm (85.59 x 54.60 x 97.48 in)
Approx. machine weight (with coolant)	4000 kg (8818 lbs)
Machine footprint	3600 x 2500 mm (141.73 x 98.42 in)

ELECTRICAL SUPPLY

Nominal power	15 kVA
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PNEUMATIC SUPPLY

Air pressure	6 to 8 bar / 0.6 to 0.8 MPa
Required output flow	Max. 300 l/min

OPERATION CONTROL

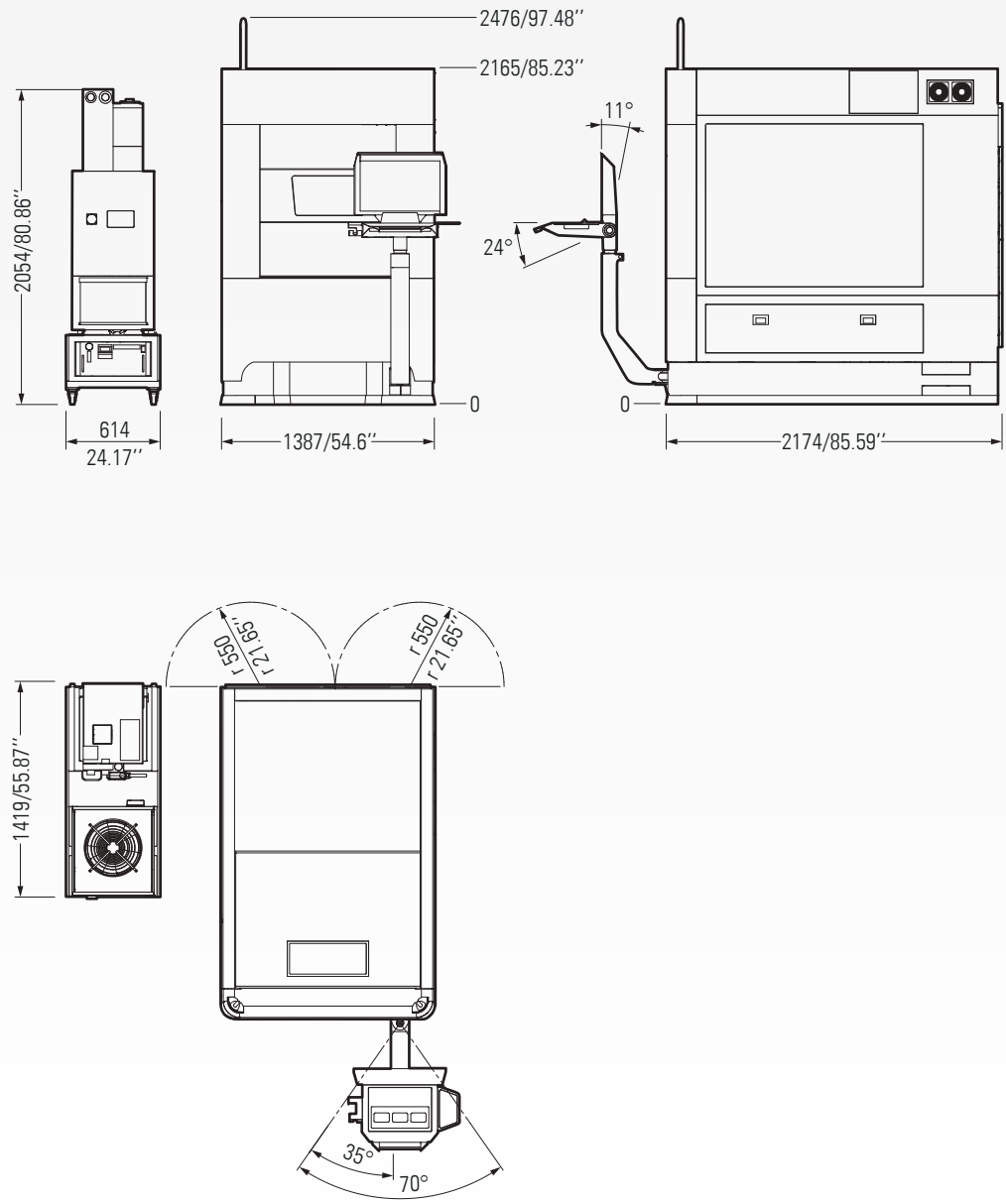
Type	Beckhoff Industrial PC (C6640)
Operating system	Microsoft Windows 10 IoT Enterprise 2019 LTSC
Screen	Multi-Touch LED 21.5" display
User interface	SPOT

MOVEMENT

Number of axes	3 (LASER S 500) / 5 (LASER S 500 U)
X travel	550 mm (21.65 in)
Y travel	400 mm (15.75 in)
Z travel	500 mm (19.68 in)
B-axis travel	-110°/+110° (LASER S 500 U)
C-axis travel	0°/+720° (LASER S 500 U)

WORKING AREA

Max. work-piece LASER S 500	60 kg (132 lbs)
Max. work-piece LASER S 500 U	15 kg (33 lbs)
Max. work-piece dim. (3-axis/5-axis)	Depends on the lens type Contact your UNITED MACHINING sales specialist
Max. permissible inertia (5-axis)	0.17 kg.m ²



CHARMILLES

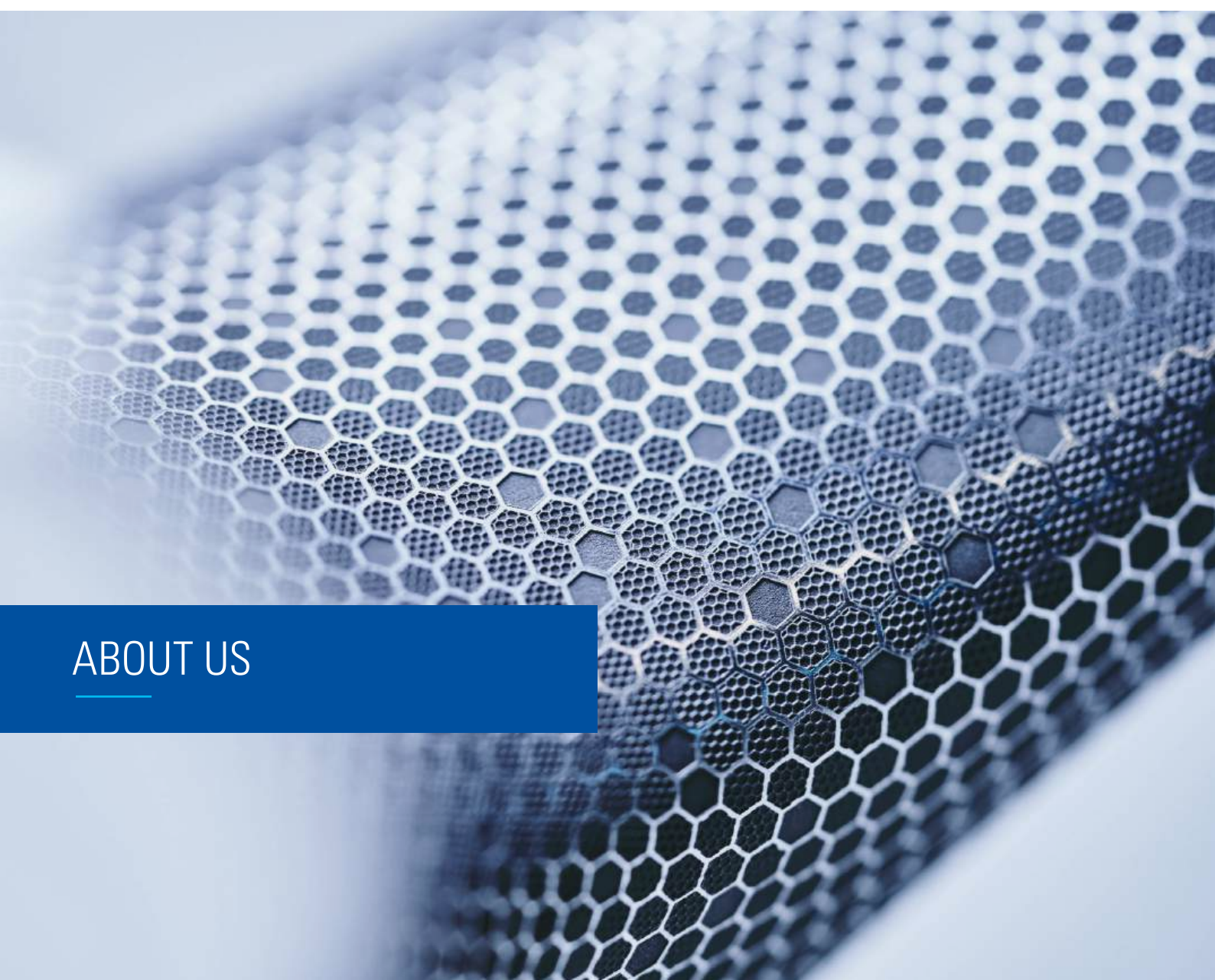
CHARMILLES stands for excellence in laser technology and builds on 25 years of expertise from AF Laser and Microlution. As a global leader in surface texturing and micromachining, CHARMILLES provides advanced nano- and femtosecond laser machine systems that meet the most demanding manufacturing requirements.

Year of birth of 5-axis laser texturing 2001
Head office Geneva, Switzerland

CHARMILLES offers the industry's most complete range of laser texturing and micromachining platforms, designed for precision and high-accuracy features. Laser texturing platforms handle graining, blasting, marking, coloring and decorative or functional finishing operations—even on complex 3D geometries.

Micromachining platforms deliver precise micro-cutting, drilling, shaping and engraving operations on the hardest material. All the CHARMILLES laser platforms are supported by our dedicated CAD/CAM software, LaserSUITE360, for full process control.

ABOUT US



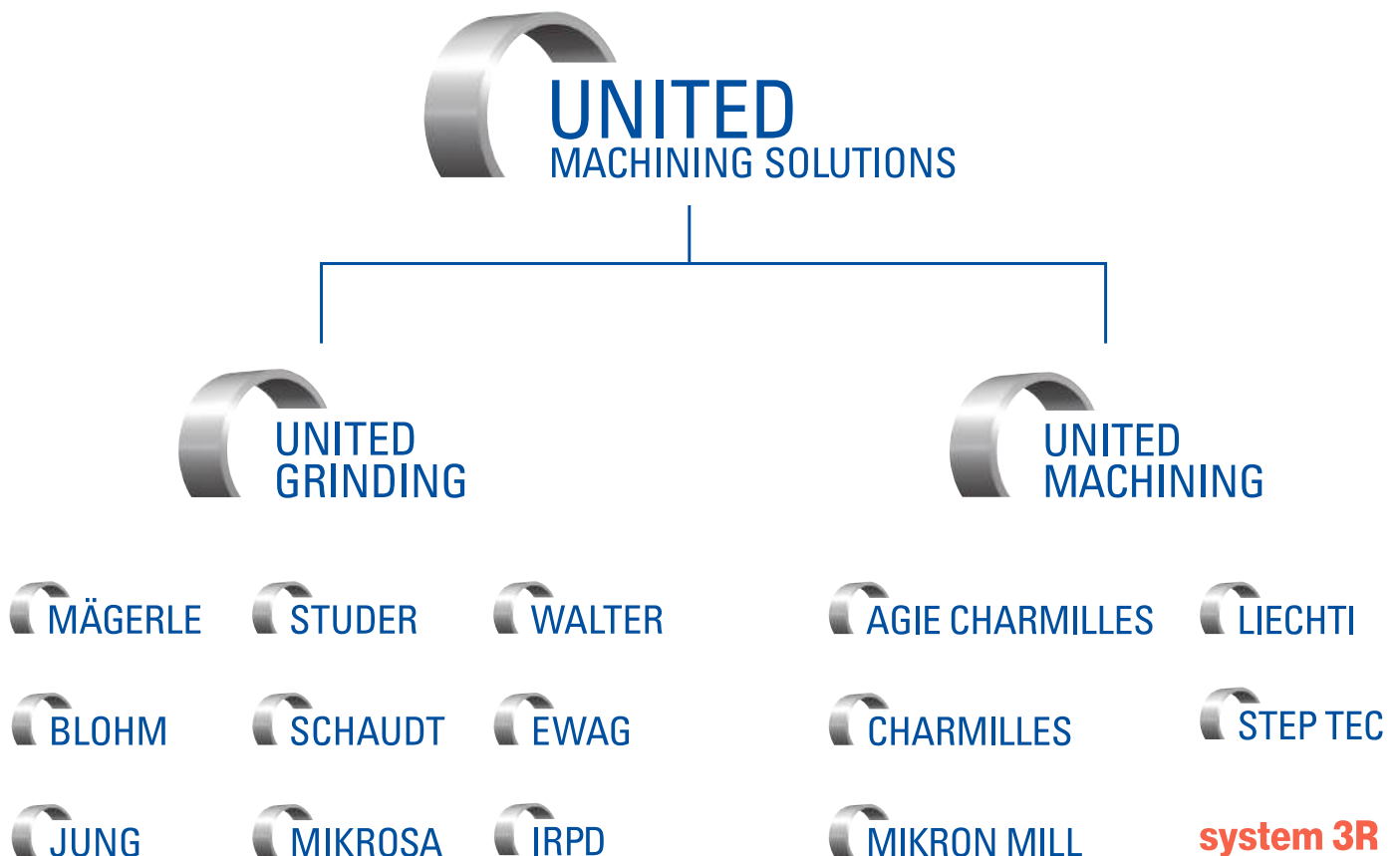
UNITED MACHINING SOLUTIONS

UNITED MACHINING SOLUTIONS is one of the largest machine tool manufacturers in the world. With around 5,000 employees at over 50 global production, service and sales locations, UNITED MACHINING SOLUTIONS is close to its customers and highly efficient. The group is organized into two divisions: UNITED GRINDING and UNITED MACHINING.

UNITED GRINDING includes the brands MÄGERLE, BLOHM, JUNG, STUDER, SCHAUDT, MIKROSA, WALTER, EWAG and IRPD. Its technologies include surface and profile grinding machines, cylindrical grinding machines, machines for tool machining and machine tools for additive manufacturing.

The UNITED MACHINING division includes the brands AGIE CHARMILLES, CHARMILLES, MIKRON MILL, LIECHTI, STEP TEC and SYSTEM 3R. It includes machines for EDM (Electrical Discharge Machining), high-speed milling and laser technology as well as spindle production and automation solutions.

«We want to make our customers even more successful»





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