

FORM S 350



 **AGIE CHARMILLES**

A member of UNITED MACHINING SOLUTIONS

CONNECTING TO SUCCESS

Easily—and with extreme repeatability—deliver the perfect machining accuracy your customers demand. From medtech to automotive to manufacturing processes, our world is increasingly connected, with electronics becoming ever smarter and making life more efficient and comfortable. Electronic component manufacturers require performant,

high-quality and cost-effective electronic components. Position your business to meet manufacturers' quality requirements with the high-precision FORM S 350's state-of-the-art design, onboard power generation system, accuracy-enhancing stability and thermostabilization, and success-boosting machining quality.

Accuracy to boost your production quality

- Extraordinary surface finish
- Ultimate accuracy and respect for details
- Use micro profiles down to a few microns

Optimal performance—right out of the box

Smallest gap in automatic mode
down to a few microns

Economical electrode use

Lower electrode consumption per part, thanks to
hardware optimization





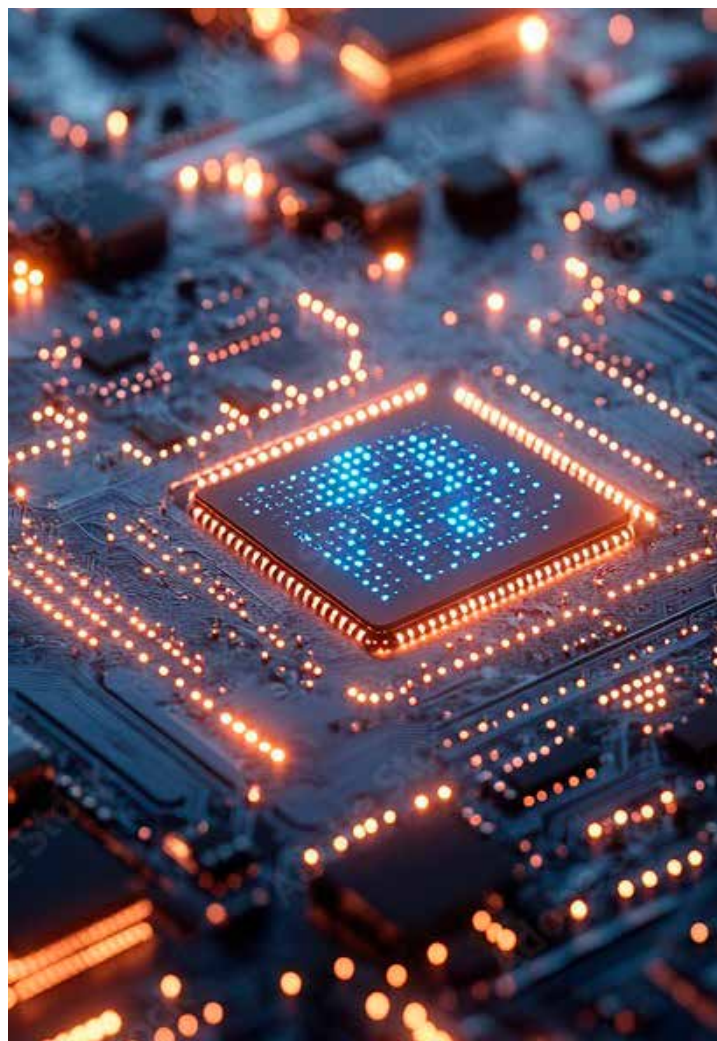
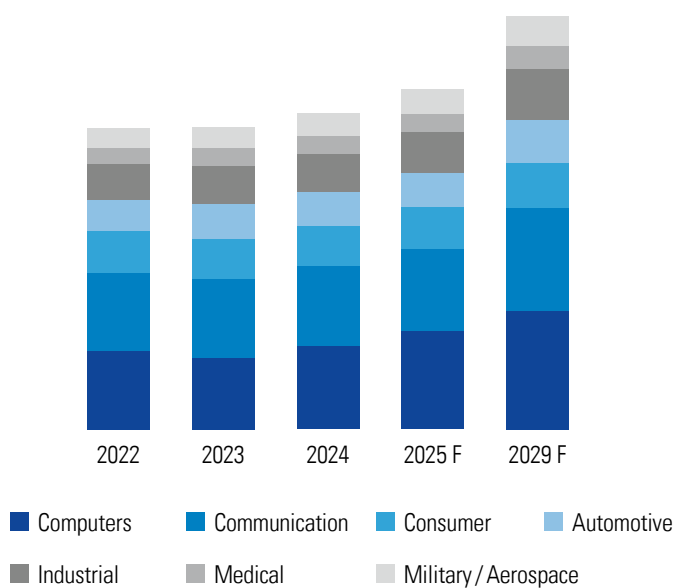
Electronics — Far beyond just computers

While consumer electronics continue to grow steadily, the real momentum is coming from other sectors embracing advanced electronic systems. The automotive industry, in particular, is driving a major surge in demand — powered by innovations in Advanced Driver Assistance

Systems (ADAS), autonomous driving technologies, and electric powertrains. At the same time, breakthroughs in industrial automation, medical devices, and other high-tech applications are fueling sustained growth across the entire electronics industry.

A growing market trend

The global electronic components market is projected to grow significantly in the coming years to satisfy demands.



CONNECT TO THE WORLD OF PRECISION

Take your mass production of multi-cavity molds to new levels of productivity and quality to overcome the miniaturization challenges in today's fast-moving electronic components marketplace. Extraordinarily small part dimensions demand highest mold accuracy in mass produc-

tion of multi-cavity molds, and this solution delivers highest accuracy and more. You'll achieve best productivity in terms of machining time while enjoying superior surface finish, high geometrical and positioning accuracy, and fewer defective parts with the FORM S 350.

Step into the world of micro profiles

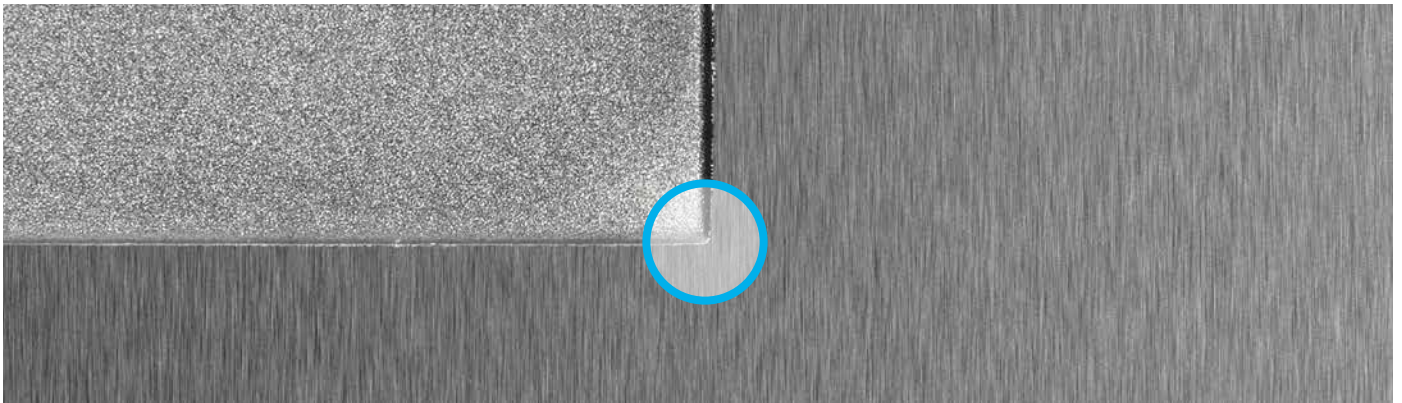
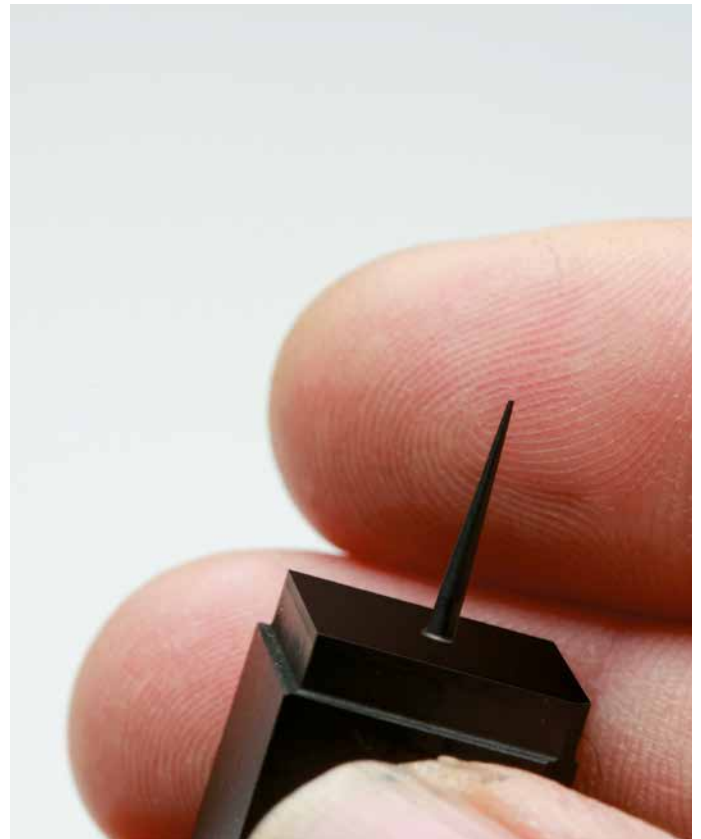
Smaller profiles—down to 50 microns—are now at your fingertips, thanks to the FORM S 350's onboard technologies for machining tiny details.

Perfect details—every time

Machine those perfect details with absolute confidence, thanks to the stable micro-spark machining process adapted to your specific micro applications. With the automatically generated small sparks delivered by this solution, you'll machine perfect details—right off the bat.

Sharpest results to meet your application demands

Reduce electrode wear by up to 50 percent and confidently machine the tiny radii required in electronic component manufacturing, thanks to the micromachining technology of this solution's latest-generation Intelligent Speed Power Generator (ISPG).



Perfect micro radii—every time

OPTIMIZE YOUR MICROMACHINING PROCESS

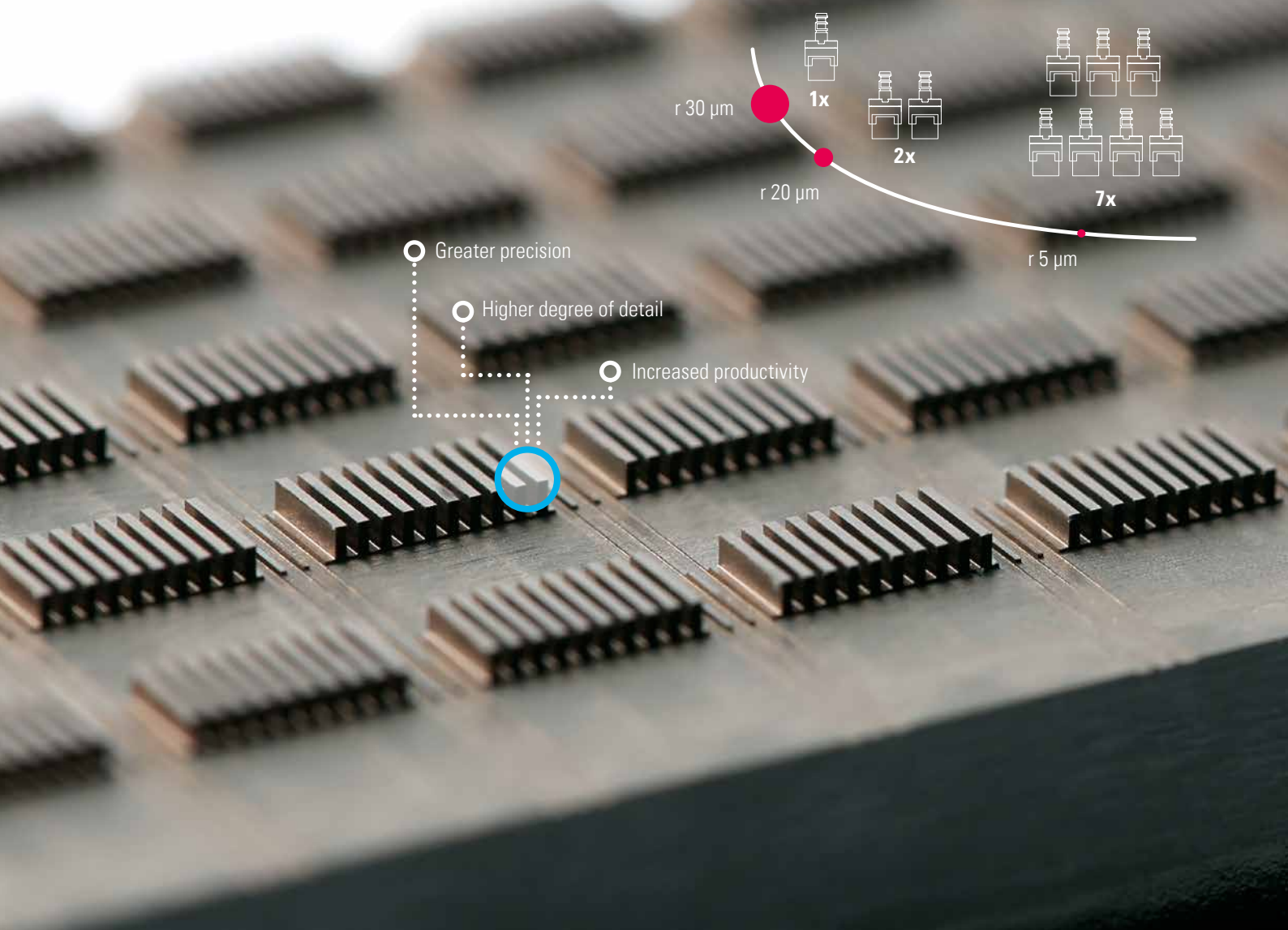
Consuming fewer electrodes has a positive impact on your bottom line, and the new embedded technology of the FORM S 350 significantly decreases the number of electrodes required for your processes. Experience the shorter machining times and reduced downtime that come with fewer electrode changes.

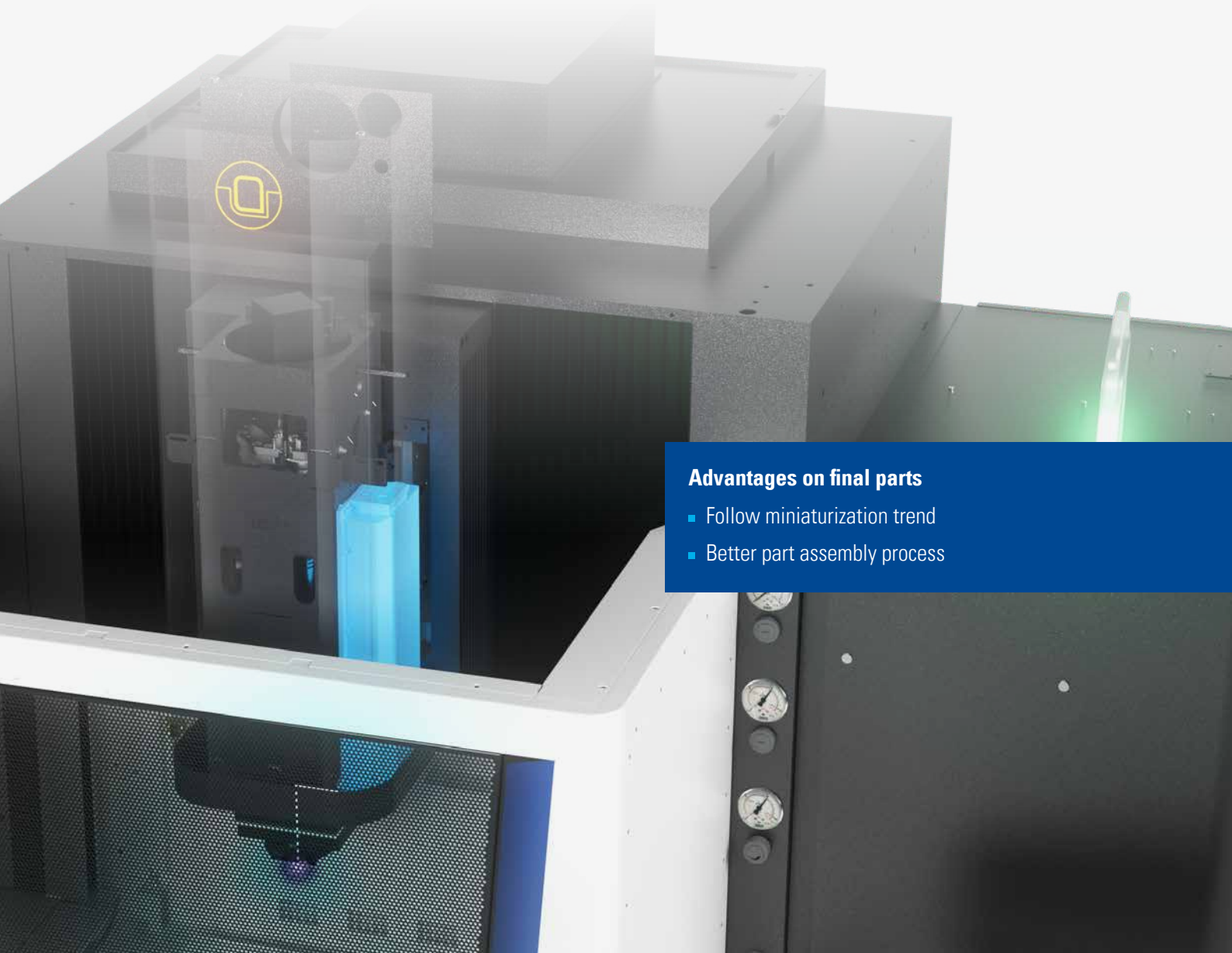
Extended life of multi-pitch electrodes

High-precision multi-pitch electrodes are costly to produce. That's why we optimize their use to yield the most precise results with maximum respect for details—in an economical way.

Greater productivity with Service + Success

The right electrode choice will have a big impact on your productivity. We are the right partner to optimize your machining process with, for example, combinations of graphic and copper electrodes as well as dielectric.





Advantages on final parts

- Follow miniaturization trend
- Better part assembly process

MASTER DETAILS FOR IMPECCABLE GEOMETRICAL QUALITY

Cost-effectively achieving the extraordinary fineness of detail on the smaller molds required for your customers' finished products is at the heart of the FORM S 350. This solution simplifies micromachining of highly detailed geometries—even in mass production—thanks to new features to enhance your precision, speed and productivity.

Closer to the part, closer to perfection

Consume fewer electrodes while achieving greater geometrical accuracy and productivity with the FORM S 350's Intelligent Speed Power Generator (ISPG), integrating the Micro Spark Control Board. Situated close to the part, the generator optimizes machining efficiency by allowing you to eliminate any issues due to lost power.

REACH UNPRECEDENTED LEVELS OF QUALITY

Ramp up your efficiency and quality, thanks to this machine’s new discharge circuit allowing spark erosion power modulation and the flexibility to maximize material removal. Achieve greater finishing detail by

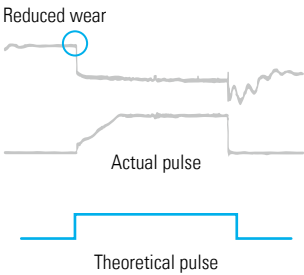
reducing the gap to a few microns. You’ll achieve higher machining yields while preserving electrode geometry, due to an extremely low rate of electrode wear.

Our miniaturization solution—from the very first spark

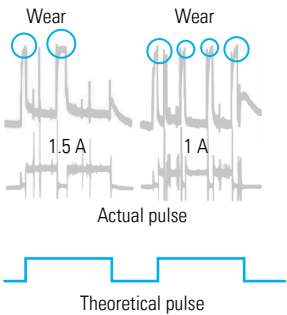
We control the spark to reduce the number of electrodes you need, so your productivity is accelerated and you achieve the smaller radii essential to the production of tools for miniature electronic components.

In super finishing, the discharge energy is accurately modulated, so you attain finer surface quality, shape accuracy and reproduction of details. That’s a real plus in applications like production of connector molds for electronics.

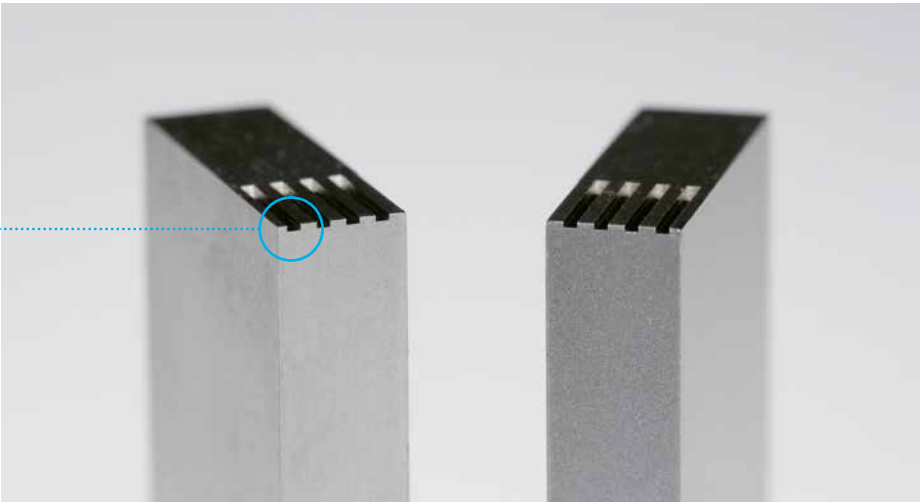
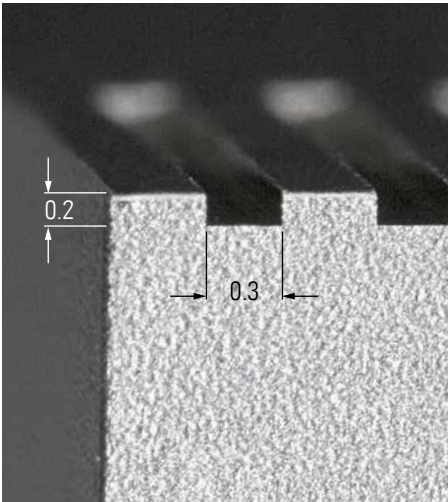
New generator



Re-openings



Avoid the problems arising from standard power generators’ power re-opening in the high finishing die-sinking process. The FORM S 350’s supreme spark control eliminates interruption of the discharge and subsequent exponential increases in electrode wear.



MADE TO HELP YOU MASTER ACCURACY

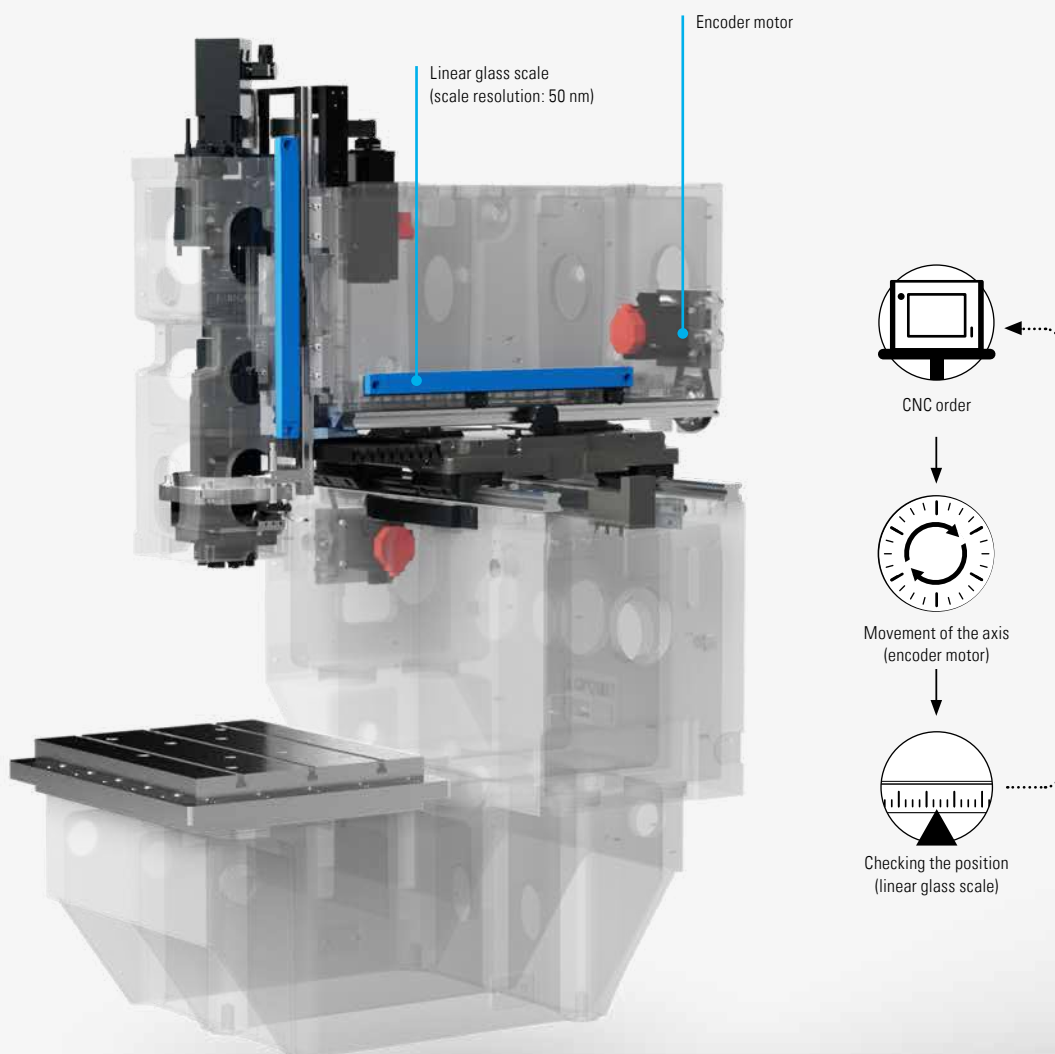
Engineered to ensure highest repeatable precision, this solution is your foundation for machining stability in the production of electronic components. With the FORM S 350's stability, you will deliver reliably high quality to your customers and ensure the perfection of their end products.

Optimal machining stability

Experience superior mechanical stability and precision across the life of the machine, thanks to its short C-axis construction and oversize cast iron frame. As a result, your accuracy is uncompromised by part weight or dielectric volume. Your precision is further advanced by this solution's robust construction absorbing all machining forces, so a precise gap between your part and electrode is maintained.

Perfect repeatability to lower your unproductive time

Experience the lasting positioning precision that only linear glass scales can guarantee. They eliminate classical errors like inversion-induced play, expansion and wear effects. At the same time, the need for periodic maintenance and calibration is eliminated by our dual loop positioning system, a closed-loop measuring system providing infallible precision, whatever the travel.





ACHIEVE PERFECT ACCURACY TO MEET HIGHEST REQUIREMENTS

You demand perfection from our machine tools and we demand perfection in their assembly. Swiss precision is an anchor of AGIE CHARMILLES production.

Quality assurance for your incomparably consistent production

Production consistency is a must-have across your global machine fleet and we give you the high-quality tools to bring predictably reliable performance to life. You can bank on our 70-plus year legacy of delivering globally consistent production quality aligned with unbeatable Swiss precision.

Our service experts at your side

Experience long-term, stable performance with us at your side throughout the whole life cycle of your machines. Our preventive maintenance program can be tailored to your needs, depending on the constraints of your market or your requirements in terms of accuracy or repeatability.

STABLE MACHINING CONDITIONS TO ACHIEVE OPTIMAL PRECISION

Workshop temperature fluctuations won't impact your part machining precision, thanks to the FORM S 350's dual thermostabilization system—a major innovation when working close to micron dimensions. Pulsating air circulates in the cabin and is cooled in real time in accor-

dance with the dielectric temperature and is measured by a double, differential thermal probe. Similarly, the full structure of the X, Y and Z axes is thermostabilized.

The principle of double thermostabilization

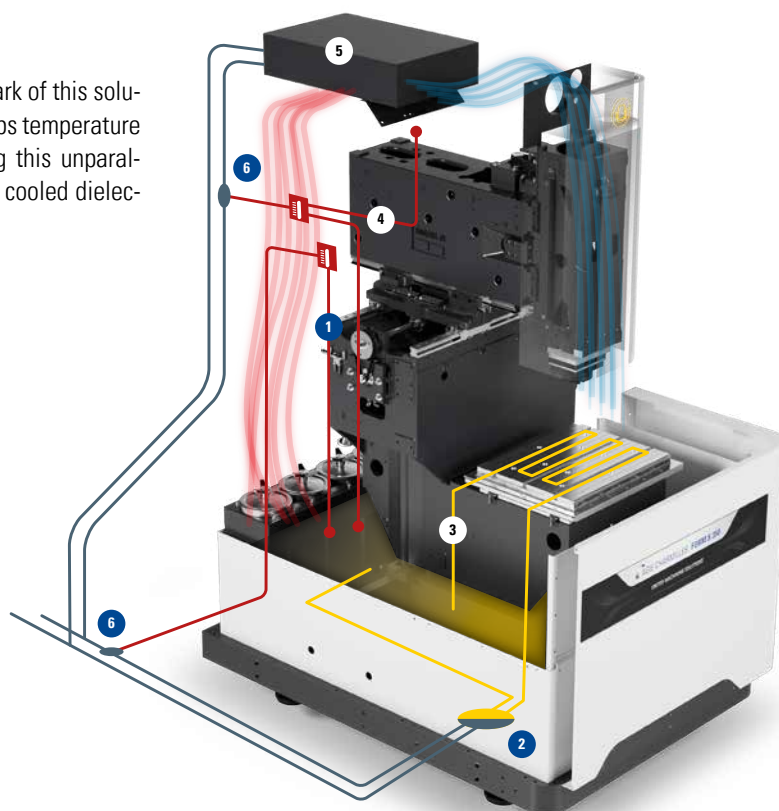
Consistent, continuous mechanical stability is the hallmark of this solution's thermostabilization system—a world first that keeps temperature variations from impacting your part machining. Making this unparalleled stability possible are an air-conditioned cabin and cooled dielectric circulation through the work table.

Dielectric

- 1 Thermostat allowing dielectric temperature regulation
- 2 Water/dielectric heat exchanger
- 3 Dielectric circulation is an integral part of the table

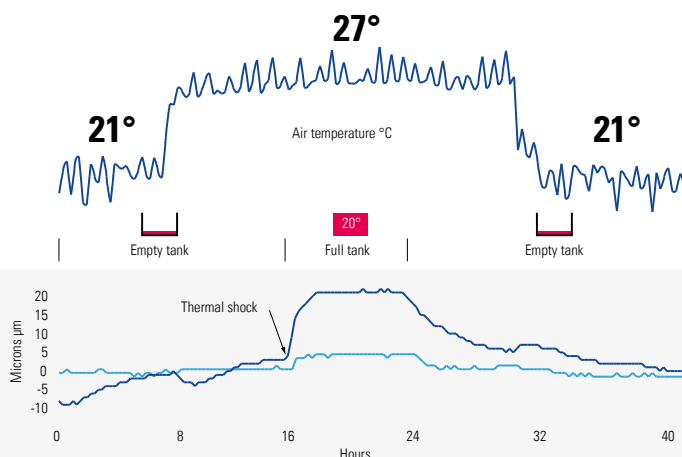
Air

- 4 Double temperature-probe thermostat allowing adjustment of air temperature to that of the dielectric
- 5 Water/air heat exchanger
- 6 Coolant liquid electrovalve



Comparative analysis of axis drift between machines with and without thermostabilization.

- XYZ deviation with thermostabilization
- XYZ deviation without thermostabilization
- Temperature variation



A STABLE CORNERSTONE FOR ADVANCED PRECISION

Flawless finished product quality is ensured by a temperature recording device that continuously displays the overall level of thermostabilization.



BOOST YOUR OPERATIONS

Achieve best-in-class results with ease. As your micromachining application champion the FORM S 350 pairs precision and ease of use to take the complexity out of your production.

Maintain machining conditions whatever the depth

Easily machine small, deep cavities—whatever their depth—while maintaining optimal machining conditions, due to AGIE CHARMILLES' specially adapted technology.

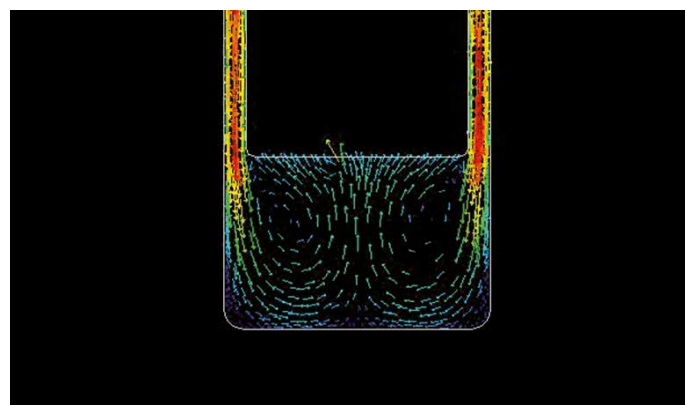
Cut consumables costs and get higher consistency

Boost your productivity with our wear partitioning technology adjusting your power, motion and electrode change. By helping you automatically generate the most effective machining strategy, wear partitioning simplifies your management of electrode wear on jobs involving multiple cavities with similar dimensions, tolerances and surface finishes.



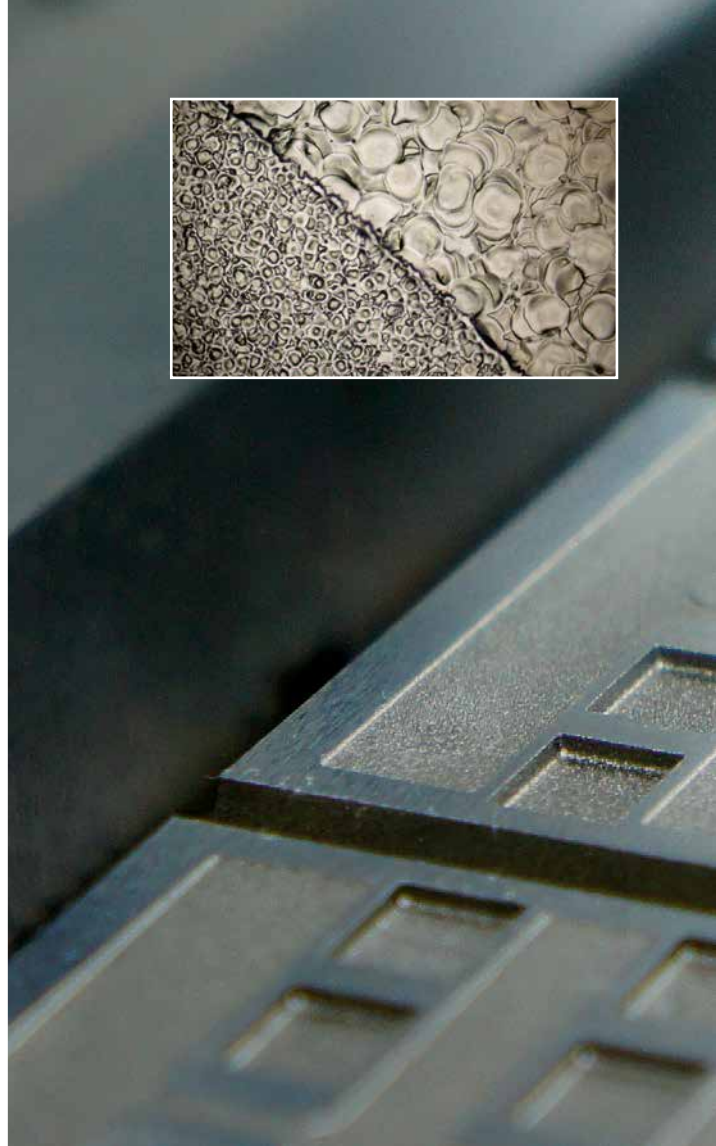
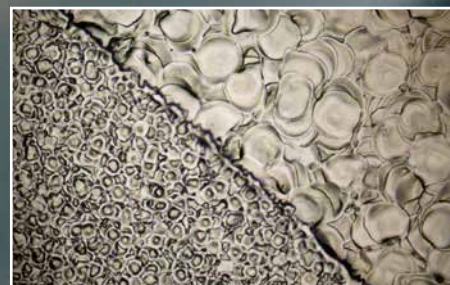
Automate your operations and boost your business

Get an extensive selection of machining technologies to cover the vast majority of your micro applications with this solution's human-machine interface (HMI). AC FORM HMI automatically generates the machining strategies you need based on data entered by your operator. Progressive power stages to increase machining efficiency according to the electrode's sub-miniature geometry are managed by the HMI without altering that geometry.



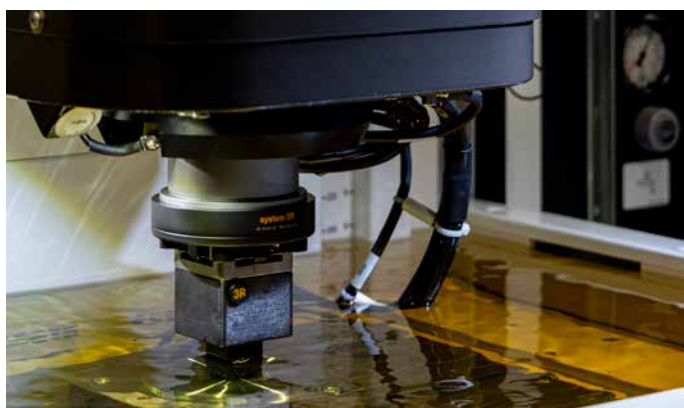
Get better particle evacuation to ease your production

This technological choice from AGIE CHARMILLES, in comparison to linear motors, facilitates evacuation of particles in cavities. The highly dynamic pulsation is controlled by an in-house developed algorithm to perfectly master the axis displacement, removing efficiently contamination without additional flushing and without deformation of the cavity. This is a distinct plus for applications such as connector technology, ribs or micro-machining.



Enhance your injection results with 3DS mold surface texturing

Your surface texturing reaches a new level of perfection, thanks to AGIE CHARMILLES' new three-dimensional surface (3DS) texturing technology enabled by our Intelligent Speed Power Generator (ISPG).



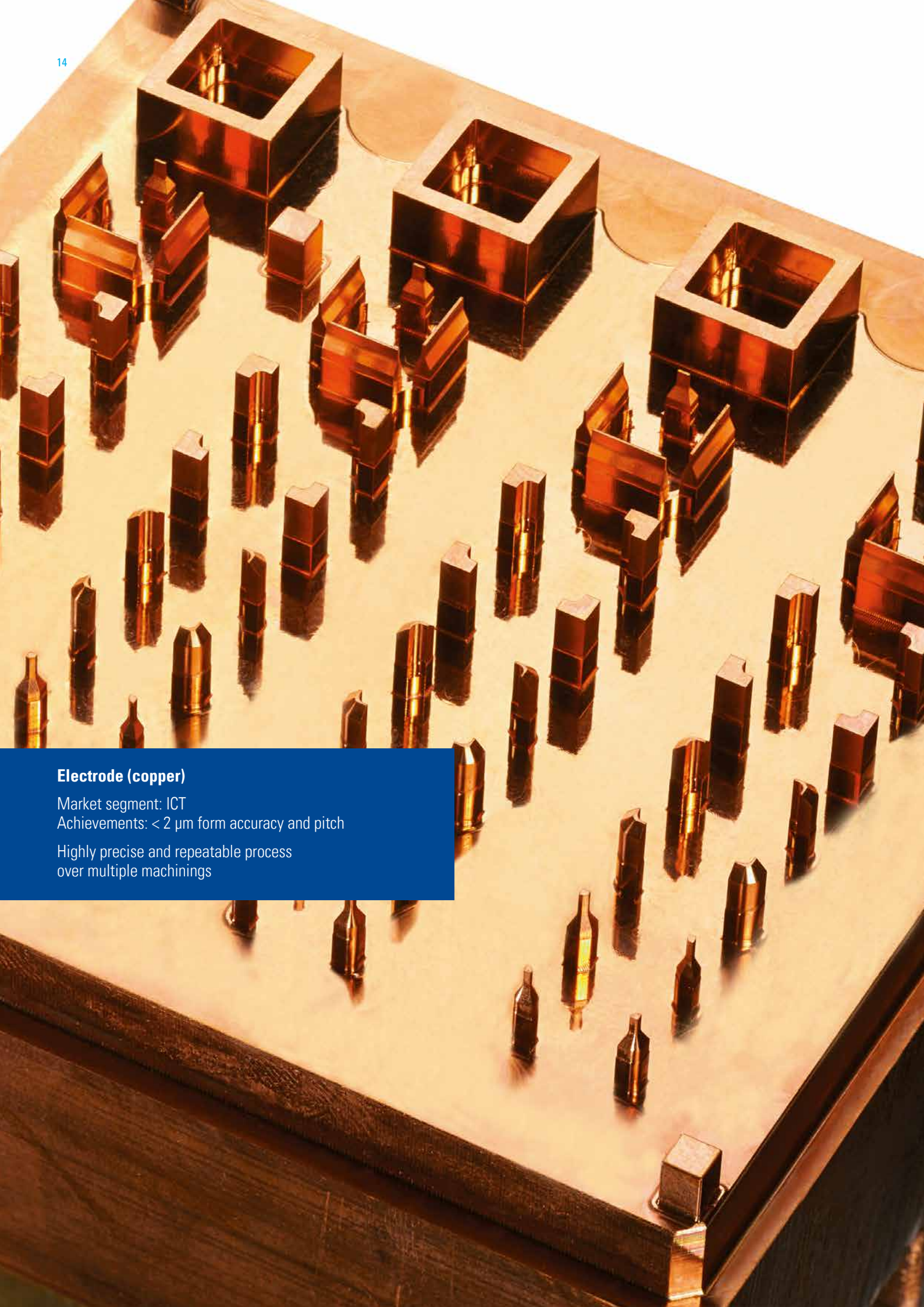
Reduce electrode and workpiece setup time

Your success in reducing unproductive time is linked to the alignment of your first workpiece and electrode. Avoid manual operations, save time, and gain productivity with the available C-axis.



Increase autonomy without manual intervention

Manufacturing a mold often requires a large number of electrodes whose spark erosion time can significantly vary from one cavity to another. The FORM S 350 machines have a rotary changer boasting storage capacity for up to 160 electrodes. A double gripper-clamp reduces unnecessary movement to appreciably speed up the loading process.



Electrode (copper)

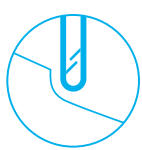
Market segment: ICT

Achievements: $< 2 \mu\text{m}$ form accuracy and pitch

Highly precise and repeatable process
over multiple machinings

YOUR ONE-SOURCE SOLUTIONS PROVIDER

Wherever you are in the world, it's a big plus to be have one partner as a single-source provider of machining technologies, products and services. UNITED MACHINING is the one partner with the expertise to optimize your global processes with solutions adapted to your electrode machining needs.



MILL S 400 U

A perfect fit in your process chain

Machine copper and graphite electrodes with high accuracy in preparation for the subsequent EDM process with MIKRON MILL S 400 U. At the same time, experience a solution that fits perfectly into your manufacturing process chain.

Unique benefits for you

- Master the challenge of delivering speed and quality at the highest level
- Solution for copper and graphite (wet or dry) in one machine
- Unbeatable flexibility in three- and five-axis applications
- Highest productivity per square meter with Automation

The best results are the best arguments

The MILL S 400 U is suited for small, accurate parts because of its combination of linear drives with high dynamics, a 42,000 rpm Spindle, and a stiff, thermalstabilized machine body.

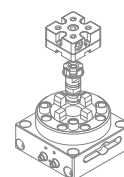


TOOLING AND AUTOMATION TO DRIVE YOUR PRODUCTIVITY

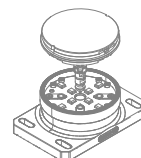
Experience always shows that measures to reduce the idle times of your machines are significantly more worthwhile than chasing seconds in the actual machining process. The solution is a stable and exact System 3R reference system. This lets you preset away from the machine and then set up the machine with minimum idle time. Quickly and precisely.

Boost your competitiveness

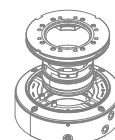
Automation keeps production going whatever the time of day or day of the week. Your results are shorter lead times, higher productivity and quicker payback of capital invested in machines. With automated operations, production can continue running round the clock, seven days a week. The possibilities are endless.



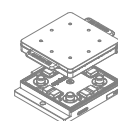
Macro



MacroMagnum



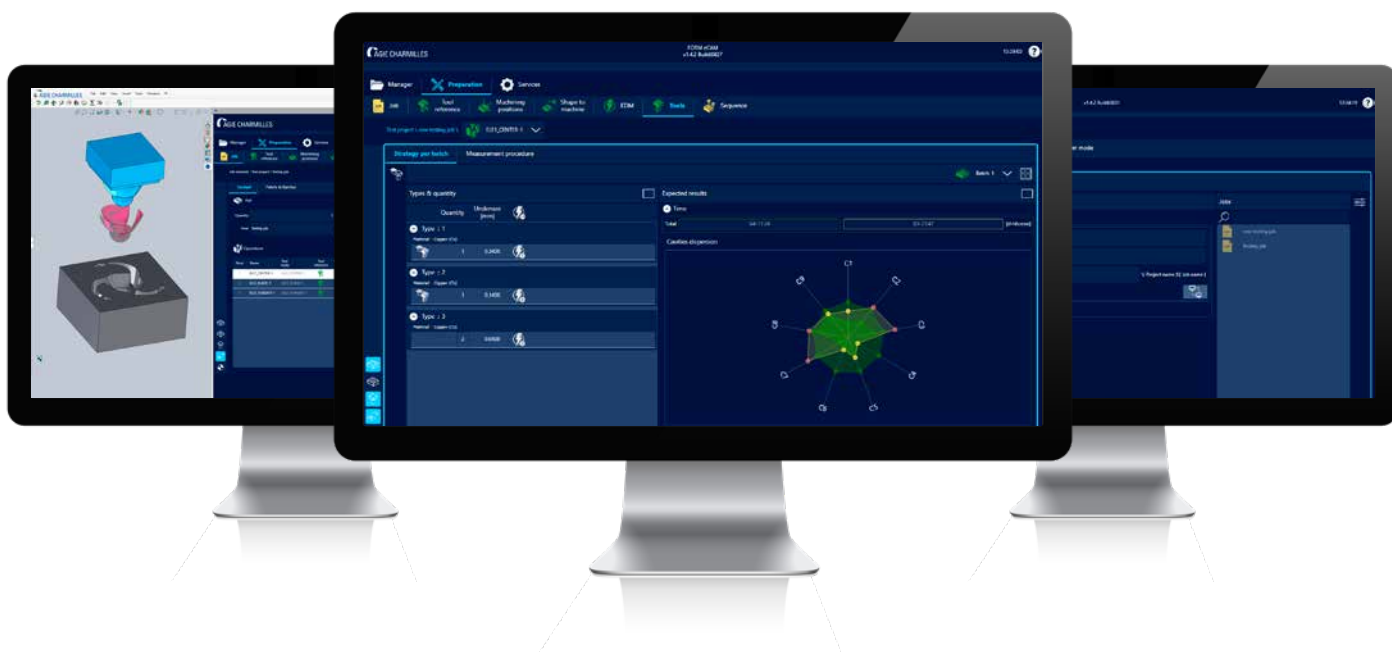
Matrix



Dynafix

FORM eCAM – REVOLUTIONIZING DIE-SINKING EDM PROGRAMMING

FORM eCAM is a dedicated standalone CAM solution for AGIE CHARMILLES Die-Sinking EDM, designed to work directly from 3D CAD files. It creates a seamless link between design and manufacturing, ensuring consistent data flow and reducing the risk of human error during machining preparation.



TRUE 3D INTELLIGENCE

- FORM eCAM is the only CAM solution for DSEDM that performs real 3D analysis — including patented integration of pre-milling data (as STL file).
- Erosion is optimized based on the actual geometry of the part, preventing damage from incorrect EDM parameters and extending electrode lifetime.

BUILT-IN EXPERTISE

- FORM eCAM embeds exclusive AGIE CHARMILLES know-how, transforming any operator into an EDM expert.
- Undersizes are automatically suggested, machining time estimated, and the right number of electrodes needed for any job calculated—making precision effortless.

SEAMLESS FLOW

- FORM eCAM connects to major CAD systems, simplifying the preparation process.
- The EDM program is exported directly into the automation system, boosting preparation efficiency, saving time, and reducing costs.

SERVICE + SUCCESS

Our Service + Success 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

Digital services for all your UNITED MACHINING machines, anytime, anywhere

My rConnect is your gateway to advanced digital assistance. Enjoy simple navigation and direct access to UNITED MACHINING support, for all connected and unconnected machines, regardless of their age.

Free standard features

- Asset overview
- Service case management
- Conferencing and communication
- Machine documentation

On-demand features

- Remote access
- Live data



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



Extended remote support

24/5 expert support through 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

MACHINE

Architecture	C-frame / Fixed table / Drop tank
Dimensions *	1900 x 1690 x 2398 mm (74.80 x 66.53 x 94.4 in)
Total weight (without dielectric)	2800 kg (6173 lbs)
Floor space **	2507 x 2208 mm (98.7 x 86.9 in)

X, Y, Z AXES

X, Y, Z travel *	350 x 250 x 300 mm (13.78 x 9.84 x 11.81 in)
Max. machining speed (XY)-(Z)	6-15 m/min (19.7-49.2 ft/min)
Max. machining acceleration (XY)-(Z)	2.5-5 m/min (8.2-16.4 ft/min)
Positioning resolution X, Y, Z	0.1 µm (4 µin)
Measurement device	Linear Scale (XYZ)
Scale resolution	0.05 µm (2 µin)
Lubrication	Automatic centralized

WORK AREA

Work tank size *	800 x 520 x 350 mm (31.49 x 20.47 x 13.78 in)
Work table size **	500 x 400 mm (19.68 x 15.75 in)
Distance floor to clamping level	1000 mm (39.37 in)
Min./max. dist btw table and chuck	150/450 mm (5.91/17.72 in)
Bath level	100-305 mm (3.94-12.01 in)
Machine thermostabilization	Dual: structure + cabin

WORKPIECE AND ELECTRODE

Max. electrode weight	50 kg (110.23 lbs)
Max. workpiece weight	500 kg (1102.31 lbs)
Max. workpiece dimensions *	700 x 460 x 285 mm (27.56 x 18.11 x 11.22 in)

DIELECTRIC UNIT

Capacity	410 l (108.65 gal)
Number of filter elements and type	4 Paper filter
Flushing injections	4 (lateral/work piece/electrode/suction)

GENERATOR

Generator type	ISPG
Integrated modules	Micro Spark Control board iGAP iQ (Low electrode wear Copper or Graphite)
Max. machining current (option)	80 A (140 A)
Expert systems	TECFORM
Best surface finish	Ra 0.05 µm (Ra 1.9 µin)

ELECTRICAL SUPPLY

Standard voltage and frequency	3 x 380V/400V ± 10%. 50/60Hz (50Hz standard)
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REDUCE ENERGY CONSUMPTION

Econowatt smart module	Standard
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CONTROL UNIT

Operating system	Windows
Data input	15" LCD screen, mouse or touch screen, keyboard and remote control
User interface	AC FORM HMI
Console support	Fixed or movable

MODULES OR OPTIONAL MODULE

Linear tool changer *	4 (Std. tooling) 5 (Combi tooling)
Rotary tool changer *	18 pos. (Std. tooling) 16-80 pos. (Std. tooling) 32-160 pos. (Combi tooling)
Ready for automation	Yes ***
Connectivity ***	e-connect, e-control, e-monitoring

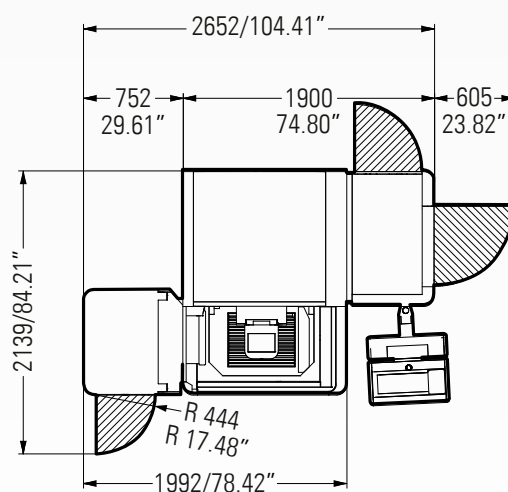
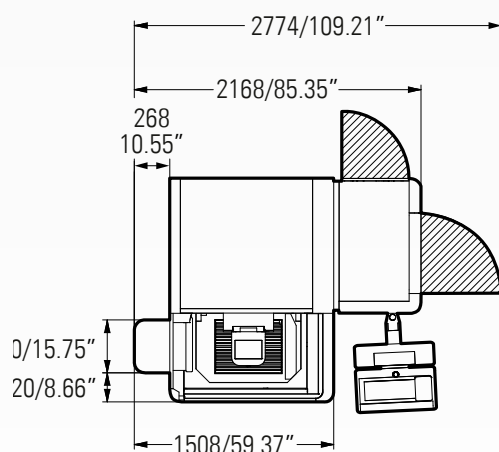
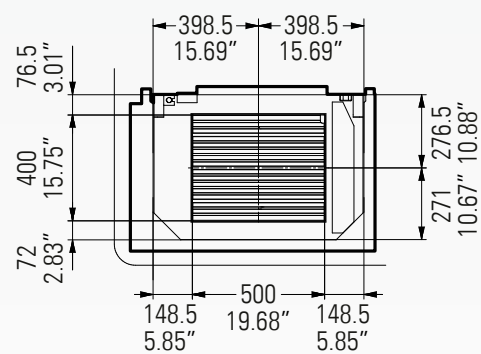
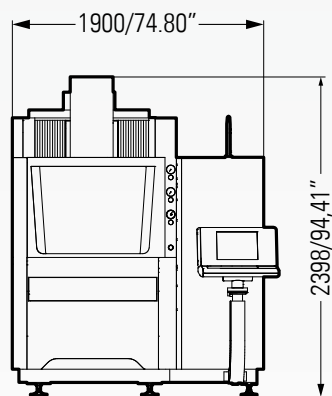
STANDARD C-AXIS ***

Max. electrode weight on automatic chuck	50 kg (110 lbs)
Rotation speed	0-100 rpm
Max. inertia	2000 kgcm ² (683 lbsin ²)

ACCURA C-AXIS ***

Max. electrode weight on automatic chuck	50 kg (110 lbs)
Rotation speed	0-100 rpm
Max. inertia	5000 kgcm ² (1700 lbsin ²)

* Width x depth x height ** Width x depth *** Option



AGIE CHARMILLES

AGIE CHARMILLES, inventor of industrial EDM, is known as a premium brand and innovation leader in Wire, Die-Sinking, and Hole-Drilling EDM. Our automation-ready solutions serve mold making and high-end part production—delivering Swiss precision, reliability, and performance.

Year of foundation 1954
Head office Losone , Switzerland

AGIE CHARMILLES's product portfolio includes wire-cutting, die-sinking, hole-drilling EDM solutions as well as fully customized solutions for specific applications like aerospace.

By integrating the latest technological advancements (Intelligent Power Generator, Intelligent Spark Protection System, iWire, and FORM eCAM), AGIE CHARMILLES machines deliver high-precision cutting performances, extreme accuracy, and nano-level surface finish. Our EDM solutions are renowned for their speed, precision, and energy efficiency, catering to diverse machining needs beyond Mold & Die applications.

ABOUT US

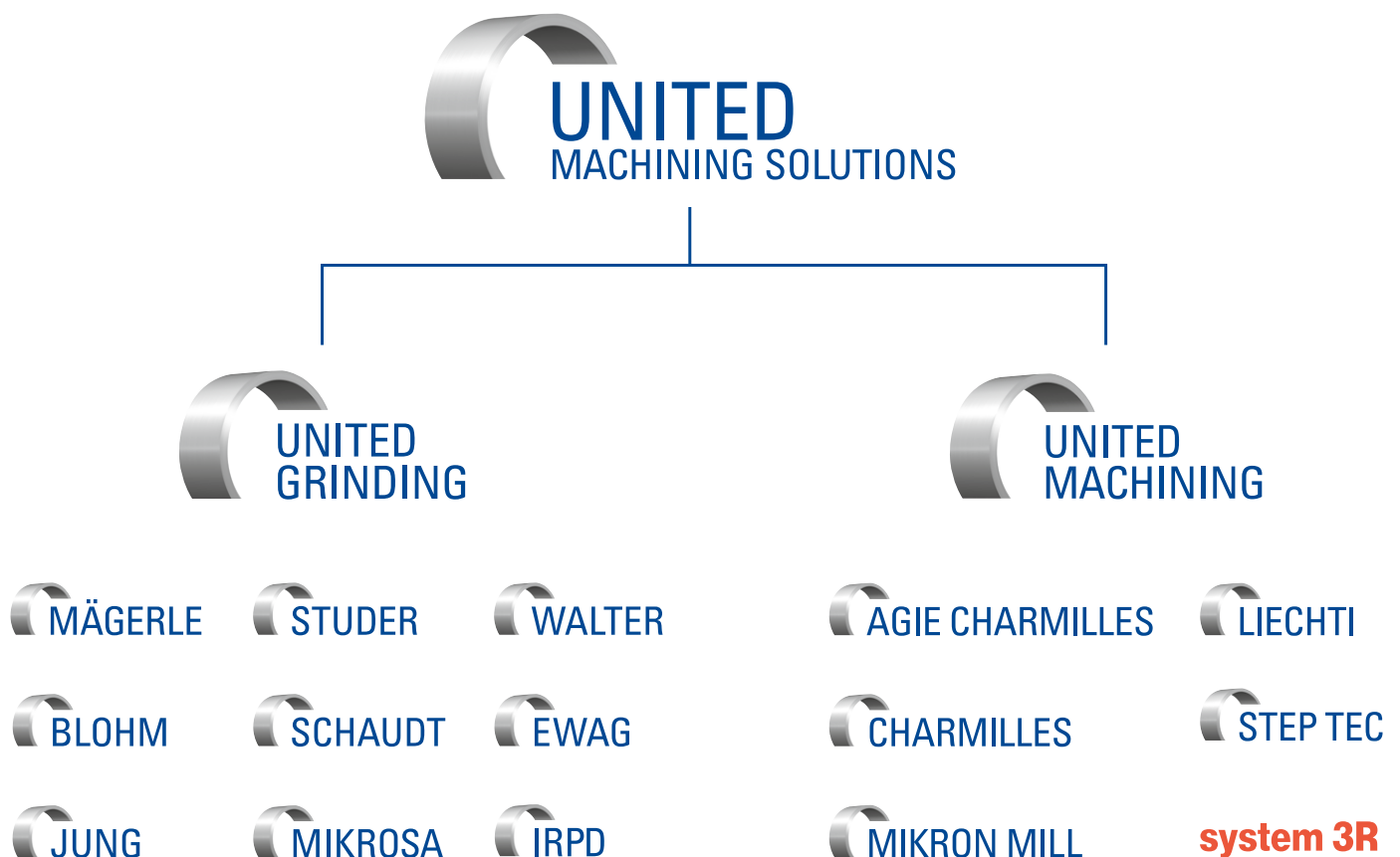
UNITED MACHINING SOLUTIONS

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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