

## AgieCharmilles

**CUT P 350**

**CUT P 550**

**CUT P 800**

**CUT P 1250**



### GF Machining Solutions: all about you

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 world-class electrical discharge machines (EDM), Laser texturing and Additive Manufacturing through to first-class Milling and Spindles, Tooling, Automation and software systems — all backed by unrivalled customer service and support — we, through our AgieCharmilles, Microlution, Mikron Mill, Liechti, Step-Tec and System 3R technologies, help you raise your game and increase your competitive edge.



# Passion for Precision

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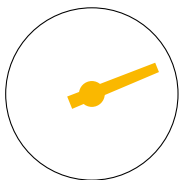
## **Limitless possibilities**

Face future challenges and gain access to limitless possibilities with the CUT P series. Answer your most critical applications with our complete range of solutions.

Electronic components

# Accuracy is the key to your productivity

Repeatability and longer tooling life are “must haves” with component miniaturization and increasing production volumes. Achieve the accuracy, machining repeatability and finer surface finishes essential to your daily success with the new CUT P wire-cutting EDM series.



**± 2 μm**

positioning and  
contour accuracy

Assembling more than 10 components—several millions of times—is one of the many challenges the ICT industry faces. Highly repeatable contour and positioning accuracy in production is a must.



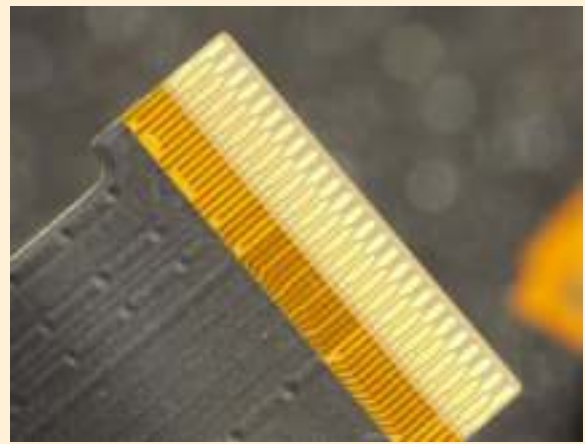
### Master miniaturization

Integrating greater functionality into smaller volumes has long been a microelectronics industry characteristic, and GF Machining Solutions' has been a miniaturization master for more than 60 years. The reproducibility of the millions of plastic injection parts produced per mold is maximized by perfectly identical mold inserts. Achieve consistent precision on inserts, whatever your workshop conditions, with our superior  $\pm 2 \mu\text{m}$  positioning precision, thermostabilization as standard, and very thin wire ( $70 \mu\text{m}$  diameter).

### Accelerate your return on investment (ROI)

Microelectronics is a fast cycling market so you need blazing fast ROI. We support your fast ROI by delivering a solution that's always ready to work. That includes smart modules to maximize consumables efficiency and maintenance planning, and the opportunity to connect anytime with our support engineers.

### Stamping for data connectors



### Accelerate your productivity

Injecting or stamping millions of parts per year requires highest productivity and reduction of manual operations and related risks of failure. The CUT P series is fully Automation ready through the entire machining process with probing module (3D setup) or automatic management of slugs. Experience a complete solution than can add more than 8,000 hours of productivity per year to your operation.

### Achieve low running costs

Running costs—due to the high volume of injected or stamped parts—are among the biggest influences on your cost per part. With the latest and fastest speed-oriented process, with wire consumption minimization as standard and smart modules maximizing consumables efficiency, the CUT P series reduces running costs up to 20 percent compared to earlier models.

### Injection molding for camera module components



Automotive

# Optimize your workflow, reduce your time to market

Shorter time to market, larger product portfolios and zero-defect manufacturing call for shorter, more efficient manufacturing flows, more flexible production lines, and more reliable processes. Overcome these challenges with the CUT P series' machining quality and efficiency solutions to optimize your production tool.



**up to  
+20%**

speed increases  
compared to previous  
generation

## Injection molding for car interiors



### Lower cost per part, greater mold lifetime

Reduce the cost per part and increase the lifetime of your mold with higher accuracy, machining repeatability, and finer surface finishes. With contour precision down to  $\pm 2 \mu\text{m}$ , extreme repeatability and surface finishes down to  $\text{Ra } 0.08 \mu\text{m}$ , more cycles are possible; at the same time, the new Intelligent Power Generator (IPG) increases process speed by 20 percent compared to earlier, similar machines.

### Reduced time to market

Being a preferred supplier is directly linked to your ability to support the right quality products in the shortest time possible. With the new CUT P series, you have a complete production solution to do just that. Increase your efficiency with tooling for part setup outside of the machine, with Automation, automatic 3D setup, or workshop management software.

### Increase flexibility, reduce scrap

Master two absolutely contradictory trends: The market requires an ever-increasing number of products and variants but has no tolerance for manufacturing defects. Ramp up your flexibility while reducing the risk of failure with the CUT P series' thermostabilization, advanced accuracy, and automated slug management solutions.

## Part production for gear boxes



## Connector and contact stamping

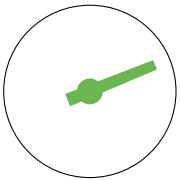




Medical

# Increase your design possibilities

Contrary to common belief, EDM has many strong advantages over more traditional medical industry manufacturing methods. With wire EDM as your solution, you easily execute complex geometries while benefitting from lower tooling costs, absence of machining forces, controlled biocompatibility, and a wide variety of Automation choices.



**100%**

open to more flexible designs compared to traditional manufacturing techniques such as milling and turning





### Production efficiency

With the increasing use of difficult-to-machine materials such as stainless steels, cobalt chromium and titanium, wire EDM presents substantial advantages versus traditional machining technologies. Wire EDM prevents expensive cutting-tool costs and delivers absolutely burr-free parts regardless of part geometry. As machining forces are totally absent, part geometries are unaltered by the process and the clamping remains very simple.

Part production for spinal implant



### Biocompatibility

Producing implantable parts implies manufacturing biocompatible technical materials. Perfect surface homogeneity is required, since no surface functionality alterations are permitted. For these purposes, the new digital IPG allows precise, fully controlled and reproducible surface integrity. For applications such as implants, our solution allows machining with tungsten wire to prevent any contamination of the part surface, providing full compliance with medical standards.

Surgical tools



### Traceability

Industry regulations mandate full traceability of the manufacturing process, and our CUT P Series allows you to adhere to the ISO 13485 medical standards. You can achieve total process control and traceability with our smart modules controlling consumables and our rConnect module ensuring permanent communication between the machine and the workshop manager.

### Reduce risks

Avoiding errors means reducing the human factor in the manufacturing process. During the EDM process for insert machining, GF Machining Solutions provides fully Automation-ready solutions, from a robot for Tooling to a dedicated module for automatic slug management.

Part production for cervical implants



Injection molding for medical consumables



\* Injection molds for packaging  
Braunform GmbH

Industry 4.0: Step into the future

# Availability is key for your business

The time you spend cutting is the time you are making money. That's why GF Machining Solutions optimizes your productivity and machine availability with SMART and connected solutions.

## Manage your resources

### Increase your efficiency with smart consumables

At the forefront of the Internet of Things, GF Machining Solutions presents SMART consumables, integrating RFID chips into wire and filter consumables to offer several efficiency-boosting benefits:

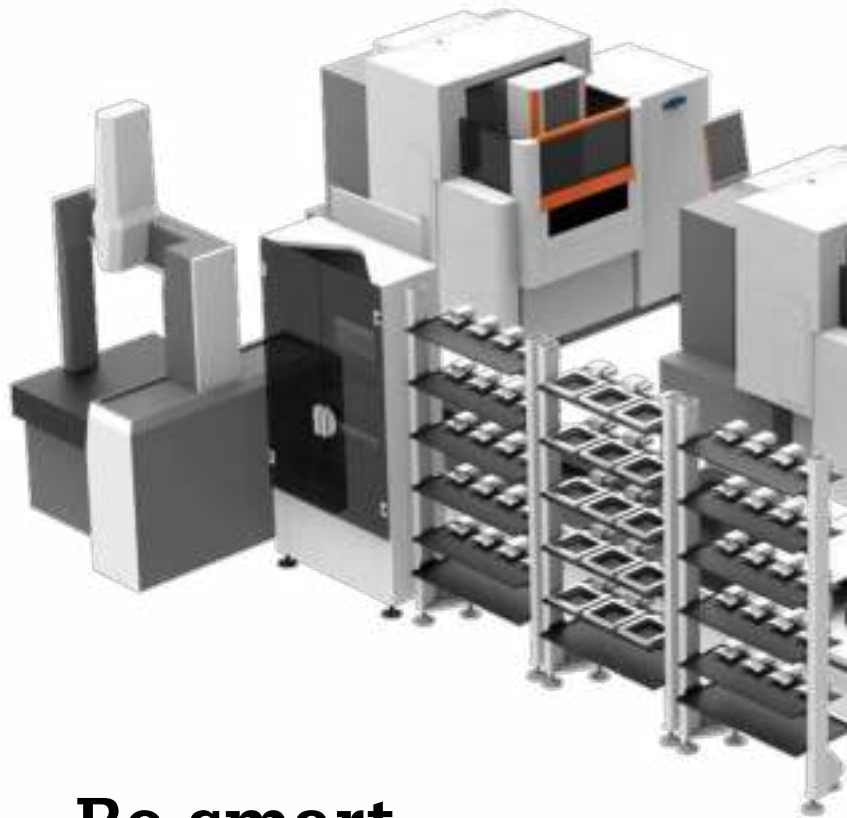
- The machine automatically recognizes and parameterizes itself to work with the wire or filter you just installed. The risk of error is eliminated and consumables are more quickly replaced.
- Increases machine availability by avoiding unnecessary breakdowns when wire or filter is finished
- Reduces your stock to the minimum
- All spool or filter data is registered and linked to the job to guarantee your complete process traceability



Wire type: AC Cut VH  
Remaining wire: 5,800 m  
Okay for job



Use: 36 percent  
EDM time: 350 hours  
Filter change date: April 24  
Okay for job



## Be smart, be connected

## Establish your autonomy

**WorkShopManager and CellManager take you to the next level of autonomy.**

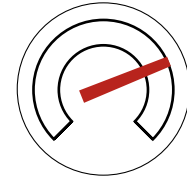
Software for administering and surveying the process of automated cells.

- Prepares jobs out of the machine on a pallet, measures with a CMM and automatically transfers the setup measurements to the machine to increase productivity
- Visualizes the loaded work and process status for process optimization
- ID chip management for highest process security

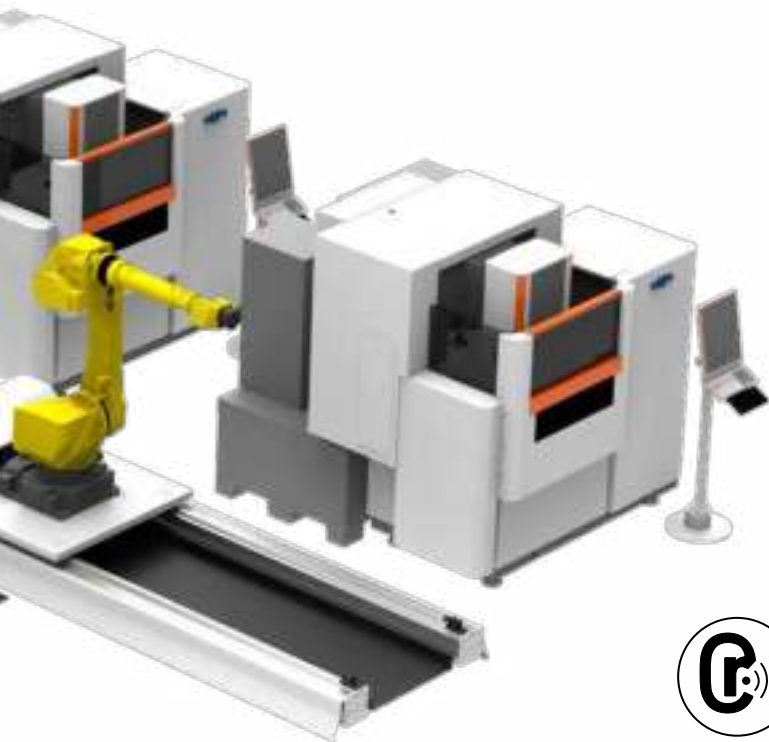
# Ensure quality with monitoring and traceability

## eTracking digitizes your process monitoring

- Ensures early quality failure detection by monitoring all machining and generator parameters
- Prevents high scrapping losses by setting up alarms and related actions if process deviates from standard conditions
- Delivers full process traceability for highly critical applications such as medical or aerospace



**Injection pressure**  
**Water temperature**  
**Short circuit**  
**Feed rate**



rConnect



## Industry 4.0

GF Machining Solutions' wire EDM is completely aligned with Industry 4.0 and your need to optimize production processes with intelligent information use. We understand that machines are part of a larger puzzle consisting of creation, simulation and post-processing stages. That's why we collaborate with multiple partners to connect all stages and make them complementary.

## Closer support for you

### Secure highest availability with rConnect

rConnect comprises our modular digital services. From Live Remote Assistance ensuring maximum machine uptime via process improvement modules to predictive maintenance and monitoring, rConnect keeps you connected anytime, wherever you are.

- Detailed information about your machine with your cockpit per machine
- More uptime for your machinery
- Direct and interactive access to our service specialists
- Faster identification of potential problems
- Secure connection based on the latest technology—certified by TÜVIT



New CUT P series

# Success relies on passion for details

**Retractable grid**  
Fast access to the working area

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**Thermostabilization**  
Cut and preserve the accuracy all day and all night

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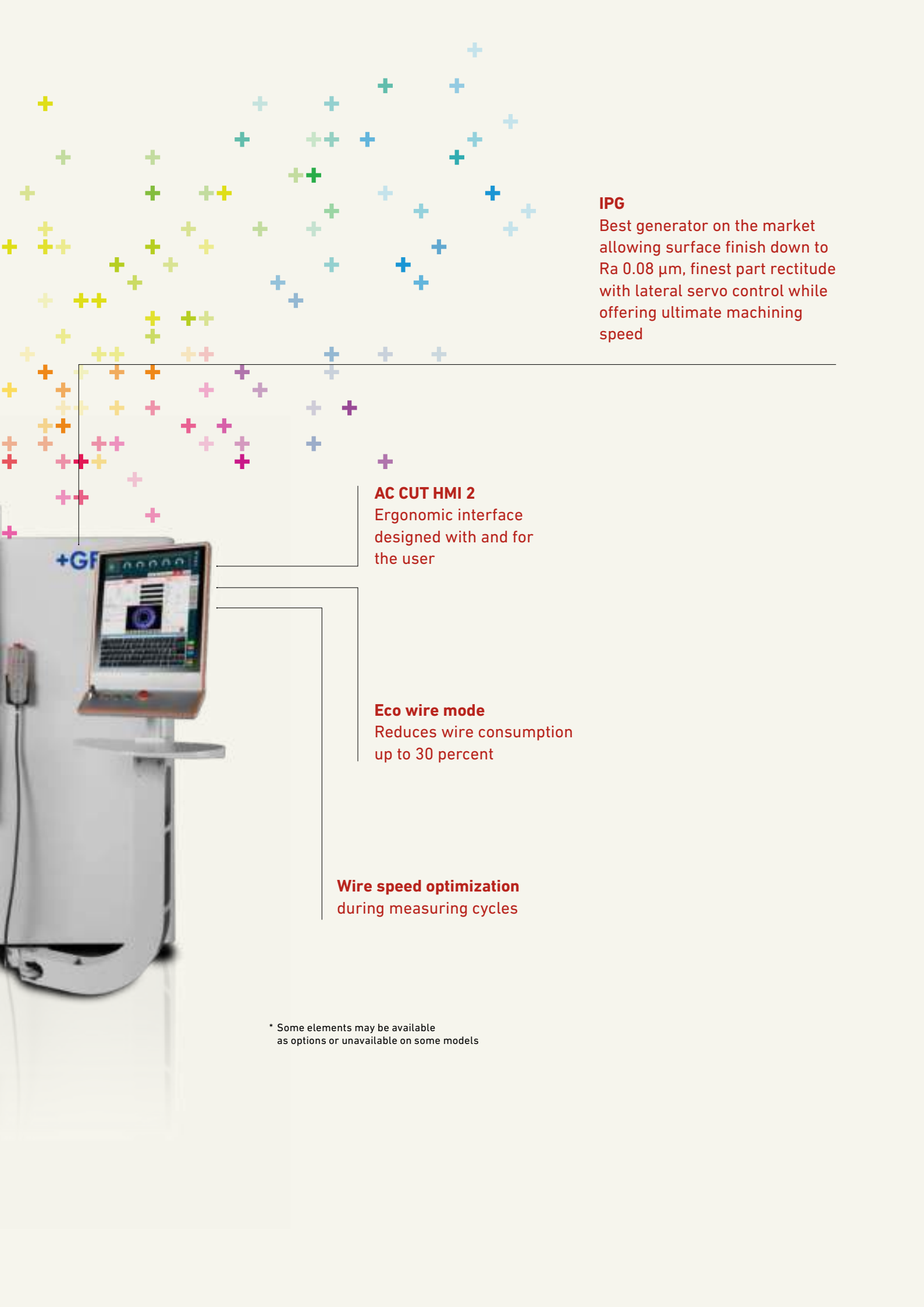
**Centralized greasing**  
Fast maintenance

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**Rhenocast**  
Stable results over time and temperature, whatever the part

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**IPG**

Best generator on the market allowing surface finish down to Ra 0.08  $\mu\text{m}$ , finest part rectitude with lateral servo control while offering ultimate machining speed



**AC CUT HMI 2**

Ergonomic interface designed with and for the user

**Eco wire mode**

Reduces wire consumption up to 30 percent

**Wire speed optimization**  
during measuring cycles

\* Some elements may be available as options or unavailable on some models

A new era of autonomy

# Enrich your potential

Productivity, part cost and flexibility are your top priorities. GF Machining Solutions stands out as your partner from project conception to the complete installation of your production solution.

Cut processing time by up to 20 percent with our slug management solutions.

## Automatic Slug Management (ASM)

For the first time, the wire EDM process becomes completely autonomous. Conventional slug extraction can represent up to 20 percent of the total processing time and requires manual intervention. By automating this step, you reduce manual intervention and gain processing time.

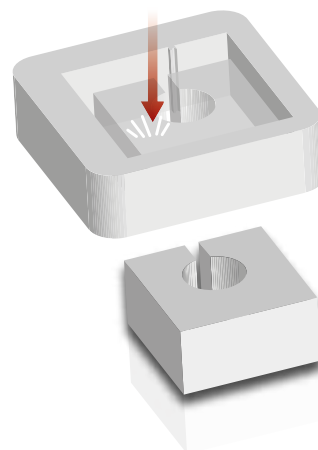
Available in September 2017



## Automatic Slug Welding (ASW)

Easy to configure, the new Automatic Slug Welding functionality automatically welds the core to the cavity, leaving a micro-fixture using a reverse erosion process.

This allows you to easily remove the core by a manual tap before the finishing cuts and reduce processing time by up to 10 percent and manual intervention time by up to 90 percent.





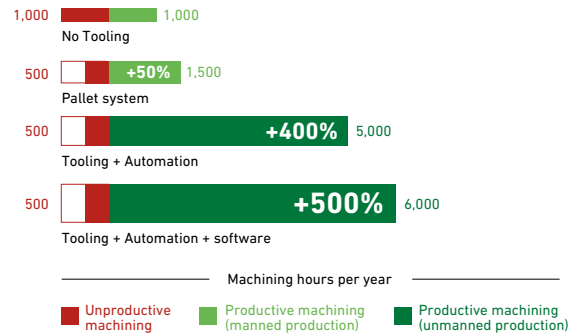
# Solutions adapted to your business

To match your business and environment, go for our Tooling and Automation solutions to accommodate production changes and maximize your throughput.

## Begin

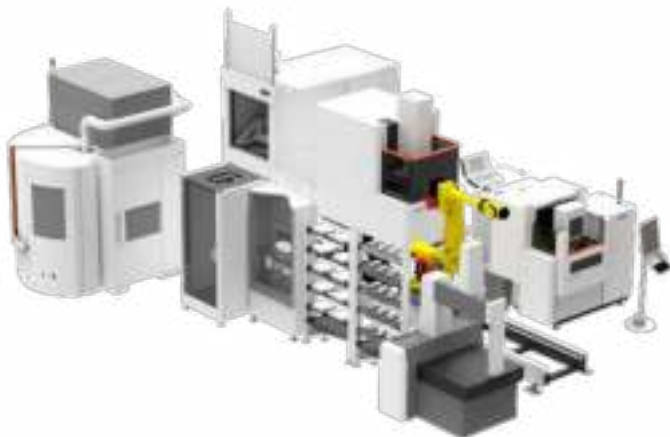
Increase your flexibility in handling workpieces of various sizes. Ensure your process repeatability. One-minute setup with pallets. Every minute that can be converted from internal to external setting time increases the machining time. Gain up to 50 percent productivity in a single-shift workshop.

### Increase productivity by 500% with full software-controlled Automation



## Expand

Linking a WPT1+ with two wire EDM machines along with our Automation programs will increase your capacity and expand your autonomy while increasing your productivity with masked time part preparation. Get faster payback on the investment by up to a factor of two.



## Industrialize

Boost your competitiveness. Achieve complete industrialization by combining wire EDM with other technologies to master your process from A to Z around the clock, seven days a week. Our software management solutions will handle all of the production data, allowing you to multiply your effective productive machining time up to sevenfold.

IPG

# Cut cost per part by up to 20 percent

**EXPERT systems:  
a legacy at the service  
of your results**

#### **POWER-EXPERT**

POWER-EXPERT prevents wire breakage on parts with variable heights while ensuring the highest speed technically achievable. In addition, during height variations, the intelligent module ensures a smooth generator transition to guarantee no lines on the part surface. You achieve highest part quality in molding applications.

#### **SURFACE-EXPERT**

SURFACE-EXPERT controls the sparking parameters during the finishing stage on parts, so you obtain the finest surface finish and minimize polishing while maximizing part quality.

#### **WIRE-EXPERT**

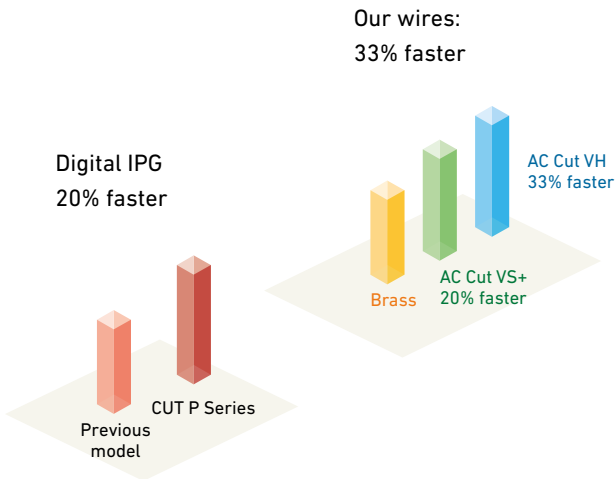
No matter the height of the part, WIRE-EXPERT will provide a dynamic control of the wear of the Wire to insure the highest geometrical accuracy.

#### **PROFIL-EXPERT**

Gain perfect control of fine details. No matter the contour or machined height of the workpiece, PROFIL-EXPERT will automatically adapt the machining parameters the machining path of rough and skim cuts to guarantee the highest profile accuracy and geometry.

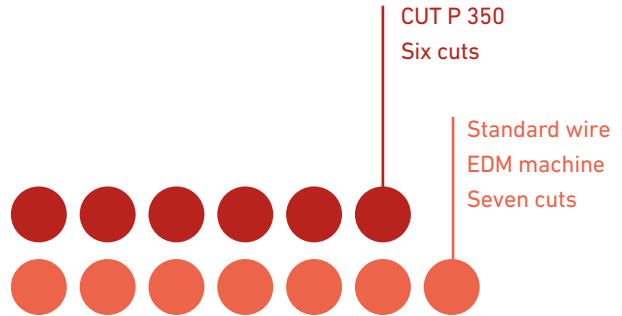
**Up to 20 percent cutting speed increase**

With our latest generation Intelligent Power Generator’s productivity reaches its quintessence. Combined with AC Cut VS+ wire, you reduce your cost per part while increasing the number of parts produced.



**Fewer cuts for improved surface finish**

Achieve surface finishes as fine as Ra 0.1 µm in minimal cutting time—up to 20 percent faster than before.



Number of cuts to reach  
Ra = 0.1 µm

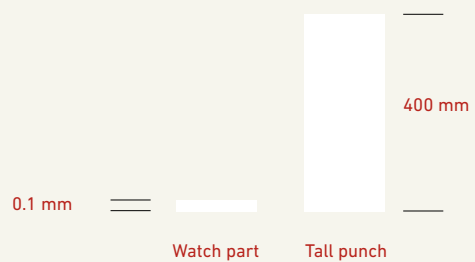
**Over 600 dedicated processes to produce the best result—whatever your need**

With more than twice the number of dedicated processes as a standard wire EDM machine, our CUT P series’ 600-plus technologies mean you can meet any objective on your parts. Our technologies cover a wide range of parts, from less than 1 mm to 800 mm in height, and materials from steel, carbide and copper, to aluminum, titanium, polycrystalline diamond (PCD) and graphite. Our complete wire range perfectly addresses your every need, whether it’s quality, speed or cost.

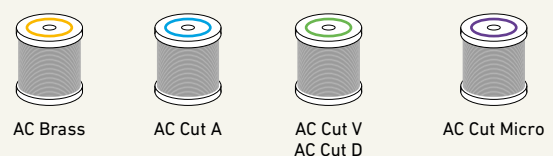
**Materials available**



**Machining heights**



**Wires available**



wire diameters  
0.07 mm\* | 0.1 mm | 0.15 mm | 0.2 mm | 0.25 mm | 0.3 mm

\* available in September 2017

Complete range of solutions

# The answer to your daily challenges

From a few grams to six metric tons, and whether you are producing surgical tools or aluminum die-casting molds for automotive, we offer a complete product line to satisfy your needs.



up to 6,000 kg



up to 800 mm

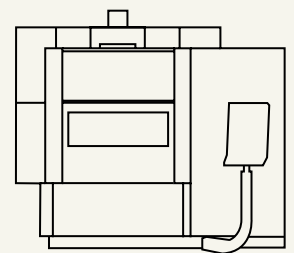
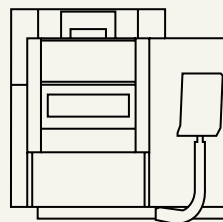


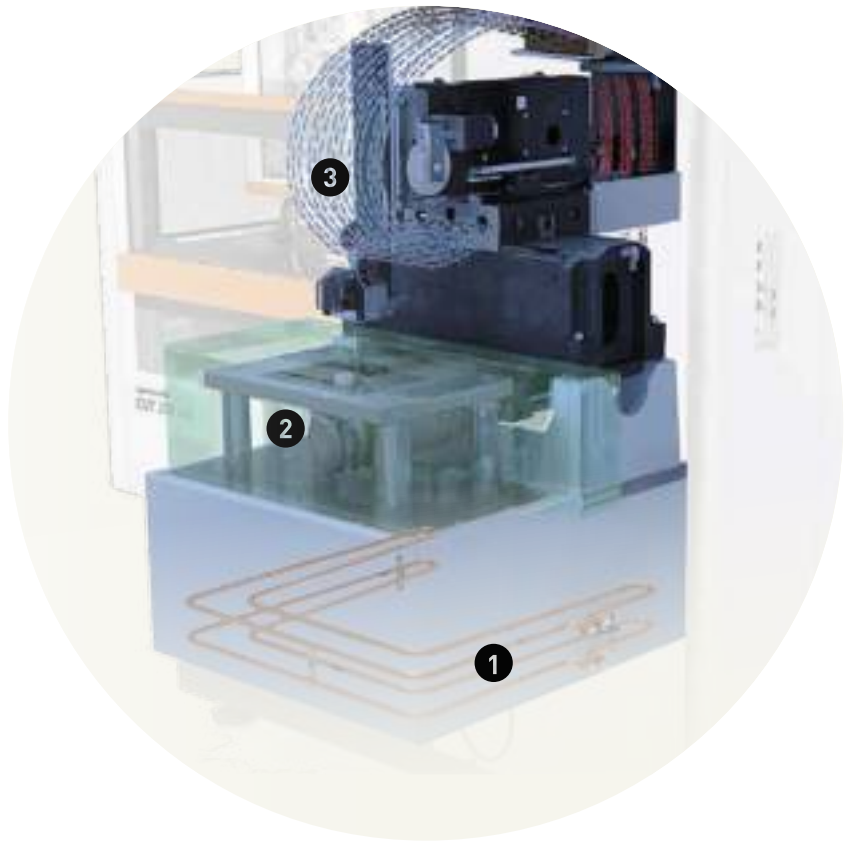
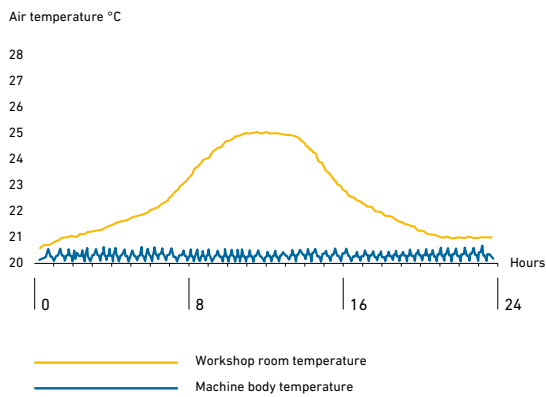
19"



## Outstanding mechanical stability

Thanks to the Quadrax® and fixed table design of the machine, accuracy and repeatability are ensured, regardless of part size and weight.





- 1 Water circulation in the Rhenocast machine base
- 2 Working area
- 3 Air conditioning in the cabin

### Advanced thermostabilization

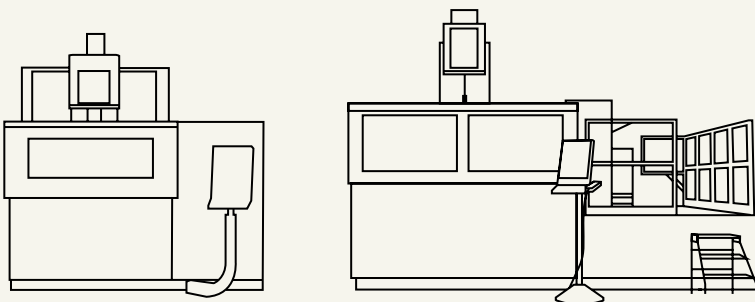
Temperature variation is the number one enemy when high accuracy is expected. Thermal regulation can be integrated to maintain temperature consistently with  $\pm 0.2^\circ\text{C}$  even in the most unstable workshops. Accuracy and repeatability remain at the highest level.

Available as a variant on CUT P 350 and CUT P 550



### Collision protection

Prevent costly machine maintenance and ensure long-term accuracy and reliability with our unique collision protection system.

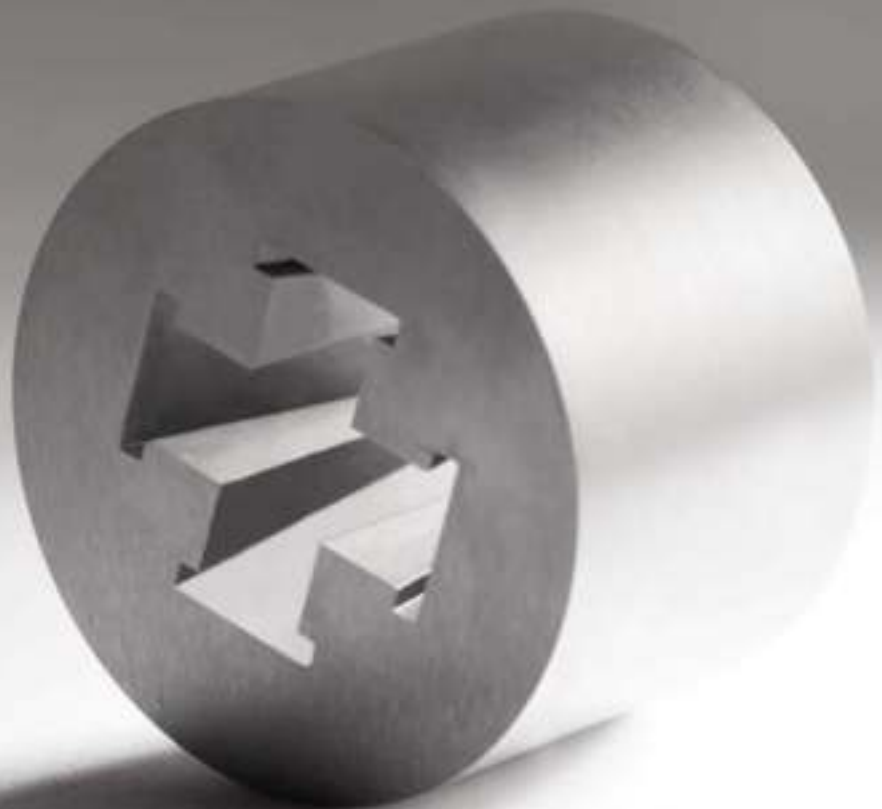
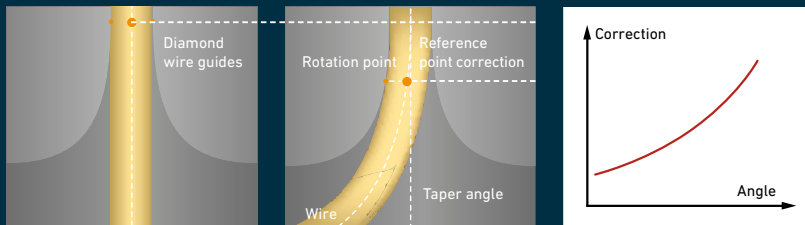


## TAPER-EXPERT

Master accuracy on small to large tapers from 0° to 30° (45° as an option). Thanks to TAPER-EXPERT and the unique Quadrax® design, the position of the wire is corrected—depending on the angle, and even on the largest angles—in real time and during machining. Secure your accuracy below one minute of angle accuracy (and even less than 20 seconds of angle accuracy with complete calibration).

### Mastering of large tapers

TAPER-EXPERT takes advantage of the unique Quadrax® design to allow very precise machining of tapers with angles varying from 0 to 30°. It corrects in real time and during machining the position of the wire depending on the angle. The surface quality is the same as that in cylindrical machining.







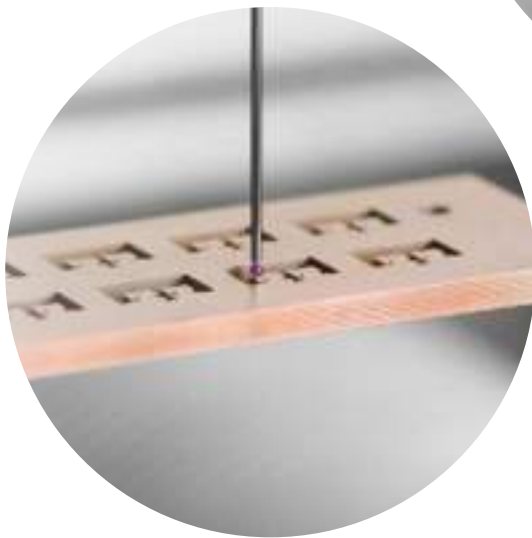
### Most advanced threading on the market

Wire threading is one of the most delicate steps in the wire EDM process. Effective wire preparation is the key to achieving successful threading in all circumstances, regardless of the wire quality. Our annealing and stretching of the wire guarantees you most reliable machining, even for long runs, with no interruptions.



### Advanced accuracy

Guarantee your precision on large multiple-die tools with advanced accuracy. By reducing assembly tolerances and adding calibration procedures positioning accuracy goes down to  $\pm 2 \mu\text{m}$ .



### Productivity with advanced setup

No matter how complex the part to be cut by wire EDM, the positioning and control of every step of the machining process are essential to ensure quality. Customized measuring cycles can be manually or automatically performed even on the most inaccessible part shapes.



### Rotary axes

Further enlarge your range of applications. We provide various types of rotating axes allowing controlled rotation simultaneously with the other axes.

#### Other available variants

Wire chopper

Chromium hardened table

3D Setup

Optical Measuring System\*

#### Other available options

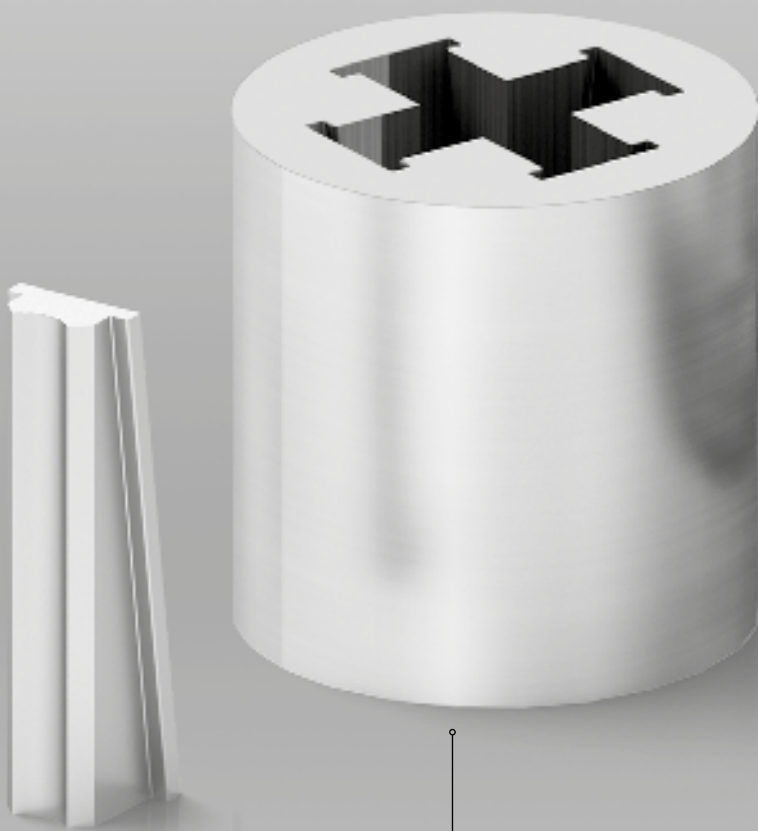
Big spool 25 kg

4-color stack light

Designed for rough conditions

# Outstanding in every situation

We strive to provide a solution that performs highly in every single situation and for every type of application, whether it's in medical, electronic components (EC) or automotive.



## Perfect molded part results in automotive

Experienced high quality on injected parts and longer tooling life, thanks to our 30 years of tapered parts mastery.

1x tapered die and 4x tapered inserts  
Application: injection molding  
Dimensions: when all 5 parts will be assembled:  $\varnothing$  42 x 40 mm  
Material: steel  
Wire: AC Cut D  $\varnothing$  0.25 mm  
Surface finish: Ra 0.5  $\mu$ m  
Contour accuracy:  $< \pm 5 \mu$ m  
Taper accuracy:  $< 10''$



**Productivity for ICT**

Achieve perfect surface without machining lines on complex stepped parts in less machining time than before.

Application: mold and die insert  
Dimensions: 60 x 60 x 20 mm  
Material: steel  
Wire: AC Brass 900 Ø 0.2 mm  
Surface finish: Ra 0.3 µm  
Contour accuracy: ± 2 µm

**Passion for precision in automotive**

Guarantee your accuracy on applications with complex shapes with our fine wire solutions.

1x punch and 1x die  
Segment: Automotive  
Application: sintering punch and die  
Dimensions die: 40 x 40 x 20 mm  
Dimensions punch : Ø16 x 50 mm  
Material: steel and Carbide  
Wire: AC Cut AH Ø 0.1mm  
Surface finish: Ra 0.2 µm  
Contour accuracy: < ± 2µm

**Whatever your mold size, we offer highest accuracy and confidence for tools and expensive parts.**

Application: injection molding  
Dimensions: H 200 mm  
Material: steel  
Wire: AC Cut AH Ø 0.25 mm  
Surface finish: Ra 0.35 µm  
Contour accuracy : < ± 10 µm

**The solution for your most complex applications**

Machine ultra-fine geometries for multi-cavity molds in electronics.

Application: injection molding  
Dimensions: approximately 100 x 6 x 40 mm  
Material: steel  
Wire: AC Cut AH Ø 0.1 mm  
Contour accuracy: < ± 2 µm

## 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 Customer Services completes our proposition.

[www.gfms.com](http://www.gfms.com)



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