GF Machining Solutions

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AgieCharmilles

CUT P

350 Pro/550 Pro/800 Pro

New CUT P Pro series

Reliable, Precise Cutting for Your Success

Quadrax +

IPG-DPS +

Spark Track +

Dedicated technologies +

AWT – Annealing +

+ Thermostabilization

+ Anti-collision

+ Uniqua

+ Automation Ready

+ Connectivity

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

The framework

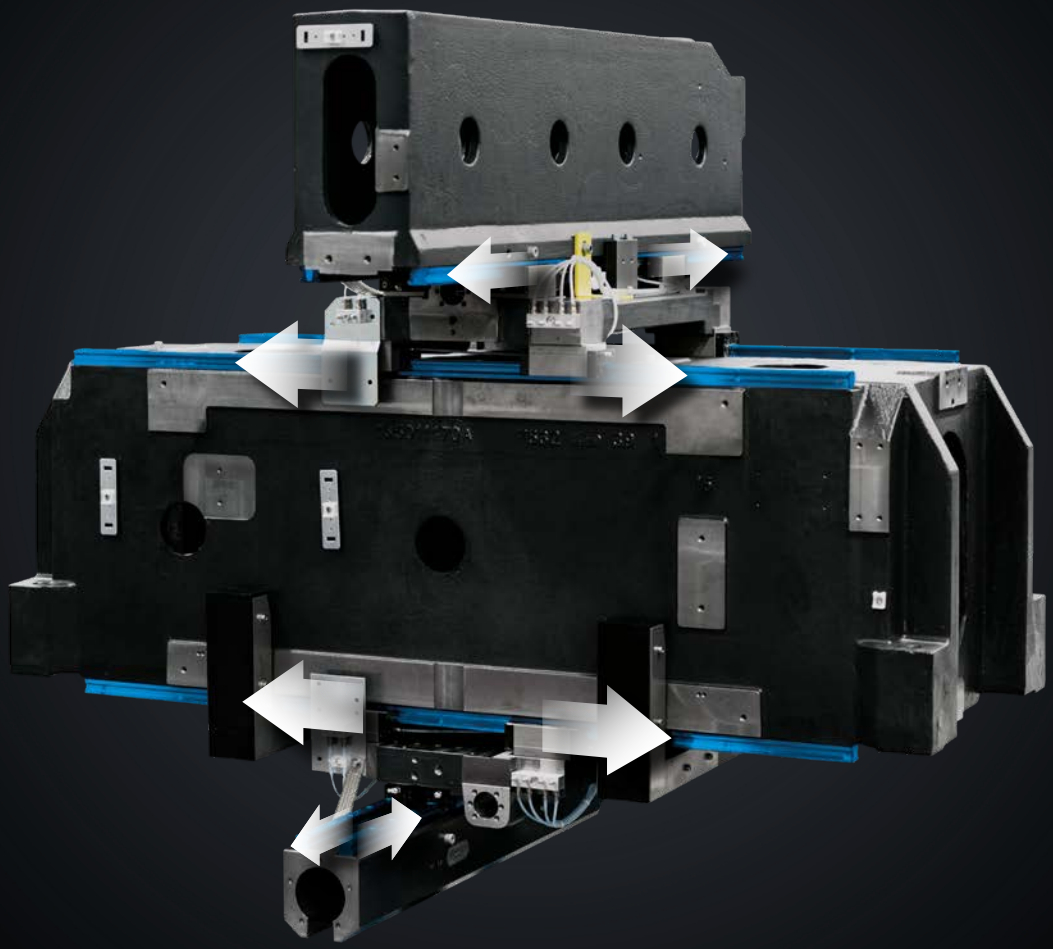
Mechanics

QUADRAX®

In the QUADRAX® system, the table, work tank and dielectric liquid remain stable, and the workpiece does not move. The axes are equal in length (X = U travel; Y = V travel), with constant, lower mass and completely independent movement, unlike other structural concepts. In addition, the base offers lower thermal conductivity and a vibration damping system.

up to 3,000 kg

up to 510 mm



QUADRAX®

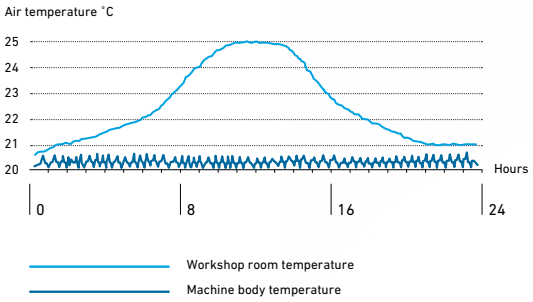
Benefits:

- Accommodates heavy jobs because the workpiece and dielectric liquid do not move.
- Independent U/V and X/Y axes produce precise tapered cuts.
- Creates large tapered cuts with same-sized U/V and X/Y axes.

Thermostabilization

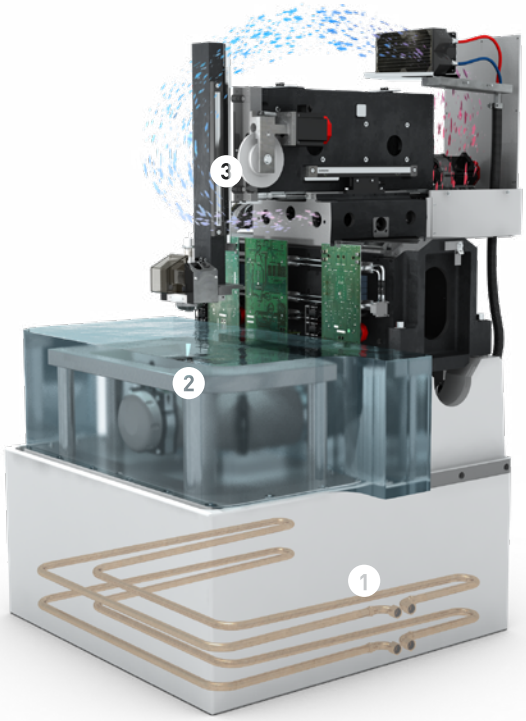
Temperature variation is the biggest enemy of high accuracy. Even when workshop temperature fluctuates, integrated thermal regulation can maintain temperature consistently within ± 0.2°C. Accuracy and repeatability remain at their highest levels.

Available as an option on CUT P 350 Pro and CUT P 550 Pro



Benefits:

- Achieve high accuracy even in unstable thermal environments.



① Water circulation in the Rhenocast machine base

② Work area

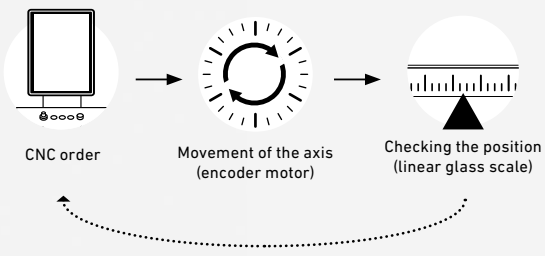
③ Air conditioning in the machine head

Collision protection

Linear scales and rotary encoders form a double measuring system that protects the X, Y, Z, U and V axes. In the event of a collision, the system differentiates between the linear and the rotary encoder, and the energy absorber system automatically stops the axes without damage to machine or workpiece. This full protection applies at machine speeds of up to 3 m/min.

Benefits:

- High availability means no downtime after a crash.
- Protect your machine investment at low or no service cost.



① Rotary encoder

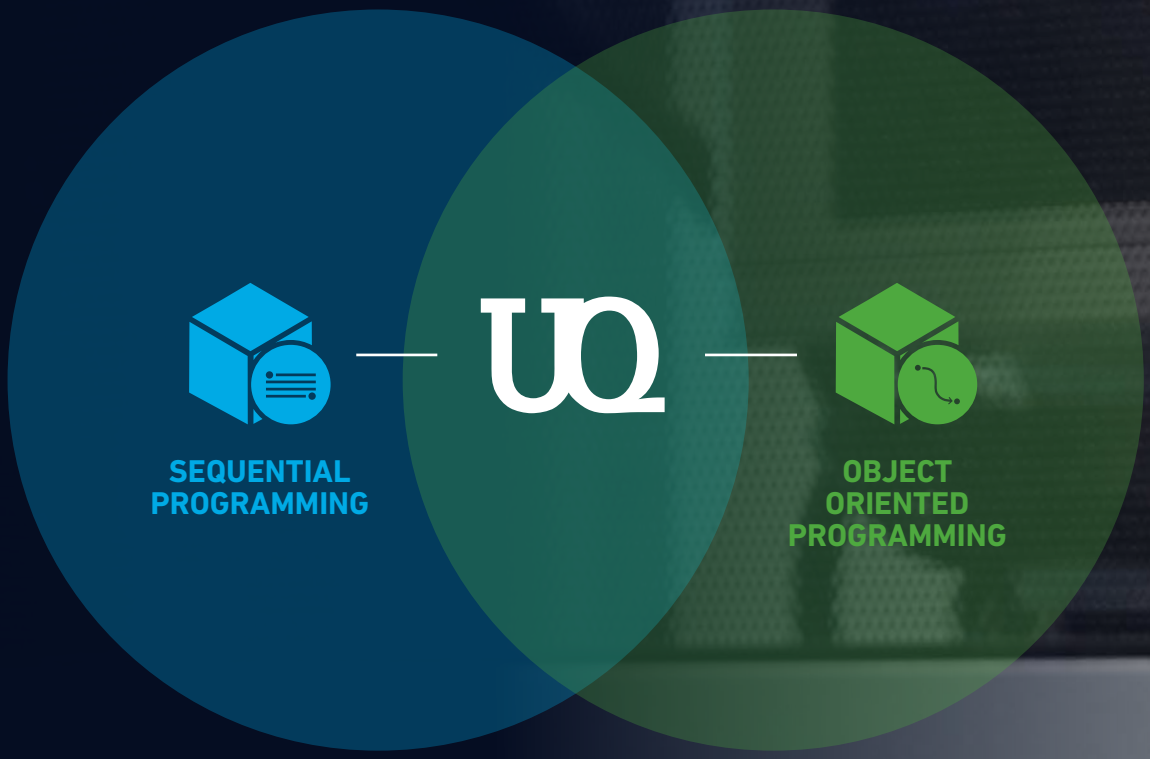
② Linear glass scale

③ Energy absorber

The human interface

UNIQUA

UNIQUA is the new GF Machining Solutions human/machine interface (HMI) for wire EDM machines. It represents the pinnacle of more than a century of EDM technology – and the perfect combination of optimal functionality and usability (ergonomics) from our previous HMIs.



Every skill level
UNIQUA is ideal for wire EDM experts and beginners alike. While experts use its powerful functionalities, beginners can take advantage of its ease-of-use and short learning curve.

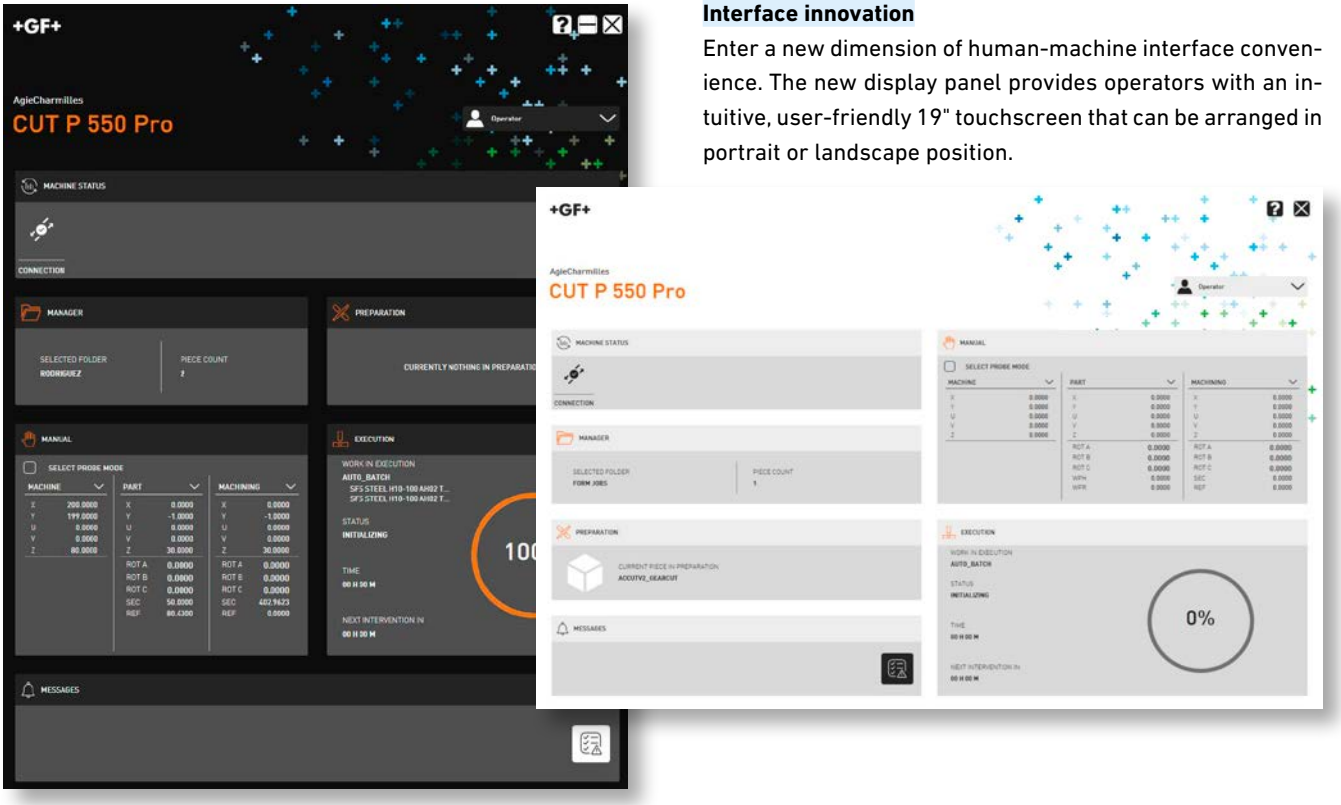
Every approach
UNIQUA works the way you want to work. Control the details of sequential programming with an updated ISO-based functionality or leverage the flexibility of object-oriented programming.

Every user
Work offline or at the machine. UNIQUA ensures compatibility with major CAD/CAM programs and also provides a powerful graphic tool with integrated CAM.


+GF+
AgieCharmilles
CUT P 550 Pro
Operator
MACHINE STATUS
CONNECTION
MANAGER
SELECTED FOLDER
RODRIGUEZ
PIECE COUNT
2
PREPARATION
CURRENTLY NOTHING IN PREPARATION
MANUAL
SELECT PROBE MODE
MACHINE
PART
MACHINING
EXECUTION
WORK IN EXECUTION
AUTO_BATCH
SF5 STEEL H10-100 AH02 T...
SF5 STEEL H10-100 AH02 T...
STATUS
INITIALIZING
100%
TIME
00 H 00 M
NEXT INTERVENTION IN
00 H 00 M
MESSAGES
+GF+

UNIQUA

Easy to use

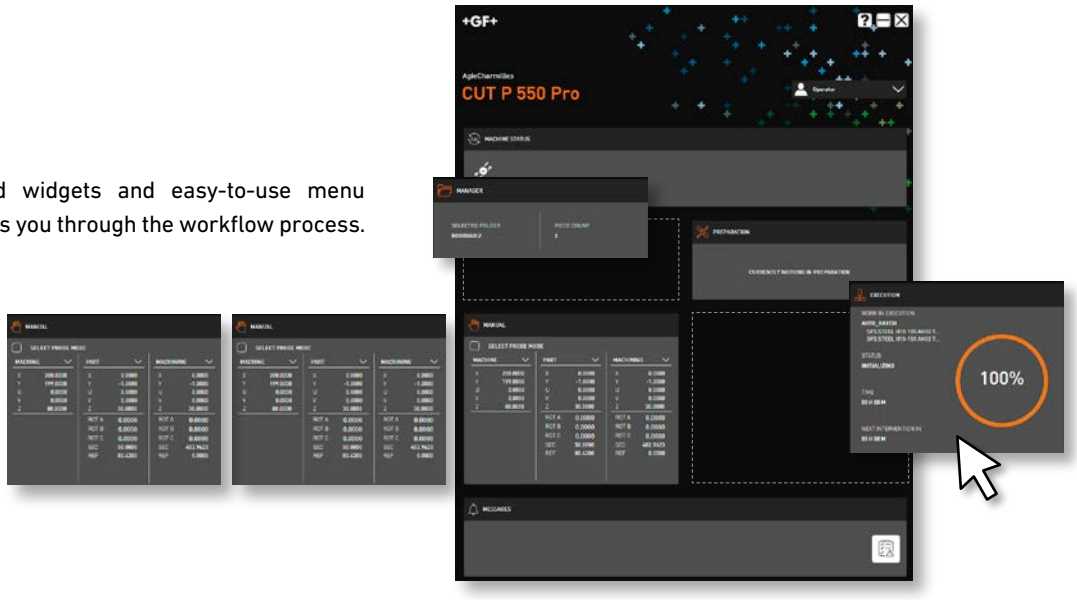


Interface innovation

Enter a new dimension of human-machine interface convenience. The new display panel provides operators with an intuitive, user-friendly 19" touchscreen that can be arranged in portrait or landscape position.

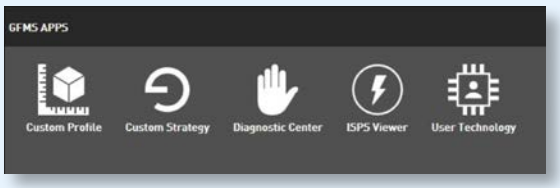
Dashboard power

Customizable dashboard widgets and easy-to-use menu system seamlessly guides you through the workflow process.



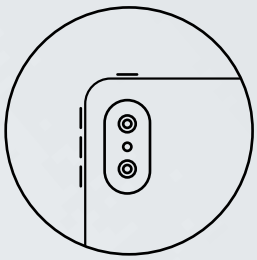
Intuitive interactivity

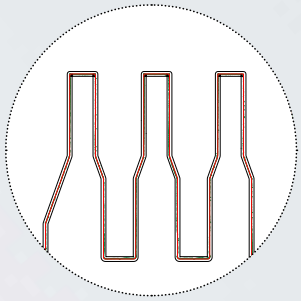
Shorten the learning curve and make any job easy with powerful graphic previews and an interactive help menu.



Work Space

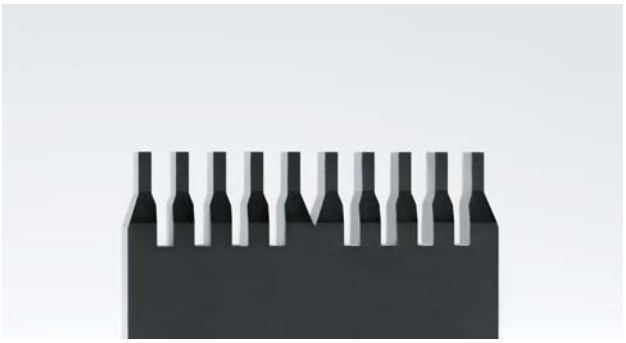
UNIQUA tools are displayed as icons to allow for all users to easily identify key functions. GFMS applications such as Custom Profile, Custom Strategy, ISPS Viewer and User Technology, and many more, are available in two sections: Tool Box and External APPS.





± 2 µm

Positioning and contour accuracy



Master miniaturization

The microelectronics industry packs greater functionality into increasingly smaller spaces – and with 60 years of miniaturization mastery, GF Machining Solutions helps you create consistently precise mold inserts under any workshop conditions. With superior ± 2 µm positioning precision, optional thermostabilization and 70 µm diameter wire, you can make perfectly identical inserts that reproduce millions of parts.

Accelerate your productivity

To inject or stamp millions of parts per year, you need to maximize productivity and minimize the risks of failure from manual operations. With a 3D-Setup probing module or automatic slug management, the CUT P Pro series provides a fully automation-ready machining process. Add more than 8,000 hours of productivity to your annual operations with this complete solution.

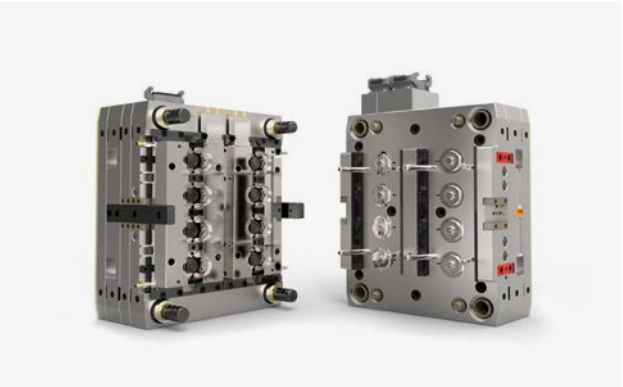
Accelerate your return on investment (ROI)

Microelectronics demands blazing-fast ROI to keep up with short market cycles. We deliver a solution that's always ready to work, with smart modules that maximize consumable efficiency and maintenance planning, plus round-the-clock remote assistance from our support engineers.

Achieve low running costs

With high-volume injected or stamped parts, operating costs make a huge impact on per-part costs. Speed production with the latest, fastest process, minimized wire consumption and maximized consumables efficiency as standard features. The CUT P Pro series reduces operating costs up to 20% over previous models.

Achieve consistently high surface quality, positioning and contour accuracy.



Perfect mold assemblies with guaranteed accuracy

For smooth functionality, mold components including ejector pins, guides lights, mold plates, insert slots and insert locks require extreme accuracy to produce effective assembly and smooth operations during mold injection cycles. Robust, reliable wire EDM accurately machines mold components with tight control over geometry, edge sharpness and taper.

Tool machining & maintenance cost

Today's mold makers face continuous supplier pressure to reduce tooling costs. Wire EDM technology speeds production of burr-free, accurate components and reduces the post-processing preparation for final assembly. Compared to other processes such as milling and grinding, which involve large tooling expenses, the stress-free machining of hard materials achieves high quality while it helps reduce mold maintenance and the costs of spare parts and overall production.

Meet market demands with high productivity

Continuous growth in consumer demands and choices means that mold makers must increase their production to supply large numbers of molds of various designs. To meet these demands, wire EDM with the CUT P Pro series offers high-speed machining, a powerful generator and lights-out operation for uninterrupted machining.

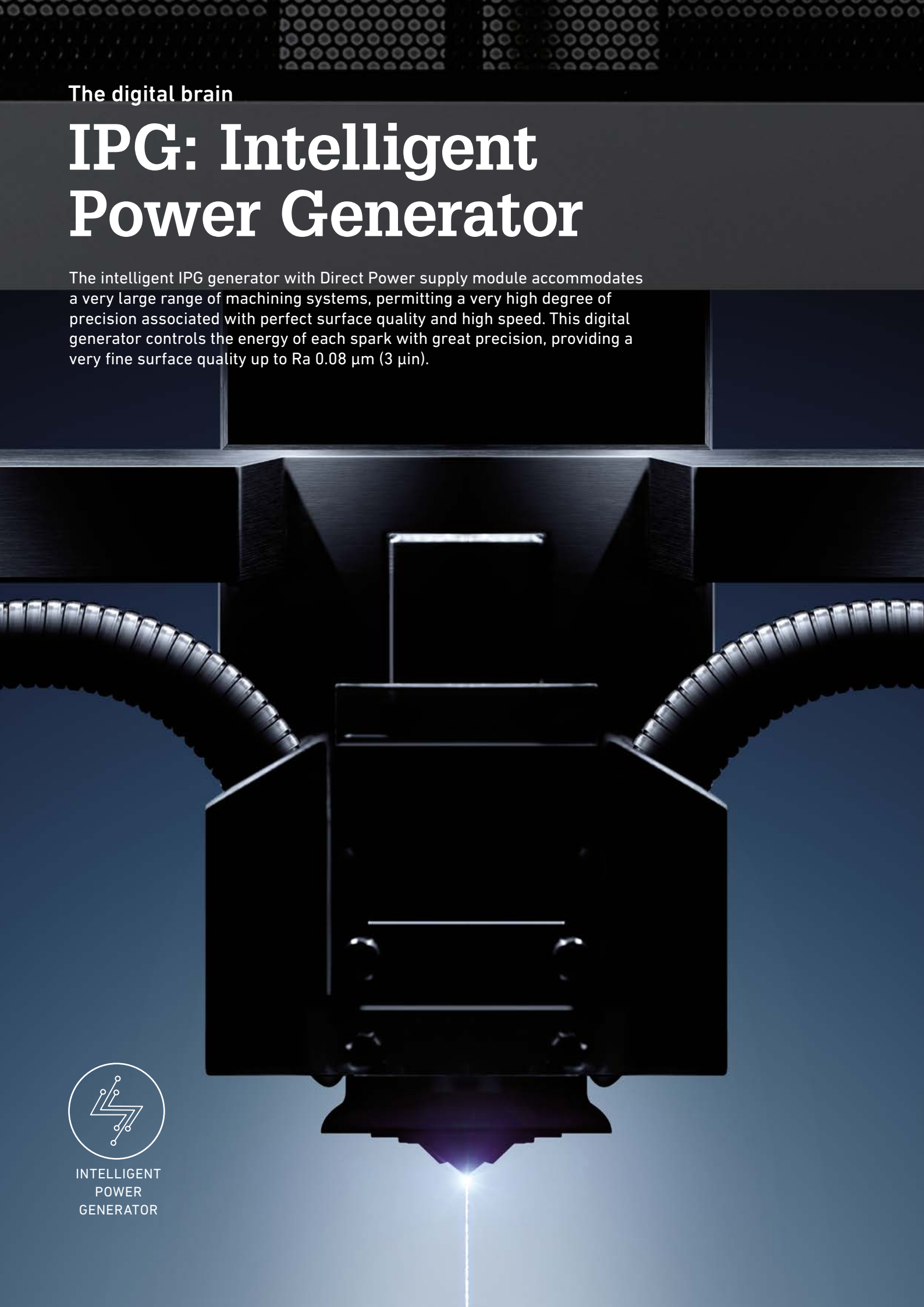
Sustainable EDM machining

Wire EDM helps increase the sustainability of global manufacturing. It machines tougher materials in an automation-friendly, energy-efficient process with reduced scrap rates, producing better injection cycles with new biocompatible, biodegradable plastics.

The digital brain

IPG: Intelligent Power Generator

The intelligent IPG generator with Direct Power supply module accommodates a very large range of machining systems, permitting a very high degree of precision associated with perfect surface quality and high speed. This digital generator controls the energy of each spark with great precision, providing a very fine surface quality up to Ra 0.08 µm (3 µin).



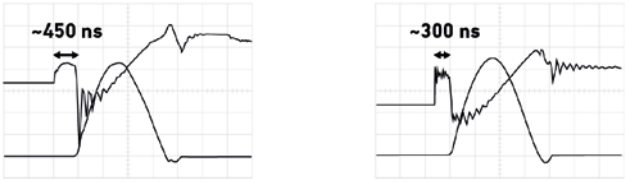
INTELLIGENT
POWER
GENERATOR

IPG MAIN FEATURES

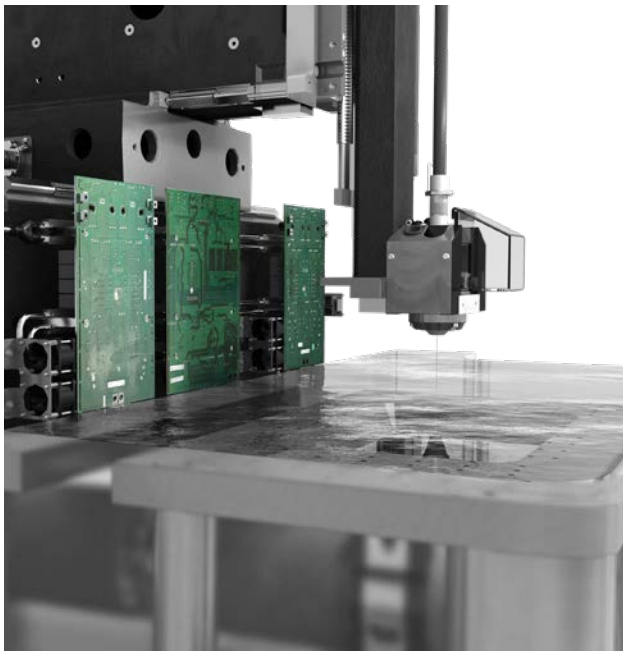
- Spark parameter control during all production stages, especially finishing.
- Dynamic control of wire wear.
- Automatic adaptation of machining parameters to the profile during roughing and skim cuts.

IPG-DPS is conveniently situated close to the machine working area to accommodate shorter cable lengths and reduced impedances. By positioning the generator behind the work tank, the reduced distance between the power source and the sparking zone allows a much smaller impedance of the electrical circuit.

Less noise means better, faster and more accurate monitoring of your sparking process. In combination with the latest generation of central processing units (CPUs), the EDM process has better gap width control, better respect of geometry and surfaces, no wire breakage and very good speed.



Current and voltage diagram of the sparking process showing the higher reactivity of the IPG-DPS generator.



Achieve better surface finishes by overcoming complex challenges - including poor flushing conditions, risk of wire breakage and lines on the parts.

Benefits:

Obtain the finest surface finishes and minimize polishing while maintaining geometrical accuracy.

- Ensure excellent geometrical accuracy in all parts' heights.
- Gain perfect control of the fine details to ensure the highest profile accuracy.

Wire breakage protection

ISPS: Intelligent Spark Protection System

To make EDM cutting easier, GF Machining Solutions' Spark Track technology includes Intelligent Spark Protection System (ISPS). Its intuitive engineering evaluates the position of each discharge between the wire and the part, analyzing the concentration against a set threshold. If the concentration exceeds the threshold, ISPS automatically adjusts spark energy in real time to prevent wire breakage and maintain optimal cutting speed.

Benefits:

- Automatic real-time parameter adjustments for variable heights, blind holes, bad flushing conditions and other extremes.
- No need for an expert operator just to avoid wire breakage.
- Elimination of wire breakage reduces idle time and enables automation.
- Increased productivity.

ISPS overcomes difficulties

+ Varying part height
+ Blind holes
+ Inclined upper or lower surfaces
+ Bad flushing conditions caused by tooling or part shape

Reduce wire consumption

iWire

Reduce wire consumption with iWire, an intelligent process based on Spark Track technology. It detects variations in the workpiece profile and adapts wire spool unwinding speed accordingly.

iWire is based on Spark Track technology that monitors the spark position and concentration. The iWire module detects the height variation of the workpiece profile and consequently adapts the wire feed speed according to the conditions.

iWire is especially effective in workpieces with high variation of height and when upper and lower heads cannot work close to the workpiece surface.

iWire is further optimized when using GF wires embedded with SMART wire (RFID) function. Knowing the wire physical characteristics, an improved technology can be applied and the wire consumption saving can increase another 20% compared to standard wires.

Benefits:

- Up to 40% wire consumption reduction
- Increase machine autonomy
- Reduce cost per part
- Reduce environmental impact

Unbeatable cutting speed

Turbo Tech

Our Turbo Tech cutting technologies place an intense focus on high-speed precision, up to 40% faster than any competitor's machine with better accuracy results, depending on flushing condition and geometry. Turbo Tech is available for different wire types – AC Brass, AC Cut VS+, VH and AH – and diameters.

Because Turbo Tech mainly alters trim cuts, it is fully compatible with Spark Track modules including ISPS and iWire.

	SPEED TECH	TURBO TECH
	Ra achieved: **0.45 µm** Tkm: **2.0 µm** **38 min**	Ra achieved: **0.45 µm** Tkm: **2.5 µm** **30 min** **21% faster**
	Internal radius: **R 0.16mm** **TF: ± 2.0 µm**	Internal radius: **R 0.16mm** **TF: ± 2.0 µm**

Benefits:

- Increases productivity and maintains high accuracy.
- Reduces costs per part.
- Works with ISPS and iWire to ensure process stability and reduce wire consumption even during high-speed operations.

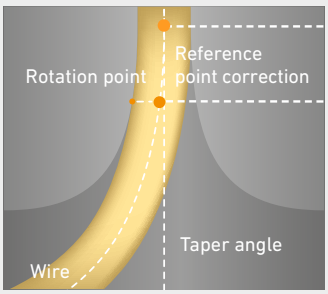
Precise angles from 0° to 30° in 400 mm

TAPER-EXPERT

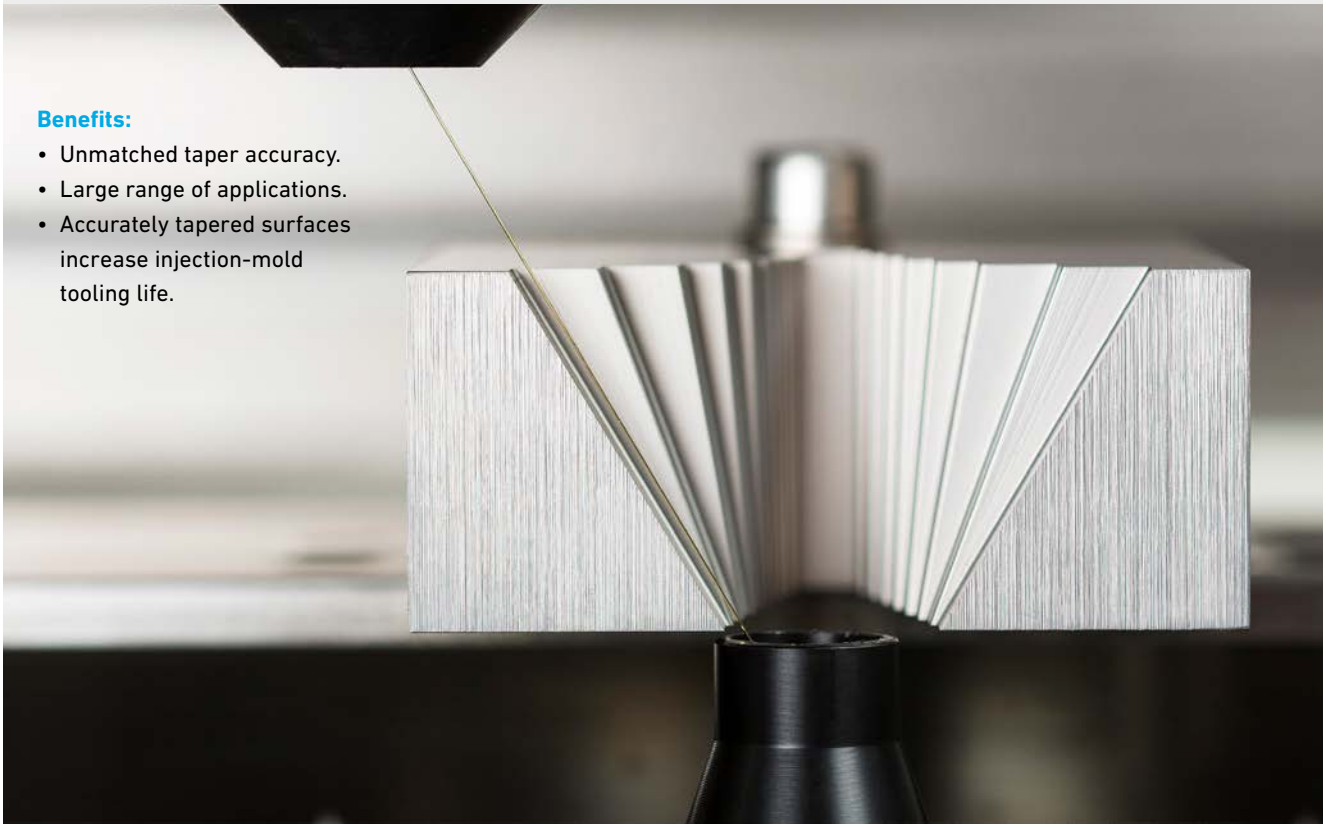
Master accuracy on small to large tapers from 0° to 30°, with 45° as an option. TAPER-EXPERT and the unique QUADRAX® design correct the wire position in real time during machining, even on the largest angles. Achieve under one minute of angle accuracy – and even below 20 seconds with complete calibration.

With its unique design and long U/V axes, the CUT P Pro series can reach up to 30° angles in 400 mm (CUT P 550 Pro feature).

To keep wire position stable and fully supported within the guide when the machine is moving, closed diamond guides allow only ± 2 µm clearance between wire and guide.

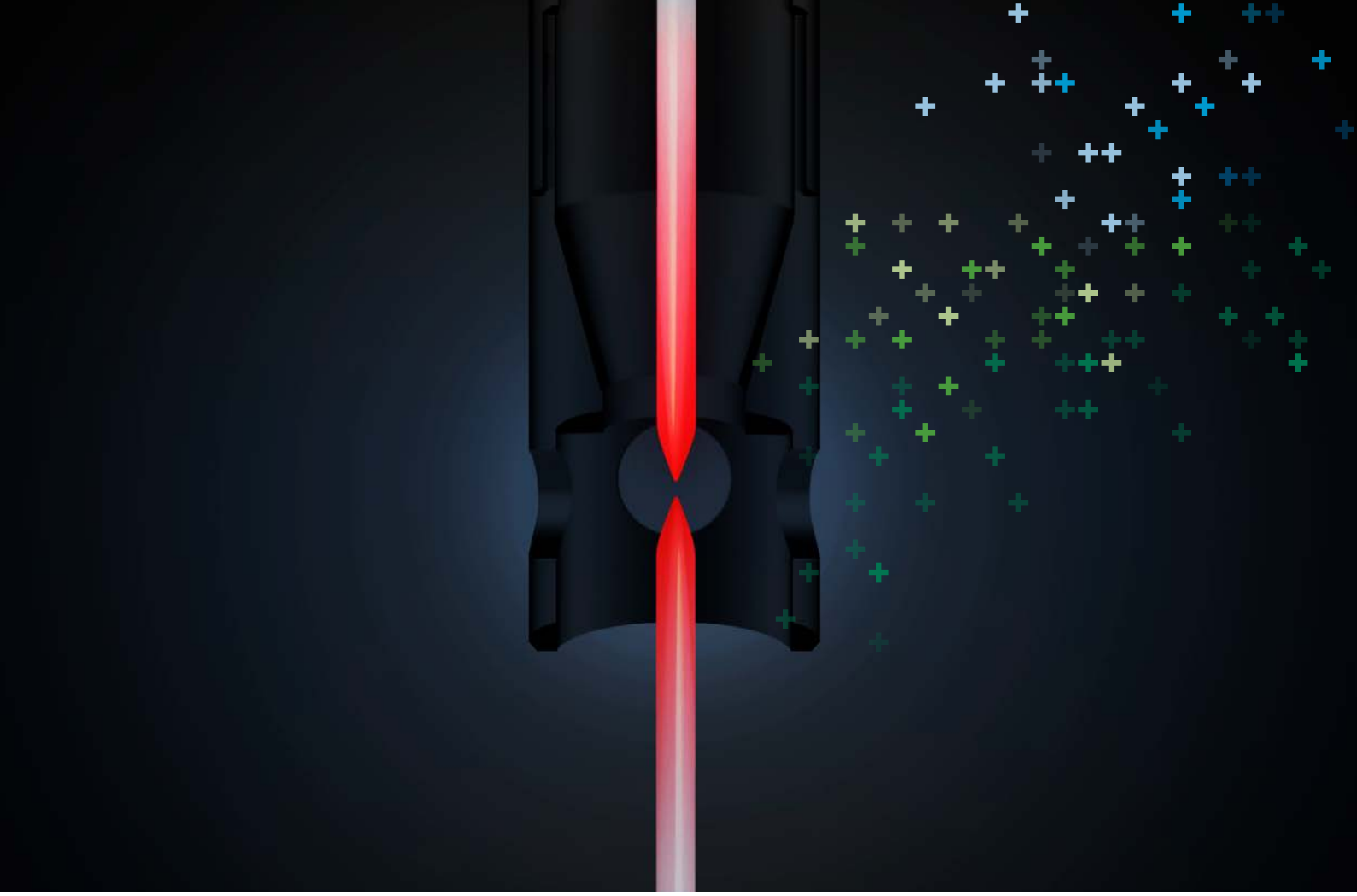


TAPER-EXPERT compensates head position in real time during machining depending on the angle.



Benefits:

- Unmatched taper accuracy.
- Large range of applications.
- Accurately tapered surfaces increase injection-mold tooling life.



Reliable threading and re-threading with annealing

AWT: Automatic Wire Threading

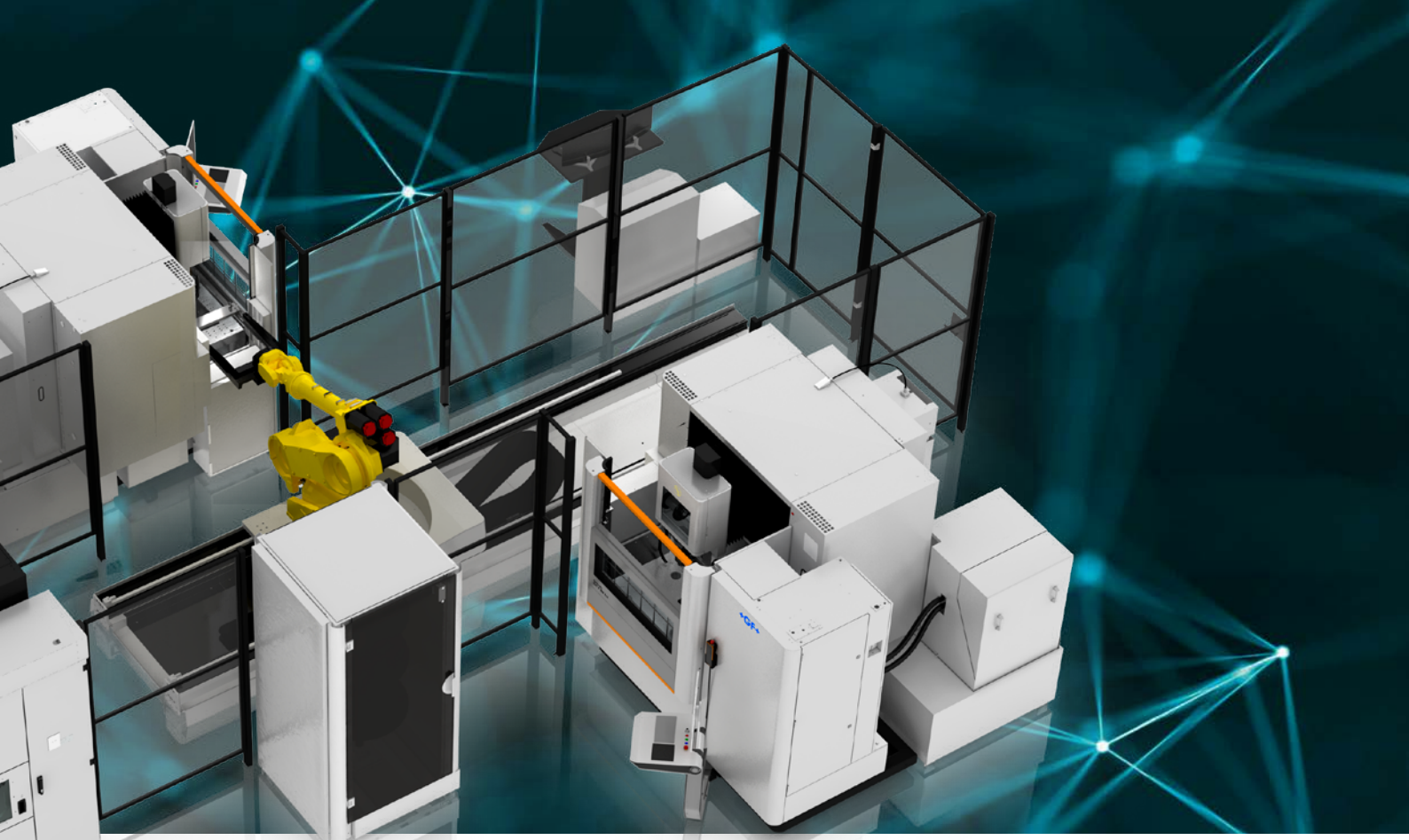
For proper unattended machine operation and automation, reliable automatic wire threading and re-threading is essential.

Wire annealing

Automatic Wire Threading heats the wire between the brake and the lower working head, then chills it with a jet of air and stretches it to reduce its diameter, annealing and extending the wire to a specific length. This produces burr-free thermal cutting and a conically shaped end that is easy to insert through the guides and the workpiece.

Benefits:

- Ensure job processing with correct rethreading even under the most difficult conditions.
- Automatically cut multiple openings in die blocks and progressive dies during unattended operation.
- Enable smooth automation implementation.



Select the best System 3R robot for your workflow

System 3R robot	Weight on the Delphin Short WEDM frame[1]
Transformer WorkMaster Easy-to-manage 3-axis polar robot, for up to 12 machines	up to 125 kg
Transformer 6-axis Flexible anthropomorphic robot, for up to 12 machines	up to 150 kg[2]

1. Weight on the frame = weight of work piece + weight of the clamping bars.
2. Maximum weight on the frame to guarantee the best repeatability.
Always ask to the System 3R Automation Specialists and Sales Support for a dedicated review of each specific case.

Benefits from frames

- External preset: save setup time.
- Load automatically into the machine.
- Exploit the full cutting area.
- Use with 1-12 machines.
- Drying-unit ready.
- Operate around the clock with automation.

rConnect

Secure the highest availability of machine intelligence
rConnect brings smart manufacturing to your shop. Operate at your full potential with innovative applications that make machine intelligence available all the time.

Benefits

- Obtain detailed production information with a dedicated rConnect cockpit for each machine.
- Increase your uptime.
- Gain direct, interactive access to our service specialists.
- Quickly identify potential problems.
- Maintain secure connections based on the latest technology – certified by TÜViT.
- Increase your efficiency with a significant step toward smart services.

rConnect Live Remote Assistance
Connect remotely to our expert engineers, who respond rapidly to your service requests in real time.

rConnect Messenger
Receive machine data directly on your mobile device. Monitor your machines continuously to gain insight into the efficiency of your shop.

Energy Efficiency Certificate

Operating mode (24-hr. cycle time)	CUT X00 series (2015)	CUT P series (2020)	Energy saving %	GF enhancements (see below)
Standby (4h)	2.7 kW	0.3 kW	-89%	1
Ready (4h)	2.75 kW	2.75 kW	–	–
Machining (16h)	5.25 kW	3.85 kW	-27%	2,3,4,5
Daily Energy Consumption	**105.8 kWh**	**73.8 kWh**	**-30%**	

Measurements made on CUT 300 and CUT P 550

1 // Econowatt
Smart module enables energy-saving standby mode and programmable fast reactivation ("wake up") option.
No energy waste during non-productive time, and the equipment is ready to run every morning.

2 // IPG – Higher electrical efficiency
The latest generation of GF Machining Solutions' Intelligent Power Generators (IPG) provides fast digital control of each spark to improve the machine's electrical efficiency.

3 // IPG – Reduced energy waste
IPG's resonant switching mode helps reduce energy waste.

4 // IPG – Reduced component wear
IPG reduces component wear throughout the lifecycle of the machine.

5 // Injection pumps – Higher energy efficiency
Replacing high-pressure pumps with injection pumps reduces energy consumption.

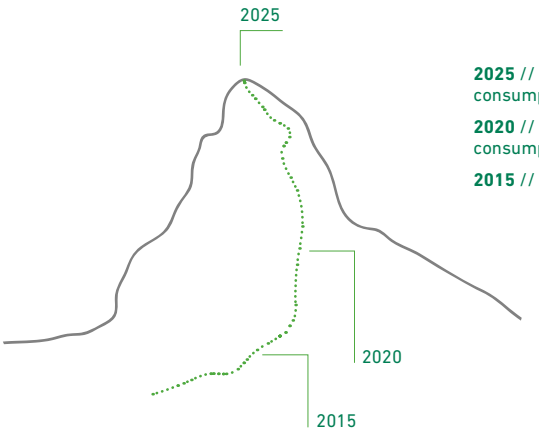
Over 1 year, equivalent to greenhouse gas and CO_2 emissions from:

719,820
smartphones charged

carbon sequestered by
97
tree seedlings grown for 10 years

23,934
kilometers driven by an average passenger car

Source:
www.epa.gov



2025 // 45% reduction of daily energy consumption

2020 // CUT P Pro series: Daily energy consumption reduced by 30%

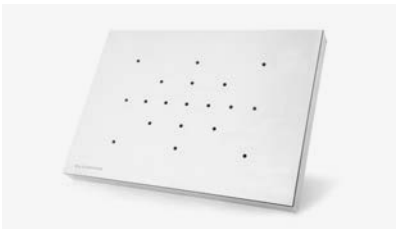
2015 // CUT X00 series

Available options


1


5


8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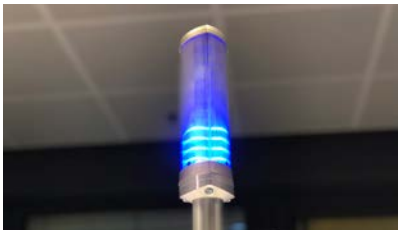
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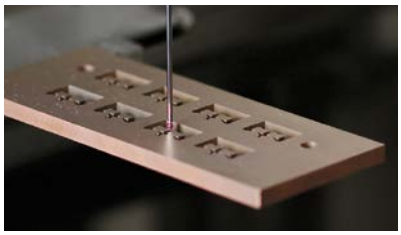
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7


10


4


11

1 // Chromium-hardened table
The clamping table features a special chromium anti-scratching surface treatment, and incorporates 108 M8 holes distributed in two rows around the table with a 50 mm pitch.

2 // Advanced accuracy
A special procedure applied during the machine's final geometry and mechanical-control check performs calibration with a 19-hole plate crafted after the build to verify positional accuracy.
We fine-tune axis calibration through several iterations based on the result of the positional accuracy check. This procedure achieves pitch accuracy of ± -2.0 Lm.

3 // Renishaw 3D probing system
Choose the fixed or retractable Renishaw mechanical touch probe option to measure the planarity and position of workpieces placed on the machine's worktable. To use the probe, insert it manually into a chuck on the left side of the Z axis.

4 // Big spool unit (25 kg)
Accessible from the left side of the machine, this option enables you to:
- Increase machining autonomy up to 100 hours (wire Ø 0.25 mm).
- Accommodate DIN K200 (16 kg), K250 (25 kg) or JIS P15 (15 kg).

5 // Surge Protection Device (SPD)
To reinforce protection against HPS breaks beyond the standard main filter with integrated protection, choose the optional additional SPD.

6 // Automatic centralized greasing
To ensure long-lasting mechanical function, the CNC automates manual centralized greasing via an electrical pump. The central lubrication system, located between the electrical cabinet and the D8 filters, lubricates all the machine's axes, including X, Y, U, V and Z. This system uses specific distribution movements to facilitate access to and lubrication of the guides and ball screws.

7 // 3D Setup
Measure the planarity of workplaces on the machine tool's worktable with the mechanical touch probe of the factory-installed workpiece alignment sensor (3D Setup). Located on the left side of the Z axis, this probe extends automatically for measurements. The full 3D functionality of this feature enables you to place the wire perpendicular to the upper face of the part automatically during part setup. Because this function not only defines wire inclination but also operates rotation in the space of the machine's coordinate system, this alignment function – called 3D correction – makes the precise position of the part planes on the Z axis precisely known.

8 // Wire chopper
The wire chopper cuts used wire into small chips and collects them into a box at the back of the machine that holds up to 25 kg of brass. Note that because the wire chopper is integrated fully into the machine, it does not change the machine dimensions.

9 // Four-color stack light
To visualize equipment status, the optional stacklight incorporates four configurable colors: green, yellow, red and blue. Order this stacklight with optional WD0188 I/O interface.

10 // Horizontal manual wire annealing
To use this wire-annealing system, the operator positions the wire horizontally. A conveniently placed button assists the operator in annealing the wire to prepare for threading.

11 // Auxiliary rotary axis (with/without chuck)
The rotating/positioning Spindle is completely sealed against liquid and can be used horizontally in the dielectric of electrical discharge machines.
The measuring system is situated on the rotary table axis for direct measurement. This axis is able to do indexing, spinning and turn while burn (TwB).

Technical specifications

CUT P 350 Pro

CUT P 550 Pro

CUT P 800 Pro

		CUT P 350 Pro	CUT P 550 Pro	CUT P 800 Pro
Machine				
Type of machining		Submerged wire cutting	Submerged wire cutting	Submerged wire cutting
Dimensions of complete equipment (*)	mm (in)	2050 x 2234 x 2154 (80.71 x 87.95 x 84.80)	2600 x 2640 x 2340 (102.36 x 103.94 x 92.13)	2670 x 2870 x 2645 (105.12 x 112.99 x 104.13)
Total weight of equipment (without dielectric)	kg (lbs)	2450 (5401)	3300 (7275)	6300 (13860)
Machining area				
Vertical sliding door		Automatic	Automatic	Automatic
Max. workpiece dimensions (*) (Top load)	mm (in)	1000 x 150 x 220 (39.37 x 5.90 x 8.66)	1200 x 275 x 400 (47.24 x 10.80 x 15.75)	1450 x 550 x 510 (57.08 x 37.40 x 20.07)
Max. workpiece dimensions (*) (Front load)	mm (in)	800 x 550 x 220 (31.50 x 21.65 x 8.66)	1000 x 700 x 400 (39.37 x 27.56 x 15.75)	1450 x 950 x 510 (51.08 x 21.65 x 20.07)
Max. workpiece weight	kg (lbs)	750 (1653)	1500 (3307)	3000 (6614)
Dimensions of table (**)	mm (in)	680 x 450 (26.77 x 17.72)	900 x 600 (35.43 x 23.62)	1240 x 800 (48.8 x 31.5)
Floor-to-table distance	mm (in)	1000 (39.37)	1000 (39.37)	1000 (39.37)
Total volume of dielectric fluid	l (gal)	700 (185)	1300 (344)	1700 (450)
X, Y, Z and U, V axes				
X, Y, Z travel (*)	mm (in)	350 x 220 x 220 (13.77 x 8.66 x 8.66)	550 x 350 x 400 (21.65 x 13.77 x 15.75)	800 x 550 x 510 (31.5 x 21.65 x 20.07)
U, V travel (**)	mm (in)	350 x 220 (13.77 x 8.66)	550 x 350 (21.65 x 13.77)	800 x 550 (31.5 x 21.65)
Max. speed (X, Y and U, V axes)	m/min	3 (9.8 ft/min)	3 (9.8 ft/min)	3 (9.8 ft/min)
Integrated Collision Protection (ICP)		Standard on 5 axes	Standard on 5 axes	Standard on 5 axes
Taper machining				
Max. taper	°/mm °/in	±45/220 (±30/220 standard) ±45/8.66 (±30/8.66 standard)	±45/400 (±30/400 standard) ±45/15.75 (±30/15.75 standard)	±45/510 (±30/510 standard) ±45/20.07 (±30/20.07 standard)
Electrical supply (machine)				
Three-phase input voltage	V	380/400	380/400	380/400
Maximum consumption	kVA	12	12	12

* Width x depth x height ** Width x depth

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Dielectric		
Paper filters		2 cartridges (option 4 cartridges)
Temperature control of clean water tank	°C	±0.1 (±2 °F)
Total volume of deionization resin (option)	l	20 (5.3 gal)
Max. injection pressure	bar	20

IPG Generator		
Protection against electrolytic effects		From roughing through to finishing
Max. cutting speed	mm^2/min	400 (37.7 in^2/hour)
Min. finishing	µm Ra	0.08 (3.2 µ-inch RMS)

Numerical control	
Position measurement system/resolution	Linear glass scales/0.050 µm (0.000002 in.)
Architecture	PC multiprocessors
Operating system	Windows
Screen	LCD 19" TFT (touch screen)
Input devices	Touch screen, mouse
Remote control	Standard
Part-program capacity	4 MB
Ethernet, USB ports	Standard

		CUT P 350 Pro / CUT P 550 Pro	CUT P 800 Pro
Wire circuit			
Wire diameters available	mm in	0.33 to 0.07 (0.33 to 0.15 std) 0.013 to 0.003 (0.013 to 0.006 std)	0.30 to 0.15 0.012 to 0.006
Type of wire guides		Closed diamond type without clearance	Closed diamond type without clearance
Permissible weights and types of spool (ISO standards)	kg lbs	1.6 (K100) to 8 (K160) 3.52 (K100) to 17.6 (K160)	25 (K250) 55 (K250)
Permissible weights and types of spool (JIS standards)	kg lbs	3 (P3) to 5 (P5) 6.6 (P3) to 11 (P5)	3 (P3) to 5 (P5) 6.6 (P3) to 11 (P5)
Programmable wire tension	daN	0.3 to 3	0.3 to 3
Automatic threading for wire	mm in	0.33 to 0.07 (0.33 to 0.15 std) 0.013 to 0.003 (0.013 to 0.006 std)	0.30 to 0.15 0.012 to 0.006
Automatic rethreading for wire	mm in	0.33 to 0.07 (0.33 to 0.15 std) 0.013 to 0.003 (0.013 to 0.006 std)	0.30 to 0.15 0.012 to 0.006
Options			
Thermostabilization		Water in machine basis/ Air in cabine (UV axis)	—
Large spools	kg (lbs)	16 (35.2) K200, 25 (55) K250	—
TAPER-EXPERT		Advance	Advance
e-Connectivity		Option	Option
Extended taper cutting		From 30° to 45°	From 30° to 45°
Used wire processing		Wire chopper	Standard
Rotating axes		Index or servo-control	—
Automatic part leveling		3D Setup	—
Optical measuring system		OMS	—
3D probing		Renishaw probe	Renishaw probe
Alarm lamp		Four-color stacklight	Four-color stacklight
Advanced accuracy		< ± 2 µm positioning	—
Automatic slug managment		Option	Option
E-tracking		Option	Option
Centralized automatic greasing		Manual (standard) Automatic (option)	Manual (standard) Automatic (option)