

### AgieCharmilles



350/600



## Becoming better every day – since 1802

#### **GF Machining Solutions**

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



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### Experience flexible, intelligent job management, speed-dedicated processes

The CUT E 350/CUT E 600 range puts efficiency at the touch of your finger with a smart, easy-to-use human-machine interface (HMI) and onboard technologies that streamline your job setup, improve your cutting speed, improve your surface finish, protect your valuable workpieces, and ensure your process robustness.

#### **Key points**

### Touch your success



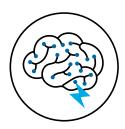


#### GF Machining Solutions innovation keeps you ahead

GF Machining Solutions tradition for constant innovation and strict quality standard push back the boundaries.

#### Benefit from our expertise

You benefit from GF Machining Solutions' legacy of more than 60 years of EDM expertise. We attach extreme importance to our ability to provide you highly competent application support, Customer Services and business support for your specific field.







#### Power your performance

Your business performance is powered by machine performance. Our Intelligent Power Generator (IPG) boasts a wide range of expert technologies helping you to achieve the surface quality and precision your discerning customers demand.

#### Accelerate your productivity

Time saved is money earned. Onboard speed technology package puts you on the fast track to provide excellent performance at an affordable price.

#### **Experience ergonomy**

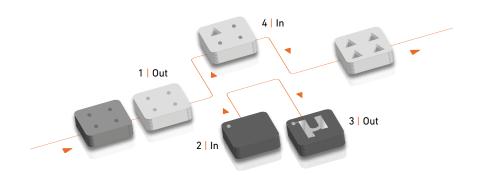
You're just one click away from machining perfect punches, dies, molds and parts, thanks to our intelligent, intuitive AC CUT HMI. Included are powerful tools for fast, safe machining preparation to make your machine programmer's life easier. Industry 4.0 at the tip of your finger.



#### Intelligence inside

## Expert solutions for your success

You benefit from GF Machining Solutions' legacy of more than 60 years of EDM expertise. That expertise informs our solutions and triggers your success.





#### PART EXPRESS

Operators sometimes face unexpected situations. It is very common to be confronted with a change in priorities in the flow of production. With AC CUT HMI, the insertion of an urgent machining job can be done in a simple, rapid and reliable manner and you can resume the previous work exactly where it was interrupted.

#### **AUTO RESTART**

If the power goes out, the point and the job name are memorized, allowing a direct re-start of the job after power is restored.



### Integrated Collision Protection (ICP) saves you money

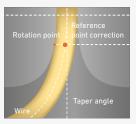
Your operator can work with greater confidence during job preparation and execution, because the ICP on the X, Y and Z axes protects sensitive workpieces from damage.

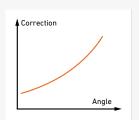
#### TAPER-EXPERT

#### Mastery of large tapers

TAPER-EXPERT allows very precise machining of taper with angle varying from 0 to  $30^\circ$ . Thanks to a dedicated measuring cycle, the position of the guides will be defined accurately according to the angle. During machining, the position of the wire will be corrected automatically according to this measuring cycle result. Despite angles up to  $30^\circ$ , the surface quality is close to cylindrical machining.





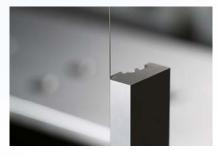




#### **POWER-EXPERT**

### Wire breakage prevention on parts with variable heights

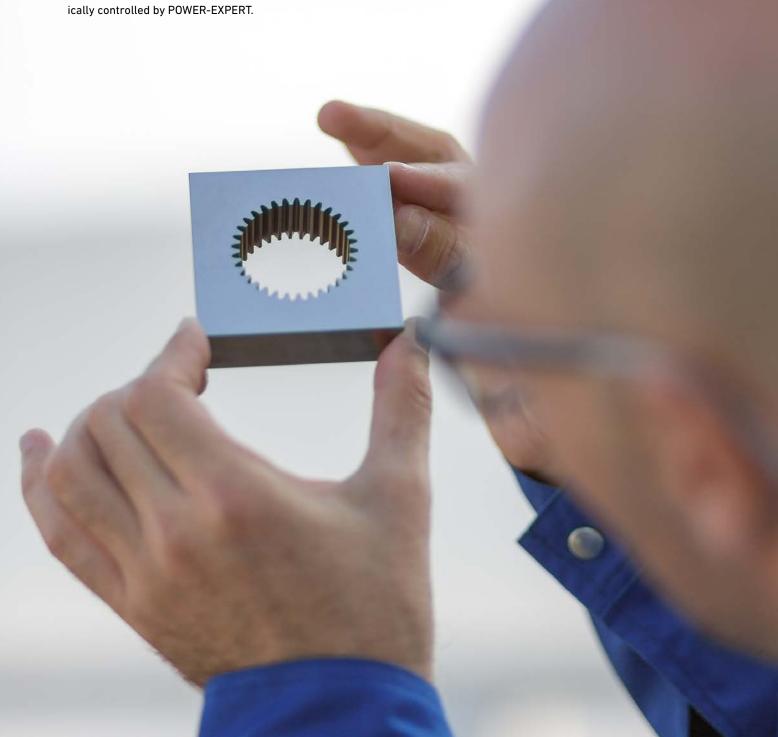
This smart module continually analyzes the machining conditions and adapts the power according to the geometry modifications. Critical situations such as when the part is approaching or crossing a blind hole, are fully automatically controlled by POWER-EXPERT.



#### **WIRE-EXPERT**

#### **Precision over height**

Control of the conicity of the piece compensates for the wire wearing across the height.





#### Compact layout

For space savings. The compact layout of about four square meters allows efficient integration of the CUT E series into your workshop.

#### Drop door

For best use of workshop space.
The standard drop door system allows easy and convenient access to the working zone.

#### Machine concept

## New design, new features based on years of legacy

Solutions to advance your performance and productivity, secure your processes, and accelerate your time to market are engineered into the CUT E 350/CUT E 600 wire-cutting EDM machines

#### Thermocut for easy operation

Your key to successful, efficient threading is preparing the wire properly before threading, thanks to the Thermocut module.

#### Wire circuit

Reliable table wire circuit design ensures a perfect unrolling process that does not disrupt the EDM process during machining.

#### **Automatic threading**

The automatic threading and rethreading is rapid and useful for all kinds of coated and uncoated and hard and soft brass wires.



Automatic indexing chuck Autoindexer is an integrated rotary indexing unit with continuous 90° capability intended for submerged use in wire EDM machines.



Remote control
Designed for one-handed use,
the remote control is a standard
feature offering ease of use and
help in fine tuning workpiece
preparation.



#### Large spool

A 25 kg spool option is available for both the CUT E 350 and the CUT E 600 to extend running hours and allow continuous production in combination with

- 20-liter deionizing bottle
- Two filter cartridges

#### Save energy: an economic and ecological necessity

In order to control production costs, saving energy has become a priority in many workshops. The Econowatt modules manage the electrical power of the machine so as to never waste energy when the machine is running unattended. When machining is finished or interrupted, the power supply is reduced to the minimum, lower than 1 kW, or completely disconnected depending on the parameters of the machine. Automatic restart is programmed according to a daily schedule corresponding to the working hours of the workshop. The machine is switched on in sufficient time to be thermostabilized when the workshop opens.



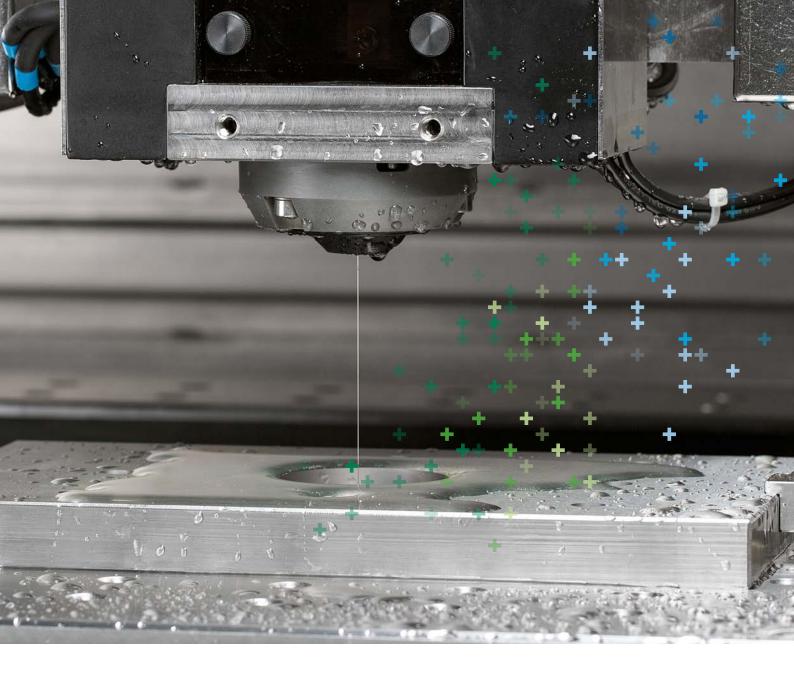


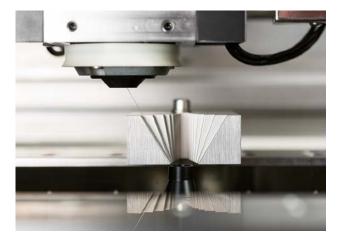
#### T shape

For accuracy. The T-shaped based frame permits loading of large and heavy work pieces. The compactness and independence of the XY/UV axes guarantee good positioning accuracy and highly repeatable results.

#### Large/heavy workpieces

Thanks to the standard drop door, large and heavy workpieces up to 1,000 kg can be easily loaded and unloaded.





#### Taper

Precison cuts up to  $30^{\circ}$  over 56 mm are enabled by a compact and flexible mechanical concept.



#### Glass scales

For repeatability. The glass scales preserve long-term accuracy, require no recalibration, and eliminate classical screw system errors related to backlash and wear.

#### Numerical control and interface

## A new era of functionalities with an ergonomic HMI

With a 19-inch touch screen with pinch-and-pull effect for high detail accuracy, intuitive logic for fast learning, and a new hand box designed for one-hand use, the AC CUT HMI makes fast work of programming multi-cavity and multi-technology jobs.



#### Manual mode setup

Directly access the main machine functions, perform manual measurements, run manual movements, and perform manual machining

Offers tables to store variables and points and displays machine variables

> Select, modify and load generator setting for manual machining

Gives a feedback about machining conditions

Offers numerous measuring cycles to allow part reference pick-up

Displays current job's operations that allows monitoring graphically the execution progress

#### Configuration and maintenanc

Manages wire, deionization resins and filters consumption

Allows user to set preferences and adjust user's profile

Allows setting and calibrating machine functions, taking axis references

Displays the current configuration of the system

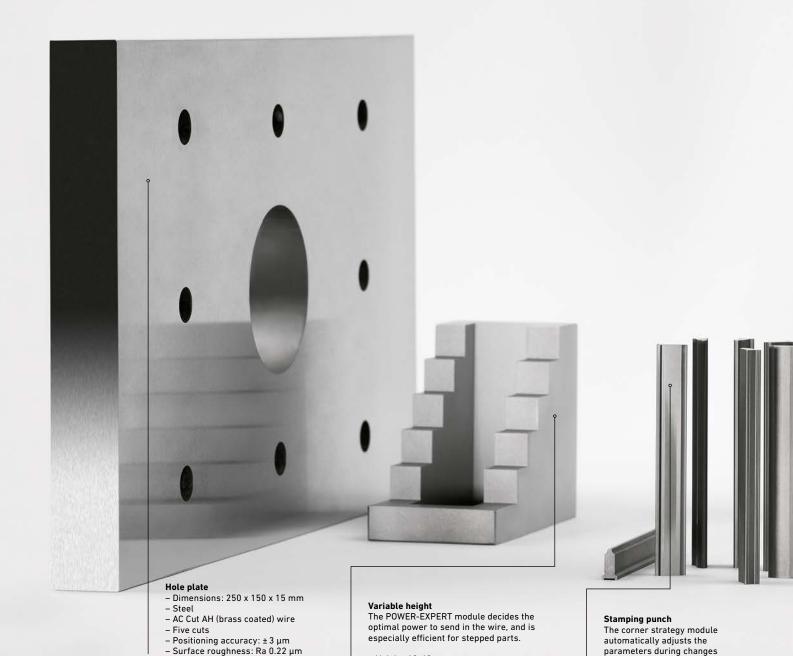
Allows to set and activate e-connection functions



#### Digital IPG generator

## **Power** your performance

Your efficient production is at the heart of the modern IPG. Its onboard technologies boost cutting speed, precision and surface quality to satisfy your customers and put you ahead of your competitors.



- Height: 10-60 mm

- AC Brass 900 (hard) wire

– Surface roughness: Ra 0.55 μm

- Steel

- Three cuts

of direction to ensure sharp

- AC Cut AH (brass coated) wire

- Contour accuracy:  $\pm\,5~\mu m$ 

angles and small radii.

- Height: 60 mm

- Steel

– Five cuts

#### 14 AgieCharmilles CUT E 350 / CUT E 600



#### Digital IPG generator

## Dedicated to accelerate your productivity

Our latest anti-electrolysis IPG generator combined renewed state of the art CNC control is the new base for the next generation GF Machining Solutions machines. The future is here.



#### **Electronic integration**

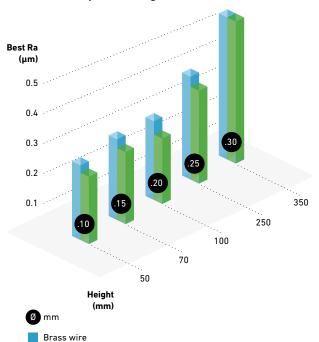
The latest generation of GF Machining Solutions' power generators allows a digital control of each spark allowing precision and very fine surface quality down to Ra 0.16  $\mu m$ .

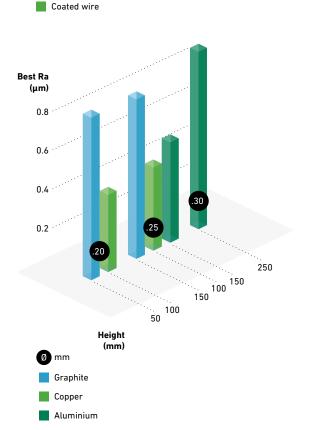


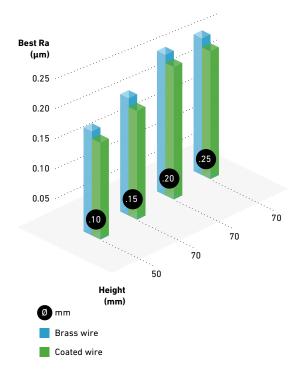
#### Easy EDM management

EDM EXPERT module generates the best process according to precision and material needs. A large panel of preconfigured technological parameters enables an optimal choice of parameters for your application. Combined with the latest state of the art GF Machining Solutions wires enables excellent performances.

#### Steel dedicated process range





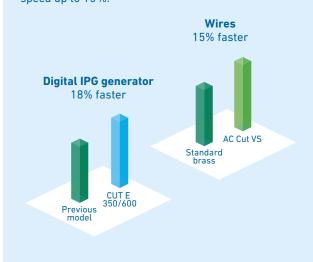


#### **Speed dedicated process**

Focusing on productivity, the integrated processes are saving you time and can reduce cutting time by as much as 18 percent compared to equivalent standard machines.

#### **AC Cut VS**

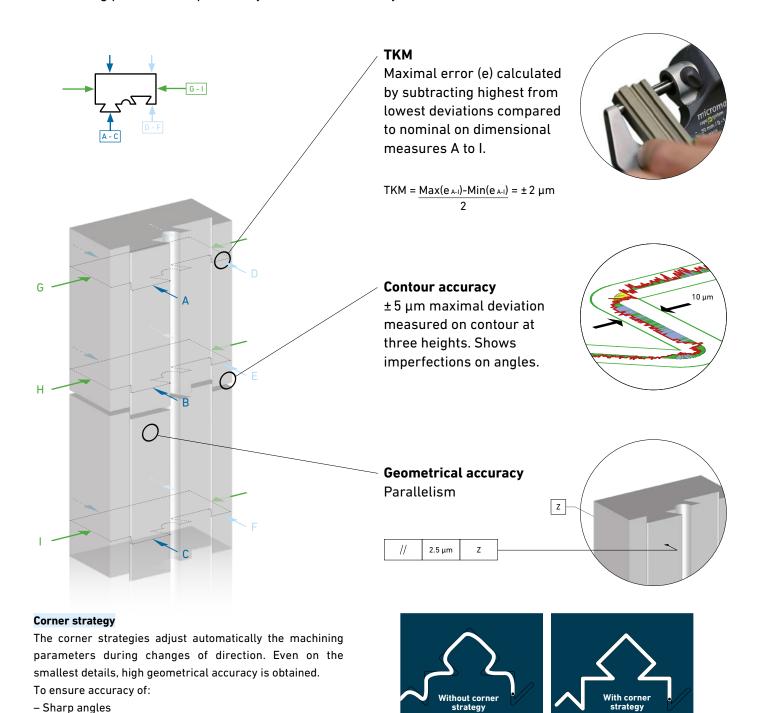
A wire EDM machine has a very wide range of applications and the choice of wire is crucial in order to obtain the best productivity and optimum results in terms of speed, precision and surface finish. The GF Machining Solutions AC Cut VS certified wire accelerates cutting speed that allows to increase machining speed up to 15%.



#### Machine performance

## Outstanding precision and repeatability

This part was machined under the conditions our customers face daily in the stamping industry. It demonstrates the excellent machining capabilities essential for precision parts: remarkable form accuracy, excellent contour precision, exemplary surface quality and outstanding production repeatability—four reasons to buy a CUT E series machine.

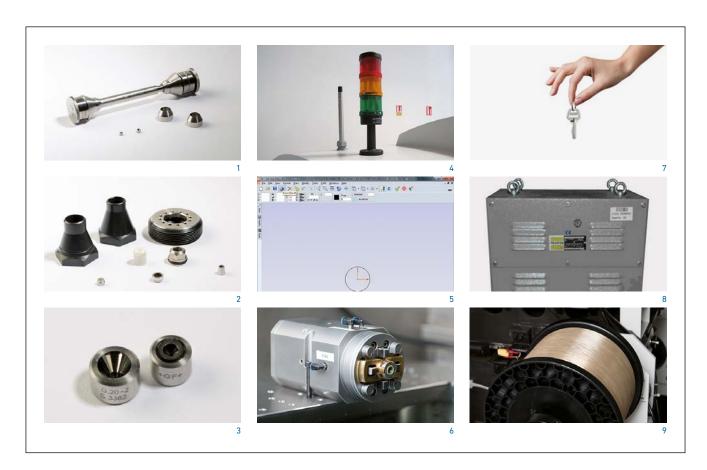


- Small radii

#### Machine options

## Customize your solution

Make your CUT E 350/CUT E 600 solution distinctly yours by customizing it to your specific workshop needs. It's as easy as choosing from our wide range of options.



#### 1 // Kit for wire diameter 0.100 mm

This set includes all the parts that ensure a good machining reliability when using a wire diameter of 0.1 mm.

#### 2 // Taper kit

- Option for accurate taper cutting

  One set of large radius guides
- One threading nozzle - One set of nuts

Available for 0.2 and 0.25 mm diameter wires.

#### 3 // Set of wire guides

Set of two closed wire guides in diamond with clearance.

– Available diameters: 0.1, 0.15, 0.2, 0.25, 0.3 mm

#### 4 // Alarm lamp

Stack lamp for the visualization of the equipment status

- Stack three-light unit (green, yellow, red)
- Mounting material

#### 5 // AC CAM EASY

#### - Professional license

This option is the updated package from the basic version to professional version.

- Advanced license
This option is the updated package from the basic version to advanced version.

#### 6 // Automatic indexing chuck

Autoindexer is an integrated rotary indexing unit with continuous  $90^{\circ}$  capability intended for submerged use in wire EDM machines.

#### 7 // Additional year parts warranty

This is an extension of the first year warranty. The contract is on the same legal basis as applicable to the first year warranty for the parts only. Consumables and wear parts are excluded. This option must be purchased when the machine is ordered.

#### 8 // 18 kVA external transformer

9 // Large wire spools up to 25 kg for more running hours

#### Our Service + Success range

# We take you to new heights

## Guiding your ascent

Whether it is Milling, EDM, Laser Texturing or Additive Manufacturing, our Service + Success experts guide you throughout the entire lifecycle of our Machining and Automation tools in order to help you reach your peak performance. Our trusted experts backed by our latest cutting-edge, intelligent Digital Solutions, provide a full range of services.



#### Operational steering

Hands-on and operational service interventions with supply of consumables and wear parts



#### **Advanced diagnosis**

Machine check-up, preventive maintenance and advanced services including original spare parts availability in all our hubs around the world



#### Cortification

State-of-the-art reference by industry sector and on machining equipment



#### Ingrados

Designed to add value to the original machine investment in order to achieve higher sustainable productivity



#### Training

Performance oriented academy with a human-centric approach of knowledge transfer in order to realize the full potential of our solutions



#### **Transformation**

Strategic partnership from made-to-measure advice on business model evolution to industrial implementation



#### **Financial solutions**

For the optimization of operating costs featuring minimal initial expenditure programs and leasing options



As a long-time partner, since 1802 we have been serving various industrial segments and have been dedicated to providing you with a first-in-class combination of services.

We have conceived our new Success Packs range for maximizing **your return on investment,** empowering you in your quest for success whatever your industrial profile.



Silver + Secure your future



Silver
Set the foundation for growth



Bronze +
Achieve flawless
production



### **Technical specifications**



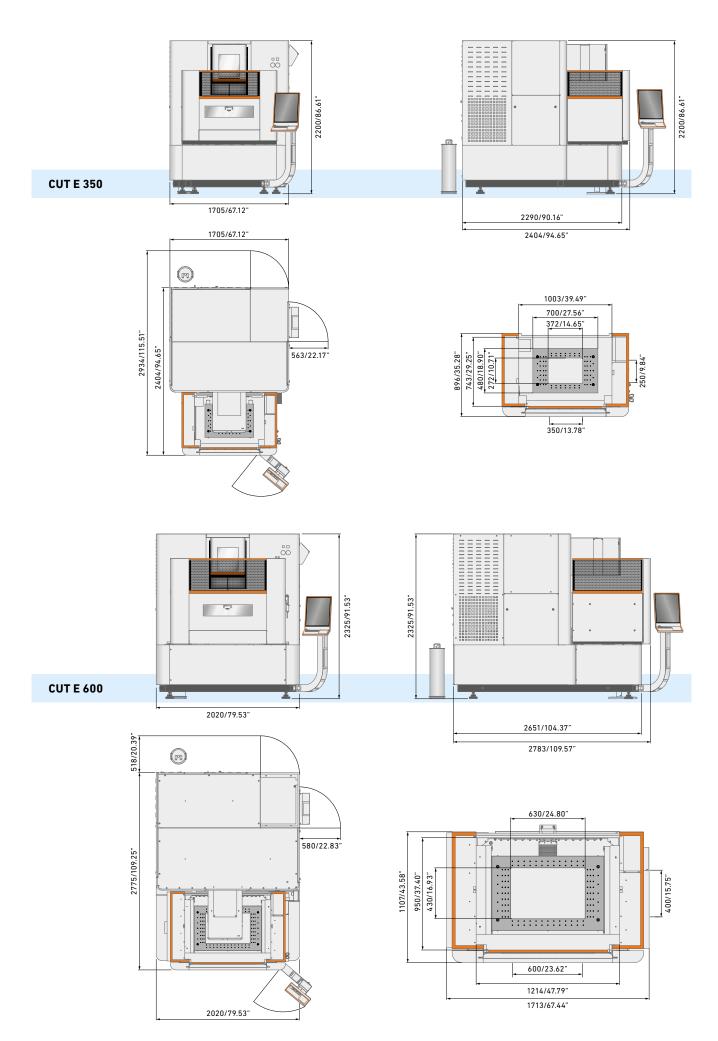


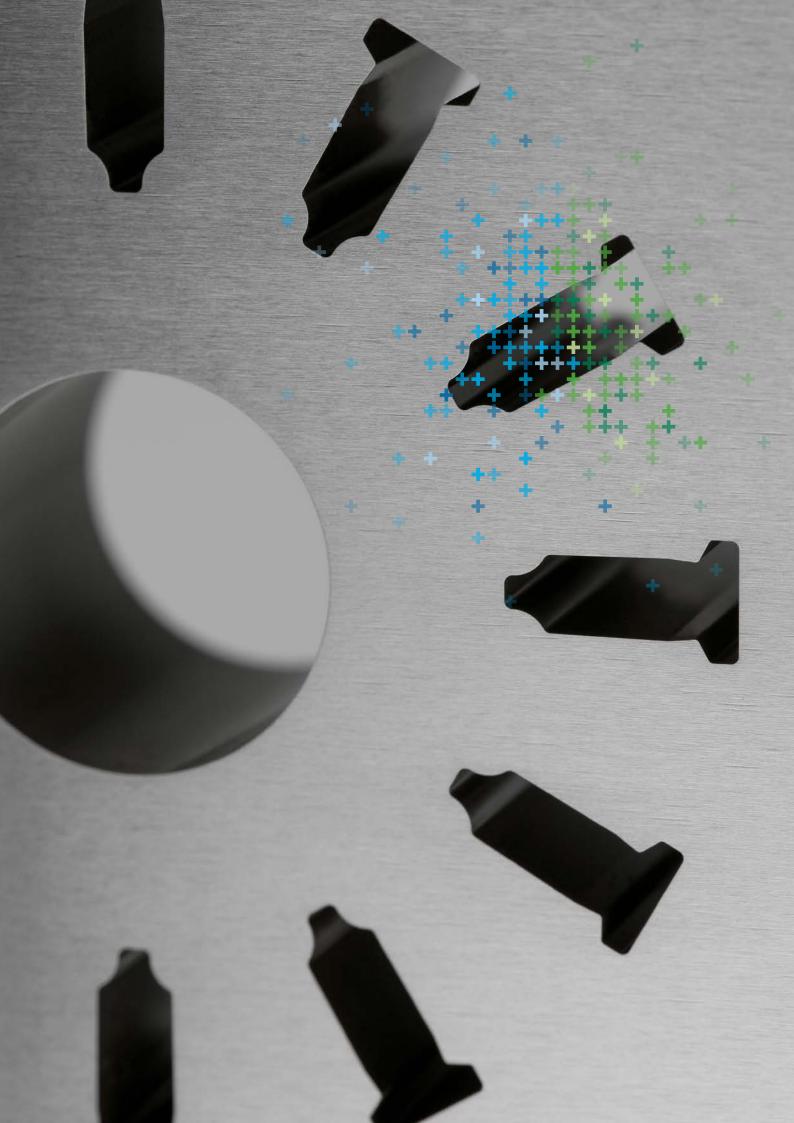
		CUT E 350	<b>CUT E 600</b>
Machine			
Dimensions of complete equipment *	mm	1750 x 2470 x 2200	2020 x 2790 x 2320
	in	68.9 x 97.24 x 86.61	79.53 x 109.84 x 91.34
Total weight of equipment without dielectric	kg (lbs)	2525 (5567)	4440 (9789)
Work area			
Part dimensions	mm	820 x 680 x 245	1030 x 800 x 345
	in	32.28 x 26.77 x 9.64	40.55 x 31.5 x 13.58
Max. part weight	kg (lbs)	400 (882)	1000 (2205)
Level of dielectric min./max.	mm (in)	0/240 (0/9.45)	0/380 (0/14.96)
Air supply			
Pressure	bar	6-7	6-7
Min. flow	l/min	150 (39.6 gal/min)	150 (39.6 gal/min)
<b>Axes</b> X, Y, Z Travel	mm	350 x 250 x 250	600 x 400 x 350
	in	13.78 x 9.84 x 9.84	23.62 x 15.75 x 13.78
U, V Travel	mm (in)	± 45 (± 1.77)	± 50 (± 1.97)
	°/mm	±30/56 or ±25/96	
Taper angle/height	/ [ ] [ ] [ ]	± 30/30 01 ± 23/90	± 30/56 or ± 25/96
Taper angle/height	°/in	±30/2.20 or ±25/3.78	
			±30/56 or ±25/96 ±30/2.20 or ±25/3.78 0.1 (3.94)
X, Y, U, V, Z measurement resolution	°/in	±30/2.20 or ±25/3.78	±30/2.20 or ±25/3.78
X, Y, U, V, Z measurement resolution Speed of axis movement (XYZ)	°/in µm (µ-inch)	±30/2.20 or ±25/3.78 0.1 (3.94)	±30/2.20 or ±25/3.78 0.1 (3.94)
X, Y, U, V, Z measurement resolution  Speed of axis movement (XYZ)  Anti-collision protection for axes	°/in µm (µ-inch)	±30/2.20 or ±25/3.78 0.1 (3.94) 0-3000 (0-118.1)	±30/2.20 or ±25/3.78 0.1 (3.94) 0-3000 (0-118.1)
X, Y, U, V, Z measurement resolution Speed of axis movement (XYZ) Anti-collision protection for axes  Dielectric	°/in µm (µ-inch)	±30/2.20 or ±25/3.78 0.1 (3.94) 0-3000 (0-118.1)	±30/2.20 or ±25/3.78 0.1 (3.94) 0-3000 (0-118.1)
Anti-collision protection for axes  Dielectric Type	°/in µm (µ-inch)	± 30/2.20 or ± 25/3.78 0.1 (3.94) 0-3000 (0-118.1) X, Y, Z	±30/2.20 or ±25/3.78 0.1 (3.94) 0-3000 (0-118.1) X, Y, Z  Deionised water
X, Y, U, V, Z measurement resolution Speed of axis movement (XYZ) Anti-collision protection for axes  Dielectric Type Total volume of dielectric	°/in μm (μ-inch) mm/min (in/min)	± 30/2.20 or ± 25/3.78 0.1 (3.94) 0-3000 (0-118.1) X, Y, Z Deionised water 760 (200.77 gal)	±30/2.20 or ±25/3.78 0.1 (3.94) 0-3000 (0-118.1) X, Y, Z  Deionised water 1000 (264.17 gal)
X, Y, U, V, Z measurement resolution Speed of axis movement (XYZ) Anti-collision protection for axes  Dielectric Type	°/in μm (μ-inch) mm/min (in/min)	± 30/2.20 or ± 25/3.78 0.1 (3.94) 0-3000 (0-118.1) X, Y, Z	±30/2.20 or ±25/3.78 0.1 (3.94) 0-3000 (0-118.1) X, Y, Z  Deionised water

<sup>\*</sup> Width x depth x height



		CUT E 350	CUT E 600
Electrode/Wire			
Standard wire guide	mm	Ø 0.20 or Ø 0.25	Ø 0.20 or Ø 0.25
Č	in	Ø 0.008 or Ø 0.010	Ø 0.008 or Ø 0.010
Wire diameter	mm	Ø 0.1-0.3	Ø 0.1-0.3
(according to configuration equipment)	in	Ø 0.004-0.012	Ø 0.004-0.012
Automatic threading for wires	mm	Ø 0.1-0.3	Ø 0.1-0.3
	in	Ø 0.004-0.012	Ø 0.004-0.012
Automatic rethreading for wires	mm	Ø 0.1-0.3	Ø 0.1-0.3
	in	Ø 0.004-0.012	Ø 0.004-0.012
Min. diameter of pre-hole	mm	Ø 0.2-0.3	Ø 0.2-0.3
for automatic threading	<u>in</u>	Ø 0.008-0.012	Ø 0.008-0.012
Max. height for automatic threading	mm	220	220
with 0.25 mm wire (0.010 inch)	in	8.66	8.66
Permissible weights and types of reel	kg	5 (JIS P5), 25 (DIN 160)	5 (JIS P5), 25 (DIN 160)
	lbs	11.02 (JIS P5), 55.11 (DIN 160)	11.02 (JIS P5), 55.11 (DIN 160)
Best Ra Tungsten Carbide/Steel	μm (μ-inch)	0.12/0.18 (4.72/7.09)	0.12/0.18 (4.72/7.09)
Max. machine cutting speed	mm²/min (in²/min)	300 (0.46)	300 (0.46)
Cabinet			
Three-phase input voltage	٧	380/400	380/400
Network frequency	Hz	50 or 60	50 or 60
Permissible fluctuations	-	± 10%	± 10%
Total installed power	kVA	10	10
Permissible micro-break	ms	4	4
Power factor		0.8	0.8
Screen/Operating system		TFT 19"/Windows 7	TFT 19"/Windows 7
CD-ROM/Keyboard		No/No	No/No
Ethernet port USB	-	Yes	Yes
Remote control		Yes	Yes
Ambient conditions			
		20 ± 1°C (68 ± 33.8°F)	20 ± 1°C (68 ± 33.8°F)
Temperature for optimum accuracy		15-30°C (59-86°F)	15-30°C (59-86°F)
Temperature for operation of the equipment			
Permissible relative humidity		40-80%	40-80%
Max. sound emission of the machine	Db(A)	76	76
Thermal stabilization time	<u>h</u>	3	3
Level of protection of electrical equipment	IP	43	43





#### **About GF Machining Solutions**

## Multi-technology solutions provider

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

#### **EDM** (Electrical Discharge Machining)









#### Wire-cutting EDM

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

#### **Die-sinking EDM**

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

#### Hole-drilling EDM

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

#### Millina



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

#### High Performance Airfoil Machining

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

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

#### Advanced manufacturing







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

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

#### Laser Additive Manufacturing (AM)

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

#### Tooling and Automation





#### Software



#### Customer Services



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

#### **Automation**

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

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

#### Worldwide for you

Ensuring the best performance throughout the lifetime of our customers' equipment is the goal of our three levels of support. Operations Support offers the complete range of original wear parts and certified consumables. Machine Support includes spare parts, technical support, and a range of preventive services to maximize machine uptime. Business Support offers customerspecific business solutions

#### Worldwide for you



#### **Switzerland**

Biel/Bienne Losone Geneva Flawil Langnau

www.gfms.com/ch

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Poland, Raszyn / Warsaw www.gfms.com/pl

Czech Republic, Brno www.gfms.com/cz

Sweden, Vällingby www.gfms.com/system3r

Turkey, Istanbul www.gfms.com/tr

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Vietnam, Hanoi www.gfms.com/sg

### 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

