GF Machining Solutions

AgieCharmilles

CUT 1000
CUT 1000 OilTech

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 Milling, electrical discharge machines (EDM) and Laser texturing machine tools through to first-class Automation, Tooling and software systems — all backed by unrivaled Customer service and support — we, through our Mikron, Liechti, AgieCharmilles and System 3R technologies help you raise your game and increase your competitive edge.

Swiss design and quality

Contents

Perfect micro components — for you

Specifically designed to meet the stringent requirements of your customers in a wide range of industries where miniaturization is a high priority, the CUT 1000 and CUT 1000 OilTech ensure your greater process autonomy and reliability, higher efficiency and accelerated performance.

See how easy it is to achieve perfect machining results with the CUT 1000 and CUT 1000 OilTech.

Highlights

The benchmark for ultra accurate results in micro wire EDM applications

The world of micro dimensions

GF Machining Solutions technology supports the increased miniaturization of industrial components. Production of very small components has become a high priority in many industries: connector technology, medtech, watch making, automotive and aerospace.

The production of micro components is linked to higher manufacturing tolerances and the ability to precisely produce geometrical shapes.

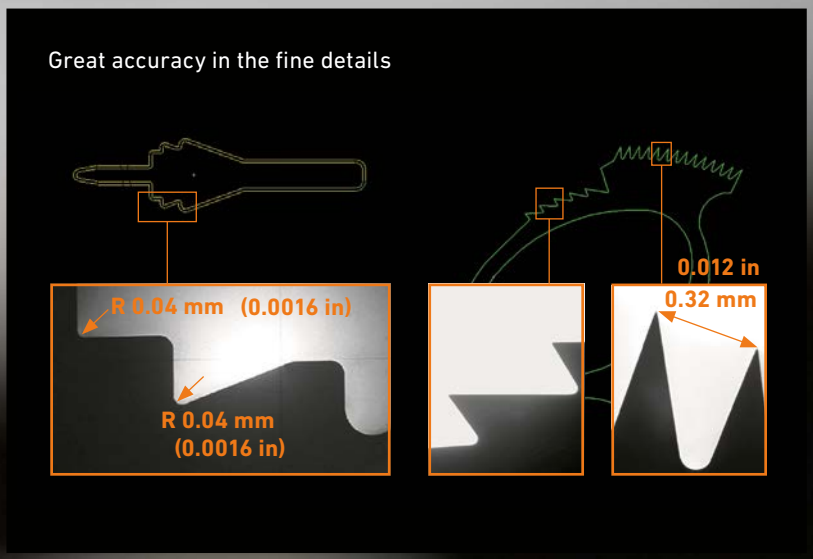
In the manufacture of high-precision stamping tools and in the production of micro components, best contour accuracy, finest surface finish and highest repeatability are absolute musts.

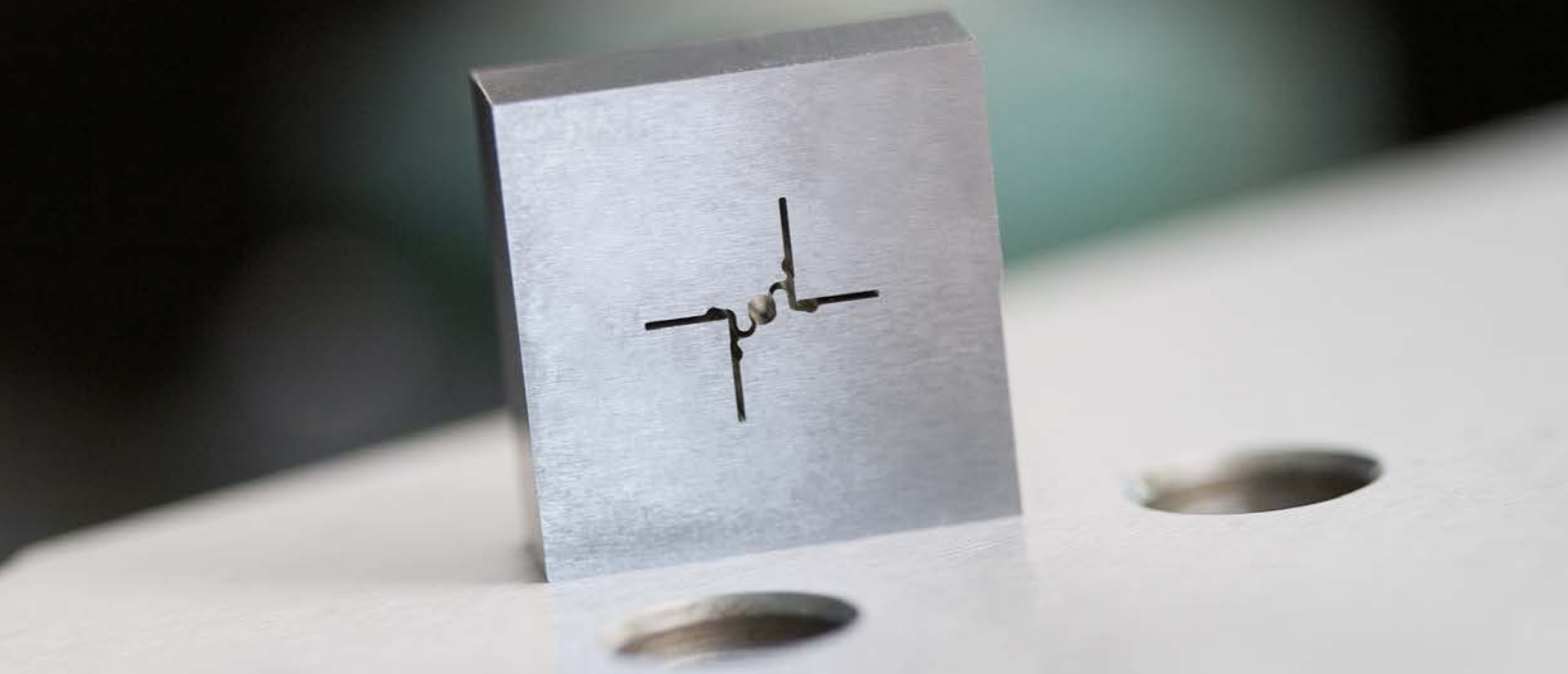
GF Machining Solutions' new CUT 1000, specifically designed to meet these demands, offers unique features in terms of precision and productivity, and perfect predictability and repeatability of machining results. This wire cut machine is a benchmark in micro erosion.

Watch industry
High accuracy in the inner radii.
Exactness in machining the small details with provision for machining inner radii down to 0.02 mm (0.0008 in).

The innovative mechanical structure of the CUT 1000 — with a patented monobloc framework, separately arranged main axes, a dual measurement system on all axes, a consistent separation of the sources of heat from the EDM area, and a working area kept constantly under water as well as an optimal water circuit — creates the prerequisites for outstanding features:

- 1 µm positioning accuracy over whole travel paths
- Ra 0.05 µm best surface quality
- 11 µm (0.44 in) smallest possible inside radii
- 20 µm (0.79 in) smallest possible wire diameter
- 22 µm (0.88 in) smallest possible slit



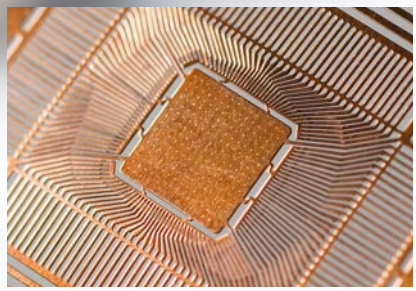


Medical technology
Production of single components or small series of surgical tools like bipolar surgical forceps.

Very good surface finish down to Ra 0.10 µm (4 µin) in stainless steel and titanium with best surface quality.

Microelectronics
Leadframes, high accuracy and perfect surface quality.

Die-punch clearance: 1 µm (40 µin)
Best surface finish Ra 0.05 µm (2 µin)
Perfect surface homogeneity, no microcracks and corrosion, very small internal radii down to 22 µm (0.88 in)

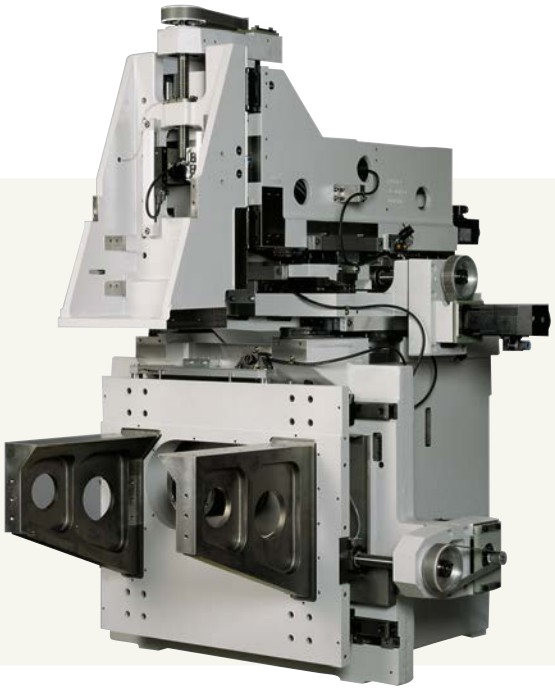


Food industry
Positioning accuracy.

Mass production requires high precision cutting tools, above all for the manufacture of articles just a few hundreds of mm in thickness.

Thickness of the sheet to be blanked:
0.04 mm (0.0016 in)
Required accuracy: <2 µm (80 µin)

Unique design for highest quality and accuracy



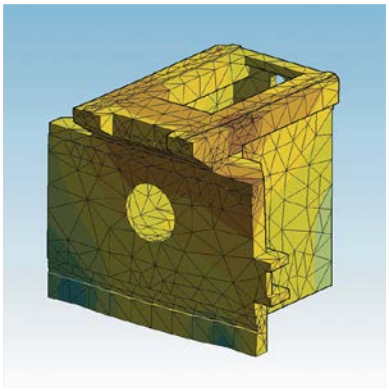
CUT 1000 designed for outstanding accuracy

Due to an exclusive machine design concept, the CUT 1000 meets highly demanding requirements in terms of positioning accuracy, shape and detail accuracy. These results are possible thanks to the development of an innovative machine tool design based on a monoblock framework with separated X and Y axes, and through the static and dynamic analysis of the behavior of the machine tool with the Finite Element Method.

Concept for insulated heat sources

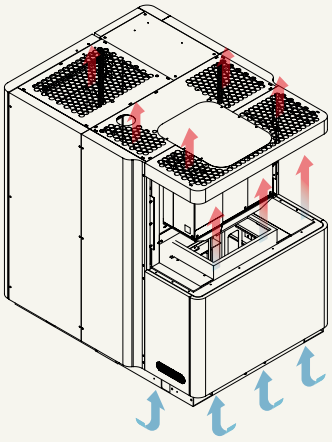
Every heat source of the CUT 1000 has been analyzed and insulated with air, cooling water, and insulation materials, or by locating the heat sources in order to not affect the machine.

Through the particular design of the cabinet, a total thermal insulation concept has been conceived, which includes two stages: first by performing a perfect temperature control between the machine and its surrounding area, and second, by creating a micro climate in the work area ensuring constant temperature.



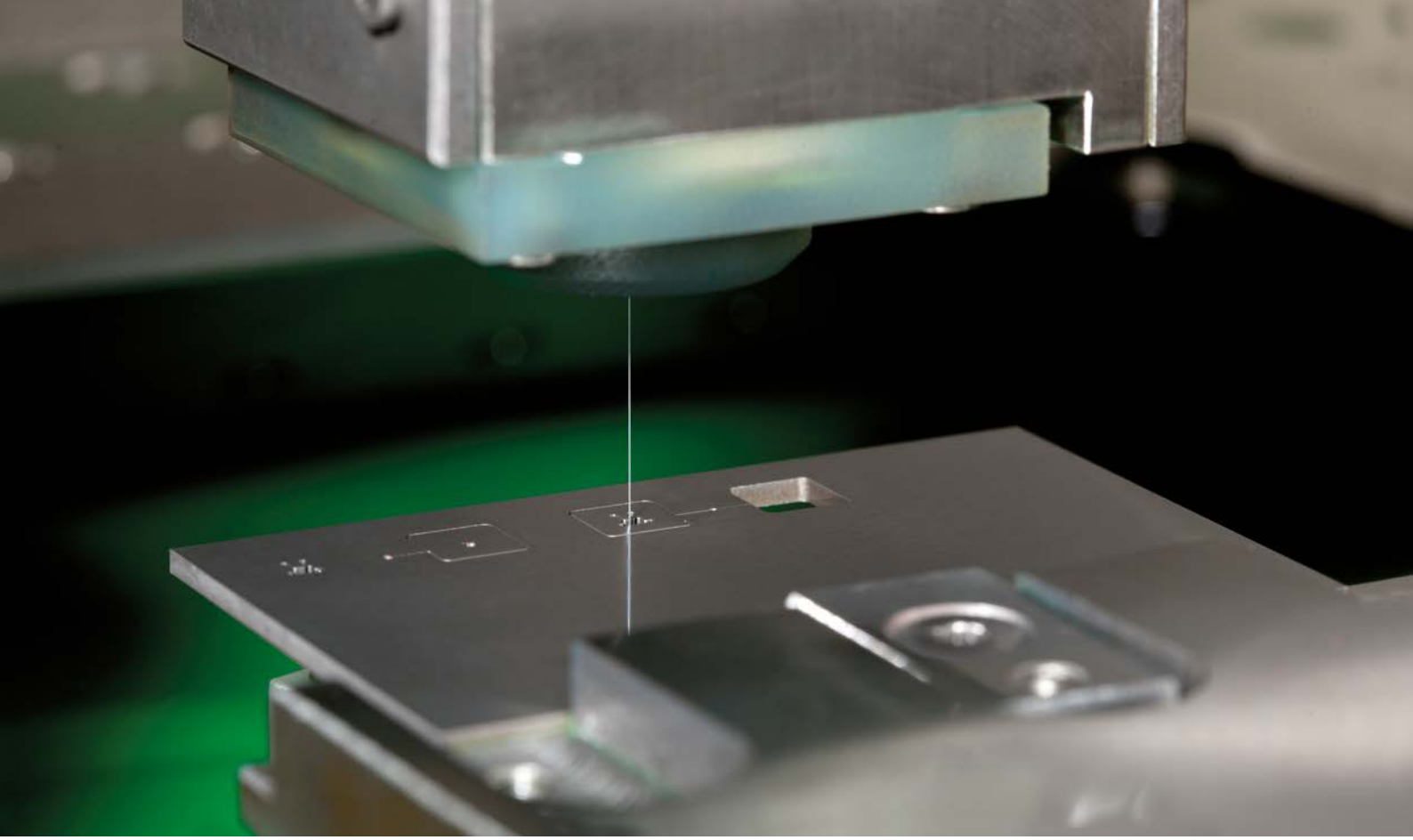
Thermo controlled water circulation

The work tank has been designed as an overflow tank for constant water circulation in the work area. The water is cooled in the main dielectric tank before recirculation. This ensures an absolutely constant temperature of the water in the work tank. The water level is adjusted automatically to the workpiece height by raising and lowering the filled work tank.



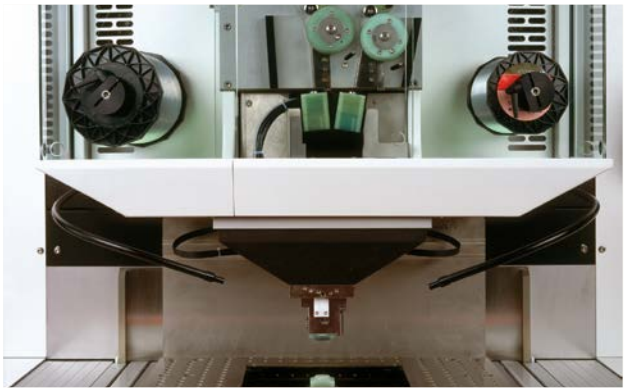
Mastery of quality and accuracy
During each phase of the assembly of the CUT 1000, the quality and tolerances of the assembled mechanical components are measured.
The measured values are stored in the control system of the CUT 1000.

For the highest level quality of monitoring, each CUT 1000 is measured and calibrated with state-of-the-art laser measuring methods, achieving nano mm resolution.



The exclusive wire system

AWC two-wire spool system for unparalleled productivity in micro wire EDM



Highest productivity with AWC

The AWC wire system considerably increases productivity by allowing the use of larger diameter wire or premium wires for the main cut and then automatically switching to smaller diameter or more economical wires for the finish cut. The result of this unique GF Machining Solutions feature is a huge increase in the average cutting speed.

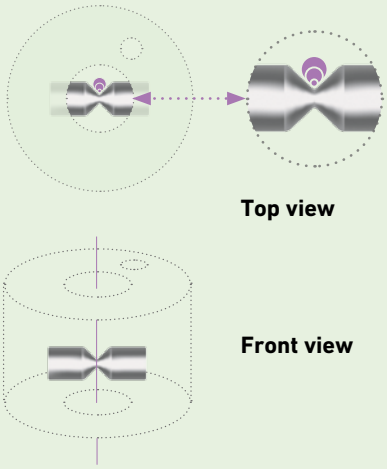
THREADING-EXPERT

Threading under even the most difficult conditions

THREADING-EXPERT is a retractable device driving the wire from the upper guide to the start hole (upper surface) through a fine slotted nozzle.

Standard configuration with various nozzle depending on the wire diameter insuring the reliability of the threading.

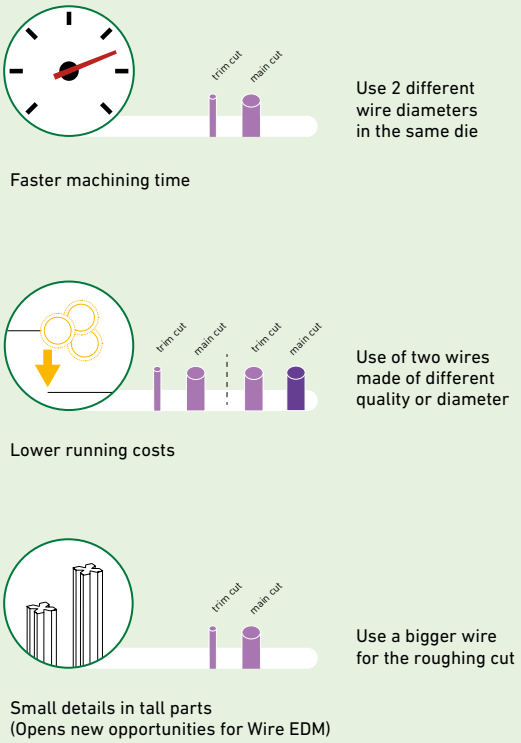
A single wire guide permits all wire diameters to be installed



The reliability of single wire and double productivity

The smart and simple design concept of the AWC double wire system and the proven AC Jet wire threading system ensure absolute reliability in automatic wire diameter change during an automatic machining process. This allows unmatched productivity by using a larger diameter wire during the main cut, for important machining time savings, and the fully automatic change to the smaller radius as required by the actual geometry, for the finishing.

AWC for micro erosion: benefits



Efficent wire chopper

Simple and reliable wire disposal with the integrated wire chopper is important to avoid electromagnetic radiation.

Designed for a high level of autonomy

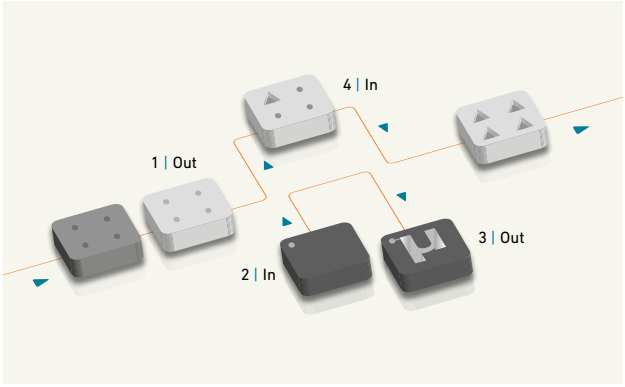
The CUT 1000 also has optimal autonomy available as a prerequisite for automated sequences:

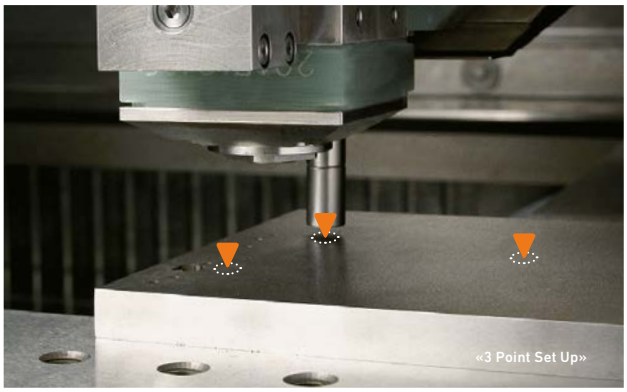
- 2 x 8 kg (17.6 lbs) wire spools
- Long service lives of the filter and deionizing system
- Long working life of the power feeds and wire guides
- Restart after a power failure
- Results on the workpiece achievable with certainty and straight off thanks to mature technologies
- Maintenance and service intervals can be planned.

AC Vision

User friendly and powerful, for highest efficiency, onboard Job Management System included

AC Vision is a control system developed especially for ED machining and shop floor requirements with a high level of operating convenience. A few data inputs are sufficient to generate the EDM program using the Microsoft® Windows® operating system, just like your PC at home.





Highest flexibility in unexpected situations with the Job Management System

Dealing with changes of priority in the workflow occurs continuously in all workshops. Inserting an urgent machining job when another job is in progress is a requirement which has to be realized in a simple manner, rapidly and with reliability.

The Job Management of the CNC Vision 5 provides the solution, providing a simple and intuitive way to suspend the job in progress, insert the urgent job, and then continue the previous job exactly at the point where it was suspended.

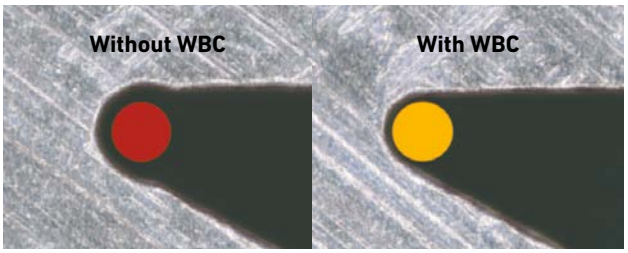
Time-saving work preparation with 3D Setup

Perfect preparation of the work by properly clamping the part on the table is an important operation which will determine the final quality of the job. Reducing time and costs spent on this operation is a permanent goal in all workshops. 3D Setup provides the solution, thanks to a cycle which puts the wire perpendicular to the surface of the workpiece.

This operation can also be performed fully automatically, using palletized workpieces.

Highest machining performance

The benchmark in terms of fine surface finish and quality



Fully digitized pulse control

Powerful and modern electronics and smart process control allow the most efficient EDM process.

All common conducting materials can be processed to the best results with any type of wire. For best surface finish, the IPG-V generator allows the elimination of the affected layer in steel, and yields perfect surface integrity in carbide.

Perfect cutting of contours with AWO and WBC functions

To operate a high performance fine blanking tool, with clearance of a few microns between punch and die, contour accuracy and parallelism of cut shapes must be perfect.

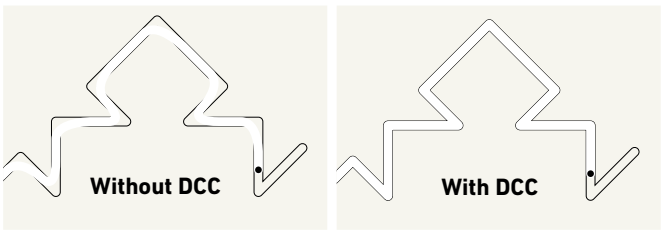
The CUT 1000 offers excellent performance due to the automatic setting of wire position and straightness.

Wire Bending Control (WBC) automatically compensates for the wire flexion caused by the eroding forces, whereas the Advanced Wire Offset (AWO) function compensates for the wire wear during finishing machining in order to reach perfect parallelism of the cut surfaces.

Variocut: optimal cutting speed under any circumstances

High cutting speed is the basic condition for productivity of the equipment. In case of variable workpiece heights, Variocut constantly optimizes the power of the spark erosion in order to avoid wire breaks and maintain a maximum cutting speed in roughing cutting.

With Variocut, the machining is performed to the required accuracy with perfect parallelism and surface homogeneity.



Constant speed in all contours

Precise full cuts at maximum speed. Dynamic Corner Control (DCC) continuously corrects physically determined contouring errors. The wire path is dynamically optimized. As a result, the quality of the geometry in full cuts improves so that trim cuts can be carried out faster or even avoided entirely.

IVU

Easy, automatic, accurate measurement and positioning

Fully integrated optical based system

The exclusive Integrated Vision Unit (IVU) embedded in the CUT 1000 and CUT 1000 OilTech machine is an optical measurement system designed for in-process measurement. Autofocus positions the CCD camera at the right distance and directly measures any shape on the workpiece without removing the piece from the machine.

The contrast of the contour is enabled by the backlight installed on the lower arm of the machine.

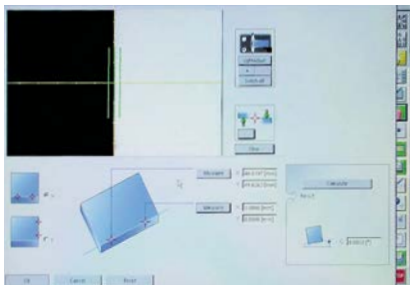
Auto scanning of the form

A complete scan of the contour can be performed anytime. A comparison with a DXF file (theoretical size) can be done and visualized directly on the machine.

If done before the end of the machining, a correction can be introduced.

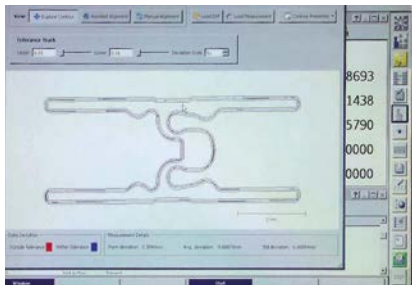
"Get the edge" concept

Special integrated software allows the machine to detect the right position of the edge by analyzing variations in light intensity. The resulting metrological data can be used in various applications.



Electronic components

An automatic correction of the contour can be generated at the end of the machining.

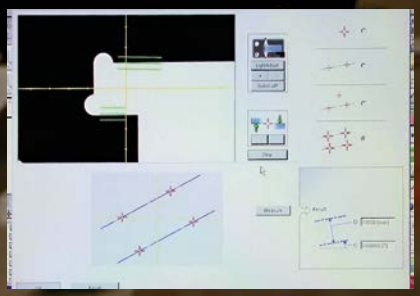


Take the reference

The IVU system makes it possible to any reference on the workpiece for:

- hole centering
- corner detection
- internal or external centering between two faces
- distance between holes, centering, dimensions

IVU system:
100 percent reliability of your results.



Local measurement
Some parts can present local difficulties.
With IVU, it is always possible to locally measure a small detail on the contour (radius, distance).

CUT 1000 OilTech

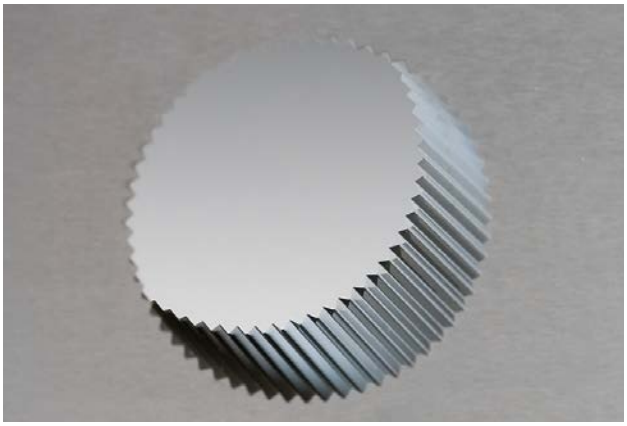
Surface quality at the highest level

The GF Machining Solutions generators for wire EDM enable elimination of electrochemical damage to the workpiece during machining in water, but natural corrosion cannot be avoided. The CUT 1000 OilTech uses an inert dielectric (oil), making it possible to produce parts with unsurpassed surface quality, even if this includes long-term immersion in the dielectric.

The use of oil-based dielectric totally eliminates the possible effects of corrosion on the pieces.

This allows:

- Leaving the eroded components in the dielectric for many hours without any risk of oxidation
- Running multiple jobs during the night and the weekend for higher productivity
- No need for an operator to remove and dry completed workpieces
- Significant simplification of the planning of the plant



Quality and perfect corner integrity after EDM machining
With the CUT 1000 OilTech, GF Machining Solutions offers a machine with an inert dielectric (oil) that enables machining in tungsten carbide without loss of cobalt, and surface finish down to Ra 0.03 µm (1.5 µin) together with impeccable corner quality.

Very fine surface finishes of exceptional quality

Parts machined on the CUT 1000 OilTech have exceptional surface quality. There is no coloration due to oxidation or redeposit of materials suspended in the dielectric.

Therefore, the machined parts are sound and without defect, ready to be used, aesthetically perfect, and of exceptional quality, meeting the very high demands of the watch making industry.

Technical Data

CUT 1000

CUT 1000 OilTech

		CUT 1000 / CUT 1000 OilTech
Machine		
Type of machining		Submerged wire-cutting
Dimensions of the machine (*)	mm (in)	1400 x 1900 x 1970 (55 x 74.8 x 77.5)
Total weight of equipment (without dielectric)	kg (lbs)	2700 (5950)
X, Y, Z and U, V axes		
X, Y, Z travel	mm (in)	220 x 160 x 100 (8.66 x 6.3 x 3.93)
U, V travel	mm (in)	± 40 (1.57)
Max. taper	°/mm °/in	3 / 80 3 / 3.14
Position measuring system		Linear glass scales
Measurement resolution	µm (in)	0.1 (0.000039)
Rapid movement	mm / min in / min	1 – 3000 0.04 – 118
Machining area		
Drop tank		Automatic
Max. workpiece dimensions (*)	mm (in)	300 x 200 x 80 (11.81 x 7.87 x 3.14)
Max. workpiece weight	kg (lbs)	35 (77)
Adjustment of dielectric level		Automatic
Clamping system		Closed clamping frame
Dimensions of table (**)	mm (in)	550 x 430 (21.65 x 16.93)
Wire circuit		
Wire spools		2 on the front panel
Accepted spool weight on front panel	kg (lbs)	1.6 – 8 (3.52 – 17.63)
Wire guides		1 set for all wire diameters 0.20 – 0.07 mm (0.0078 – 0.0027 in)
Wire diameters (standard)	mm (in)	0.20 – 0.07 (0.0078 – 0.0027)
Automatic threading for wire	mm (in)	0.20 – 0.07 (0.0078 – 0.0027)
Min. diameter of threading hole	mm (in)	Wire diameter + 50 µm (0.002 in)
Programmable wire unspooling speed	mm / s in / s	60 – 300 2.36 – 11.81
Programmable wire traction force	N	0.1 – 25
Dielectric		
Dielectric		Deionized water (CUT 1000 OilTech: oil)
Total volume of dielectric	l	420 (110 US gallons)
Filtration cartridges		4
Dielectric temperature in clean dieletric tank	°C	20 ± 0.1
Total volume of deionization resin	l	10 (2.62 US gallons)

* Width x depth x height ** Width x depth

CUT 1000 / CUT 1000 OilTech

Generator

Type		IPG-V (CUT 1000 OilTech: IPG-VO)
Min. finishing (steel)	µm Ra	0.05 (2 µin), CUT 1000 OilTech: 0.05 (2 µin)
Min. finishing (carbide)	µm Ra	0.05 (2 µin), CUT 1000 OilTech: 0.03 (1.2 µin)
Three-phase input voltage	V	380 / 400
Consumption	kVA	7.3
Temperature for max. accuracy	°C	20 ± 1
Operating temperature of the equipment	°C	≤ 0.5 / Hour – 1 / Day

Numerical control

Architecture	PC multiprocessors
HMI	VISION
Screen	LCD 15" TFT / Touch screen
Keyboard	PC style
CD-Rom	Standard
Hard disk capacity	Min. 80 GB
RAM	1024 MB
Operating system	Windows

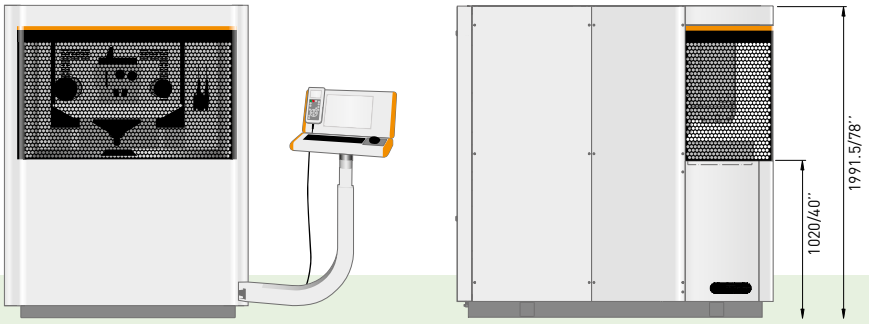
Options

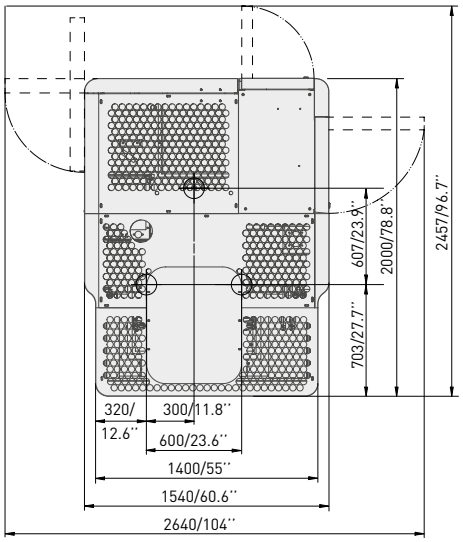
F20 Fine wire module (incl. automatic threading)	Wire diameter 0.20 – 0.02 mm (0.0078 – 0.00078 in)
3D SETUP	Measuring probe and pickup cycles

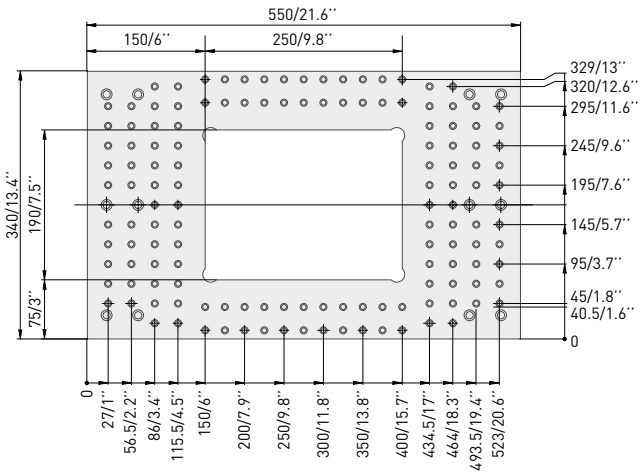
CUT 1000 OilTech

Fire detection system	Standard
Fire exthinguishing system	Option

CUT 1000
CUT 1000 OilTech







GF Machining Solutions

EDM (electrical discharge machining)

AgieCharmilles wire-cutting, die-sinking and hole-drilling machines.

For over 60 years we have been at the forefront of every EDM development: designing and refining the EDM process and building machine tools that deliver peerless part accuracies, surface finishes, cutting speeds and process reliability. Today, our AgieCharmilles wire-cutting, die-sinking and hole-drilling machines are recognized throughout the world as the best in the business. Our continuous research and development in digital generator technology, control systems and integrated Automation systems are evidence of our commitment to keeping your EDM operations on the leading edge of technology.

Laser

AgieCharmilles Laser texturing machines.

Laser texturing is a fully-digitized surface engineering process that has huge potential. The technology enables precise 2D and 3D textures or engravings to be machined accurately and directly onto complex parts or molds to improve and alter their aesthetic appeal, functionality and performance. The process is infinitely repeatable and offers many distinct environmental and economic advantages over conventional texturing processes.

Laser Additive Manufacturing (AM).

GF Machining Solutions has partnered with EOS, the global leader for high-end AM solutions, to integrate this innovative technology and further develop it into its current solutions to fully benefit the mold industry, by focusing on injection efficiency: optimized cooling design to reduce cycle time, lower energy consumption, higher quality of plastic parts.

Automation

System 3R Automation, Tooling and software.

Productivity is the key to manufacturing success, and automating a manufacturing process is a proven method of increasing its efficiency, effectiveness, quality and reliability. System 3R's integrated Automation, Tooling and software solutions — simple workpiece pallet and electrode changers and flexible manufacturing and robot handling systems — increase your competitive advantage.

Milling

Mikron high-speed (HSM), high-performance (HPM) and high-efficiency (HEM) Milling centers.

Customers operating in the mold, tool and die and precision component manufacturing sectors stake their reputations on being able to quickly and cost-competitively meet their customers' demands. That's why they invest in Mikron machines. Incorporating the latest and most advanced technologies and premium-performance components, Mikron HSM, HPM and HEM machines help you increase your production capabilities and improve your productivity. Designed and built for speed, accuracy and reliability, the machines, like you, are proven performers.

Liechti Dedicated Aerospace and Energy machining Centers.

Aerospace and power generation turbine manufacturers increasingly turn to Liechti dedicated five- and six-axis machining centers to machine complex, high-precision airfoils on blades, disks, blings, blisks/IBRs and impellers. It's easy to see why because these machines, with their specific profile machining technology, specialized CAD/CAM software and engineering competence for ultra-dynamic machining in titanium, Inconel, nimonic, titanium-aluminide and high-alloy steels, yield productivity gains as much as 30 percent, thanks to reduced machining times. In the globally competitive aerospace and power generation manufacturing sector, that's definitely worth shouting about.

Step-Tec Spindles.

At the heart of every Mikron machining center is high-performance Step-Tec Spindle. Step-Tec Spindles are essential core components of our machining centers. Highly accurate and thermally stable Step-Tec Spindles ensure that our machines can handle everything from heavy-duty roughing to fine-finishing operations.

Customer Services

Operations Support, Machine Support and Business Support.

To help you get the most and the best from your machine tools and equipment, we offer three levels of support. Operations Support covers our range of original wear parts and certified consumables (EDM wires, filters, resins, electrodes etc.) to ensure that your machines are performing at the highest levels. Machine Support maximizes, through our best-in-class technical support, preventive services and quality spare parts, your machine tool uptime. Business Support is designed to help you make a real step-change in your productivity and performance with solutions tailored to your specific needs.

GF Machining Solutions

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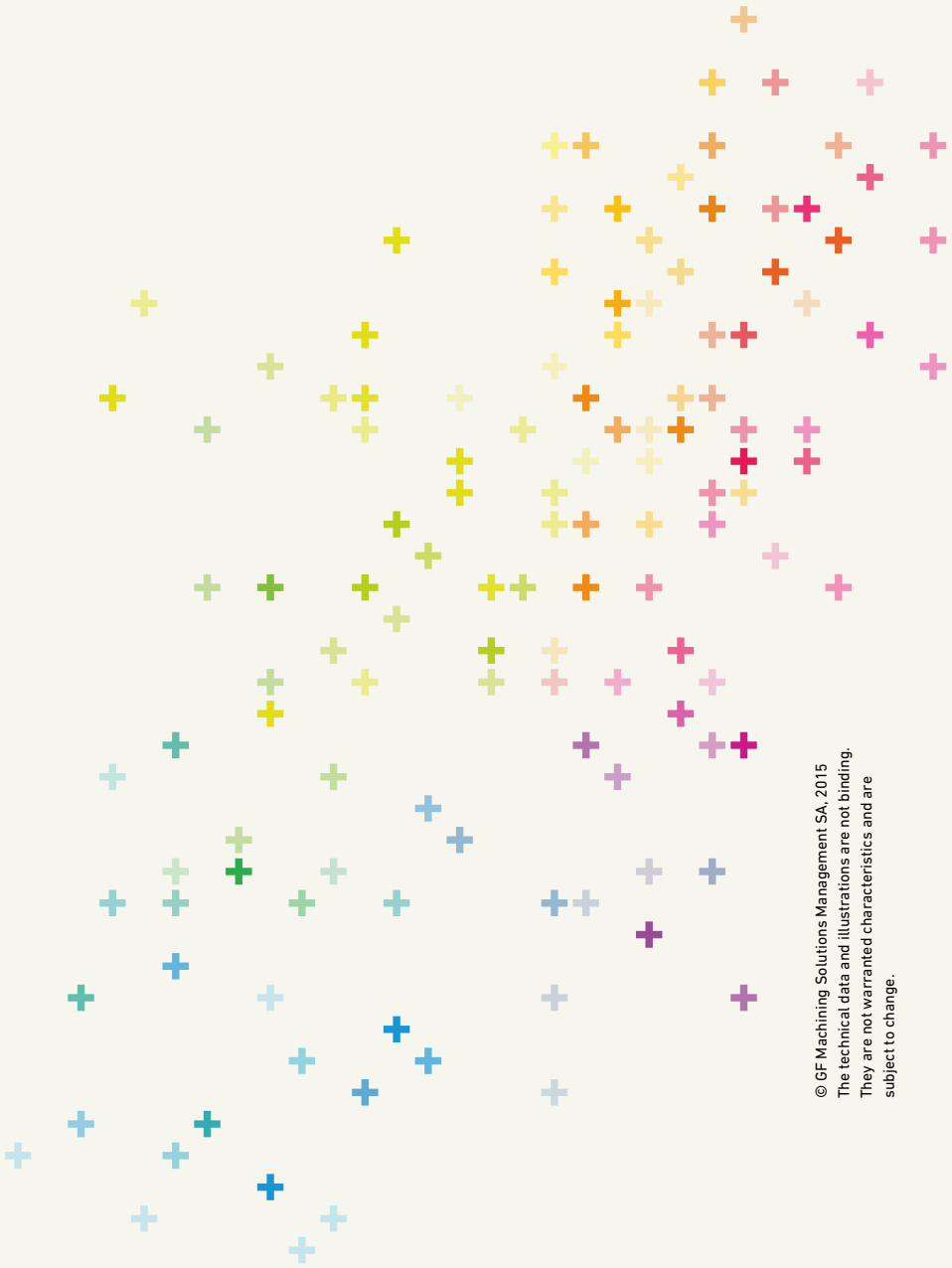
At a glance

We enable our customers to run their businesses efficiently and effectively by offering innovative Milling, EDM, Laser, Spindle, Automation and Tooling solutions. A comprehensive package of Customer Services completes our proposition.

www.gfms.com



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