

AgieCharmilles

CUT 1000

CUT 1000 OilTech



# 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 service 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.



+ We are AgieCharmilles.  
We are GF Machining Solutions.

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## **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.

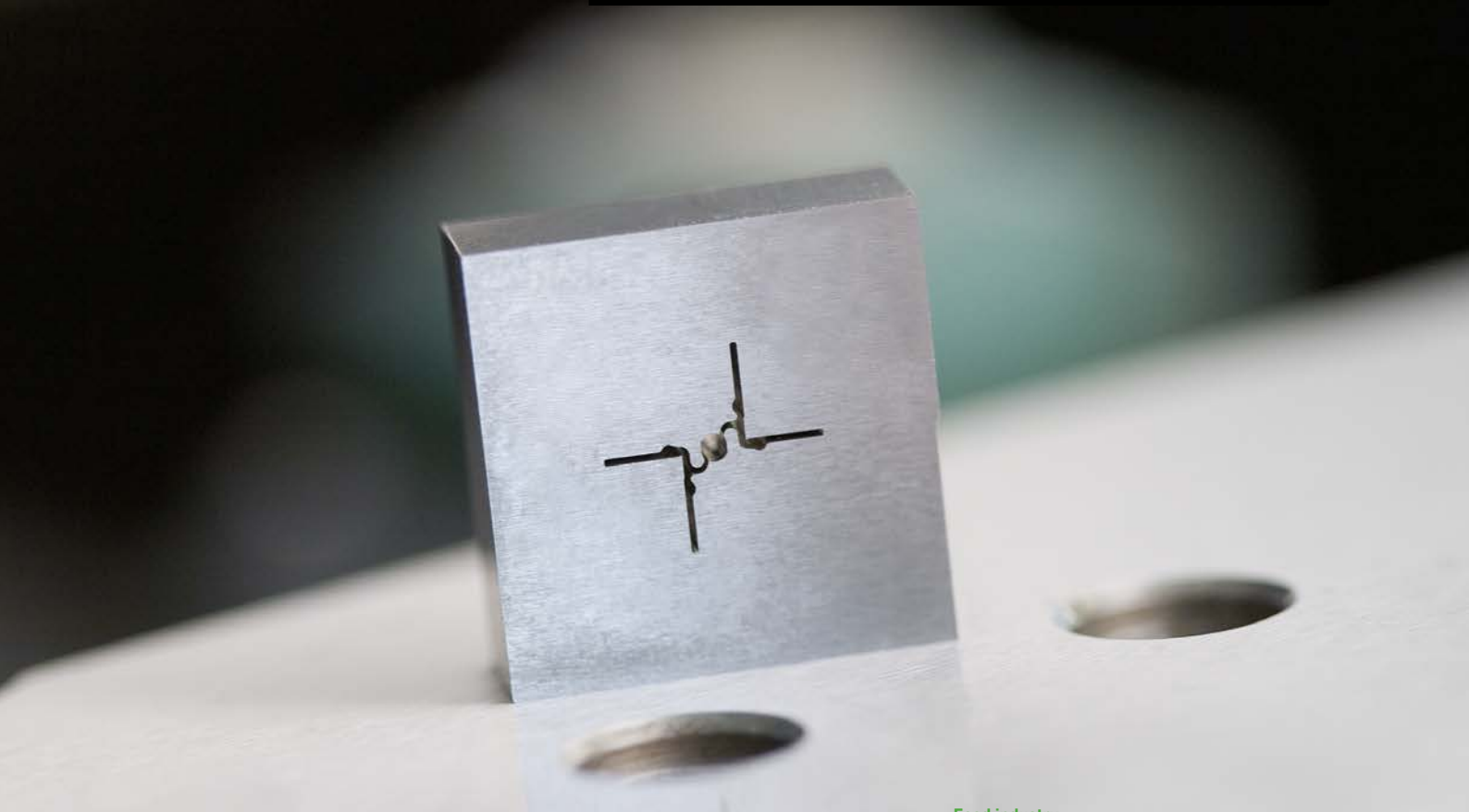
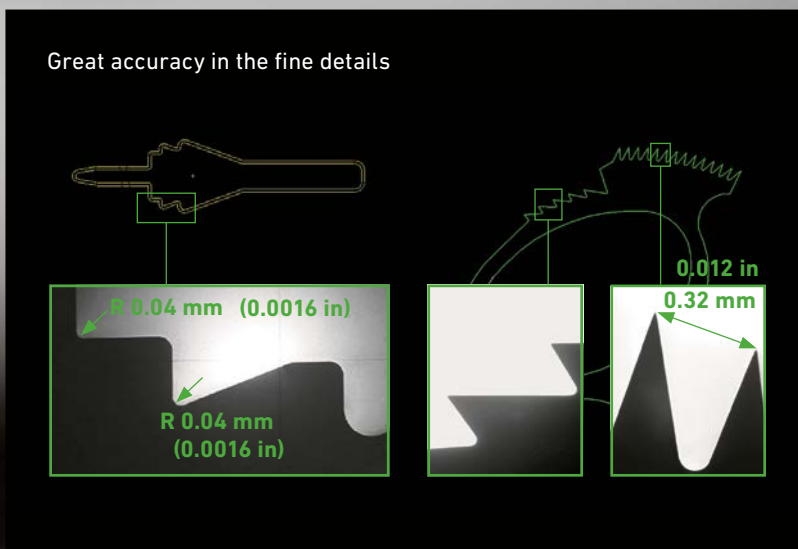
### Watch industry

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 (laser measurement at factory site)
- Ra 0.08 µm (steel/carbide) best surface quality



**Medical technology**

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

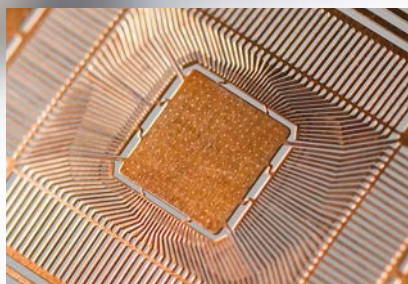
Very good surface finish down to Ra 0.10 µm (4 µin) in stainless steel and titanium with best surface quality.



**Microelectronics**

Leadframes, high accuracy and perfect surface quality.

Die-punch clearance: 1 µm (40 µin)  
 Best surface finish Ra 0.08 µm (3 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)

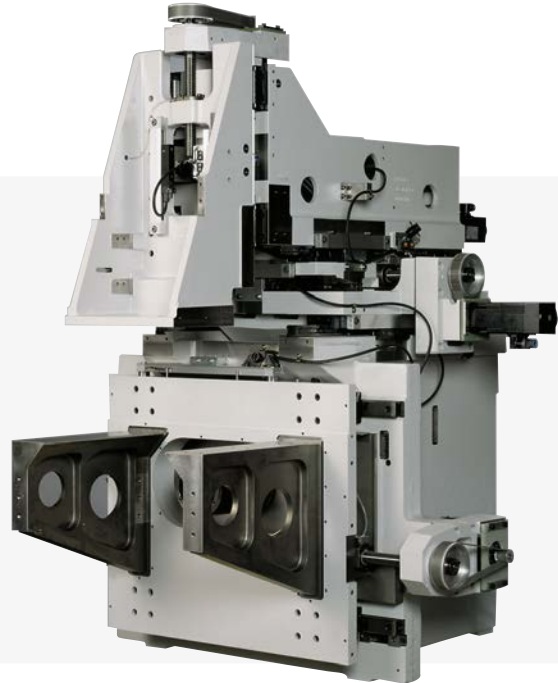


Quality and accuracy

# 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.



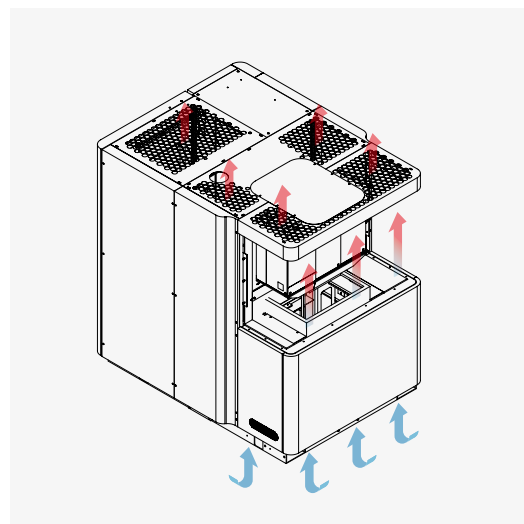
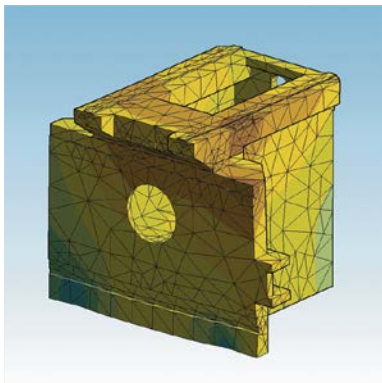
## Concept for insulated heat sources

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.



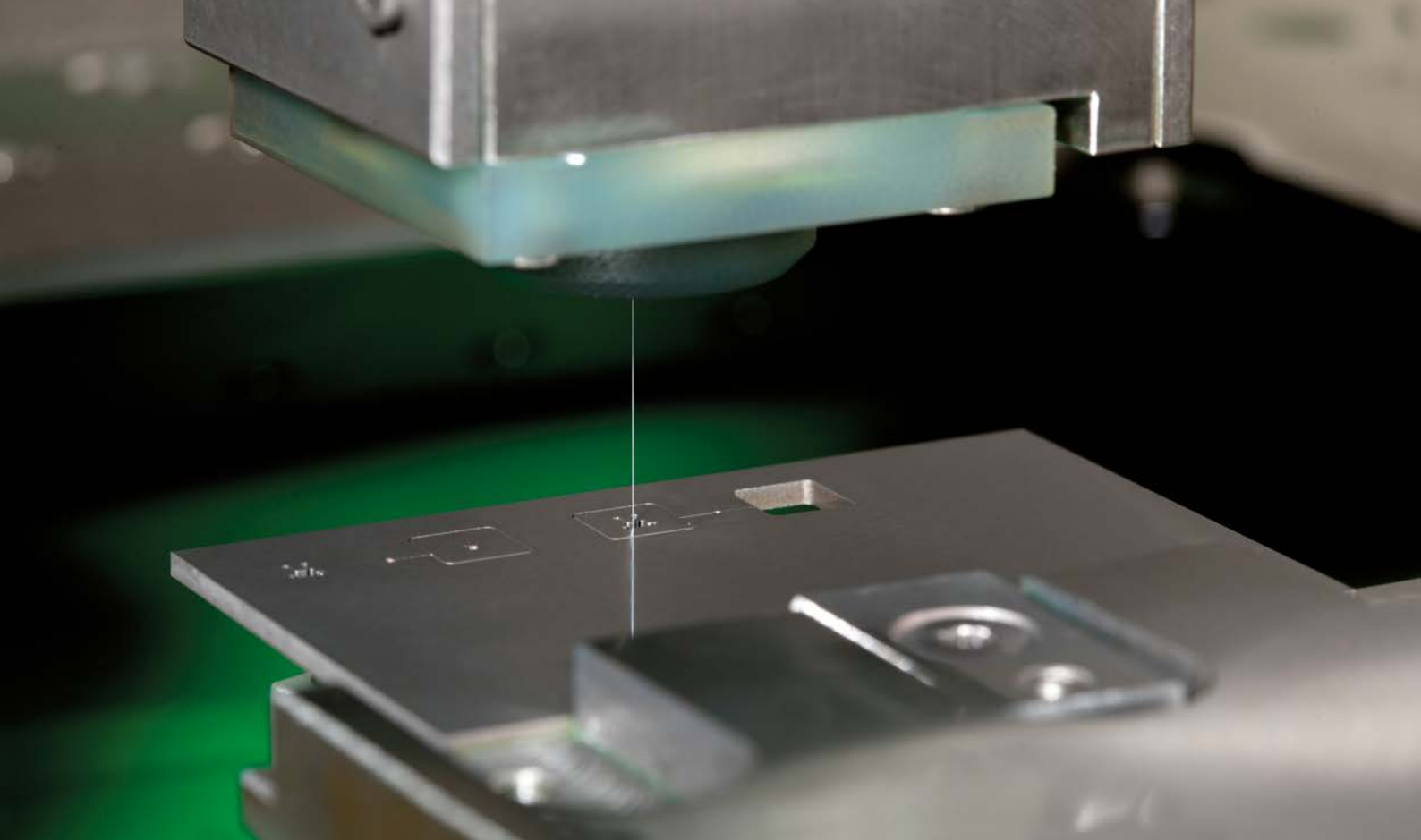


#### **Mastery of quality and accuracy**

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.





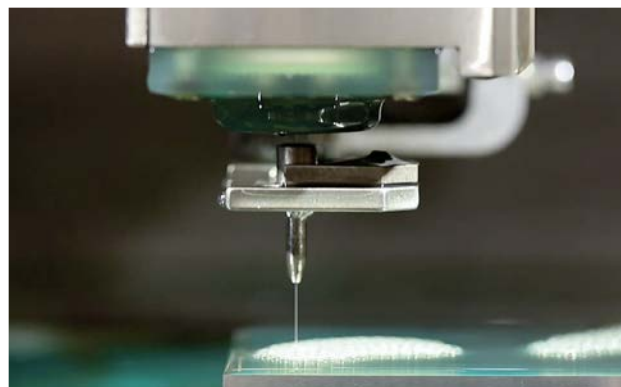
The exclusive wire system

# **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**

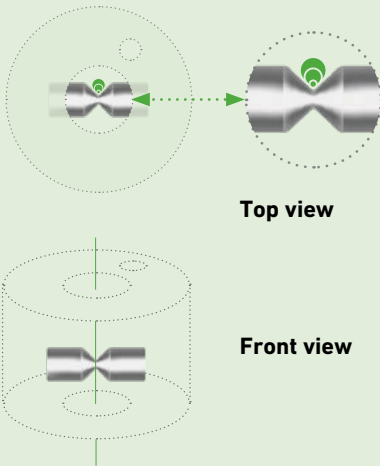
### **Threading under even the most difficult conditions**

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



Top view

Front view

### 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



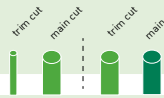
Faster machining time



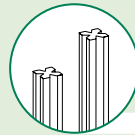
Use 2 different wire diameters in the same die



Lower running costs



Use of two wires made of different quality or diameter



Small details in tall parts  
(Opens new opportunities for Wire EDM)



Use a bigger wire for the roughing cut



### Efficient 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

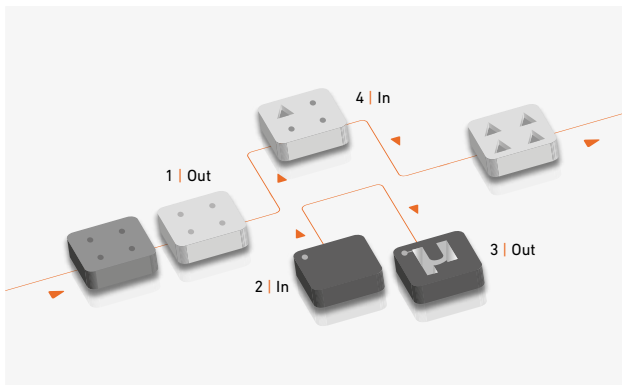
The CUT 1000 also has optimal autonomy available as a prerequisite for automated sequences:

- 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.

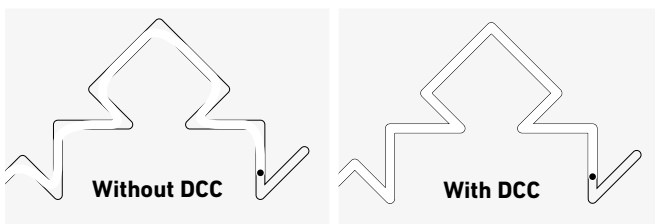
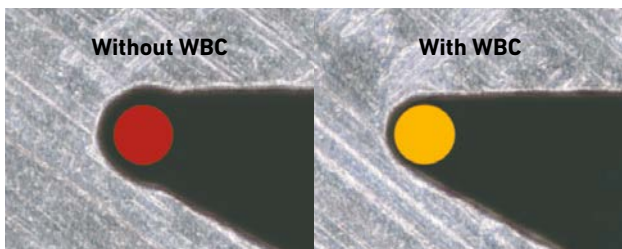
### Time-saving work preparation with 3D Setup

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

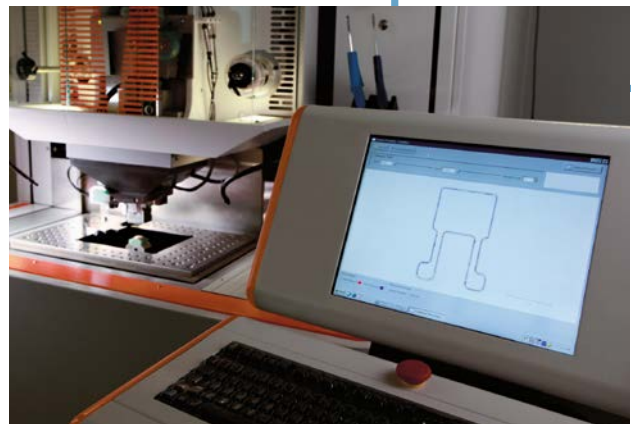
# Easy, automatic, accurate measurement and positioning



## 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.

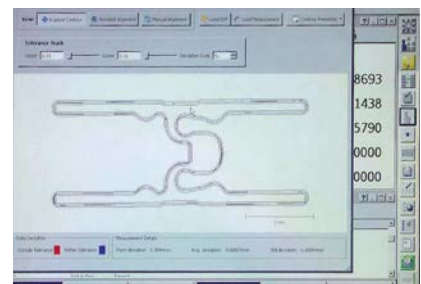
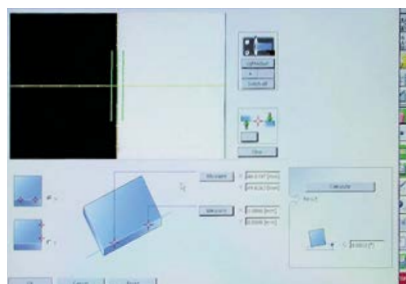
If done before the end of the machining, a correction can be introduced.

## "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

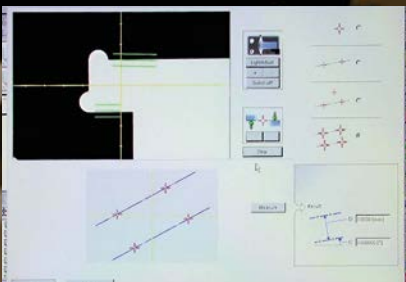
The IVU system makes it possible to any reference on the workpiece for:

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

### 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).

**IVU system:**  
100 percent reliability of your results.



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:

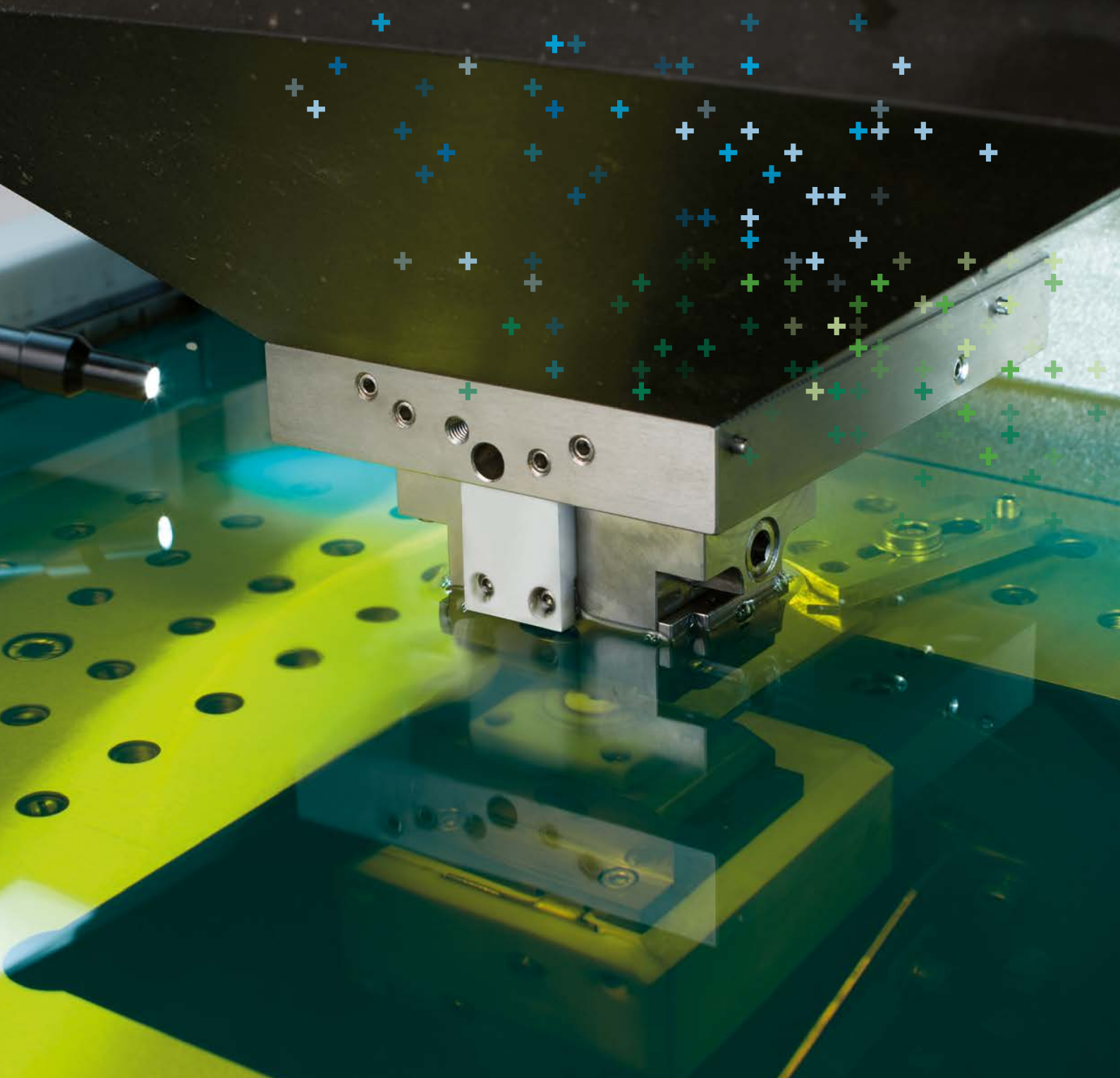
- Leaving the eroded components in the dielectric for many hours without any risk of oxidation
- Running multiple jobs during the night and the weekend for higher productivity
- No need for an operator to remove and dry completed workpieces
- Significant simplification of the planning of the plant



## **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  $Ra\ 0.03\ \mu\text{m}$  ( $1.5\ \mu\text{in}$ ) 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 specifications



**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	3 / 80
	°/in	3 / 3.14
Position measuring system		Linear glass scales
Measurement resolution	µm (in)	0.1 (0.000039)
Rapid movement	mm /min	1 – 3000
	in /min	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 340 (21.65 x 13.39)

#### 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 0.07 – 0.20 mm (0.008 – 0.003 in)
Wire diameters	mm (in)	0.07 – 0.20 (0.003 – 0.008)
Wire diameters (option)		0.02 – 0.05 (0.0008 – 0.002)
Automatic threading for wire	mm (in)	0.07 – 0.20 (0.003 – 0.008)
Min. diameter of threading hole	mm (in)	Wire diameter + 50 µm (0.002 in)
Programmable wire unspooling speed	mm /s	60 – 300
	in/s	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 dielectric 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	0.08 (3 µin)
Min. finishing (carbide)	µm Ra	0.08 (3 µin) / 0.03 (1.5 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

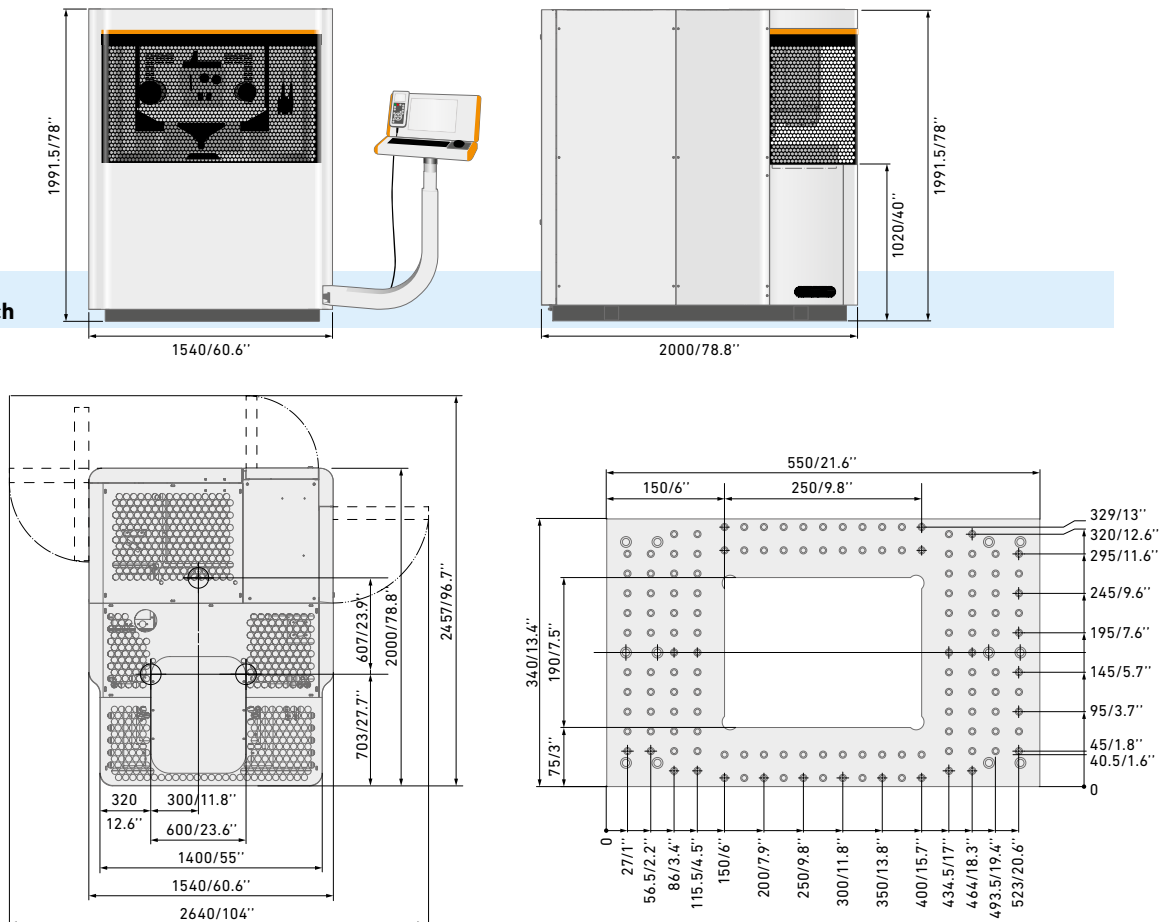
### Options

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 extinguishing system	Option

**CUT 1000  
CUT 1000 OilTech**



## 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 die-sinking 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 µm (4 µin).

#### Hole-drilling EDM

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

### Tooling and Automation



#### Tooling

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, multi-process cells, tailored to your needs.

### Milling



#### Milling

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.

#### Spindles

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.

### Software



#### Digitalization solutions

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 ability 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.

### Advanced manufacturing



#### Laser texturing

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.

#### Laser micromachining

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.

### Service + Success



#### We take you to new heights

Our Success Packs are designed to maximise your return on investment and empower you in your quest for success across all industrial segments. Our subscription packs feature a comprehensive range of services that guarantee the access and support you need to get the most out of your assets today, while preparing for the challenges of tomorrow. Our trusted experts backed by our latest cutting-edge, intelligent Digital Solutions, provide a full range of services.



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## 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 services completes our proposition.

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