THE MODELS

CUT 200
The CUT 200/300/400 range combines quality, productivity and control over production costs.

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3. Comfort and safety of use
4. The performance basis
5. Unique characteristics
6. Versatility and high precision

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Versatility and productivity

General engineering, molding, cutting tool, extrusion tool, machining...

Part in titanium for the medical industry

Part for the aeronautics industry

Stamping die
Prototype part

Machining requiring a controlled rotating axis

Stamp for clock making requiring the use of a 0.070 mm wire

Prototype part
ICP: anti-collision protection effective up to three meters per minute for working quickly and completely worry-free

ICP Integrated Collision Protection is an exclusive mechanical system that absorbs the energy of the collision and is effective up to three meters per minute.

**Fast and safe**
The fast movement of the axes at three meters per minute allows a significant amount of time to be saved during set-up operations before machining. Movements during measurement cycles can be done much faster. This high-speed movement of the axes is made possible by the effective protection against collisions on the CUT 200/300/400’s five axes. The operator can work in complete confidence because no movement error means no negative effect on the machine’s components.

**Comfort of use**
Thanks to its worktable that is fitted directly to its frame, the stationary work area is perfectly accessible to the operator. The vertical sliding door on the CUT 200/300/400 means the machine consumes less workshop space. A large front door allows large parts to be loaded. Whatever the size of the machine, loading heavy parts can be assisted with the use of a hoist.

It takes less than 30 seconds to carry out emptying or filling operations on the tank.

- **Fill in 30 seconds**: 200 mm / 30 s
- **Empty in 30 seconds**: 200 mm / 30 s
The performance basis

Controlling the roundness and the accuracy of distance in order to confirm precision
The mechanical design of the CUT 200/300/400 guarantees great precision for the distance and roundness. This is measured and checked in accordance with the ISO 230-4 standard.

Precision guaranteed for life
A surface quality as fine as Ra 0.1 μm requires very high precision in positioning. To obtain this precision, each XYUVZ axis is fitted with a linear glass scale with absolute coding, at a resolution of 50 nanometers.

Traditional Swiss design and manufacture
The performance of the CUT 200/300/400 remains unchanged after years of use. This longevity is due in large part to the quality of its manufacture. Also, the very high quality flat precision grinding of the guiding and assembly surfaces contribute to this long-lasting precision.

Movement precision guarantee
Before delivery, each machine is subject to a laser testing which allows the verification, in accordance with the VDI 3441 standard, that the precision of the positioning is within the specified tolerances.

Careful construction

Measurement of the roundness of circles with a diameter of 100 mm.

The linear scale with a resolution of 50 nanometres

Flat precision grinding of the guiding surfaces

Laser testing on each machine
QUADRA® 45° over 510 mm, a unique capacity for conical machining
The CUT 200/300/400 is the most versatile machine range on the market, capable of cutting 45° cones, and can do this whatever the height of the part. The principle of crossed double guiding of the X, Y, U and V axes independently and of the same dimensions, allows machining to be done with a large taper, thus widening the scope of possible applications for wire spark erosion.
Versatility and high precision

The mechanical design is that of a fixed bench combining strength and precision
The part to be machined rests directly on the worktable that is solidly fixed to the machine’s frame. This design has the advantage of retaining the high precision of the positioning whatever the weight of the part to be machined. The precision components of the machine are used only to move the wire guides. Since less motor power is required, better thermal stability and energy savings are achieved.

Strengthened thermal stability
The machine’s frame is in Rhenocast. This composite material possesses a thermal inertia 25 times higher than that of cast iron. Combined with the thermostabilisation of the water in the tank, this characteristic is used to smooth the effects of temperature variations in the workshop on the precision of the machine. This rustproof material also provides excellent electrical insulation that protects the whole machine from corrosion.

A wide choice of wire diameters
Where fineness of detail is required, the CUT 200 can be fitted with a wire as fine 70 microns. The minimum radius machined will then be less than 50 microns. On the other hand, to boost productivity, the machine has the necessary power to operate wire diameters up to 0.33 mm allowing higher cutting speeds to be reached.

The fixed worktable allows the same machining precisions for parts weighing 1 kg to 3000 kg

| Guaranteed precision from 1 to 3000 kg |
|-------------------|-------------------|-------------------|
| Safe area          | Exposed area      |                   |
| Linear glass scale | Machining         |                   |
| Guide rails        | Dirt              |                   |
| Ball screws        | Risk of shocks    |                   |
The exclusive wire set-up operation by the ThermoCut 2 system allows fast, automatic threading of all wires that are available on the market, in the closed wire guides, without any gaps, guaranteeing precision and a fine surface finish in any situation.

The key to success resides in the annealing of the wire, the stretch and the fully programmable thermal cut.

"3 Point Set Up" measurement cycle
CNC provides the "3 Point Set Up" cycle which allows the wire to be aligned perpendicularly to the upper surface of the part to be machined. The "3 Point Set Up" can be set up for work on a three-dimensional measuring machine during down time to increase efficiency.

15-second cycle time
The adjustment parameters for the automatic threading are fully digital. The operating speed of the threading cycle has been optimized, to allow for the type of wire used, and the work being carried out. This results in a total cycle time of less than 20 seconds spark to spark between immersion machining on 80 mm high parts, while retaining precision due to the use of closed guides. The resulting gain in productivity is especially noticeable when machining multi-cavities at short sparking times.
Before starting machining, the wire must not touch the part. If this happens, a short-circuit occurs and stops spark machining. Now, it is possible to distance the wire from the part in a helical trajectory until just before contact is made. Machining can then start.

Automatic detection of the absence of a threading hole
If the guide hole has been forgotten or cannot be found in the planned position, the machine automatically moves on to the next guide hole. This operation avoids the need for the installation to stop during unattended operation, at night or during the weekend.

Hole search during the threading operation
In addition, it is possible to program a hole search. Activation of this function is programmable by a specific code. The machine searches, where necessary, up to eight successive threadings on a circular trajectory around a point defined beforehand.

“Smart” modules

Search for non-contact before machining is started
Before starting machining, the wire must not touch the part. If this happens, a short-circuit occurs and stops spark machining. Now, it is possible to distance the wire from the part in a helical trajectory until just before contact is made. Machining can then start.
Achieve more...
The CC digital generator

Cutting speed and respect for the integrity of the machined surface

The CC digital generator is calibrated perfectly by GF AgieCharmilles, the recast layer (white layer) is very thin from the rough cut and practically disappears after two finishes. The hardness of the surface is unchanged. Because of this, the cutting tools machined with the CC generator have a clearly extended service life.

Steel
Thanks to the CC generator and its perfectly calibrated sparks, the recast layer (white layer) is very thin from the rough cut and practically disappears after two finishes. The hardness of the surface is unchanged. Because of this, the cutting tools machined with the CC generator have a clearly extended service life.

The CUT 200/300/400 machines are fitted with the latest generation spark generator. Its unique design uses powerful modern components which allows it to generate sparks in new shapes. To date, this digital generator remains unique, and above all, is unequalled for its overall performance in machining.

A maximum speed of over 500 mm² per minute (optional)
Thanks to the power of the generator, it is possible to reach cutting speeds higher than 400 mm² per minute in industrial use conditions. The CUT 200/300/400 range allows the threading and re-threading, of large stratified wires that are essential for obtaining high machining speeds, and the resulting high productivity.

Priority to the quality of the machined surface
Tools subject to intense stresses need faultless surface quality. By programming the sparks for which the energy is precisely controlled, the digital generator of the CUT 200/300/400 allows high precision parts to be produced with perfect quality, with a surface finish of Ra 0.1 μm.
The spark is adapted to each material

**Carbide**
The CC generator allows a surface finish of Ra 0.1 μm to be attained with a remarkable lift rate. Machining speeds do not cause any electrochemical reactions which could make the sensitive cobalt binding material dissolve. The quality of the cut edges and the service life of the tools are optimized.

**Titanium**
Titanium – light, resistant and above all biocompatible – is used a lot in the medical field (manufacture of artificial implants), optics and clock making. The CC generator minimizes pollution of the titanium surface with copper or zinc particles from the spark erosion process. In addition, it does not oxidize the surface and so does not change its color to blue.

**Tools in PCD (polychrystalline diamond) and in tungsten carbide**
The CUT 200/300/400 machines are ideal for machining gouging chisels in PCD or carbide. The anti-electrolysis CC generator and its micro-sparks with perfectly calibrated power allow sharp, strong and long lasting cutting edges to be obtained.

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**H40S CF Carbide**
Ra 0.10 μm  
Rt 0.88 μm  
Rz 0.71 μm

**Surface machined with a conventional generator:** deposits and pollution

**Surface machined with the CC:** minimal deposits, smooth surface

**Stamping die in PCD**
(10 mm = 1 mm)

**Gouging chisel in PCD**
(10 mm = 100 μm)

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**Econotec technology, high speed at the least cost**
Production requirements mean that savings have to be made at all levels, especially on the cost of consumables. Thanks to complete control of the EDM wire process, Econotec technology allows to go 30% faster with a 0.3 mm diameter wire, while reducing its operating speed and therefore its final cost by 20%.
**The CC digital generator**

Used by the most demanding industries

Used by industries that are the most demanding in terms of safety

Studies on titanium or nickel alloys have shown that the layer affected by machining with the CC digital generator is very small. This affected surface layer becomes almost invisible after four finishings, and so the mechanical characteristics of the machined part remain completely unchanged.

The process is compatible with the most demanding industries in terms of safety, such as aeronautics and the medical industry.

**Micrographic section showing the layer affected at the surface**

- Ti-6Al-4V titanium alloy rough cut
- Ti-6Al-4V titanium alloy 4th finishing
- IN 718 nickel alloy rough cut
- IN 718 nickel alloy 4th finishing

**Clean seals for faultless assemblies**

Precision molds and casts. Mass production of injected plastic parts requires high-precision molds. The inserts must be assembled without any gaps and with a perfect sealing quality. The result is the production of parts with clean edges and at a high rate of production.

- Machining parts for the aeronautics or medical industries
- Mold insert mating face
  Enlarged 400 times
Precise contours for efficient tools

Very high-speed cutting tools for the electronics industry work with a very small gap between the punch and the guide or die. The precision of the contour is crucial to distribute the gap uniformly, and a fine surface finish is a necessity for supporting the speed of the cut. The CUT 200/300 provide as standard a surface quality as fine as Ra 0.1 μm, and the precision of the contour is within a tolerance of \( \pm 2 \mu m \).

Parts with variable heights

Machining parts with variable heights is very common for molding, extruding aluminium, general engineering and parts production. The Power Expert Smart Module continuously maintains an optimum speed, even in the most delicate of situations such as crossing a blind hole, and it does this without any intervention from the operator. This is great progress because before Power Expert, the operator had to set the machine for the injection quality that would be met during machining. The wrong choice had great consequences on the speed of machining and productivity. This problem no longer exists. It is no longer necessary to select particular approach speeds for the part or the shape of the raw material. Just one setting, defined by the maximum height, is required, whatever the shape of the part.
EDM Expertise

The expertise of a market leader in service of the user
CT-EXPERT, the expertise of GF AgieCharmilles in your hands
Designed so that you can attain the maximum amount of profit from your machine, CT-EXPERT chooses the best machining speeds, suggests the best wire, automatically calculates all the offsets and creates a control program that links all the machining phases together.

TAPER-EXPERT, the control of large tapers
The TAPER-EXPERT software allows very precise machining of tapers whose angle varies from 0 to 30°. It corrects in real time and during machining the position of the wire depending on the angle. The surface quality is the same as that in cylindrical machining.

PROFIL-EXPERT, the control of fine details
On the rough cut and on finishing, PROFIL-EXPERT automatically adjusts the machining parameters during changes of direction. It adjusts speed in advance and with precision to guarantee perfect geometry for fine details. These modifications are automatic and do not require any setting or calibration, whatever the programmed height or contour.

POWER EXPERT, easy machining of parts with variable heights
The Power Expert Smart Module continually optimises the speed for machining the rough cut. It reads the injection quality, calculates the height of the part and decides from this the optimum power to send in the wire. Critical situations such as when the part is approaching, or crossing a blind hole, are fully automatically controlled by Power Expert.

SURFACE-EXPERT, a decisive stage for wire EDM
SURFACE-EXPERT independently controls sparking during the finishing stage on parts that have abrupt changes in height. This intelligent functionality allows precise dimensions to be obtained, and a smooth surface finish where machining conditions change abruptly on cylindrical or angled parts (reduction in polishing time).
The excellence of the CUT 200/300/400 also resides in the control of operational costs. The potential for using less expensive wires and reduced filtration cost, added to a lower consumption of electricity, make the CUT 200/300/400 particularly economical machines to run.

**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 while the machine is running unattended. When machining is finished or interrupted, the power supply is reduced to the minimum, lower than 1kW, or completely disconnected depending on the parameters of the machine. Automatic restart is programmed according to a daily schedule corresponding to the operating hours of the workshop. The machine is switched on in sufficient time to be thermostabilized when the workshop opens. The power consumed is continuously displayed on a screen page.

**Rotating axes**

GF AgieCharmilles provides various types of rotating axes fully integrated with the digital control. They are particularly easy to install. Controlled rotation simultaneously with the movement of axes X, Y, U and V during machining is also possible. This function allows complex shapes to be created that were previously not possible.
When the machine is working unattended, remote notification allows messages and alerts to be sent by e-mail or sms. Thanks to this information received in real time, the operator knows how the work is progressing.

Integrated within a production workshop, the machine can be controlled remotely thanks to the e-control and e-supervision modules.

The touch screen provides efficiency and is user-friendly

With a touch screen and based on the Windows XP operating system, the Millennium digital control offers power and ease of use. Simple to learn with powerful help functions, the Millennium control can be integrated in any workshop.

The CUT 200/300/400 range offers a wide choice of peripherals to receive programs or to send out surveillance information.
### Milling

**High-Speed and High-Performance Milling Centers**

In terms of cutting speed, HSM centers are 10 times faster than conventional milling machines. Greater accuracy and a better surface finish are also achieved. This means that even tempered materials can be machined to a condition where they are largely ready to use. One essential advantage of HSM is that with systematic integration, the process chain can be significantly shortened. HSM has developed alongside EDM into one of the key technologies in mold and tool making.

### EDM

**Electric Discharge Machines**

EDM can be used to machine conductive materials of any hardness (for example steel or titanium) to an accuracy of up to one-thousandth of a millimeter with no mechanical action. By virtue of these properties, EDM is one of the key technologies in mold and tool making. There are two distinct processes – wire-cutting EDM and die-sinking EDM.

### Laser

**Laser ablation**

Laser ablation supplements and extends the technologies offered by GF AgieCharmilles. With our laser technology we enable you to produce texturizing, engraving, microstructuring, marking and labeling of 2D geometries right through to complex 3D geometries. Laser ablation, compared to conventional surface treatment using manual etching processes, offers economic, ecological and design advantages.

### Customer Services

**Operations, Machine and Business Support**

Customer Services provides with three levels of support all kind of services for GF AgieCharmilles machines. Operations Support offers the complete range of original wear parts and certified consumables including wires, filters, electrodes, resin and many other materials. Machine Support contains all services connected with spare parts, technical support and preventive services. Business Support offers business solutions tailored to the customer’s specific needs.

### Automation

**Tooling, Automation, Software**

Tooling for fixing workpieces and tools; automation systems and system software for configuring machine tools and recording and exchanging data with the various system components.
GF AgieCharmilles

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