

AgieCharmilles

FORM 200

FORM 300

FORM 400



Swiss design and quality



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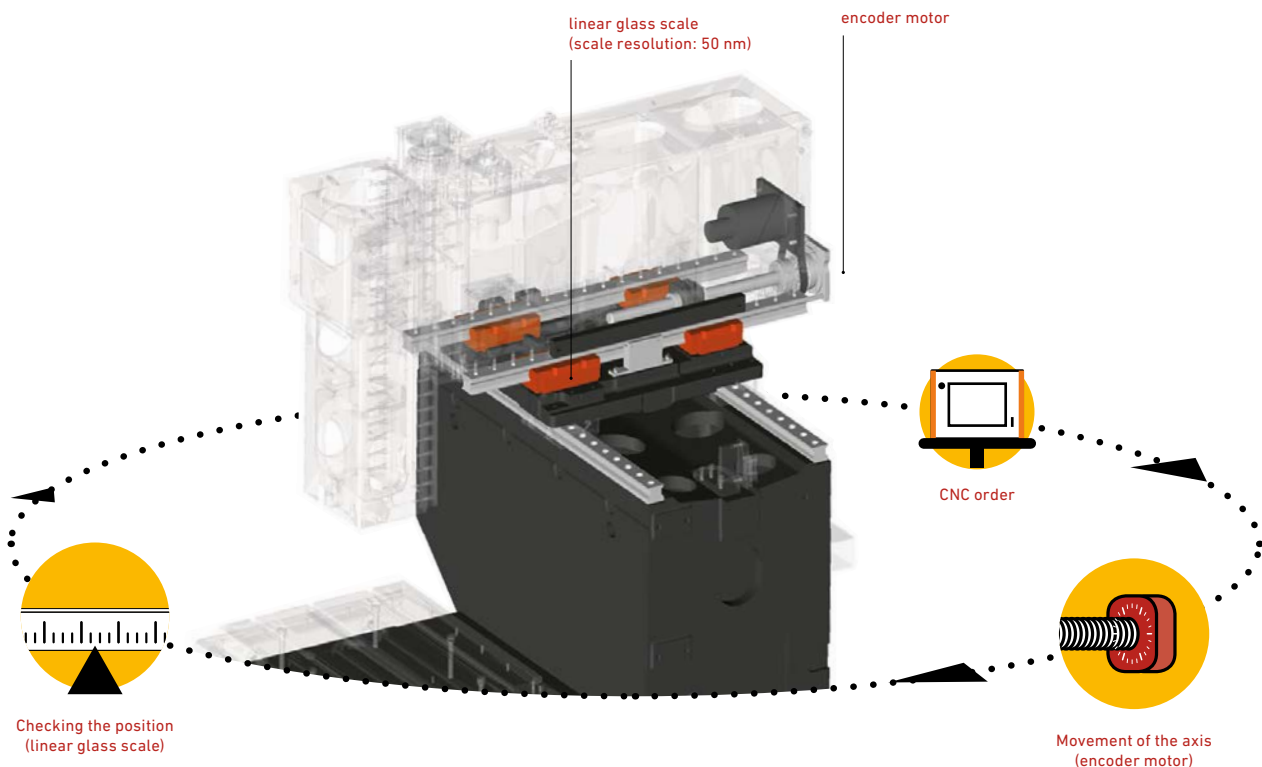


Perfect results at your fingertips

The ergonomics of GF Machining Solutions' new AC FORM human-machine interface (HMI) put customers in the driver's seat by making die-sinking EDM an intuitive, easy-to-learn and easy-to-use process. That means greater autonomy over your processes, higher efficiency, improved process reliability and accelerated performance. The standardized working environment created by the AC FORM HMI makes it easy to achieve perfect machining results.

Mechanical construction

Compact and rigid mechanical concept

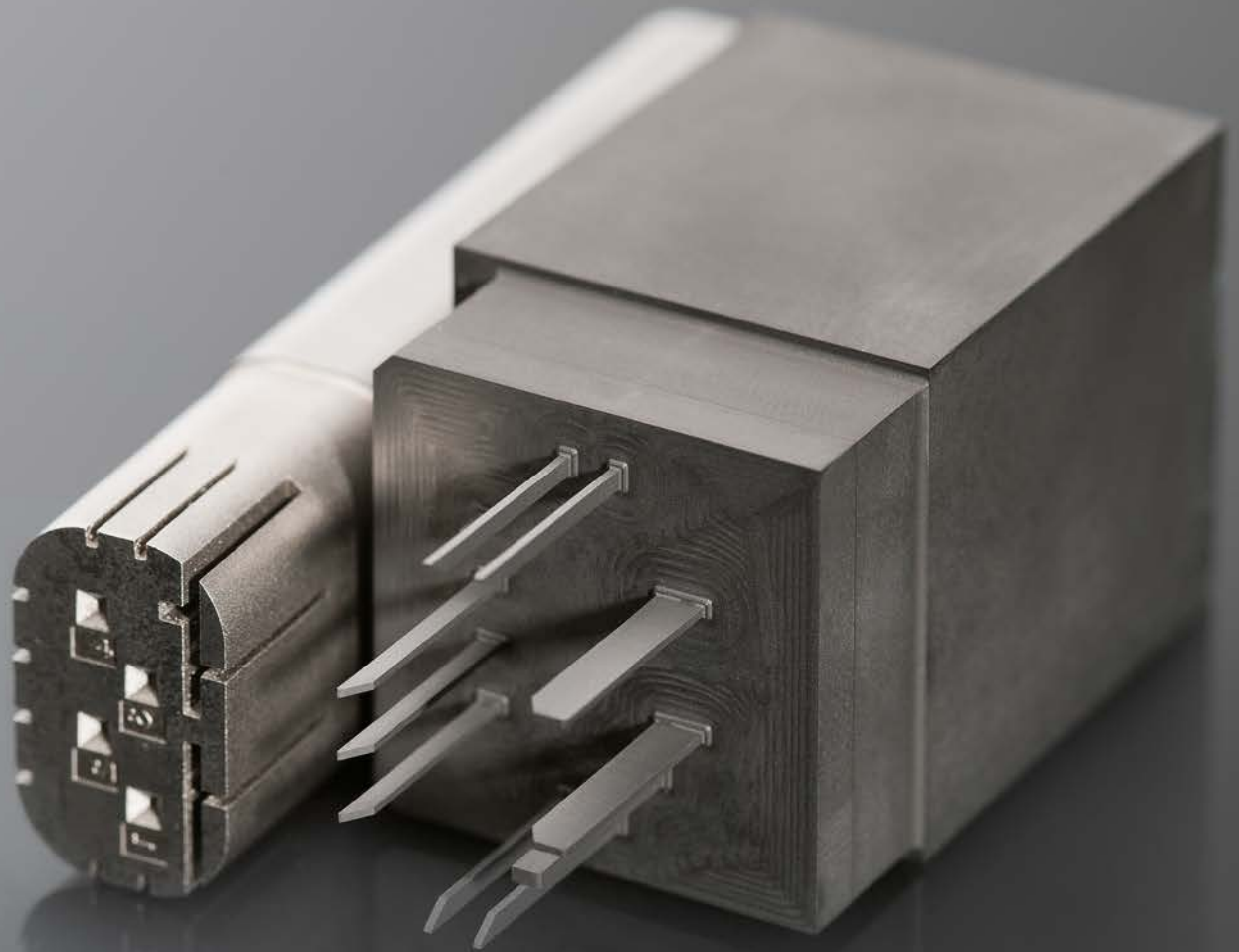


Robust mechanical concept

The construction as a short C frame and the oversized casting guarantee mechanical stability and precision throughout the life of the machine. The weight of the part and the volume of the dielectric have no effect. In addition, the robustness of the machine absorbs all the machining forces to maintain a precise gap between the part and the electrode.

Linear glass scales: lifetime accuracy

To obtain reliable positioning accuracy, only linear glass scales are effective. They eliminate all the classic errors, such as backlash, expansion and wear effects. The axis servo control system developed by GF Machining Solutions is a closed loop measurement solution designed to provide infallible accuracy, whatever the travel. It makes periodic maintenance and calibration operations unnecessary.



+ Exceptional efficiency

The FORM 200, FORM 300 and FORM 400 combine productivity and flexibility



AC FORM HMI

Faster control, in complete security

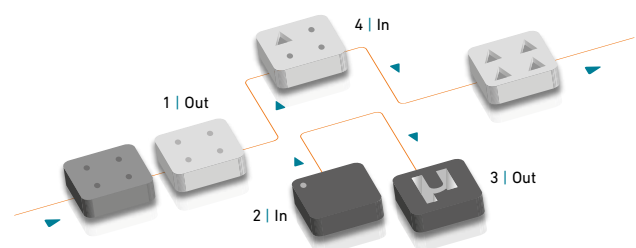
Dynamic manufacturing process

The development of AC FORM human-machine interface (HMI) is based on a study carried out with numerous mold makers in order to streamline the mold-making technique. The organization and layout of screens are a direct development of the information taken from this study. This user-friendliness, which has made GF Machining Solutions interfaces so successful, has not only been maintained but has been developed even further to benefit the mold maker's task.

Maximize productive time

Due to the necessity of maximizing productive time, the AC FORM HMI brings new solutions:

- Part Express allows interruption of an operation so that an urgent job can be inserted.
- Job List organizes the order of jobs according to manufacturing priorities.



e-Doc

The FORM 200/300/400 range incorporates new online help to allow the operator to find relevant information as quickly as possible. This occurs via simplified access to help menus, by having a clearly organized navigation interface, that is more user-friendly and easy to grasp, and including search by key words or user index. Machining examples are produced as hard copy, presented in a succinct manner.

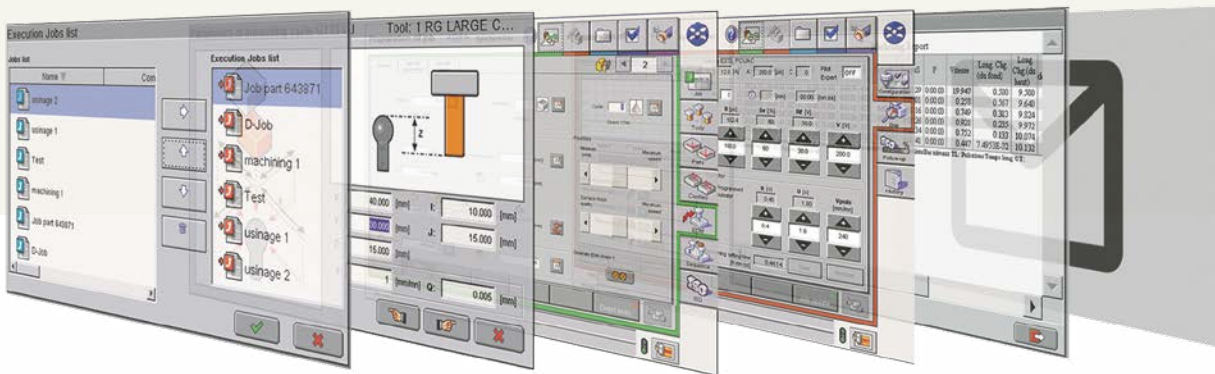
They are called up by using the online help system, so that implementation of a machining process can be followed stage by stage. More than additional descriptive documentation, e-Doc allows a genuine knowledge transfer for the benefit of the operator, enabling him to improve his knowledge continuously, while reducing working days lost to training.

Automatic CAD/CAM link

The different EDM machining sequences are automatically integrated into AC FORM HMI.

Platform: Windows

- Integral PC
- Touch screen
- CD-ROM drive
- USB port
- Network connection



Flexible work organization
AC FORM HMI offers you job creation whether on the FORM 200/300/400 machine or on a PC and allows you to organize them according to your priorities on the machine.

Measurement of essential offsets and positions during work preparation: the measurements made on a pre-measurement terminal can be used directly by AC FORM HMI.

Electrodes designed under AC FORM HMI offer ideal undersize and streamline the number of electrodes necessary for machining.

Machining under AC FORM HMI high surveillance, with Systems EXPERT automated protection, guarantees you results at the height of your requirements.

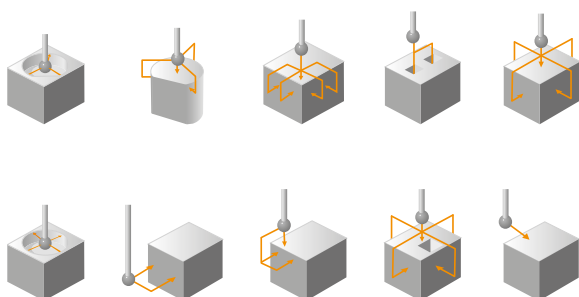
Control of work executed under AC FORM HMI automatically creates a report after each machining session. The operator can access it via the network or directly on the machine.

SMS notification
All information related to machining can be transmitted directly to the operator via SMS.

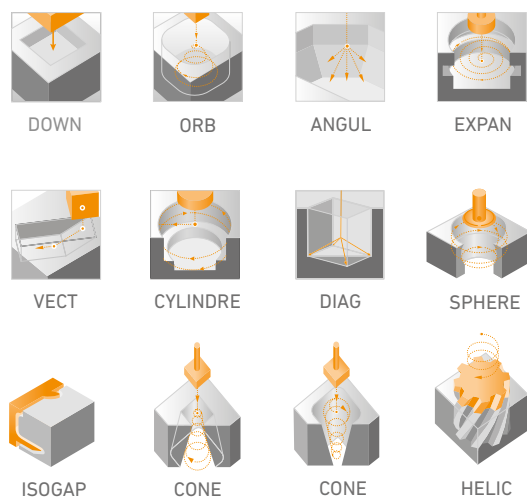
Interactive graphical assistance

All operations, such as measurement, machining or cavity-positioning cycles, are illustrated by graphics/icons, allowing the operator to understand intuitively and spontaneously.

Measurement cycles



2D/3D machining cycles



Generator

Flexibility and power guarantee reliable results

The FORM 200, FORM 300 and FORM 400 sinker spark erosion machines are fitted with an Intelligent Speed Power Generator (ISPG) which, using patented technologies, establishes new standards in surface quality, material removal and accuracy of form. Electrode wear is reduced in all machining operations, from roughing to finishing, with copper or graphite electrodes. Productivity shows an average increase of 30 percent, and can even reach 100 percent for pre-milled forms. Even in the presence of deep, narrow cavities, with poor flushing conditions, a 50 percent increase in erosion speed can be obtained with no increase in electrode wear.

Predictive planetary erosion

With the Predictive Learning System (PLS), the erosion conditions for orbital movements are continuously recorded and analyzed. When there is a deviation, the planetary erosion process is thus optimized one step after the other. The cavities are then made quickly and accurately. [1]

Small, deep cavities

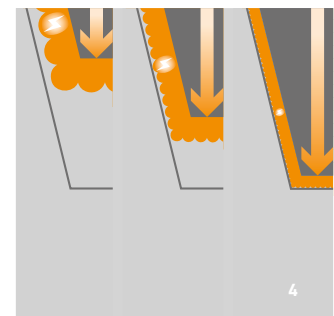
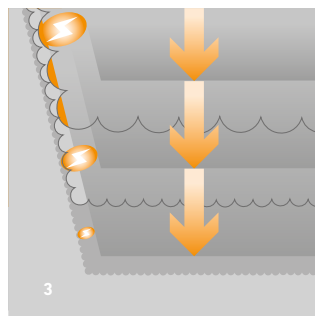
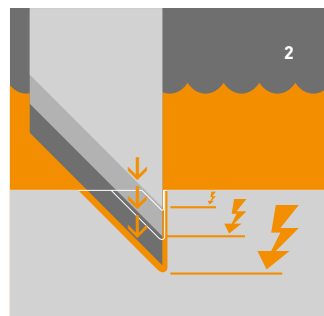
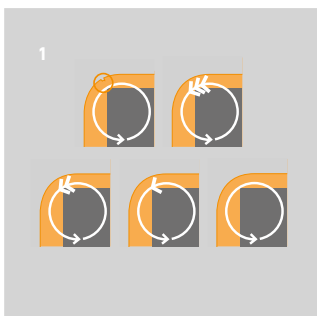
The High Velocity Pulsation (HVP) unit allows efficient cavity cleaning by rapid retraction with extreme reaction time and by smooth re-entry. The electrodes are moved rapidly during the return movement, with an extremely short reaction time, creating an action that yields good flushing conditions and, for small deep cavities, guarantees that optimum erosion results are obtained. [2]

Mastery of spark generators

The ISPG generator yields distinctly higher removal rates on average than other products, whether it is machining blades, conical shapes or pre-milled cavities, all of which are machining challenges that can be resolved only with electro erosion. [3]

Controlled process

Using perfected algorithms reacting more quickly, while organizing the electro erosion process safely even for Adaptive Current Control (ACC) and Adaptive Current Optimization (ACO) high removal rates, productivity is increased. [4]



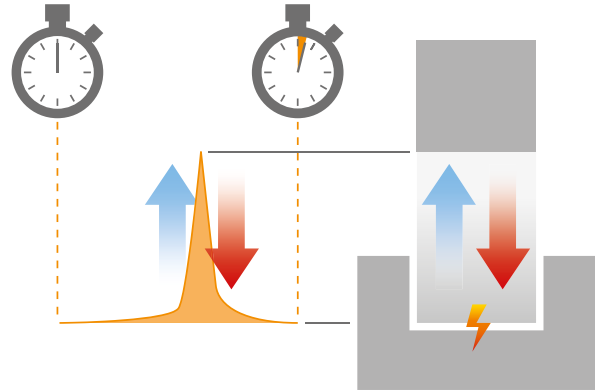
The surface finish quality

The SF module allows excellent surface finish qualities to be obtained notably during finish machining and this can be done with most conductive materials.



Large surfaces, no problem

Dynamic acceleration and adaptively controlled lift movements allow optimum erosion results, even with large areas, whereas electrode return movements stop uniformly.



Lowest-wear EDM

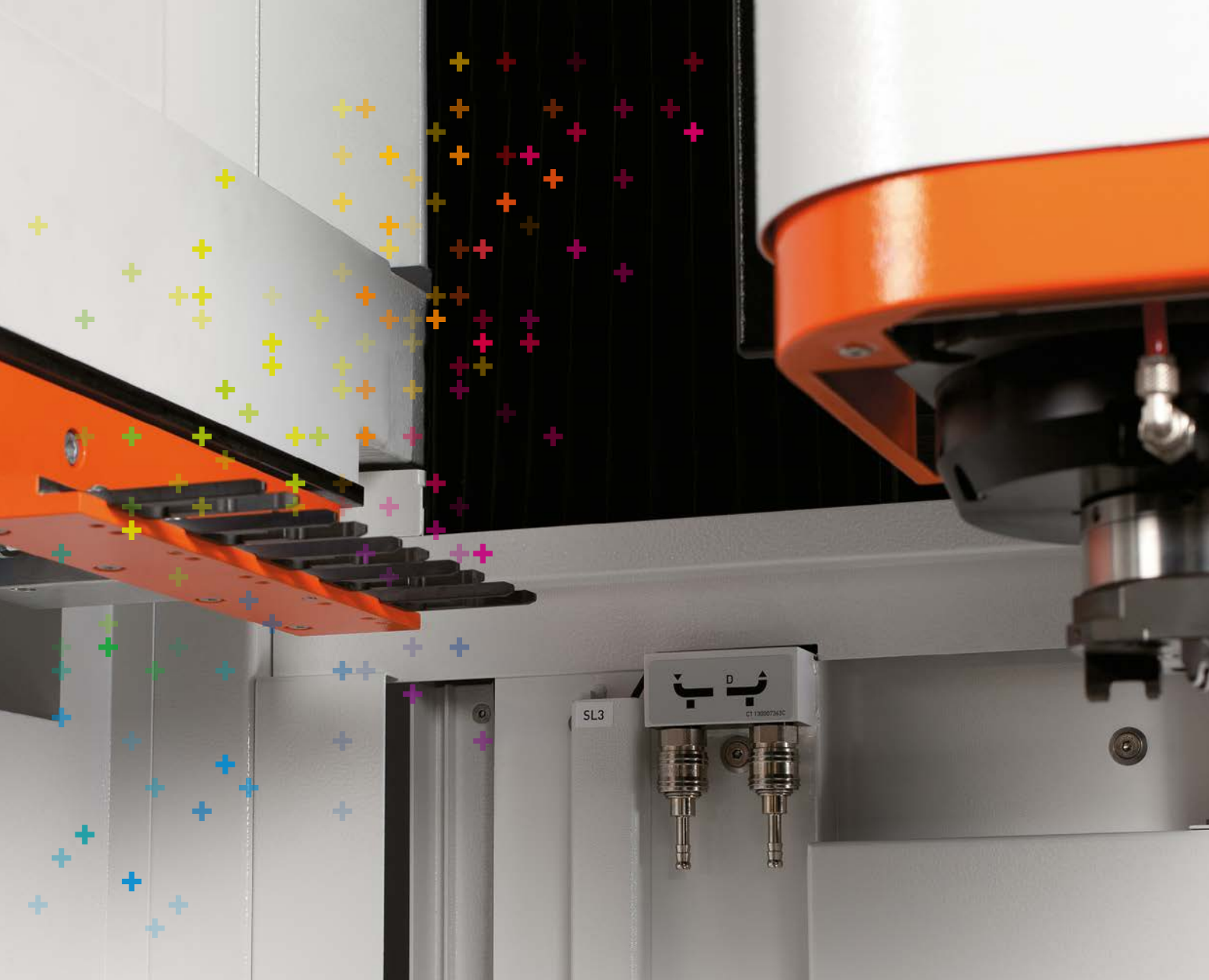
The iQ (innovative Quality) technology developed by GF Machining Solutions is available for the FORM 200, FORM 300 and FORM 400. The iQ technology allows wear-free EDM with graphite and copper electrodes, reducing the number of electrodes and corresponding costs and guaranteeing the highest accuracy of form.



Part material: Steel 1.2343
Electrode material: Graphite R8710
Number of electrodes: 2
Number of simple forms: 7
Machining depth: 9 mm
Roughness: VDI 19, Ra 0.9 µm
Electric discharge machining time: 88 minutes
Average linear wear: 7 µm



Part material: Steel 1.2343
Electrode material: Copper
Under measure: 0.56 mm
Machining depth: 20 mm
Roughness: VDI 26, Ra 1.8 µm
Result with iQ technology (total time): 5 h 21 min.
Reduction in wear: from 20 % to 90 %



Autonomy and flexibility

Configurable performance potential

High autonomy and reduction in dead time

The FORM 200, FORM 300 and FORM 400 can be equipped with integrated tool changers, allowing them to work for long periods without surveillance. These linear changers allow satisfactory autonomy for work requiring a smaller number of tools.

Integrated tool changer (option)

The FORM 400 can be equipped with a tool changer integrated into the machining zone to keep machine dimensions to a strict minimum. This changer is available with a capacity of 10 to 20 positions, installed on the left or right side of the machining zone.



Remote control menus adapted to operator tasks

To allow the operator to adapt the remote control to the manual task at hand, a menu is provided for configuring the icons displayed on the remote control display. In addition of standard icons, this menu allows the operator to define semi-automatic movements or specific measuring cycles during the manual process.

This is one of many AC FORM HMI features that put greater flexibility and efficiency at the operator's fingertips.



Get on the fast track to superior quality

GF Machining Solutions eTracking software platform, linked with the computer numerical control (CNC) of EDM machines, help trim costs by reducing the number of rejected parts and focusing on post-machining control of suspect parts. Our eTracking software helps you establish standard machining methodology from the start, lays a foundation for machining quality, and creates a data record for certification of quality production.



Renishaw probe

To ensure positioning precision, an optical transmission probe can be managed by the FORM 200/300/400. Measurement allows dimensional inspection of machined cavities as well as the taking of references of the part, without having to remove it, thus saving a considerable amount of time. Furthermore, a measurement report is automatically generated by AC FORM HMI enabling rigorous checking and monitoring.



Accura-C, the best high-performance axis on the market

It is not unusual to be confronted by machining where the electrodes are incorrectly located, even by such a distance that maintaining their position or stability during machining becomes problematic. Pulsation-induced movements in a liquid (dielectric) medium generate lateral forces (flexural or rotational) on the electrode, which must be resisted by the C-axis. Thanks to its very robust design, the Accura-C allows very high moments of inertia to be absorbed, up to 5000 kgcm².

Autonomy and flexibility

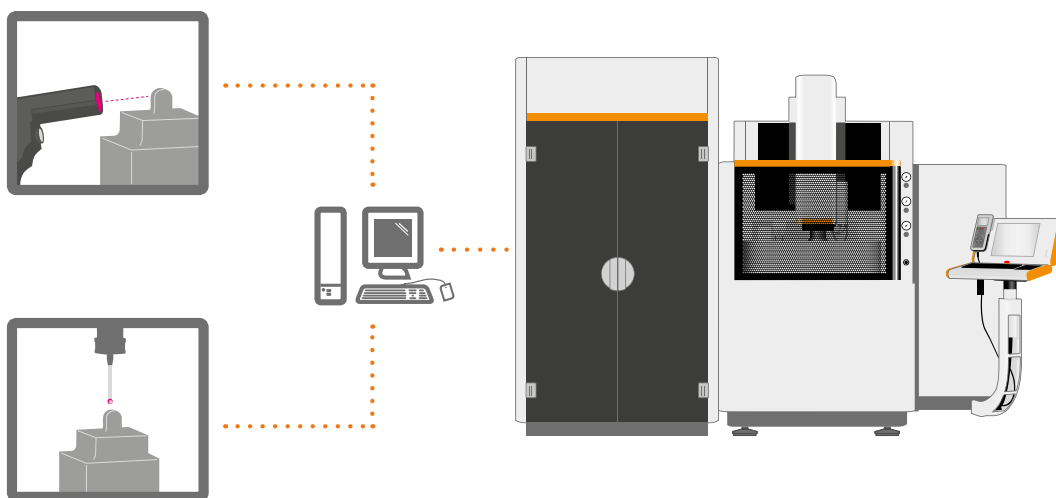
Configurable performance potential

Increased autonomy without manual intervention

Manufacture of a mold often requires a large number of electrodes whose spark erosion time can vary noticeably from one cavity to another. The FORM 200/300 machines have a new rotary changer which offer a large storage capacity for up to 160 electrodes. A double gripper clamp reduces unnecessary movements, notably speeding up the loading process.

Aim: 7,000 hours of EDM per year

Autonomous cell management maximizes machine time, which can now be increased from 2,500 hours on average, to close to 7,000 hours per year. Due to importing CAD/CAM data into the machine operator's AC FORM HMI, taking references, as well as optimizing tool changer cycles and flexible machining programming, results are backed up while allowing continuous production.





Record productivity

This cell-management system expands and supplements the practicality of AC FORM HMI. Quasi-total autonomy of each cell radically optimizes machine time while simultaneously increasing operator comfort and eliminating risk of errors. Workshop productivity beats all records.

Machining flexibility and reliability of work results

Thanks to AC FORM HMI's integral automation of machining sequences, as well as the design and functionality of Part Express, productive time is maximized, while still allowing urgent work to be inserted easily. End-to-end reliability of the process is assured.

Technical Data



FORM 200



FORM 300



FORM 400

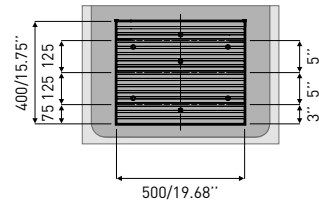
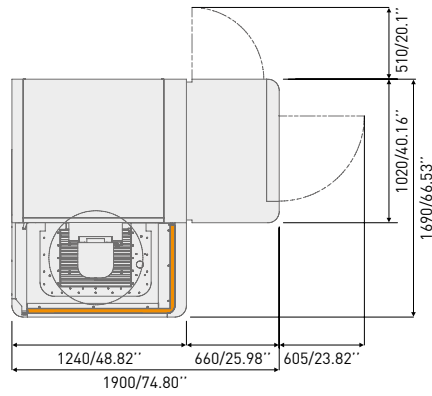
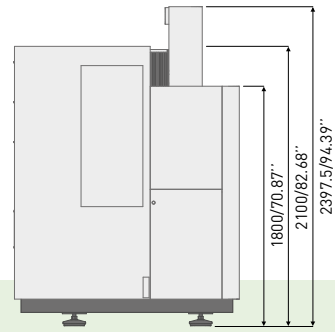
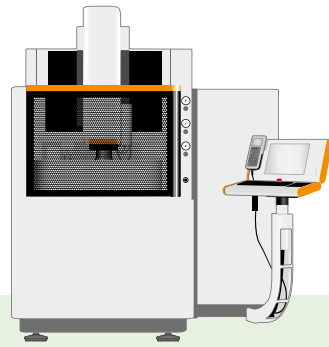
		FORM 200	FORM 300	FORM 400
Machine				
Architecture		C-frame/Fixed table/Drop tank		
Dimensions (*)	mm (in)	1900 x 1690 x 2398 (74.80 x 66.53 x 94.4)	2265 x 2110 x 2780 (89.17 x 83.07 x 109.45)	2970 x 3100 x 3320 (116.93 x 122.05 x 130.71)
Total weight (without dielectric)	kg (lbs)	2800 (6173)	4500 (9920)	7000 (15432)
Floor space (**)	mm (in)	1900 x 1690 (74.80 x 66.53)	3040 x 2830 (119.68 x 111.42)	2970 x 3100 (116.93 x 122.05)
Complies with "Machines, Safety and Health" directive		89/392/CEE	89/392/CEE	89/392/CEE
Complies with "Electromagnetic Compatibility" directive		89/336/CEE	89/336/CEE	89/336/CEE
X, Y, Z axes				
X, Y, Z travel (*)	mm (in)	350 x 250 x 300 (13.78 x 9.84 x 11.81)	600 x 400 x 450 (23.62 x 15.75 x 17.72)	900 x 700 x 500 (35.43 x 27.56 x 19.68)
X, Y, axes speed	m/min (ft/min)	6 (19.7)	6 (19.7)	6 (19.7)
Z axis speed	m/min (ft/min)	15 (49.2)	10 (32.8)	7.5 (24.6)
Positioning resolution X, Y, Z	µm (in)	0.05 (0.000002)	0.05 (0.000002)	0.05 (0.000002)
Work area				
Worktank size (*)	mm (in)	790 x 530 x 350 (31.1 x 20.87 x 13.78)	1220 x 870 x 470 (48.03 x 34.25 x 18.50)	1814 x 1215 x 700 (71.42 x 47.83 x 27.56) Extendable in X
Worktable size (**)	mm (in)	500 x 400 (19.68 x 15.75)	750 x 600 (29.53 x 23.62)	1100 x 900 (43.31 x 35.43)
Distance floor to clamping level	mm (in)	1000 (39.37)	1000 (39.37)	1100 (43.31)
Min./Max. distance between table and chuck	mm (in)	150/450 (5.91/17.72)	150/600 (5.91/23.62)	322/822 (12.68/32.36)
Workpiece and electrode				
Max. electrode weight	kg (lbs)	50 (110.23)	50 (110.23)	50 (110.23)
Max. workpiece weight	kg (lbs)	500 (1102.31)	1600 (3527.40)	3000 (6613.86)
Max. workpiece dimensions (*)	mm (in)	790 x 530 x 275 (31.1 x 20.87 x 10.83)	1220 x 870 x 470 (48.03 x 34.25 x 18.50)	1814 x 1215 x 600 (71.42 x 47.83 x 23.62)
Bath level (programmable)	mm (in)	100 - 325 (3.94 - 12.8)	100 - 450 (3.94 - 17.72)	100 - 630 (3.94 - 24.80)

* Width x depth x height ** Width x depth

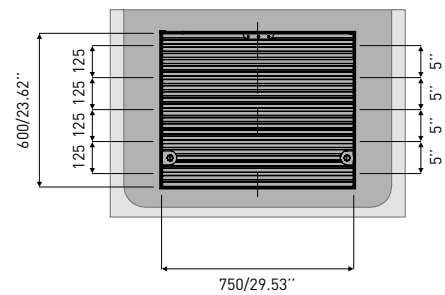
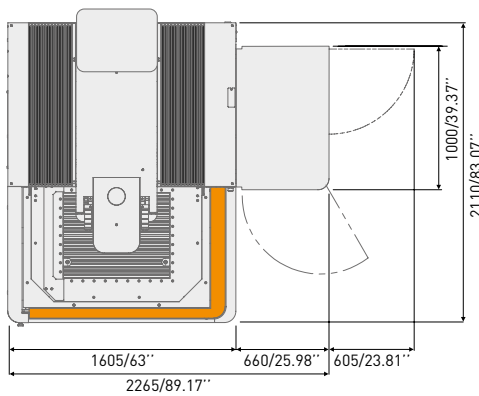
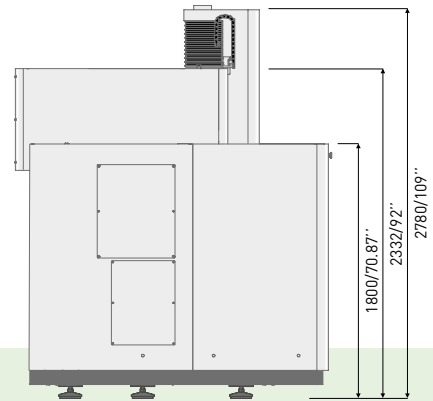
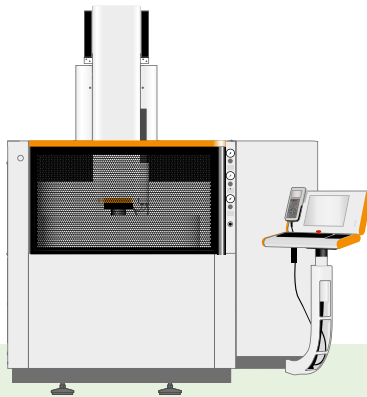
		FORM 200	FORM 300	FORM 400
Dielectric unit				
Capacity	l (gal)	410 (108.65)	700 (184.8)	2500 (662.5)
Number of filter elements and type		4 Paper filter	6 Paper filter	8 Paper filter
Generator				
Generator type		ISPG	ISPG	ISPG
Max. machining current (option)	A	80 (140)	80 (140)	80 (140)
Best surface finish	µm Ra	0.08	0.08	0.1
Electrical supply Standard				
Standard voltage		3 x 380V/400V ± 10%. 50/60Hz (50Hz standard)		
Cooling				
Heat exchanger dielectricum/water for the dielectricum		Integrated	Integrated	Integrated
Control Unit				
Operating system		Windows		
Data input		15" LCD screen, mouse or touch screen, keyboard and Remote control		
User interface		AC FORM HMI		
Expert systems		TECFORM		
Console support		Movable on cabinet or on foot		
Modules				
Z axis (15 m/min)		Standard	—	Option
Linear tool changer (*)		4 (Std. tooling) 5 (Combi tooling)	6 (Std. tooling) 6 (Combi tooling)	10 (Std. tooling) Left 10 (Std. tooling) Right
Rotary tool changer (*)		16-80 pos. (Std. tooling) 32-160 pos. (Combi tooling)	16-80 pos. (Std. tooling) 32-160 pos. (Combi tooling)	— —
Flushing Injections		2 Laterals, 1 through the piece, 1 through the electrode, 1 suction		
Heat exchanger air/water for the cabinet		Option	Option	Option
Multicavity flushing 6 outputs		Option	Option	Option
3D probe measuring system for Erowa or System 3R		Option	Option	Option
iQ graphite and copper module for reduction of electrodes' wear		Standard	Standard	Standard
Standard C-Axis (*)				
Max. electrode weight on automatic chuck	kg (lbs)	50 (110.23)	50 (110.23)	50 (110.23)
Rotation speed	rpm	0-100	0-100	0-100
Max. inertia	kgcm ² (lbsin ²)	2000 (683)	2000 (683)	2000 (683)
Accura C-Axis (*)				
Max. electrode weight on automatic chuck	kg (lbs)	50 (110.23)	50 (110.23)	50 (110.23)
Rotation speed	rpm	0-100	0-100	0-100
Max. inertia	kgcm ² (lbsin ²)	5000 (1700)	5000 (1700)	5000 (1700)

* Option

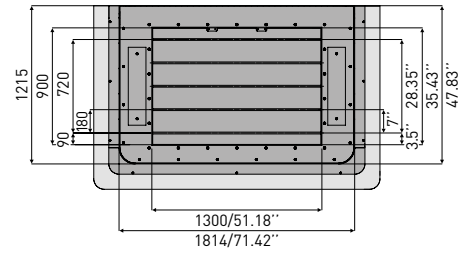
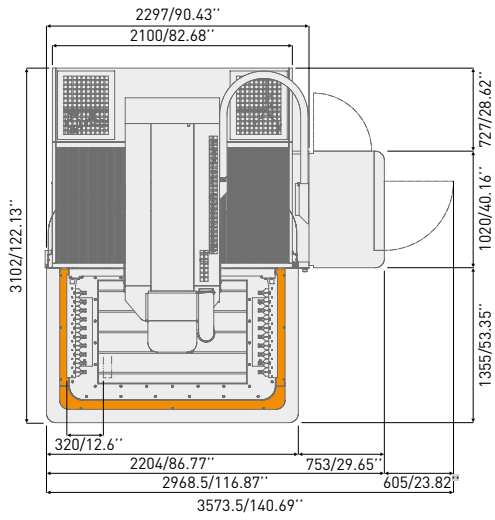
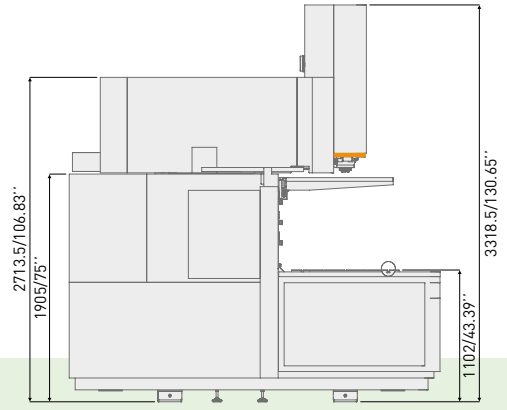
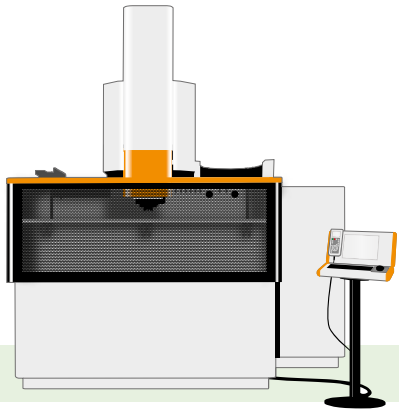
FORM 200



FORM 300



FORM 400



GF Machining Solutions



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

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



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 and design advantages.



Customer Services

Operations, Machine and Business Support. Customer Services provides with three levels of support providing all kinds of services for GF Machining Solutions 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.



At a glance

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

www.gfms.com

