

U-FAST SPS R|EVOLUTION



GeniCore
Genius at the Core

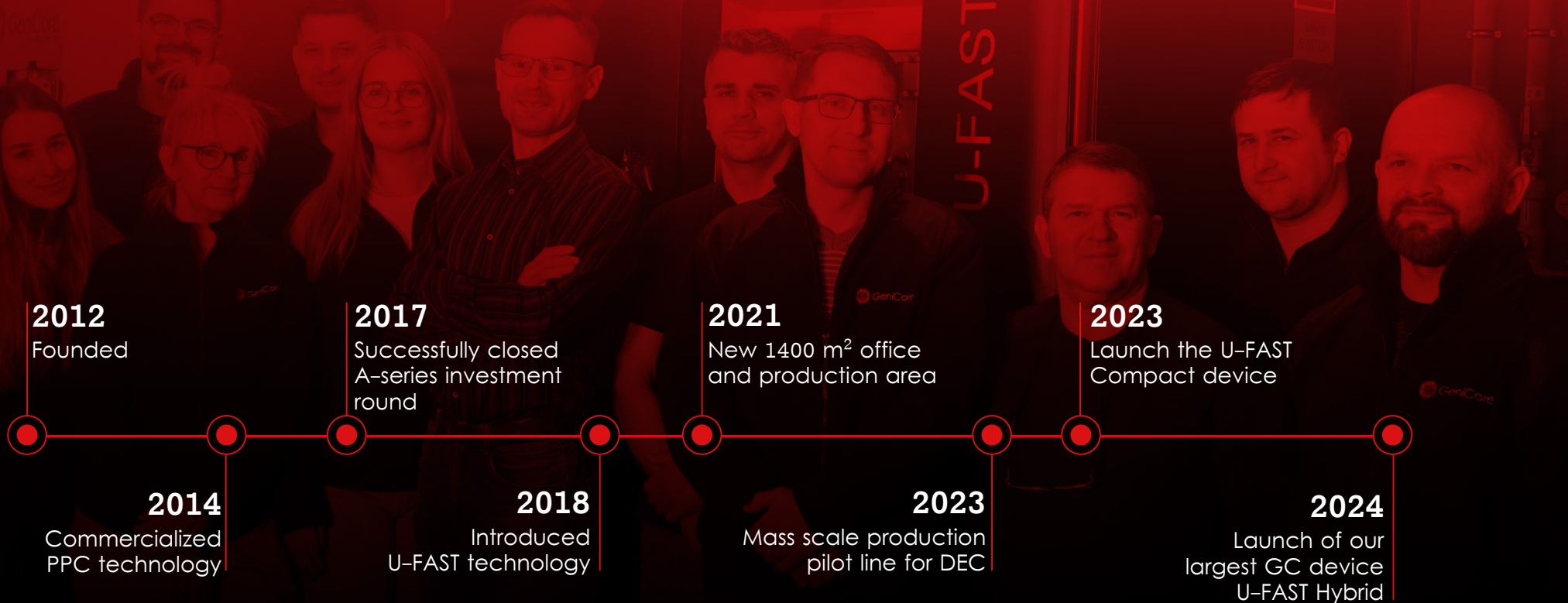
WHO WE ARE

Genius at the Core



GeniCore

Since 2012, GeniCore has been successfully specializing in the production of advanced machines for the SPS (Spark Plasma Sintering) process. We are a company operating in the field of materials engineering, possessing our own technological, equipment, and material know-how. GeniCore supports and closely collaborates with clients, meeting their specific needs and ultimately delivering products and technologies based on the motto „Genius at the Core“. We offer innovative systems for sintering materials of a new generation, including the U-FAST (Upgraded-Field Assisted Sintering Technology) product line. Our dedicated solutions are aimed at industries, R&D companies, universities, and research units in the field of materials engineering.



GeniCore is a reliable partner in sintering technology.

Is also the creator of cutting edge U-FAST and PPC technologies.

Thanks to our vast experience in R&D we can design devices with focus on the materials.



REVOLUTION IN TECHNOLOGY: We offer a unique U-FAST technology, positioning us as innovators in the SPS field. This is a revolution in speed and precision, allowing materials to be sintered with great accuracy, reducing costs and production time. It also opens up new possibilities in creating advanced materials.



CUSTOMER EVOLUTION: We take an individual approach to each project, ensuring optimal adaptation of devices to the industry's specifics. Our U-FAST line evolves with the needs of our customers, offering possibilities for expansion and customization for various projects, from nanocrystalline materials to advanced composites and thermoelectric materials.



WE UNDERTAKE PROJECTS AT THE EU AND NATIONAL LEVELS: Our cooperation with leading institutions such as IKTS Fraunhofer, Laboratório Nacional de Energia e Geologia, I.P. – LNEG, Sintef, or ICMPE CNRS, is evidence of the trust and recognition that GeniCore enjoys. Thanks to this, we are at the forefront of innovation, creating SPS solutions that define the future of the industry. Choose GeniCore and be part of this revolution.



U-FAST SPS RE|EVOLUTION

U-FAST SPS represents of spark plasma sintering that sets new standards in the sintering process. Our innovation is based on advanced technology that generates current pulses with a duration shorter than 1 ms, enabling sintering of materials with minimal or zero grain growth.

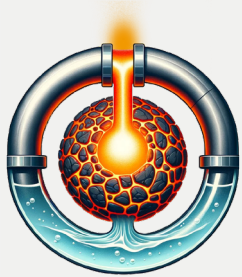
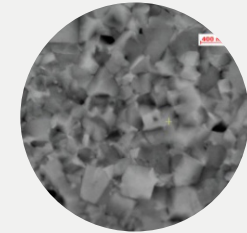
 As leaders in SPS Technology, we not only deliver products but also provide unique experiences and constant support in a process. The uniqueness of U-FAST lies in its ability to adapt to individual customer needs, creating bespoke solutions that evolve with the industry. Each of our devices is not just a revolution but also a flexible evolution, tailored to industry specifics and customer requirements. Join our revolution, where innovation meets customization, and U-FAST technology defines new horizons in the sintering field.



GeniCore | **Your** FUTURE **our technology today.**

MINIMIZED GRAIN GROWTH:

Resulting in materials with exceptional structure and mechanical properties.



DECREASED WATER CONSUMPTION THROUGH CLOSED LOOP:

U-FAST SPS utilizes a closed-loop system, minimizing water consumption and addressing the challenges of sustainable development.

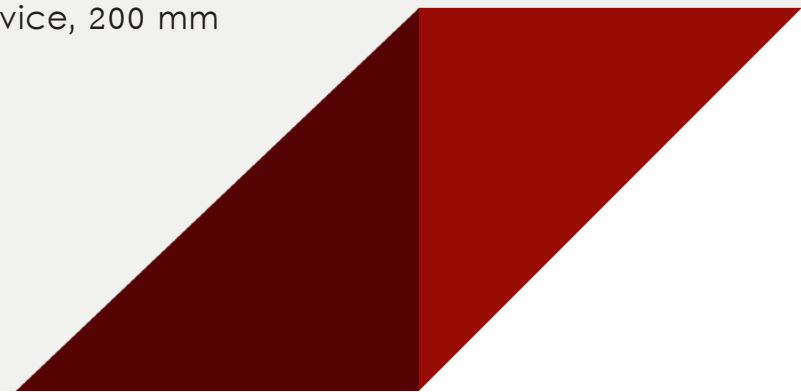
REDUCED ELECTRICITY CONSUMPTION / HIGHER EFFICIENCY:

Lead to operational cost savings around 30% compared to HP technologies.

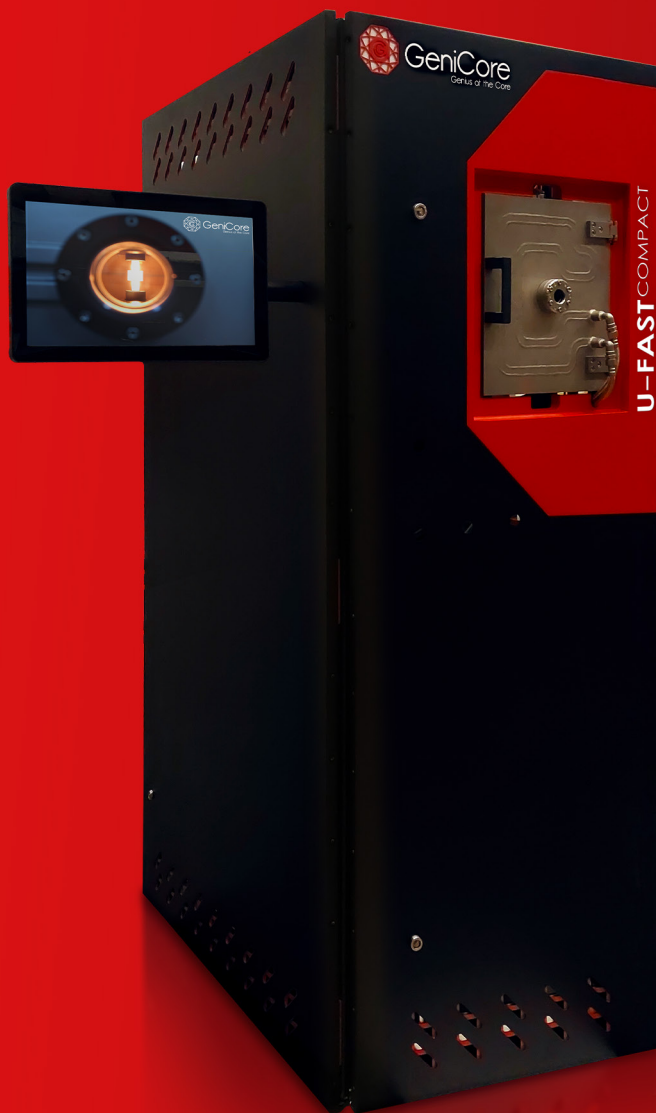


TECHNOLOGICAL ACHIEVEMENTS:

current pulses <1 ms, vacuum pump 5×10^{-5} mbar in a small Compact device, technical vacuum under a minute in the MASS device, 200 mm sinter diameter in the Hybrid systems.



U-FAST COMPACT



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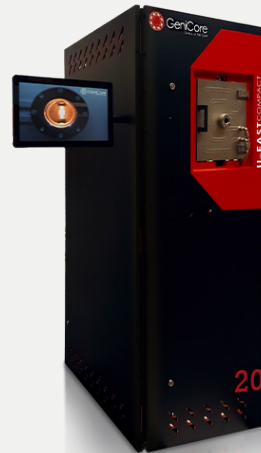
REVOLUTION IN COMPACT DESIGN FOR SPS DEVICE TO FIT IN SMALL RESEARCH LABS.

Small, Powerful, Precise and budget-friendly U-FAST solution to support innovation. Limited investment level without quality compromise thanks to accurate pressing system. Capable to work with air cooled chillers.

PARAMETERS

5 000	Max. pulse current [A]
14	Max. output voltage [V]
0.8 – 999	Pulse duration [ms]
5×10^{-5}	Vacuum [mbar]
2 – 75	Pressing force [kN]
0 – 500	Pulse Pause [ms]
1 – 500	Number of pulses
fully programable	Pulse control

U-FAST COMPACT



U-FAST^{COMPACT} 10

Max Sintered Diameter
Ø 10 mm

Max Current
1 100 A

SPS pulses

Pressing force
35 kN

Oil rotary pump
9x10⁻² mbar

U-FAST^{COMPACT} 20

Max Sintered Diameter
Ø 20 mm

Max Current
2 200 A

SPS pulses

Pressing force
55 kN

Oil rotary pump
9x10⁻² mbar

U-FAST^{COMPACT} 30

Max Sintered Diameter
Ø 30 mm

Max Current
3 300 A

SPS pulses

Pressing force
75 kN

Oil rotary pump
9x10⁻² mbar

U-FAST^{COMPACT} 40 PRO

Max Sintered Diameter
Ø 40 mm

Max Current
5 000 A

SPS pulses + Induction Heating

Pressing force
60 kN

Oil rotary pump + Turbo pump
5x10⁻⁵ mbar

U-FAST GC 85-HV



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EVOLUTION SUITABLE FOR BOTH R&D AND LOW-VOLUME PRODUCTION.

It consolidates materials using SPS technology for efficient small-scale production. Created for tech companies and manufacturers with research centers.

PARAMETERS

10 000	Max. pulse current [A]
14	Max. output voltage [V]
0.8 – 999	Pulse duration [ms]
5×10^{-5}	Vacuum [mbar]
6 – 300	Pressing force [kN]
0 – 500	Pulse Pause [ms]
1 – 500	Number of pulses
fully programable	Pulse control

U-FAST GC 85-HV



U-FAST GC 35

Max Sintered Diameter
Ø 35 mm

Max Current
3 300 A

SPS pulses

Pressing force
125 kN

Oil rotary pump
9x10⁻² mbar



U-FAST GC 55

Max Sintered Diameter
Ø 55 mm

Max Current
6 600 A

SPS pulses

Pressing force
125 kN

Oil rotary pump
9x10⁻² mbar



U-FAST GC 85

Max Sintered Diameter
Ø 85 mm

Max Current
10 000 A

SPS pulses

Pressing force
200 kN

Oil rotary pump
9x10⁻² mbar



U-FAST GC 85 PRO

Max Sintered Diameter
Ø 85 mm

Max Current
10 000 A

SPS pulses

Pressing force
300 kN

Oil rotary pump + Turbo pump
5x10⁻⁵ mbar

U-FAST MASS



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REVOLUTION THAT LEAD TO AN AUTOMATED FOR SPS UNIT FOR CONTINUOUS, LARGE-SCALE PRODUCTION.

It efficiently handles high-volume demands and reduces costs with its energy-efficient, modular hardware and SPS technology. This device can be loaded with max 6 distinct graphite sets.

- 400 kN > Load**
- 5×10^{-5} mbar > Vacuum**
- 300 kW > Heating power**
- 10 - 100 mm > Sinters diameter**
- Fully automated > Working mode**

PARAMETERS	
30 000	Max. pulse current [A]
14	Max. output voltage [V]
0.8 - 999	Pulse duration [ms]
5×10^{-5}	Vacuum [mbar]
300 - 400	Max. pressing force [kN]
0 - 500	Pulse Pause [ms]
1 - 500	Number of pulses
fully programmable	Pulse control

GEOMETRY	APPLICATION	YIELD
\varnothing 12.7 x 5 mm	Ceramic whiskers tools material	450 000 pcs
20 x 20 x 2.5 mm	High thermal conductive substrate	1 000 000 pcs

U-FAST MASS



U-FAST MASS

Heating power
200 kW

Process SPS
standard pulses length

working mode
Fully automated

Load
300 kN

Oil rotary pump
 9×10^{-2} mbar



U-FAST MASS PRO

Heating power
300 kW

Process SPS
shorter pulses

working mode
Fully automated

Load
400 kN

Dry pre-pumping system + Turbomolecular pump
 5×10^{-5} mbar

U-FAST HYBRID



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REVOLUTION IN BIG DIAMETERS SPS SINTERING.

The U-FAST Hybrid sintering technology rapidly heats a wide range of materials, maintaining uniform temperature distribution in samples up to 200 mm. It features two independently controlled heating sources, ensuring precise, efficient heating and improved sample quality.

PARAMETERS

2000 – 3.500 kN	Max Pressing Force
1 – 2	Vacuum Chambers
200 mm	Max Sintered Diameter
60 000 A	Max Pulses Current
350 kW	Max Heating Power Induction
$> 5 \times 10^{-5}$ mbar	Dry Pre-Pumping System + Turbomolecular Pump
$> 600 - 1,000$ kW	Max Heating Power U-FAST

U-FAST HYBRID



U-FAST HYBRID 200

Max Pressing Force
2 000 kN

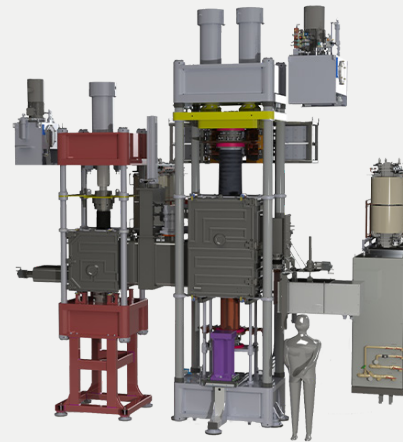
Vacuum chambers
1

Max Sintered Diameter
200

Max Heating Power Induction
350 kW

Oil rotary pump
 9×10^{-2} mbar

Max Heating Power U-FAST
600 - 1 000 kW



U-FAST HYBRID CSP 350

Max Pressing Force
3 500 kN

Vacuum chambers
2

Max Sintered Diameter
200

Max Heating Power Induction
350 kW

Oil rotary pump
 9×10^{-2} mbar

Max Heating Power U-FAST
600 - 1 000 kW



U-FAST HYBRID CSP 350 PRO

Max Pressing Force
3 500 kN

Vacuum chambers
2

Max Sintered Diameter
200

Max Heating Power Induction
350 kW

Dry pre-pumping system
+ Turbomolecular pump
 5×10^{-5} mbar

Max Heating Power U-FAST
600 - 1 000 kW



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Pulse Plasma COMPACTION



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PPC

The PPC device represents an evolutionary leap in the sintering process, capable of sintering a wide range of powder materials efficiently and with precise temperature control. This technology uses high-frequency, narrow current high voltage pulses to achieve sintering, a method not achievable with traditional or mechanical switches. Key features of the PPC include its ability to generate pulses with equal amplitude, adjustable amperage reaching dozens kA, and a control system that allows for precise pulse. This specialized device is not part of our standard product range but rather a showcase of the technology we have and its implementation.

DURING THE PPC PROCESS, electrical energy stored in the battery of capacitors is dissipated in a closed circuit of capacitors /consolidated powder / stamps using electronic switch. Capacitor bank is adapted to pulse operation at the voltage of 2000 V and big rates of current rise. The main advantages of this method are short sintering time and low pressing load.

PULSE PLASMA COMPACTION is intended for the application to the sintered set of high and narrow current pulses repeated at a high frequency, whilst ensuring a long duration of the high-current electronic key in the capacitors' battery discharge circuit. One of the factors behind the usage of the high-current electronic keys is the formation of pulses with the duration of several hundred microseconds and adjustable amperage already for several kA. The possibility of forming current pulses cannot be reached using other well-known semiconductor connectors or mechanical switches, which use oscillatory discharge of the battery – the amplitude of each successive half is smaller and cannot be controlled/monitored, so the value of the supplied energy is variable.



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**We create the World
everyday Materials matter.**



U-FAST TECHNOLOGY

GeniCore U-FAST, thanks to its advanced heating system based on a unique pulse shape allows to achieve better results compared to other available FAST devices. This fact has determined the name of the device hence the name GeniCore U-FAST (Upgraded Field-Assisted Sintering Technology). The tests carried out so far on U-FAST materials open up a number of possibilities in areas where the expected material quality is not achievable with other methods. Current activities of GeniCore have confirmed the validity of the use of U-FAST materials in the tool industry, mining and advanced electronics. These are one of the first application possibilities, which will certainly be much more given the intensity of research work.



A FASTER AND CHEAPER WAY TO SINTER METALIC AND CERAMIC POWDERS

The U-FAST device has a rated power of 100 kW, a press with a pressure of 3 to 350 kN and a vacuum system ensuring sintering processes at a pressure of up to 5×10^{-5} mbar. Thanks to the use of electrodes in the construction of a material with very high electrical conductivity,

it is very energy efficient. Its effectiveness is also influenced by the process being carried out in a vacuum with the use of materials with a very low thermal conductivity coefficient – at the level of 0.44 W/mK. This significantly reduces costs in the production process. The total

energy consumption necessary to produce a cobalt-free carbide sinter weighing 1.5 kg and a diameter of Ø 60 mm is 18.5 kWh. The economic advantages also include the time of the sintering process, which is 50 minutes.



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SUSTAINABILITY

In our activities we follow a policy of sustainable development, which impact area of development of our devices. The operation of GeniCore's device has less negative influence to the environment compared to conventional production technologies.

- > **Reduction of pollution and water** consumption by using closed-loop cooling systems.
- > **Reduction of energy** consumption by heat release within the material subjected to the sintering process.
- > **Reduction of energy** consumption in the production process.
- > **Reduction of material** consumption per product unit due to the possibility of sintering elements in a shape similar to the final application.

Our client's success is a source of satisfaction and inspiration for further action and development!

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GeniCore
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To ensure the best service for our clients, GeniCore operates through a network of trusted distributors worldwide. These distributors provide top-notch sales and service solutions on our behalf.

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DIALUX

CYC CARBIDE

SALES OF GC DEVICES:

Poland | China | USA | France

● Sales of GC devices

● Agents/representatives of the company worldwide

If you have any questions or concerns, please don't hesitate to contact our customer service team at **+48 789 221 553** or via email at genicore@genicore.pl. We are ready to address all your needs and provide comprehensive support both before and after purchase.



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