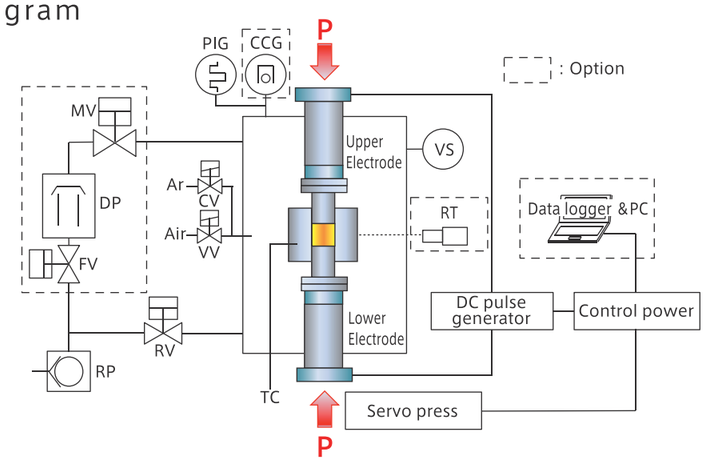
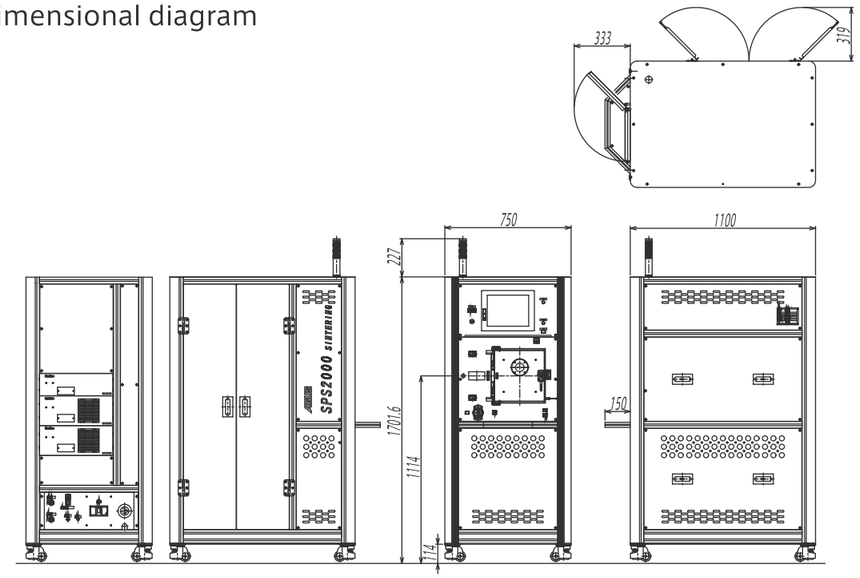
● Block diagram



● Dimensional diagram



Main unit : W750xD1250xH1930 mm

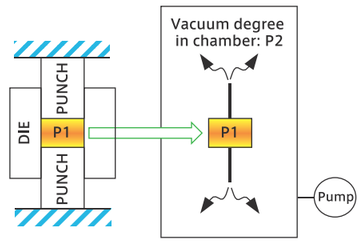
SPS Series

SPS2000
Spark Plasma Sintering System

放電プラズマ焼結装置

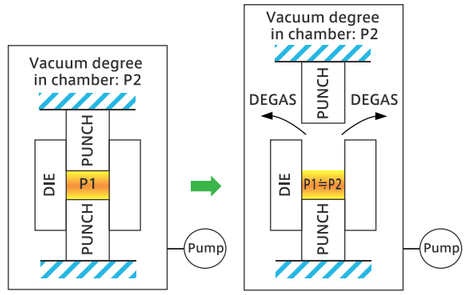
Patent pending

○ Issue to be solved.



The pressure in "P1" increases due to outgassing from the powder surface which is released by heating during sintering. Even in the high vacuum condition, the conductance of the evacuation path of "P1" is extremely small, so the impurities adhering to the powder could not be fully removed.

○ SPS2000 offers solution!



SPS2000 can preheat the powder in the vacuum chamber before the sintering process and release the upper surface of the powder into vacuum condition so that outgassing from the powder can be efficiently evacuated.

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＊ Product specifications are subject to change without notice.
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放電プラズマ焼結装置
SPS2000
Spark Plasma Sintering System

SPS2000 is the only SPS system that incorporates the DEGAS mode (powder cleaning step). It is a compact and lightweight SPS system with stylish design that guarantees not only high operability and safety but the new functions required for advanced material development. Additional options are available even after the installation. Pressurization capacity and DC pulse generator can be added up to the maximum specifications at affordable cost and simple procedures. In addition, SUGA's ALD and Sputtering systems for the deposition on powders could be a unique innovative solution.

● Features

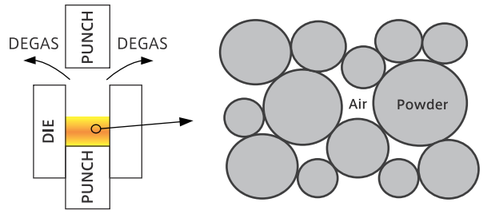
■ Selectable pre/after sintering process mode

In addition to the regular sintering control, the following modes can be selected and automatically controlled in a series of operations.

Pre-sintering

w/o heat

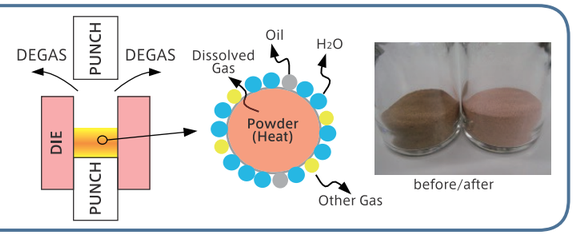
A mechanism that efficiently evacuates the atmosphere from the boundary of powder particles to maintain better purity on the material.



Pre-sintering

w/ heat

A mechanism that heats powder in a vacuum atmosphere to remove water molecules, etc. on the powder surface for better purity of sintered compacts.

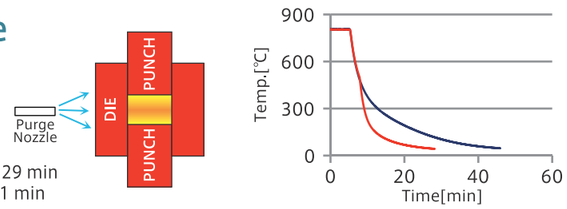


After-sintering

Rapid cooling mode

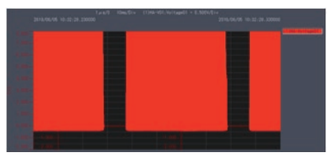
Rapid cooling mechanism that blows cooling gas onto the die after sintering

[Reference] ϕ10mm punch
Natural cooling 800 ℃ → 80 ℃ : Approx. 29 min
Rapid cooling 800 ℃ → 80 ℃ : Approx. 11 min



■ Selectable Wave Form

Continuous DC and Full Wave can be selected on a touch screen in addition to DC Pulse (Standard output for SPS)


DC Pulse

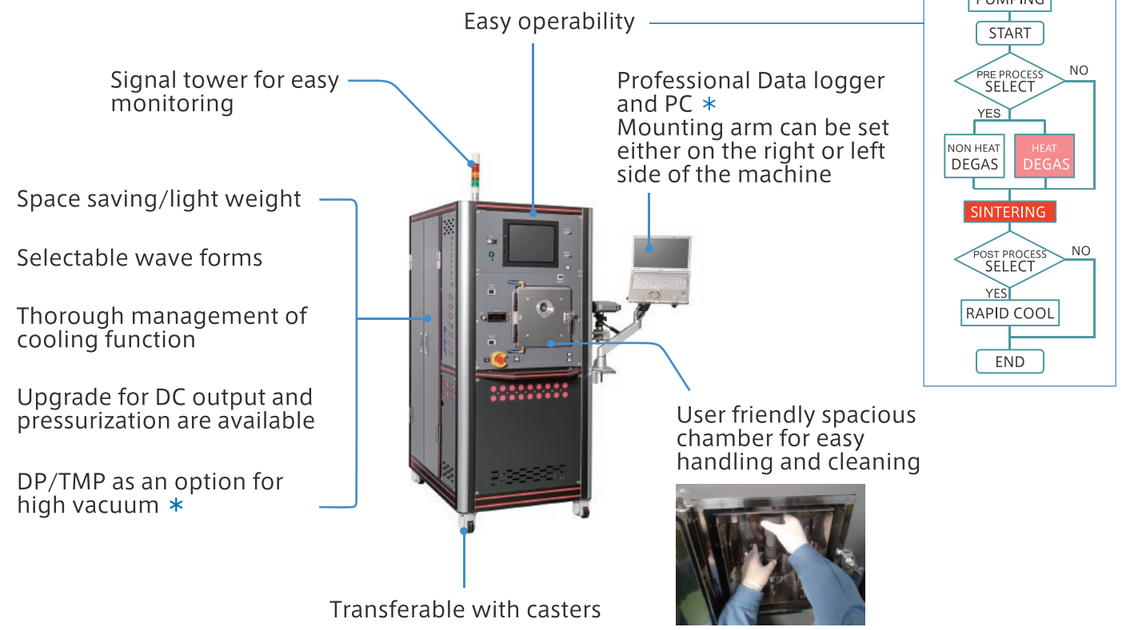

Continuous DC


Full Wave

■ FLASH SPS

Densification within a few seconds.
Heating rate: 10^2-10^3 C/min.

＊: Option



● Specification

Specifications				
Model		SPS2000-3T	SPS2000-5T	SPS2000-7T
Max. pressure		30kN	50kN	70kN
Min. pressure		0.2kN (20kgf)		
SPS current		1000A	2000A	3000A
Stroke		150mm (open height : 200mm)		
Max. temperature		2500℃ (working temp. 2200℃)		
Pressurization system		AC Servo motor		
DC pulse control		ON/1～999ms OFF/1～99ms		
Vacuum chamber		Rectangular-shaped water cooled system		
Vacuum speed		2Pa / 5 min		
Weight	Main unit	600kg	725kg	850kg
	RP pump	27kg		

Max. output of DC pulse generator can be increased in increments of 500A as an option up to 3000A.

Option		
High vacuum	DP (Diffusion Pump)	≦ 5×10^{-4}Pa
	TMP(Turbo molecular pump)	
Radiation thermometer	for above 600℃	
PC for data logger	Windows notebook with mounting arm	
Chiller	for cooling water	

Utillity							
Model		SPS2000-3T	SPS2000-5T	SPS2000-7T	Cooling water	Water amount	≧10L/min
SPS current (standard)		1000A	2000A	3000A		Supply pressure	0.2～0.3MPa (back pressure ≦0.05MPa)
Rated input	Power supply	3ϕ 200/380/400/480V±10% 50/60Hz					
		18.2kVA	32.2kVA	46.2kVA		Temp.	15～30℃
	Input cable	Length: 5m (User's side is unconnected)				Port	Rc3/8
Exhaust duct	Port	NW25(KF25) Flange			Compressed air	Supply pressure	0.5～0.8MPa
Required space (inclusive of maintenance space)		W1300xD1600xH2500 mm				Port	Rc1/8