

Spotless images, bright perspectives:
 TRUMPF Hüttinger for impressive quality and performance.



Generating waveforms. TruPlasma Bipolar Series 4000 (G2.1).

The TruPlasma Bipolar Series 4000 (G2.1) Water Cooled power supplies are ideally suited for plasma-assisted film deposition PECVD and dual cathode sputtering processes, where reliability and performance are critical: semiconductor manufacturing, architectural glass coating and solar cell production, high-quality hard and decorative coatings, and for optical films.

G2.1 – the extended version of G2 generation with highly sophisticated fully digital arc-management ensures optimum results for film quality and deposition rate. Its compact size and comprehensive set of communication interfaces makes the TruPlasma Bipolar Series 4000 (G2.1) the ideal choice for easy tool integration at limited space conditions.

Top 3 Product Benefits

1. Waveform and Frequency Flexibility

- Maximum flexibility with 6 waveform modes: MF and DC in one power supply
- Maximum frequency flexibility: 1 Hz ... 100 kHz, widest duty cycle range

Benefit

- High process yield
- Highest achievable deposition rate
- High quality coatings at different duty or frequency settings
- Control of temperature stress for sensitive substrates
- Limitation of arcing probability

2. Best in Class Arc Management

- Lowest arc energies of any MF / bipolar power supply (less by 0.2 mJ compared to the other vendors)
- Highest flexibility in arc parameter settings

Benefit

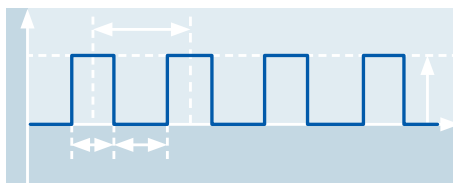
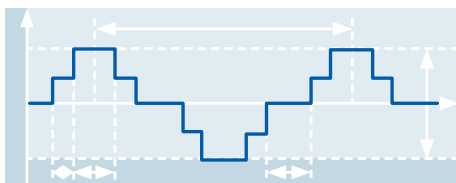
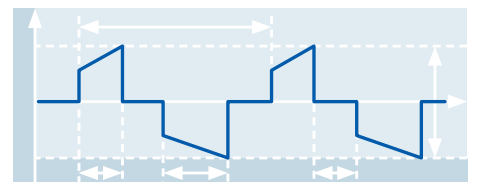
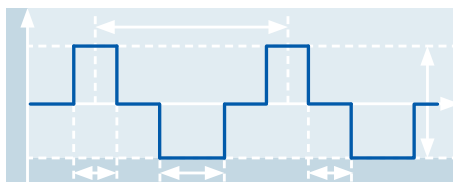
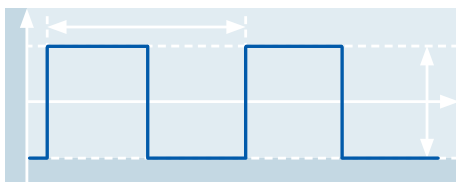
- High process yield
- Shorter process duration
- Best layer quality
- Less target wear
- Reduced particulate contamination

3. Energy Efficiency and Power Factor

- Up to 5 % better efficiency than other bipolar power supply
- Highest power factor of any bipolar power supply (constant 0.95 comparing to 0.7 – 0.9 other vendors)

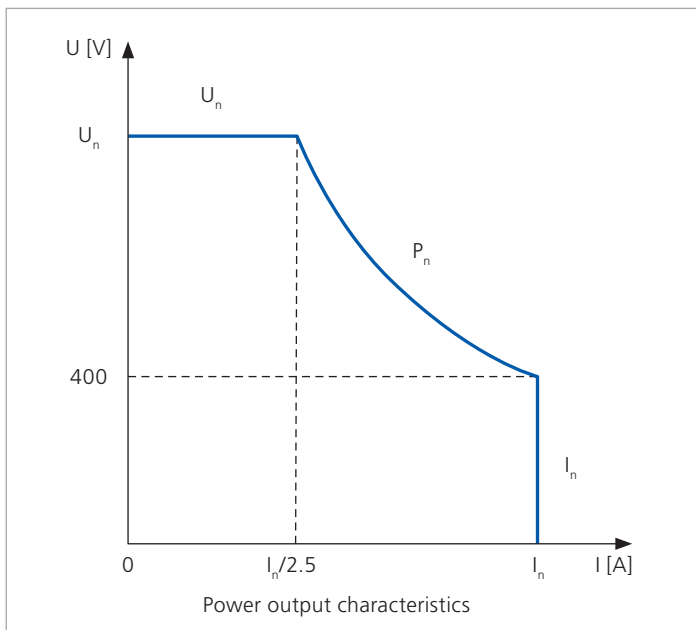
Benefit

- Constant power factor (0.95) in full operation range
- Low cost of ownership
- Lower production costs



TRUMPF Hüttinger
 generating confidence

TruPlasma Bipolar Series 4000 (G2.1)



Electrical Data

Regulation Modes	Power, Voltage, Current
Efficiency	> 90 % (typically)
Input Line Voltage	380 ÷ 480 V ± 10 %
Input Line Frequency	50 Hz / 60 Hz
Arc Handling	Current and voltage based criteria 40 kArc/s Arc handling rate < 0.3 mJ/kW typically
Ignition	Up to 2000 V
Output Modes (duty cycle adjustable 1 – 99 %)	Bipolar pulsing Bipolar rectangular pulsing with off time Bipolar trapeze pulsing with off time Bipolar step mode Unipolar pulsing DC
Pulsing Frequency	1 Hz – 100 kHz
Regulation	Accuracy: ± 0.5 % Repeatability: ± 0.2 %

Mechanical and Operation Data

Protection Class	IP 40
Output Connection	M8 bolt
Ambient Temperature	+5 °C to +45 °C operation -25 °C to +55 °C storage
Cooling Water Temperature	Up to +35 °C
Cooling Water Pressure	Max. 7 bar
Humidity / Air Pressure	5 % – 85 % non condensing 860 hPa – 1060 hPa operating

Interfaces

Digital	RS-232, RS-485 or Profibus, EtherCat, DeviceNet, USB, Ethernet/Ip, Profinet
Other	Analog, Active front panel

		Electrical Data			Dimensions	Water Flow Rate	Weight
Single Operation		P _n [kW]	I _n [A]	U _n [V]			
	TruPlasma Bipolar 4010	10	25	1000	4U, 19"	> 6 l/min	50 kg
	TruPlasma Bipolar 4020	20	50	1000	4U, 19"	> 8 l/min	50 kg
	TruPlasma Bipolar 4030	30	75	1000	8U, 19"	> 16 l/min	100 kg
	TruPlasma Bipolar 4040	40	100	1000	8U, 19"	> 16 l/min	100 kg
	TruPlasma Bipolar 4060	60	150	1000	12U, 19"	> 24 l/min	150 kg
Parallel Operation							
	TruPlasma Bipolar 4080	80	200	1000	2 x 8U, 19"	> 2 x 16 l/min	2 x 100 kg
	TruPlasma Bipolar 4100	100	250	1000	Ex. 1 x 8U, 1 x 12U, 19"	Ex. > 16 + 24 l/min	
	TruPlasma Bipolar 4120	120	300	1000	2 x 12U, 19"	> 2 x 24 l/min	2 x 150 kg
	TruPlasma Bipolar 4150	150	375	1000	Ex. 1 x 8U, 2 x 12U, 19"	Ex. > 12 + 48 l/min	
	TruPlasma Bipolar 4180	180	450	1000	3 x 12U, 19"	> 3 x 24 l/min	3 x 150 kg

For further information please contact:

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