

TruPlasma Highpulse  
Series 4000

Generate high  
density plasmas for  
superior deposition  
results.





Formed in microseconds – lasting for years:  
Spotless hard coatings accomplished by TRUMPF Hüttinger power.

## Droplet-free deposition and adhesion. TruPlasma Highpulse Series 4000.

The TruPlasma Highpulse Series 4000 power supplies are specifically designed for High Power Impulse Magnetron Sputtering. Pulses of up to 8 megawatts produce extremely dense metal plasma. High ion fluxes and high ion-to-neutral ratios yield films with superior mechanical characteristics.

Hard, homogeneous and smooth, these coatings are ideal for functional and decorative applications. The unique characteristics of ions created by TruPlasma Highpulse Series 4000 can also be used for metal ion etching (pre-sputter treatment) and semiconductor applications (trench filling).

TruPlasma Highpulse Series 4000 generators deliver repeated, short, megawatt pulses with up to 4 kiloamperes peak current and up to 2 kilovolts peak voltage. However, short pulse durations and low duty cycles ensure that the average power stays within the kilowatt range. This means you can use existing magnetrons, whether for laboratory or production systems, without modification.

The TruPlasma Highpulse power supplies consist of 2 sections: a DC power supply and a pulse unit. Standard models are available with 10 kilowatts (kW) and 20 kW average output power. Models offering higher or lower power are available upon request.

### Features

- The world's broadest range of TruPlasma HIPIMS power force
- Active arc suppression
- Adjustable pulse duration and frequency
- Real time, pulse-by-pulse monitoring and control
- Optional cable length compensation

### Benefits

- Unsurpassed flexibility for lab or industrial processes
- Droplet-free sputtering, reduced film defects
- Easily adoptable to existing cathodes and process requirements
- Effective utilization of cathode's power capabilities
- Prevents negative effects of arc both to cathode and coating



DC Unit



Pulse Unit

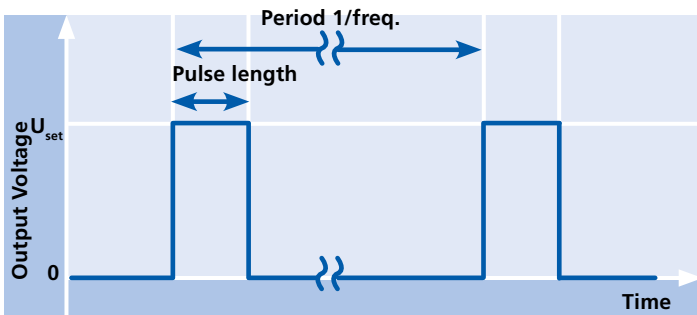
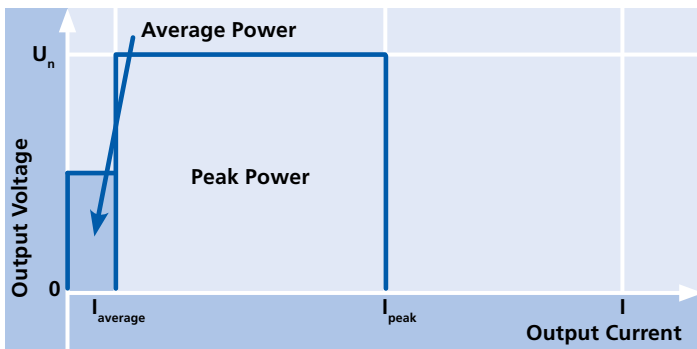
Output Parameters		
Output Peak Power	1 MW to 8 MW	
Output Average Power	Up to 20 kW <sup>1</sup>	
Output Peak Voltage	1 kV to 2 kV	
Output Peak Current	1 kA, 3 kA, 4 kA	
Regulation Modes	Voltage	
Efficiency	90 % – 92 % <sup>2</sup>	
Operation Duty Cycle	100 %	
Regulation Line ±10 % Load 10 % – 90 %	Accuracy	± 1.0 %
	Repeatability	± 0.5 %
Output Polarity	Negative	

1) Depending on cathode max. average power.  
2) Depending on model.

Arc Detection Criteria	
I <sub>max</sub> -Detection	Var. I <sub>max</sub> threshold: 5 % – 105 %
Arc Detection Time	< 500 ns

Input Parameters	
Line Voltage	3 x 400 V ± 10 %
Line Frequency	50 Hz / 60 Hz ± 5 %

Pulsed Operation Parameters	
Pulse Frequency	Up to 500 Hz
Pulse Duration	< 200 μs





## Cooling Specifications

<b>Cooling System</b>	Forced Air Cooling / Fan Control
<b>Max. Inlet Air Temperature</b>	+35 °C

## Environmental Specifications

<b>Ambient Temperature</b>	+5 °C to +35 °C operating -25 °C to +55 °C storage
<b>Max. Humidity</b>	80 % non condensing
<b>Max. Operating Altitude</b>	2 000 m above sea level <sup>3</sup>

3) Special high altitude versions available upon request.

## Interfaces

<b>Analog / Digital</b>	25-pin Sub-D
<b>RS 232 / RS 485</b>	9-pin Sub-D
<b>PROFIBUS<sup>4</sup></b>	9-pin Sub-D
<b>Connection Type</b>	Front

4) Optionally available.

## Dimensions (W x H x D)

<b>DC Unit</b>	483 mm x 632 mm x 675 mm
<b>Pulse Unit</b>	483 mm x 635 mm x 676 mm

## Weight

<b>DC Unit<sup>5</sup></b>	75 kg
<b>Pulse Unit<sup>5</sup></b>	50 kg

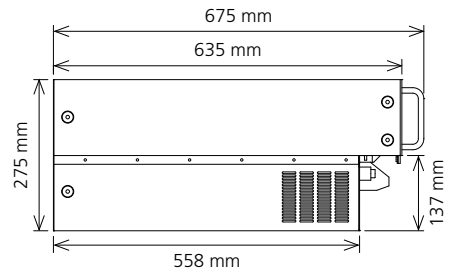
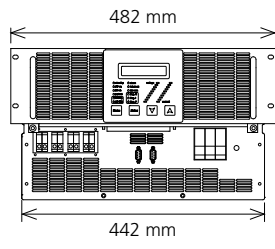
5) The numbers indicate minimum weight. Depending on model.







### DC Unit



### Pulse Unit

