

TruPlasma DC  
Series 3000 (G2)  
Series 4000 (G2)

Take a closer look  
to perfection.



## State-of-the-art solutions for DC sputtering. TruPlasma DC Series 3000 (G2).

TruPlasma DC Series 3000 (G2) power supplies are designed to serve a broad range of DC sputtering applications. With a generation of very compact, water-cooled units, TRUMPF Hüttinger now offers continuous DC power supplies that can replace pulsed generators in many sputtering applications.

The generators prove themselves under heavy use in industrial plasma processes. And they deliver their maximum power from 10 kilowatts (kW) to 300 kW across a wide load impedance range. Thus, TruPlasma DC Series 3000 (G2) is ideally suited for coating processes where reliability and performance are critical: solar cell production and architectural glass coating. In applications of hard, decorative and optical coatings the generators are key components for providing uncompromising results.

TruPlasma DC Series 3000 (G2) boasts TRUMPF Hüttinger's highly sophisticated arc management system CompensateLine. It allows for a dramatic reduction of the residual arc energy and ensures optimum results with regards to layer quality and deposition rate. Consequently, CompensateLine enables exceptionally high quality and homogeneous films also in highly arcing processes, like TCO processes.

TRUMPF's generation of water-cooled DC power supplies features an enhanced arc energy reduction which is market-leading. The wide range of mains voltage, a high output voltage and the full encapsulation of the housing make the units state-of-the-art solutions for DC sputtering. Its compact size and a comprehensive set of communication interfaces support easy tool integration.

### Features

- CompensateLine allows for better results also in highly arcing processes
- Extremely low stored arc energy and fast recovery time
- State-of-the-art solution for DC sputtering applications
- High power density at very compact size
- Proven large-volume generator design and full water cooling

### Benefits

- Competitive replacement of expensive pulsed generators
- Considerably increased production yield
- High film quality and stable, repeatable processes
- Easy integration, even for output power of more than 40 kW
- High system uptime and reduced need for maintenance

## TruPlasma DC Series 3000 (G2) water-cooled version



Output Parameters		
Output Power	10 kW to 300 kW	
Output Voltage	1 000 V	
Output Current	25 A to 750 A	
Regulation Modes	Power, voltage, current, SimReg	
Operation Duty Cycle	100 %	
Regulation Line $\pm 10$ % Load 10 % – 90 %	Accuracy	$\pm 0.5$ %
	Repeatability	$\pm 0.2$ %
Ignition (Capability)	1 500 V / Floating Anode <sup>1</sup>	
Output Polarity	Floating	
Load Impedance	5.3 $\Omega$ – 21.2 $\Omega$ (1:4) full power	

1) Available upon request.

Arc Detection Criteria	
Arc Detection Time	< 100 ns
$I_{max}$ Detection	Adj. $I_{max}$ threshold: 10 % – 130 %
Cross Detection (U x I)	Adj. $U_x$ threshold: 0 V – 900 V Adj. $I_x$ threshold: 10 % – 100 %
Dynamic Voltage Change	Adj. dU threshold: 0 V – 900 V
CompensateLine	Up to 8 kARC/s <sup>2</sup>

2) Optionally available for all models. Standard: 2 kARC/s

Input parameters	
Line Voltage	3 x 380 V – to 3 x 480 V <sup>3</sup>
Line Frequency	50 Hz / 60 Hz $\pm 5$ %
Efficiency	92 %
Power Factor	> 0.96

3) Available on request.

Cooling Specifications	
Water-cooled Version	
Max. Water Pressure	2 bar to 7 bar
Min. Differential Pressure	2 bar
Water Flow	4 l/min to 12 l/min
Max. Cooling Water Temperature	+20 °C to +35 °C

Environmental Specifications	
Ambient Temperature	+5 °C to +45 °C operating
Ambient Temperature	-25 °C to +55 °C storage
Rel. Air Humidity	5 % – 85 % not condensing
Air Pressure <sup>4</sup>	860 hPa – 1 060 hPa operating

4) Max. 2 000 m above sea level. Special high altitude versions available upon request.

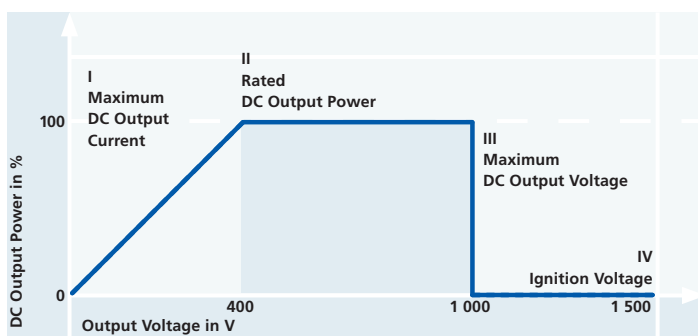
Interfaces	
Analog / Digital	25-pin Sub-D
RS 232 / RS 485	9-pin Sub-D
PROFIBUS	9-pin Sub-D
DeviceNet	5-pin DeviceNet Connector
EtherCAT <sup>5</sup>	2 x RJ45

5) Optionally available.

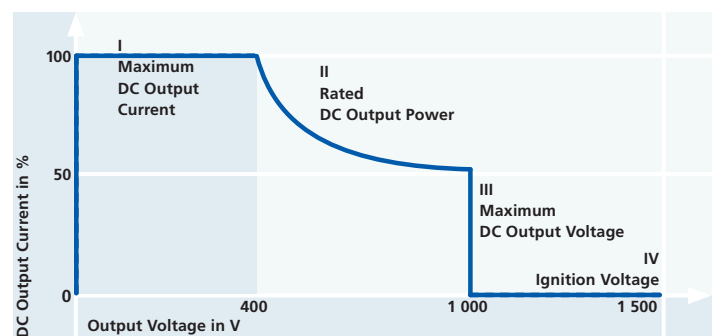
Protection Class	
Water-cooled Version	IP 40

Designation	
	CE Declaration of conformity available upon request

V/P Diagram



V/I Diagram





## TruPlasma DC Series 3000 (G2) water-cooled version

Name	Output Power (kW)	Output Current (A)	Dimensions (W x H x D, mm)	Weight (kg)
TruPlasma DC 3010 (G2) / 3020 (G2) water-cooled	10/20	25/50	482 (19") x 133 (3U) x 610	45
TruPlasma DC 3030 (G2) / 3040 (G2) water-cooled	30/40	75/100	482 (19") x 178 (4U) x 610	65
TruPlasma DC 3060 (G2) water-cooled	60	150	482 (19") x 265 (6U) x 611	85
TruPlasma DC 3080 (G2) water-cooled	80 (2 x 40) <sup>6</sup>	200	482 (19") x 178 (4U) x 610 <sup>7</sup>	2 x 65
TruPlasma DC 3120 (G2) water-cooled	120 (2 x 60) <sup>6</sup>	300	482 (19") x 265 (6U) x 611 <sup>7</sup>	2 x 85
TruPlasma DC 3180 (G2) water-cooled	180 (3 x 60) <sup>6</sup>	450	482 (19") x 265 (6U) x 611 <sup>7</sup>	3 x 85
TruPlasma DC 3240 (G2) water-cooled	240 (4 x 60) <sup>6</sup>	600	482 (19") x 265 (6U) x 611 <sup>7</sup>	4 x 85
TruPlasma DC 3300 (G2) water-cooled	300 (5 x 60) <sup>6</sup>	750	482 (19") x 265 (6U) x 611 <sup>7</sup>	5 x 85

6) Master / Slave configuration.

7) Dimensions are given for each of the stacked units.





## Perfection in sight: Pulsed processes for spotless films. TruPlasma DC Series 4000 (G2).

The TruPlasma DC Series 4000 (G2) power supplies are especially designed to serve reactive sputtering processes of difficult materials. Whether PVD or PECVD, the generators prove themselves in critical industrial plasma processes. These include solar cells manufacturing, production of semiconductors and hard coating applications. At output powers ranging from 10 to 200 kilowatts (stackable), the generators deliver their maximum power across a wide load impedance range. Fast DSP control allows thereby for stable processes and low arc-time related losses.

TruPlasma DC Series 4000 (G2) combines the advantages of TRUMPF Hüttinger's excellent arc management and DC pulse technology. Thus reaching even less droplets and lower substrate damages in critical coating processes. Combined with an inherent very low stored energy, this considerably improves the overall process quality and production throughput.

### Features

- Extremely low arc energy
- Ultrafast digital control platform
- Adjustable reverse voltage
- Wide range of adjustable parameters: frequency and pulse parameters
- High sophisticated monitoring tools
- Full water cooling

### Benefits

- High film quality and production yield
- Stable plasma and low arc-related time losses
- Simple adoption to different process requirements
- Allows for a wide range of applications with one device
- Fast and easy process optimization
- Compact size, easy system integration

## TruPlasma DC Series 4000 (G2)

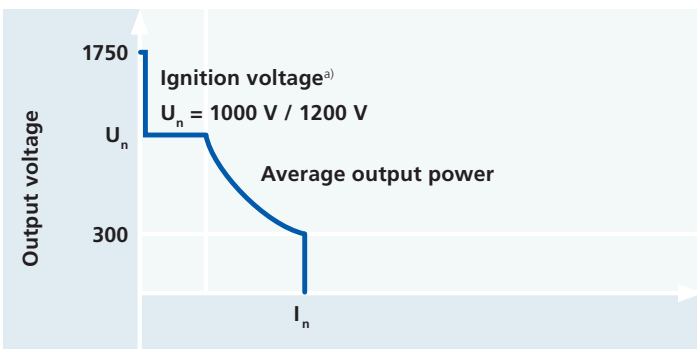


Output Parameters		
Output Power	10 kW, 20 kW, 40 kW	
Output Frequency	2 kHz – 100 kHz, 2 kHz – 150 kHz	
Output Voltage	1000 V, 1200 V	
Output Current	25 A, 50 A, 100 A, 33 A, 66.5 A, 133 A	
Regulation Modes	Power, voltage, current	
Efficiency	> 90 %	
Operation Duty Cycle	10 % – 100 %	
Reverse voltage	Adjustable 0 V – 100 V	
Regulation Line $\pm 10$ % Load 10 % – 90 %	Accuracy	0.5 % (DC mode) / 1 % (Pulsed mode)
	Repeatability	$\pm 0.2$ %
Output Polarity	Floating	

Arc Detection Criteria	
Arc Handling Capability	Up to 20 kArcs / sec
Arc Detection Time	< 100 ns
$I_{max}$ Detection	Var. $I_{max}$ threshold: 10 % – 130 %
Cross Detection (U x I)	Var. $U_x$ threshold: 0 % – 90 % Var. $I_x$ threshold: 5 % – 100 %
Dynamic Voltage Change	Var. dU threshold: 5 % – 80 % $U_n$

Input parameters	
Line Voltage	3 x 400 V – 480 V $\pm 10$ %
Line Frequency	50 Hz / 60 Hz $\pm 5$ %

### V/I Diagram



a) Adjustable ignition voltage – available upon request.

Cooling Specifications	
Max. Water Pressure	Up to 7 bar
Min. Differential Pressure	2 bar
Water Flow	8 l/min (per module)
Max. Cooling Water Temperature	Up to +35 °C

Environmental Specifications	
Ambient Temperature	+5 °C to +45 °C operating -25 °C to +55 °C storage
Relative Humidity	5 % – 85 % non condensing
Air Pressure <sup>1</sup>	860 hPa – 1 060 hPa

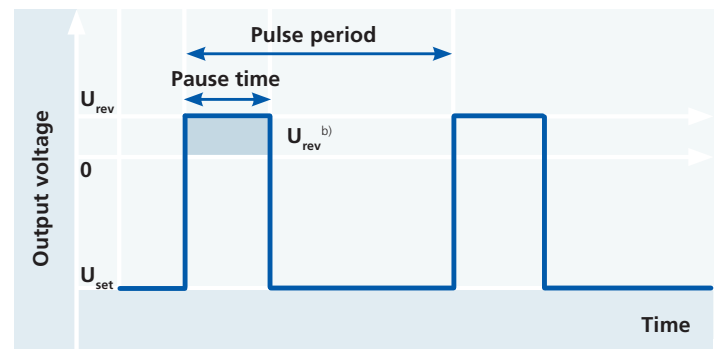
1) Max. 2 000 m above sea level.

Interfaces	
Analog / Digital	25-pin Sub-D
RS 232 / RS 485	9-pin Sub-D
PROFIBUS	9-pin Sub-D
EtherCAT <sup>2</sup>	2 x RJ45
DeviceNet <sup>2</sup>	5-pin DeviceNet Connector
ProfiNet <sup>2</sup>	2 x RJ45

2) Available upon request.

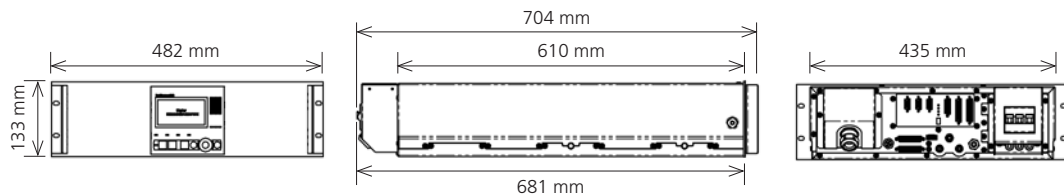
Dimensions (W x H x D, mm)	
TruPlasma DC 4010 / 4020	482 (19") x 178 (4U) x 720
TruPlasma DC 4040	482 (19") x 357 (8U) x 720
Weight	
TruPlasma DC 4010 / 4020	60 kg / 75 kg
TruPlasma DC 4040	150 kg

### Adjustable reverse voltage

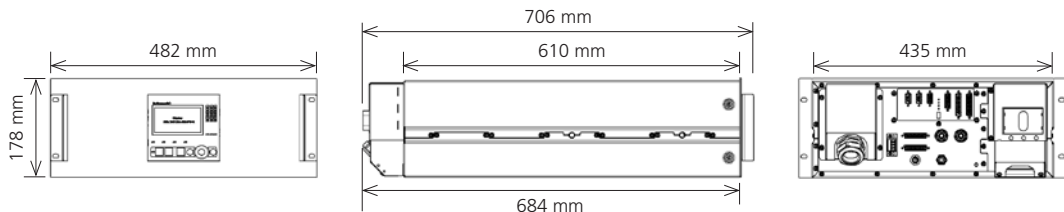


b) Adjustable reverse voltage (0 – 100 V) independent from working voltage.

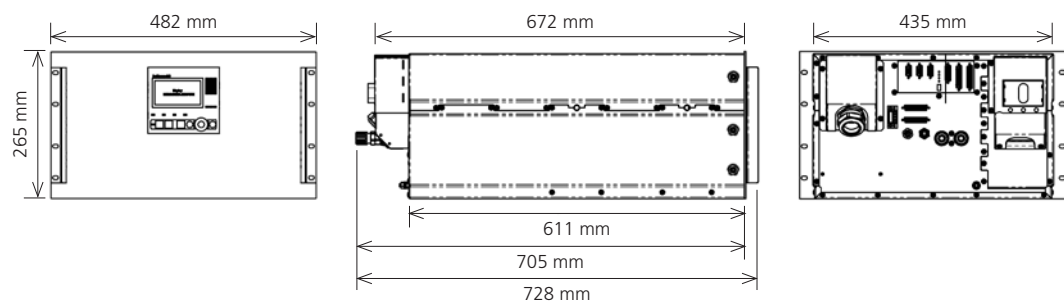
### TruPlasma DC 3020 (G2)



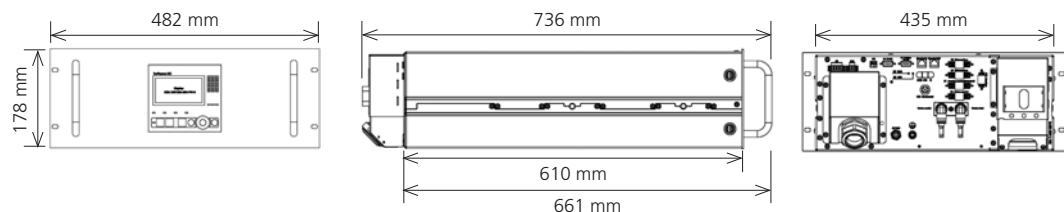
### TruPlasma DC 3040 (G2)



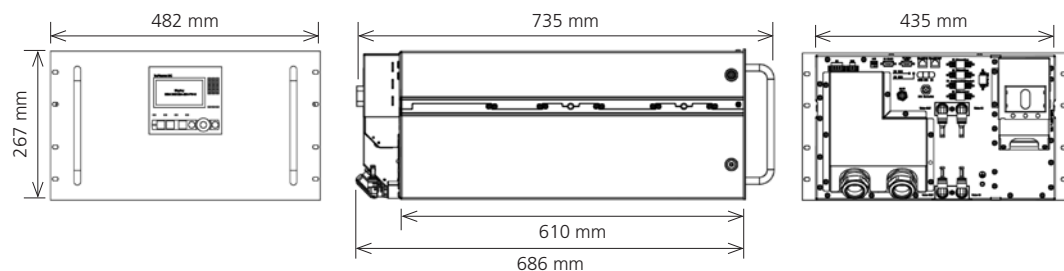
### TruPlasma DC 3060 (G2)



### TruPlasma DC 4010-20 (G2)



### TruPlasma DC 4010 (2x5) (G2) and DC 4020 (2x10) (G2)



### TruPlasma DC 4040 (G2)

