

TruPlasma RF Series 3000

Generating
revolution.



RF technology without compromises



TRUMPF Hüttinger
generating confidence

Start your revolution!

TRUMPF Hüttinger presents the revolutionary new generator generation: With previously unheard-of energy efficiency and robustness, the TruPlasma RF Series 3000 revolutionizes the production of semiconductor elements, microchips, solar cells and flat screens in addition to assuring outstanding process stability.

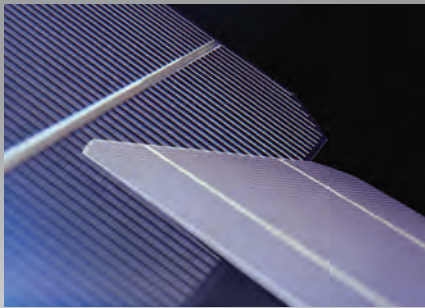
Thanks to special converter technology, the TruPlasma RF Series 3000 achieves up to 80 % efficiency – which means energy losses are halved compared to the market standard. A wide range of interfaces such as the EtherCAT interface and TruControl software simplify operation of the TruPlasma RF Series 3000, making it absolutely future-proof. A technical revolution we can be proud of!



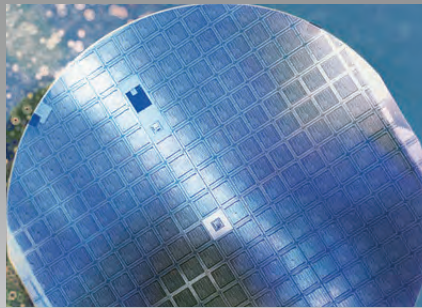
efficiency³

Ensures stable processes – in any application.

Thin film solar cells, microchips, flat screens – very different coating processes that require a high-frequency process power supply. Lead the pack with the generator TruPlasma RF Series 3000 of TRUMPF Hüttinger!



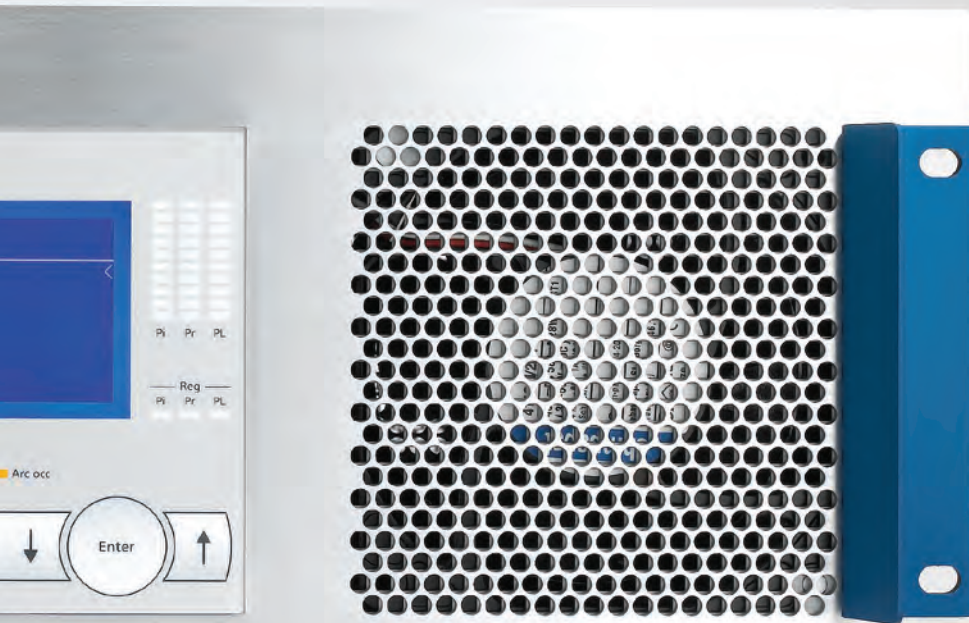
Full control in plasma-assisted thin film deposition processes.



Structuring 450 mm silicon wafers is also no problem with the TruPlasma RF Series 3000.



Outstanding results, both in deposition and etch processes.



TruPlasma RF Series 3000:
Highlights at a glance

- 1 Energy losses are halved thanks to improved energy efficiency
- 2 Stable process performance for ultimate productivity
- 3 Especially robust and durable
- 4 Guaranteed future-proof thanks to modularization and innovative data interfaces
- 5 Arc-Management:
Outstanding RF-Arc-Management

Unswervingly efficient.

The highest efficiency for your processes.



The unique efficiency and stability of the TruPlasma RF Series 3000 is based on two complementary, highly modern characteristics: Class D technology, an energy-efficient power transformation method, as well as the CombineLine coupler patented by TRUMPF Hüttinger that ensures a particularly steady process power supply and prevents damage due to reflected output power.

Stability and efficiency: Features & benefits

- | | | | |
|----------|------------------------------|---|--|
| 1 | Unrivalled 80 % efficiency | ▶ | Energy losses are halved, reducing operating costs and CO ₂ emissions |
| 2 | Patented CombineLine coupler | ▶ | Stable, reliable process electricity supply |

Guaranteed stability – the CombineLine coupler.

A stable process power supply is essential for predictable and economical production. Thanks to the CombineLine coupler patented by TRUMPF Hüttinger, an interference-free process power supply is possible for the first time since reflected output power no longer flows back into the sensitive power semiconductors of the RF stage but is rerouted to an absorber.

Class D – a class of its own.

This used to be your daily routine in high-frequency technology: high energy costs due to low efficiency. Thanks to the innovative class D technology, the TruPlasma RF Series 3000 offers tremendous savings potential. Rather than 60 % effectiveness commonly accepted in the market, the TruPlasma RF 3012 achieves an outstanding 80%! This allows you to cut your energy losses in half, lower operating costs and reduce your CO₂ emissions in production.

Cost reduction through conversion efficiency.

TruPlasma RF series 1000 – 3000 vs. market standard (class E)		
Example: Deposition of SiNx passivation layer for wafer-based solar cells		
Operation parameters	Value	Unit
RF process power	12,000	W
Energy efficiency TruPlasma RF	80	%
Energy efficiency market standard	60	%
Duration of process cycle	6	min
Total cycle time	8	min
Hours of operation per day	22	hours
Days of operation per year	355	days
Energy saving per year per power supply	29,288	kWh
Cost of electricity ¹⁾	0.120	EUR/kWh
Cost reduction per year per power supply	3,515	EUR

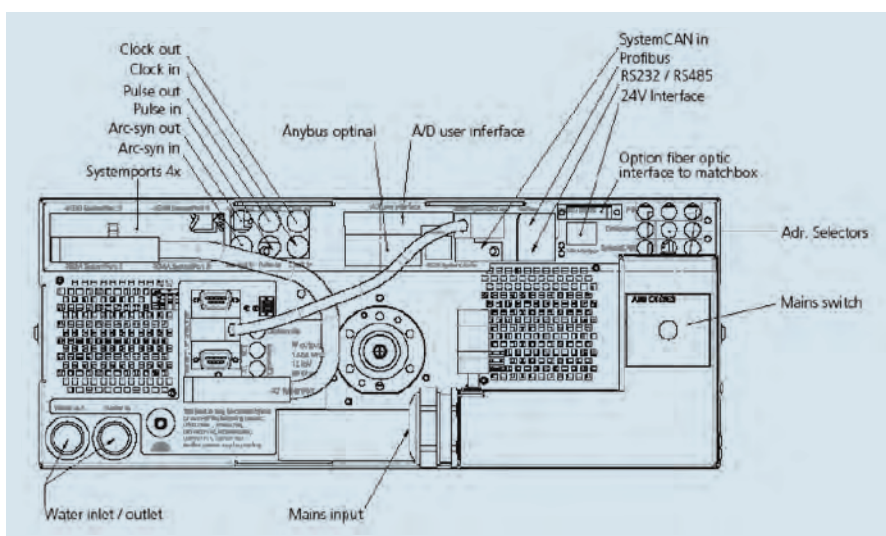
¹⁾Electricity prices (German industry) as of January 2013



Discover your surprising savings potential and calculate online how much of your energy cost you can save with the TruPlasma RF Series 3000.

Technology at the highest level.

Equipped for the future.



With the TruPlasma RF Series 3000, you are on the safe side in every way – and not only due to its unique robustness and energy efficiency. Numerous interfaces and connections, including an interface for the highly modern EtherCAT communication bus system, make it future-proof and ensure stability.



Compact and reliable: the TruPlasma RF 3012.

Control in comfort – TruControl Power.



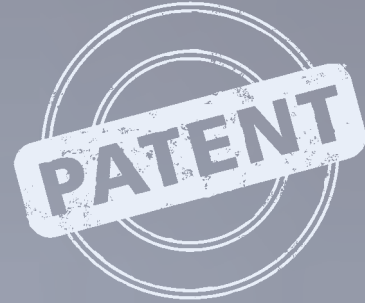
Our user-friendly, multilingual TruControl Power software offers you numerous possibilities for the operation, configuration and diagnosis of the TruPlasma RF Series 3000. As a graphical user interface running on a PC, TruControl Power displays all relevant actual values; the nominal values can be specified by you. Warnings and alarms can be displayed in table form and reset if needed. With TruControl Power, you can also update the software on your generator easily and securely.

With the easy-to-use TruControl Power programming software, you can control your processes easily from the comfort of your laptop.

Other features & benefits:

- | | | | |
|---|---|---|---|
| 1 | Compact 19-inch design | ▶ | Standardized, optimized device format |
| 2 | EtherCAT and all common interfaces/connections | ▶ | Especially future-proof and progressive |
| 3 | Automated process for production and putting into operation | ▶ | Quality guarantee and accuracy |
| 4 | TruControl Power software | ▶ | Convenient configuration and diagnosis |

TruPlasma RF Series 3000.




3dB coupler patents:

US7151422, JP5038715, US7512387, US7477114, US8133347,
EP1701376, US7452443, KR100796475, TWI348335, JP4824438,
CN100409727, US7745955, EP1783904, KR100842243,
CN101056495, JP4755566

Class D/RF module patents:

US7705676, EP1968188, US8129653, US8154897, EP2097921

Technical data	TruPlasma RF 3006	TruPlasma RF 3012	TruPlasma RF 3024
Output parameters			
Output power	6 kW	12 kW	24 kW
Min. output power	30 W	30 W	60 W
Reflected output power (VSWR ∞)	1.200 W	2.400 W	4.800 W
Operating frequency	13,56 MHz \pm 0,05 %		
Pulsed operation parameters			
Pulse frequency	10 Hz – 50 kHz		
Duty cycle Min. pulse on time / off time	1 % – 99 % 10 μ s		
Mains input parameters			
Mains voltage	400 – 480 VAC \pm 10 % 200 – 220 VAC \pm 10 %		
Mains frequency	50 Hz / 60 Hz \pm 3 Hz		
Power factor	> 0,93		
Overall efficiency (line to load) at 12 kW / 50 Ω	> 75% (mains 400 V) > 73% (mains 200 V)	> 78% (mains 400 V) > 77% (mains 200 V)	
Current at 12 kW / 50 Ω	12,5 A (mains 400 V) 25,5 A (mains 200 V)	24 A (mains 400 V) 48,5 A (mains 200 V)	48 A (mains 400 V) 97 A (mains 200 V)
Power consumption at 12 kW / 50 Ω	8,7 kVA (mains 400 V) 8,8 kVA (mains 200 V)	16,6 kVA (mains 400 V) 16,8 kVA (mains 200 V)	33,3 kVA (mains 400 V) 33,6 kVA (mains 200 V)
Cooling specifications			
Cooling system	Water and air		
Min. water flow rate	10 l/min	20 l/min	
Cooling water temperature	5 °C – 35 °C ¹⁾		
¹⁾ The cooling water temperature must exceed the dew point of the ambient air (no condensation).			
Interfaces and connections			
Analog	0 – 10 VDC		
Digital	RS 232/485 Profibus DP Ethernet EtherCAT (optional) DeviceNet (optional)		
Matchbox interface	Fiber Optics		
Clock	Input/Output		
Pulse	Input/Output (optional)		
Arc synchronization	Input/Output (optional)		
Mains connection	Terminal block max. max. 25 mm ² / AWG 4	Terminal block max. max. 50 mm ² / AWG 1/0	
RF output connection	7/8" EIA-connection	1 5/8" EIA-connection	
Dimensions (W x H x D) ²⁾	483 mm x 176,5 mm x 736,5 mm (4 HE)	483 mm x 354,5 mm x 745,5 mm (8 HE)	
Weight	57 kg	117 kg	
²⁾ Without connectors.			
Protection class	IP 20		
Certification	CE, SEMI S2, SEMI F47		

A photograph showing two men in dark suits standing on a mezzanine level of a modern industrial building. They are facing each other and appear to be in conversation. The mezzanine has a glass railing. Below them, a factory floor is visible through large glass windows, showing various pieces of machinery and equipment. The lighting is bright and even, suggesting an indoor industrial setting.

Top-class process performance.

Day after day for more than ninety years, we have considered how we can supply energy to your production processes even faster, safer and more sustainably. Our experience and expertise in the development of process power supply systems have made us a world-leading supplier in the field of plasma applications, induction heating and CO₂ laser excitation.

We have committed to the TRUMPF quality standard for the development and production of our products. We subject our processes, activities and results to continuous control. For TRUMPF Hüttinger, quality means that we fully satisfy our customers and exceed their expectations.

We are always open to new ideas, and are happy to also develop individual solutions for customers who have to master very specialized challenges.

TRUMPF Hüttinger – regional roots, active worldwide.

TRUMPF Hüttinger has been part of the TRUMPF Group as one of four business areas since 1990 and employs around 700 people. TRUMPF Hüttinger is based in Freiburg in the Breisgau and maintains sales and service branches in Europe, America and Asia.

Social responsibility is important to us as a family run company. We therefore work with various social institutions in the region. Promoting young talent is also close to our heart: we maintain partnerships with several schools, universities and networks. Here we consistently pursue one objective: to pass our enthusiasm for technology on to the next generation.



Energy is flowing here: the production and administrative building in Freiburg.

