



Process power from
TRUMPF Hüttinger

Generators for
plasma excitation.



TRUMPF Hüttinger
generating confidence

TRUMPF Hüttinger harnesses one of nature's most awesome powers.



How we are putting plasma excitation to work.

We can see it in lightning, the northern lights and the sun's corona – fascinating examples of naturally occurring plasma phenomena. Sometimes called the Fourth State of Matter, plasma is created when gas is heated to an extremely high temperature, causing the kinetic energy of the gas particles to rise so much that electrons are released from the atoms and molecules. In nature, plasmas are self-igniting and highly unstable. Fortunately, scientists and engineers have figured out how to create sustained and precisely controlled plasmas for use in the world of industrial technology.

Generators from TRUMPF Hüttinger help achieve this mastery, making it possible to perform a wide range of intriguing applications. Our generators, developed and refined over many years, deliver the stable and accurate energy needed for these various plasma applications, as e.g. large area coating resp. etching semiconductors, solar cells and flat panel displays; surface treatment of metals and plastics among others. As a result, DC, middle and radio frequency generators from TRUMPF Hüttinger are the acknowledged leaders in many high technology markets.



TRUMPF Hüttinger – the perfect development partner for plasma.

Despite its many uses, plasma technology is still in its infancy. New applications are continuously being developed. TRUMPF Hüttinger is ready to work with you to find the optimal energy source you need for new or existing uses. TRUMPF Hüttinger's DC, middle and radio frequency units already cover a wide range of applications. With our cost-effective, field-proven devices, customer-specific requirements can be accommodated with custom solutions that are based on our standard products.

Sectors:

- Glass industry
- Photovoltaic industry
- Automotive industry
- Flat panel display industry
- Semiconductor industry
- Chemical industry
- Science and research
- Manufacturing industry

TRUMPF Hüttinger – process experts with experience

Process expertise and experience are key to developing optimum plasma energy sources. Over the past few decades, TRUMPF Hüttinger has enjoyed the unwavering loyalty of its customers. Their continued support attests to our ability to provide products that are reliable, robust and that deliver exceptional process stability.

Applications:

- Plasma-enhanced chemical vapour deposition (PECVD)
- Plasma etching (dry etching)
- Plasma diffusion
- Plasma polymerization
- Plasma cleaning
- Unipolar magnetron sputtering
- Dual magnetron sputtering (DMS)
- Hard coating

Using our knowledge for your benefits.



Generators from TRUMPF Hüttinger – the power to meet your needs.

From compact modules, to 19-inch rack and table top versions, to system solutions in stand-alone cabinets: TRUMPF Hüttinger offers a proven range of generators for plasma excitation in industry, science, research, and development. Our MF and RF generators are perfectly matched to all processes and can be seamlessly integrated into any system design concept. Their high up-time and progressive arc management enhances their already superior process stability. We offer leading technology solutions for sputtering with either single or dual magnetrons, reactive or metallic processes, with isolating or conductive targets.



Middle frequency (MF)

TruPlasma MF Series 3000 – the versatile

The right choice for DMS processes in the output range from 10 kW to 40 kW, at frequencies from 20 kHz to 100 kHz. Ideally suited for DMS processes which have a high or low plasma impedance.

TruPlasma Bipolar Series 4000 (G2) – the bi-polar choice

Bi-polar pulsed DC power supplies with a broad output range and adjustability. Ideal for reactive sputtering with dual magnetrons.

TruPlasma MF Series 7000 (50 kHz / 70 kHz) – the brilliant ones

Equipped with our advanced arc management these MF generators are the market and technology leaders for large area coating applications in industrial environments.

TruPlasma MF Series 7000 (G2) – the superior ones

The first choice for large area deposition processes using double magnetron sputtering. Our latest MF family attains a formerly unachievable coating quality – even with the most difficult reactive processes, and with simultaneous high output sputtering rate.

Radio frequency (RF)

TruPlasma RF Serie 1000 / 1000 (G2/13) – the robust ones

Energy-efficient RF generator for coating and etching processes in semiconductor manufacturing applications. Accurate output power regulation and extreme robust operation ensure maximum productivity.

TruPlasma RF Series 3000 / RF 3006 (G2/13) – the efficient ones

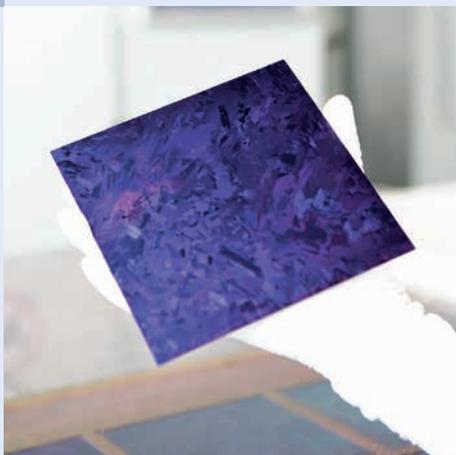
With previously unheard-of energy efficiency and robustness, the TruPlasma RF Series 3000 revolutionizes the production of semiconductor elements, microchips, solar cells and flat screens in addition to assuring outstanding process stability.

TruPlasma RF Series 7000 – the high performers

Optimized RF generators utilizing reliable hybrid technology. Developed for continuous operation in high throughput applications. Offer superior performance for processing large substrates.

CombineLine – innovative Combiner technique

Unique high-frequency combiner technology with true 50-Ohm output impedance. Ensures stable processes for best productivity.





They're not just accessories.

You certainly need more than just a power source.

The conditions and constraints present in many plasma environments require special devices to ensure that your equipment functions as desired. Matching networks, master oscillators, RF switches and coaxial cables: these are all critical elements in a well designed RF power delivery system. Engineers seeking a lasting, consistent process solution also choose these components from TRUMPF Hüttinger because of our extensive high frequency expertise and decades of process experience.



Matchboxes

Impedance matching networks for the complex loads typical in plasma excitation.

Master oscillators

Precise frequency synchronization for applications with multiple RF sources.

RF switches

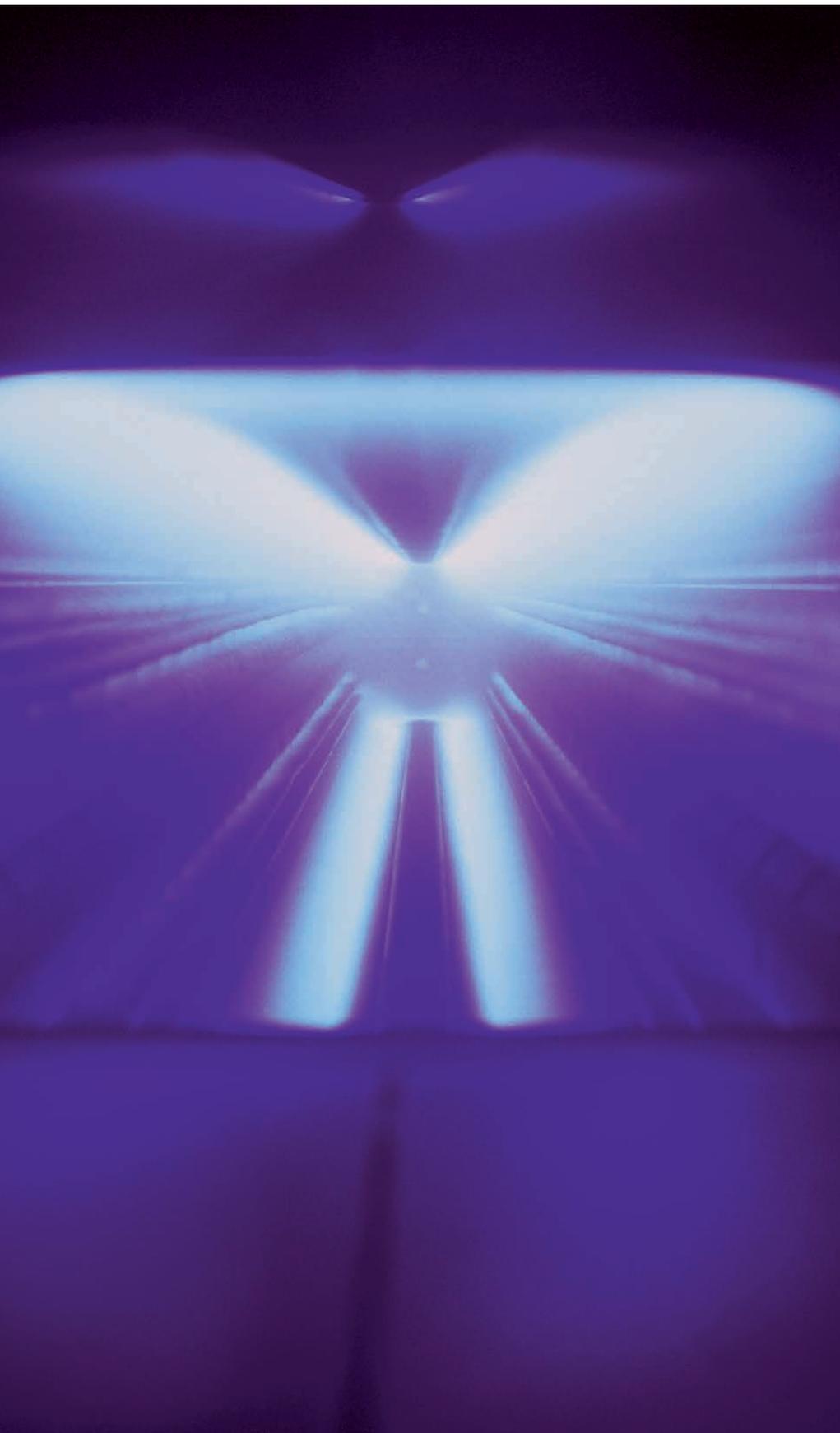
Provide power to several process chambers from a single generator.

Coaxial cables

Perfect for low-loss connections between the generator and matchbox.

Ready for tomorrow: MF and RF generators from TRUMPF Hüttinger.

MF and RF generators from TRUMPF Hüttinger: high accuracy and repeatability you can count on, even under continuous load. A solution to rely on, no matter how critical the application may be.



TruPlasma Bipolar Series 4000 / 4000 (G2)



Ideally suited for PECVD and dual cathode sputtering processes, where reliability and performance are critical. The highly sophisticated fully digital arc management ensures optimum results for film quality and deposition rate.

Output	10 – 180 kW
Frequency	20 – 80 kHz
Cooling	Water
Interfaces	Analog / Digital RS 232 RS 485 PROFIBUS EtherCAT (optional)

Radio frequency

TruPlasma RF Series 1000 / 1000 (G2/13)



Extremely robust RF generator for PECVD and etching applications in semiconductor manufacturing. Accurate output power regulation and CombineLine allow for stable processes and best productivity. Cost-efficient system integration due to compact half 19" design.

Output	1 – 3 000 W
Frequency	13 560 kHz
Cooling	Water
Interfaces	Analog RS 232 RS 485 DeviceNet PROFIBUS EtherCAT

Middle frequency

TruPlasma MF Series 3000



Reliable MF generators for small and medium outputs. Available in compact 19-inch rack and in stand-alone cabinets. Proven for sputtering with dual magnetrons, for activation and glow discharge processes as well as for sputtering processes in the manufacturing of touch panels and solar cells.

Output	10 – 40 kW
Frequency	20 – 100 kHz
Cooling	Water
Interfaces	Analog/Digital RS 232 RS 485

TruPlasma MF Series 7000 (50 kHz/70 kHz)



Available in two versions: The 50 kHz version is the right choice for DMS processes which require high power. These power supplies are ideally suited for architectural glass coating processes. The 70 kHz version is ideally suited for DMS processes which have a low plasma impedance. Typical applications include the manufacturing of flat panel displays and touch displays.

Output	100 – 200 or 50 – 100 kW
Frequency	20 – 50 or 20 – 70 kHz
Cooling	Water
Interfaces	Analog/Digital RS 232 RS 485 PROFIBUS

TruPlasma MF Series 7000 (G2)



With their superior arc management and ignition behavior, the output voltage and frequency (adjustable over a wide range) and their high current reserve, our new MF generators are the number one choice for large area coating and demanding processes. As a result of peak efficiencies of more than 90 percent and particularly efficient water management, unique in MF technology, they are also extremely economical to operate.

Output	50 – 150 kW
Frequency	20 – 50 kHz*
Cooling	Water
Interfaces	RS 232 RS 485 Ethernet PROFIBUS AVD (optional) PROFINET (optional)

* 20 – 70 kHz until 100 kW optionally available.

TruPlasma RF 3006 (G2/13)



This RF generator provides exceptionally power output stability and operational reliability. Designed with a focus on RF plasma processes in semiconductor applications, its features are also suited to ensure best results and productivity in photovoltaic and surface treatment processes.

Output	6 kW
Frequency	13 560 kHz
Cooling	Water
Interfaces	Analog RS 232 RS 485 DeviceNet Profibus EtherCAT

TruPlasma RF Series 3000



Thanks to special converter technology, these RF generators achieve up to 80 % efficiency – which means energy losses are halved compared to the market standard. The patented Combine-Line coupler ensures stable and reliable processes.

Output	12 – 24 kW
Frequency	13 560 kHz
Cooling	Water / Air
Interfaces	RS 232 RS 485 Ethernet PROFIBUS DP EtherCAT (optional) PROFINET (optional)

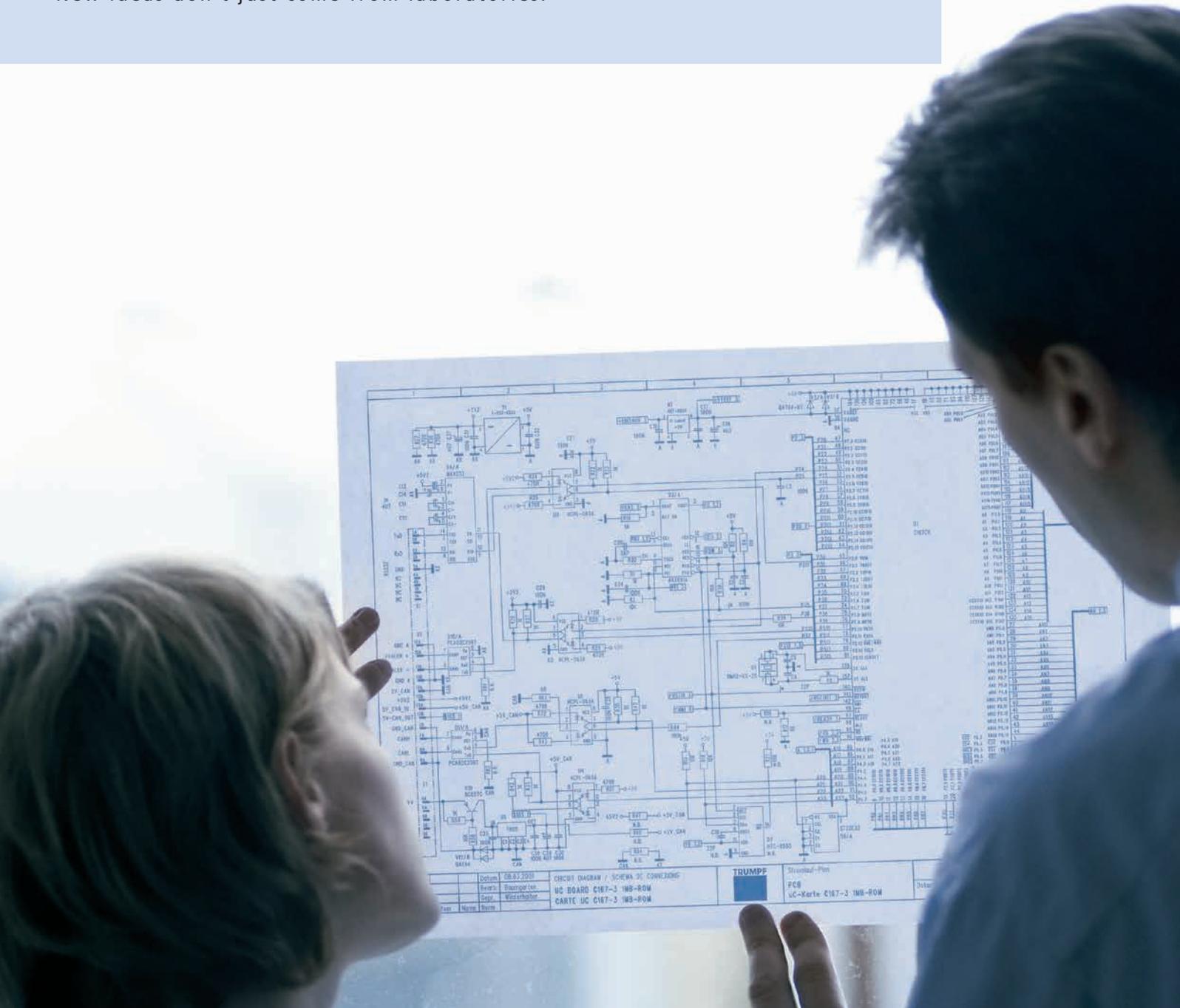
TruPlasma RF Series 7000



Developed with hybrid technology, these RF generators provide high power outputs for high throughput or large surface area applications. With 100 % mismatch protection, they provide optimum process reliability for continuous, uninterrupted operation.

Output	40 – 50 kW
Frequency	13 560 kHz
Cooling	Water
Interfaces	Analog/Digital RS 232 PROFIBUS DeviceNet

New ideas don't just come from laboratories.



Together, we can take plasma excitation into the future.

TRUMPF Hüttinger is a pioneer in power conversion. Our expertise has enabled customers around the world to perfect existing processes and create exciting new ones. Yet, we know that our future inventions and developments will be a result of our close collaboration with scientists and engineers seeking solutions to real-world problems. Their applications, new production techniques and innovative developments require the resources of a company committed to rapidly and efficiently bringing new technology to the market.



High impact. Deeply impressive.

DC generators from TRUMPF Hüttinger of the TruPlasma Highpulse Series 4000 are leading-edge products designed especially for High Power Impulse Magnetron Sputtering (HIPIMS). It's the key enabler for this innovative PVD pulse sputtering technology. Capable of peak power of up to 8 megawatts, TruPlasma Highpulse Series 4000 is the most advanced generator available for HIPIMS processes.



