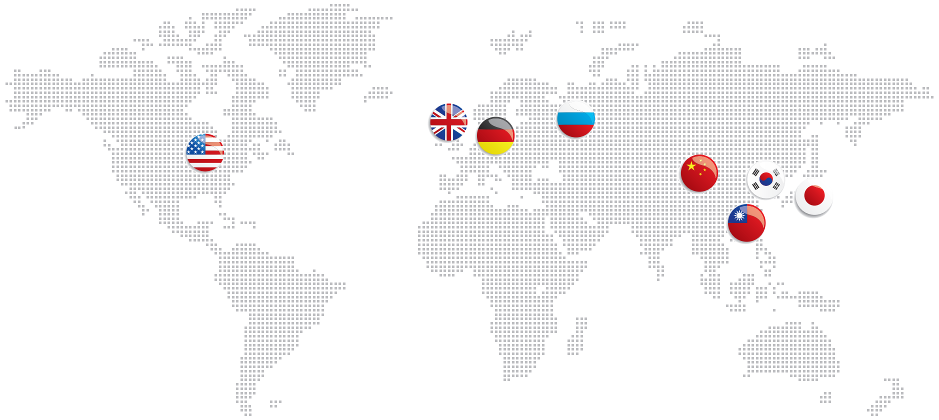
Worldwide Sales & Service Support

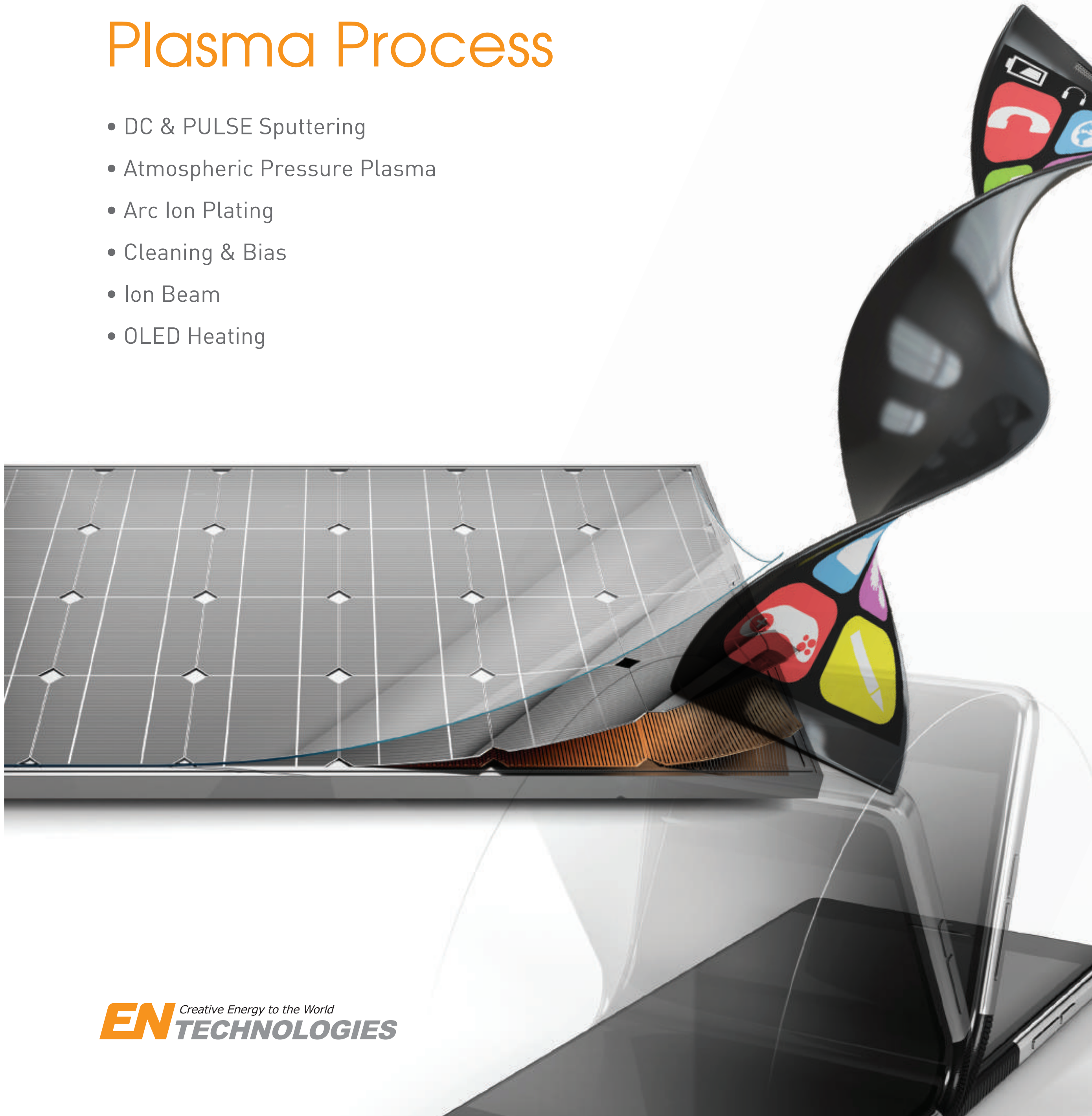


EN TECHNOLOGIES
Creative Energy to the World

102-1101, SK Ventium, Gosan-Ro 166, Gunpo, Gyeonggi-Do, KOREA 15850
Tel +82.31.429.7794   Fax +82.31.429.7795
Homepage : www.entek.kr/electronic
E-mail : sales@entech.biz

DC & PULSE Power Supplies for Plasma Process

- DC & PULSE Sputtering
- Atmospheric Pressure Plasma
- Arc Ion Plating
- Cleaning & Bias
- Ion Beam
- OLED Heating



EN TECHNOLOGIES
Creative Energy to the World

EN Creative Energy to the World TECHNOLOGIES

With solid and proven product portfolio, EN Technologies Inc. offers market-leading power generation solutions and services for various applications

We are the preferred provider of power supplies across Asia. With our accumulated experiences in extensive local applications and engineering support, we thrive to fulfill our customers' needs with robust, reliable, and specialized products and services.

2015 - Supplied Bipolar Pulsed DC Power Supplies for Solar Cell application of Hanwha Q-Cell
- Supplied DC Power Supplies to equipment manufacturer for Samsung Electronics' metal mobile case application

2012 - Established Customer Support Center in Shanghai, China

2011 - ISO 14001 Certified

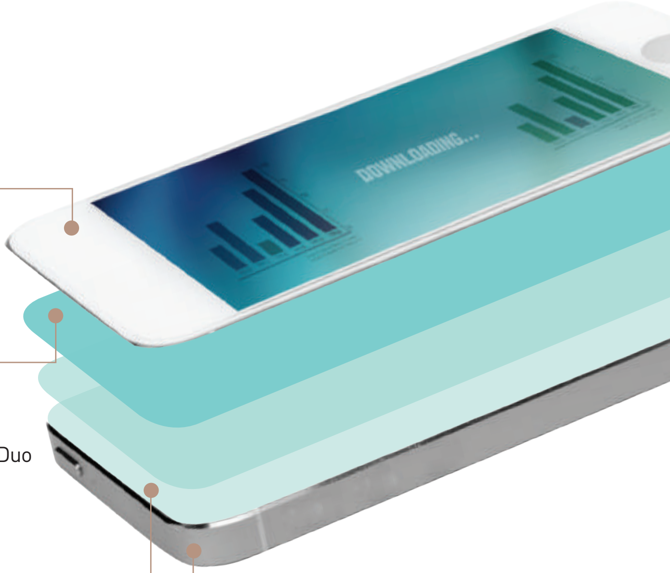
2010 - Received Presidential Award for Entrepreneurship
- Supplied DC Power Supplies to major FPD manufacturers [Samsung Display, LG Display, Japan Display, Sharp]

2009 - Single PPM certified

2005 - ISO 9001 certified

2003 - Established EN Technologies Inc.

Applications



TOP GLASS

AR(Anti-Reflection)
AF(Anti-Fingerprint)

- DC : EnerStream
- Pulsed DC : EnerPulse

TOUCH PANEL

ITO & Metal Sputter
Reactive Sputter

- Pulsed DC : EnerPulse
- DC : EnerStream
- Bipolar Pulsed DC : EnerPulseDuo

OLED, TFT-LCD, Oxide TFT

ITO & Metal Sputter
Organic & Metal Heating

- Pulsed DC : EnerPulse
- DC : EnerStream
- DC for OLED Heating : Neos

CASE

EMI Coating
Multi Coating for color

- Pulsed DC : EnerPulse
- DC : EnerStream
- Bipolar Pulsed DC : EnerPulseDuo

OLED, Flexible Touch Panel, Optical Lens, ITO Glass, Automotive Wheels & Headlamps, DLC Coating Parts, TiN Coating, CIGS Solar Cell

Features

Excellent Arc Control System

Arc Energy Less than 0.2mJ/kW

To minimize arc effect, EN Technologies' arc suppression technology applies reverse voltage within 200ns and drops current value to 0 within 2.5μs at arcing to enable users to create thin film and yield

High Performance

Apply Stable Topology with Drooping Characteristics

Generate stable plasma at ignition. Allow fast detection and stable output control at arcing. Enable users to control constant power, constant current, and constant voltage

Wide Operating Range

Wide Operating Range

Wide range of operating power curve is applied to high voltage and high current

Interface

User-friendly Interface

Various interfaces such as Analog/Digital input/output, RS-232/485, Fieldbus, and Ethernet allow users to integrate systems easily

Parallel Operation

High-capacity

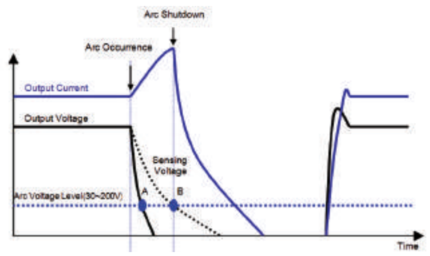
Maximum of 12 units (1 Master+11 Slave) can operate in parallel

Worldwide Sales & Service Support

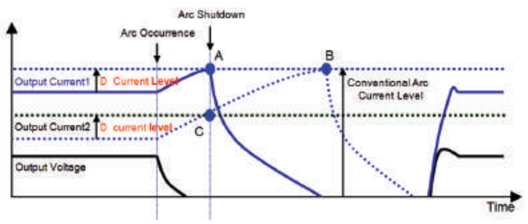
24-hour Customer Service

We can immediately assist our customers with optimized solutions 24 hours a day, 7 days a week

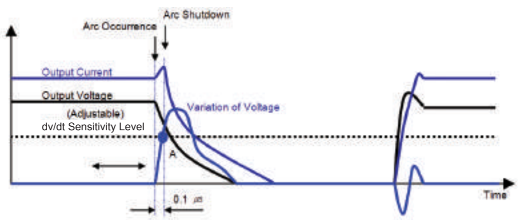
Arc Management



| Voltage Arc Suppression |



| Current Arc Suppression |



| dv/dt Arc Suppression |

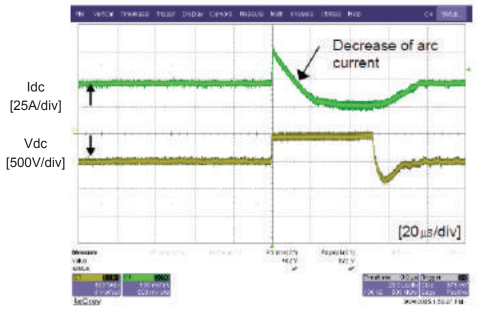
Less than 0.2mJ/kW arc energy is obtained to minimize the damages caused by arc during sputtering process

- Adopt topology to minimize the capacitance and inductance of internal energy storage
- Apply reverse voltage within 200ns at arcing
- Current value drops to 0 within 2.5μs
- Stable absorption the inductance energy of output cable

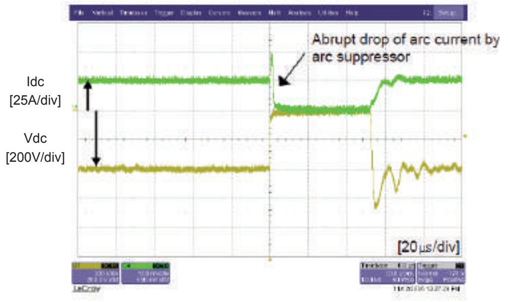
Arc Suppression Waveform

Test conditions : Al Target (5"×20")
Power supply : EnerStream20 (20kW DC)

Process pressure : 3.5×10^{-2} ~ 1.0×10^{-4} Torr
Gas : Ar

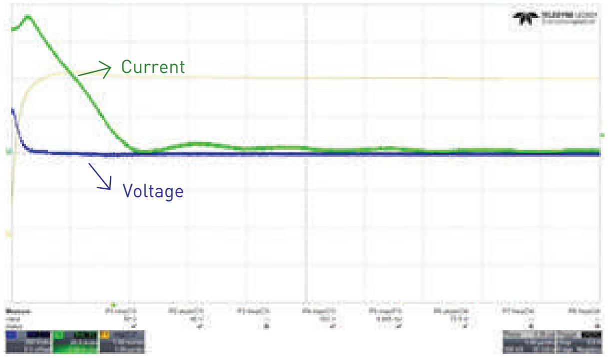


| Arc Energy without Arc Suppressor |

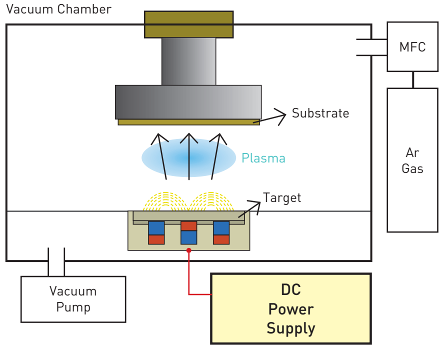


| Arc Energy with Arc Suppressor |

DC Power Supplies for Magnetron Sputter



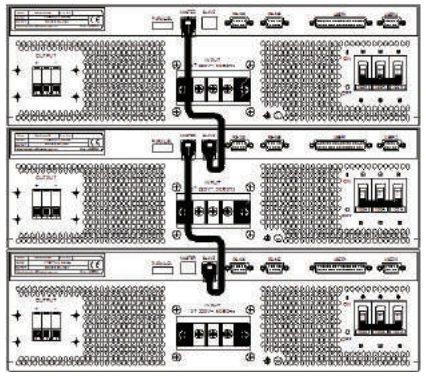
| EnerStream 60 generates Arc energy less than 0.2mJ/kW |



| Magnetron Sputter |

Applications

- Semiconductor wafer sputtering
- TFT LCD
- OLED LTPS sputter metal & TCO deposition
- Thin film for solar cells
- Mobile phone cases
- ITO deposition for touch panels
- Automotive wheels and headlamps
- Ion nitriding
- BIPV, data storage, FCCL

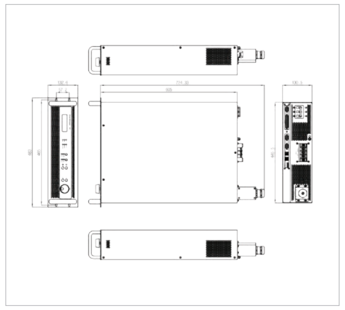


Parallel Operation

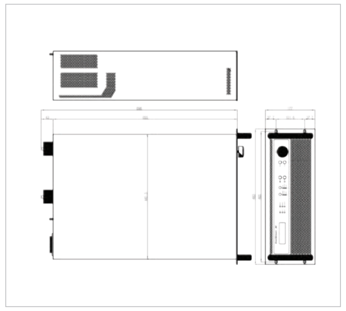
- Maximum parallel operation of 12EA
  (Master 1EA+Slave 11EA)
- Maximum output of 480kW
  (EnerStream 60: maximum parallel
  operation of 8EA)

Product Specifications

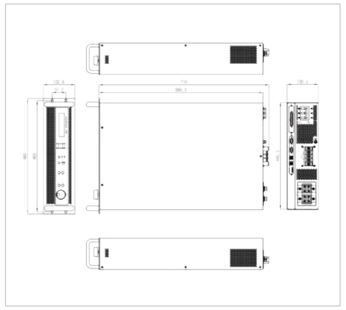
EnerStream®



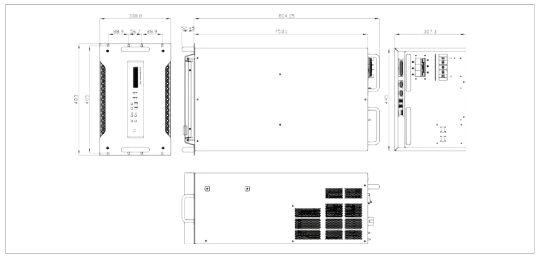
| EnerStream 5/10/20 |



| EnerStream 30 |



| EnerStream 5/10D |



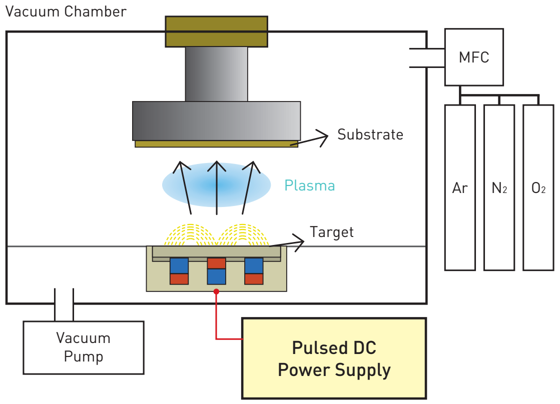
| EnerStream 60 |

Items	Specifications							
	DC (1Ch)						DC (2Ch)	
	EnerStream 5	EnerStream 10	EnerStream 20	EnerStream 30	EnerStream 30H	EnerStream 60	EnerStream 5D	EnerStream 10D
Input	3Ø 208V/ 220V/380V	3Ø 208V/ 220V/380V	3Ø 220V/380V	3Ø 380V/440V	3Ø 440V	3Ø 440V	3Ø 380V	3Ø 380V
Output voltage (Ignition)	800V(1500V)				1200V(1500V)	900V(1500V)	800V(1500V)/Ch.	
Max output current	12.5A	25A	50A	75A	55A	150A	12.5A/Ch.	25A/Ch.
Output power	DC 5kW	DC 10kW	DC 20kW	DC 30kW	DC 30kW	DC 60kW	DC 5kW+5kW	DC 10kW+10kW
Arc energy	Less than 0.5mJ/kW					Less than 0.2mJ/kW	Less than 0.5mJ/kW	
Interface	RS-232 / RS-485 (options : DeviceNet, ProfiBus)							
Size[mm]	133(H)x483(W) x605(D)	133(H)x483(W) x605(D)	133(H)x483(W) x605(D)	177(H)x483(W) x655(D)	177(H)x483(W) x655(D)	309(H)x483(W) x782(D)	133(H)x483(W) x655(D)	133(H)x483(W) x655(D)
Weight[kg]	24.5	24.5	30.5	38.8	38.8	80	32	32
Cooling	Forced Air							

※ Cable Duct + 129mm

※ Specifications subject to change without notice

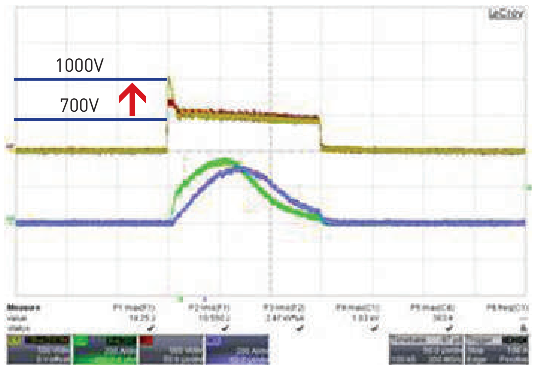
Pulsed DC Power Supplies
for Single Magnetron Sputtering

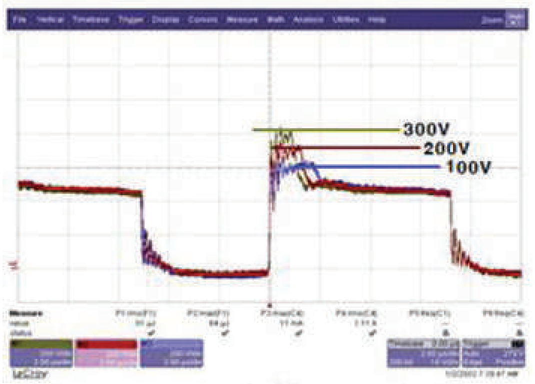


Applications

- Semiconductor wafer sputtering
- Oxide TFT LCD & Color filter
- OLED LTPS sputter metal & TCO deposition
- Thin film for solar cells
- Mobile phone cases
- ITO deposition for touch panels
- Automotive wheels and headlamps
- Ion nitriding
- BIPV, data storage, FCCL

Pulsed DC waveform to maximize ionization



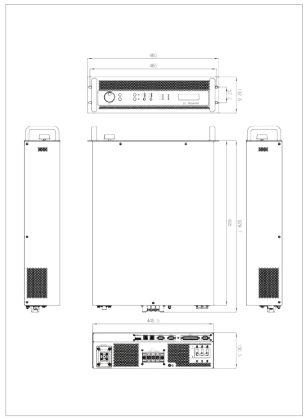


Benefits

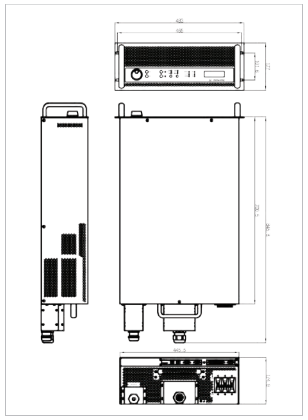
- Rapid increase of current induced by change in reignition voltage : 700V →1000V
- Adjustable reignition voltage : 50 - 300V

Product Specifications

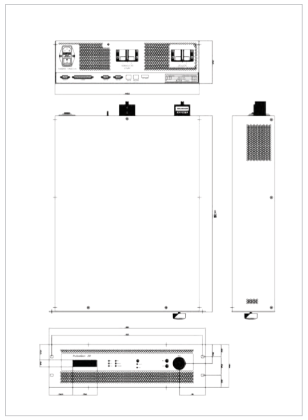
EnerPulse®



| EnerPulse 5/10/10LV/10M |



| EnerPulse 20 |



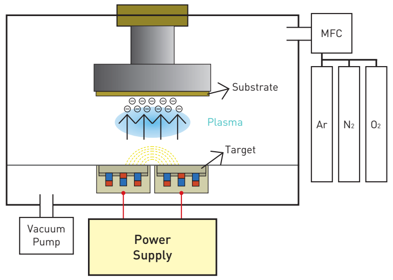
| PulseGen 20/30/40 |

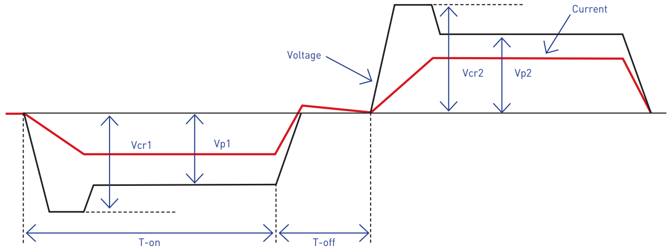
Items	Specifications							
	EnerPulse 5	EnerPulse 10	EnerPulse 10LV	EnerPulse 10M	EnerPulse 20	Pulse 20 (ES20+PG20)	Pulse 30 (ES30+PG30)	Pulse 40 (2xES20+PG40)
Input	3Ø 208V/220V/380V	3Ø 208V/220V/380V	3Ø 380V	3Ø 380V	3Ø 220V/380V/440V	3Ø 220V/380V	3Ø 380V/440V	3Ø 220V/380V
Ignition Voltage	1500V	1500V	1500V	1500V	1200V	1500V	1500V	1500V
Output	800V, 6.25A / 400V, 12.5A	800V, 12.5A / 400V, 25A	650V, 15.4A / 300V, 33.3A	800V, 12.5A / 400V, 25A	650V, 30A / 400V, 50A	800V, 25A / 400V, 50A	800V, 37.5A / 400V, 75A	800V, 50A / 400V, 100A
Output Power	Unipolar Pulse 5kW	Pulsed DC 10kW	Unipolar Pulse 10kW	Unipolar Pulse 10kW	Unipolar Pulse 20kW	Unipolar Pulse 20kW	Unipolar Pulse 30kW	Unipolar Pulse 40kW
Output Frequency	20 ~ 150 kHz			5~350kHz	40 ~ 100 kHz			40 ~ 80 kHz
Reverse Time	DC mode, 1.0μs~10μs				DC mode, 1.0μs~5μs			
Arc Energy	Less than 1mJ/kW							
Interface	RS-232 / RS-485 (Option : DeviceNet, ProfiBus)							
Size[mm]	133(H)x483(W) x605(D)	133(H)x483(W) x605(D)	133(H)x483(W) x605(D)	133(H)x483(W) x605(D)	177(H)x483(W) x700(D)	133(H)x483(W) x605(D)_PG	133(H)x483(W) x605(D)_PG	133(H)x483(W) x605(D)_PG
Weight[kg]	29.5	29.5	29.5	29.5	40	30.5+28	38.8+32	2*(30.5)+32
Cooling	Forced Air							

※ Cable Duct + 129mm

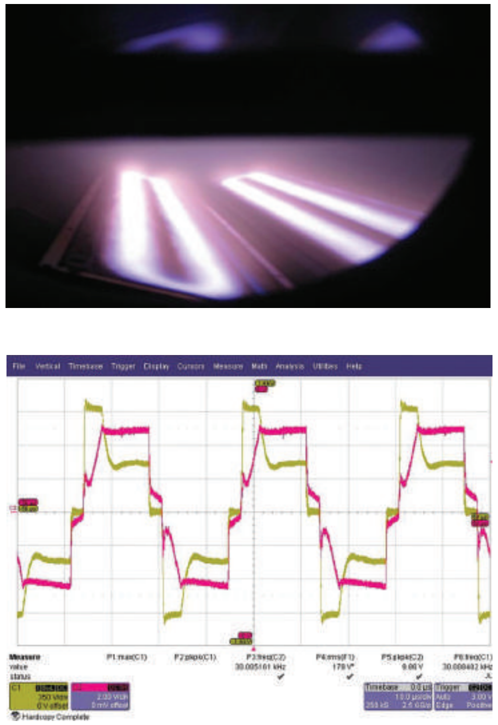
※ Specifications subject to change without notice

Bipolar Pulsed DC Power Supplies
for Dual Magnetron Sputtering & PECVD

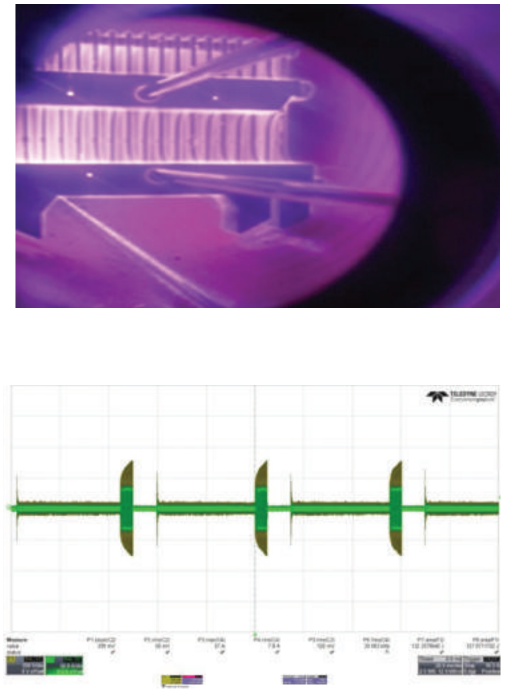




* Vp : Nominal pulse voltage
* Vcr : Clamped pulse peak voltage (max.1200V)
  - Improved ionization and ignition performance
  - Vp1 + dV, dV = 100~300V (default 100V)
  - Clamping voltage width varies depending on condition of chamber



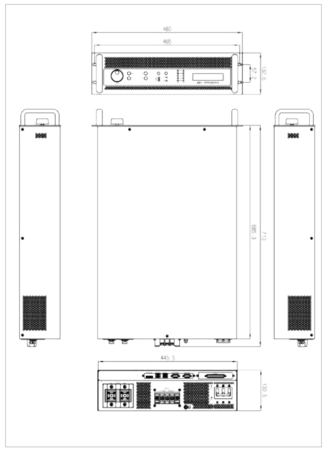
| Dual Magnetron Sputter |



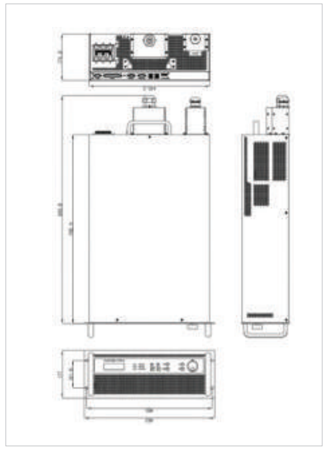
| PECVD |

Product Specifications

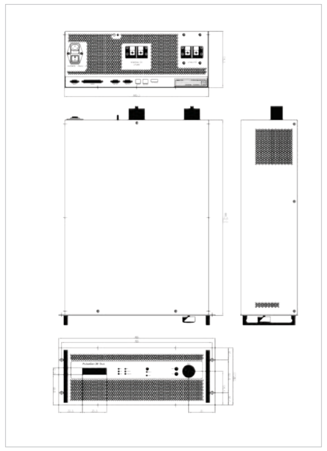
EnerPulse Duo™



| EnerPulse 5 /10 Duo |



| EnerPulse 20 Duo |



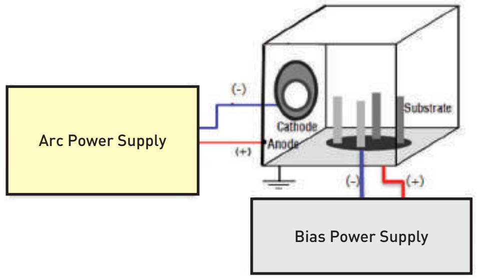
| PulseGen 20/30 Duo |

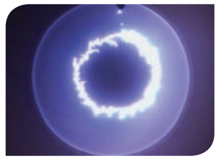
Items	Specifications				
	EnerPulse 5 Duo	EnerPulse 10 Duo	EnerPulse 20 Duo	DMS 20	DMS 30
Input	3Ø 380V	3Ø 380V	3Ø 440V	3Ø 220V/380V	3Ø 380V/440V
Output	800V, 6.25A / 400V, 12.5A	800V, 12.5A / 400V, 25A	600V, 33.3A / 400V, 50A	800V, 25A / 400V, 50A	800V, 37.5A / 400V, 75A
Output Power	Bipolar Pulsed DC 5kW	Bipolar Pulsed DC 10kW	Bipolar Pulsed DC 20kW	Bipolar Pulsed DC 20kW	Bipolar Pulsed DC 30kW
Output Frequency	20 ~ 50 kHz		20 ~ 40kHz		
Reverse Time	DC mode, 0.5μs~10μs		DC mode, 0.5μs~2μs	DC mode, 0.5μs~3μs	
Arc Energy	Less than 1mJ/kW			Less than 3mJ/kW	
Interface	RS-232 / RS-485 (Option : DeviceNet, ProfiBus)				
Size[mm]	133(H)x483(W) x605(D)	133(H)x483(W) x605(D)	177(H)x483(W) x700(D)	177(H)x483(W) x605(D)_PGD	177(H)x483(W) x605(D)_PGD
Weight[kg]	29.5	29.5	40	30.5+32	38.8+32
Cooling	Forced Air				
*Wave	On : 1ms ~ 72ms (Full-time output without “Wave” function when this parameter set “OFF”.) / Period : 10ms ~ 80ms / Extra Wave : 0ms(OFF) ~ 75ms				

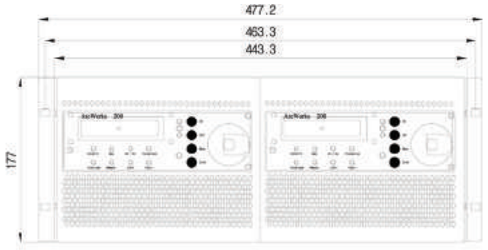
※ Cable Duct + 129mm

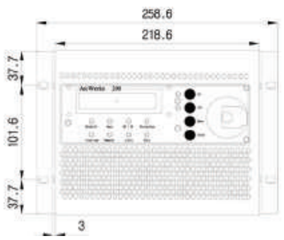
※ Specifications subject to change without notice

DC Power Supply for Arc Ion Plating









Advantages

Customized Functions

- High speed control of current using DSP Technology
- Built-in auto trigger circuit
- Protect target by preventing abnormal discharge with low voltage detection circuit
- Enhance durability by preventing the accumulation of dust/particles
- Easy to install with compact design and high power density
- Reduced noise with built-in EMI filter
- Self-diagnosis (protection, limit)

Applications

- Coating for tools and molds
- DLC coating
- Automotive and decorative parts
- Metal mobile phone cases

Items	Specifications
	Arc Works 200
Input	3Ø 220V/380V
Output Power	10kW
Output Voltage	50V / Trigger 130V
Output Current	200A
Interface	RS-232/485
Size[mm]	177(H)x218.6(W)x608.5(D)
Weight[kg]	17
Cooling	Forced Air

※ Specifications subject to change without notice

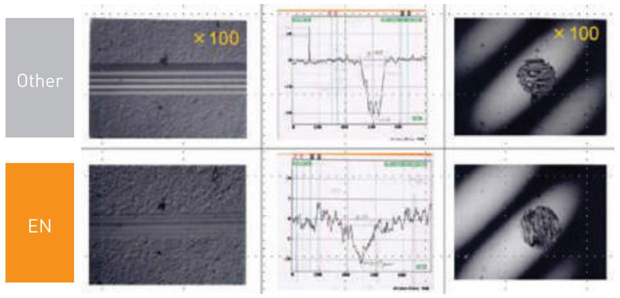
DC & Pulse Power Supplies for Ion Cleaning & Bias

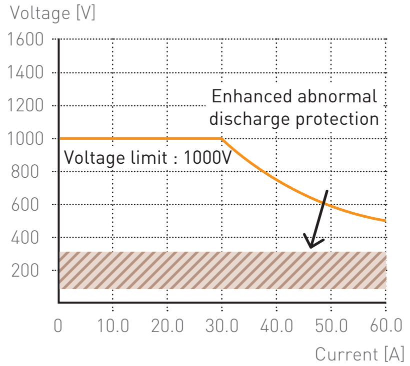
Applications

- Cleaning & Biasing
- Surface treatment

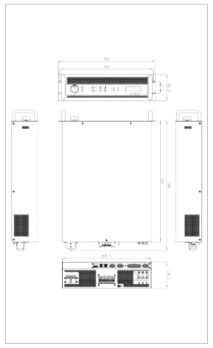
Enhanced Process Control

- Wide operating range
- Enhanced low voltage arc control

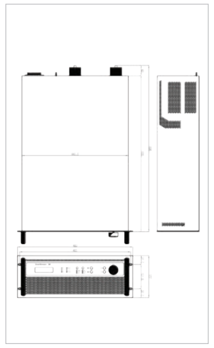




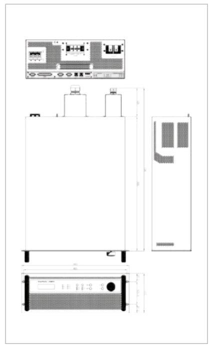
| EnerStream 30B |



| Hercules 10(BLV)/20(S)
EnerPulse 5/10BHV|



| EnerStream 30B |



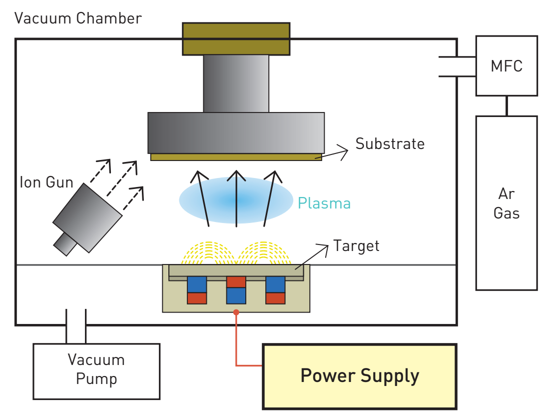
| EnerPulse 16BHV |

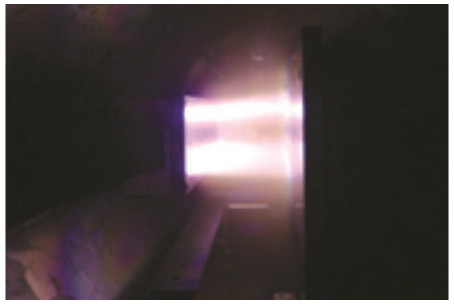
Items	Specifications							
	DC					Pulsed DC		
	Hercules 10BLV	Hercules 10	Hercules 20	Hercules 20S	EnerStream 30B	EnerPulse 5BHV	EnerPulse 10BHV	EnerPulse 16BHV
Input	3Ø 380V	3Ø 208V/380V	3Ø 208V/220V/380V	3Ø 208V/380V	3Ø 380V	3Ø 220V/380V		3Ø 380V
Ignition				1500V	1500V	1500V	1500V	1400V
Output	100V, 100A	1200V, 8.3A / 300V, 33.3A	1200V, 16.7A / 250V, 80A	800V, 25A / 400V, 50A	1000V, 30A / 500V, 60A	1400V, 5A / 1000V, 6.5A	1400V, 10A / 1000V, 13A	1150V, 17.7A / 530V, 35A
Output Power	DC 10kW		DC 20kW		DC 30kW	Pulsed DC 5kW	Pulsed DC 10kW	Pulsed DC 16kW
Output Frequency						20 ~ 120 kHz		
Reverse Time						1.5μs~40μs		
Arc Energy	Less than 1mJ/kW	Less than 0.5mJ/kW				Less than 1mJ/kW		
Interface	RS-232 / RS-485 (Option : ProfiBus, DeviceNet)					RS-232 / RS-485		
Size[mm]	133(H)x483(W)x605(D)		133(H)x483(W)x605(D)	133(H)x483(W)x605(D)	133(H)x483(W)x605(D)	133(H)x483(W)x605(D)	133(H)x483(W)x605(D)	177(H)x483(W)x605(D)
Weight[kg]	23.5		30.5	30.5	30.5	29	29	35
Cooling	Forced Air							

※ Cable Duct + 129mm

※ Specifications subject to change without notice

DC Power Supply for Ion Beam

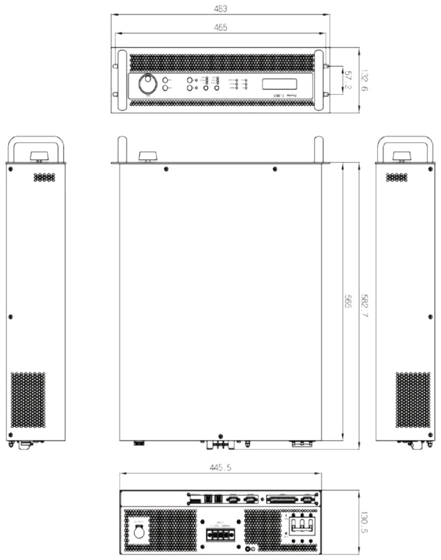




Applications

- Surface treatment with closed drift ion source

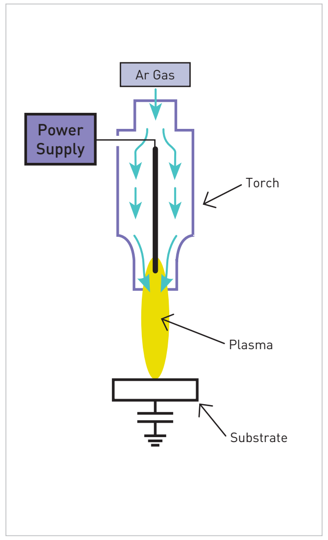
Items	Specifications
	Forte I-302
Input	3Ø 220V, 380V
Output power	6kW
Output voltage	3000V
Output current	2A
Arc energy	Less than 0.5mJ/kW
Interface	RS-232/485 (Option : ProfiBus, DeviceNet)
Size[mm]	133(H)x483(W)x605(D)
Weight[kg]	24.5
Cooling	Forced Air



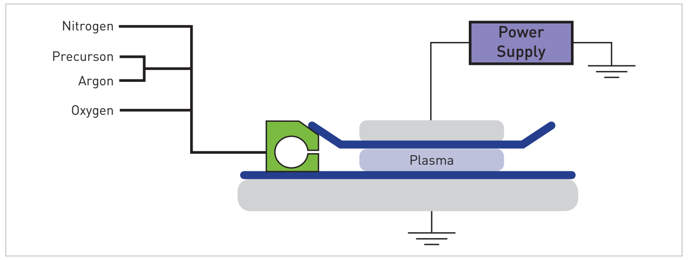
※ Cable Duct + 129mm

※ Specifications subject to change without notice

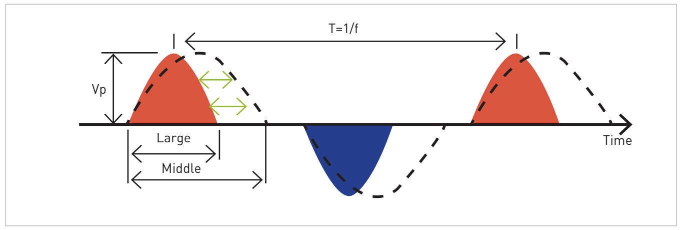
Quasi Pulse Power Supplies
for Atmospheric Pressure Plasma



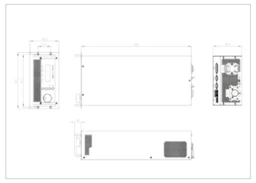
| Torch Type |



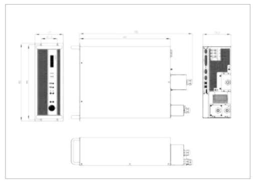
| DBD Type |



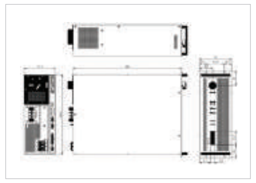
| Controlable Power Density Waveform |



| Genius J-1000 |



| Genius 2 |



| Genius 6 |

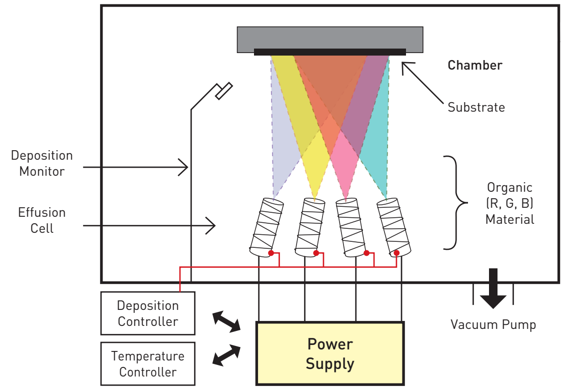
| Genius 10 |

Items	Specifications			
	Torch	DBD		
	Genius J-1000	Genius 2	Genius 6	Genius 10
Input	1Ø 220V	3Ø 220V		
Output Voltage	10kVpeak	10kVpeak / 15kVpeak		
Output Power	Quasi Pulsed DC 1kW	Quasi Pulsed DC 2kW	Quasi Pulsed DC 6kW	Quasi Pulsed DC 10kW
Output Frequency	40 ~ 60kHz	20 ~ 60 kHz		
Interface	RS-232 / RS-485			
Size[mm]	132(H)x257(W)x531(D)	177(H)x483(W)x590(D)	177(H)x483(W)x627(D)	177(H)x483(W)x627(D)
Weight[kg]	8.5	28	37.5	37.5
Cooling	Forced Air			

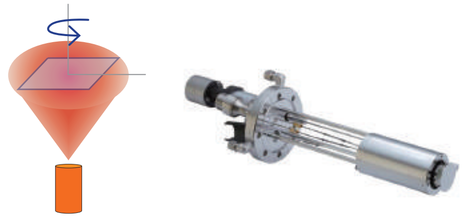
※ Cable Duct + 138mm

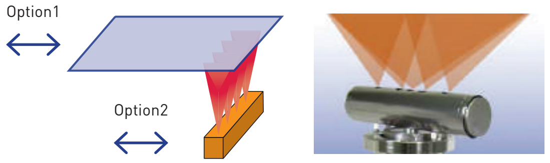
※ Specifications subject to change without notice

DC Power Supplies for OLED Heating Process

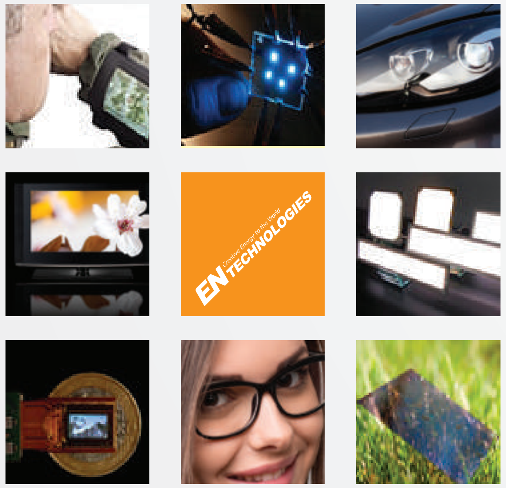


Evaporation of Point & Linear Source Application


| Point Source |



| Linear Source |



Applications

- Evaporation of AMOLED, W-OLED & OLED lighting
- Evaporation of MOCVD
- Evaporation of CIGS solar cells
- Battery charging

Features

- Voltage and current control
- Up to 50kW
- Low noise & ripple
- RS-232 & RS-485

Product Line-Up

NEOS Series


NEOS-200/400 (Input : 1Ø / 100~265V)


NEOS-750/1500 (Input : 1Ø / 100~265V)


NEOS-2000/3000 (Input : 1Ø, 3Ø / 220V)


NEOS-5000/10K (Input : 3Ø / 220V, 380V)

Model	Maximum Voltage(V)														Power(W)	Type	
	10	20	30	36	40	50	60	80	100	150	200	300	500	600			
NEOS-200		●		●											200	$3^{1}/_{6}$U	Module
NEOS-400		●		●											400		
NEOS-800		●		●											800		
NEOS-750					●		●	●		●					750	1U	19” Standard Rack
NEOS-1500					●		●	●		●					1,500	1U	
NEOS-2000			●			●	●	●	●		●				2,000	2U	
NEOS-3000			●			●	●	●	●		●	●			3,000	2U	
NEOS-5000	●	●	●			●	●	●	●	●	●	●			5,000	3U	
NEOS-10K	●	●				●	●		●	●	●	●	●	●	10,000	3U	

In-line Sputter System
for Touch panel

Power Supplies for Plasma Applications