

# SOLVIX ARC AND BIAS SERIES

CATHODIC ARC DEPOSITION WITH PRECISE PROCESS CONTROL  
AND SUPERIOR FILM QUALITY



## Arc Units

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60, 100, 210, and 400 A

## Bias Units

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3 to 30 kW

## Regulation Modes

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Current, power, and voltage

## A New Level of Precision and Productivity for Cathodic Arc Processes

The Solvix<sup>®</sup> by AE<sup>®</sup> arc-bias solution brings a new level of precision and productivity to cathodic arc processes. Powerful arc discharges, rapid vaporization of target material, and high-energy ions make cathodic arc deposition both powerful and potentially unstable. Available at a range of current levels up to 400 A, Solvix by AE arc supplies deliver excellent plasma ionization, ion energy, and throughput — with remarkable power and process control. Solvix by AE bias supplies add an even greater degree of control over film properties, for remarkably hard, dense, durable, adherent films.

### Product Highlights

- Power and process control
- Better film density and adhesion
- Reduced target damage
- Proven reliability
- Reduced substrate damage and better yield
- Adaptability to a wide range of process requirements
- High throughput
- Efficient installation and service
- DC and pulsed-DC units
- Current, power, and voltage regulation modes
- Flexible architecture
- Air cooling
- Multiple units configurable for high-power requirements
- High-performance DSP regulator

### Applications

Cathodic arc deposition of functional, decorative, and hard coatings, including:

- TiN
- TiCN
- ALTiN
- ALCrSiN
- TiB<sub>2</sub>
- CrN



### **Power and Process Control**

Regulated startup and highly accurate (< 1%), repeatable (< 0.5%) output stabilize process conditions. Pulsing adds a greater degree of control by keeping cathodic arcs in check, without sacrificing deposition rate because of the ability to operate at high current levels (up to 400 A).

### **Better Film Density and Adhesion**

Cathodic arc deposition typically creates dense, durable, uniform, highly adhesive films, due to high ion energy. However, micro-particle filtering can interfere with this process. Further, ions may impact the substrate with excessive force, causing film stress and adhesion problems. Solvix by AE bias power supplies modulate ion energy impacting the substrate, enabling control over critical film properties, such as degree of implantation, density, and adhesion.

### **Reduced Target Damage**

Cathodic arcs produce significant heat that can destroy target quality. Pulsing extends target life by allowing cooling during the pulse off time. It also inhibits the growth of damaging cathode spots by limiting cathodic arc movement.

### **Proven Reliability**

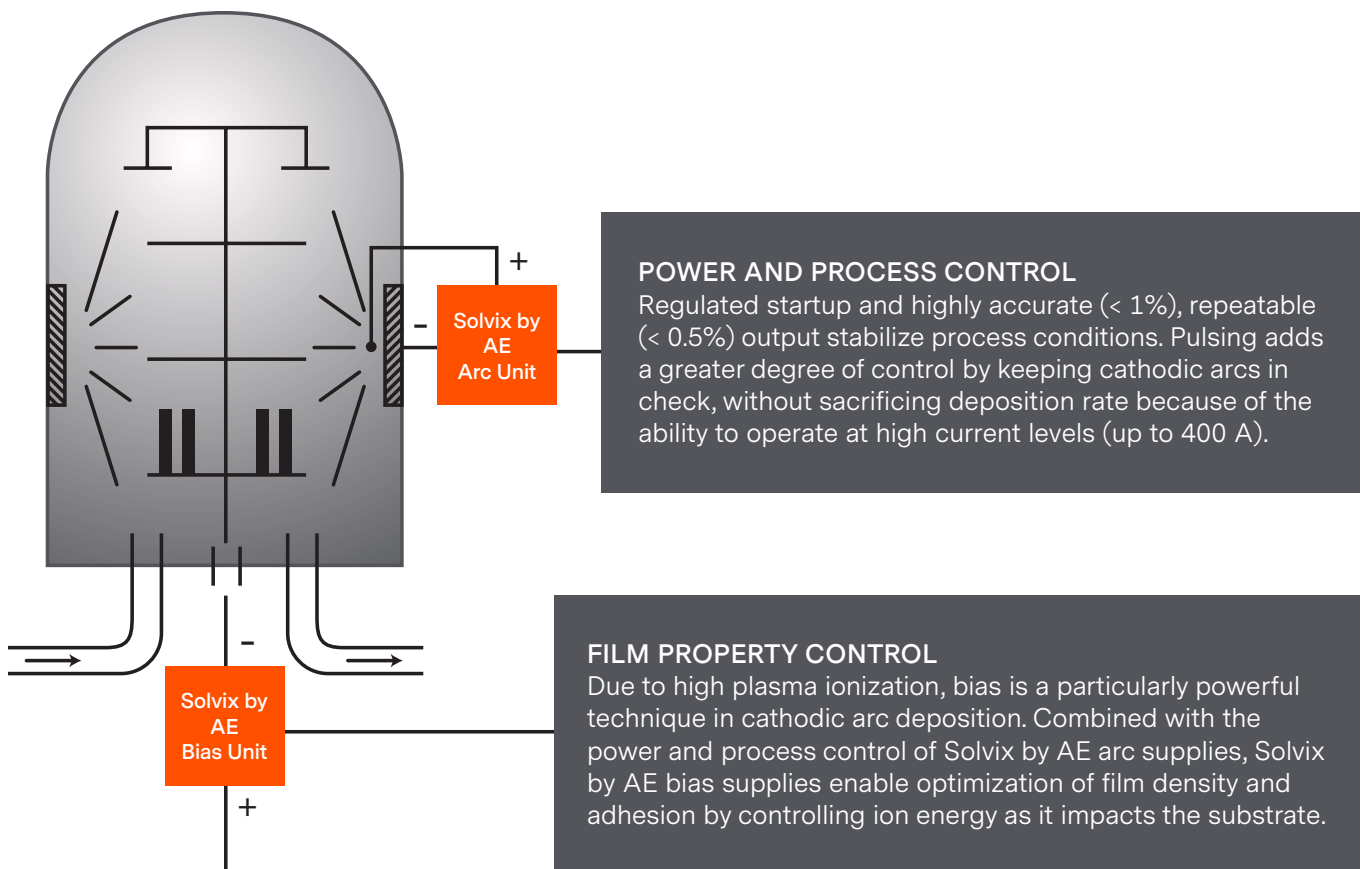
The Solvix by AE arc-bias system features highly developed DC and pulsed-DC technology. Units are streamlined to eliminate potential points of failure. Constructed at a world-class manufacturing facility that has received the highest scores from the most discerning OEM auditors, these rugged power supplies are highly reliable, with > 10 years of proven field operation.

### Worldwide Support Network

More than 200 professionals are available around the clock — in dozens of locations around the world — to provide highly responsive sales, service, and technical support. Our comprehensive network of AE offices and regional partners provides insight into your product, process, and application from a location near you.

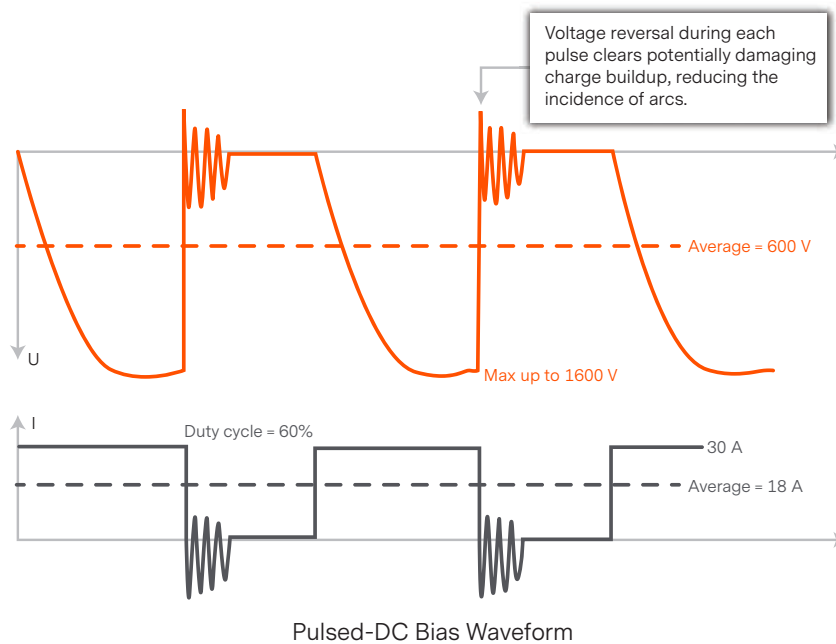
### Solvix by AE Arc-Bias System

Solvix by AE arc and bias supplies easily integrate and perform as a powerful system that enables you to take full advantage of the benefits of cathodic arc deposition — high throughput and excellent film density and hardness — while establishing a remarkable degree of process and film-property control.



## Reduced Substrate Damage and Better Yield

With a fast reaction time ( $< 1 \mu\text{s}$ ) and selectable detection modes, Solvix by AE series power supplies reduce contamination and damage caused by vacuum and substrate arcing. Pulsed-DC units reduce unwanted arc formation and minimize arc energy by periodically reversing electrode voltage to clear charge buildup. Bias units attract only ions to the substrate surface, discouraging non-charged atoms, such as particulates, from contacting the substrate.



## Adaptability to a Range of Process Requirements

With a flexible architecture, the Solvix by AE bias series offers a wide range of power levels from 3 to 30 kW. Arc units are available at 100, 210, and 400 A. In addition, multiple communication options are available to meet the needs of your unique manufacturing process.

## High Throughput

The stable power delivery of Solvix by AE arc supplies and the ion-energy control of Solvix by AE bias supplies allow you to take full advantage of the high throughput inherent to the cathodic arc deposition method. Able to operate at high currents, pulsed-DC units experience no decrease in throughput resulting from pulse off times. Mid-frequency pulsed-DC units can be combined and synchronized for higher-power operation.

## Efficient Installation and Service

Modular in design, Solvix by AE units are easy to install and make preventive maintenance easy to perform in the field, reducing maintenance costs. Arc and bias units are easily integrated to act as a single, high-performing system.





## Product Specifications

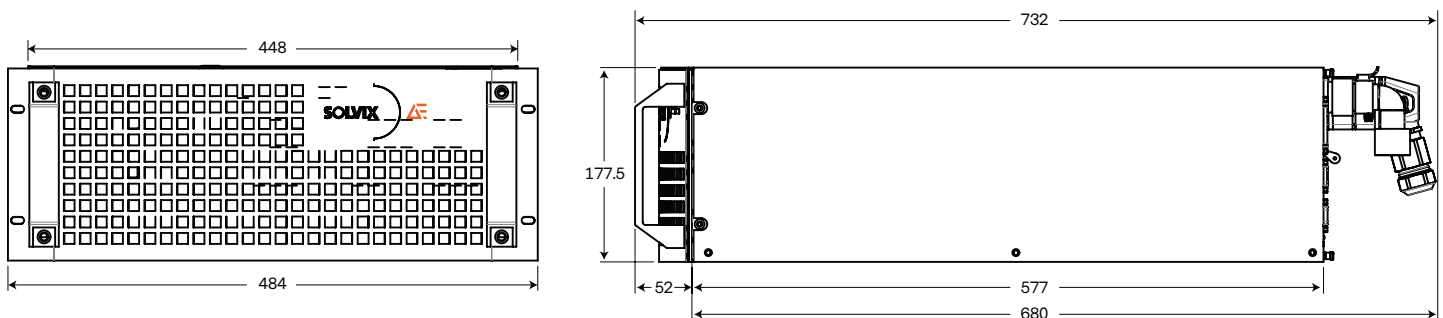
Solvix by AE Arc Power Supplies				
Electrical				
Output Power	0 to 60 A	0 to 100 A	0 to 210 A	0 to 400 A
Output Power	3 kW		6 kW	12 kW
Frequency Range	1 to 200 Hz (1 Hz increments)			
Open-Load Voltage	100 VDC	60 VDC		
Regulation Modes	Current (power and voltage)			
Power Accuracy	< 1%			
Repeatability	< 0.5%			
Pulse Duty Cycle	1 to 99%			
Input Voltage	400 to 480 VAC, 3 $\Phi$ , 50/60Hz			
Physical				
Dimensions	17.8 cm (H) x 48.4 cm (W) x 62.0 cm (D)			
	7" (H) x 19.1" (W) x 24.4" (D)			
Weight	31.5 kg (69.4 lb)			
Cooling	Air			
I/O Control				
Analog	Software customized: 4 digital input, 4 digital output; 3 analog input, 2 analog output			
Digital	Standard: RS-232			
	Available: RS-485, Profibus, Ethernet			

## Product Specifications Continued

	Solvix by AE DC Bias Power Supplies		Solvix by AE Medium-Frequency Pulsed-DC Bias Power Supplies		Solvix by AE High-Frequency Pulsed-DC Bias Power Supplies	
<b>Electrical</b>						
Output Power	6, 10, 15, and 30 kW		10, 15, and 30 kW		3, 5, 10, and 20 kW	
Frequency Range	—		1 to 30 kHz		5 to 350 kHz	
Voltage Range	20 to 1000 VDC				20 to 700 VDC	
Regulation Modes	Voltage, current, and power					
Power Accuracy	< 0.5%					
Repeatability	< 0.2%					
Pulse Duty Cycle	—		1 to 99%		50 to 100%	
Input Voltage	400 VAC, 3 $\Phi$ , 50/60Hz					
Arc Management	Voltage reversal serial + parallel switch				Voltage reversal parallel switch	
Physical	3 kW <sup>1</sup>	6 kW	10 kW	15 kW	20 kW	30 kW
Dimensions	17.8 cm (H) x 48.4 cm (W) x 68.0 cm (D) 7" (H) x 19.1" (W) x 26.8" (D)				26.5 cm (H) x 48.4 cm (W) x 68.3 cm (D) 10.5" (H) x 19.1" (W) x 26.9" (D)	
Weight	29 to 40 kg (64 to 88 lb)				67 kg (148 lb)	
Cooling	Air					
I/O Control	3 kW	6 kW	10 kW	15 kW	20 kW	30 kW
Analog	Software customized: 4 digital input, 4 digital output; 3 analog input, 2 analog output					
Digital	Standard: RS-232					
	Available: RS-485, Profibus, Ethernet					

<sup>1</sup> Depth is 62.2 cm (24.5")      NOTE: HF is not appropriate for pulsed arc.

## Mechanical Specifications



Measurements are shown in millimeters.



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## ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

PRECISION | POWER | PERFORMANCE

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