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ADVANCED ENERGY®



MDX DC 1 kW & 1.5 kW Series

- Tight regulation
- Superior arc control
- Low stored output energy

Benefits

Tight regulation

Improved yield

Reduced target burn-in time

High reliability

Easy maintenance and replacement

Features

Low stored output energy

Low ripple

Adjustable arc suppression time

High efficiency

Compact design

Voltage, current, and power regulation modes

Front panel and analog interface control

Full range of protection features

Tight regulation, superior arc quenching, and low stored output energy make MDX Series DC power supplies an industry leader. Intended for continuous hard use in a vacuum environment, these rugged power supplies are most commonly used as DC magnetron sputtering drives. They also offer tight regulation as bias supplies in RF sputtering and etching systems. Their compact design makes them the primary choice for laboratory systems.

The design of the MDX 1 kW and 1.5 kW models is a scaled version of the industry standard MDX 10 kW model. This allows processes defined with any MDX unit to be scaled up or down without surprises. These magnetron drives use a high-frequency conversion technique to provide excellent regulation, high conversion efficiency, and low stored energy at the output.

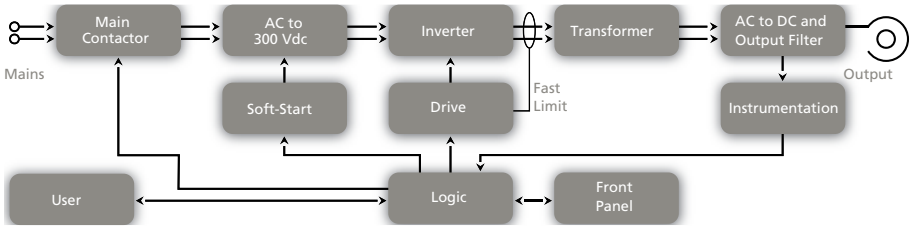
Features

Advanced Energy® switchmode conversion modules provide over 90% efficiency from line to load. The high-frequency method used gives a 20 msec response to plasma load changes. The design reduces the stored energy at the output by several orders of magnitude. Line-induced surges and noise spikes are virtually eliminated.

The MDX series features 1 kW and 1.5 kW units. Each model comes in two configurations to suit either standard Z or low Z applications. The standard Z version has a “soft” 1500 V striking voltage; the low Z units produce an 800 V striking voltage. This is a significant aid to low-pressure ignition and plasma stabilization. The standard Z unit supplies 1 kW at 1000 V and 1 A; the low Z unit supplies 1.5 kW at 500 V and 3 A.

These features give an added advantage when developing methods for sputtering hard-to-deposit materials at high rates:

- Very low ripple
- Adjustable arc suppression time



Arc-Out™ suppression circuitry provides multi-level suppression and quenching of different types of arcs in the magnetron environment. This, in conjunction with the low stored energy at the output, has been shown to produce better yields than other supplies when depositing aluminum. Arc-Out circuitry also reduces target burn-in time and material loss.

Output power may be regulated in constant voltage, constant current, or constant power modes. You can control the MDX from either the front panel or an analog interface connector. Power can be set to ramp up in seconds or minutes.

The internal logic checks for proper circuit operation while supervising all operating parameters. Instrumentation and status readings are displayed by means of front panel digital meters and LED indicators. This enables you to monitor a variety of parameters, including power, voltage, current, ramp time, at set point, output on, interlock status, and arcing indication. Full analog interfacing enables control and data logging. The analog interface can be used for remote control, status indication, remote off, interlocking, and data logging of key parameters. It provides complete access to all operating parameters, status indication, output control functions, and set point data.

MDX magnetron drives have complete internal protection for over-voltage, over-current, and over-power conditions, as well as for short and open circuits. They feature input connections for safety interlocks such as vacuum, water, and system.

MDX magnetron drives are among the most reliable available. When a unit does require service, its small size makes removal and handling easy. Its modular construction enables replacements to be completed in minutes. These features, combined with the rapid response of our expert staff, ensure superior productivity over a long unit life.

Functional Specifications

Dual digital meters display power, current, and voltage, as well as ramp time and set points. The left meter automatically displays the appropriate measurement for the regulation mode selected. The right meter is used with the right display switches to display actual and set point values as desired. The ramp time may be entered in seconds or minutes. The meters have 0.1% resolution and 2% reading accuracy.

MDX 1 kW and 1.5 kW models feature a master circuit breaker, an input power switch, output on/off switches, and an output regulation switch for selecting power, current, or voltage regulation. The right display switches are used to select the value displayed on the right meter. The ramp adjust sets or modifies ramp time and the level knob adjusts the output set point. Switches that enable remote control are located on the rear panel.

LED messages indicate that an arc has occurred, the MDX unit is at set point, a ramp is in progress, plasma is present, output is on, and that water, vacuum, and aux (user specified) interlock conditions have been satisfied.

A 25-pin, sub-miniature D connector on the rear panel enables control and data logging. Analog signals are 0 to 5 V in and out. Digital signals are 0 to 15 V CMOS compatible. Three switches on the rear panel are used to select whether the ramp time is programmed in seconds or minutes, whether the MDX is under remote or local control, and whether the output is turned on from the front panel or from a remote source.





Left and Right Meters

Display output, voltage, current, and power (left) and either actual values or set points (right).



Ramp Adjust Knob

Sets and adjusts ramp time.



Right Display Switches

Select the parameter or set point value to be displayed on the right meter.



Level Knob

Sets and adjusts output level.



Output Switches

Turn output on and off.



Regulation Switches

Select output regulation method.

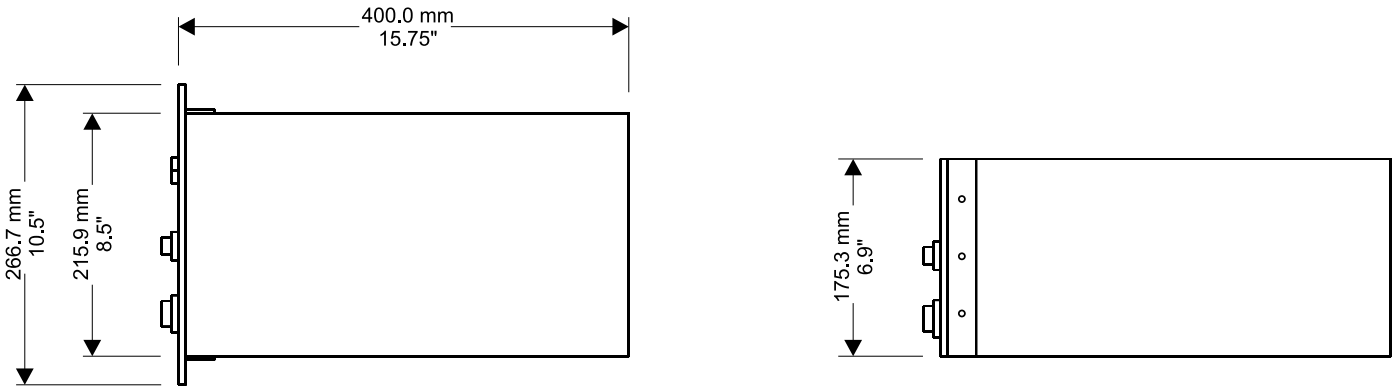
Specifications

Electrical	MDX 1 kW	MDX 1.5 kW
Regulation	0.2%	
Ripple	5% at 50 kHz	
Ramp Timer	1 to 10 sec or 1 to 10 min	
Load Mismatch	Continuous operation into any load mismatch. Automatic limiting occurs when current, voltage, or power exceeds preset limits.	
Power Output	1000 W	1500 W
Output Voltage	1000 V, 1300 V	500 V, 750 V
Ignition Voltage	1500 V	800 V, 1200 V
Input Power	115 VAC, 50/60 Hz ±10%, 16 A max 208/220 VAC, 50/60 Hz ±10%, 8.9 A	208/220 VAC, 50/60 Hz ±10%, 13.4 A
Power Factor	0.6	

Physical	MDX 1 kW	MDX 1.5 kW
Dimensions	175.3 mm (H) x 266.7 mm (W) x 400 mm (D); 6.9" (H) x 10.5" (W) x 15.75" (D)	
Weight	8.6 kg (19 lb)	
Power Output Connector	UHF or terminal block (6-32 screw)	

Environmental	MDX 1 kW	MDX 1.5 kW
Ambient Operating Temperature	0 to 40°C (32 to 104°F); max value of average over 24 h: 35°C (95°F)	
Coolant Type	Air (gas)	
Coolant Temperature	0 to 35°C (32 to 95°F)	
Humidity	15 to 85% relative humidity, no condensing or icing	
Atmospheric Pressure	800 mbar min (approx. 2000 m above sea level)	

Dimensional Drawing



For more information on MDX DC Series power supplies, visit:
www.advanced-energy.com/en/MDX_Series.html

To view AE's comprehensive power systems portfolio, visit:
www.advanced-energy.com/en/Power_Systems.html

To view AE's complete product portfolio, visit:
www.advanced-energy.com/en/products.html

Specifications are subject to change without notice.

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