MDX DC
1 kW & 1.5 kW SERIES

MDX DC 1 kW & 1.5 kW SERIES *used where tight regulation, superior arc control, and low stored output energy are essential.*

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1 kW & 1.5 kW SERIES

MDX DC MAGNETRON DRIVE

These supplies are intended for continuous hard use in a vacuum environment. They are most commonly used as dc magnetron sputtering drives where tight regulation, superior arc quenching, and low stored output energy make them an industry leader. They are also used as tightly regulated bias supplies in RF sputtering and etching systems. Their small size has made them the primary choice for laboratory systems.

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***

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 very good 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 ms 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.

MDX 1 kW and 1.5 kW units are provided in two configurations for standard Z and low Z applications. The standard Z version has a “soft” 1600-V striking voltage; the low Z units produce a 900-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 magnetron drives have Arc-Out™ suppression circuitry. This provides multi-level suppression and quenching of different types of arcs in the magnetron environment. Arc-Out™ 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™ reduces target burn-in time and material loss.

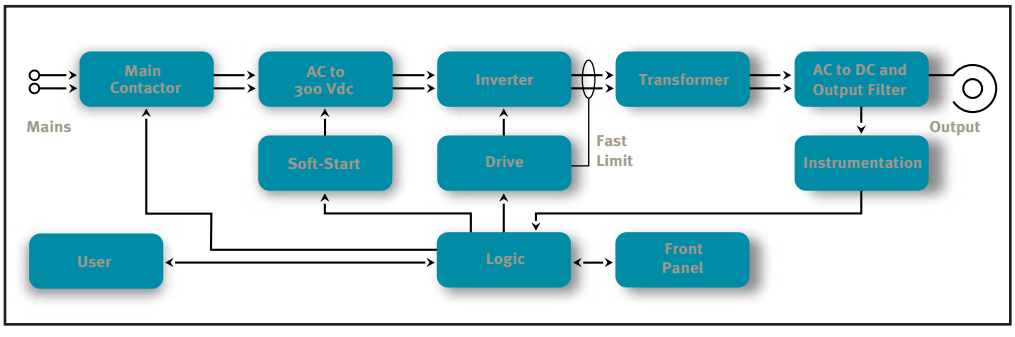
Output power may be regulated in constant voltage, constant current, or constant power modes. You can control the MDX from either the front panel or an analog interface connector. Power can be set to ramp up in seconds or minutes.

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. Power, voltage, current, ramp time, at setpoint, output on, interlock status, and arcing indication are examples of the values and parameters that can be monitored.

Full analog interfacing is provided for control and data-logging purposes. 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 setpoint data.

The MDX magnetron drives have complete internal protection for overvoltage, overcurrent, and overpower conditions, as well as for short and open circuits. Input connections are provided for safety interlocks such as vacuum, water, and system.

The MDX magnetron drives are designed to be among the most reliable and



quality oriented available. All parts and labor carry our standard one-year warranty. When a unit does require service, its small size makes removal and handling easy. Its modular construction enables replacements to be made in minutes. These features, combined with the rapid response of our expert staff, ensure you of superior productivity over the long life of the unit.

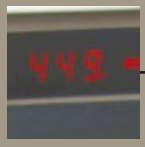
FUNCTIONAL SPECIFICATIONS

Dual digital meters display power, current, and voltage, as well as ramp time and setpoints. 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 setpoint values as desired. The ramp time may be entered in seconds or minutes. The meters have 0.1% resolution and 2% reading accuracy.

The MDX 1 kW and 1.5 kW models are provided with 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 what value will be displayed on the right meter. The RAMP ADJUST knob is used to set or modify ramp time and the LEVEL knob is used to enter the output setpoint. Switches that enable remote control are located on the rear panel.

LED messages indicate that an ARC has occurred, the MDX is at SETPOINT, a RAMP is in progress, a PLASMA is present, OUTPUT has been turned on, and that WATER, VACUUM, and AUX (user specified) interlock conditions have been satisfied.

A connector (25-pin, sub-D) is provided on the rear panel for 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.

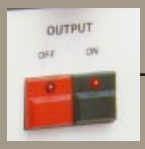


Left and Right Meters
Display output, voltage, current, and power (left) and either actual values or setpoints (right).

Ramp Adjust Knob
Sets and adjusts ramp time.

Right Display Switches
Select parameter or setpoint 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 method of output regulation.

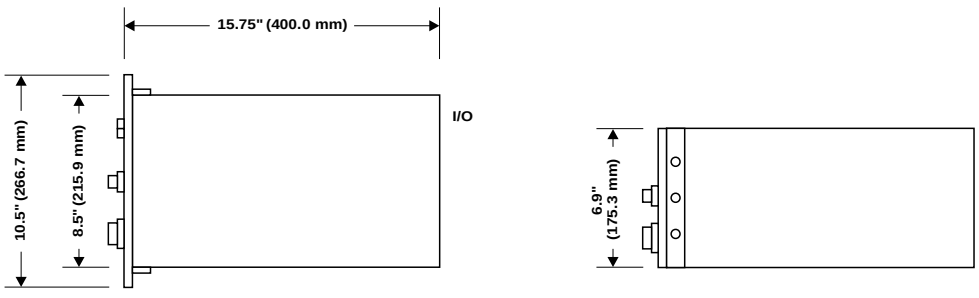
SPECIFICATIONS

ELECTRICAL		
Regulation	0.2%	
Ripple	5% at 50 kHz	
Ramp Timer	1 to 10 seconds or 1 to 10 minutes	
Load Mismatch	Continuous operation into any load mismatch. Automatic limiting occurs when current, voltage, or power exceeds preset limits.	
Power Output	MDX 1 kW: 1000 W	MDX 1.5 kW: 1500 W
Output Voltage	MDX 1 kW: 1000 V, 1300 V	VMDX 1.5 kW: 500 V, 750 V
Ignition Voltage	MDX 1 kW: 1500 V	MDX 1.5 kW: 900 V, 1200 V
Input Power	MDX 1 kW: 115 Vac, 50/60 Hz ±10%, 16 A max. 208/220 Vac, 50/60 Hz ±10%, 8.9 A	MDX 1.5 kW: 208/220 Vac, 50/60 Hz ±10%, 13.4 A
Power Factor	MDX 1 kW: 0.6	MDX 1.5 kW: 0.6

PHYSICAL		
Size	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)UHF style	

ENVIRONMENTAL	
Ambient Operating Temperature	Minimum 0°C (32°F), maximum 40°C (104°F); maximum value of average over 24 hr: 35°C (95°F)
Coolant Temperature	Air (gas) minimum 0°C (32°F), maximum 35°C (95°F)
Humidity	15 to 85% relative humidity, no condensing or icing
Atmospheric Pressure	800 mbar minimum (approx. 2000 m above sea level)

DIMENSIONS



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