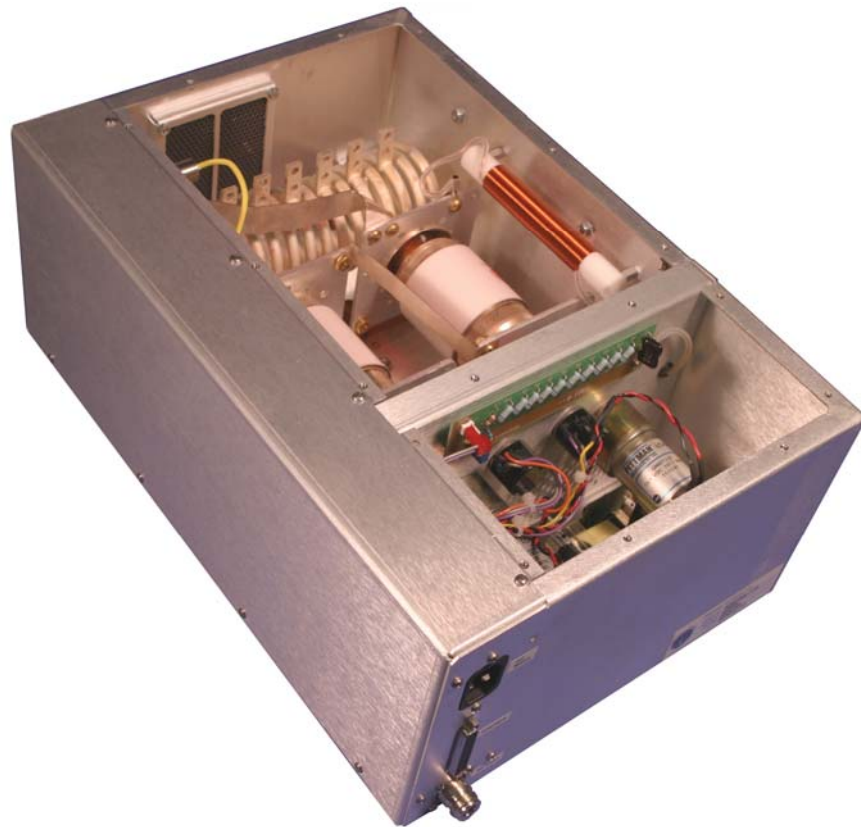




ACCU-MATCH™

AUTOMATIC IMPEDANCE
MATCHING NETWORKS



*RF POWER SYSTEMS
FOR
PLASMA PROCESSING*



- Precision, ultra fast plasma load tuning
- Analog interface with optional serial bus interface
- Unified servo driver / RF detector circuit board
- Multiple tuning algorithms selectable by user
- Real-time fault and operational event reporting

The **Accu-Match™** automatic impedance matching network complements the **Helius™** series RF power generators for a complete RF plasma power delivery system. Today's semiconductor and industrial plasma processing applications demand high performance and reliability. Manitou meets this challenge by using proven high power RF components and unified SMD printed circuit board construction.

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The **Accu-Match** control system is built around a state of the art "network analyzer on a chip" providing precise and repeatable RF plasma signal detection resulting in accurate matching. The capacitor positioning (servo driver) circuitry includes two possible operating modes. These are user selectable and will enable continuous *search & pounce* tuning or tune & halt algorithms. Although the **Accu-Match** will operate independently in the automatic mode, the manual / capacitor position pre-set mode enables the variable capacitors to be precisely positioned using a linear analog signal.

Many internal operating parameters and all soft & hard faults may be monitored and used for process control when directed to the process system controller via the various interface ports. Connectivity to the user's system is made possible via analog, or optional serial bus interface. The **Accu-Match** product platform is compliant with typical industry accepted regulations including NRTL and CE.

The impedance matching network is typically the most misunderstood component of the RF power delivery system. **Manitou** stands behind the **Accu-Match** products with technical support enabling the user to experience an easy installation, an understanding of the commissioning process and access to quick turnaround service in the event of component failure.

In addition to advanced control features and performance **Manitou** offers the OEM user application specific models meeting many load impedance, operating frequency and power level combinations. Complementary products such as cables & output switch modules complete the RF power system package product line.

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The **Accu-Match** is manufactured with the highest quality electrical and mechanical components. For example, our servo motors are manufactured using all metal drive gears resulting in longer lifetimes. High current RF conductors and inductors are fabricated from copper and finished with a silver plating designed to maintain a low insertion loss. The high overall impedance transfer efficiency is attributed to using high quality air-gap and/or vacuum capacitors. The entire enclosure is constructed from sheet aluminum that is chemically treated to inhibit oxidation while ensuring conductivity.

The user can take advantage of basic and advanced controls and diagnostic signals through the analog and/or serial bus interfaces. The **Accu-Match** includes as standard an Analog I/O connection. Optional serial interfaces such as RS232, Profibus and DeviceNet are offered. The serial interfaces offer both system control as well as a source of streaming data output of critical operating and diagnostic parameters.

The standard analog interface includes the following signals:

- Capacitor preset inputs
- Auto/Manual select
- RF connector interlock OK output
- Capacitor Hi & Lo limits
- Developed DC Bias level output
- RF & Servo active signal output
- Servo motor current sense outputs
- Cooling fan rotation failure output
- Capacitor position outputs
- Over temperature fault output
- Phase & Magnitude signal outputs
- Plasma light signal output

Forced air *and* forced air/water cooling ensure that optimal component operating temperatures are maintained. To ensure long lifetime all cooling fans are managed by onboard digital controls offering a sleep mode during idle periods and variable speed to meet the thermal need. The fan management system also includes active faults upon locked rotor and over temperature fault conditions.

To enable the typical Accu-Match to be able to tune all plasma loads, provisions for additional fixed shunt capacitors and the ability to swap in different series inductor values come as standard.

An RF input connector interlock informs the user that the mating connector is properly installed.

A plasma light monitor enables a remote photo cell to be attached to a system view port for the purpose of monitoring for the presence of plasma. The linear signal may be used to drive a threshold detector.

All cooling air supply and exhaust ports are shielded using “wave guide beyond cutoff” filter material.



Accu-Match Model	ACM600	ACM1000	ACM1500	ACM5000	ACM10000
Typical RF Input Power (Watts)	600	1,000	1,500	5,000	10,000
50 Ohm RF Input Connection	Type N Female			Type 7/16 Female	
Series Inductor	Tapped			Fixed	
Output Connection to Plasma	7/16 DIN Female or 6 mm Multi-Contact			6 mm Multi-Contact	10 mm Multi-Contact
AC Mains Requirements	110 > 240VAC 50/60Hz 45W			110 > 240VAC 50/60Hz 65W	
Cooling Method	Forced Air	Forced Air + (Water cooling optional based RF current)		Forced Air + Water cooling	
Water Fittings	—	1/4" compression			3/8" compression
Product Weight (Lbs)	15	17.5	19	25	35
Product Dimensions (L" x W" x H")	12 X 8 x 5.5	14.75 X 9.5 X 6			18 X 12 X 8

The table shown above lists basic product models and their typical specifications. **Manitou Systems** offers OEM and custom versions with non-standard operating frequencies, special packaging and application specific RF circuitry. Please consult the web site or factory for up to date and additional information.

All models (unless otherwise specified) offer the following features as standard

- 13.56 MHz operating frequency DB25 female analog interface connector.
- DC developed bias probe 0 > 5 kV with 100:1 attenuation
- Manufactured in the USA

Available **Accu-Match** accessories

- | | |
|--------------------------------------|----------------------------|
| • Remote Control Module | • 50 Ohm RF Power Splitter |
| • Coaxial RF Cables (Input & Output) | • Output Switch Box |
| • DB25 Interface Cable | • Serial Bus Interface |
| • Non-Standard Operating Frequency | • OEM Packaging / Designs |

For up to date pricing and delivery information please contact us at the address below:



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