

APG 7-50

TECHNICAL DATA SHEET



Overview

The APG 7-50 is a Radio Frequency power source intended for industrial and scientific radio frequency dielectric heating and drying applications. It also may be used for plasma generation and wireless power transfer. It is typically operated at 6.78 MHz which is an ISM frequency.

The innovative solid state RF power architecture results in compact dimensions while offering unparalleled energy efficiency over a wide range of operating impedances and power levels.

The DSP based control system uses direct sampling of the RF output voltage and current for fast and exact control. RF Power is continuously adjustable from zero to rated power. Integration with industrial control systems is easy using Modbus TCP over Ethernet. Control modes include constant power, fixed frequency as well as variable frequency which tracks load resonance for maximum efficiency and power transfer. The control system seamlessly transfers to constant current mode when excessive current is detected. Front OLED screen provides convenient user access to current operating parameters.

Cooling is provided by a custom engineered high performance cold plate resulting in low operating temperatures. The cold plate is directly connected through the rear panel with no internal hoses or couplings that could leak. Rear panel dripless connectors are included.

Built in stepper motor drivers, managed by the internal control system, are used with Aethera matching networks to ensure maximum power transfer when dynamic loads require improved power transfer. Manually adjusted or fixed matching networks may also be used. Careful component selection and derating, low operating temperatures, and simplified architecture with low parts count result in high reliability and long operating life.

Physical	
Outside Dimensions (W x D xH)	19" x 27" x 8.5" (483mm x 686mm x 216mm)
Weight	32 kg / 70 lbs
19" Rack Space	4U, minimum rack depth 32", Allow 1U for supporting shelf
AC Input	
Configuration	3Ø, 3 Wire & Gnd
AC Frequency	47-63 Hz
AC Voltage	240 V (+/- 10%)
Extended Voltage Range	187 V minimum with reduced power
Power Factor	0.95
Maximum Line Current	148 A
Surge/Lightning protection	IEC/EN 61000-4-5 Class 4 (by design)
RF Output	
Power Capability	0 - 50kW continuously adjustable
Load Impedance	Maintains efficiency over a wide impedance range. 5 Ohm nominal load. Separate matching network is typically supplied based on user requirements.
Maximum Average Current	100 Arms
Maximum Reactive Current	35 Arms
AC to RF Efficiency	95% at rated power, resistive load
Frequency Range	6.78 MHz Nominal, consult factory for wider range
Frequency accuracy	+/- 5 ppm
Cooling	
Liquid Flow	7.6-15.2 litres per minute (2-4 GPM)
Liquid Pressure Drop	15.8 – 62.7 kPa (2.3 - 9.1 PSI) at min/max flow
Entering Liquid Temperature	0 – 45 C (32 – 113 F), chilled liquid must not cause condensation
Maximum Liquid Pressure	413 kPa (60 PSI) Gauge pressure
Coolant	Inhibited / Al compatible PGW/EGW, 30-50% glycol recommended
Wetted surfaces	Cu and Al, all surfaces at earth/ground potential
Operating Ambient Temperature	0 to 45 C (32 to 113 F)
Storage Ambient Temperature	-35 to 60 C (-31 to 140 F)
Cabinet Cooling Air	Rear input, side output, less than 80 CFM
Control	
Mode	Constant power, fixed or variable frequency. Transfer to constant current mode when current limit is exceeded.
Programmability	Configurable time/power/frequency ramps
IP Connectivity	Ethernet, 8P8C connector, 10BASE-T/100BASE-TX, IP address fixed or DHCP, up to 5 simultaneous connections
Protocol	Modbus TCP
Wired Connectivity	DB-25 Female, 2 Isolated inputs, 4 Isolated Outputs
Serial	RS-232/DB9 for factory use
Instrumentation	
RF Output	Real & Reactive Power, Voltage, Current, Impedance, Frequency
Cooling	Inlet & Outlet temperature and pressure with flow estimate
Amplifier parameters	DC Input Voltage and Current, Temperature
State information	Operating status and fault listing
Protection	
Load impedance protection	Fully protected for safe operation into any load impedance
Thermal protection	High coolant temperature, low coolant flow. Amplifiers individually thermally protected
Down stream equipment	Configurable load circuit limits - arc detection, excessive current and excessive voltage
Options	
Electrical safety field inspection (before shipment) per CSA SPE 1000	
Modular liquid cooling system	
AC transformer for alternate voltage operation	
RF load matching equipment with manual or automatic tuning	
RF generator, cooling system, transformer and matching unit pre-configured and installed in a 19" Rack	