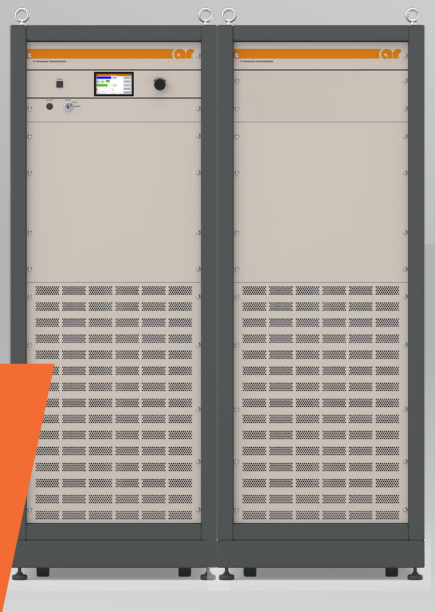
AMETEK®
COMPLIANCE TEST SOLUTIONS

NEMP (Nuclear Electromagnetic Pulse) Laboratory Simulation

AR1BP400 Amplifier Series (Pulsed) 1.0 MHz to 400 MHz



AMETEK

AR BP Series

ADVANCED PULSED POWER

FOR CRITICAL RF APPLICATIONS

The AR BP Series represents a cutting-edge line of solid-state, Class A-AB, air-cooled broadband pulsed power amplifiers, meticulously designed for demanding pulsed RF applications with low duty cycles.

Engineered for environments where instantaneous bandwidth, high gain, and reliability are critical, these amplifiers deliver output power ranging from 20 kW to 500 kW across a 10 kHz 1MHz to 400 MHz operating bandwidth. This makes the BP Series an ideal solution for NEMP application testing.

At the core of the BP Series is an intuitive Digital Control Panel (DCP), combining a color LCD touchscreen with a single rotary dial for streamlined local operation. The DCP provides real-time monitoring of forward and reflected power, amplifier status, gain control and RF output Level protection.

For remote operation, the amplifier supports a comprehensive suite of interfaces, including: GPIB/IEEE-488, RS-232, USB, Ethernet and Fiber-optic Serial. All control and status functions are fully accessible via these interfaces, enabling seamless integration into automated test systems or remote-controlled environments.

MAIN FEATURES

- Class A Design.
- Built-in fault monitoring, logging and protection.
- Full VSWR Tolerance without Foldback
- Scalable Modular Design
- USB, Ethernet, GPIB and RS232 Interface

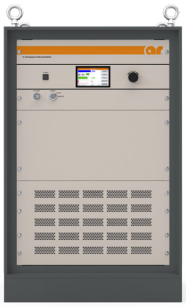
APPLICATIONS

- HEMP & NEMP Testing
- EMC Test Applications
- EW
- Radar & Jamming
- Communication Testing

AR BP Series

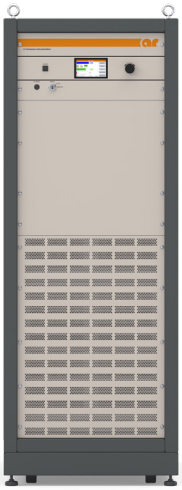
1.0 MHz to 400 MHz Pulsed

The BP Series is built with robust fault detection and protection mechanisms, including, over-temperature protection, power supply fault monitoring, and RF output protection. A front-panel status display provides immediate visual feedback on operational state and fault conditions, ensuring maximum uptime and system safety.



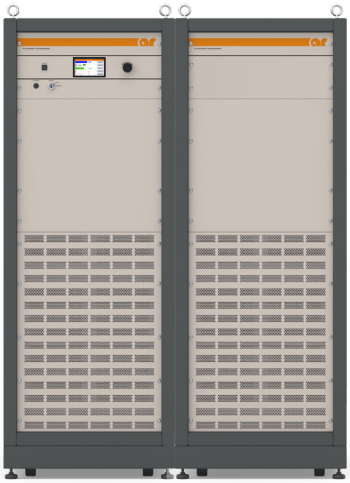
20 kW

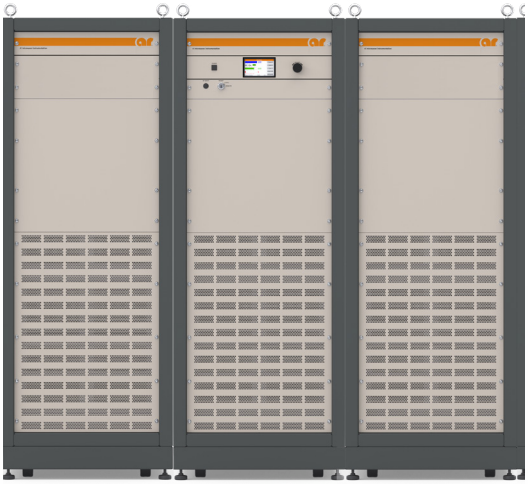
40 kW



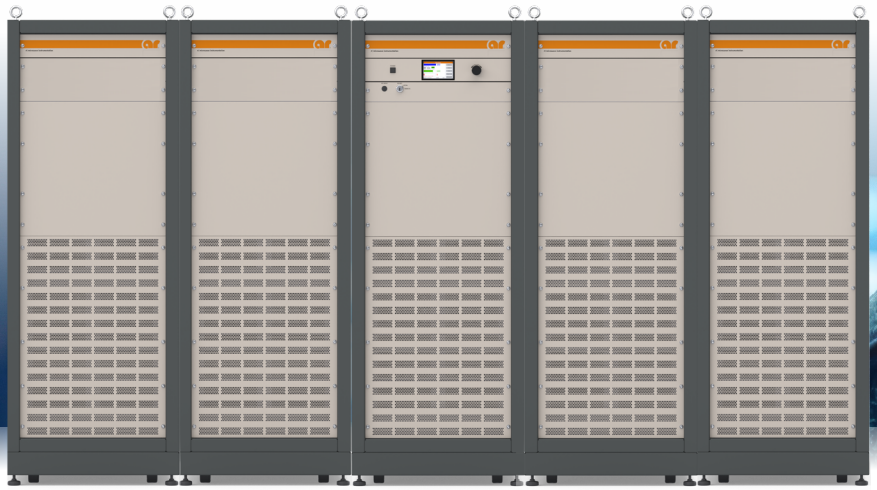
80 kW

150 kW





300 kW



500 kW

SPECIFICATION

Models & General Specifications

Model Number	Rated Peak Power	Gain	Rated Peak Voltage / 50 Ω	Weight	Size
1. AR1BP400-20kW	20 kW	73 dB	1.0 kV	78 kg	19 inch, 16U Rack Case, 955mm Deep
2. AR1BP400-40kW	40 kW	76 dB	1.4 kV	124 kg	19 inch, 26U Rack Case, 955mm Deep
3. AR1BP400-80kW	80 kW	79 dB	2.0 kV	212 kg	19 inch, 35U Rack Case, 955mm Deep
5. AR1BP400-150kW	150 kW	81.7 dB	2.7 kV	430 kg	19 inch, 2x45U Rack Case, 955mm Deep
6. AR1BP400-300kW	300 kW	84 dB	3.8 kV	810 kg	19 inch, 3x45U Rack Case, 955mm Deep
7. AR1BP400-500kW	500 kW	86 dB	5.0 kV	1620 kg	19 inch, 5x45U Rack Case, 955mm Deep

Technical Specifications

Instantaneous Frequency Range	1 to 400 MHz
Gain Variation @ 1dBc (max) ±	+/- 2.5 @-20 dBm input < +/- 1.5 dB @1dBc
Gain Control Adjust When Below P1dB	20 dB
Harmonics @ P1dB (min) H2 and H3	< -20 dBc@1 dBc / <-17 dBc @P sat
Spurious	60 dBc
Input VSWR	1.5:1 (max) 1.5
Output Impedance	50 Ohm
Output VSWR Tolerance	Will operate without damage and without feedback loop when connected to any complex load impedance from open to short
Stability	Unconditional
Modulation Formats	AM, FM Pulse
Pulse Width Range	0.1-100 µs
PRF Range (max)	2 Hz (max) Hz
Duty Cycle	0.02% (PW = 100 µs)
Pulse Rise & Fall Time	30 ns (max) (10-90%)
Pulse Delay	< 12 µs from pulse input to RF 90%
Pulse Width Distortion	+/- 25 ns (max) (difference between Pulse input gate and RF Pulse)
Pulse On / Off Ratio	60 dB Min
Pulse Input	0

Regulatory Compliance

EMC	EN 61326-1
Safety	UL 61010-1
RoHS	DIRECTIVE 2011-65-EU
Export Classification	1

General Specifications

Built in Bidirectional coupler	70 dB +/- 1 dB (1-400 MHz)
Supply Frequency	47 to 63 Hz
Supply Voltage	180 to 260 VAC
Three Phase 4 Wire Delta	190 to 240 Line to Line VAC
Three Phase 5 Wire WYE	380 to 415 Line to Line VAC
Three Phase 5 Wire WYE Low Line	200 to 240 Line to Line VAC

Mechanical Specifications

RF Input Connector	Type N Female
RF Output Connector	(20kW 7/16) (40kW / 80kW 1-5/8 EIA) (150kW 3-1/8 EIA) (300kW 4-1/2 EIA) (500kW 6-1/8 EIA
Safety Interlock	15-pin subminiature D female
Cooling System	Air Cooled, Self-contained
Com. Interface	GPIB, RS232, Ethernet & USB
Three Phase 5 Wire WYE Low Line	200 to 240 Line to Line VAC

Environmental Specifications

Ambient Running Temperature	+5°C to +40°C
Storage Temperature	-20°C to +50°C
Maximum Altitude	up to 2000m
Shock and Vibration	Mil std 810G Methods 514 and 516

PERFORMANCE CHARACTERISTICS

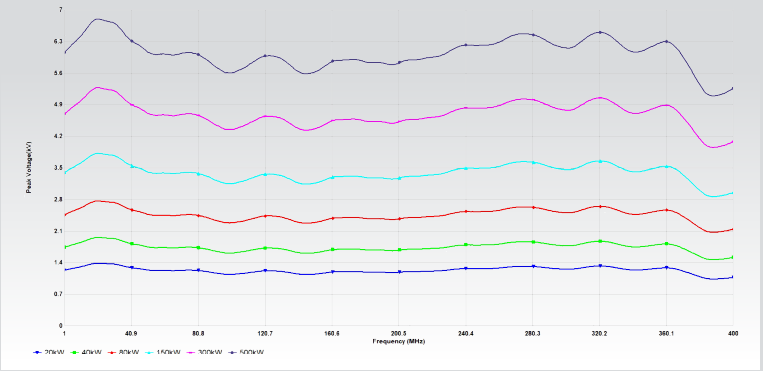
Performance Insights for Pulsed RF Operation

The following graphs provide a detailed visualization of key output characteristics of the BP Series amplifier under pulsed RF conditions. Voltage Peak and Power Peak plots illustrate the amplifier's ability to deliver high-energy pulses with precision and consistency, critical for simulating NEMP environments.

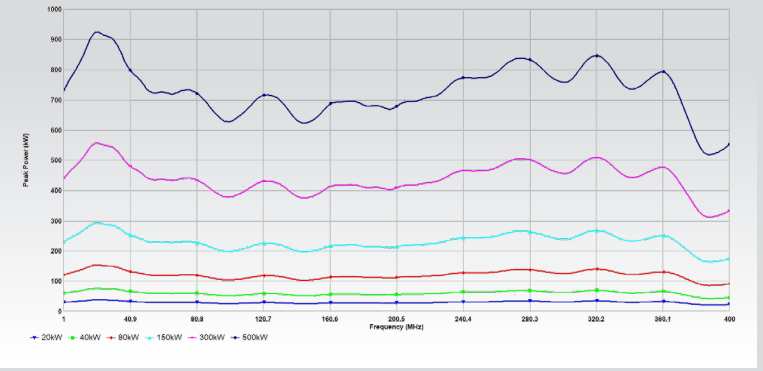
The Harmonics graph highlights spectral purity and linearity across the operating bandwidth, offering insight into compliance with electromagnetic compatibility (EMC) requirements and system-level performance.

These metrics underscore the BP Series' suitability for high-fidelity, low-duty-cycle pulse testing where transient response and spectral control are paramount.

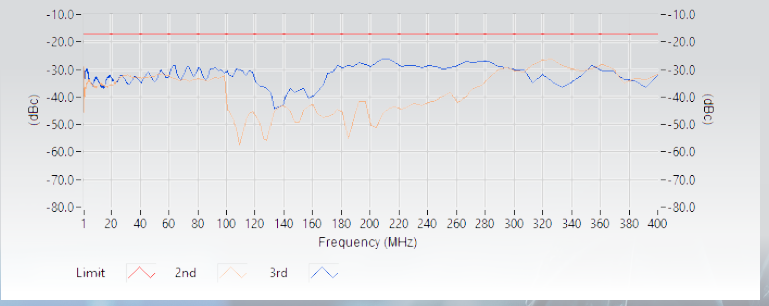
PEAK VOLTAGE

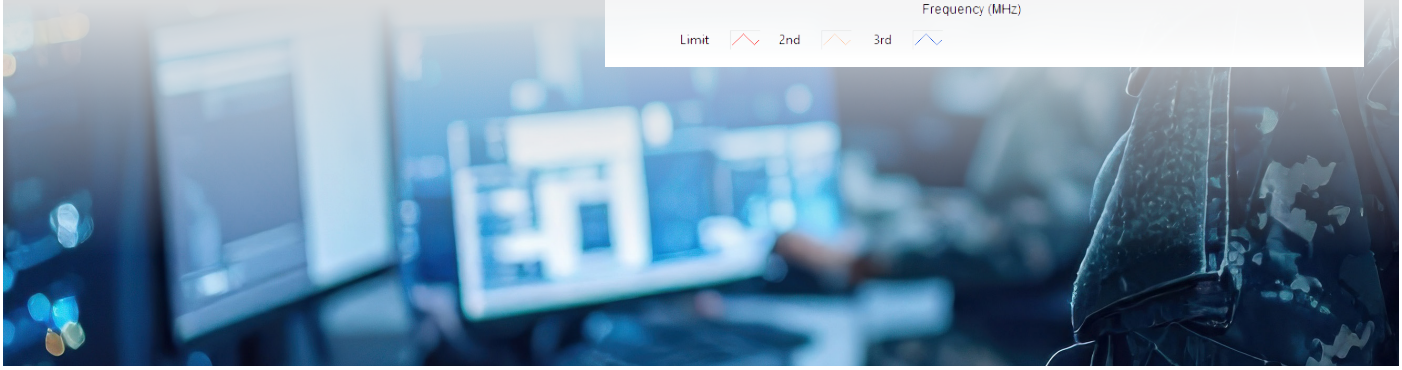


PEAK POWER



HARMONICS





RUGGEDIZED ARCHITECTURE
for High-Reliability Operation

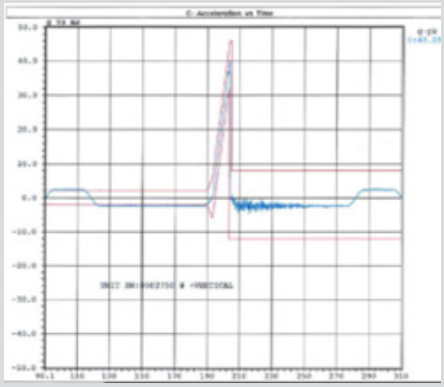
Designed to meet the stringent requirements of MIL-STD-810G, our AR systems incorporate mechanical and structural reinforcements validated through Method 514 (Vibration) and Method 516 (Shock) testing protocols. This ensures sustained performance in environments subject to high mechanical stress, including mobile platforms, industrial installations, and field-deployed systems.

The ruggedized design mitigates failure risks due to repetitive vibration and sudden impact, supporting long-term operational integrity in mission-critical applications.

High power RF module: 1.4 kW peak min 1-400 MHz

Shock	+X	-X
40G 11 msec terminal sawtooth	3	3
	+Y	-Y
	3	3
	+Z	-Z
	3	3

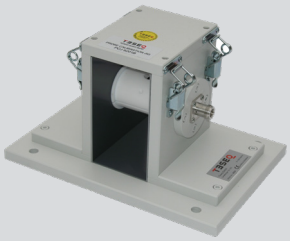
A Single RF Block Tested up to 40 G axes

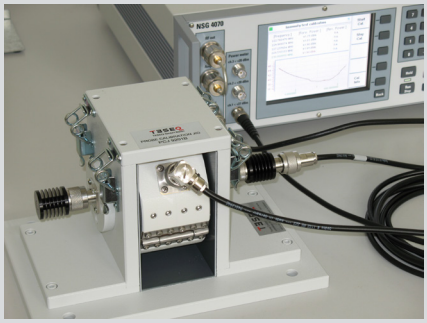


ACCESSORIES

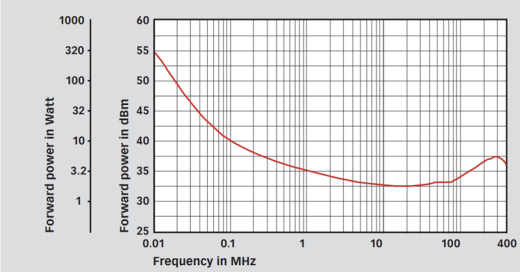
While most tests involve direct RF coupling from the amplifier to the Device Under Test (DUT), certain scenarios—such as susceptibility testing—can be performed via bulk current injection (BCI) using standard injection probes.

Current Injection Probe + calibration JIG

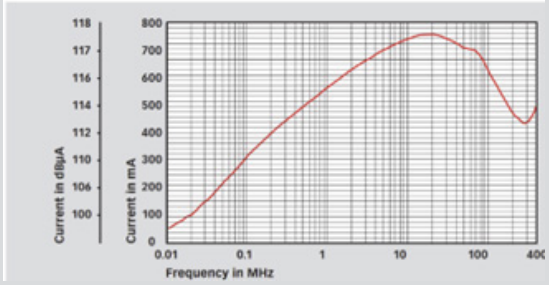




BCI application: Typical required forward power to inject 100 mA (100 dBµA)

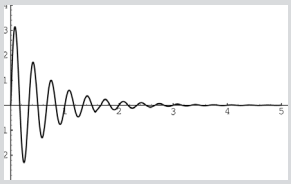


BCI application: Typical injected current with 100 W forward power



Extended Frequency Testing

While the majority of tests are conducted within the 1–400 MHz range, certain standards require evaluation at 10 kHz and 100 kHz frequency points. To support these low-frequency test requirements, AR recommends high-voltage generators from EM TEST, part of the AMETEK CTS portfolio, offering reliable performance and seamless integration with your test setup.



10 kHz and 100 kHz damped sinus generators

AMETEK®
COMPLIANCE TEST SOLUTIONS

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