



8500 Series

The First Wide-Bandwidth,
High-Power Switch-Mode Amplifiers

AE Techron's 8500 Series amplifiers are the first (and only) wide-bandwidth, high-power digital amplifiers available from any manufacturer. An 8500 series amplifier has a collection of advantages: wide bandwidth, very low noise, high efficiency and the ability to safely drive a wide variety of load types and impedances.

The 8500 Series of amplifiers are also very signal- and application-versatile, able to reproduce AC, DC and AC+DC wave forms at rated power into loads from a dead short to high impedance without re-configuring or selecting different operational modes.

8500 series amplifiers pack a lot of power into a small package. They are able to produce surge power ratings at up to 2.5X continuous and process apparent power at levels up to 5X the continuous power ratings. This makes an 8500 series amplifier an ideal choice for many difficult-to-drive reactive loads.

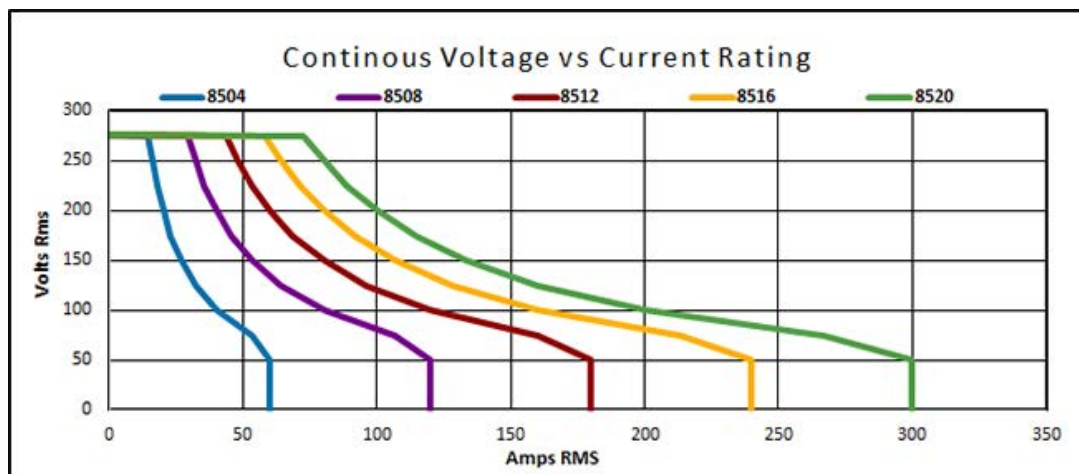
This combination of abilities, flexibility, and ease-of-use makes 8500 series amplifiers a singular solution for many common and some previously unsolvable amplifier applications. 8500 series amplifiers can be used for EMC conducted immunity testing, MIL-PRF capacitor tests, DC automotive dropout testing and as a variable AC source for ISO 61000, Aviation and Power Quality Measurements.

- Bandwidth** DC to 50 kHz
- Slew rate** 60V/ μ s
- Voltage** 0 to 250 V_{RMS}
0 to 350 VDC
- Current** 60 to 300 A_{RMS}
- Distortion** 0.1%
- Power** 4 kVA to 20 kVA*
- Power levels up to 5X rated power when driving reactive loads**
- Drives loads PF 0 to 1**

*Models available with output from 4 kW to 20 kW (capable of up to 100 kVA of apparent power).

	Continuous Output Current *				
	8504	8508	8512	8516	8520
13.5 VDC	50A	100A	150A	200A	250A
28 VDC	50A	100A	150A	200A	250A
42 VDC	50A	100A	150A	200A	250A
120 VAC	33A	66A	99A	132A	165A
230 VAC	17A	34A	51A	68A	85A
277 VAC	14A	28A	42A	56A	70A

*Higher voltages possible with optional step-up transformer.



	Traditional		
	Linear	Switch-mode	8500
Wide Bandwidth	✓		✓
Low Distortion	✓		✓
High Efficiency		✓	✓
Drive Resistive & Reactive Loads		✓	✓

The 8500 Advantage

Unlike traditional switch-mode amplifiers with a ripple frequency between 80 kHz and 100 kHz, the 8500 series has an effective switch frequency of 1 MHz. This ultra-high-frequency switching gives the 8500 amplifier many benefits over both linear (dissipative) amplifiers and traditional switch-mode amplifiers.

Bandwidth: The first and most obvious benefit from a higher switching frequency is wider bandwidth. The 8500 is the only high-power switch-mode amplifier with a bandwidth that extends to 50 kHz.

Smaller output filter: Switch-mode amplifiers, as a part of their basic design, have high-frequency, high-voltage switching at the heart of their operation. The last stage in any switch-mode amplifier is the low-pass filter that removes the high-frequency switching-noise artifacts from the output signal. Increasing the effective switching frequency by a factor of 10 allows us to reduce the size of these large L-C components used to create this low-pass filter by a similar amount, reducing amplifier size and cost.

Lower magnitude, higher frequency ripple noises: The reduction in output filter component size also makes it easier to implement more complex, higher-order low-pass filters, to greatly reduce output ripple noise. The 8500 series uses this advantage to create output voltages of up to 400 Vp with 1 MHz ripple noises that are less than 2 Vp, with in-band noise specifications similar to low-noise linear amplifiers. If even lower noise floors are needed, simple, small, external filtering can reduce this noise even further.

Optimized for transient waveforms and reactive loads: The 8500 Series of amplifiers are compact and capable. They are able to drive purely resistive loads, at rated power, continuously, but really excel when it comes to reproducing short-duration waveforms and/or driving reactive loads.

For periods of up to one minute, the 8500 series amplifier can exceed continuous power ratings by as much as 2.5X. When the load to be driven is reactive, and most of the energy sent into the load is returned to the amplifier, the 8500 can reuse this returned energy to produce apparent power levels that are as much as 5X that of the amplifier's continuous power ratings.

Scalable: The 8500 Series is scalable, available in power levels from a 4 kW, 3U, single-phase, bench top model to mini rack systems that can deliver up to 100 kVA of power into reactive loads at currents of up to 300 ARMS.

CONFIGURABLE

The 8500 Series provides all key configuration controls on the back panel of the unit.

- **GAIN:** Fixed or variable gain (0 to 40)
- **CURRENT LIMIT:** From 5% to rated limit (to protect fragile DUTs or where specified in the Standard)
- **DC CONTROL:** DC enabled or DC blocked and DC Servo (for driving transformer-coupled loads or coils)
- **INPUT:** Balanced and/or unbalanced
- **MODE:** Voltage source or current source
- **OUTPUT IMPEDANCE:** Variable from 0 to 1 ohm (Voltage mode)
- **SENSE:** Sense line with correction of up to 4 volts

Specifications

8504

Maximum Continuous Output Current: 60A_{RMS}
Surge Rating: 2X power at up to 400 V_P or 150A
Apparent Power Rating: Up to 5X continuous power rating at up to 400 V_P or 150A
Supply Voltage: Single-phase, 120V/208V/230V/240V*, 30A, 50/60 Hz
Dimensions (HxWxD): 5.25 x 19.0 x 25.26 in. (13.34 x 48.26 x 64.16 cm)
Weight: Approximately 84 lbs. (38.1 kg)

8508

Maximum Continuous Output Current: 120A_{RMS}
Surge Rating: 2X power at up to 400 V_P or 300A
Apparent Power Rating: Up to 5X continuous power rating at up to 400 V_P or 300A
Supply Voltage: Three-phase 208V ±10%, 30A, 50/60 Hz; 400V ±10%, 15A version available.
Dimensions (HxWxD): 36.5 x 21.0 x 30.75 in. (13.34 x 48.26 x 64.16 cm)
Weight: Approximately 290 lbs. (131.5 kg)

8512

Maximum Continuous Output Current: 180A_{RMS}
Surge Rating: 2X power at up to 400 V_P or 450A
Apparent Power Rating: Up to 5X continuous power rating at up to 400 V_P or 450A
Supply Voltage: Three-phase 208V ±10%, 30A, 50/60 Hz;

400V ±10%, 15A version available.
Dimensions (HxWxD): 36.5 x 21.0 x 30.75 inches (92.7 x 53.3 x 78.1 cm)
Weight: Approximately 370 lbs. (167.8 kg)

8516

Maximum Continuous Output Current: 240A_{RMS}
Surge Rating: 2X power at up to 400 V_P or 600A
Apparent Power Rating: Up to 5X continuous power rating at up to 600 V_P or 300A
Supply Voltage: Three-phase 208V ±10%, 60A, 50/60 Hz; 400V ±10%, 15A version available.
Dimensions (HxWxD): 36.5 x 21.0 x 30.75 inches (92.7 x 53.3 x 78.1 cm)
Weight: Approximately 460 lbs. (208.7 kg)

8520

Maximum Continuous Output Current: 300A_{RMS}
Surge Rating: 2X power at up to 400 V_P or 750A
Apparent Power Rating: Up to 5X continuous power rating at up to 400 V_P or 750A
Supply Voltage: Three-phase 208V ±10%, 60A, 50/60 Hz; 400V ±10%, 15A version available.
Dimensions (HxWxD): 36.5 x 21.0 x 30.75 inches (92.7 x 53.3 x 78.1 cm)
Weight: Approximately 540 lbs. (244.9 kg)

*Rated performance at 230V/240V, lower voltage potential at 208V, maximum continuous power limited to 2500W at 120V/30A. Contact AE Techron for details.

Common Data (all models)

Operating Modes: AC, DC and AC + DC
Frequency, AC Mode Output (-3 dB): DC - 50 kHz
Max Voltage Ranges (no load),
 AC: 0 - 277 V_{RMS}
 AC + DC: 0 - ±400 V_P
Load Regulation (full scale): <0.025%, DC to 100 Hz;
<0.05%, 100 Hz to 10 kHz
Line Regulation (full scale): <0.1% for 10% line change
External Sense: Voltage-drop compensation (up to ±4 V_P)
Harmonic Distortion (80 kHz, low-passed): Less than 0.3% from 10 Hz to 30 kHz; 0.5% up to 50 kHz
Harmonic Distortion (30 kHz, low-passed): Less than 0.1% from 10 Hz to 50 kHz
DC Offset: <10 mV
Distortion: <1.0%
Voltage Slew Rate: Load dependent; up to 60V per μs, typically 10 μs to 30 μs for 10% to 90% of full-scale change, depending on load and power

Efficiency: 85%, typical
Power Factor: .72, typical
Source Impedance: 3 mΩ + 3 μH
Cooling: Internal forced-air fans
Protection: Over/under voltage, over current, over temperature
Input, Signal In: BNC connector (unbalanced); terminal strip (balanced)
Output: High current connectors
Operating Environment,
 Temperature: 10°C to 50°C (50°F to 122°F);
 Maximum output power de-rated above 30°C (86°F)
 Humidity: 70% or less, non-condensing
 Atmospheric Pressure: 86 kPa (860 mbar) to 106 kPa (1,060 mbar)