7796

5-kVA, DC-enabled Linear Power Amplifier

Performance Overview:

AC Power (up to 20 kHz):	5000 watts RMS
Small Signal:	28V p-p to 250 kHz
For High-Power Applications to:	100 kHz
40 mS Pulse (0.5Ω):	210 Ap
Slew Rate:	>35 V/µs
Output Voltage:	±180 Vp
Output Impedance:	3.2 mΩ in series with 2.2 µH

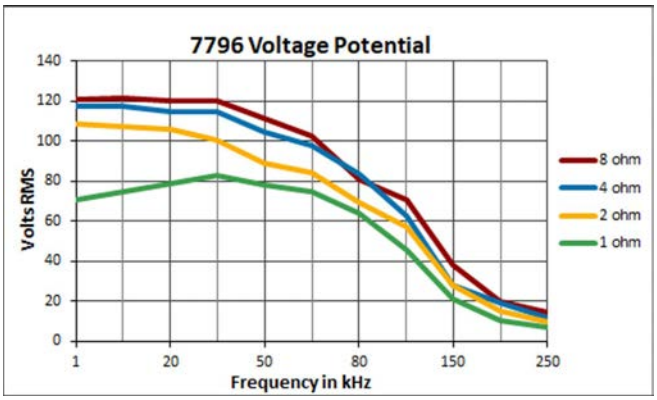
AE Techron's 7796 amplifier is a 5,000-VA, DC-enabled, four-quandrant amplifier designed to provide clean, reliable power for gradient coils in magnetic resonance imaging systems or in applications that require both significant short-term (burst) and long-term (continuous) power.

A single 7796 has an output capability of over 210 amperes peak at its rated voltage. If more current is needed, up to four amplifiers can be combined in parallel and operate as a single system for up to 800 Ap output. The 7796 also can be connected to form large, low-distortion, two- or three-phase power systems with voltages of up to 500V L-L and 300V L-N.

It is typically used as a gradient amplifier in small bore, high gain MRI systems of up to 200 Ap per axis and to reproduce waveforms found in EMC standards like MIL STD 1275, MIL STD 461 and DO160. It can also be used as a self-contained, general purpose amplifier or combined into systems for doing three-phase or high-current testing required in ANSI-T1-315-2001 or MIL-STD-704.

Features

- 30A continuous at 28V DC
- 200A in-rush current capability
- Stable when driving a wide range of resistive, inductive or capacitive loads
- Four-quadrant operation (source and sink)
- Continuous system output of over 650 Vp and 250 Ap are possible with multiple, interconnected amplifiers
- Field-selectable controlled-voltage or controlled-current modes of operation.
- Can be switched between rail supply modes to optimize for various load impedances
- Protection circuitry protects the amplifier from input overloads, improper output connection (including shorted and improper loads), over-temperature, over-current, and supply voltages that are too high or low.



Specifications

Performance

Testing performed at 208V/415V AC. 7796 amplifiers can operate from 400V AC ±10%. Since these amplifiers have an unregulated power supply, low line conditions may slightly affect the maximum voltage potential.

All testing was performed in Controlled-Voltage (CV) mode. Accuracy was measured when driven into a 10-ohm load with between 0.1V DC and 6V DC or between 0.2V AC and 5V AC presented at its inputs.

Frequency Response, DC–30 kHz (1 watt into 8 ohms): +0.1 to –0.5 dB

8-Ohm Power Response (continuous duty),
- **DC to 50 kHz:** ±150 Vpk
- **DC to 150 kHz:** ±50 Vpk
- **DC to 200 kHz :** ±25 Vpk

Maximum Continuous Output Power: 5000 watts RMS

Slew Rate: >35 V/µs

Phase Response (10 Hz - 10 kHz): ±8.3 degrees

Unit to Unit Phase Error: ±0.1 degrees at 60 Hz

Output Offset: <±200 µV

Output Offset Current: <10 mA, DC

Residual Noise, 10 Hz to 20 kHz: <250 µV (<0.25 mV)

THD (DC - 20 kHz): <0.2%

DC Drift,
- **From Cold to Maximum Operating Temperature:** <±400 µV
- **After 20 Minutes of Operation:** ±200 µV

Output Impedance: 3.2 mΩ in Series with 2.2 µH

Input Characteristics,
- **Balanced with ground:** Three terminal barrier-block connector, 20 kΩ differential
- **Unbalanced:** BNC connector, 10 kΩ single-ended

Gain,
- **Voltage Mode:** 20 volts/volt
- **Current Mode:** 20 amperes/volt

Gain Linearity (over input signal, from 0.2V to 5V),
- **DC:** 0.0125%
- **AC:** 0.030%

Max Input Voltage: ±10V, balanced or unbalanced

Input Impedance: 20 kΩ differential

Input Sensitivity: 3.0V input for 3800W output into 1 ohm, adjustable

Common Mode Rejection Range: ±11V DC maximum

Common Mode Rejection Ratio: Better than 70 dB

Status Display, Control, I/O

Front Panel LED Displays indicate: Ready, Standby, Fault

Soft Touch Switches for: Run, Stop, Reset

LCD Display: Can be configured for up to four simultaneous displays reporting one, two, or all four of the following: V_p, V_{RMS}, A_p, A_{RMS}. Also reports any fault conditions that occur and suggests corrective action.

Back Panel Power Connection: NEMA-style locking receptacle; matching AC connector also included

Signal Output: 4-position terminal barrier block (OUTPUT / COMMON / SAMPLED COMMON / CHASSIS GROUND); resistor installed between SAMPLED COMMON AND CHASSIS GROUND is a 2.7-ohm, 2W, 5%, metal-oxide resistor

Signal Input: User-selectable BNC or Barrier Strip, Balanced or Unbalanced

Interlock Connector: 25-pin D-sub connector used for amplifier control and status applications; also used in multi-amplifier applications

Communication Capabilities

Current Monitor: 20A/V ±1%; 10A/V ±1% (differential configuration)

Reporting: System Fault, Over Temp, Over Voltage, Over Load

Remote Control via Interlock Connector: Force to Standby, Reset after a Fault

Protection

Over/Under Voltage: ±10% from specified supply voltage amplifier is forced to Standby

Over Current: Breaker protection on both main power and low-voltage supplies

Over Temperature: Separate output transistor, heat sink, and transformer temperature monitoring and protection

Physical Characteristics

Chassis: The amplifier is designed for stand- alone or rack-mounted operation. The chassis is aluminum with a black powder-coat finish. The unit occupies seven EIA 19-inch-wide units.

Weight: 153 lbs (69 kg), Shipping 168 lbs (76.2 kg)

AC Power: Three-phase, 208V AC (±10%), 47-60 Hz, 30A AC service; (400V AC (±10%), 15A model available)

Operating 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

Cooling: Forced air cooling from front to back through removable filters via six 100ft3/min. fans. No space is required between rack-mounted amplifiers. Air filters are removeable from the rear via one fastener per side and may be eliminated if cabinet filtration is provided.

Dimensions: 19" x 22.8" x 12.25" (48.3 cm x 57.9 cm x 31.1 cm)

AC Output

	PEAK OUTPUT						RMS OUTPUT				
	40 mSec Pulse, 20% Duty Cycle		5 Minutes, 100% Duty Cycle		1 Hour, 100% Duty Cycle		5 Minutes, 100% Duty Cycle		1 Hour, 100% Duty Cycle		
Ohms	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Watts
Open	181	0	181	0	181	0	128	0	128	0	0
16	159	12	159	10	159	10	112	7	112	7	795
8	159	19	154	19	154	19	109	13	109	13	1463
4	158	39	152	38	152	38	107	27	107	27	2887
2	157	79	*	*	141	71	*	*	100	50	5004
1.5	148	99	*	*	*	*	*	*	*	*	*
1	140	140	*	*	71	71	*	*	50	50	2509
0.5	106	209	*	*	63	127	*	*	45	90	3999
0.25	53	209	*	*	*	*	*	*	*	*	*

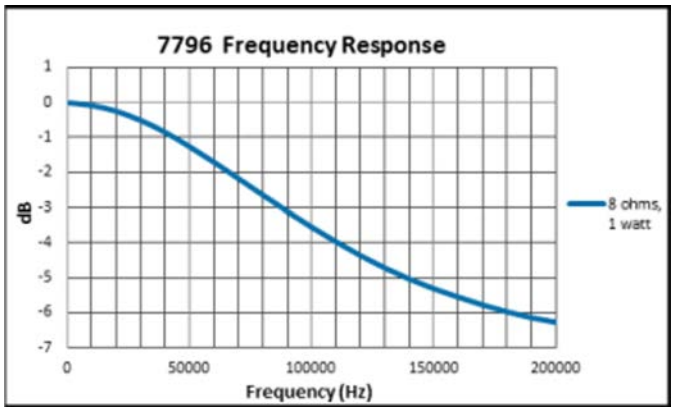
Note: Testing performed at 208V/415V AC into resistive loads as specified. 7796 acciracuy was measured when driven into a 10-ohm load with between 0.1V DC and 6V DC or between 0.2V AC and 5V AC presented at its inputs. Performance reported is typical into the specified load up to 20 kHz frequency levels. Performance may be affected when operating into highly reactive loads or above 20 kHz, reducing maximum voltage, current and power output. 7796 amplifiers can operate from 208V/400V AC ±10%. Since these amplifiers have an unregulated power supply, low line conditions may slightly affect the maximum voltage potential.

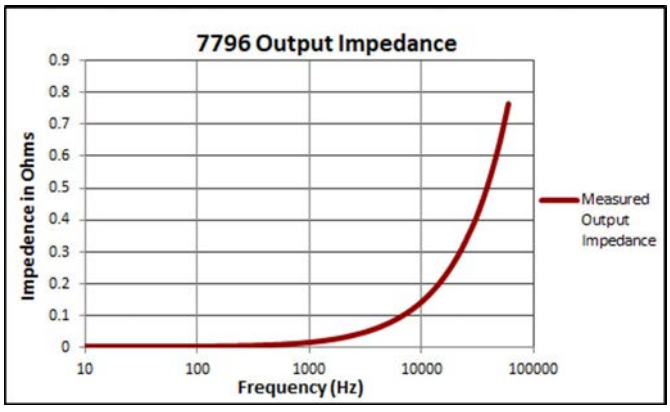
* Testing not performed.

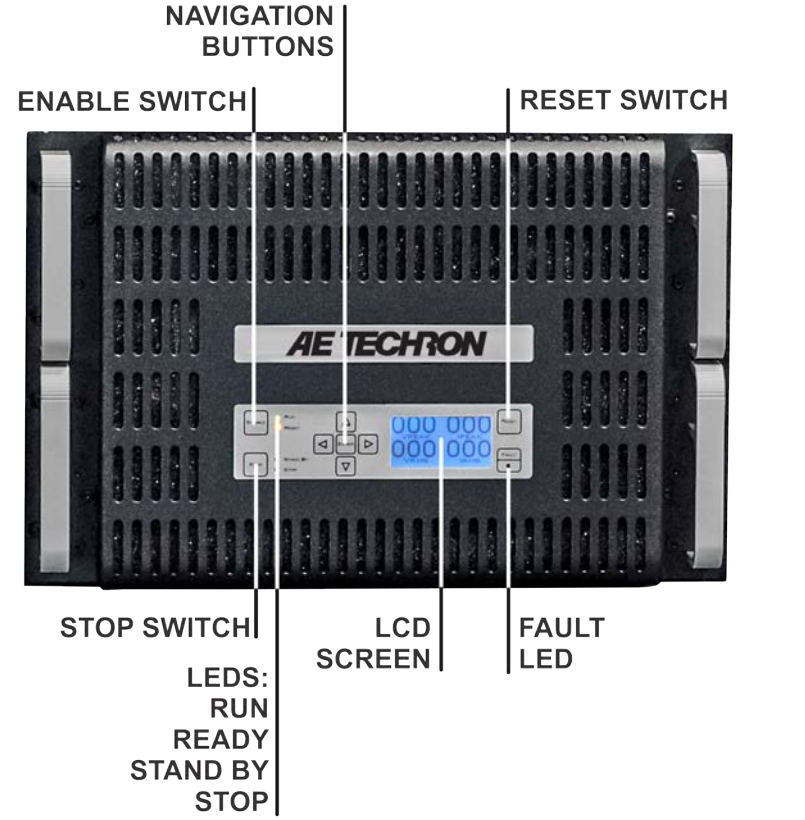
DC Output

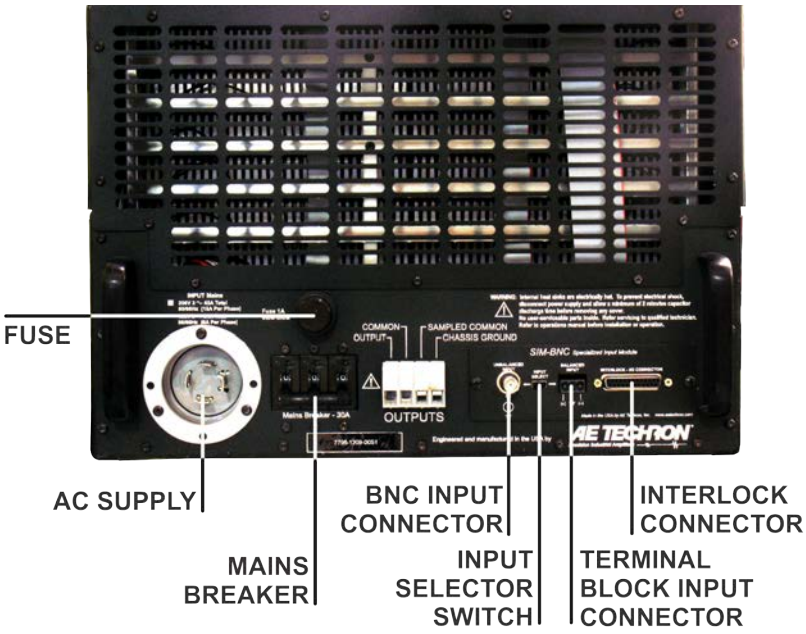
	OUTPUT (Amperes)	
VDC	10 Minutes, 100% Duty Cycle	1 Hour, 100% Duty Cycle
13.5	34	25
24	42	30
48	95	80

Performance









CE 400V versions of this product bear the CE mark

AE Techron Sales Representative