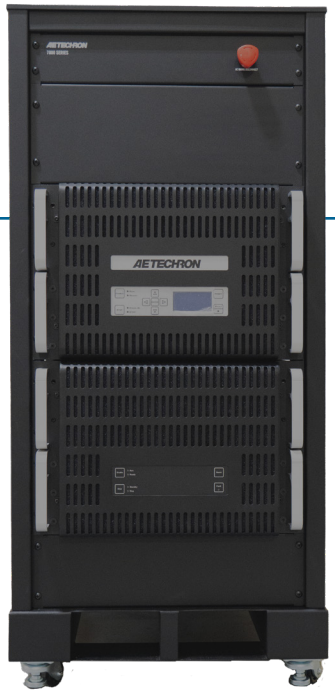
7810 Series

High-Power, High-Precision AC/DC Linear Power Amplifiers



Features

- Stable when driving a wide range of resistive, inductive or capacitive loads
- Four-quadrant operation (source and sink)
- Field-selectable controlled-voltage or controlled-current modes of operation
- 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

AE Techron's 7810 Series AC power amplifiers are durable, four-quadrant, DC-enabled, low-noise, wide-bandwidth amplifiers. This combination of features and capabilities makes them a great choice for a large number of research and industrial applications. 7810 series amplifiers are a great solution if bandwidth and/or system noise is a problem. They are able to drive low-impedance loads at frequencies of up to 60kHz. Because they utilize a linear circuit topology, AE Techron 7810 series amplifiers have no switching noise in their output and very low radiated EMI. This results in THD and noise floors that are much lower than what is possible with traditional switch mode amplifiers, making them ideal for applications that require either high precision or, because of sensitive measurements, cannot tolerate the radiated noise associated with switch mode amplifiers.

7810 series amplifiers are tough, both physically and electrically. 7810 series models have been used for conducting experiments on a Navy warship, controlling a magnetic field in a fusion experiment, and driving DUTs while absorbing back EMF when there is a failure.

The 7810 series is designed and built for applications where large surge currents or long duration power is needed. This makes them ideal for applications where power or duty cycle requirements are greater than is possible with consumer- or pro-audio-grade amplifiers. Because power ratings are continuous, AE Techron amplifiers often produce between 4 and 8 times more power than a similarly rated consumer amplifier.

Key Performance Capabilities:

Output Power:	**Up to 10 kVA continuous, 20 kVA short-term**
Current:	**Up to 200A continuous, 400A short-term**
Voltage:	**Up to ±350 Vp**
Bandwidth:	**DC to 60 kHz, ±3 dB**
Slew Rate:	**40 V/µs**
THD:	**Less than 0.25% (DC to 20 kHz)**
DC Drift:	**Less than ±400 µV (from room temperature to thermal shutdown)**

The 7810 Series consists of three amplifier models: 7810-50-200, 7810-100-100 and 7810-200-50.s Each model has been optimized for specific load impedances, from 0.1 ohm to 8 ohms. Customized versions can be ordered with special amplifier configurations and/or with extra rack space to install additional equipment. Contact us today; let us see if we can create a custom configuration specifically to meet your needs.

7810-50-200 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
4	98	26	98	26	97	26	69	18	69	18	1242
2	95	46	95	46	95	46	66	32	66	32	2112
1	88	88	88	88	88	88	60	60	60	60	3600
0.5	81	162	81	162	81	162	56	112	56	112	6272
0.25	72	288	72	288	72	288	50	200	50	200	10000
0.125	50	420	32	268	32	268	23	182	23	182	4186
0.0625	23	394	23	388	23	382	16	266	16	260	4160

Note: Testing performed into resistive loads as specified. 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.

7810-100-100 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
8	159	24	159	20	159	20	112	14	112	14	1568
4	159	38	154	38	154	38	109	26	109	26	2834
2	158	78	152	76	152	76	107	54	107	54	5778
1	157	158	*	*	141	142	*	*	100	100	10000
0.75	148	198	*	*	71	142	*	*	50	100	5000
0.5	140	280	*	*	71	142	*	*	50	100	5000
0.25	106	418	*	*	63	254	*	*	45	180	8100

* Testing not performed.

Note: Testing performed into resistive loads as specified. 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.

7810-200-50 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	362	0	362	0	362	0	256	0	256	0	0
32	318	12	318	10	318	10	224	7	224	7	1568
16	318	19	308	19	308	19	218	13	218	13	2834
8	316	39	304	38	304	38	214	27	214	27	5778
4	314	79	*	*	282	71	*	*	200	50	10000
3	296	99	*	*	*	*	*	*	*	*	*
2	280	140	*	*	142	71	*	*	100	50	5000
1	212	209	*	*	126	127	*	*	90	90	8100

* Testing not performed.

Note: Testing performed into resistive loads as specified. 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.

7810-50-200
Output Range: -95Vp to +95Vp
Output Current: 0A to 200A RMS continuous
Maximum Continuous Output Power: 10 kW RMS
Peak Current: 420A for 40 ms
Slew Rate: 40 V/µs
Supply Voltage: 3-phase 208V ±10%, 60A, 50/60 Hz; 400V, 30A version available
Dimensions (HxWxD): 40.1 x 22.6 x 31.6 in. (101.9 x 57.4 x 80.3 cm)
Weight: Approximately 380 lbs. (172 kg)

7810-100-100
Output Range: -180Vp to +180Vp
Output Current: 0A to 100A RMS continuous
Maximum Continuous Output Power: 10 kW RMS
Peak Current: 280A for 40 ms
Bandwidth (-3dB): DC to 60 kHz
Supply Voltage: 3-phase 208V ±10%, 60A, 50/60 Hz; 400V, 30A version available
Dimensions (HxWxD): 40.1 x 22.6 x 31.6 in. (101.9 x 57.4 x 80.3 cm)
Weight: Approximately 380 lbs. (172 kg)

7810-200-50
Output Range: -360Vp to +360Vp
Output Current: 0A to 50A RMS continuous
Maximum Continuous Output Power: 10 kW RMS
Peak Current: 200A for 40 ms
Slew Rate: 40 V/µs
Supply Voltage: 3-phase 208V ±10%, 60A, 50/60 Hz; 400V, 30A version available
Dimensions (HxWxD): 40.1 x 22.6 x 31.6 in. (101.9 x 57.4 x 80.3 cm)
Weight: Approximately 380 lbs. (172 kg)

Common Data (all models)

Performance
Testing performed at 208V/415V AC. 7800 series 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.

Bandwidth (-3dB): DC to 60 kHz
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): <0.25%
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: Unbalanced BNC connector, 10 kΩ single-ended
Gain,
- **Voltage Mode:** 40 volts/volt
- **Current Mode**: 40 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: Barrier strip
Signal Output: Back-panel high-current connectors
Signal Input: Back-panel unbalanced BNC

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

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: Black powder-coated heavy-duty steel frame and panels
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 filters via six 100ft3/min. fans.

CE 400V versions of this product bear the CE mark