AE TECHRON®
Precision Industrial Amplifiers

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7224 SPECIFICATION SHEET

The *AE Techron* ***7224*** amplifier is a 1 kVA, DC-enabled unit that provides exceptional versatility and value. It features DC to 300 kHz bandwidth and offers a wide range of field-configurable options. A single 7224 can output a 40 mSec pulse with up to 52 amperes peak current. In continuous operation, a 7224 can provide 1,100 watts RMS of output power. If more current or power is needed, up to four amplifiers can be combined in series or parallel and operate as a single system.

The 7224 can operate in either voltage or current mode and can be configured by the customer for high-voltage/low-current, medium voltage and current, or low-voltage/high-current applications. It provides very low noise and fast slew rates, and can safely drive a wide range of resistive, inductive loads.

The 7224 is typically used to create waveforms found in EMC standards like CS2009, DO-160, MIL STD 461, and as a gradient amplifier for very small bore, high-gain MRI and NMR systems.

Performance

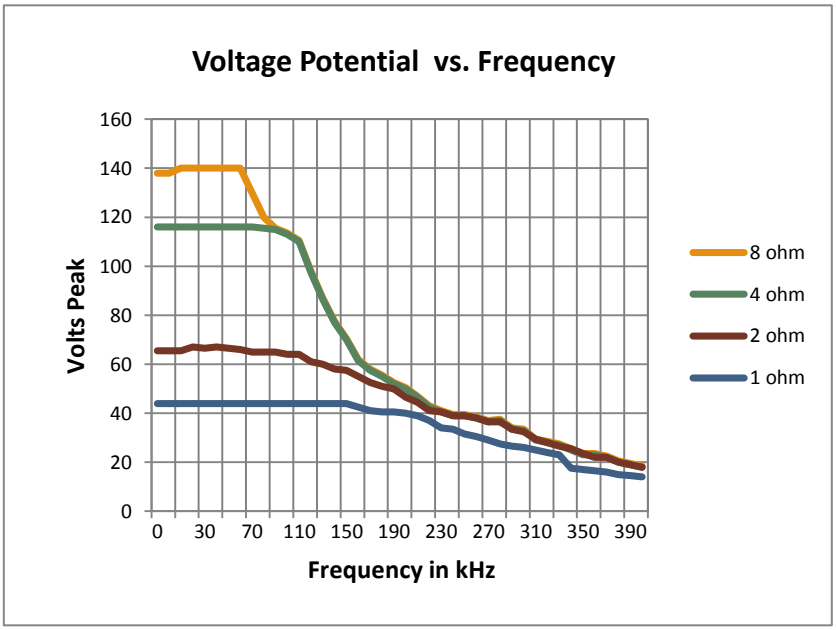
Testing was done at 100 Hz. Continuous DC power levels are lower. See DC Specifications chart.

7224P accuracy was measured when driven into a 10-ohm load with between 0.1VDC and 6VDC or between 0.2VAC and 5VAC presented at its inputs.

Small Signal Frequency Response:
DC - 300 kHz +0.0 to -1.0 dB

Features

- Frequency bandwidth of DC to 300 kHz at rated power.
- Continuous output of over 1,100 watts RMS at 4 ohms.
- 40 mSec pulses of up to 52 amperes peak into a 0.5 ohm load.
- System output of over 4,000 watts or over 200 amperes maximum is possible with multiple, interconnected amplifiers.
- Efficient design and light weight chassis materials allow amplifier to occupy only 2U height and weigh only 41 lbs.
- Protection circuitry protects the *AE Techron 7224* from input overloads, improper output connection (including shorted and improper loads), over-temperature, over-current, and supply voltages that are too high or low.
- 7224 with “P” option offers precision control of output offset, DC drift and gain linearity.
- Shipped ready to operate from 120-volt (±10%) single-phase AC mains; 220/240-volt model available on request.



AC Specifications - *High Voltage Mode*

	PEAK OUTPUT						RMS OUTPUT				
	40mSec Pulse, 20% Duty Cycle		5 Minute, 100% Duty Cycle		1 Hour, 100% Duty Cycle		5 Minute, 100% Duty Cycle		1 Hour, 100% Duty Cycle		
Ohms	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Watts
16	158	10	158	10	158	10	112	7	112	7	774
8	154	19	136	16	136	16	96	12	96	12	1108
4	124	31	108	26	61	15	76	18	43	10	442
2	98	49									

AC Specifications - *Mid-Level Mode*

	PEAK OUTPUT						RMS OUTPUT				
	40mSec Pulse, 20% Duty Cycle		5 Minute, 100% Duty Cycle		1 Hour, 100% Duty Cycle		5 Minute, 100% Duty Cycle		1 Hour, 100% Duty Cycle		
Ohms	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Watts
4	72	18	69	16	69	16	49	12	49	12	566
2	61	30	57	26	57	26	40	19	40	19	746
1	47	47	43	40	21	21	30	28	15	15	220
0.5	26	52									

AC Specifications - *High Current Mode*

	PEAK OUTPUT						RMS OUTPUT				
	40mSec Pulse, 20% Duty Cycle		5 Minute, 100% Duty Cycle		1 Hour, 100% Duty Cycle		5 Minute, 100% Duty Cycle		1 Hour, 100% Duty Cycle		
Ohms	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Watts
1			29	29	29	29	21	21	21	21	420
0.75			26	34	26	34	18	24	18	24	442
0.5			23	45	23	45	16	32	16	32	511
0.25											

8-Ohm Power Response:
± 140 Vpk DC to 60 kHz
± 50 Vpk DC to 180 kHz
± 30 Vpk DC to 300 kHz

Slew Rate:
75 V/µSec

Residual Noise:
10 Hz to 300 kHz: 950 µV (0.95 mV)
10 Hz to 80 kHz: 300 µV (0.3 mV)

Signal-to-Noise Ratio:
10 Hz - 30 kHz: –113 dB
10 Hz - 80 kHz: –106.6 dB
10 Hz - 300 kHz: –99.9 dB

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

THD:
DC - 30 kHz less than 0.1%

Output Offset:
7724: Less than ±5 mV
7224P: Less than ±400 µV

DC Drift:
7224: <±1.5 mV
7224P: <±200 µV
(after 20 minutes of operation)

Output Impedance:
28 mOhm in Series with 1 µH

DC Specifications

Low Voltage High Current	5 Min	1 Hr
Volts DC	Amps DC	Amps DC
24.0	26	20
13.5	20	16

Phase Response:
± 5 degrees (10 Hz - 10 kHz) plus 560 nsec propagation delay

Input Characteristics

Balanced with ground:
Three terminal barrier block connector 20 k ohm differential

Unbalanced:
BNC connector, 10k ohm single ended. Fixed or variable gain

Gain:
Voltage Mode: 20 volts/volt
Current Mode: 5 amperes/volt

Gain Linearity (over input signal, from 0.2V to 5V):
7224: 0.15%
7224P: 0.02% (DC); 0.05% (AC)

Max Input Voltage:
± 10 V balanced or unbalanced

Common Mode Rejection:
-58 dB with 5 V input

Display, Control, Status, I/O

Front Panel LED Displays indicate:
Ready, Standby, Fault, Over Temp, Over Voltage, Overload

Soft Touch Switches for:
Run, Stop, Reset

Gain Control, when enabled:
Voltage gain adjustable from 20 to 0

On/Off Breaker

Back Panel Power Connection:
25 Amp IEC (with retention latch)

Signal Output:
+/Common/Sampled Common

Signal Input:
User Selectable BNC or Barrier Strip Balanced

Communication Capabilities

Current Monitor: ± 1 V / 5 A ± 1%

Voltage Monitor: ± 1 V / 1 V ± 1%

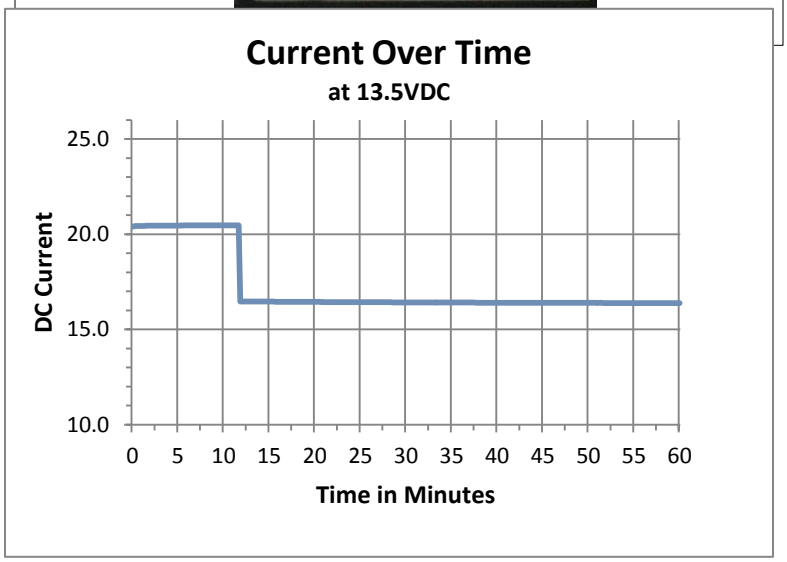
Reporting:
System Fault, Over Temp, Over Voltage, Over Load

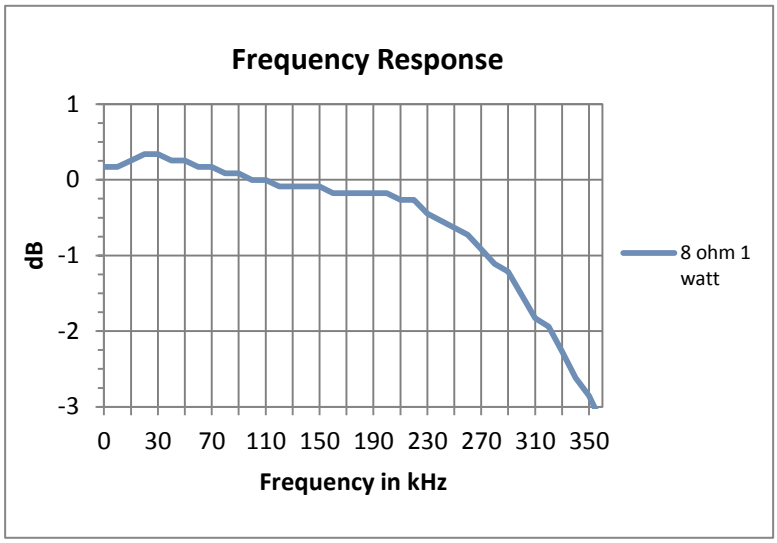
Control:
Force to Standby, Reset after a fault

Multiple Unit Configuration

Series Operation:
Total Voltage (1, 2, 3, or 4-7224's):
150 V_{pk}, 300 V_{pk}, 450 V_{pk} or 600 V_{pk};
Increased slew rate up to 200 V/µSec

Parallel Operation:
Total Current (1, 2, 3, or 4-7224's):
50 A_{pk}, 100 A_{pk}, 150 A_{pk} or 200 A_{pk}





Physical Characteristics

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

Weight:
41 lbs (18.6 kg), Shipping 51 lbs (23.2 kg)

AC Power:
Single phase, 120 VAC, 60 Hz, 20 Amp service; (220-240 VAC, 50-60 Hz, 10 Amp service 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.

Airflow:
180CFM

Dimensions:
19” x 22.75” x 3.5” (48.3 cm x 57.8 cm x 8.9 cm)

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

Two 7224s in Series

High Voltage Low Current

	5 Min, 30% duty Cycle		1 Hr, 100% duty Cycle	
Ohms	Volts Peak	Amps Peak	Volts Peak	Amps Peak
32	316	9.8	316	9.8
16	272	16.3	272	16.3
8	216	25.7	122	14.5

Medium Voltage Medium Current

	5 Min, 30% duty Cycle		1 Hr, 100% duty Cycle	
Ohms	Volts Peak	Amps Peak	Volts Peak	Amps Peak
8	138	16.4	138	16.4
4	114	26.2	114	26.2
2	86	39.6	42	21

Low Voltage High Current

	5 Min, 30% duty Cycle		1 Hr, 100% duty Cycle	
Ohms	Volts Peak	Amps Peak	Volts Peak	Amps Peak
2	58	29	58	29
1.5	52	34	52	34
1	45.4	45	45.4	45

Two 7224s in Parallel

High Voltage Low Current

	5 Min, 30% duty Cycle		1 Hr, 100% duty Cycle	
Ohms	Volts Peak	Amps Peak	Volts Peak	Amps Peak
8	158	19.6	158	19.6
4	136	16.3	136	16.3
2	108	25.7	61	14.5

Medium Voltage Medium Current

	5 Min, 30% duty Cycle		1 Hr, 100% duty Cycle	
Ohms	Volts Peak	Amps Peak	Volts Peak	Amps Peak
2	69	32.8	69	32.8
1	57	54.2	57	52.4
0.5	43	79.2	21	42

Low Voltage High Current

	5 Min, 30% duty Cycle		1 Hr, 100% duty Cycle	
Ohms	Volts Peak	Amps Peak	Volts Peak	Amps Peak
0.5	29	58	29	58
0.375	26	68	26	68
0.25	22.7	90	22.7	90

AE Techron Sales Representative