



7212

0.44-kVA Power Amplifier for Power Grid Simulation

Performance Overview:

Continuous Output (4Ω):	430 watts RMS
Frequency Bandwidth:	DC to 250 kHz
For High-Power	
Applications to:	100 kHz
40 mS Pulse (1.0Ω):	30 Ap
Slew Rate:	50 V/μs
Output Voltage:	Up to 113 V _{RMS} at 4A
Output Impedance:	28mΩ in series with 1μH

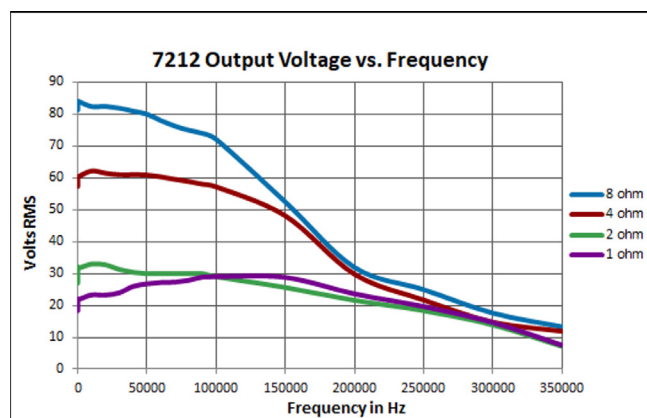
Features

- **Phase Stability:** DC - 250 kHz bandwidth design minimizes phase shift of system output when reproducing the most rapid fault events
- **Low Noise:** Noise floor of only 300 μV
- **User-selectable controlled-voltage or controlled-current modes of operation**
- **Can be field-configured for high-voltage/low current, medium voltage and current, or low-voltage/high-current applications**
- **System output of over 1,700 watts is possible with multiple, interconnected amplifiers**
- **Efficient design and light-weight chassis materials allow amplifier to occupy only 2U height and weigh only 35 lbs**
- **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.**
- **Backed by AE Techron's comprehensive, 3-year, no-fault warranty.**

AE Techron's **7212** is a four-quadrant, 0.44 kVA, DC-enabled power amplifier that was created to meet the exacting requirements of the power utility industry. It features a DC to 250 kHz bandwidth, low noise floor, fast slew rate and a 113 V_{RMS} potential. The 7212 can be combined to form a 3-phase Y voltage source, and has a wide range of field-configurable options.

A single 7212 can output a 40 ms pulse with up to 30 amperes peak current. In continuous operation, a 7212 can provide 440 watts RMS of output power. If more voltage is needed, up to four amplifiers can be combined in series and operate as a single system.

The 7212 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 or inductive loads.



Specifications

Performance

AC testing was performed at 1 kHz.

Frequency Response, DC–100 kHz (1 watt): +0.0 to -3.0 dB

8-Ohm Power Response (continuous duty),

DC to 60 kHz: ± 140 Vpk

DC to 100 kHz: ± 50 Vpk

Slew Rate: 50 V/ μ Sec

Residual Noise,

10 Hz to 300 kHz: 950 μ V (0.95 mV)

10 Hz to 80 kHz: 300 μ V (0.3 mV)

Signal-to-Noise Ratio,

10 Hz - 30 kHz: -113 dB

10 Hz - 80 kHz: -106.6 dB

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

THD (DC - 30 kHz): <0.1%

Output Offset: $<\pm 5$ mV, field adjustable to less than 1 mV

DC Drift: $<\pm 1.5$ mV

Output Impedance: 5.3 mOhm in Series with 0.95 μ H

Phase Response (10 Hz - 10 kHz):

± 5 degrees plus 560 nsec propagation delay

Input Characteristics

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

Unbalanced: BNC connector, 10k ohm single ended

Gain (variable or fixed):

Voltage Mode: 20 volts/volt

Current Mode: 5 amperes/volt

Gain Linearity (over input signal, from 0.2V to 5V): 0.15%

Max Input Voltage: ± 10 V, balanced or unbalanced

Input Impedance: 20k ohm differential

Common Mode Rejection: -58 dB with 5V 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:

Three-position terminal strip (OUTPUT/COM/CHASSIS GROUND); resistor between COM and CHASSIS GROUND terminals is a 2.7-ohm, 2W, 5%, metal-oxide resistor

Signal Input:

User-selectable BNC or Barrier Strip, Balanced or Unbalanced

Communication Capabilities

Current Monitor:

5A/V $\pm 1\%$; 2.5A/V $\pm 1\%$ (differential configuration)

Reporting:

System Fault, Over Temp, Over Voltage, Over Load

Remote Control via Interlock Connector:

Force to Standby, Reset after a Fault

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: 35 lbs (15.9 kg), Shipping 45 lbs (20.4 kg)

AC Power:

Single phase, 120 VAC, 60 Hz, 20A service;
(220-240 VAC, 50-60 Hz, 10A 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 in. x 22.75 in. x 3.5 in.

(48.3 cm x 57.8 cm x 8.9 cm)

Protection

Over/Under Voltage:

$\pm 10\%$ 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

AC Specifications – High-Voltage Mode

Ohms	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		
	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Watts
32	166	5.1	161	5	161	5	113	3.6	113	3.6	407
16	147	9	146	9	120	7.4	102	6.3	85	5.2	442
8	123	15	99	12	68	8.5	69	8.5	48	6	288
4	95	23.1	*	*	*	*	*	*	*	*	*

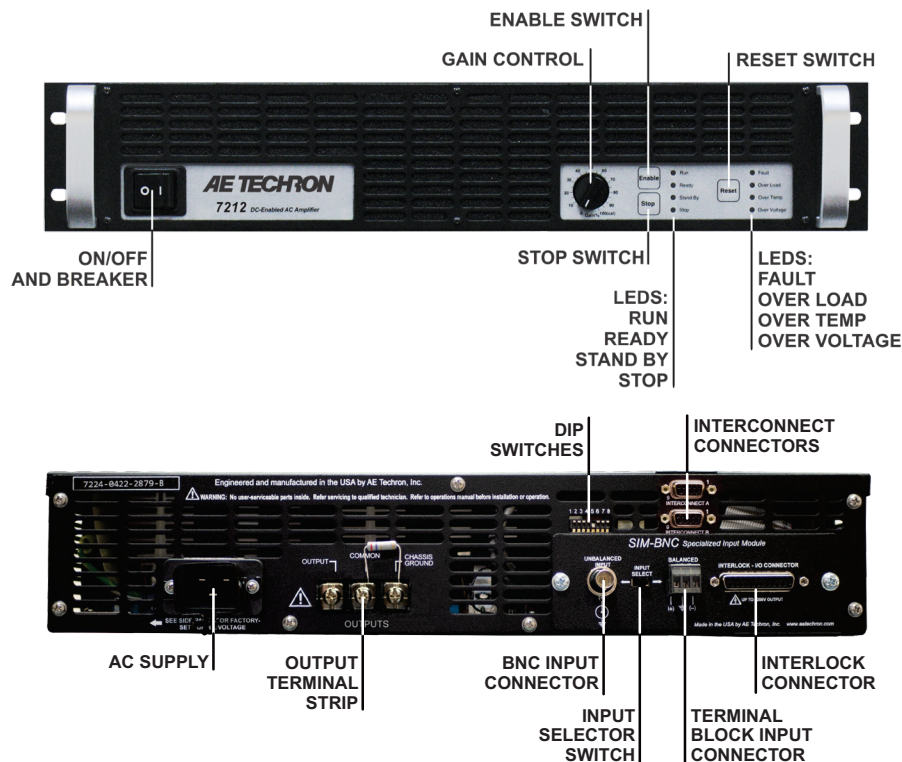
AC Specifications – Mid-Level Mode

Ohms	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		
	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Watts
8	72	8.8	71	8.8	71	8.8	50	6.2	50	6.2	313
4	62	14.8	60	14.8	59	14.6	42	10.5	42	10.3	432
2	48	22.7	42	21.2	30	14.1	30	15	20	10	200
1	32	30	*	*	*	*	*	*	*	*	*

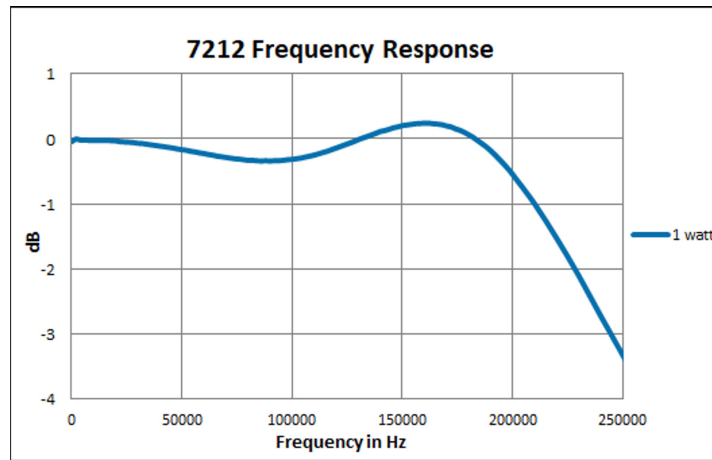
AC Specifications – High-Current Mode

Ohms	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		
	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Watts
2	30	14.9	30	14.9	30	14.9	21	10.5	21	10.5	225
1.5	27	17.6	27	17.7	27	17.7	19	12.5	19	12.4	236
1	24	22.6	24	22.6	24	22.6	17	16	17	16	272

*Not tested.



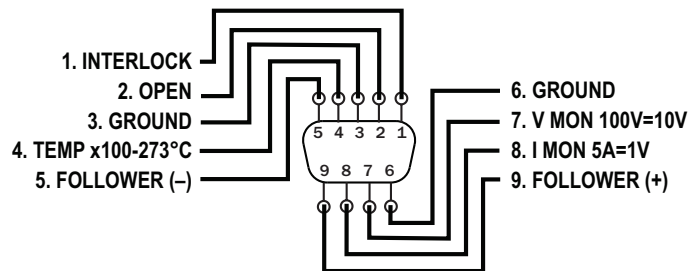
FREQUENCY PERFORMANCE



CONFIGURATION SETTINGS

PINOUTS FOR INTERCONNECT PORTS (A & B)

Model 7212



DIP SWITCH SETTINGS

Model 7212

1 2 3 4 5 6 7 8



DEFAULT DIP SWITCH
SETTINGS SHOWN

DIP SWITCH SETTINGS

- 1 OPERATION (CV / CC)
- 2 COMPENSATION (CC1 / CC2)
- 3 LOW PASS FILTER
- 4 GAIN (20 / 6)
- 5 ELECTRONIC GAIN MATCHING
- 6 MASTER / FOLLOWER
- 7 VOLTAGE INPUT (LOW / HIGH)
- 8 DC / AC COUPLING

UP

- CV**
CC1
OFF
20
ON
MASTER
LOW
DC

DOWN

- CC
CC2
ON
6
OFF
FOLLOWER
HIGH
AC

- Controlled-voltage or controlled-current operation
- Compensation network (for controlled-current operation)
- Enable 50 kHz low-pass filter
- Gain selection (20 / 6)
- Enable electronic gain matching (for parallel multi-amp operation)
- Multi-amp configuration
- Low (line-level) input or high input (up to 180V)
- DC enable or DC block

RED = FACTORY DEFAULT

CE 230V versions of this
product bear the CE mark

AE Techron Sales Representative