



## 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 <sub>RMS</sub> at 4A
Output Impedance:	28mΩ in series with 1μH

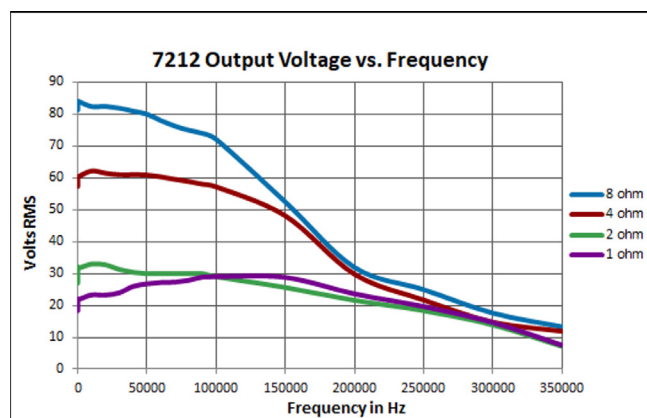
#### Features

- **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<sub>RMS</sub> 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:  $\pm 140$  Vpk

DC to 100 kHz:  $\pm 50$  Vpk

**Slew Rate**: 50 V/ $\mu$ Sec

**Residual Noise**,

10 Hz to 300 kHz: 950  $\mu$ V (0.95 mV)

10 Hz to 80 kHz: 300  $\mu$ 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**:  $\pm 0.1$  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  $\mu$ H

**Phase Response** (10 Hz - 10 kHz):

$\pm 5$  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**:  $\pm 10$ 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	*	*	*	*	*	*	*	*	*

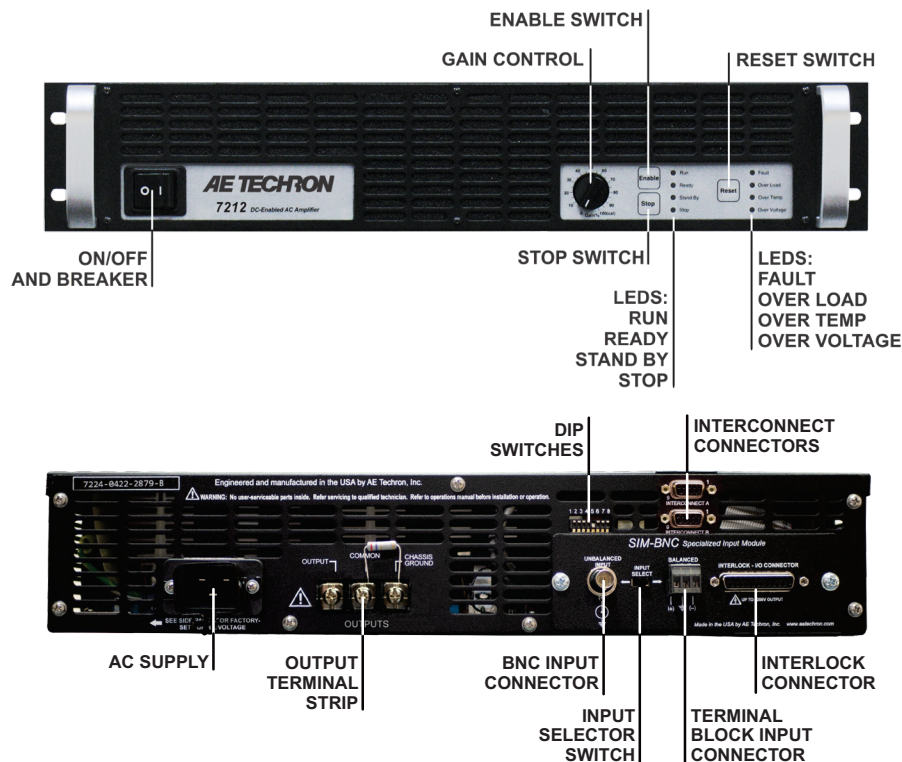
### AC Specifications – Mid-Level Mode

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	*	*	*	*	*	*	*	*	*

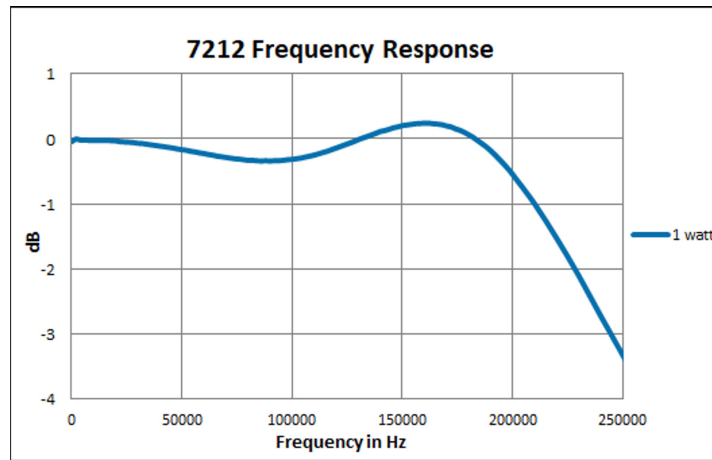
### AC Specifications – High-Current Mode

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.



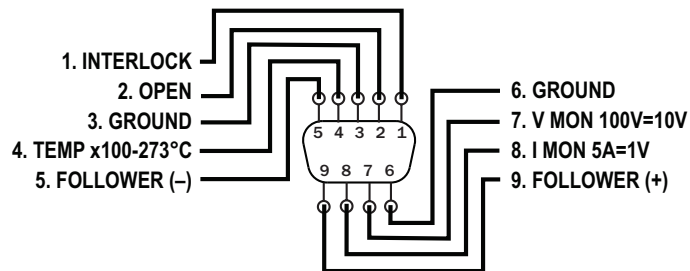
## FREQUENCY PERFORMANCE



## 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*