



7224RLY

Four-Quadrant Power Amplifier
for Protection Relay Production
Testing and Commissioning

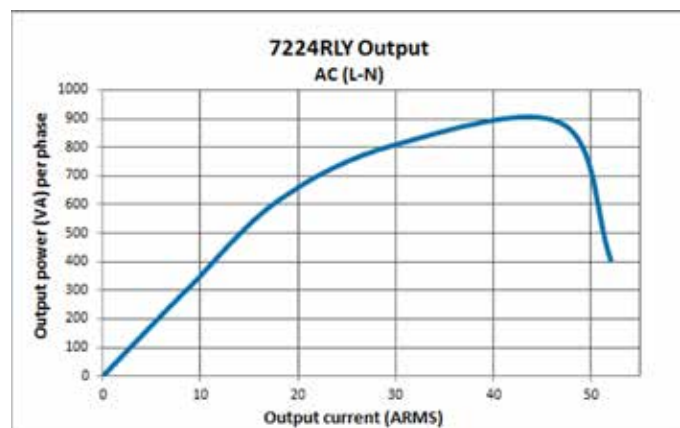
Performance Overview:

Maximum Current Output (0.5Ω):	50 Ap (35 ARMS)
Maximum Output Voltage:	158 Vp
Controlled-Current Bandwidth (0.25Ω load):	DC to 10 kHz
Standard Transconductance (from short to 1Ω load):	20 ±0.2%
Unit to Unit Phase Error (60 Hz):	±0.1°
Residual Noise (40 Hz to 600 Hz):	<2.5 mAp

AE Techron's **7224RLY** is a four-quadrant, DC-enabled power amplifier that was created to meet the exacting requirements of the power utility industry. Capable of outputting a 40 mSec pulse with up to 52 amperes peak current, the 7224RLY is powerful enough to put protection relays, fuses and other critical components through a full range of tests. The low noise floor, low distortion and minimal phase error of the 7224RLY make it the ideal amplifier for power grid modeling.

Features:

- High compliance voltage allows the 7224RLY to drive electromechanical relays directly
- Maintains phase accuracy for any load from a dead short to 2 ohms
- Front panel indicators for rapid assessment of amplifier status
- Installs in just 2U of a standard 19-inch rack; or stands alone for bench-top operation.
- Shipped ready to operate from single-phase, 120VAC (±10%) 60 Hz, 20A service. 220/240VAC, 50/60Hz, 10A model available on request.
- Protection circuitry protects 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.



Specifications

Performance

*All loads from 8-ohm to short are stable with 2 mH in series.

Controlled-Current Bandwidth (0.25Ω load): DC to 10 kHz

Maximum Output Current (0.5Ω load): 35A RMS (50 Ap)

Maximum Output Voltage: 158 Vp

Maximum Output Power: Dependent on load and frequency

Load Constraint for Maximum Output: 0.5Ω + 200 mH*

Output Offset Current: Less than 10.0 mA DC peak

Standard Transconductance (from short to 1Ω load): 20 ±0.2%

Common Mode Rejection Ratio (40 to 600 Hz):
-58 dB minimum

Unit-to-Unit Phase Error (60 Hz): ±0.1 degrees

Residual Noise (40 to 600 Hz): Less than 2.5 mA peak

Input-to-Output Phase Delay: -0.2 degrees

Out Accuracy: Less than ±1%

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

Max Input Voltage: ±10V, balanced or unbalanced

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 ± 1%; 2.5A/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 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, 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 (HxWxD): 3.5 in. x 19 in. x 22.75 in.
(8.9 cm x 48.3 cm x 57.8 cm)

Please note that the handles are not to be used for carrying the amplifier and only lift the device using a two-person technique.

Pulse/Burst Specifications

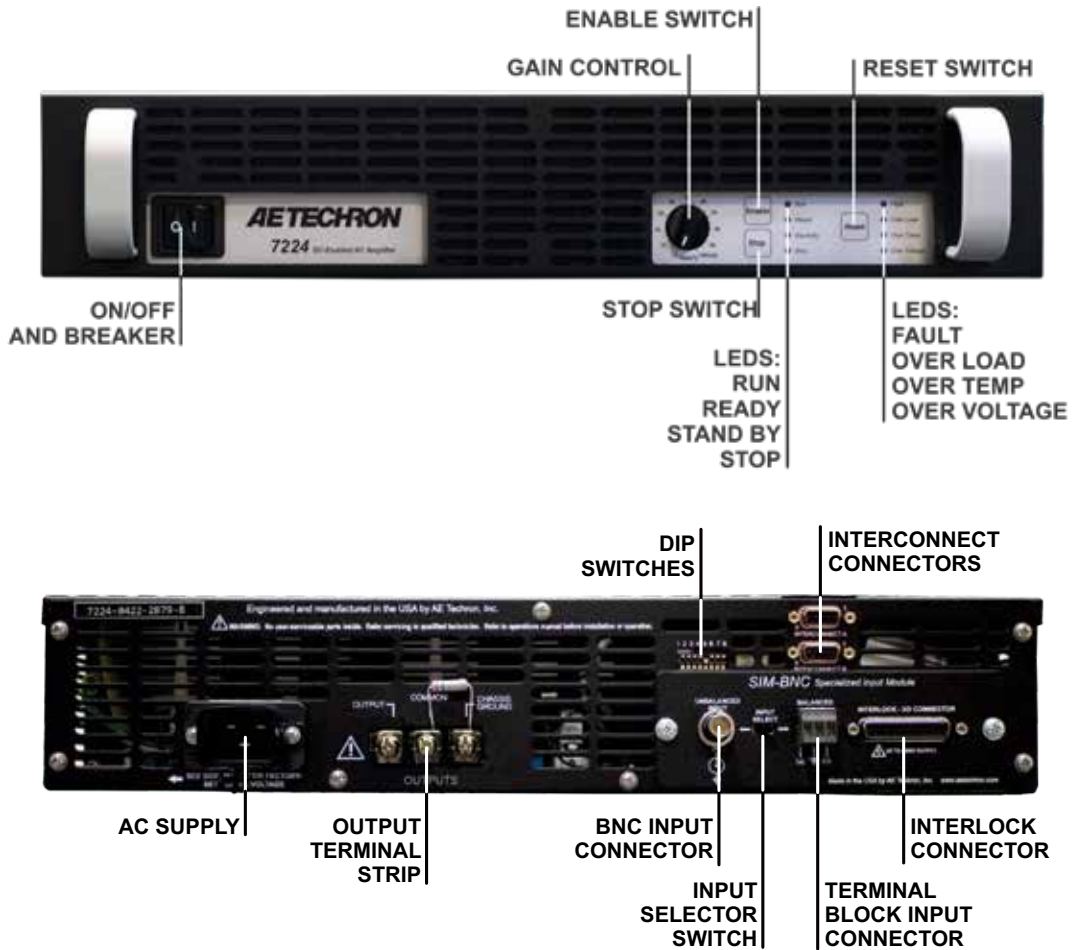
TOTAL LOAD	DURATION	WAVEFORM	OUTPUT POWER
1.0 ohms	5 minutes	60 Hz Sine	28A RMS / 40A peak
		DC	20A peak
	20 seconds	60 Hz Sine	30A RMS / 43A peak
		DC	20A peak
	0.2 seconds	60 Hz Sine	33A RMS / 47A peak
		DC	30A peak

NOTE: Testing performed in mid-level mode using 40 ms pulses with a 30% duty cycle..

Accuracy

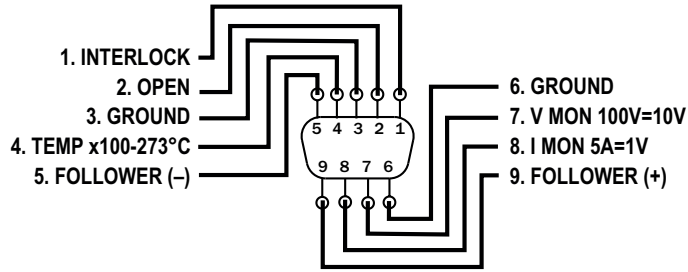
Amplitude vs. Frequency at 1V input, 20A output, amplifier transconductance set to 20:			
Load	Input Signal	Transconductance	
		1 kHz	100 Hz
2 ohms	Sine	19.9	20
1 ohm	Sine	20	20
0.5 ohm	Sine	20	20
Short*	Sine	20	20

*Unimpeded wire.

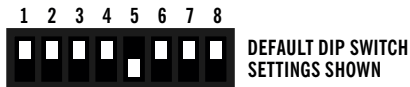


CONFIGURATION SETTINGS

PINOUTS FOR INTERCONNECT PORTS (A & B) Models 7224 and 7234



DIP SWITCH SETTINGS Models 7224 and 7234



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