



7796RLY

Four Quadrant Power Amplifier for Protection Relay Production Testing and Commissioning

Performance Overview:

Maximum Current Output (0.5Ω): 200 Ap (141 A_{RMS})

Maximum Output Voltage: 183 Vp

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

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

Unit to Unit Phase Error (60 Hz): ±0.1°

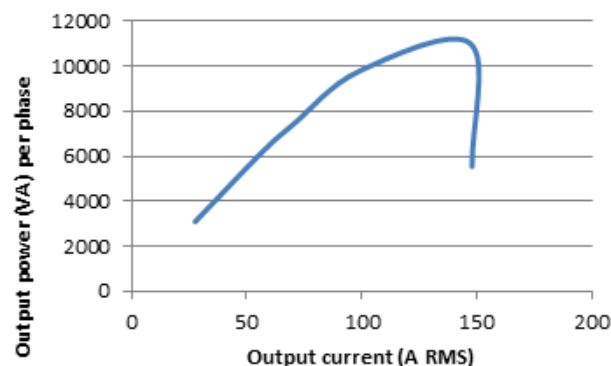
Residual Noise (40 Hz - 600 Hz): <2.5 mAp

THD+Noise
(600 Hz at full output power): <0.10%

AE Techron's 7796RLY amplifier was created to meet the demanding requirements of the power utility industry. With an output capability of 200 Ap, the 7796RLY is powerful enough to put protection relays, fuses and other critical components through a full range of tests. It is capable of a controlled voltage bandwidth of DC - 100 kHz, and a controlled current bandwidth of DC - 10 kHz. The low noise floor, low distortion and minimal phase error of the 7796RLY make it the ideal amplifier for power grid modeling.

Features

- High compliance voltage allows the 7796RLY to drive electromechanical relays directly.
- Maintains phase accuracy for any load from a dead short to 0.25 ohms.
- Front panel indicators for rapid assessment of amplifier status.
- Installs in a standard 19-inch rack; or stands alone for bench-top operation.
- Shipped ready to operate from three-phase, 208VAC (±10%), 47-60 Hz, 30A service. 400VAC (±5%) 15A 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

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

Maximum Output Current (0.19-ohm load): 141 A_{RMS} (200 Ap)

Maximum Output Voltage: 183 Vp

Maximum Output Power: Dependent on load and frequency

Load Constraint for Maximum Output: $0.19\Omega + 200\text{ mH}$
Output Offset Current: Less than 10.0 mA DC peak
Standard Transconductance (from short to 1-ohm load): 20 $\pm 0.2\%$

Unit to Unit Phase Error (60 Hz): ± 0.1 degrees
Residual Noise (40 Hz to 600 Hz): Less than 2.5 mAp
THD+Noise (600 Hz at full output power): Less than 0.10%

Input Characteristics,

Input Characteristics

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

Unbalanced: BNC connector, 10 k Ω single-ended

Max Input Voltage: $\pm 10\text{V}$, balanced or unbalanced

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

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: NEMA-style locking receptacle; matching AC connector also included

Signal Output: 4-position terminal barrier block (OUTPUT / COMMON / SAMPLED COMMON / CHASSIS GROUND); resistor installed between SAMPLED COMMON AND CHASSIS GROUND is a 2.7-ohm, 2W, 5%, metal-oxide resistor

Signal Input: User-selectable BNC or Barrier Strip, Balanced or Unbalanced

Interlock Connector: 25-pin D-sub connector used for amplifier control and status applications; also used in multi-amplifier applications

Communication Capabilities

Current Monitor: 20A/V $\pm 1\%$; 10A/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

Protection

Over/Under Voltage: $\pm 10\%$ ($\pm 5\%$ for 400VAC version) 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 aluminum with a black powder-coat finish. The unit occupies seven EIA 19-inch-wide units.

Weight: 160 lbs (72.5 kg), Shipping 175 lbs (79.4kg)

AC Power: Three-phase, 208V AC ($\pm 10\%$), 47-60 Hz, 30A AC service; (400V AC ($\pm 10\%$), 15A 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 via six 100ft³/min. fans. No space is required between rack-mounted amplifiers. Air filters are removable from the rear via one fastener per side and may be eliminated if cabinet filtration is provided.

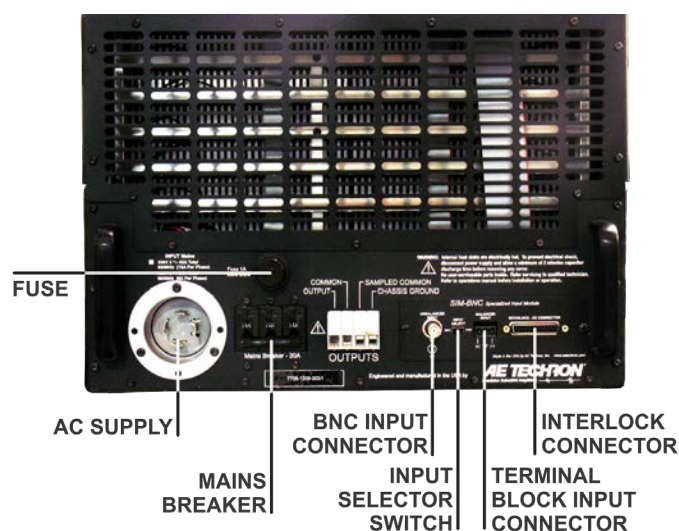
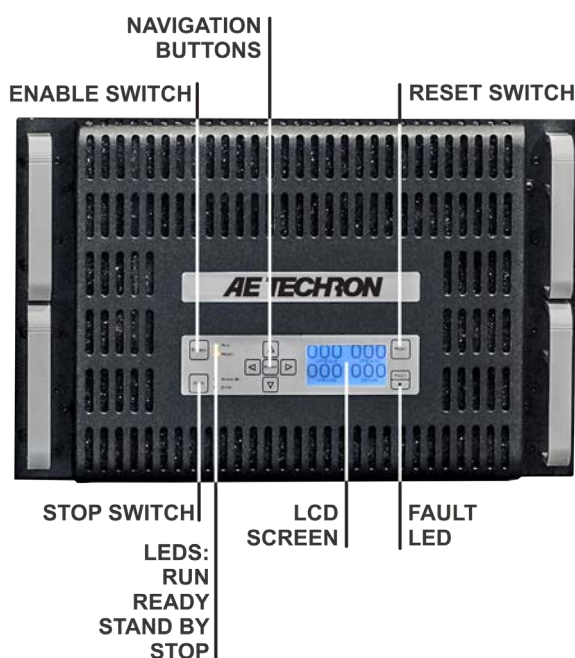
Dimensions (HxWxD): 12.25" x 19" x 22.8" (31.1 cm x 48.3 cm x 57.9 cm)

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
½ ohm	Sine	20	20
Short (unimpeded wire)	Sine	20	20

Pulse/Burst Specifications

Load	Duration	Waveform	Output Power
0.19 ohm	1 minute	60 Hz Sine	125 Arms / 176 Apeak
		DC	60 Apeak
	0.5 second	60 Hz Sine	141 Arms / 200 Apeak
		DC	188 Apeak
	0.2 second	60 Hz Sine	141 Arms / 200 Apeak
		DC	188 Apeak
0.53 ohm	1 minute	60 Hz Sine	91 Arms / 128 Apeak
		DC	100 Apeak
	0.5 second	60 Hz Sine	137 Arms / 193 Apeak
		DC	181 Apeak
	0.2 second	60 Hz Sine	139 Arms / 196 Apeak
		DC	164 Apeak
1.07 ohm	1 minute	60 Hz Sine	75 Arms / 107 Apeak
		DC	66 Apeak
	0.5 second	60 Hz Sine	93 Arms / 118 Apeak
		DC	108 Apeak
	0.2 second	60 Hz Sine	85 Arms / 120 Apeak
		DC	108 Apeak



CE 400V versions of this product bear the CE mark

AE Techron Sales Representative