

TREK 609E-6

High voltage power amplifier for industrial and research applications that features an all solid-state design for a high slew rate, wide bandwidth, and low-noise operation.



The Trek® 609E-6 is a DC-stable, high-voltage power amplifier used in industrial and research applications. The four-quadrant, active output stage sinks or sources current into reactive or resistive loads throughout the output voltage range. This type of output is essential to achieve an accurate output response and high slew rate demanded by a variety of loads such as highly capacitive or reactive loads. It is configured as a non-inverting amplifier, an inverting amplifier or as a differential amplifier. Different input configurations can be wired into the unit.

PRODUCT HIGHLIGHTS

- Four-quadrant output for driving capacitive loads
- Closed loop system for high accuracy
- Short-circuit protected for equipment protection
- DC-stable for programmable supply applications
- Low output noise for ultra-accurate outputs
- NIST-traceable Certificate of Calibration provided with each unit

TYPICAL APPLICATIONS

- AC or DC biasing
- Atmospheric plasma
- Dielectric barrier discharge
- Electroactive polymers (EAP)
- Electrophoresis, electrophotography
- Electrorheological fluids
- Electrostatic deflection
- Electro-optic modulation
- Ferroelectric material characterization
- Ion beam steering
- Mass spectrometers
- Material poling and particle accelerators

AT A GLANCE

Output Voltage Range

0 to ± 4 kV DC or peak AC

Output Current Range

0 to ± 20 mA DC or peak AC

Slew Rate

Greater than 150 V/ μ s

Large Signal Bandwidth (-3 dB)

DC to greater than 13 kHz

DC Voltage Gain

1000 V/V

TREK 609E-6 HIGH VOLTAGE POWER AMPLIFIER

TECHNICAL DATA

Performance Specifications		
Output Voltage Range	0 to ± 4 kV DC or peak AC	
Output Current Range	0 to ± 20 mA DC or peak AC	
Input Voltage Range	0 to ± 4 V DC or peak AC	
Input Impedance	Non-inverting	25 k Ω , nominal
	Inverting	50 k Ω , nominal
	Differential	50 k Ω , nominal
DC Voltage Gain	1000 V/V	
	Non-inverting (V_A) Configuration	1000 V/V
	Inverting (V_A) Configuration	-1000 V/V
	Differential Configuration	Function of the difference between two input signals. Represented by the equation: $V_{OUT} = 1000 (V_A - V_B)$
DC Voltage Gain Accuracy	Better than 0.1% of full scale	
DC Offset Voltage	Less than ± 2 V	
Output Noise	Less than 50 mV rms ¹	
Slew Rate	Greater than 150 V/ μ s (10% to 90%, typical)	
Settling Time	Less than 150 μ s for a 0 to 4 kV step	
Large Signal Bandwidth	DC to greater 6 kHz (1% Distortion)	
	DC to greater 13 kHz (-3 dB)	
Small Signal Bandwidth	DC to greater than 35 kHz (-3dB)	
Stability	Drift with Time	Less than 100 ppm/hr, noncumulative
	Drift with Temp	Less than 200 ppm/ $^{\circ}$ C

Voltage Monitor Specifications	
Ratio	1/1000th of the high voltage output signal
DC Accuracy	Better than 0.1% of full scale
DC Offset Voltage	Less than ± 2.5 mV
Output Noise	Less than 2 mV rms ¹
Output Impedance	47 Ω

Current Monitor Specifications	
Ratio	0.5 V/mA
DC Accuracy	Better than 0.5% of full scale
DC Offset Voltage	Less than ± 5 mV
Output Noise	Less than 10 mV ¹
Output Impedance	47 Ω

Mechanical Specifications	
Dimensions (H x W x D)	140 x 432 x 439 mm (5.5 x 17 x 17.25 in)
Weight	13.2 kg (29 lb)
HV Connector	Alden High Voltage Connector
BNC Connectors	Voltage monitor, current monitor, remote HV ON/OFF, out of regulation, fault/trip status
Amplifier Input	Amphenol panel mount

¹ Measured using the true rms feature of the HP Model 34401A digital multimeter

TECHNICAL DATA

Electrical Specifications

Line Voltage	Factory set for one of three ranges (specify when ordering): 100 VAC, 115 VAC or 230 VAC at 48 to 63 Hz
Power Consumption	220 VA, maximum

Environmental Specifications

Temperature	0 to 40°C (32 to 104°F)
Relative Humidity	To 85%, noncondensing
Altitude	To 2000 meters (6561.68 ft.)

REFERENCE NUMBERS

Included Accessories

PN	Description
23163	Operator's Manual
43406	HV Output Cable
43418	Input Cable Connector Assembly
N5011	Line Cord (90 V to 127 V operation)
Contact factory	Line Cord 230 VAC

Other Accessories

PN	Description
43406	HV Output Cable
607RA	19 in Rack Mount Kit (with EIA hole spacing)
607RAJ	19 in Rack Mount Kit (with JIS hole spacing)



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ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

PRECISION | POWER | PERFORMANCE

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