Trek Model 609E-6

High-Voltage Power Amplifier



The Model 609E-6 is a DC-stable, high-voltage power amplifier used in industrial and research applications. It features an all-solid-state design for high slew rate, wide bandwidth and low-noise operation. 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.

Key Specifications

Output Voltage Range:

• Output Current Range:

Slew Rate:

Large Signal Bandwidth (-3 dB):

DC Voltage Gain:

0 to ±4 kV DC or peak AC 0 to ±20 mA DC or peak AC Greater than 150 V/µs DC to greater than 13 kHz 1000 V/V

Typical Applications Include

- 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

Features and Benefits

- 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
- C ∈ compliant



Model 609E-6 Specifications

Performance

Output Voltage 0 to ±4 kV DC or peak AC

Output Current 0 to ±20 mA DC or peak AC

0 to ±4 V DC or peak AC Input Voltage Range

Input Impedance

Noninverting 25 kΩ, nominal

Inverting 50 kΩ, nominal

Differential 50 kΩ, nominal

DC Voltage Gain 1000 V/V

Noninverting (V_A) Configuration

1000 V/V

Inverting (V_R) Configuration

-1000 V/V

Function of the difference between two input Differential Configuration 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

Less than 50 mV rms* **Output Noise**

Slew Rate

Greater than 150 V/µs (10% to 90%, typical)

Settling Time (to 1%) Less than 150 µs for a 0-4 kV step

Large Signal DC to greater 6 kHz (1% Distortion) DC to greater 13 kHz (-3 dB) Bandwidth

Small Signal

Bandwidth (-3dB)

DC to greater than 35 kHz

Stability

Drift with Time Less than 100 ppm/hr, noncumulative

Less than 200 ppm/°C Drift with Temp

Voltage Monitor

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*

Output Impedance 47Ω

Current Monitor

Ratio 0.5 V/mA

DC Accuracy Better than 0.5% of full scale

Offset Voltage Less than ±5 mV **Output Noise** Less than 10 mV*

Output Impedance

Features

High Voltage On/Off

Individual push-button switches Local

Remote TTL high turns OFF the high voltage; TTL low

turns on the high voltage

Dvnamics Graduated 1-turn potentiometer used to Adjustments optimize the AC response for various load

parameters

Switch selectable for limit or trip. Graduated 1-Current Limit/Trip

turn potentiometer adjusts from 0 to 20 mA

Out of Regulation LED illuminates and BNC provides a TTL low

when Model 609E-6 fails to produce HV output

such as during a current limit

Trip Status LED illuminates and BNC provides a TTL low when HV is disabled due to the output current

exceeding the current trip level, a high voltage fault is detected or the top cover is removed

Mechanical

Dimensions 140 mm H x 432 mm W x 439 mm D

(5.5" H x 17" W x 17.25" D)

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

Operating Conditions

Temperature 0°C to 40°C (32°F to 104°F)

Relative Humidity To 85%, noncondensing

Altitude To 2000 meters (6561.68 ft.)

Electrical

Line Voltage Factory Set for one of two ranges:

90 to 127 V AC or 180 to 250 V AC.

either at 48 to 63 Hz

Power Consumption 220 VA, maximum

Supplied Accessories

PN: 23163 Operator's Manual

HV Output Cable PN: 43406

Input Cable PN: 43418

Connector Assembly

PN: N5011

Line Cord (90 V to 127 V operation)

Line Cord 230 V AC Contact factory

Optional Accessories

HV Output Cable PN: 43406

19" Rack Mount Kit Model 607RA (with EIA hole spacing)

Model 607RAJ (with JIS hole spacing)

*Measured using the true rms feature of the HP Model 34401A digital multimeter Copyright ⊚ 2013 TREK, INC. All specifications are subject to change. 1343/JRB



