



## Trek 5/80-HS

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



### PRODUCT HIGHLIGHTS

- Four-quadrant output for driving capacitive loads
- Closed loop system for high accuracy
- Short-circuit protected for equipment protection
- All solid-state design for maintenance free operation
- 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)
- Electrorheological fluids
- Electrostatic deflection
- Electro-optic modulation
- Ion beam steering
- Mass spectrometry
- Material poling and particle accelerators
- Ferroelectric material characterization

### AT A GLANCE

#### Output Voltage Range

0 to  $\pm 5$  kV DC or peak AC

#### Output Current Range

0 to  $\pm 80$  mADC or  $\pm 240$  mA peak AC  
for 1 ms (not to exceed 80 mArms)

#### Slew Rate

Greater than 1200 V/ $\mu$ s

#### Large Signal Bandwidth (1% Distortion)

DC to greater than 35 kHz

#### DC Voltage Gain

Fixed at 1000 V/V

## OVERVIEW

The Trek® 5/80-HS is a DC-stable, high-speed, 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.

## TECHNICAL DATA

## Performance Specifications

Output Voltage Range	0 to $\pm 5$ kV DC or peak AC
Output Current Range	0 to $\pm 80$ mADC or $\pm 240$ mA peak AC for 1 ms (not to exceed 80 mArms)
Input Voltage Range	0 to $\pm 5$ kV DC or peak AC
Input Impedance	25 k $\Omega$ , nominal
DC Voltage Gain	Fixed at 1000 V/V
DC Voltage Gain Accuracy	Better than 0.1% of full scale
DC Offset Voltage	Less than $\pm 2$ V
Output Noise	Less than 1.0 V rms <sup>1</sup>
Slew Rate (10% to 90%, typical)	Greater than 1200 V/ $\mu$ s
Large Signal Bandwidth (1%)	DC to greater than 35 kHz
Small Signal Bandwidth	DC to greater than 100 kHz
Stability	Drift with Time: < 50 ppm/hr, noncumulative Drift with Temperature: < 200 ppm/ $^{\circ}$ C

## Voltage Monitor Specifications

Ratio	1/1000 <sup>th</sup> of the high-voltage output signal
DC Accuracy	Better than 0.1% of full scale
DC Offset Voltage	Less than $\pm 2$ mV
Output Noise	Less than 10 mV rms <sup>1</sup>
Output Impedance	47 $\Omega$

## Current Monitor Specifications

Ratio	1 V/24 mA
DC Accuracy	Better than 1% of full scale
Offset Voltage	Less than $\pm 20$ mV
Output Noise	Less than 30 mV rms*
Bandwidth (-3 dB)	DC to greater than 20 kHz
Output Impedance	47 $\Omega$

## TECHNICAL DATA (CONTINUED)

Mechanical Specifications	
Dimensions	279 mm H x 482 mm W x 654 mm D (11" H x 19" W x 25.75" D)
Weight	24.9 kg (55 lb)
HV Connector	Alden High Voltage Connector
BNC Connectors	Amplifier Input, Voltage Monitor, Current Monitor, Remote High Voltage ON/OFF, Out of Regulation Status, Fault/Trip Status

Electrical Specifications	
Line Voltage (factory set)	104 to 127 V AC or 180 to 250 V AC, either at 48 to 63 Hz
AC Line Receptacle	Standard IEC 320 three-prong AC line connector
Power Consumption	1000 VA, maximum

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

Features	
High-Voltage On/Off	Local, individual push-button switch
Remote	TTL compatible input. TTL high (or open) turns off high-voltage output. TTL low turns on high-voltage output
Dynamic Adjustment	Graduated one-turn panel potentiometer is used to optimize the AC response for various load parameters
Limit/Trip Mode	Switch selectable for either limit or trip. Graduated one-turn potentiometer is used to adjust limit or trip level from 0 to 100% peak current. There is one LED indicator and one BNC connector
Trip Status Indicator/Connector	Illuminates and a TTL low is provided after the amplifier is out of regulation for more than 500 ms. The HV output is not disabled
Limit Status Indicator/Connector	Illuminates and a TTL low is provided after the amplifier is out of regulation for more than 500 ms. The HV output is not disabled
Out of Regulation Status	Illuminates and a TTL low is provided when the unit fails to produce required HV output such as during a current limit

<sup>1</sup> Measured using the true rms feature of the HP Model 34401A digital multimeter

## ACCESSORIES

Supplied Accessories	
PN	Description
23463	Operators Manual
43463	HV Output Cable
N5011	Line Cord, Spare Fuses (selected per geographic destination)

Optional Accessories	
PN	Description
43466	5m HV Output Cable
43422	10m HV Output Cable
43423	20m HV Output Cable



## 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.

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