



## TREK 30/20A

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

The Trek® 30/20A is a DC-stable, high voltage power amplifier featuring an all solid-state design for high slew rate, wide bandwidth, and low-noise operation. Configured as non-inverting with a fixed gain of 3000 V/V, it is protected against over-voltage and over-current conditions that may be generated by active loads or by output short circuits to ground. The four-quadrant, active output stage sinks or sources current to reactive or resistive loads throughout the output voltage range to achieve the accurate output response and high slew rates demanded by reactive loads.

### 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

- Dielectric studies
- Electron beam ion traps and ion sourcing
- Electrospinning
- Electrostatic deflection (including ion beam steering)
- Electrostatic flame control
- Electrostatic levitation
- Electrostatic precipitation
- High-voltage cable testing
- High-voltage component testing
- Plasma studies (including dielectric barrier discharge)



### AT A GLANCE

#### Output Voltage Range

0 to  $\pm 30$  kVDC or peak AC

#### Output Current Range

0 to  $\pm 20$  mADC or peak AC

#### Slew Rate

Greater than 550 V/ $\mu$ s

#### Large Signal Bandwidth (2%)

DC to greater than 2.5 kHz

#### DC Voltage Gain

3000 V/V Fixed

# TREK 30/20A HIGH VOLTAGE POWER AMPLIFIER

## TECHNICAL DATA

Performance Specifications		
Output Voltage Range	0 to $\pm 30$ kVDC or peak AC	
Output Current Range	0 to $\pm 20$ mADC or peak AC	
Input Voltage Range	0 to $\pm 10$ VDC or peak AC	
Input Impedance	25 k $\Omega$ , nominal (inverting/differential option: 50 k $\Omega$ , nominal)	
DC Voltage Gain	3000 V/V	
DC Voltage Gain Accuracy	Better than 0.1% of full scale	
DC Offset Voltage	Less than $\pm 4$ V	
Output Noise	Less than 1.5 V rms <sup>1</sup>	
Slew Rate	Greater than 550 V/ $\mu$ s (10% to 90%, typical)	
Small Signal Bandwidth	DC to greater 30 kHz (-3dB)	
Large Signal Bandwidth	DC to greater than 2.5 kHz, typical (2% distortion)	
Stability	Drift with Time: Less than 50 ppm/hr, noncumulative	Drift with Temp: Less than 100 ppm/ $^{\circ}$ C

Voltage Monitor Specifications	
Ratio	1 V / 3000 V
DC Accuracy	Better than 0.1% of full scale
DC Offset Voltage	Less than $\pm 5$ mV
Output Noise	Less than 20 mV rms <sup>1</sup>
Output Impedance	47 $\Omega$

Current Monitor Specifications	
Ratio	0.5 V/mA
DC Accuracy	Better than 2% of full scale
Offset Voltage	Less than $\pm 10$ mV
Output Noise	Less than 30 mV rms <sup>1</sup>
Bandwidth	DC to greater than 5 kHz (-3dB)
Output Impedance	47 $\Omega$

Mechanical Specifications	
Dimensions (H x W x D)	103.9 x 43 x 87 cm (40.9 x 17 x 34 in)
Weight	73 kg (160 lb) approximate
HV Connector	Caton 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 for one of two ranges: 104 to 127 VAC or 180 to 250 VAC at 48 to 63 Hz (specify when ordering)
AC Line Receptacle	Standard 3-prong with integral fuse holder
Power Consumption	1800 VA, maximum

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

TECHNICAL DATA

Environmental Specifications	
Temperature	0 to 40°C (32 to 104°F)
Relative Humidity	To 75%, noncondensing
Altitude	To 1524 meters (5000 ft)

Features	
Settling Time (to 1%)	Less than 200 μs for a 0 to 30 kV step
Dynamic Adjustment	Graduated one-turn panel potentiometer is used to optimize the AC response for various load parameters.
High Voltage On/Off	Local: Individual push-button switches Remote: TTL compatible input. TTL high (or open) turns off high voltage output. TTL low turns on high voltage output.
Current Limit/Trip	Switch selectable for limit or trip. Graduated one-turn panel potentiometer is used to adjust limit or trip level from 0 to ±20 mA.
Out of Regulation Status Indicator and Connector	Illuminates and TTL low is provided when unit fails to produce required HV output such as during current limit.
Limit/Trip Status Indicator and Connector	An indicator will illuminate and a BNC will provide a TTL low when the high-voltage output is disabled due to the output current exceeding the current trip level, the detection of a high-voltage supply fault, the removal of one of the panels, or if the Trek 30/20A is out of regulation for greater than 500 ms.

REFERENCE NUMBERS

Included Accessories	
PN	Description
23343	Operator's Manual
B3060	Shorting BNC Cap
43466	HV Output Cable
Varies	Line Cord, Spare Fuses (selected per geographic destination)
1K042	Locking Wheel Kit



#### **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.

AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

#### **PRECISION | POWER | PERFORMANCE**



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