



TREK 50/12

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

The Trek® 50/12 is a DC-stable, high-voltage power amplifier featuring an all solid-state design for high slew rate, wide bandwidth, and low-noise operation. It is designed to provide precise control of output voltages in the range of 0 to ± 50 kV DC or peak AC with an output current range of 0 to ± 12 mA DC or peak AC. The four-quadrant, active output stage sinks or sources current to reactive or resistive loads throughout the output voltage range. This is essential 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 ± 50 kVDC or peak AC

Output Current Range

0 to ± 12 mADC or peak AC

Slew Rate

Greater than 350 V/ μ s

Large Signal Bandwidth (2%)

DC to greater than 1.4 kHz

DC Voltage Gain

5000 V/V Fixed

TREK 50/12 HIGH VOLTAGE POWER AMPLIFIER

TECHNICAL DATA

| Performance Specifications | | |
|----------------------------|--|---------------------------------------|
| Output Voltage Range | 0 to ±50 kVDC or peak AC | |
| Output Current Range | 0 to ±12 mADC or peak AC | |
| Input Voltage Range | 0 to ±10 VDC or peak AC | |
| Input Impedance | 25 kΩ, nominal (inverting/differential option: 50 kΩ, nominal) | |
| DC Voltage Gain | 5000 V/V | |
| DC Voltage Gain Accuracy | Better than 0.1% of full scale | |
| DC Offset Voltage | Less than ±5 V | |
| Output Noise | Less than 10 V rms ¹ | |
| Slew Rate | Greater than 350 V/μs (10% to 90%, typical) | |
| Small Signal Bandwidth | DC to greater 20 kHz (-3dB) | |
| Large Signal Bandwidth | DC to greater than 1.4 kHz, typical (2% distortion) | |
| Stability | Drift with Time: Less than 50 ppm/hr, noncumulative | Drift with Temp: Less than 100 ppm/°C |

| Voltage Monitor Specifications | |
|--------------------------------|----------------------------------|
| Ratio | 1 V / 5000 V |
| DC Accuracy | Better than 0.1% of full scale |
| DC Offset Voltage | Less than ±4 mV |
| Output Noise | Less than 20 mV rms ¹ |
| Output Impedance | 47 Ω |

| Current Monitor Specifications | |
|--------------------------------|----------------------------------|
| Ratio | 0.5 V/mA |
| DC Accuracy | Better than 2% of full scale |
| Offset Voltage | Less than ±10 mV |
| Output Noise | Less than 30 mV rms ¹ |
| Bandwidth | DC to greater than 5 kHz (-3dB) |
| Output Impedance | 47 Ω |

| Mechanical Specifications | |
|---------------------------|--|
| Dimensions (H x W x D) | 1473.5 x 628.7 x 948.4 mm (58.01 x 24.75 x 37.34 in) |
| Weight | 125 to 136 kg (275 to 300 lb) approximate |
| HV Connector | 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 | 180 to 250 VAC at 48 to 63 Hz |
| AC Line Receptacle | Standard 3-prong with integral fuse holder |
| Power Consumption | 1800 VA, maximum |

¹ 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 | | |
|--|---|---|
| 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. |
| Dynamic Adjustment | Graduated one-turn panel potentiometer is used to optimize the AC response for various load parameters. | |
| 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 ±12 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 50/12 is out of regulation for greater than 500 ms. | |

REFERENCE NUMBERS

| Included Accessories | |
|----------------------|--|
| PN | Description |
| 23392 | Operator's Manual |
| B3060 | Shorting BNC Cap |
| 43466 | HV Output Cable |
| Varies | Line Cord, Spare Fuses (selected per geographic destination) |



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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