# TREK 610E

High voltage power supply/amplifier/controller that provides six modes of high-voltage operation.

The Trek® 610E provides six modes of high voltage operation. As a high voltage amplifier, the Trek 610E amplifies an externally applied signal with a switch-selectable setting of 100 V/V or 1000 V/V. As a high voltage reference supply, a front panel dial commands the output voltage. As a transconductance amplifier, an externally applied voltage signal produces a proportional output current. As a current supply, a front-panel dial commands the output currents. As a high voltage controller, the high voltage amplifier mode is maintained but the amplifier input and feedback elements are uncommitted and configured by the user.

## PRODUCT HIGHLIGHTS

- Multi-mode operation for enhanced utility
- 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
- CE compliant

## TYPICAL APPLICATIONS

- Closed-loop charge control
- Electrophotographic research
- Insulation testing
- Dielectric material evaluation
- AC or DC calibrators and supplies

## AT A GLANCE

### Output Voltage Range

**0 to ±1 kV or 0 to ±10 kV**

### Output Current Range

**0 to ±200 µA or 0 to ±2000 µA peak AC**

### Slew Rate

**Greater than 35 V/µs**

### Large Signal Bandwidth (-3 dB)

**DC to greater than 1.2 kHz**

### Voltage Gain

**1 kV range: 100 V/V**
**10 kV range: 1000 V/V**

## TECHNICAL DATA

| Performance Specifications | | | |
|---|---|---|---|
| Output Voltage Ranges | As a High Voltage Supply | 0 to ±1 kV or 0 to ±10 kV; switch selectable/adjustable with potentiometer. Resolution of 1 kV range is 1 V, resolution of 10 kV range is 10 V | |
| | As a High Voltage Amplifier and Controller | 0 to ±1 kV or 0 to ±10 kV DC or peak AC; switch selectable | |
| Output Current Ranges | As a Current Supply | 0 to ±200 µA or 0 to ±2000 µA; switch selectable/ adjustable with potentiometer. Resolution of 200 µA range is 0.2 µA, resolution of 2000 µA range is 2 µA | |
| | As a Transconductance Amplifier and Controller | 0 to ±200 µA or 0 to ±2000 µA DC or peak AC, switch selectable | |
| Input Voltage Ranges | As a High Voltage Amplifier and Controller | 0 to ±10 V DC or peak AC | |
| | As a Transconductance Amplifier and Controller | 0 to ±10 V DC or peak AC | |
| Gain and Accuracy | As a High Voltage Amplifier and Controller | Gain | 1 kV range: 100 V/V<br>10 kV range: 1000 V/V |
| | | Accuracy | Better than 0.3% of full scale (controller mode is dependent on user-specified components) |
| | As a Transconductance Amplifier and Controller | Gain | 200 µA range: 20 µA/V<br>2000 µA range: 200 µA/V |
| | | Accuracy | Better than 0.3% of full scale, typical and 1% full scale, max (controller mode is dependent on user-specified components) |
| Compliance | Voltage Range | Adjustable range 0 to ±10 kV DC (or peak AC) using the potentiometer | |
| | Current Range | Adjustable range 0 to ±2 mA DC (or peak AC) using the potentiometer | |

| Performance Specifications (When Used as a High Voltage Amplifier and Controller) | |
|---|---|
| DC Offset Voltage | Less than 2 V |
| Output Noise | Less than 700 mV rms (measured with a 20 kHz true rms meter) |
| Slew Rate | Greater than 35 V/µs (10% to 90%, typical) |
| Large Signal Bandwidth | DC to greater than 600 Hz (1% Distortion) |
| | DC to greater than 1.2 kHz |
| Small Signal Bandwidth | DC to 10 kHz (-3dB) |
| Settling Time to 1% | Less than 1 ms for a 0 to 10 kV step |

| Voltage Monitor Specifications | |
|---|---|
| Scale Factor | 1/1000th of the output voltage |
| DC Scale Accuracy | Better than 0.1% FS as referred to the high-voltage output |
| Offset Voltage | Less than ±2.5 mV |
| Noise | Less than 20 mV p-p |
| Output Impedance | 47 Ω, nominal |

| Current Monitor Specifications | |
|---|---|
| Scale Factor | 1 V/200 µA |
| DC Scale Accuracy | Better than 0.1% FS as referred to the high voltage output |
| Offset Voltage | Less than 10 mV |
| Noise | Less than 30 mV p-p |
| Output Impedance | 1 k Ω, nominal |

## TECHNICAL DATA

| Mechanical Specifications | | |
|---|---|---|
| Dimensions (H x W x D) | 140 x 432 x 374 mm (5.5 x 17 x 15 in) | |
| Weight | 10.6 kg (23.5 lb) | |
| HV Control | Three-position switch: On, Off, Remote | |
| Mode Control | Three-position switch: Supply, Amplifier, Controller | |
| Supply Mode Voltage Control | Range Select | Two-position switch: 0 to ±1 kV to 0 to ±10 kV |
| | Output Select | Precision potentiometer with graduated dial |
| | Polarity Select | Three-position switch: Positive, Negative, Off |

| Electrical Specifications | |
|---|---|
| Line Voltage | Factory Set for one of four nominal voltages: 100 V, 120 V, 230 V at 48 to 63 Hz |
| AC Receptacle | Standard three-prong |
| Power Consumption | 220 VA, maximum |

| Environmental Specifications | |
|---|---|
| Temperature | 0 to 40°C (32 to 104°F) |
| Relative Humidity | To 85%, noncondensing |

| Features | | |
|---|---|---|
| Input Config Programming | May be configured for inverting, non-inverting, or differential | |
| High-Voltage On/Off | Local: Individual push-button switch | Remote: TTL high (or open) turns off the HV output; TTL low tuns on the HV output |
| Compliance Level Selection | Precision potentiometer is used to set the current limit when operating in the voltage mode or to set a voltage limit when operating in the current mode | |
| Compliance Indicator | LED illuminates in a compliance limit condition | |
| Compliance Limit | Current mode is adjustable to within 20 V of the output voltage. Voltage mode is adjustable to within 0.5 µA of the output current | |

## REFERENCE NUMBERS

| Included Accessories | |
|---|---|
| **PN** | **Description** |
| 23291 | Operator's Manual |
| 43406 | HV Output Cable |
| Varies | Line Cord, Fuses (selected per geographic area) |

| Other Accessories | |
|---|---|
| **PN** | **Description** |
| 43421 | HV Output Cable, 5 m |
| 43422 | HV Output Cable, 10 m |
| 43423 | HV Output Cable, 20 m |
| 607RA | 19 in Rack Mount Kit (with EIA hole spacing) |
| 607RAJ | 19 in Rack Mount Kit (with JIS hole spacing) |

## ABOUT ADVANCED ENERGY

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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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