The Trek Model 610E is a high-voltage supply/amplifier/controller which provides six modes of high-voltage operation. As a high-voltage amplifier, the Model 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 available for configuration by the user.

### Key Specifications

- **Output Voltage Range:** 0 to ±1 kV or 0 to ±10 kV
- **Output Current Range:** peak AC 0 to ±200 µA or 0 to ±2000 µA
- **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
- **Voltage Gain (10 kV range):** 1000 V/V
- **Transconductance Gain:** 200 µA range is 20 µA/V; 2000 µA range is 200 µA/V

### Typical Applications Include

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

### Features and Benefits

- 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
## Model 610E Specifications

### Performance

#### 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; 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 µAV; 2000 µA range: 200 µAV; 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.

The specifications listed under “Performance” in column two refer to the Model 610E when used as a High-Voltage Amplifier and Controller.

### Performance (cont.)

<table>
<thead>
<tr>
<th>DC Offset Voltage</th>
<th>Less than 2 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Noise</td>
<td>Less than 700 mV rms (measured with a 20 kHz rms meter)</td>
</tr>
<tr>
<td>Slew Rate (10 to 90%, typical)</td>
<td>Greater than 35 V/µs</td>
</tr>
<tr>
<td>Small Signal Bandwidth (-3 dB)</td>
<td>DC to 10 kHz</td>
</tr>
<tr>
<td>Large Signal Bandwidth (-3 dB)</td>
<td>DC to greater than 1.2 kHz</td>
</tr>
<tr>
<td>Large Signal Bandwidth (1% distortion)</td>
<td>DC to greater than 600 Hz</td>
</tr>
<tr>
<td>Setting Time to 1%</td>
<td>Less than 1 ms for a 0 to 10 kV step</td>
</tr>
</tbody>
</table>

#### Voltage Monitor

- **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 5 mV
- **Noise:** Less than 20 mV p-p
- **Output Impedance:** 47 Ω, nominal

#### Current Monitor

- **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 kΩ, nominal

### Features

- **Input Config Programming:** May be configured for inverting, noninverting or differential
- **High-Voltage On/Off:** Individual push-button switch
- **Remote:** TTL high (or open) turns off the HV output; TTL low turns on the HV output

### Features (cont.)

- **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.

### Mechanical

- **Dimensions:** 140 mm H x 432 mm W x 374 mm D (5.5” H x 17” W x 15” D)
- **Weight:** 10.6 kg (23.5 lb.)
- **HV Control:** 3-position switch: On, Off, Remote
- **Mode Control:** 3-position switch: Supply, Amplifier or Controller
- **Supply Mode Voltage Control:** Range Select 2-position switch: 0 to ±1 kV to 0 to ±10 kV
- **Output Select:** Precision potentiometer with graduated dial
- **Polarity Select:** 3-position switch: Positive, Negative, Off

### Operating Conditions

- **Temperature:** 0°C to 40°C (32°F to 104°F)
- **Rel. Humidity:** To 85%, noncondensing

### Electrical

- **Line Voltage:** Factory Set for one of four nominal voltages: 100 V, 120 V, 230 V at 48 to 63 Hz
- **AC Receptacle:** Standard 3-prong
- **Power Consumption:** 200 VA, maximum

### Supplied Accessories

- **Manual:** PN: 23291
- **HV Output Cable:** PN: 43406
- **Line cord, fuses:** Selected per geographic area

### Optional Accessories

- **HV Output Cable:** 43421 (5), 43422 (10), 43423 (20)
- **19” Rack Mounts:** Models: 607RA and 607RAJ

### Front Panel Display

Please contact the factory for information pertaining to the specifications of the Front Panel Display feature.