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: 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
- 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 µA/V; 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

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>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Offset Voltage</td>
<td>Less than 2 V</td>
</tr>
<tr>
<td>Output Noise</td>
<td>Less than 700 mV rms (measured with a 20 kHz true 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>Settling 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: 200 VA, maximum
- 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

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