

# Trek Model 610E

## High-Voltage Supply / Amplifier / Controller



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  $\pm 1$  kV or 0 to  $\pm 10$  kV
- Output Current Range: 0 to  $\pm 200$   $\mu$ A or 0 to  $\pm 2000$   $\mu$ A peak AC
- Slew Rate: Greater than 35 V/ $\mu$ s
- 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  $\mu$ A range is 20  $\mu$ A/V; 2000  $\mu$ A range is 200  $\mu$ A/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



High Voltage Products. High Voltage Experts.

| 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 Trans-conductance 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 Trans-conductance Amplifier and Controller  | 0 to ±10 V DC or peak AC   |
| Gain and Accuracy  |  |
| As a High-Voltage Amplifier and Controller   | <b>Gain</b> , 1 kV range: 100 V/V;10 kV range: 1000 V/V; <b>Accuracy</b> , Better than 0.3% of full scale (controller mode is dependent on user-specified components)                                      |
| As a Trans-conductance Amplifier and Controller  | <b>Gain</b> , 200 µA range: 20 µA/V; 2000 µA range: 200 µA/V; <b>Accuracy</b> , 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.)                    |   |
|--|---|
| DC Offset Voltage                      | Less than 2 V   |
| Output Noise                           | Less than 700 mV rms (measured with a 20 kHz true rms meter)              |
| Slew Rate (10 to 90%, typical)         | Greater than 35 V/µs  |
| Small Signal Bandwidth (-3 dB)         | DC to 10 kHz  |
| Large Signal Bandwidth (-3 dB)         | DC to greater than 1.2 kHz  |
| Large Signal Bandwidth (1% distortion) | DC to greater than 600 Hz   |
| Settling Time to 1%                    | Less than 1 ms for a 0 to 10 kV step                                      |
| 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                    |   |
| Local                                  | Individual push-button switch   |
| Remote                                 | TTL high (or open) turns off the HV output; TTL low tuns 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 |  |

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