

# 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 20 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
- $\text{CE}$  compliant



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# Model 610E Specifications

## Performance

### Output Voltage Ranges

As a High-Voltage Supply 0 to  $\pm 1$  kV or 0 to  $\pm 10$  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  $\pm 1$  kV or 0 to  $\pm 10$  kV DC or peak AC; switch selectable

### Output Current Ranges

As a Current Supply 0 to  $\pm 200$   $\mu$ A or 0 to  $\pm 2000$   $\mu$ A; switch selectable/adjustable with potentiometer. Resolution of 200  $\mu$ A range is 0.2  $\mu$ A, resolution of 2000  $\mu$ A range is 2  $\mu$ A

As a Trans-conductance Amplifier and Controller 0 to  $\pm 200$   $\mu$ A or 0 to  $\pm 2000$   $\mu$ A DC or peak AC, switch selectable

### Input Voltage Ranges

As a High-Voltage Amplifier and Controller 0 to  $\pm 10$  V DC or peak AC

As a Trans-conductance Amplifier and Controller 0 to  $\pm 10$  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 Trans-conductance Amplifier and Controller **Gain**, 200  $\mu$ A range: 20  $\mu$ A/V; 2000  $\mu$ A range: 200  $\mu$ A/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  $\pm 10$  kV DC (or peak AC) using the potentiometer

Current Range Adjustable range 0 to  $\pm 2$  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 20 V/ $\mu$ s

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  $\Omega$ , nominal

## Current Monitor

Scale Factor 1 V/200  $\mu$ A

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 $\Omega$ , 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 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  $\mu$ A 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  $\pm 1$  kV to 0 to  $\pm 10$  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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