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 ±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 20 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

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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	**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 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.)

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/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

TREK

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