



## TREK 610E

High voltage power supply/amplifier/controller that provides six modes of high-voltage operation.



The Trek® 610E provides six modes of high voltage operation. As a high voltage amplifier, the Trek 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 configured by the user.

### PRODUCT HIGHLIGHTS

- 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

### TYPICAL APPLICATIONS

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

### AT A GLANCE

#### 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  
10 kV range: 1000 V/V

## TREK 610E HIGH VOLTAGE POWER AMPLIFIER

### TECHNICAL DATA

Performance Specifications			
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 Transconductance 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 Transconductance 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 Transconductance 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	

Performance Specifications (When Used as a High Voltage Amplifier and Controller)	
DC Offset Voltage	Less than 2 V
Output Noise	Less than 700 mV rms (measured with a 20 kHz true rms meter)
Slew Rate	Greater than 35 V/ $\mu$ s (10% to 90%, typical)
Large Signal Bandwidth	DC to greater than 600 Hz (1% Distortion)
	DC to greater than 1.2 kHz
Small Signal Bandwidth	DC to 10 kHz (-3dB)
Settling Time to 1%	Less than 1 ms for a 0 to 10 kV step

Voltage Monitor Specifications	
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 $\pm 2.5$ mV
Noise	Less than 20 mV p-p
Output Impedance	47 $\Omega$ , nominal

Current Monitor Specifications	
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

## TECHNICAL DATA

## Mechanical Specifications

Dimensions (H x W x D)	140 x 432 x 374 mm (5.5 x 17 x 15 in)	
Weight	10.6 kg (23.5 lb)	
HV Control	Three-position switch: On, Off, Remote	
Mode Control	Three-position switch: Supply, Amplifier, Controller	
Supply Mode Voltage Control	Range Select	Two-position switch: 0 to $\pm 1$ kV to 0 to $\pm 10$ kV
	Output Select	Precision potentiometer with graduated dial
	Polarity Select	Three-position switch: Positive, Negative, Off

## Electrical Specifications

Line Voltage	Factory Set for one of four nominal voltages: 100 V, 120 V, 230 V at 48 to 63 Hz
AC Receptacle	Standard three-prong
Power Consumption	220 VA, maximum

## Environmental Specifications

Temperature	0 to 40°C (32 to 104°F)
Relative Humidity	To 85%, noncondensing

## Features

Input Config Programming	May be configured for inverting, non-inverting, 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
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	

## REFERENCE NUMBERS

## Included Accessories

PN	Description
23291	Operator's Manual
43406	HV Output Cable
Varies	Line Cord, Fuses (selected per geographic area)

## Other Accessories

PN	Description
43421	HV Output Cable, 5 m
43422	HV Output Cable, 10 m
43423	HV Output Cable, 20 m
607RA	19 in Rack Mount Kit (with EIA hole spacing)
607RAJ	19 in Rack Mount Kit (with JIS hole spacing)



### ABOUT ADVANCED ENERGY

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Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

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