

Trek Model 10/40A

High-Voltage Power Amplifier



The Model 10/40A is a DC-stable, high-voltage power amplifier used in industrial and research applications. It features an all-solid-state design for high slew rate, wide bandwidth and low-noise operation. The four-quadrant, active output stage sinks or sources current into reactive or resistive loads throughout the output voltage range. This type of output is essential to achieve an accurate output response and high slew rate demanded by a variety of loads such as highly capacitive or reactive loads. It is configured as a non-inverting amplifier.

Key Specifications

- Output Voltage Range: 0 to ± 10 kV DC or peak AC
- Output Current Range: 0 to ± 40 mA DC or peak AC
- Slew Rate: Greater than 750 V/ μ s
- Large Signal Bandwidth (-3 dB): DC to greater than 23 kHz, typical
- DC Voltage Gain: 1000 V/V

Typical Applications Include

- Electrostatic deflection
- Electrophoresis
- Electrorheological fluids
- Electro-optic modulation
- Material poling
- AC or DC biasing
- Ion beam steering
- Particle accelerators
- Mass spectrometers
- Material characterization
- Ferroelectrics
- Atmospheric plasma
- Dielectric barrier discharge

Features and Benefits

- Four-quadrant output for driving capacitive loads
- Closed loop system for high accuracy
- Short-circuit protected for equipment protection
- All solid-state design for maintenance free operation
- DC-stable for programmable supply applications
- Low output noise for ultra-accurate outputs
- NIST-traceable Certificate of Calibration provided with each unit
- CE compliant (230 VAC unit only)



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Model 10/40A Specifications

Performance

Output Voltage Range	0 to ± 10 kV DC or peak AC
Output Current Range	0 to ± 40 mA DC or peak AC (must not exceed 40 mA rms, max)
Input Voltage Range	0 to ± 10 V DC or peak AC
Input Impedance	25 k Ω , nominal
DC Voltage Gain	1000 V/V
DC Voltage Gain Accuracy	Better than 0.1% of full scale
DC Offset Voltage	Less than ± 2 V
Output Noise	Less than 5 V rms*
Slew Rate (10% to 90%, typical)	Greater than 750 V/ μ s
Small Signal Bandwidth (-3dB)	DC to greater than 25 kHz
Large Signal Bandwidth (-3 dB)	DC to greater than 23 kHz, typical
Large Signal Bandwidth (1% distortion)	DC to greater than 7.5 kHz, typical
Stability	
<i>Drift with Time</i>	Less than 50 ppm/hr, noncumulative
<i>Drift with Temp</i>	Less than 100 ppm/ $^{\circ}$ C

Voltage Monitor

Ratio	1/1000th of the high-voltage output signal
DC Accuracy	Better than 0.1% of full scale
DC Offset Voltage	Less than ± 2 mV
Output Noise	Less than 10 mV rms*
Output Impedance	47 Ω

Current Monitor

Ratio	0.1 V/mA
DC Accuracy	Greater than 1% of full scale
Offset Voltage	Less than ± 10 mV
Output Noise	Less than 30 mV rms*
Bandwidth (-3dB)	DC to greater than 5 kHz
Output Impedance	47 Ω

Features

High-Voltage On/Off

<i>Local</i>	Individual push-button switch
<i>Remote (TTL compatible input)</i>	TTL high (or open) turns off high-voltage output. TTL low turns on high-voltage output

Features (cont.)

Dynamic Adjustment	Graduated one-turn panel potentiometer is used to optimize the AC response for various load parameters
Current Limit/Trip	Switch selectable for either limit or trip. Graduated 1-turn panel potentiometer is used to adjust the limit or trip level from 0 to ± 40 mA
Out of Regulation Status	Illuminates and a TTL low is provided when unit fails to produce required HV output such as during a current limit
Trip Status	An amber indicator will illuminate and a BNC will provide a TTL low when the high-voltage output is disabled due to the activation of the current trip or the removal of the top cover
Fault Status	A BNC will provide a TTL low when the Model 10/40A is out of regulation for greater than 500 ms

Mechanical

Dimensions	279 mm H x 482 mm W 654 mm D (11" H x 19" W x 25.75" D)
Weight	24.9 kg (55 lb)
HV Connector	Alden High Voltage Connector
BNC Connectors	Amplifier Input, Voltage Monitor, Current Monitor, Remote High Voltage ON/OFF, Out of Regulation Status, Limit/Trip Status

Operating Conditions

Temperature	0 $^{\circ}$ C to 40 $^{\circ}$ C (32 $^{\circ}$ F to 104 $^{\circ}$ F)
Relative Humidity	To 85%, noncondensing
Altitude	To 2000 meters (6561.68 ft.)

Electrical

Line Voltage	Factory Set for one of two ranges: 104 to 127 V AC or 180 to 250 V AC, either at 48 to 63 Hz
AC Line Receptacle	Standard IEC 320 three-prong AC line connector
Power Consumption	1000 VA, maximum

Supplied Accessories

Operators' Manual	PN: 23228
HV Output Cable	PN: 43463
Line Cord, Spare Fuses	PN: N5011. Selected per geographic destination

Optional Accessories

HV Output Cable	PN: 43463
19" Rack Mount Kit	Model: 608RA (with EIA hole spacing) Model: 608RAJ (with JIS hole spacing)

*Measured using the true rms feature of the HP Model 34401A digital multimeter

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