Trek Model 5/80

High-Voltage Power Amplifier

The Model 5/80 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 ±5 kV DC or peak AC
- Output Current Range: 0 to ±80 mA DC or peak AC
- Slew Rate: Greater than 1000 V/µs
- Large Signal Bandwidth (-3 dB): DC to greater than 60 kHz
- DC Voltage Gain: Fixed at 1000 V/V

Typical Applications Include

- AC or DC biasing
- Atmospheric plasma
- Dielectric barrier discharge
- Electroactive polymers (EAP)
- Electrophoresis, electrophotography
- Electrorheological fluids
- Electrostatic deflection
- Electro-optic modulation
- Ferroelectric material characterization
- Ion beam steering
- Mass spectrometers
- Material poling and particle accelerators

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 5/80 Specifications

Performance

Output Voltage Range	0 to ±5 kV DC or peak AC
Output Current Range	0 to ±80 mA DC or peak AC
Input Voltage Range	0 to ±5 V DC or peak AC
Input Impedance	10 kΩ, 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 1.0 V rms*
Slew Rate (10% to 90%, typical)	Greater than 1000 V/µs
Large Signal Bandwidth (-3 dB)	DC to greater than 60 kHz
Large Signal Bandwidth (3% distortion)	DC to greater 50 kHz
Small Signal Bandwidth (-3dB)	DC to greater than 75 kHz
Settling Time	Less than 50 µs for a 0 to 5 kV step
Stability	
Drift with Time	Less than 50 ppm/hr, noncumulative
Drift with Temp	Less than 200 ppm/°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	Better than 1% of full scale
Offset Voltage	Less than ±10 mV
Output Noise	Less than 30 mV rms*
Bandwidth (-3dB)	DC to greater than 10 kHz
Output Impedance	47 Ω

Features

High-Voltage On/Off	
Local	Individual push-button switch

Features (cont.)

Remote	TTL compatible input. TTL high (or open) turns off high-voltage output. TTL low turns on high-voltage output
Dynamic Adjustment	Graduated 1-turn panel potentiometer is used to optimize the AC response for various load parameters.
Current Limit/Trip	Switch selectable for either limit or trip. A graduated 1-turn panel potentiometer is used to adjust limit or trip level from 0 to ±80 mA
Out of Regulation	Indicator illuminates and BNC provides TTL low when the high-voltage output fails to produce required HV output (e.g. during a current limit)
Trip Status	Illuminates and a TTL low is provided when the high-voltage output is disabled due to the output current exceeding the trip level, the detection of a high-voltage supply fault for the removal of the top cover
Fault Status	TTL low is provided when out of regulation for greater than 500 ms.

Mechanical

Dimensions	279 mm H x 482 mm W x 654 mm D (11" H x 19" W x 25.75" D)
Weight	24 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, Fault/Trip Status

Operating Conditions

Temperature	0°C to 40°C (32°F to 104°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 three-prong AC line connector
Power Consumption	1000 VA, maximum

Supplied Accessories

Operators' Manual	PN: 23189
HV Output Cable	PN: 43406
Line Cord, Spare Fuses	PN: N5011. Selected per geographic destination

Optional Accessories

HV Output Cable	PN: 43421 (5m); 43422 (10 m); 43423 (20 m)
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