Model PD05034

High-Voltage Power Amplifier

The Trek Model PD05034 is a DC-stable, high-voltage power amplifier designed to provide precise control of output voltages in the range of 0 to ±7.5 kV DC or peak AC with an output current range of 0 to ±50 mA DC with a peak current capability of 160 mA for 60 μs. The Model PD05034 is configured as a noninverting amplifier with a fixed gain of 1000 V/V. Industrial and research applications include dielectric material characterization, polymer and ceramic corona charging, and piezoelectric driving and control.

The Model PD05034 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 is essential for achieving the accurate output response and high slew rates demanded by reactive loads.

The Model PD05034 is protected against overvoltage and overcurrent conditions that may be generated by active loads or by output short circuits to ground. Precision voltage and current monitors provide low-voltage replicas of the high-voltage output and load current for monitoring purposes or for use as feedback signals in a closed-loop system.

The Remote High-Voltage On/Off feature provides a connection for a remote device to turn on and off the High-Voltage of the instrument. This makes the Model PD05034 suitable for automated or computer controlled systems.

The Model PD05034 can be operated on a bench top or in a standard 19-inch rack.

Output Voltage Range 0 to ±7.5 kV

Output Current Range 0 to ±50 mA DC with a 0 to ±160 mA peak current capability for 60 μs

Slew rate greater than 1000 V/μs

DC Voltage Gain Accuracy 0.1% of Full Scale

Remote high-voltage ON/OFF capability

Output Monitors Provide Low-Voltage Representations of Output Voltage and Current

Adjustable current limit or current trip

Dynamics Adjust optimizes output voltage waveform

CE Compliant

CONTROL WITHOUT COMPROMISE

Model PD05034 Specifications

All specifications are with no load unless otherwise noted.

Output

Output Voltage Range
0 to ±7.5 kV DC or peak AC.

Output Current Range
0 to ±50 mA DC with a peak current capability of ±160 mA for 60 µs (see Automatic Power Limit feature for limitations).

Amplifier Input

Input Voltage Range
0 to ±7.5 V DC or peak AC.

Input Impedance
10 kΩ, nominal.

Features

High-Voltage On/Off
Switch selectable for either local or remote control.

Local
Individual push-button switches.

Remote
A TTL compatible input. A TTL high (or open) turns off the high-voltage output. A TTL low turns on the high-voltage output.

Dynamic Adjustment
A graduated one-turn panel potentiometer is used to optimize the AC response of the Model PD05034 for various load parameters.

Current Limit/Trip
Switch selectable for either limit or trip. A graduated one-turn panel potentiometer is used to adjust the limit or trip level from 0 to ±50 mA.

Out of Regulation Status
An indicator will illuminate and a BNC will provide a TTL low when the Model PD05034 fails to produce the required high-voltage output such as during current limit.

Trip Status
An indicator will illuminate and a BNC will provide a TTL low when the high-voltage output is disabled due to the output current exceeding the current trip level, the detection of a high-voltage supply fault, or the removal of the top cover.

Fault Status
A BNC will provide a TTL low when the Model PD05034 is out of regulation for greater than 100 ms.

Features (cont.)

Voltage Monitor
A buffered output provides a low-voltage replica of the high voltage output.

Scale Factor
1/1000th of the high-voltage output signal.

DC Accuracy
Better than 0.1% of full scale.

Offset Voltage
Less than ±2 mV.

Output Noise
Less than 10 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

Output Impedance
47 Ω.

Current Monitor
A buffered output provides a low-voltage representation of the load current.

Scale Factor
0.05 V/mA.

DC Accuracy
Better than 1 % of full scale.

Offset Voltage
Less than ±10 mV.

Output Noise
Less than 30 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

Bandwidth (-3db)
DC to greater than 5 kHz.

Output Impedance
47 Ω.

Performance

DC Voltage Gain
1000 V/V.

DC Voltage Gain Accuracy
Better than 0.1% of full scale.

Offset Voltage
Less than ±2 V.

Output Noise
Less than 5 V rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

Slew Rate (10% to 90%, typical)
Greater than 1000 V/µs.

Large Signal Bandwidth (1% distortion)
DC to greater than 15 kHz.

Small Signal Bandwidth (-3dB)
DC to greater than 75 kHz.

Settling Time (to 1%)
Less than 50 µs for a 0 to 7.5 kV step.

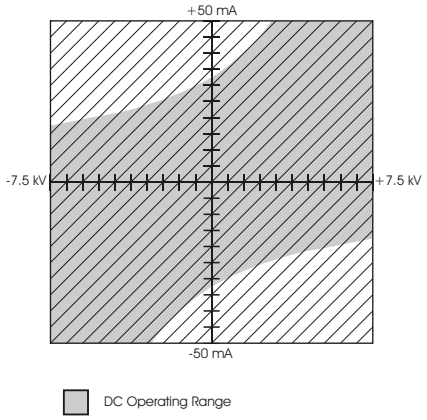
Performance (cont.)

Stability

Drift with Time
Less than 50 ppm/hr, noncumulative.

Drift with Temperature
Less than 200 ppm/°C.

Automatic Power Limit Feature
This feature automatically limits the internal power dissipation to protect the Model PD05034 from overheating. The following graph illustrates the automatic power limit output capability.



General

Dimensions
279 mm H x 482 mm W x 654 mm D (11" H x 19" W x 25.75" D).

Weight
24.9 kg (55 lb).

High-Voltage Output 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 connector

Power Requirements

Line Voltage
Factory set for one of two ranges: 104 to 127 V AC or 180 to 250 V AC, at 48 to 63 Hz (specify when ordering).

Power Consumption
1000 VA, maximum.

AC Line Receptacle
Standard three-prong AC line connector.

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