Model 10/40A

High-Voltage Power Amplifier

The Trek Model 10/40A DC-stable high-voltage power amplifier is used in a variety of applications including pulsed field electrophoresis, ion implantation beam sweeping AC and DC biasing of electrophotographic rollers, and electrorheological fluid research.

Configured as a noninverting amplifier with a fixed gain of 1000 V/V, the Model 10/40A is designed to provide precise control of output voltages in the range of 0 to ±10 kV DC or peak AC with an output current range of 0 to ±40 mA DC or peak AC.

As with all Trek power amplifier series, the Model 10/40A features an all solid-state design for high slew rate, wide bandwidth, and low-noise operation. A four-quadrant active output stage sinks or sources current into reactive or resistive loads throughout the output voltage range. This output type is essential for achieving the accurate output response and high slew rates when driving highly capacitive loads.

The Model 10/40A is protected against overvoltage and overcurrent conditions that may be generated by active loads or by output short circuits to ground. A mode switch allows the user to select either CURRENT LIMIT or unit TRIP-OFF if the output current reaches a pre-set current value as determined by a current-set potentiometer. An automatic internal power monitor and limit functions to automatically protect the unit from excessive internal power dissipation.

Precision voltage and current monitors provide low-voltage representations of the high-voltage output and load current for monitoring purposes or for use as feedback signals in auxiliary closed-loop systems.

A Remote High Voltage On/Off feature provides a connection for a remotely located device to turn on and off the high voltage of the amplifier. The Model 10/40A can be operated on a bench top or in a 19-inch rack.

- **Output Voltage Range 0 to ±10 kV**
- **Output Current Range 0 to ±40 mA**
- **Slew Rate Greater than 750 V/µs**
- **Dynamics Adjust For Optimizing AC Response**
- **Remote High-Voltage ON/OFF Capability**
- **Adjustable Current Limit or Current Trip**
- **Precision Voltage and Current Monitors Provide Low-Voltage Representations of Model 10/40A Output**
- **230 V AC Unit is CE Compliant**

Model 10/40A Specifications

All specifications are with no load unless otherwise noted.

Output

Output Voltage Range
0 to ±10 kV DC or peak AC.

Output Current Range
0 to ±40 mA DC or peak AC.
(See Automatic Power Limit feature for limitations.)

Amplifier Input

Input Voltage Range
0 to ±10 V DC or peak AC.

Input Impedance
25 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.

Dynamics Adjust
A graduated one-turn panel potentiometer is used to optimize the AC response of the Model 10/40A 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 ±40 mA.

Out of Regulation Status
An amber indicator will illuminate and a BNC will provide a TTL low when the Model 10/40A fails to produce the required high-voltage output such as during current limited operation.

Trip Status
An amber indicator will illuminate and a BNC will provide a TTL low when the high-voltage output is disabled due to:
a) the activation of the current trip, or
b) 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.

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
0.1 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). Detailed information concerning the output noise is available upon request.

Slew Rate (10% to 90%, typical)
Greater than 750 V/µs.

Large Signal Bandwidth (-3dB)
DC to greater than 23 kHz.

Large Signal Bandwidth(1% distortion)
DC to greater than 7.5 kHz.

Small Signal Bandwidth (-3dB)
DC to greater than 25 kHz.

Settling Time (to 1%)
Less than 150 µs for a 0 to 10 kV step.

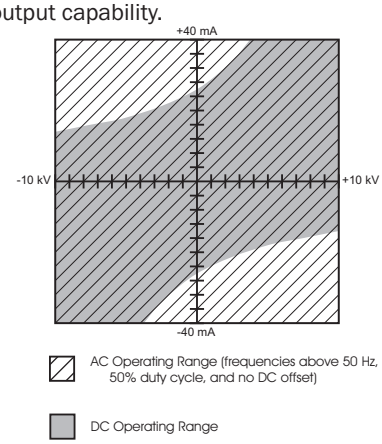
Stability

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

Drift with Temperature
Less than 100 ppm/°C.

Performance (cont.)

Automatic Power Limit
Automatically limits the internal power dissipation to protect the Model 10/40A 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 25.8" 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 IEC 320 three-prong AC line connector.

Included Accessories

Operator's Manual, HV Output Cable Assembly, Line Cord (for 104 to 126V AC), Line Cord (for 180 to 250V AC)*

*Line cord type is determined by the geographical destination of the unit.

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