

Model 623B

High-Voltage Power Amplifier



The Trek Model 623B high-voltage DC-stable power amplifier is designed to provide precise control of bipolar output voltages in the range of 0 to ± 2 kV DC or peak AC with an output current capability of ± 40 mA DC or peak AC. Applications for the Model 623B include electrostatic beam deflection, electrooptic modulation, electrophoresis research, and piezoelectric poling and driving.

Features of the Model 623B include an all-solid-state design, a slew rate greater than 300 V/ μ s, a large signal bandwidth of DC to greater than 10 kHz, and low noise operation. The four-quadrant active output stage sinks or sources current into reactive or resistive loads throughout the output voltage range which is essential for achieving the accurate output responses and high slew rates demanded by reactive loads.

The Model 623B features a current trip or current limit that is adjustable from 2 to 40 mA using the Current Trip/Limit Adjust potentiometer on the front panel.

When the Model 623B enters a current trip condition, the high-voltage output is disabled, the Trip Status indicator will illuminate and the Trip Monitor output will provide a TTL low. When the current limit operation is selected, the output crosses over to a constant current supply at the programmed limit value.

The Model 623B is protected against over-voltage and over-current conditions that may be generated by active loads or by output short circuits to ground. Precision voltage and current monitors provide buffered low-voltage output signals for monitoring purposes or for use as feedback signals in closed-loop control systems. A Digital Enable feature provides a connection for a remote device to turn the high voltage on and off.

The Model 623B is available in all nominal line voltages and can be operated on a bench top, or with optional equipment, in a standard 19-inch rack.

Output Voltage and Current Range:

0 to ± 2 kV at
0 to ± 40 mA

Slew Rate greater than 300 V/ μ s

DC Voltage Gain accuracy 0.1% of full scale

Output Monitors provide low-voltage representations of output voltage and load current

Adjustable Current Limit or Current Trip

Response Adjust optimizes output voltage waveform

Remote high-voltage ON/OFF capability

CE compliant

CONTROL WITHOUT COMPROMISE



Model 623B Specifications

All specifications are with no load unless otherwise noted.

Output

Output Voltage Range

0 to ± 2 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 ± 2 V DC or peak AC.

Input Impedance

Noninverting

25 k Ω , nominal.

Inverting

50 k Ω , nominal.

Differential

50 k Ω , nominal.

Features

Amplifier Input

A three pin input connector that can be configured for inverting, noninverting, or differential amplification.

Digital Enable

An input provides a connection for a TTL compatible signal to turn on and off the high-voltage output. A TTL high (or open) turns off the high-voltage output. A TTL low turns on the high-voltage output.

Response Adjust

A graduated one-turn potentiometer used to optimize the AC response of the Model 623B.

Trip/Limit

Switch selectable for either Current Trip mode or Current Limit mode. A graduated one-turn potentiometer is used to adjust the current trip/limit value from 2 to 40 mA.

Out of Regulation Indicator

An indicator will illuminate when the Model 623B fails to produce the required high-voltage output such as during a current limit.

Trip Status

An indicator will illuminate and the Trip Monitor BNC connector will provide a TTL low when the high-voltage output is disabled due to the output current exceeding the current trip level.

Features (cont.)

Voltage Monitor

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

Scale

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

DC Accuracy

Better than 0.1% of full scale.

AC Accuracy

Calibrated against a Ross Model VD 30-4.1-BD-KC-ALU high-voltage divider.

Offset Voltage

Less than ± 2.5 mV.

Output Noise

Less than 2 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

Output Impedance

0.1 Ω .

Current Monitor

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

Scale

0.25 V/mA.

DC Accuracy

Better than 5% of full scale.

Offset Voltage

Less than ± 5 mV.

Output Noise

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

Small Signal Bandwidth (-3dB)

DC to greater than 10 kHz.

Output Impedance

47 Ω .

Performance

DC Voltage Gain

Noninverting Configuration (V_A)

1000 V/V.

Inverting Configuration (V_B)

-1000 V/V

Differential Configuration

Function of the difference between two input signals. Represented by the equation:

$$V_{out} = 1000 (V_A - V_B)$$

DC Voltage Gain Accuracy

Better than 0.1% of full scale.

Offset Voltage

Less than ± 1 V.

Settling Time (to 1%)

Less than 150 μ s for a 2 kV step.

Performance

Output Noise

Less than 80 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter). Detailed information is available upon request.

Slew Rate (10% to 90%, typical)

Greater than 300 V/ μ s.

Large Signal Bandwidth (1% distortion)

DC to greater than 10 kHz.

Small Signal Bandwidth (-3dB)

DC to greater than 40 kHz.

Stability

Drift with Time

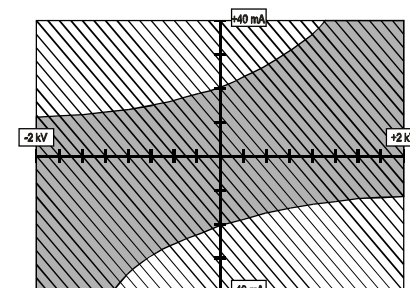
Less than 100 ppm/hr, noncumulative.

Drift with Temperature

Less than 200 ppm/ $^{\circ}$ C.

Automatic Power Limit

Automatically limits the internal power dissipation to protect the Model 623B from overheating. The following graph illustrates the automatic power limit output capability:



AC Operating Range (frequencies above 50 Hz, 50% duty cycle, and no DC offset)

DC Operating Range

General

Dimensions

134 mm H x 432 mm W x 439 mm D
(5.25" H x 17" W x 17.25" D).

Weight

13.2 kg (29 lb).

High-Voltage Output Connector

Alden high-voltage connector.

Amplifier Input

Amphenol panel mount.

BNC Coaxial Connectors

Voltage Monitor Connector
Current Monitor Connector
Digital Enable Connector
Trip/Limit Connector

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