

# Model 677B

## High-Voltage Power Amplifier/Supply



The Trek Model 677B is a high-voltage power amplifier/supply unit for precise control of output voltages in the range of 0 to  $\pm 2$  kV DC or peak AC with an output current range of 0 to  $\pm 5$  mA DC or peak AC. A differential input is available on the Model 677B-1.

The Model 677B can be operated in one of two modes: as a high-voltage amplifier where it is configured as a noninverting amplifier with a fixed gain of 200 V/V, or as a high-voltage power supply which responds to front panel controls to command an exact output voltage or current.

The Model 677B 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 677B 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 low-voltage representations of the high-voltage output and load current for monitoring purposes, or for use as feedback signals in a closed-loop system.

The Digital Enable feature provides a connection for a remote device to turn on and off the high-voltage output. This makes the 677B suitable for automated or computer-controlled systems. The 677B can be bench top operable or, with optional hardware, in a 19-inch rack.

- Output Voltage Range:  
0 to  $\pm 2$  kV DC or Peak AC
- Output Current Range:  
0 to  $\pm 5$  mA DC or Peak AC
- DC Accuracy: Better  
Than 0.1% of Full Scale
- Slew Rate: Greater Than  
15 V/ $\mu$ s
- Adjustable Current Limit
- Precision Voltage and  
Current Monitors  
Provide Low-Voltage  
Representations of the  
Output Voltage and Load  
Current
- Remote High Voltage
- On/Off Feature Ideal for  
Use with Automated or  
Computer-Controlled  
Systems
- $\text{CE}$  Compliant



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# Model 677B Specifications

All specifications are with no load unless otherwise noted.

## Output

### Output Voltage Range

#### Amplifier Mode

0 to  $\pm 2$  kV DC or peak AC.

#### Supply Mode

Adjustable from 0 to +2 kV or 0 to -2 kV with 1 V resolution.

### Output Current Range

0 to  $\pm 5$  mA DC or peak AC with an adjustable current limit.

## Amplifier Input\*

### Input Voltage Range

0 to  $\pm 10$  V DC or peak AC.

### Input Impedance

10 k $\Omega$ , nominal.

\* A differential input is available on the Model 677B-1.

## General Performance

### DC Accuracy

Better than 0.1% of full scale.

### Offset Voltage

Less than 500 mV.

### Output Noise

Less than 100 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

### Stability

#### Drift with Time

Less than 100 ppm/hr, noncumulative.

#### Drift with Temperature

Less than 350 ppm/ $^{\circ}$ C.

### Regulation

#### Line

Better than 0.025% for a line change from 90 to 110 V AC, 104 to 127 V AC, or 207 to 250 V AC.

#### Load

Better than 0.025% for a load change from 0 to 5 mA.

## Amplifier Performance

### DC Voltage Gain

200 V/V.

### Slew Rate (10% to 90%, typical)

Greater than 15 V/ $\mu$ s.

### Large Signal Bandwidth (1% distortion)

DC to greater than 1.2 kHz.

### Small Signal Bandwidth (-3dB)

DC to greater than 5 kHz.

### Settling Time to 1%

Less than 300  $\mu$ s for a 2 kV step.

## Features

### High-Voltage On/Off

A three-position rocker switch to select on, off or remote. (See "Digital Enable" for information pertaining to remote on/off.)

### Supply Mode Voltage Control Voltage Selection

A multiturn control to set the desired output voltage as indicated by the digital display.

### Polarity

A two-position rocker switch.

### Current Limit

Adjustable from 1 mA to 5 mA. A multiturn control is used to set the current limit as indicated by the digital display. A LED will illuminate when the instrument is in a current limit condition.

### Current Limit Set Accuracy

Better than 1% of setting.

### Front Panel Display

A 3½ digit LED display can be selected to indicate the voltage output, the voltage setting (supply mode), the current output, or the current limit setting. Two rocker switches, the Voltage/Current switch and the Output/Set switch, are used to select the quantity to be displayed.

### Voltage Range

0 to  $\pm 1999$  V.

### Current Range

0 to 5.00 mA.

### Voltage Resolution

1 V.

### Current Resolution

10 mA.

### Zero Offset

$\pm 1$  count, referred to the Voltage and Current Monitors.

### Voltage Monitor

A buffered output providing a low-voltage representation of the high voltage output.

### Scale Factor

1/200th of the high-voltage output signal.

### DC Accuracy

Better than 0.1% of full scale. (May degrade to 0.6% in the presence of RF fields up to 3 V/m.)

### 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).

### Output Impedance

Less than 0.1  $\Omega$ .

## Features (cont.)

### Current Monitor

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

### Scale Factor

1 V/mA.

### DC Accuracy

Better than 1% 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).

### Bandwidth (-3db)

DC to greater than 800 Hz.

### Output Impedance

Less than 0.1  $\Omega$ .

### Mode Switch

Selects either the Amplifier or Supply mode of operation.

### Digital Enable

An open collector, TTL compatible input to turn on and off the high voltage when the High Voltage switch is in the Remote position. A TTL high will turn off the high voltage. A TTL low will turn on the high voltage.

## General

### Dimensions

110 mm H x 220 mm W x 430 mm D (4.3" H x 8.7" W x 17" D).

### Weight

4 kg (9 lb).

### High-Voltage Output Connector

Alden high-voltage connector.

### BNC Connectors

Amplifier Input  
Voltage Monitor Connector  
Current Monitor Connector  
Digital Enable Connector

### AC Line Receptacle

Standard three-prong AC line connector.

### Power Requirements

#### Line Voltage

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

#### Power Consumption

60 VA, maximum.

### Operating Conditions

#### Temperature

0  $^{\circ}$ C to 40  $^{\circ}$ C.

#### Relative Humidity

To 85%, noncondensing.

