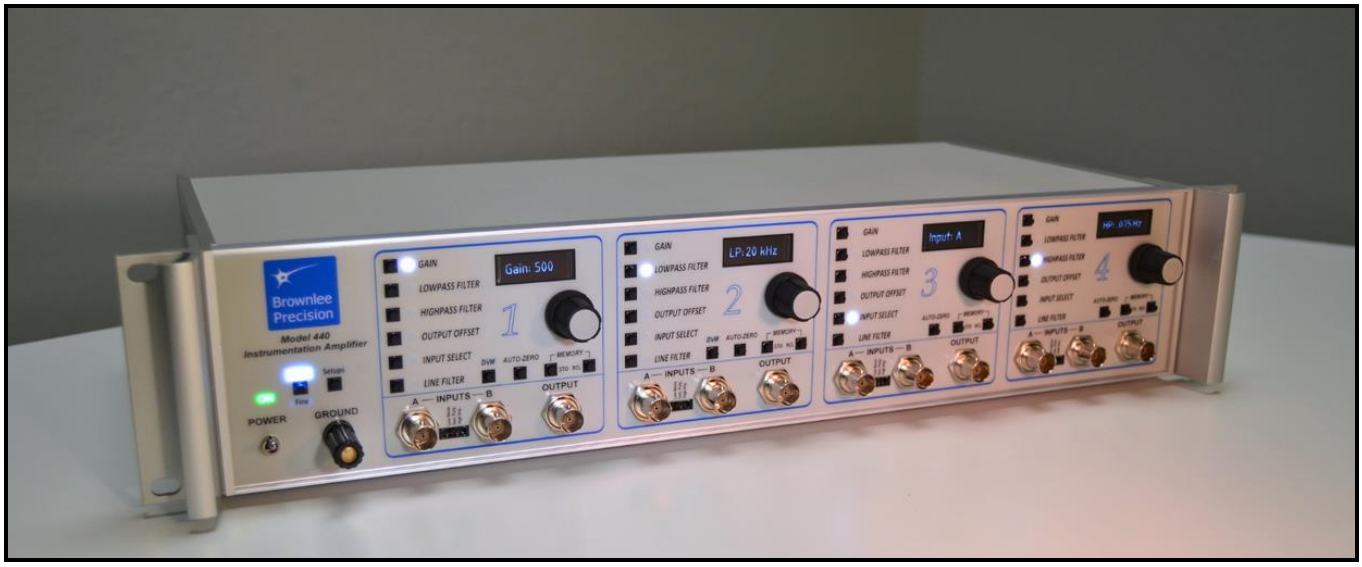
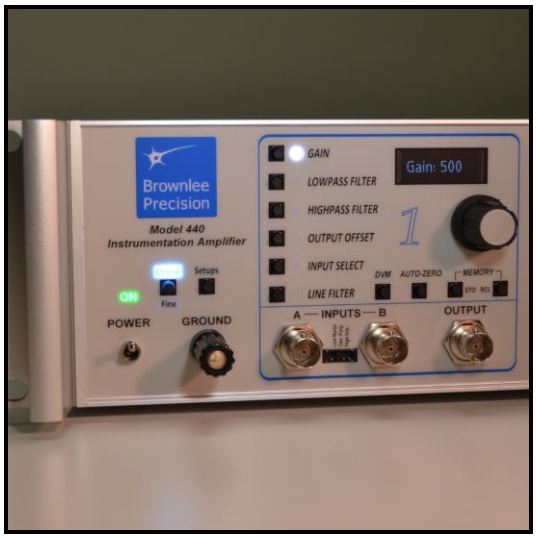
Model 440

High Performance Four-Channel Amplifier and Signal Conditioner



Description

The Brownlee Precision Model 440 incorporates four channels of sophisticated amplifier and filter circuitry in a friendly, easy to use instrument. Each channel consists of a high gain/low noise amplifier, an 8-pole Bessel lowpass filter, a highpass filter, a line notch filter, and output offset controls. A control knob sets the amplifier parameters and the values are displayed on a bright OLED alphanumeric readout.



Key Features

- Clear front panel controls for all settings
- Gains from 0.1 to 10,000 in fine, calibrated steps
- Single-ended or differential inputs
- 8-pole Bessel lowpass filter with range 20 Hz to 50 kHz
- Highpass filter with frequency range .01 Hz to 1 kHz
- Output offset control to shift output up to +/- 10 Volts
- Auto-Zero feature to reset the output to the baseline level
- Notch filter to suppress line noise
- Digital Voltmeter on channels 1 and 2
- Memory which holds multiple setups
- Powerful output which can directly drive transducers
- Wide bandwidth: greater than 150 kHz on all gains

PRECISE - - -

The Brownlee Precision Model 440 is a rugged, flexible, and precise laboratory amplifier. It was designed with particular attention to the needs of electrophysiology research. These requirements include: high gain, low noise, clean pulse response, adjustable filtering, removal of offset levels, high input impedance, and ease of use.

The 8-pole Bessel lowpass filter is ideal for removing high frequency noise while accurately amplifying the shape of input pulses. Overshoot and ringing are negligible, even with fast rise and fall times and at high gains. There are 108 different cutoff frequencies available over a range from 20Hz to 50kHz.

The Model 440's input voltage noise is a very quiet 1.5μV_{rms} or 10$\mu V_{\text{peak to peak}}$ (measurement bandwidth of 10kHz).

The input bias current is also very low at 20pA. The input resistance may be set for 1MΩ to $10^{12}\Omega$. These characteristics make the amplifier almost "invisible" to source, allowing the direct connection of many types of electrodes.

EASY TO USE - - -

The Model 440's front panel interface preserves the simplicity and "feel" of older analog instruments while taking advantage of the benefits of digital control.

Changing an amplifier setting is as easy as pushing a parameter button ("Gain" for example) and turning the control knob, up or down, until the desired setting is reached. Unlike a potentiometer however, the settings increment or decrement through discrete, calibrated steps. The bright LED alphanumeric readout displays the exact value ("Gain=850" for example).

Multiple setups may be stored for each channel in memory.

All the input and output BNC connectors are conveniently located on the front panel. Each channel functions independently and is designed to prevent crosstalk.

VERSATILE - - -

Special features have been incorporated into the Model 440 to simplify many measurement tasks.

If the input signal has a drifting DC offset voltage, it can be removed using the Highpass Filter. A notch filter is available to reduce power line noise.

The Output Offset control can shift the output baseline level from -10 V to +10 V in 100mV steps. This is helpful if the output level must match the input range of a computer's A/D board, for example. The Model 440's powerful output stage can drive +/- 100mA, and is stable even when driving capacitive loads.

Pressing "Auto-Zero" will reset the output to the baseline level (when the Highpass Filter is on) and self-calibrate the amplifier's internal offset voltages.

Channels 1 and 2 include a handy Digital Voltmeter to quickly and easily measure the output level.

SPECIFICATIONS:

Gain, Lowpass Filter, and Highpass Filter generally step through the following values in "fine" mode:
1.0, 1.1, 1.2, 1.3, … 1.9,
2.0, 2.2, 2.4, 2.6, … 4.8
5.0, 5.5, 6.0, 6.5, … 9.5,
And multiples of 10 thereof.

Gain:
Range: 0.1 to 10,000
Steps: 0.1, 0.15, 0.2, 0.25, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, then as above for gains 1.0 to 10,000.
Gain Accuracy: < 3% error

Lowpass Filter:
Range: 20 Hz to 50 kHz, and wideband.
Steps: as above for frequencies 20 Hz to 15 kHz, then 18,20, 22, 25, 33, 40, 50 (all kHz), and wideband
Characteristic: 8 pole Bessel (8 pole Butterworth may be substituted on any or all channels; contact factory)
Wideband Frequency Response: 150 kHz min., all gains

Highpass Filter (AC Coupling):
Range: .01 Hz to 1 kHz
Steps: DC, AutoZero DC, then as above

Input:
Selection: A, -B, A-B, or Grounded
Impedance: 1 MΩ or 10^{10} Ω, 20 pF
Bias Current: 20 pA
Offset Voltage: 15µV, max.
Voltage Range: +/- 10V
CMRR: > 70dB, all gains
Noise: 1.5 μV_{rms} (10 $\mu V_{\text{peak to peak}}$) @ 10 kHz

Output:
Voltage Range: +/- 10 V
Current Drive Capability: +/- 100 mA
Slew Rate: 10 V/µS
Output Offset Control Range: +/- 10 V in 100 mV steps
Noise: 500 μV_{rms} (3mV $_{\text{peak to peak}}$) @ 10 kHz

Warranty:
12 months, parts and labor

Warning:
This product is not for use on human subjects

International Orders:
The Model 440 can be specially configured for international operation. Please specify linecord, voltage, and frequency when ordering.

All specifications are typical unless indicated as min. or max. This data is preliminary and subject to change without notice. 01/2025

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