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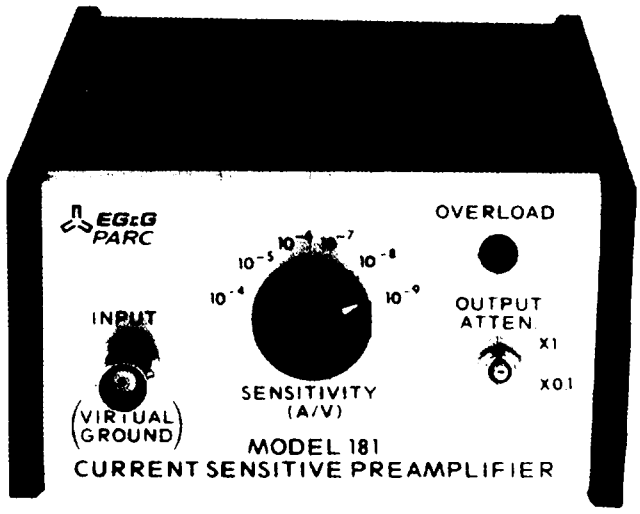
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181 CURRENT-SENSITIVE PREAMPLIFIER



FEATURES

- Low input impedance
- Low noise
- Wide range of gain settings
- High open loop gain

DESCRIPTION

The Model 181 and any EG&G Princeton Applied Research Corporation lock-in form a sensitive system optimized for measuring low-level currents such as those encountered in photometry and semiconductor research. The resulting system offers lower internal noise, greater frequency response, higher dynamic range, greater phase accuracy and lower input impedance than nearly any other low-level ac current-measuring system available. In photometric applications, the system's low internal noise enables you to utilize fully photodetectors with dark currents as low as 10^{-14} A/$\sqrt{}$ Hz. The system's wide frequency response enables you to employ high chopping rates to minimize the effects of 1/f noise and power-line pickup. The system's high dynamic range enables you to measure small ac currents superimposed on quiescent detector current as great as 10 times the current-to-voltage conversion setting without overloading the preamplifier. In semiconductor applications, the low input impedance enables you to plot accurately the actual bias voltage applied to the device under test without having to worry about the effects of back bias. The system's low internal noise enables you to measure accurately the smallest capacitance changes without having to use excessively long time-constants. The system's low phase shift enables you to take data at several different frequencies without having to readjust controls continually. This combination of performance features makes the Model 181/EG&G PARC Lock-In Amplifier combination the ideal choice for many applications involving the measurement of minute ac currents.

SPECIFICATIONS

Gain

Overall system current sensitivity when operated with a lock-in amplifier is equal to the lock-in sensitivity multiplied by the Model 181 A/V sensitivity setting. The Model 181 output voltage will be equal to the input current multiplied by (A/V)$^{-1}$.

Overload Indicator Light

Indicates instantaneous (dc plus peak ac) current has exceeded amplifier capability; see table.

Monitor

A 600 Ω output is available at a rear-panel BNC connector to permit monitoring of the input signal.

Output Attenuator

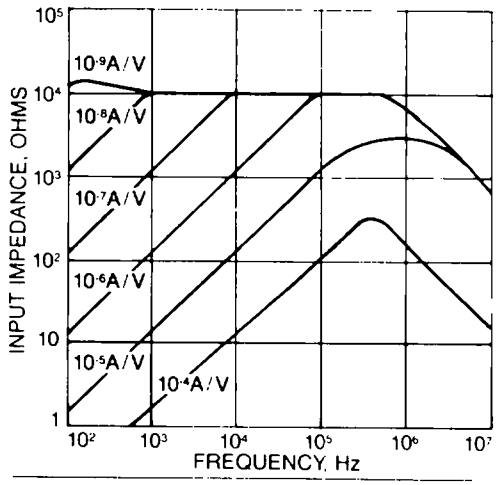
Provides 10:1 attenuation of output voltage.

Signal Output

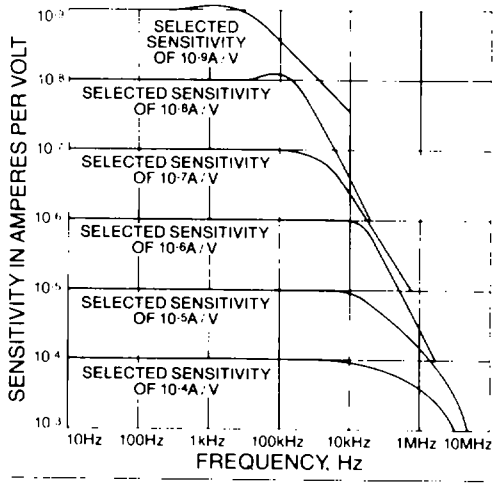
6.5 V rms maximum output voltage. 1 kΩ nominal output impedance.

181 PREAMPLIFIER SPECIFICATIONS

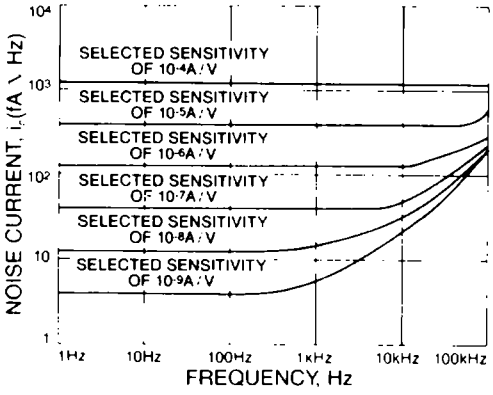
SPECIFICATIONS



Typical input impedance as a function of sensitivity and frequency



Typical frequency response as a function of sensitivity



Typical noise current as a function of frequency and sensitivity

Gain	Upper Frequency	Maximum (Peak) Input Current	Upper 3 dB N.F. Contour Source Resistance
10^{-9} A/V	1 kHz	10 nA	500 megohms
10^{-8} A/V	10 kHz	100 nA	100 megohms
10^{-7} A/V	50 kHz	1 μA	10 megohms
10^{-6} A/V	100 kHz	10 μA	1 megohms
10^{-5} A/V	200 kHz	100 μA	100 kilohms
10^{-4} A/V	200 kHz	1 mA	10 kilohms

Typical model 181 characteristics.

NOTE: Specifications subject to change without notice

GENERAL

Adjustments

Bias: This adjustment (accessible through an opening in the bottom of the instrument) provides detector biases in the range of 0 V to − 5 V at the front panel. Nominal source impedance is 10^{5}/S, where S is the selected sensitivity; e.g., selected sensitivity = 10^{-7} A/V; source impedance = $10^{5}/10^{-7}$ = 10^{2} = 100 Ω. In some applications, it may prove convenient to use the Bias adjustment to cancel the effect of dc bias accompanying the input signal.

DC-Zero Adjustment: (also accessible through opening in the bottom of the instrument) allows internal electronics to be dc zeroed.

Power Requirements

± 15 V dc or + 24 V dc at 30 mA, each obtainable from the EG&G PARC lock-in with which it is used by means of the special power cable supplied. When the Model 181 is ordered with a lock-in, the appropriate power cable is automatically supplied. However, if the Model 181 is to be used with your present EG&G PARC lock-in, please specify both the model number and the serial number of the instrument. Additional power cables can be ordered separately to enable you to operate your Model 181 with more than one model EG&G PARC lock-in. A remote power supply is available for stand alone operation.

Weight and Size

1.1 lbs (0.5 kg). 4.5" W x 2.7" H x 6.6" D (11.4 cm W x 6.9 cm H x 16.8 cm D).
Shipping Weight: 2.2 lbs (1 kg).

Warranty

Two years.

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