

Model 518X

Series Preamplifiers

This series of preamplifiers offers convenient bench top instruments with a range of specifications to suit a wide variety of applications. All models in the series can be powered from internally housed (alkaline) batteries (except the model 5185), external low voltage supplies (± 15 V or ± 18 V) or via the optional line power supply module, model PS0108. Nickel-cadmium rechargeable batteries can also be used, but give reduced operating time and must be recharged in an external charger. In addition, all of the preamplifiers in this range, with the exception of the 5185, can be directly powered from **SIGNAL RECOVERY** Lock-in Amplifiers (other than the models 5105 and 5106) and the 7310 Noise Rejecting Voltmeter. Their low noise performance makes them ideally suited for signal recovery applications.

The models 5182, 5183, 5184, 5186 and 5188 preamplifiers offer an output impedance of 450Ω which when connected to a 50Ω load creates a convenient 10:1 signal attenuation.

A rack mount kit, model K0304, is available which will accommodate one or two instruments, including their associated power supplies if required (see page 13).

Model 5182

Current Preamplifier



FEATURES

- ◆ Low input impedance
- ◆ Low noise
- ◆ Single-ended virtual ground input
- ◆ Adjustable sensitivity
- ◆ Bias current monitor (DC) and signal (AC) outputs
- ◆ DC to 1 MHz frequency response
- ◆ Battery or external DC power

APPLICATIONS

- ◆ Photodiode amplification
- ◆ Photomultiplier amplification
- ◆ Ion collector amplification
- ◆ Electron multiplier amplification

DESCRIPTION

The model 5182 is a current-to-voltage preamplifier of low noise and low input impedance designed to amplify the extremely low currents encountered in such areas as photometry and semiconductor research. It has four standard sensitivity settings but in addition includes a special low-noise mode on the highest gain position for even better low current measurement capability. The unit features two outputs, allowing both the AC and DC components of the input signal to be independently monitored, so that, for example, in a PMT application the bias current can be measured separately from the signal current.

It can be powered from its own internally housed (alkaline) batteries, an external low voltage supply (± 15 V or ± 18 V) or from the model PS0108 remote line power supply (optional extra). This preamplifier can also be powered from most of our range of lock-in amplifiers and from the model 7310 noise rejecting voltmeter.

The model 5182 is ideally suited to amplifying signals from current sources such as electron multipliers, ion collectors, photomultipliers and photodiodes.

Specifications

General

DC coupled current to voltage amplifier with adjustable sensitivity and a maximum frequency response extending from DC to 1 MHz. Single-ended virtual ground input and single-ended DC and AC coupled outputs via BNC connectors.

Battery powered from internal alkaline batteries or external DC power supply.

Inputs

Modes	Single-ended virtual ground
Coupling	DC
Sensitivity	Switch selectable (5 settings)
AC Output	10^{-5} , 10^{-6} , 10^{-7} , 10^{-8} , 10^{-9} low noise A/V
DC Output	10^{-3} , 10^{-4} , 10^{-6} , 10^{-7} , 10^{-8} A/V
Accuracy	$\pm 2\%$
Stability	± 300 ppm/ $^{\circ}$ C
Impedance	see Figure 1

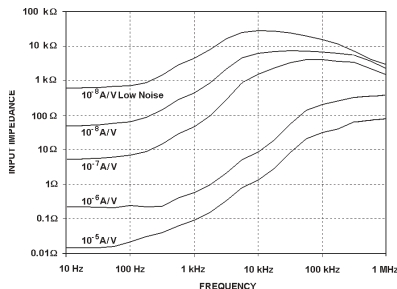


Figure 1, Input Impedance vs. Frequency and Sensitivity

Max input w/o damage ± 15 V DC or 10 V rms. AC @ 50 Hz
 Noise see Table 1

Noise

Gain A/V	Max DC Input Current	Noise Current at 1 kHz
10^{-5}	9 mA	10 pA/ $\sqrt{\text{Hz}}$
10^{-6}	900 μ A	5 pA/ $\sqrt{\text{Hz}}$
10^{-7}	9 μ A	135 fA/ $\sqrt{\text{Hz}}$
10^{-8}	900 nA	45 fA/ $\sqrt{\text{Hz}}$
10^{-8} , low noise	90 nA	15 fA/ $\sqrt{\text{Hz}}$

Table 1, Max DC Current and Noise Current vs. Sensitivity

Frequency Response (AC Output) lower limit 0.5 Hz upper limit depends on sensitivity setting, see Figure 2

Max DC current at input see Table 1

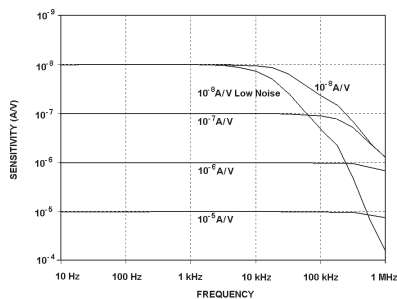


Figure 2, Frequency Response vs. Sensitivity

Outputs

AC Output	Impedance 450 Ω Max voltage swing > 10 V pk-pk Slew rate > 22 V/ μ s
DC Output	Impedance 10 k Ω Max voltage swing $> \pm 9$ V Polarity Current flowing into the input produces positive output voltage

Power

Internal	Four 9 V alkaline batteries provide approximately 15 hours of use
External a)	± 15 V or ± 18 V DC @ 25 mA
b)	110 V AC or 240 V AC via optional external model PS0108 power supply

Dimensions

(excluding connectors) 8.25" wide x 11" deep x 3.5" high
 (210 mm wide x 279 mm deep x 89 mm high)
 Weight 5.3 lbs. (2.4 kg) excluding optional power supply

Weight

Why should you choose **SIGNAL RECOVERY** products?

Models 181, 5182, 5183, 5184, 5186, 5187, 5188A and 5188B Preamplifiers

SIGNAL RECOVERY Product Features

- ♦ Wide choice of units
- ♦ Battery, line power (via PS0108) or power from one of our other instruments
- ♦ Can be used not only with our units but also with oscilloscopes, ADC cards and instruments from other suppliers - anywhere that a low-noise, high performance gain stage is required
- ♦ Model 181 can apply an adjustable bias to a detector

Benefit to you

- No need to compromise on specifications. Gives best match to the signal of interest
- Battery operation usually gives the lowest noise
- Preamplifiers are useful general laboratory instruments
- Avoid building your own biasing network and eliminate the need to replace batteries