

MODEL 564 CURRENT PREAMPLIFIER

The Model 564 Current Preamplifier is a versatile gain block for use with photomultipliers, photodiode detectors and other current source type transducers. It incorporates several features not found on the simpler Model 1641. These include switchable ac or dc signal coupling, a detector biasing trimpot, an output buffer amplifier and an overload indicator. It consists of an input current converter stage with gain switchable from 10^4 to 10^8 V/A followed by an output voltage buffer switchable for 1X or X100 gain. This allows operation either in a high speed (but noisier) mode or a lower bandwidth mode with near-theoretical noise performance. The output buffer amp stage also makes the Model 564 immune to capacitive loading offsets at the output, resulting in stable operation even when both the input and output have heavy capacitive loads.

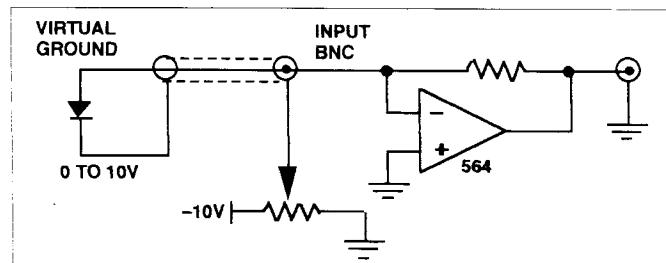
The 564 operates with an input virtual ground to mitigate the effects of source and cabling shunt capacitance and to prevent loading effects on non-linear transducers such as photodiodes. Like the Model 1212, the Model 564 is relatively lightly damped, which optimizes it to have the widest bandwidth consistent with lock-in amplifiers yet not be overpeaked when operated with moderate capacitance transducers such as small area PIN photodiodes.

The input offset trimpot can be used to prevent unwanted current from disturbing the zero bias voltage condition of a quiescent photodiode, or alternatively to null the output offset voltage. When employing the offset function, one should disengage the bias function by turning its trimpot fully counterclockwise.

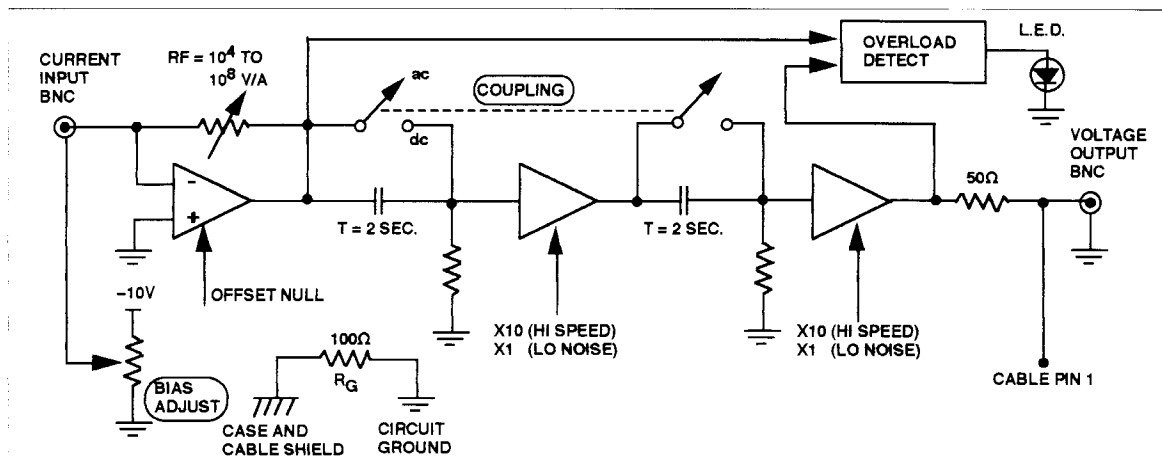
The bias trimpot in effect acts to develop a deliberate gross input offset voltage. This allows one to impose a reverse potential in the range of 0 to 10 volts across photoconductive type diode detectors. The detector anode should connect to the input BNC center conductor with the cathode connected to the shell as shown in the Figure below .

SPECIFICATIONS

- SENSITIVITY** 10^{-4} to 10^{-8} A/V in "Low Noise" mode. 10^{-6} to 10^{-10} A/V in "High speed" mode
- DETECTOR BIAS** Adjustable 0 to +10 V
- INPUT OFFSET** Nullable to zero
- AMPLIFIER COUPLING** Switchable ac/dc
- LOW FREQ CUTOFF** 0.05 Hz -3 dB in ac coupled mode @ 12 dB/oct rolloff
- OUTPUT POLARITY** Inverting (buffered)
- OUTPUT IMPEDANCE** 50 Ω
- DC SUPPLY REQUIREMENT** ± 14 to ± 24 Vdc @30 mA
- TEMPERATURE AND HUMIDITY**
 - Operating** 0 to 45°C, 10 to 90% R.H.
 - Storage** -20 to +60°C, 10 to 80% R.H.
- DIMENSIONS** 60 x 80 x 43 mm, (2.36" x 3.15" x 1.69")
- WEIGHT** 300 grams (10.5 oz)



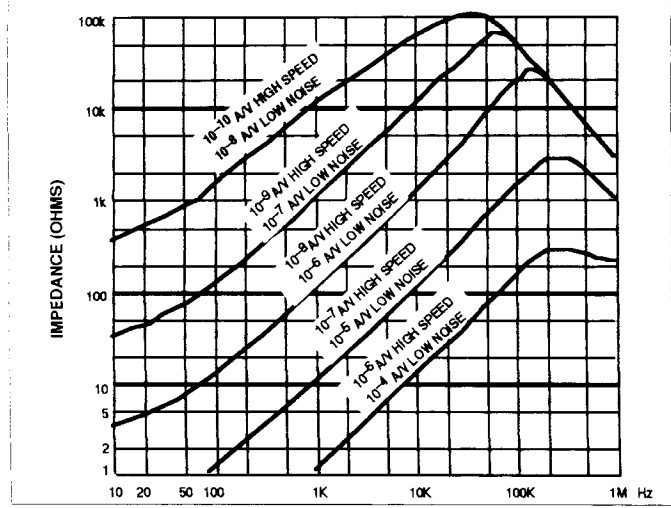
Model 564 Detector Biasing



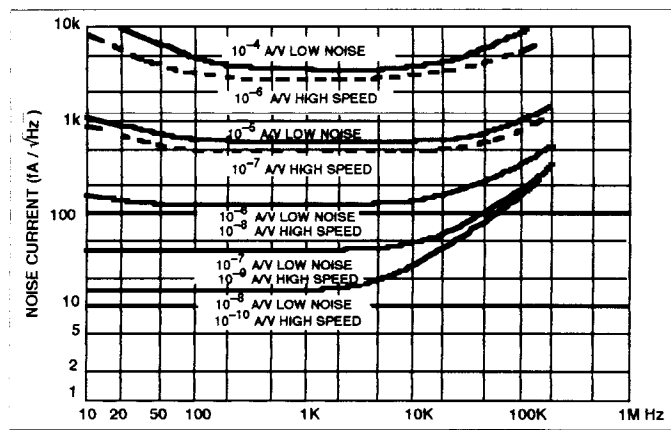
Model 564 Current Preamplifier Block Diagram

MODEL 564 CURRENT PREAMPLIFIER

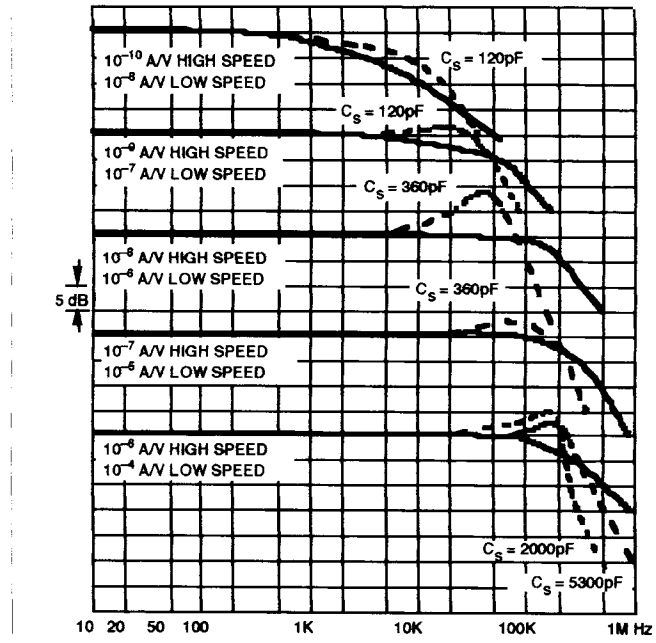
RANGE (Low Noise) A/V	Peak Full Scale Input	3 dB Frequency	Open Circuit Input Noise @ 1kHz A/v/Hz
10 ⁻⁸	100 nA	3 kHz	1.3 X 10 ⁻¹⁴
10 ⁻⁷	1 μA	20 kHz	4.1 X 10 ⁻¹⁴
10 ⁻⁶	10 μA	150 kHz	1.3 X 10 ⁻¹³
10 ⁻⁵	100 μA	200 kHz	6 X 10 ⁻¹³
10 ⁻⁴	1 mA	250 kHz	4 X 10 ⁻¹²
RANGE (High Speed) A/V			
10 ⁻¹⁰	1 nA	3 kHz	1.3 X 10 ⁻¹⁴
10 ⁻⁹	10 nA	20 kHz	4.1 X 10 ⁻¹⁴
10 ⁻⁸	100 nA	150 kHz	1.3 X 10 ⁻¹³
10 ⁻⁷	1 μA	200 kHz	5 X 10 ⁻¹³
10 ⁻⁶	10 μA	250 kHz	3 X 10 ⁻¹²



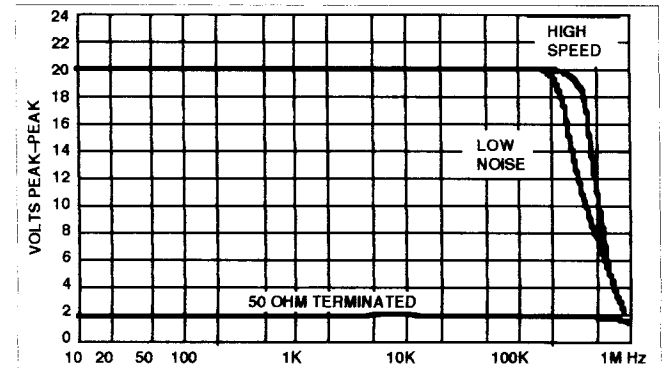
Model 564 Input Impedance vs Frequency



Model 564 Effective Noise Current vs Frequency

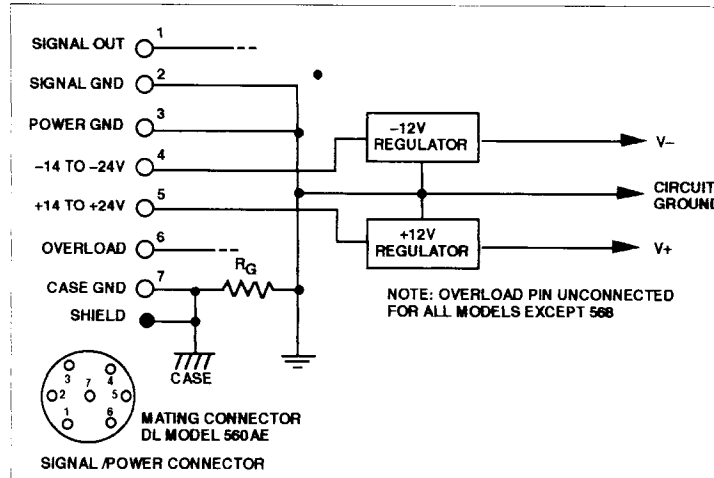


Model 564 Frequency Response vs Source



Model 564 Maximum Sinusoidal Output Voltage vs Frequency

- 560 SERIES CABLES (2 meter length)**
560V1 Power Cable for 399 Lock-In
4200V2 Power and signal cable for 450 Series Amplifiers and 4000 Series Filters



560 Series Preamplifier Power and Grounding

For more information contact
DL Instruments, LLC

725 West Clinton Street Ithaca, NY 14850
 Telephone 607-277-8498 FAX 607-277-8499