

# MODEL 565 ULTRA LOW NOISE TRANSFORMER COUPLED VOLTAGE PREAMPLIFIER

**DL** Instruments, LLC

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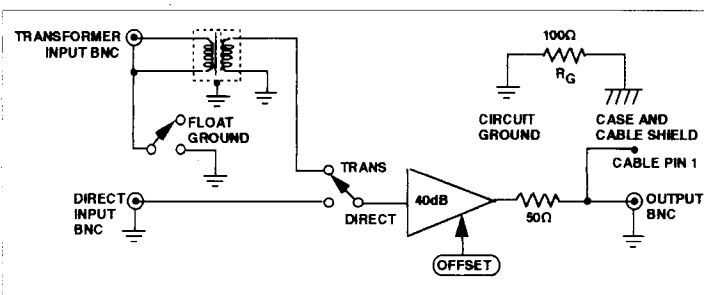
The 565 is operable in two modes. In the direct mode it yields 40 dB of gain with medium impedance performance similar to the Model 566 Voltage Pre-amplifier. In the transformer mode, it provides truly exceptional noise performance (equivalent to the Johnson thermal noise of a 1.4  $\Omega$  resistor at 300°K) by switching in a 20 dB impedance matching transformer ahead of the amplifier stage. Its superior magnetic design also yields very wide bandwidth for source impedances of 10  $\Omega$  or lower.

**CAUTION!** The 565 cannot tolerate dc voltage on its transformer input in excess of  $\pm 10$  millivolts. For ac inputs below 50 Hz riding on the dc bias, the allowable dc level for less than 5% gain error will decrease linearly with frequency. Thus for a 5 Hz signal, only 1 mV of dc input bias would be allowable.

The input transformer is torroidally wound to render it insensitive to stray magnetic fields. Additionally, it is completely encased in mu-metal to shield against magnetic pickup. The input transformer also incorporates a conductive shield to prevent capacitive coupling of common mode interference from the input winding to the secondary winding. The aluminum case of the 565 affords a further shielding effect against electric fields.

## SPECIFICATIONS

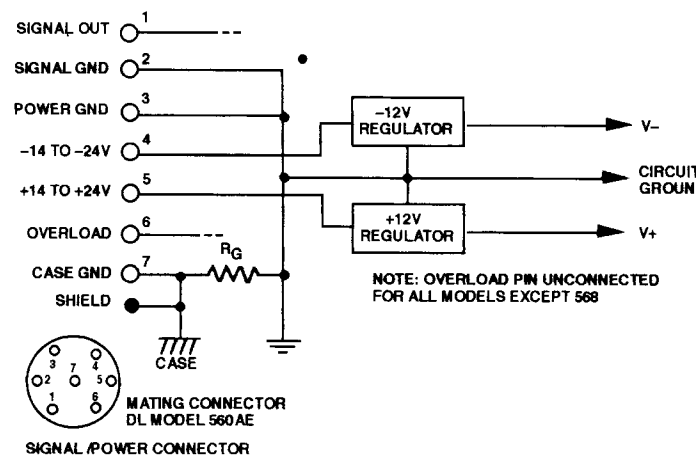
**GAIN** Transformer Mode 60 dB Direct Mode 40 dB  
**BANDWIDTH** Transformer 0.05 Hz - 100 kHz,  
 with 0.5  $\Omega$  Source Direct dc - 600 kHz  
**INPUT** Transformer Switchable, floating or  
 grounded Direct Single ended  
**MAX. INPUT SIGNAL WITHOUT DISTORTION**  
 Transformer 16 mVpp above 0.5 Hz. Linearly de-  
 rate below 0.4 Hz (e.g., 2 mV pp max @ 0.05 Hz)  
**TRANSFORMER MAGNITIZATION THRESHOLD\***  
 500 mA dc (200 mV dc) applied to input  
**TRANSFORMER INPUT CMRR** 90 dB @ 50 kHz,  
 110 dB @ 20 kHz, 120 dB below 10 kHz



## SPECIFICATIONS (continued)

**INPUT DAMAGE THRESHOLD\*** Transformer 5A  
 dc (2V dc) Direct 3V rms or  $\pm 2V$  dc  
**INPUT NOISE** Transformer Typ. 0.15 nV/ $\sqrt{\text{Hz}}$   
 Direct Typ. 1.2 nV/ $\sqrt{\text{Hz}}$   
**INPUT OFFSET** Direct Screwdriver adjustable to  
 zero.  
**GAIN STABILITY** Direct Typ. 50ppm/ $^{\circ}\text{C}$   
**INPUT OFFSET STABILITY** Direct Typ. 0.5  $\mu\text{V}/^{\circ}\text{C}$   
**TOTAL HARMONIC DISTORTION** Direct Typ.  
 0.001% @ 1 kHz into 10 K load  
**INPUT dc IMPEDANCE** Transformer 0.4  $\Omega$   
 Direct 100 k $\Omega$   
**OUTPUT IMPEDANCE** 50  $\Omega$   
**OUTPUT POLARITY** Non-inverted  
**dc SUPPLY REQUIREMENT**  $\pm 14$  to  $\pm 24$  Vdc @  
 20 mA  
**OPTIMAL SOURCE IMPEDANCE** Transformer  
 0.5 to 50  $\Omega$  Direct 50  $\Omega$  to 10 k $\Omega$   
**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 54 mm (2.36" x 3.15" x  
 2.13") excluding connectors  
**WEIGHT** 500 grams (1 lb. 2 oz.)

\*Suggested external fuse to protect against damage or magnetization, 500 mA fast blow. See IPB 0134 "Model 565 Preamplifier Transformer Input Characteristics" for more details, including a demagnetization procedure.

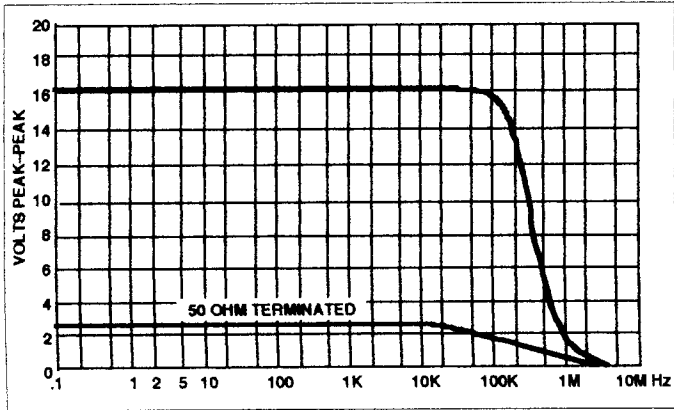


## 560 Series Preamplifier Power and Grounding

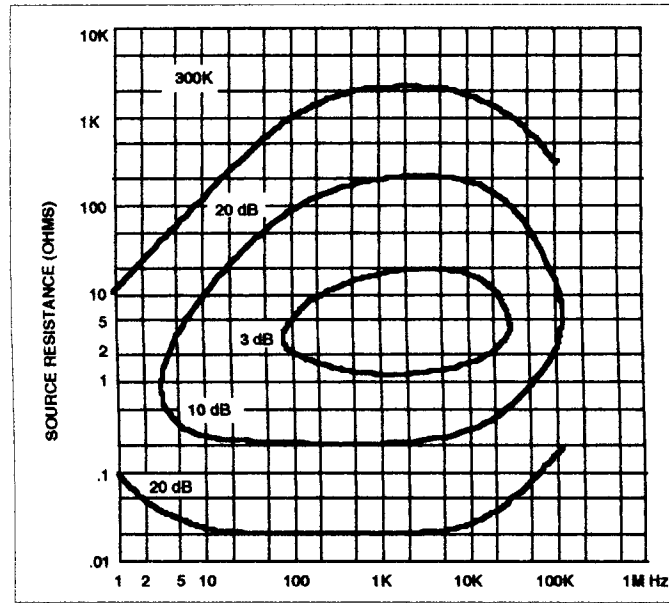
### 560 SERIES CABLES (2 meter length)

- 560V1** Power Cable for 399 Lock-In
- 4200V2** Power and signal cable for 450 Series Amplifiers and 4000 Series Filters

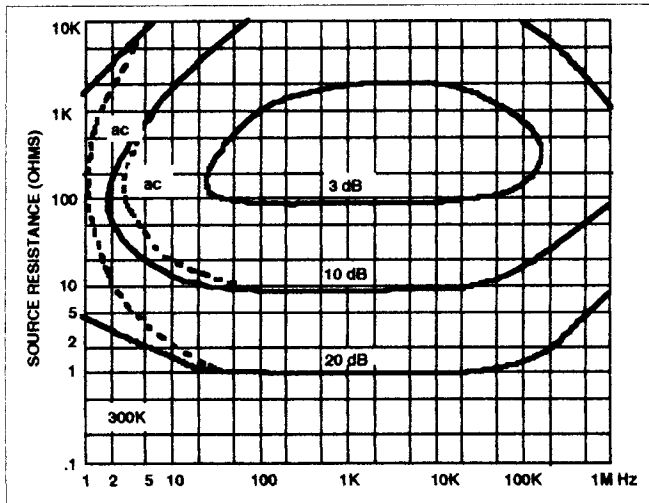
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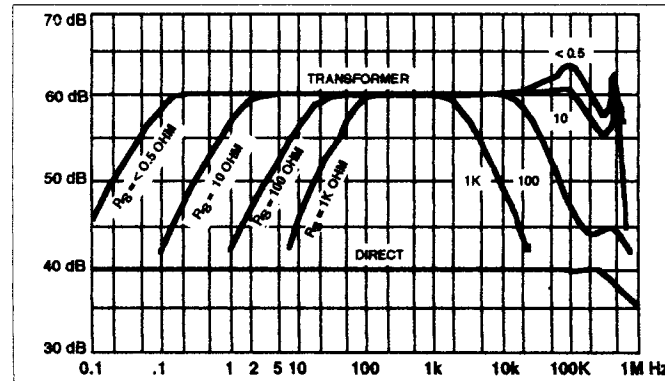
565 Maximum Sinusoidal Output Voltage vs Frequency



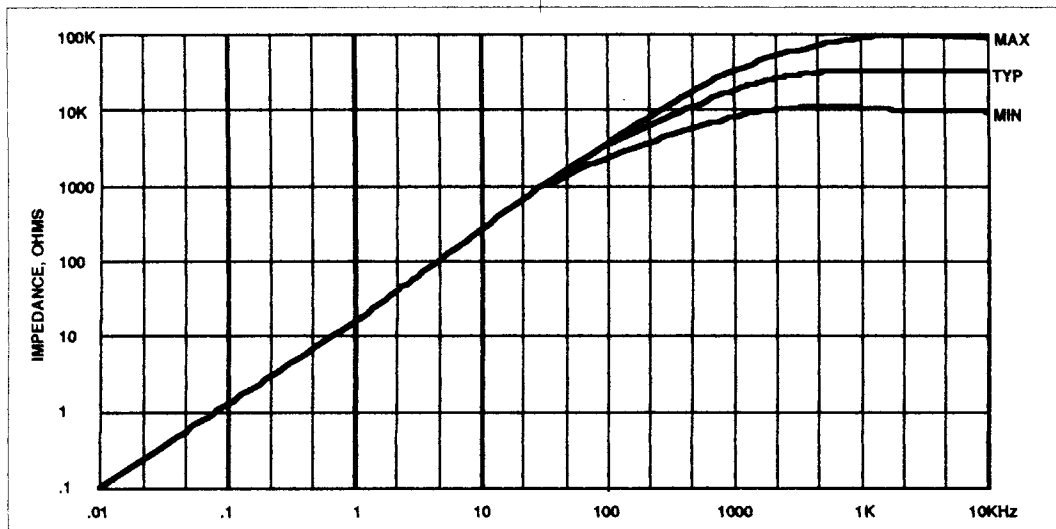
565 (Transformer Mode) Noise Figure Contours



565 (Direct Mode) Noise Figure Contours



565 Frequency Response



565 ac Input Impedance vs Frequency In Transformer Mode

For more information contact