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MODEL SR552

Voltage Pre-amplifier

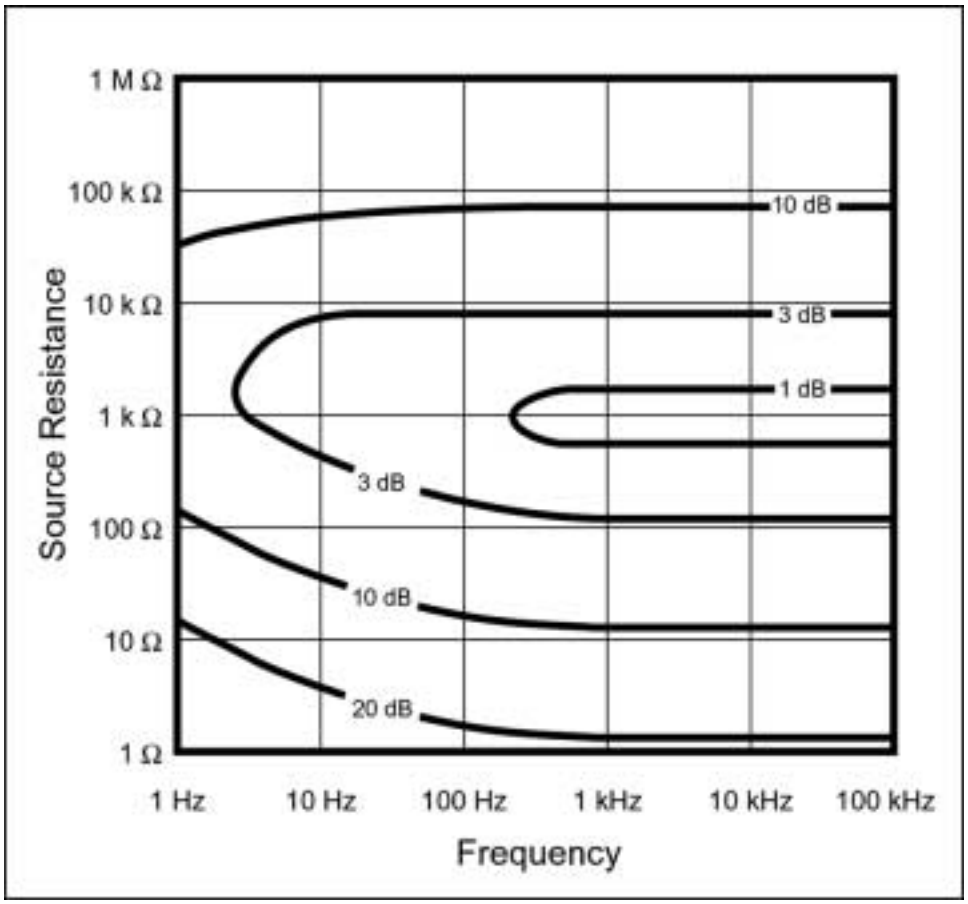
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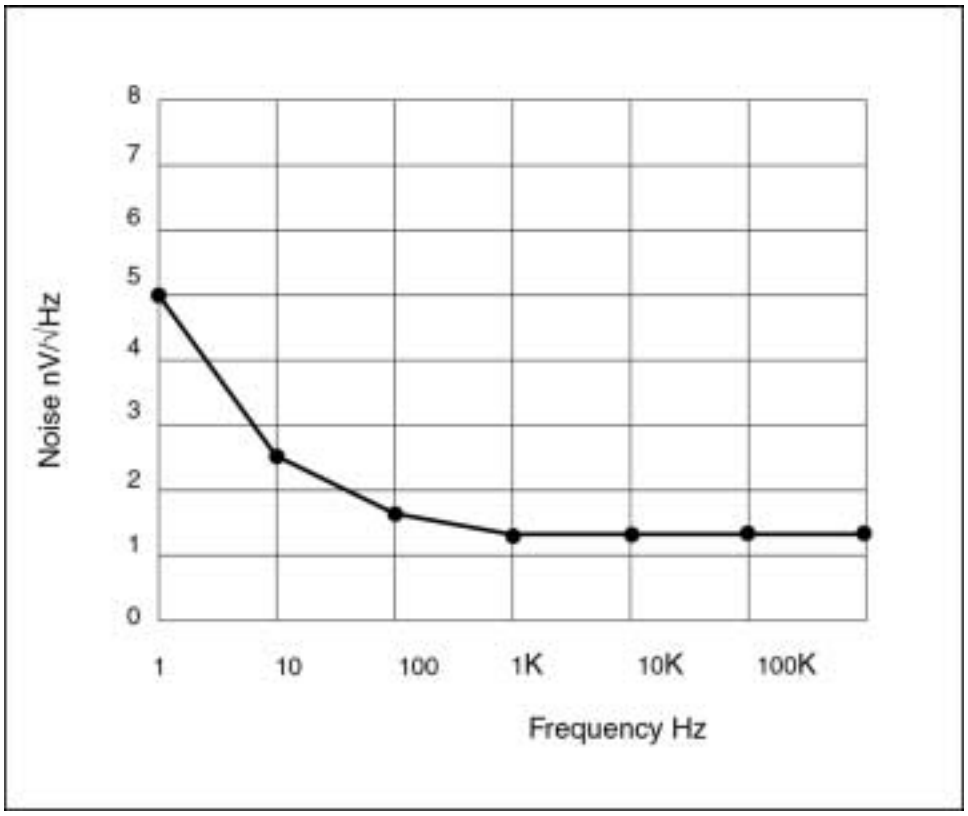
Stanford Research Systems

SR552 Preamplifier Specifications Summary

IInput Impedance	100 KΩ + 25 pF	
Inputs	Single ended or differential (switch selectable)	
Maximum Inputs	70 mV rms for overload Damage threshold: 20 Vac, 50 Vdc	
Noise	1.4 nV/√Hz at 1000 Hz 1.6 nV/√Hz at 100 Hz 2.5 nV/√Hz at 10 Hz (all figures are Typical)	
Common Mode	Range: Rejection:	1 Volt peak 100 dB at 100 Hz
Gain	10,20,50,100 SR510/530 DSP Lock-Ins	 Automatically set by SR510 or SR530 Lock-In depending on sensitivity and dynamic reserve. Sensitivity ranges from 10 nV to 200 mV full scale (with expand off). Note: Lock-in readings must be divided by 10. Gain is set to 100. Divide lock-in recordings by 100 for correct amplitude.
Gain Accuracy	2% (2 Hz to 100 kHz)	
Gain Stability	200 ppm/°C	
Outputs	(A) single ended (600Ω impedance) (B) shielded ground	
Maximum Output	10 Volts peak	
Power	Supplied by SRS Lock-In via control cable.	
Mechanical	Size 1.3" X 3.0" X 5.1" Weight 1 lb.	
Warranty	One year parts and labor on materials and workmanship.	

Noise Figure Contour





OPERATING INSTRUCTIONS

The SR552 Voltage Pre-Amplifier is designed to be used with either the SR510/530 lock-ins as well as the newer DSP lock-ins. The SR552 reduces the input noise and extends the full scale sensitivity to 10 nV (without expand). When used as a remote pre-amplifier, the SR552 can eliminate the effects of noise pickup on long signal cables.

Power and control are supplied to the SR552 via the 9 pin cable which is supplied with the unit. Attach one end of the cable to the connector on the rear of the SR552. With the lock-in power off, connect the other end of the cable to the PRE-AMP connector on the rear of lock-in. Both ends of the cable are equivalent. If a longer cable is required, any standard 9 pin cable will suffice since all connections are straight through. When the lock-in power is on, the POWER indicator on the SR552 will light.

CONNECTING THE SR552

The (A) Output of the SR552 should be connected to the (A) Input of the lock-in. For most applications, this single connection will be adequate. The lock-in Input Selector should be set to (A). For situations where there may be noise pick-up on this cable, it is better to connect the SR552 (B) Output (shielded pre-amp ground) to the (B) Input of the lock-in as well. The (A) and (B) cables should be twisted together to prevent inductive pick-up. The lock-in Input Selector should then be set to (A-B).

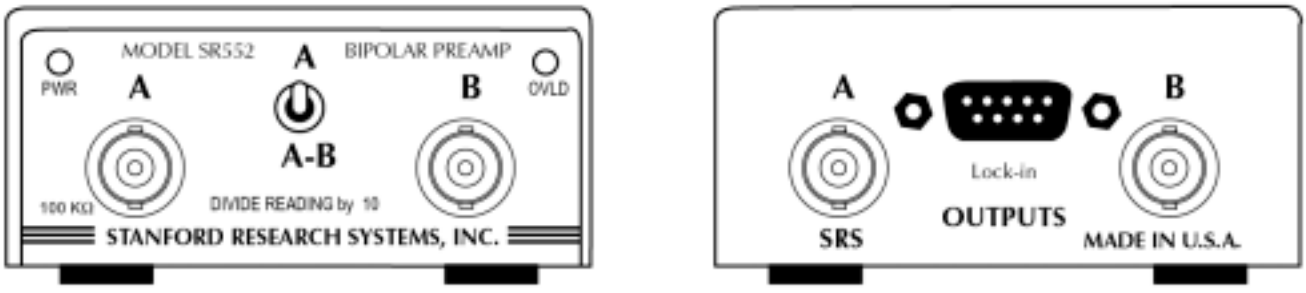
The SR552 (A) and (B) Inputs should now be used as the lock-in voltage inputs. The input switch selects single ended, (A), or differential, (A-B), operation. The input impedance is 100 kΩ, 25 pF. The connector shields are isolated from the chassis ground by 10 Ohms. These inputs are protected to 100 Vdc but the ac input should never exceed 10 V peak. The maximum input before overload is 70 mV rms. The OVERLOAD indicator will light whenever the pre-amplifier overloads. Note that overloads that occur after the pre-amplifier are indicated by the lock-in's overload indicator.

USING THE SR550 WITH THE SR510/530

The SR510/530 lock-ins sense the presence of the SR552 through the power cable and takes it into account when setting the gain of its own amplifiers. Thus, to obtain the correct overall gain, the SR552 output must be connected to the voltage inputs of the lock-in.

The overall sensitivity of the lock-in plus the pre-amplifier is displayed as the sensitivity on the lock-in front panel. It is necessary to divide the displayed sensitivity by 10.

The gain of the SR552 is 10, 20, 50, or 100. The gain is controlled by the lock-in and is set to maximize the pre-amplifier gain while maintaining the selected dynamic reserve. For most sensitivities, the pre-amplifier gain will be 100. The following table summarizes the gain allocation.



SR552 Pre-Amplifier Front Panel and Rear Panel

DYN RES	FS Sensitivity	SR552 Gain
LOW	> 50 mV	10
20 db	50 mV	20
	20 mV	50
	< 20 mV	100
NORM	> 5 mV	10
40 db	5 mV	20
	2 mV	50
	< 2 mV	100
HIGH	> 500 μV	10
60 db	500 μV	20
	200 μV	50
	< 200 μV	100

When the SR552 is connected, the full scale sensitivity can extend to 10 nV (no expand). The 10, 20, 50 nV sensitivities can be reached using the normal lock-in controls. If the SR552 is disconnected while the sensitivity is below 100 nV, the sensitivity will revert back to 100 nV.

From the computer interface, the presence of the SR552 can be determined using the 'H' command. Also, gain codes 1-3 are acceptable in the 'G' command to set sensitivities below 100 nV. Pre-amplifier overloads are not detectable via the computer interface.

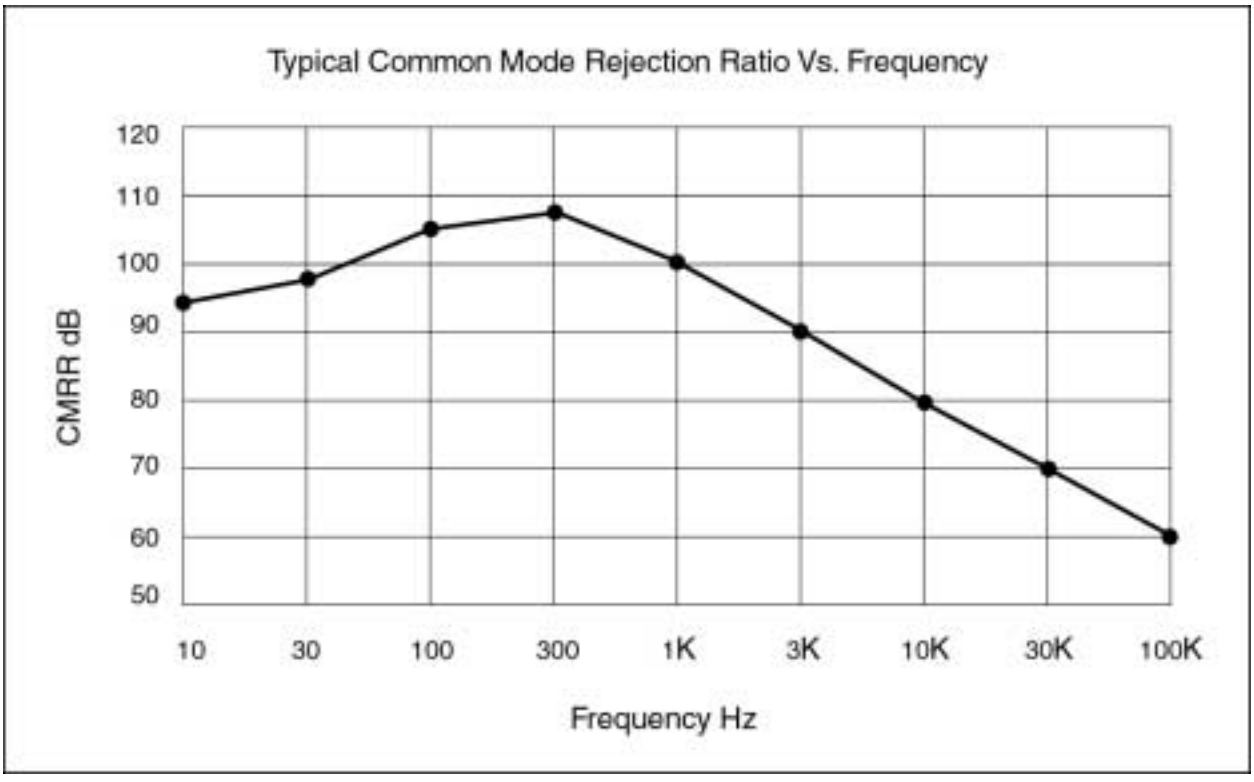
USING THE SR552 WITH SRS DSP LOCK-INS

The SR552 is not sensed by the DSP lock-ins. The DSP lock-in does NOT compensate for the gain of the preamp. The gain of the preamp is set to 10. Measurements made with the preamp need to be divided by 100.

The SR552 is AC coupled from 1 Hz to 100 kHz. Set the lock-in input to AC coupled since the signal must be above 1 Hz. Frequencies below 1 Hz will not be detected by the SR552.

COMMON MODE ADJUST

The common mode rejection of the SR552 is adjusted by the small screw on the right side of the enclosure. The CMR is set at the factory, however, it may be necessary to re-adjust it, particularly if there is one specific frequency which is important. The easiest way to peak the CMR is to use the internal oscillator of the lock-in (or any signal generator). Apply a reference signal to the lock-in REFERENCE INPUT. Apply a 100 mV signal to both the (A) and (B) inputs of the SR552. Check the SR552 connections by switching the input selector to (A). The lock-in should read 100 mV (with the phase adjusted on the SR510). Now switch the SR552 to (A-B). Adjust the lock-in sensitivity to obtain a 50% output. Adjust the CMR screw on the SR552 to minimize the lock-in output. On the SR510, it is necessary to check the output when 90° of phase shift is added as well. On a



dual phase lock-in, use the R output to avoid phase shifts.

The SR552 without a lock-in

The SR552 can be powered with an external power supply. Power is applied through the 9 pin connector as described below.

Pin	Voltage	Current
1	+20 V	100 mA
2	+5 V	10 mA
6	-20 V	100 mA
7,8	Ground	

All three voltages are required. Pins 7 and 8 should be tied together. All other pins should be left open. The gain will be 100 in this configuration. Grounding pin 3 will change the gain to 50, and grounding pin 4 will change the gain to 20. Grounding both pins 3 and 4 will change the gain to 10.

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