

Model 7280 Dual Phase, Wide Bandwidth DSP Lock-in Amplifier



General

The model 7280 DSP Lock-in Amplifier is an exceptionally versatile instrument with outstanding performance. With direct digital demodulation over an operating frequency extending up to 2.0 MHz, output filter time constants down to 1 μ s and a main ADC sampling rate of 7.5 MHz it is ideal for recovering fast changing signals. But unlike some other high frequency lock-ins, it also works in the traditional audio frequency band.

In addition to its excellent technical specifications, it is also very easy to use. The front panel is dominated by a large electroluminescent display panel, used both to show the instrument's outputs and for adjusting its controls via a series of menus. Controls are set by a combination of the use of the keys surrounding the display and the keypad, while four cursor-movement keys simplify use of the graphic display menus. Users of the **SIGNAL RECOVERY** (formerly PerkinElmer/EG&G) 7260 and 7265 will find switching to the 7280 very easy, since we've designed it with a similar menu structure. The only significant changes are in some of the control menus, where the better resolution of the display allows both the controls and the instrument outputs to be shown simultaneously, for even faster feedback on the effects of control adjustments.

Naturally, the instrument includes the extended operating modes like dual reference, dual harmonic and virtual reference made popular by the 7260 and 7265, as well as the spectral display mode used to aid reference frequency selection. It also includes GPIB and RS232 interfaces for remote computer control and a range of auxiliary analog and digital inputs and outputs. Software support is available in the form of a LabVIEW driver supporting all instrument functions, and the Acquire™ lock-in amplifier applications software. The driver and a demonstration version of the software, DemoAcquire, are available for download from this site.

In summary, if you need a lock-in capable of working beyond the traditional audio frequency band but still want the drift-free performance that only digital demodulation brings, then look no further - you have found it in the **SIGNAL RECOVERY** Model 7280.

Input

Voltage

Mode	A only, -B only or Differential
Sensitivity	
0.5 Hz \leq F \leq 250 kHz	10 nV to 1 V in a 1-2-5 sequence
250 kHz < F \leq 2.0 MHz	100 nV to 1 V in a 1-2-5 sequence
Impedance	100 M Ω
Noise	5 nV/ $\sqrt{\text{Hz}}$ at 1 kHz
C.M.R.R.	> 100 dB at 1 kHz
Gain Accuracy	\pm 0.3% typ (full bandwidth)
Line Filter	attenuates 50, 60, 100, 120 Hz

Current

Mode	Low-noise, Normal or Wideband
Sensitivity	
Low Noise	10 fA to 10 nA in a 1-2-5 sequence
Normal	10 fA to 1 μ A in a 1-2-5 sequence
Wideband	
F \leq 250 kHz	1 pA to 100 μ A in a 1-2-5 sequence
F > 250 kHz	10 pA to 100 μ A in a 1-2-5 sequence
Impedance	
Low Noise	< 2.5 k Ω
Normal	< 250 Ω
Wideband	< 25 Ω
Noise	
Low Noise	13 fA/ $\sqrt{\text{Hz}}$
Normal	130 fA/ $\sqrt{\text{Hz}}$
Wideband	1.3 pA/ $\sqrt{\text{Hz}}$
Gain Accuracy	\pm 0.6% typ
Line Filter	attenuates 50, 60, 100, 120 Hz
Dynamic Reserve	> 100 dB
Frequency Response	0.5 Hz to 2.0 MHz
Detection Modes	
Phases	2
Harmonic	F to 32 \times F
Dual Harmonic	Detects and measures at two different harmonics simultaneously, F1 and F2 < 20 kHz. With 7280/99 option, F1 and F2 < 800 kHz, and with 7280/98 option, F1 and F2 < 2.0 MHz.
Dual Reference	Detects and measures at two different reference frequencies simultaneously, F1 and F2 < 20 kHz. With 7280/99 option, F1 and F2 < 800 kHz, and with 7280/98 option, F1 and F2 < 2.0 MHz.
Virtual Reference™	Detects a signal without a reference (100 Hz \leq F \leq 60 kHz)
Spectral Display	Computes and displays graphically the input signal power spectral density
Noise	Measures noise in a given bandwidth centered on frequency F

Output

Modes	X, Y, R, θ , Noise
X, Y and R outputs only	
Time constant	1 μ s to 1 ms in a 1-2-5 sequence, and 4 ms
Slope	6 and 12 dB/octave
All outputs	5 ms to 100 ks in a 1-2-5 sequence
Time constant	6, 12, 18 and 24 dB/octave
Analog Outputs, Voltage	\pm 10 V
Impedance	1 k Ω

Oscillator

Amplitude Range	1 mV to 1 V
Amplitude Sweep	Linear or logarithmic: manual or computer control
Amplitude Resolution	1 mV
Frequency Range	0.5 Hz to 2.0 MHz
Frequency Sweep	Linear or Logarithmic: manual or computer control
Impedance	50 Ω

User Settings

Up to 8 settings can be stored and recalled at will

Auxiliary Control

4 ADC, 2 DAC, 8 logic input/output lines

Data Buffer

32k 16-bit data points

Interface

RS232, GPIB (IEEE-488).

A second RS232 is provided for "daisy-chain" connection of up to sixteen compatible instruments