

Lock-In Amplifiers

SE1300 Series Multichannel Lock-In Amplifier

100 kHz to 500 kHz optional

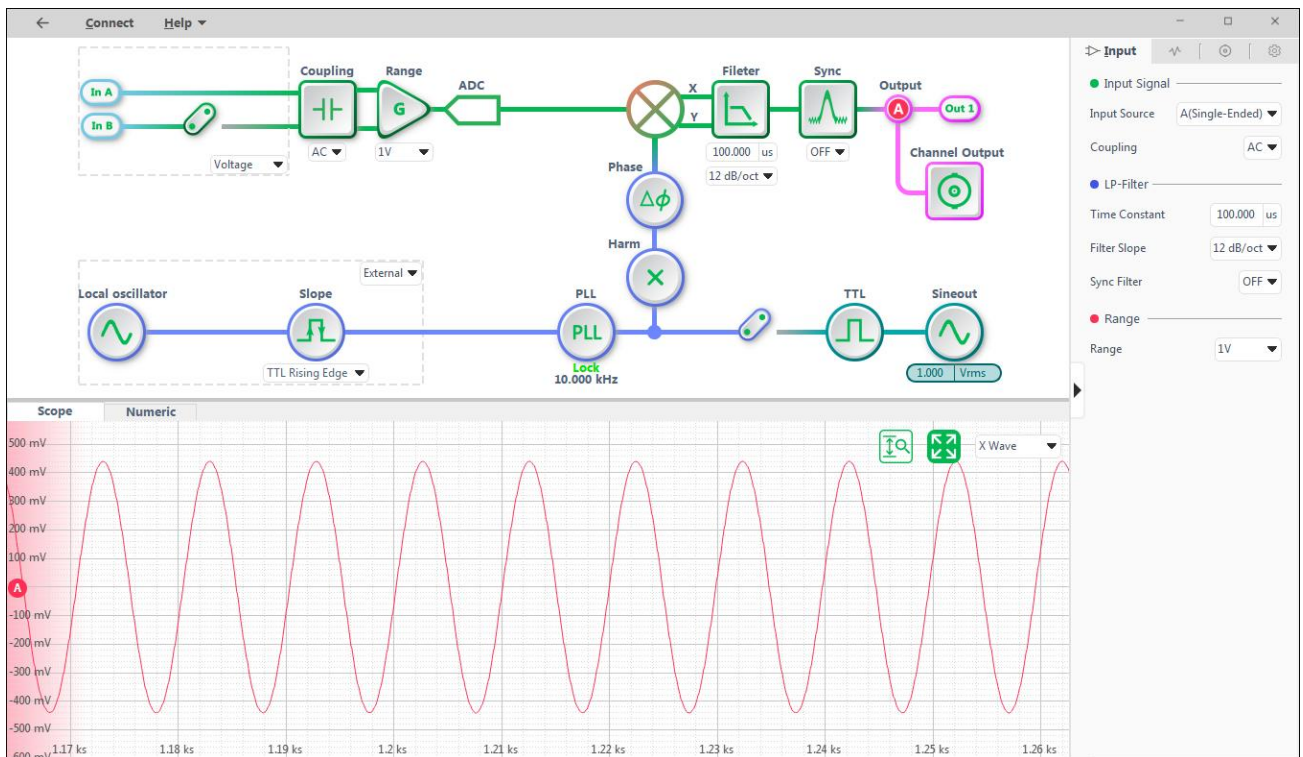
3 to 10 channels optional

Key Features

- Number of channels 3 to 10 channels optional
- Frequency range DC to 100kHz or 500kHz optional
- 1nV to 5V voltage measurement range
- Time constants 1us to 3 ks
- Noise down to 5nV $\sqrt{\text{Hz}}$
- 8 arbitrary frequency demodulators per channel
- Dynamic reserve up to 130dB
- Communication interface: RS232, USB, network port



Software Interface



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Technical Specifications

➤ Enter The Signal Channel

Voltage Input Mode	Single-ended or Differential
Full-scale Sensitivity	1 nV to 1 V in a 1-2-5 sequence
Current Input	10^6 V/A
Impedance	
Voltage	10 M Ω // 10 pF, AC or DC coupled
Current	1 k Ω to virtual ground
C.M.R.R	>120 dB to 10 kHz, decreasing by 6 dB/oct
Dynamic Reserve	>120 dB
Gain Accuracy	0.2% typ, 1% max
Voltage Noise	5 nV/ $\sqrt{\text{Hz}}$ at 997 Hz
Current Noise	260 fA/ $\sqrt{\text{Hz}}$ at 997 Hz

➤ Reference Channel

Input	
Frequency range	1 uHz to 500 kHz
Reference input	TTL or Sine
Input impedance	1 M Ω
Phase	
Resolution	1 μdeg
Absolute phase error	<1 deg
Relative phase error	<0.01 deg
Phase noise	
Internal ref.	Synthesized, <0.0001 $^{\circ}$ rms at 1 kHz
External ref.	0.005 $^{\circ}$ rms at 1 kHz (100 ms time constant, 12 dB/oct)

Drift	<0.01 $^{\circ}$ / $^{\circ}\text{C}$ below 10 kHz <0.1 $^{\circ}$ / $^{\circ}\text{C}$ above 10 kHz
Harmonic Detection	2F, 3F, ...nF to 500 kHz (n<65,535)
Acquisition Time	
Internal ref.	Instantaneous acquisition
External ref.	(3 cycles + 5 ms) or 40 ms, whichever is larger

➤ Demodulator

Stability	
Digital output	no zero drift on all setting
Display	no zero drift on all setting
Analog output	<5 ppm/ $^{\circ}\text{C}$ for all dynamic reserve settings
Harmonic Rejection	-75 dB
Time Constant	1 μs to 3 ks (<200 Hz (6, 12, 18, 24, 30, 36, 42, 48 dB/oct rolloff)
Synchronous Filters	Available below 20 Hz

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➤ Internal Oscillator

Frequency	
Range	1 mHz to 500 kHz
Accuracy	2 ppm + 10 μ Hz
Resolution	1 uHz
Distortion	-80 dBc (f<10 kHz), -70 dBc (f>10 kHz)
Amplitude	100nVrms to 5Vrms
Accuracy	1%
Stability	100 ppm/ $^{\circ}$ C
Sine Output	Sine signal output impedance is 50 Ω
TTL Synchronous Output	5V TTL/CMOS level, output impedance 200 Ω

➤ clock Interfaces

Clock Input External	10 MHz clock input, 3.3VTTL/CMOS
Clock Output Internal	10 MHz clock output 3.3V TTL/CMOS

➤ Communication Interfaces

RS-232	standard 9-array RS-232 female socket
USB2.0	USB2.0 high-speed communication interface
Enetnet	1Gbps Gigabit network communication interface

➤ System Reference Interface

Ref in System	reference signal input interface,3.3V TTL/CMOS
Ref out System	reference signal output interface, 3.3V TTL/CMOS

➤ Outputs

CH1 and CH2 Outputs	
Function	Output X, Y, R, θ
Amplitude	\pm 10V
Impedance	100 Ω
AUX Inputs	
Function	2 channel input
Amplitude	\pm 10V
Impedance	1M Ω

➤ General

Power Requirement	
Voltage	220 - 240 VAC,
Frequency	50 Hz
Power	80 W
Power supply noise rejection	70dB@1MHz