



# USB LockIn 250

## 2-phase Digital Lockin Amplifier

**⚡ Anfatec's new LockIn Model**



Remote control via USB

**Real 2-phase** lockin amplifier

**<< 10 nV/Hz<sup>0.5</sup>** input noise @ 100 kHz

User-friendly software interface

Remote control via **USB**

20 MSPS input sampling rate

Down to 1  $\mu$ s time constant (Sync mode) – 10  $\mu$ s to 5 s

0.1 Hz to **250 kHz**, 135 dB dynamic reserve

**Synchronous filtering** over full frequency range

14-bit/160 MSPS sine wave generation from 0.1 mV<sub>rms</sub> to 7 V<sub>rms</sub>

Calibrated to 250 kHz / Spectra acquisition up to **1 MHz**

Digital results: float

2 x AuxOut – scaled to 10 nV to 10 V sensitivity or as AUX

Open source software examples

Free DLL, windows driver and remote program

TTL input and output



2 analog output channels



Back side view



# USB LockIn Specifications

## GENERAL PARAMETER

Functions	Lockin Amplifier
	Spectrum Acquisition
Remote Control	USB
Special Features	Synchron Mode up to 1 MHz

## LOCKIN AMPLIFIER SPECIFICATION

General	Number of Phases	2 simultaneously acquired phases
	Dynamic Reserve	max. 135 dB
	Input Noise	$< 5 \text{ nV}_{\text{rms}}/\text{Hz}^{0.5}$ @ 100kHz
	Time Constants	10 $\mu\text{s}$ ... 5 s / 1 $\mu\text{s}$ in sync mode
	Full Scale Sensitivity	10 nV ... 10 V in 1-2-5 sequence at AuxOut
	Phase Resolution	0.0001°
Signal Input	Type	Single-ended
	Connector	BNC
	Coupling	DC or AC ( $f_{-3\text{dB}} = 2 \text{ Hz}$ )
	Damage Threshold	+/- 12 V (in ON state) +/- 2 V (in OFF state)
	Full Scale Input Ranges	High dynamic: $\pm 3.6 \text{ V}_{\text{rms}}$ Normal: $\pm 360 \text{ mV}_{\text{rms}}$ Low noise: $\pm 35 \text{ mV}_{\text{rms}}$
	Sampling Rate	20 MSPS
	Synchron filter	1 to 200 periods in 1-2-5 steps (down to 1 $\mu\text{s}$ time constant)
	Filter Characteristic	Butterworth (10 $\mu\text{s}$ to 5 s)
	Gain Deviations	$< 1 \%$ between Dynamic Ranges
	Gain accuracy @ 20 °C	$\pm ( 0.0004 \%$ of range $+ 0.5 \%$ measurement)
	Impedance	$\sim 1 \text{ M}\Omega \parallel 10 \text{ pF}$
	Input Noise $\tau = 1 \text{ ms}$ 50 $\Omega$ @ 100 kHz	high dynamic: $< 60 \text{ nV}_{\text{rms}}/\text{Hz}^{0.5}$ normal dynamic: $< 20 \text{ nV}_{\text{rms}}/\text{Hz}^{0.5}$ low noise: $< 5 \text{ nV}_{\text{rms}}/\text{Hz}^{0.5}$
	Reference Output	Internal Oscillator
Frequency Resolution		10 mHz
Frequency Accuracy		+/- 50 ppm from 0 °C to 70 °C
Reference Output Voltage		$< 0.1 \text{ mV}_{\text{rms}}$ ... $7 \text{ V}_{\text{rms}}$
Output Noise		@ $U_{\text{out}} = 1 \text{ mV}_{\text{rms}}$ , $\tau = 1 \text{ ms}$ , 100 kHz $< 230 \text{ nV}_{\text{rms}}/\text{Hz}^{0.5}$
Reference Input (for synchronization with external source)	Frequency	0.1 Hz .. 1 MHz
	Amplitude	TTL or sine signal $> 100 \text{ mV}_{\text{rms}}$
	PLL Locking Time	$< (100 \text{ ms} + 10 \text{ Cycle})$
	Phase Error	$< 4 \text{ deg}$ @ $f = 1 \text{ kHz}$
	Impedance	TTL: 1 M $\Omega$ small sine signals: 1 M $\Omega$ large sine signals: 1 k $\Omega$

## SPECTRUM ACQUISITION SPECIFICATION

General	Displayed channels	2
	Frequency range	0.1 Hz to 1 MHz
	Modes	Logarithmic, linear
	Acquisition	Single spectra Integrated spectra Continuous spectra
Special Features	Measurement	Single point positions & Q-factors
	File formats	ASCII

## ANALOG OUTPUT CHANNELS

Outputs	Number of Available Channels	2
	Output Range	$\pm 10 \text{ V}$
	Sampling Rate	156 kHz
	Resolution	24 bit

## TTL OUTPUT

### GENERAL

Power supply	12 V
Dimensions	45.8 (H) x 105.9 (W) x 175 (D) mm
Weight	2 kg
Warranty	2 years
Includes	Manual & Certificate USB stick Low noise BNC cable power supply USB cable
Optional	I/U-converters



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#Note: Specifications are subject to change without notice due to design improvement