

Model 7210

Multi-Channel Lock-in Amplifier

Simultaneous Multiple Detection



The Signal Recovery Model 7210 provides a different dimension to lock-in Amplifier design. Until the introduction of the Model 7210, instruments have been restricted to a single signal channel, allowing only one, or at most two, signals to be measured at any one time. The Model 7210, with its use of new technology, allows up to 32 signals to be measured simultaneously. What is more, units can be linked together to give more detection channels. For example, four units give 128 channels, while sixteen would give 512 channels.

This technological development opens new research avenues and experimental arrangements. A typical use of this instrument would be in simultaneous spectroscopy experiments. In such experiments, a sample would be excited using a known frequency and multiple detectors would provide emission/absorption measurements at each required wavelength.

- Simultaneous Spectroscopy
- Superconductivity Tests
- Simultaneous Impedance Measurements
- Field Mapping
- Pump-probe experiments
- Simultaneous Scanning

Specifications

Measurement Modes

Single-frequency Mode:

Up to 32 channel dual-phase lock-in amplifier, running with an external reference frequency in the range 20 Hz to 50.5 kHz. Outputs in this mode are X1 and Y1 (in-phase and quadrature components) for each channel

Tandem-operation Mode:

Up to 32 channel dual-phase lock-in amplifier, running with a first, external reference frequency (the carrier frequency) in the range 20 Hz to 50.5 kHz and generating the second reference frequency by integer division of the first. The range of the second frequency is 0.001 Hz to 100 Hz. Outputs in this mode are X1 and Y1 of the carrier frequency and X2 and Y2 of the amplitude modulation of the carrier frequency by the second reference frequency.

Interconnections

7210 Instruments can be interconnected to provide more than 32 detection channels. Interconnections are via RG45 multipole connectors. Each instrument has a rear-panel switch to select whether the connectors function as outputs, in which case the unit is the “master”, or inputs, when the unit is a “slave”.

Signal Channel		Demodulator	
<i>7210/99 Voltage Input Board:</i>		<i>Main ADC's, each channel</i>	
Mode	Virtual Ground floating	Type	12 bit
Connector	BNC	Sampling Rate	208 kHz < fs < 250 kHz, synchronous to external reference (f1) frequency
Impedance Shell to Ground	1k Ohms or 0 Ohms - set by pin jumpers	<i>Single-Frequency Operation</i>	
Input Impedance	10 M Ohms	Time Constants	4 ms to 1 ks in 12 steps (1-3-10)
Input Voltage Noise	< 10 nVHz-0.5 at 1 kHz	Slope	12 dB/octave
Max Safe Input	± 12.0 V	Type	Synchronous digital FIR filters
Full-Scale Sensitivity	100 µV to 1 V rms in a 1-3-10 sequence (9 settings)	Harmonic Rejection	> 90 dB
		Dynamic Reserve	> 80 dB
Reference Channel		General	
<i>External Reference Input</i>		Computer Interfaces	GPIB (IEEE-488) RS232
Impedance	1 M Ohms/35 pF	Control Software	7210Comms: ActiveX & SDK MULTILOCK: software package
Level	250 mV to 2.5 V rms	Dimensions	Width: 446 mm Depth: 435 mm Height: 3U (133.5 mm) Weight: 12.5 kg
Connector	BNC		
Frequency Range	20 Hz to 50.5 kHz		
Lock Acquisition Time	2 seconds max		
Reference Phase Shifter (each channel)	Set Resolution 10 m° Orthogonality 90° ± 0.001°		
Reference Output (Tandem frequency)	0.001 Hz to 100 Hz		
Harmonic Detection f and 2f	2f < 50.5 kHz		

Specifications subject to change

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