

Lock-In Amplifiers

SE1311\SE1351 Modulation Lock-In

Signal Channel

Voltage input Mode	Single-ended or Differential
Full-scale Sensitivity	1nV to 5 V in a 1-2-5 sequence
Current input	10 ⁶ V/A
Impedance	
Voltage	10 MΩ // 25pF, AC or DC coupled
Current	1kΩ 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
Noise	5nV/√Hz at 997Hz

Reference Channel

Input	
Frequency range	DC to 100/500 kHz
Reference input	TTL or sine
Input impedance	10 MΩ
Phase	
Resolution	1u° increments
Absolute phase error	<1°
Relative phase error	<0.01°
Orthogonality	90°±0.001°
Phase noise	
Internal ref.	Synthesized, <0.0001°rms at 1kHz
External ref.	0.005°rms at 1 kHz (100 ms time constant, 12 dB/oct)
Drift	<0.01° /°C below 10 kHz <0.1° /°C above 10 kHz
Harmonic detection	2F, 3F, ...nF to 100/500 Hz (n<32,767)
Acquisition time	
Internal Ref.	Instantaneous acquisition
External Ref.	(2 cycles + 5 ms) or 40 ms, whichever is larger

Demodulator

Quantity	8
Stability	
Digital outputs	no zero drift on all setting
Display	no zero drift on all setting
Analog outputs	<5 ppm/°C for all dynamic reserve settings
Harmonic rejection	-90 dB
Time constants	1μs to 3ks (6, 12, 18, 24, 30, 36, 42, 48dB/oct rolloff)
Synchronous filters	Available below 1k Hz and greater than 18 dB/oct rolloff

Internal Oscillator

Frequency	
Range	DC to 100/500 kHz
Accuracy	2 ppm + 10 μHz
Resolution	1 uHz
Distortion	-80 dBc (f<10 kHz), -70 dBc (f>10 kHz)
Amplitude	100nVrms to 5 Vrms 10nVrms Resolution
Accuracy	1%
Stability	100 ppm/°C
Outputs	Sine, 50 Ω output impedance TTL, 200 Ω output impedance

Outputs

CH1 and CH2 Outputs	
Function	X, Y, R, θ
Amplitude	±10 V
Impedance	100 Ω
AUX Inputs	
Function	2 BNC A/D inputs
Amplitude	±10 V
Impedance	1MΩ

Interfaces

RS-232 and Ethernet.

General

Power requirements	
Voltage	12VDC±5%
Power	15 W
Dimensions	
Width	180 mm
Depth	106 mm
Height	44 mm