

Features

- Dual phase instrument
- Voltage or current input
- Gain settings from $1\mu\text{V}$ to 1V
- Frequency range from 1mHz to 200kHz
- High performance wide bandwidth input gain stage
- Digital demodulation
- First and second order digital filters with time constants from $1\mu\text{s}$ to 500ks
- Operation at 1/8, 1/4, 1/2, 1, 2, 4, 8th harmonics of the reference signal.
- Ethernet and RS232 interfaces
- Control selection and adjustment by onscreen menus and sub-menus via web browser
- All outputs are general purpose and fully programmable



Input Signal Channel

Input	voltage or current inputs, via front panel BNC
Sensitivity	$1\mu\text{V}$ to 1V (for 1V output) switched in 1, 2, 5, 10 steps
Input Impedance	$10^8 \Omega // 50 \text{ pF}$, dc coupled
Frequency	1 mHz to 200 kHz
Maximum Inputs	$\pm 3\text{V}$ before input protection circuitry comes into operation
Dynamic Reserve	100dB max(*). limited by a maximum signal input noise voltage of 1V

Note : (*) This figure is subject to change

Demodulator

The output of the signal input stage is processed using a very high bandwidth digital demodulator to recover the input signal

Low Pass Filter

Time Constant	$1\mu\text{s}$ to 500ks in 1, 2, 5, 10 steps
Output	$\pm 1\text{V}$ output corresponds to full scale input, with headroom to 4.5V Short circuit protection included
Offset	Up to 1x full scale, switchable on or off
Output update rate	780 KHz

Reference Channel

frequency	1mHz - 200kHz	
Input Impedance	100k Ω	
Trigger	-Zero crossing	0V and -0.1V
	-TTL/CMOS	2V and 1V
Acquisition Time	1.5 cycles + $2\mu\text{s}$	

General

Power	9V, 1.8A
Mechanical	435(W) x 44(H) x 300(D)mm
Weight	5Kg
Temperature range	0-50 $^{\circ}\text{C}$

Ordering Information

Model	Descriptions
450S	A complete cased DSP dual phase lock-in amplifier (requires suitable wall mount power supply)