

Overview

The SCU-100 Signal Conditioning Unit takes a composite input signal, splits the signal into its broadband AC and low-pass DC signals, amplifies these signals, then applies the amplified signals to AC and DC outputs.

The AC output voltage can be determined using a lock-in amplifier and a digital voltmeter and can be used to measure the DC output voltage. The ratio of the AC to DC voltage is a necessary computation for the measurement of linear and circular dichroism.

The SCU-100 provides signal amplification via AC and DC gain controls, which is useful in many experimental setups. A 9 volt, 150mA detector power output is provided for powering the Hinds Instruments, Inc. detector/preamplifier units.

Many applications of the photoelastic modulator require computation of the ratio of V_{AC}/V_{DC} : the AC voltage component of the signal (as detected by a lock-in amplifier) compared to the DC or average voltage component. This computation is required for applications such as linear and circular dichroism and the addition of this calculation can be a significant design improvement for linear birefringence measurements, Stokes polarimetry measurements, and many others.

To assist photoelastic modulator users with these measurements, Hinds Instruments offers a Signal Conditioning Unit (SCU-100). The SCU-100 takes a composite input signal, splits the signal into its broadband AC and low-pass DC components, amplifies these elements,

then applies the amplified signals to AC and DC outputs. The voltage magnitude of these outputs can be determined using a lock-in amplifier or a digital voltmeter.

Two signal outputs are provided from the SCU-100:

1. Broadband amplified or reduced signal (voltage gain from 0.1 to 20), suitable for input to a lock-in amplifier. The AC signal output error is typically +/-2% accuracy across a frequency range of 10 kHz to 200 kHz. The recommended output load is 10K Ohms or greater.
2. Low-pass DC amplified signal (with voltage gain from 1 to 1000). The DC output error signal is typically +/-2% accuracy across a frequency range of 10 kHz to 200 kHz. The recommended output load is 10K Ohms or greater.



SPECIFICATIONS

General

<i>Model Number</i>	SCU-100, P/N 020-2650-975
<i>Size</i>	8.37" W x 4.03" H x 12.86" D
<i>Weight</i>	6 Lbs
<i>Power</i>	100-240 VAC (no switching required), 50-60 Hz, 27 Watts maximum
<i>Power Fuses Rating</i>	(2) each, 1 Amp, Slo-Blo, 5 x 20 mm

Composite Signal Input

<i>AC Component</i>	10 VAC peak to peak, maximum
<i>DC Component</i>	0 to 10 VDC
<i>Signal Input Impedance</i>	1 Megohm

AC Output

<i>AC Gain Settings</i>	0.1, 0.2, 0.5, 1, 2, 5, 10, 20
<i>AC Accuracy, typical</i>	+/- 2% throughout signal input, AC gain and AC bandwidth ranges and with AC Saturation LED OFF (1)
<i>AC Bandwidth</i>	10 KHz – 200 KHz
<i>AC Output Saturation Level</i>	1 VAC RMS
<i>Output Load Impedance, minimum</i>	10K Ohms
<i>AC Signal Input to Output Phase Shift</i>	18 degrees maximum, typical
<i>DC Offset</i>	Less than 1 mV
<i>Cable Length</i>	Specified for a AC Output cable length not to exceed 3 meters

DC Output

<i>DC Gain Settings</i>	1, 2, 5, 10, 50, 100, 200, 500, 1000
<i>DC Accuracy, typical</i>	+/- 2% throughout DC gain ranges and with DC Saturation LED OFF (1)
<i>DC Output Saturation Level</i>	10 VDC
<i>Output Load Impedance, minimum</i>	10K Ohms
<i>Cable Length</i>	Specified for a DC Output cable length not to exceed 3 meters

Detector Power Output

<i>Detector Power Output Voltage Range</i>	8.55 – 9.45 VDC
<i>Maximum Detector Power Output Current</i>	150 mA
<i>Detector Power Output Fuse Rating</i>	(1) each, 0.200 Amp, Slo-Blo, 5 x 20 mm

(1) This is a maximum value; accuracy is typically < 0.5%.