

OUTPUTS, OFFSETS and EXPANDS

This measurement is designed to use the internal oscillator to explore some of the basic lock-in outputs. You will need BNC cables and a digital voltmeter (DVM).

Specifically, you will measure the amplitude of the Sine Out and provide analog outputs proportional to the measurement. The effect of offsets and expands on the displayed values and the analog outputs will be explored.

1. Disconnect all cables from the lock-in. Turn the power on while holding down the [Setup] key. Wait until the power-on tests are completed.

2. Connect the Sine Out on the front panel to the A input using a BNC cable.

3. Connect the CH1 OUTPUT on the front panel to the DVM. Set the DVM to read DC Volts.

4. Press [Ampl]

Use the knob to adjust the sine amplitude to 0.5 V.

When the power is turned on with the [Setup] key pressed, the lock-in returns to its standard settings. See the Standard Settings list in the Operation section for a complete listing of the settings.

The Channel 1 display shows X and Channel 2 shows Y.

The lock-in defaults to the internal oscillator reference set at 1.000 kHz. The reference mode is indicated by the INTERNAL led. In this mode, the lock-in generates a synchronous sine output at the internal reference frequency.

The input impedance of the lock-in is 10 M Ω . The Sine Out has an output impedance of 50 Ω . Since the Sine Output amplitude is specified into a high impedance load, the output impedance does not affect the amplitude.

The sine amplitude is 1.000 V_{rms} and the sensitivity is 1 V(rms). Since the phase shift of the sine output is very close to zero, Channel 1 (X) should read close to 1.000 V and Channel 2 (Y) should read close to 0.000 V.

The CH1 output defaults to X. The output voltage is simply $(X/\text{Sensitivity} - \text{Offset}) \times \text{Expand} \times 10\text{V}$. In this case, $X = 1.000\text{ V}$, the sensitivity = 1 V, the offset is zero percent and the expand is 1. The output should thus be 10 V or 100% of full scale.

Display the sine output amplitude.

Set the amplitude to 0.5 V. The Channel 1 display should show $X=0.5\text{ V}$ and the CH1 output voltage should be 5 V on the DVM (1/2 of full scale).