

## The Basic Lock-in

Use the knob to adjust the phase shift until Y is zero and X is equal to the positive amplitude.

Press [Auto Phase]

### 6. Press [Freq]

Use the knob to adjust the frequency to 10 kHz.

Use the knob to adjust the frequency back to 1 kHz.

### 7. Press [Ampl]

Use the knob to adjust the amplitude to 0.01 V.

### 8. Press [Auto Gain]

### 9. Press [Sensitivity Up] to select 50 mV full scale.

Change the sensitivity back to 20 mV.

### 10. Press [Time Constant Down] to change the time constant to 300 $\mu$ s.

Press [Time Constant Up] to change the time constant to 3 ms.

The knob is used to adjust parameters which are shown in the Reference display, such as phase, amplitude and frequency. The final phase value should be close to zero again.

Use the Auto Phase function to return Y to zero and X to the amplitude.

Show the internal oscillator frequency in the Reference display.

The knob now adjusts the frequency. The measured signal amplitude should stay within 1% of 1 V and the phase shift should stay close to zero (the value of Y should stay close to zero).

The internal oscillator is crystal synthesized with 25 ppm of frequency error. The frequency can be set with 4 1/2 digit or 0.1 mHz resolution, whichever is greater.

Show the sine output amplitude in the Reference display.

As the amplitude is changed, the measured value of X should equal the sine output amplitude. The sine amplitude can be set from 4 mV to 5 V rms into high impedance (half the amplitude into a 50  $\Omega$  load).

The Auto Gain function will adjust the sensitivity so that the measured magnitude (R) is a sizable percentage of full scale. Watch the sensitivity indicators change.

Parameters which have many options, such as sensitivity and time constant, are changed with up and down keys. The sensitivity and time constant are indicated by leds.

The values of X and Y become noisy. This is because the 2f component of the output (at 2 kHz) is no longer attenuated completely by the low pass filters.

Let's leave the time constant short and change the filter slope.