

Outputs, Offsets and Expands

5. Press [Channel 1 Auto Offset]

X, Y and R may all be offset and expanded separately. Since Channel 1 is displaying X, the OFFSET and [Expand] keys below the Channel 1 display set the X offset and expand. The display determines which quantity (X or R) is offset and expanded.

Auto Offset automatically adjusts the X offset (or Y or R) such that X (or Y or R) becomes zero. In this case, X is offset to zero. The offset should be about 50%. Offsets are useful for making relative measurements. In analog lock-ins, offsets were generally used to remove DC output errors from the lock-in itself. The SR830 has no DC output errors and the offset is not required for most measurements.

The offset affects both the displayed value of X and any analog output proportional to X. The CH1 output voltage should be zero in this case.

The Offset indicator turns on at the bottom of the Channel 1 display to indicate that the displayed quantity is affected by an offset.

Press [Channel 1 Offset Modify]

Show the Channel 1 (X) offset in the Reference display.

Use the knob to adjust the X offset to 40.0%

Change the offset to 40% of full scale. The output offsets are a percentage of full scale. The percentage does not change with the sensitivity. The displayed value of X should be 0.100 V (0.5 V - 40% of full scale). The CH1 output voltage is $(X/\text{Sensitivity} - \text{Offset}) \times \text{Expand} \times 10\text{V}$.

$$\text{CH1 Out} = (0.5/1.0 - 0.4) \times 1 \times 10\text{V} = 1\text{ V}$$

Press [Channel 1 Expand] to select x10.

With an expand of 10, the display has one more digit of resolution (100.00 mV full scale).

The Expand indicator turns on at the bottom of the Channel 1 display to indicate that the displayed quantity is affected by a non-unity expand.

The CH1 output is $(X/\text{Sensitivity} - \text{Offset}) \times \text{Expand} \times 10\text{V}$. In this case, the output voltage is

$$\text{CH1 Out} = (0.5/1.0 - 0.4) \times 10 \times 10\text{V} = 10\text{V}$$

The expand allows the output gain to be increased by up to 100. The output voltage is limited to 10.9 V and any output which tries to be greater will