

sTEem-at-Work
Answer to Puzzle #58

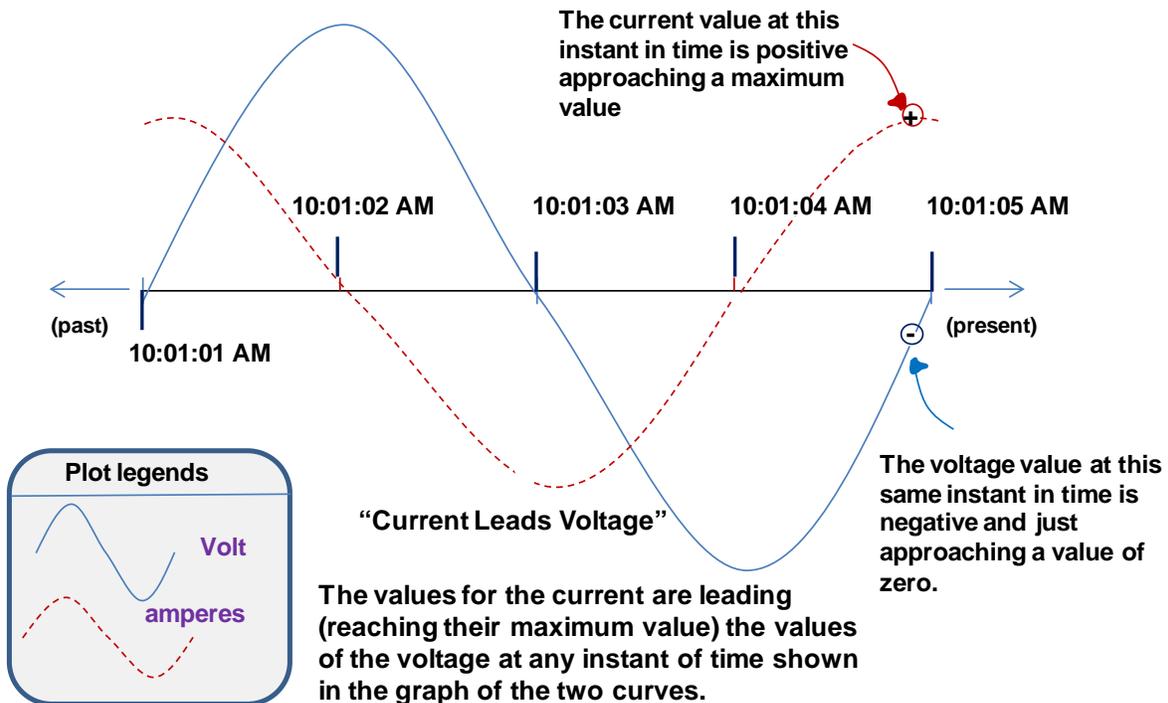
Signal Analysis for a 3D Printer Inductive Leveling Sensor

This puzzle provides an opportunity to understand the relationship between the output voltage and output current signals provided by a level sensor that uses an inductor in its measurement circuit. In this case it was a level measurement however, in any case, an inductor will always have a shift in the shapes of the voltage and current signals (**the voltage signal always leads the current signal**). This time concept of a wave being ahead of or behind in time is confusing to students. The puzzle provided graphic information is enhanced to help lower that learning curve issue. In this case this graphic allows a repeat discussion (see puzzle 56) of one of the leading vs lagging options.

The graphic below emphasizes the fact that at 10:01:05 AM the current value is already decreasing while the voltage value is just increasing as it crosses zero volts. The data collected below represents the signals this one level sensor does provide during the level measurement. Thus, this sensor has the current leading the voltage. **This is not the expected behavior of an inductor based sensor.**

The Technician thinks that the Inductive Sensor is functioning correctly?

yes no



(The technician knows that the sensor is not operating as expected)