

Sensor Electronics: Power, grounding, and wiring

Tues, 09:00

Bob Strand

- I. Electrical vs. Electronic...
- II. Circuits
 - A. Electron Potential – Voltage Source
 - B. Electron Flow – Current Source
 - C. The consequences of Ohm's Law
 - D. Power
 1. AC
 2. DC
 3. AC/DC conversion and conversion efficiency
- III. Power Sources
 - A. DC
 1. Battery
 2. Regulator
 3. Rectified AC
 4. Solar?
 - B. AC
 1. Generator
 - a) Fuel
 - b) Noisy output
 2. Inverter
 - a) Simulated sine wave via square step approximation
 - b) Output quality improves as load increases
 - c) True sine wave devices available for \$\$\$
 - C. We are assessing use of an auxiliary power unit for the ALARC tractor
- IV. Sensors
 - A. Supply power
 1. Power generally supplied via DC voltage
 - a) Note whether device requires regulated supply voltage or has built-in regulator
 2. DC Self-powered current loops
 3. Some require no power – passive devices
 - B. Sensor Outputs
 1. Analog – Converting outputs to binary values
 - a) Voltage output
 - i. Voltage more universal – A-D conversion typically voltage-based
 - ii. Single-ended and Differential measurements
 - iii. Varying ranges; e.g. +/- 2.5, 0-1, and 0-5 volts
 - iv. Disadvantage – Voltage drop over long cable lengths

