

Sheet 6: Displacement, Position and Proximity Sensors

1. What will be the change in resistance of an electrical resistance strain gauge with a gauge factor of 2.1 and resistance 50Ω if it is subject to a strain of 0.001?
2. You are offered a choice of an incremental shaft encoder or an absolute shaft encoder for the measurement of an angular displacement. What is the principal difference between the results that can be obtained by these methods?
3. A shaft encoder is to be used with a 50 mm radius tracking wheel to monitor linear displacement. If the encoder produces 256 pulses per revolution, what will be the number of pulses produced by a linear displacement of 200 mm?
4. A rotary variable differential transformer has a specification which includes the following information:
Ranges: $\pm 30^\circ$, linearity error $\pm 0.5\%$ full range
 : $\pm 60^\circ$, linearity error $\pm 2.0\%$ full range
Sensitivity: 1.1 (mV/V input)/degree
Impedance: primary 750Ω , secondary 2000Ω
What will be (a) the error in a reading of 40° due to non-linearity when the RDVT is used on the $\pm 60^\circ$ range, and (b) the output voltage change that occurs per degree if there is an input voltage of 3 V?