1	Displacement cable coefficient of thermal expansion: in/in-°F (0.0000096 in/in-°F for Type 304 stainless steel wire rope (see MatWeb for coefficients of other materials))
2	Displacement cable length: inches (include cable on the reel and entire length to the application)
3	Position transducer range: inches
4	Change in temperature: ° F
Press	
Answer	For the above values, the change in displacement cable length due to the temperature change is **0.0072 inches**. This length change due to thermal effect adds **±0.03%** to the product's measurement error. Metric Units Version

What is the effect of a change in temperature on the accuracy of our position transducers? Is a temperature-compensation circuit required to account for the change in temperature in the operating environment?

For nearly all applications, the temperature effect on our position transducers is modest, if not negligible. The most significant temperature effect occurs on the stranded, Type 304 stainless steel displacement cable. The calculator above allows you to determine the effect of temperature change on the displacement cable length and position transducer's accuracy.

Incidentally, because our analog potentiometer-based products are designed to be used as voltage dividers (voltage variance) and not rheostats (resistance variance), there is no temperature effect related to the potentiometer itself. This is because there is no voltage change due to the temperature change: the potentiometer's resistance change occurs uniformly throughout the resistive material.

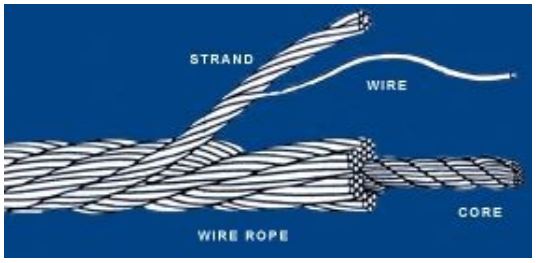
Any determination of thermal effect must also take into account the thermal effect on the object being measured.

The calculator uses this equation to calculate the change in length due to thermal expansion: **delta l = a * l * delta T**

where:

- l = displacement cable length
- delta l = change in displacement cable length
- a = coefficient of thermal expansion for the displacement cable material
- T = temperature
- delta T = change in temperature

The initial values above show a nominal 12-inch position transducer range, a total of 15 inches of displacement cable being used to attach to the application, 50° F of temperature change. Our standard displacement cables are constructed of Type 304 stainless steel and have a coefficient of thermal expansion of 0.0000096 in/in-°F (from 32°F to 212°F). This temperature change would increase the displacement cable length 0.0072 inches in going from 32°F to 82°F. This results in an increase of ±0.03% in inaccuracy over the full-scale measurement range of the position transducer.



Construction of Stainless Steel Wire Rope

Other Calculators:

- Sinusoidal Motion
- Displacement Cable Sag (Catenary Curve)
- Position Transducer Linearity (Calibration)
- Sensor Total Cost of Ownership
- Cable (String) Fundamental Frequency
- Voltage Conditioner Zero-Span Calculator
- Potentiometer-Based Position Transducer Voltage Divider and Power Calculator