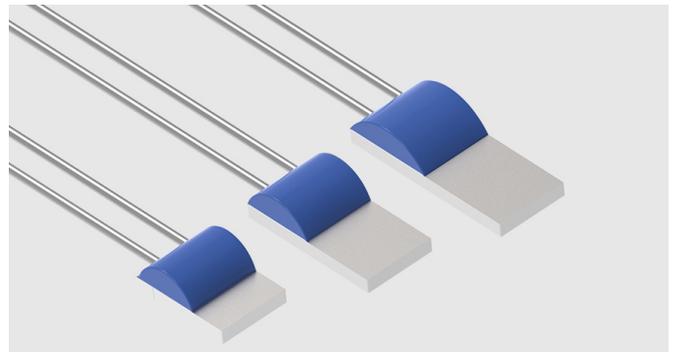


HOW DO RTD SENSORS WORK?

Industries in medical, aerospace, automotive, electronics and more are noticing a trend in temperature sensors. Applications demanding high accuracy are being designed with RTD sensors and replacing thermocouples. The following will look at how RTD sensors work, and one application that is driving the future of electric vehicles.

How do RTDs work?

An RTD (Resistance Temperature Detector) changes resistance directly proportional with its temperature. The resistance vs temperature relationship is well known and repeatable. An RTD is a passive sensor that uses an external electronic device to measure its resistance by passing an electrical current through the sensor. Typically, 1 mA or less are used, but currents up to 5 mA are possible without the risk of self-heating. RTD sensors are designed to provide precise, stable measurements in extreme environment applications.



Applications of RTDs

[RTD sensors](#) are found in applications that demand accuracies around $\pm 0.05^{\circ}\text{C}$ to $\pm 0.1^{\circ}\text{C}$ and temperature ranges between -200°C to $+600^{\circ}\text{C}$. While thermocouples are associated with lower cost and broader temperature ranges, they are less accurate (around $\pm 0.2^{\circ}\text{C}$ to $\pm 0.5^{\circ}\text{C}$) and are more susceptible to drift. The difference between these sensors led Andretti Technologies to use TE Connectivity's (TE) RTD sensor to measure its Formula E vehicle's gearbox temperature. Oil temperature affects viscosity which can affect performance or compromise the integrity of the gearbox. Advancing Formula E with robust, accurate sensors is a driving force for the future of the electric vehicle industry.



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