Zero-Temperature-Drift Compensation

Zero-temperature-drift is the drift of the zero-offset with the temperature of the sensor body, which is originally induced by the change of ambient temperature.

The main part of the zero-temperature-drift can be compensated by using the STC gauges and the fine correction of the zero-temperature-drift can be done by means of the zero-temperature-compensation (ZC) resistors, for example, the ON-series, OB-series or OQ-series bondable ZC resistors from BCM SENSOR. The corresponding bridge circuit is demonstrated in Fig. 1. The resistance of the ZC resistor can be calculated approximately according to the formula:

\[ R_T \approx \frac{|2 \cdot R \cdot (U_{O2} - U_{O1})|}{|\alpha_T \cdot U_{IN} \cdot (T_2 - T_1)|} \]

Where,
- \( R_T \) = the resistance of ZC resistor;
- \( R \) = the bridge resistance;
- \( U_{O1} \) = the output voltage of bridge circuit at the temperature \( T_1 \);
- \( U_{O2} \) = the output voltage of bridge circuit at the temperature \( T_2 \);
- \( \alpha_T \) = the temperature coefficient of resistance (TCR) of the ZC resistor;
- \( U_{IN} \) = the input voltage of the bridge circuit. In the case of Fig. 1, the \( U_{IN} \) is equal to \( U_{EXC} \).

![Fig. 1: Sketch of Circuit Using ONF-2H-RT to Compensate Zero-Temperature-Drift](image)

According to the working principle of the ZA- and ZC-resistor, in some cases one can use one ZC resistor to realize both zero-offset adjustment and zero-temperature-compensation by a more complicated calculation.

The further info on the zero-temperature-drift and its corrections is explained in the technical note of STC strain gauges.