Applying Calibration Factors for BDI Strain Transducers

Each ST350 is supplied with a N.I.S.T. traceable calibration factor. Since this sensor is a ratiometric sensor and can be supplied a range of excitation voltage. The supplied calibration factor is normalized for excitation voltage. To calculate the proper calibration factor for the data acquisition system, the excitation voltage that is used must be multiplied by the General Gage Factor (GGF). The following is an example of the supplied calibration factor:

$$GGF = \#\#\#\ \mu\varepsilon/mV_{out}/V_{exc}$$

Where:

- GGF = General Gage Factor
- ### = Numeric Calibration Factor
- $\mu\varepsilon$ = microstrain (strain x 10^{-6})
- mV_{out} = Output Voltage in Millivolts DC
- V_{exc} = Excitation Voltage supplied to sensor in Volts DC

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Example of applying the GGF:

This example is using a ST350 with a supplied GGF = 504.32 $\mu\varepsilon/mV_{out}/V_{exc}$. The data acquisition system supplies a +5VDC excitation voltage and reads the output in volts so the GGF must be adjusted to $\mu\varepsilon/V_{out}$ before applying the GGF in the results. The current reading on the data acquisition system is 3.2312 x 10^{-3} V.

Step 1: Convert GGF to $\mu\varepsilon/V_{out}$

$$GGF = 504.32 \frac{\mu\varepsilon/mV_{out}}{V_{exc}} \div 5.0V_{exc} \times \frac{1000mV_{out}}{1V_{out}} = 100{,}864\frac{\mu\varepsilon}{V_{out}}$$

Step 2: Apply GGF to output voltage from data acquisition system

$$Reading = V_{out} \times GGF = 3.2312\ x\ 10^{-3}\ V_{out} \times 100{,}864\ \frac{\mu\varepsilon}{V_{out}}$$

$$Reading = 325.9\ \mu\varepsilon$$

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