

Understanding Instrumentation "Zero"

by Custom Electronics Systems

What is an Instrument's Zero?

- An instrument's "zero" is the lowest signal the instrument is capable of reading, processing, and ultimately outputting.
- Zero ensures that when our "analog signal" is at the bottom of our instrument's range, our instrument outputs the appropriate amount of current or voltage (depending on the type of transmitter).
- Due to small physical differences in the components within the transmitter, all instrument manufacturers must calibrate each transmitter's zero before shipping.

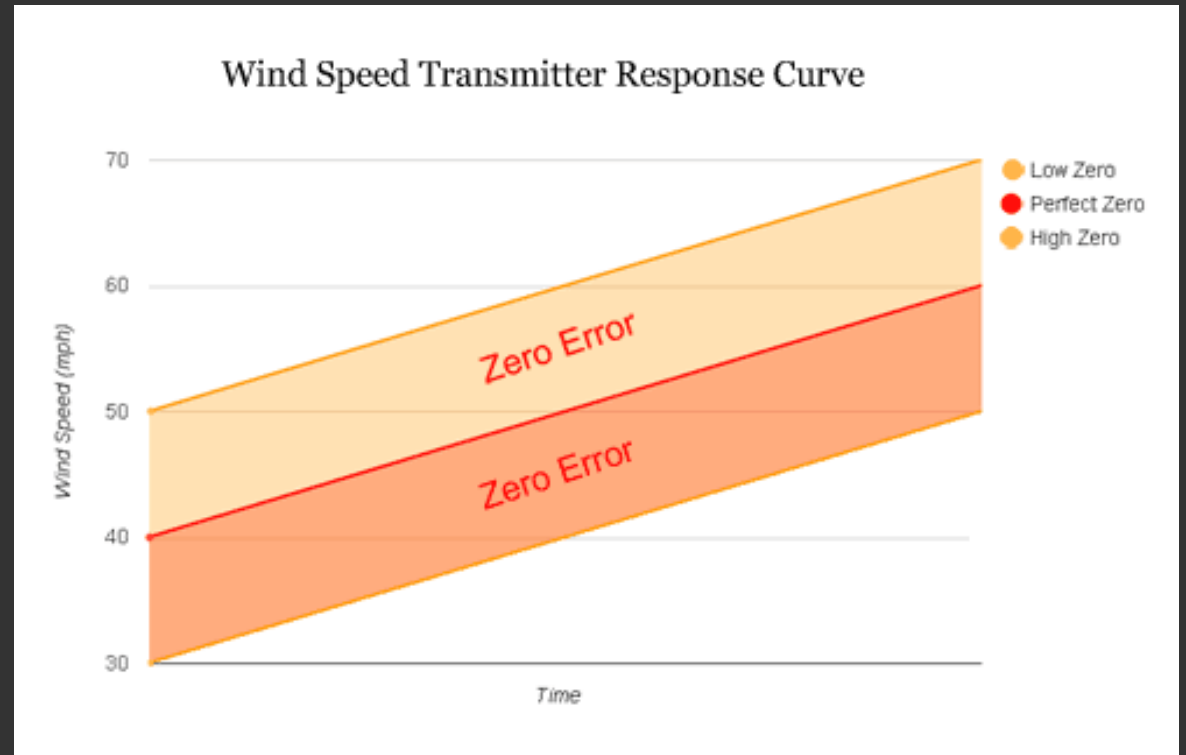
Example: Wind Speed Detector

- We're building a transmitter that measures tornado level wind speeds (40 - 318mph).
- Assume that 40mph is the lowest reading our transmitter will register.
- Assume our transmitter outputs a signal between 5-10v.
- Therefore, 40mph is considered our transmitter's "zero".
- When our transmitter detects 40mph winds it will output the lowest signal in it's range. (i.e. 5 volts).



Why is Zero Important?

- Transmitters have a fixed response curve shape.
- An instrument's zero is essentially an offset for the curve's origin. It shifts the curve up or down depending on where the zero is set.
- If the zero is accidentally shifted up or down, error is introduced into every reading (see "Zero Error" above).



Thank You!

We hope you've enjoyed this presentation.

The next presentation in this series is Auto-Zero Basics.

If you found this presentation informative, consider viewing our [other presentations](#).