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PIPING SYSTEMS

Signet Tech-Tips

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Title: Determining 60/50 Hz Interference Noise in a Flow Application

There are three elements involved in a noise problem:

1. A noise source (line transient, magnetic, radio frequency)
2. A coupling medium (capacitance, magnetic field)
3. A receiver (preamplifier, converter)

In order to solve a noise problem, one or more of these elements must be removed, reduced, or diverted. It is important to thoroughly understand the role of the problem, before the problem can be solved. Different noise problems require different solutions.

Most electronic systems contain many sources of noise. Three basic forms in which it appears are: transmitted noise (received with the original signal and indistinguishable), intrinsic noise (shot), and interference noise (picked up from an outside circuit).

For flow applications, we are mostly referring to interference noise from the sensor location to the power line or electrical outlet. If the sensor location is too close to a power source, the sensor will pick up a strong power device noise from the line.

These tests must be done in a **NO FLOW** condition with water in the line.

To determine if the interference is from a power line, use the following formula for either 60 Hz power line or 50 Hz power line.

60 Hz power $3600 \div \text{K-Factor} = \text{reading on the transmitter display}$
Example: Use 1 inch pipe, schedule 80, PVC with 515 would be as follows:
 $3600 \div 174.67 = 20.610$ Gallons per Minute on the transmitter display

50 Hz power $3000 \div \text{K-Factor} = \text{reading on the transmitter display}$
Example: Use 1 inch pipe, schedule 80, PVC with 515 would be as follows:
 $3000 \div 174.67 = 17.175$ Gallons per Minute on the transmitter display

To determine interference for a system with frequency drive motors: Set the frequency to a fixed frequency and use the following formula:

$$(\text{60 x Frequency}) \div \text{K-Factor} = \text{reading on the transmitter display}$$

If the display reads anything but zero flow, install a 10K-ohm shunt resistor across the input circuit. Up to (3) 10K-ohm shunt resistors can be installed to solve the problem.

Example for Process Pro Transmitters:

