WHITE PAPER

REASONS TO REPLACE PRESSURE SENSORS

Read how systems can can benefit from smaller, simpler pressure transmitter designs.

AUTHOR:

Greg Montrose, Marketing Manager, Sensor Solutions

The lower cost of crude oil has put pressure on oil and gas producing companies to evaluate suppliers, such as those that provide instrumentation, and their ability to reduce cost. In many cases, equipment manufacturers set a target cost reduction percentage to maintain previous production levels. This strategy can be effective, however there is an alternative consideration. Does the existing system require the same instrumentation to achieve the end result? Here are four thoughts on how engineers have decided against the traditional process type transmitter and replace it.

COST

Many system designers install differential pressure transmitters on air and natural gas compressors to monitor filters for maintenance purposes. As the difference in pressure increases before and after the filter, the output signal of the transmitter increases and the PLC notifies the user to change the filter. While it is a very simple concept with fairly benign liquids and gases, like oil and air, respectively, engineers continue to specify a transmitter that costs around $2,000. Additionally, the valves and hardware required to connect to the device can be extremely expensive. Differential pressure transducers, which provide an output based on a differential pressure drop, are available with the same basic functionality for hazardous locations at $500, as shown below.

SIZE AND WEIGHT

The size of a transmitter can be dictated by the transmitter manufacturer's features built into the design. With more complicated electronics and displays, additional hardware is required to fit the envelope. Smaller designs can permit more hardware in a smaller area or using transmitters closer to the process not possible with larger designs, as shown in image below. Aside from the limitations of fitting the transmitter in certain areas of the system, added weight can be an issue related to logistic costs. For stationary systems, the weight of the transmitter is not going to change the transportation cost of the equipment, but the cost of receiving the transmitter from the supplier could be three times more than a more compact transmitter. If insurance is added onto the shipment and expedited service is needed, the soft cost of shipping becomes a larger overall cost.

INSTALLATION COMPLEXITY

Mechanical and electrical functionality are both strong reasons to consider a more basic pressure transmitter. Five-way valves, diaphragm isolators, reducers, and mounting brackets are common barriers for process style pressure transmitters. Limitations in sensor materials can add a layer of complexity to ensure that the liquid or gas being monitored does not corrode and break down. Basic "stick" transmitters can offer cost savings in their flexibility. The materials and sensor technologies available in this type of transmitter create a situation where systems can last longer with lower overall cost, as in the image below. The hardware requirements can be as simple as a quarter turn valve or T fitting. There is typically a low amount of mass that requires it to be mounted to a bracket. The output signal of the transducer is related to both the cost and the complexity. Many process style pressure transmitters have design features that make the product convenient for a number of installations. Digital communications, turn-downs, and field calibration are all great features for certain applications when used. However, in some cases the features create a liability for the transducer being adjusted by non-certified technicians. The added features often come at a cost if they are not being utilized.

One of the most difficult tasks for engineers is comparing data sheets of transmitters. The terms used to describe performance can be specified in different ways, various formats, and using either maximum errors or typical values. There is no argument that some expensive pressure transmitters are extremely accurate. For applications where the transmitter is being used to ensure billing to API standards, the accuracy translates to dollars and a lower accuracy transmitter can cost more money. To revisit the filter application, this is a case where higher accuracy might come at the sacrifice of reaching an overall cost point. In addition to lower cost and higher performance electronics, the accuracy, repeatability, and long-term stability of stick-style pressure transmitters has increased over time with new sensor technology developments. With significant advancements in human machine interfaces (HMIs) over the past ten years, design engineers have more flexibility to dial in the performance of the transmitter by plotting values in the system. Technology has made it easier to bridge the gap between lower cost transducers with industrial specifications and higher cost process transmitters, as shown below.

Conclusion

The universal fear of using something less expensive will always be present. Cost does not always translate into performance and cost is not only the price paid for a product or service. Alternatives are out there, so ask yourself these four questions:

1. Am I going to use all of the features?
2. Can I simplify the overall design to reduce cost?
3. Do I want or need higher performance?
4. Can I achieve the same performance by alternate methods?