

BOP System Case Study

*High pressure, high
accuracy transmitter*



Product: Model H455T2-33-P15-A1 Pressure Transmitter

Description: High Pressure H455 model with thin-film technology, 30K psi range with HiP HF4 or AE FC250 equivalent process connection, and HART® communication protocol

Problem:

Original equipment manufacturers of Blowout Preventer (BOP) are required to follow their internal quality standards per API specification Q1, in addition many have recertification programs that follow API S-53 recommendations to refurbish used equipment. Barksdale collaborated with a BOP original equipment manufacturer (OEM) that is committed to a quality management system that provides continuous improvement, emphasizing defect prevention and conformity of the product being tested with reduction of variability and waste in the process. The customer's calibration program requires a 90-day cycle of all pressure transmitters used for testing their BOP systems with the goal of maintaining calibration within 0.25% accuracy. Failure to maintain accuracy requires retesting of BOP systems at a very high cost to the OEM. The OEM was using 0.25% accuracy, 30,000 psi and 10,000 psi range 4-20mA analog transmitters using foil strain gage technology with potentiometers for Zero and Span trim. The potentiometers were an important feature to the OEM to make adjustments to the calibration when they were found to be out of accuracy specification. However, potentiometers drift with temperature and vibration which requires application of glyptol to prevent rotation. The OEM follows a rigorous multi-point calibration procedure for each transmitter

that can take up to four hours and potentially up to eight hours if any adjustment of the potentiometers for zero or span trim is required. When the transmitter can no longer be calibrated within specification, it is discarded. While the OEM maintained some spares, replacement transmitters had a 14-22 weeks lead time from their supplier.

Solution:

After years of trying to find another source for transmitters that would survive the testing environment and maintain accuracy, Barksdale's new BiT product family met the challenge. Barksdale's Intelligent Transmitter's thin-film technology design provides better accuracy, down to 0.1%, and long term stability proven in high cycle industrial applications to over a billion cycles. In addition, HART® communication protocol provides some remarkable advantages to several problems and a reduction in time spent locating and tracking transmitters that were up for calibration.

Result:

The OEM put the Barksdale transmitters through a fatigue, shock loading and low/high temperature testing followed by their rigorous calibration process to ensure calibration is maintained. The higher accuracy provided more margin to maintain their minimum 0.25% accuracy, and better long term stability is expected to increase time between trim adjustments. HART protocol allows for digital zero trim and re-ranging to adjust span, eliminating the need for potentiometers that drift with temperature and vibration which further improves the stability of the transmitter. BiT HART transmitter re-ranging capability includes 10:1 turn down which allows the OEM to stock one part that can be reconfigured from 30,000 psi or 10,000 psi range. Additional benefits of HART protocol include the unique device ID and ability to create custom tags to identify each transmitter to help track and identify the physical location of the transmitter in a system. The OEM was able to add a module to their existing data acquisition system to communicate through HART protocol and identify transmitters installed in each test bay from the control system.

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Figure 1.

Shows BiT with digital zero trim and re-ranging (Left), and competitors unit with potentiometers to manually adjust zero and span trim (Right Lower). Potentiometers drift with temperature and vibration and require glyptal to lock potentiometers in place (Upper right).



Figure 2.

Shows a BOP test bay. Testing includes high and low temperature testing of the rubber sealing inserts under pressure and shock loading, on large land BOP this included instant application of pressure from 0 to 7,500 psi.



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Barksdale is a leading provider of valves and regulators for BOP's and also provides hazardous area BiT transmitters that can be used to meet API RP 53 BOP testing requirements in the field. Barksdale maintains inventory for popular models to reduce lead time to maximum of 4 weeks.

Have any questions? Contact us today.

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