APPLICATION NOTE

CAS DATALOGGERS

Universal Data Acquisition System Controls Hydraulic Pressure Test

Delphin Expert Key Helps Ensure High Product Quality

Data acquisition systems have helped to increase quality control and cut costs in a wide range of manufacturing fields. One customer who discovered this was a leading hydraulic tube and fitting manufacturer in India. Their company produced many different types of pipe fittings and exported up to 90% of their products to customers around the world. By using a data acquisition system with a custom software application to monitor a hydraulic pressure test, they were able to optimize a rotary flex test procedure and deliver a better product.

To ensure a high-quality product, it was necessary for the manufacturer to perform both pressure and leakage tests on samples from each production lot. The quality engineers performed a rotary flexure test of the hydraulic joints and fittings in accordance with the ASTM F-1387 standard. In the past, they had relied on a manual procedure using hydraulic pressure gauges and torque meters with the data recorded by hand on paper forms. They were looking for a data acquisition system to monitor and automate this test bench application.

These tests were performed in a precise sequence: the rotary flex joints were first

mounted to a 12mm-diameter tube which measured 6 inches long. This assembly was then mounted to a support rest on one side and to a rotating spindle on the other side. The spindle was rotated at a speed of 1750 RPM. While the spindle was rotating, the joint was pressurized up to 25 BAR or about 370 PSI.

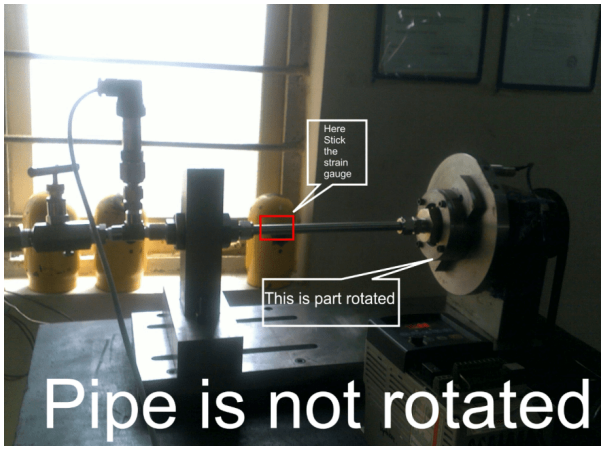
The test stand incorporated a strain gauge attached to the support rest to monitor the torque or twisting force on the flex joint and a pressure transducer in the hydraulic line feeding the tube. This test was run for 15 minutes to measure the twisting forces of the tube and the pressure level. If the pressure declined during the test, they knew there was leakage on the fitting seal rings. A high torque reading indicated a fit-up issue where one of the parts was not machined correctly and which could lead to binding or a premature joint failure.

Installation

For this test bench application, the manufacturer installed a Delphin Expert Key 100L USB/Ethernet Data Acquisition System along with Delphin's ProfiSignal Klicks software. ProfiSignal Klicks was installed on a PC that controlled the stand to allow data acquisition and test automation. The Expert Key offers both USB and Ethernet communications options; in this case, USB was used because of the short distance between the PC and the DAQ system.

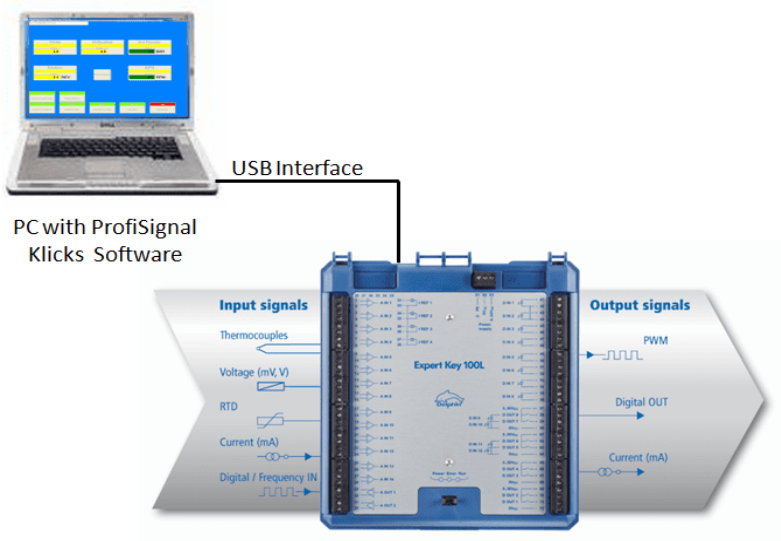
The Expert Key system featured both analog and digital inputs and outputs in a compact desktop enclosure. The universal analog inputs of the Expert Key support many types of signals and sensors including mV, Volt, 4-20 mA, thermocouples, and RTD sensors. This system has a sample rate of up to 100 kHz with an 18-bit measurement resolution. For this application, one of the excitation sources of the Expert Key was used to power the strain gauge with the mV output of the gauge routed to one of the analog inputs. The pressure sensor supplied a 0-10V output which was read by second analog input.

A digital input was attached to a pulse output sensor attached to the spindle of the test stand to measure RPM. Digital output was used to turn on and off a relay that controlled the motor driving the rotating spindle. Essentially, all of the functions and measuremnts for the test were possible with just the Expert Key.



USAGE

A ProfiSignal Klicks application with the user interface shown below (main screen) was created to allow the test engineer to operate the test bench and ensure that the measurements were compliant with the requirements of F-1387. The engineer could specify the part number and lot number of the product currently undergoing testing. With the click of another button, he could then start the test cycle and begin recording data. During the test, the live data consisting of speed (RPM), strain (torque)/deflection, and pressure were all displayed. A timer was used to stop the test at the end of the desired duration.
When the test was finished, a report was automatically generated showing a strip chart of all test data, as well as a data table with all measurement values available. The test data was also recorded in the Profisignal database on the PC so that they could always go back and retrieve data from a previous run.



Expert Key 100L
Universal high speed DAQ system

Benefits

The Expert Key 100L provided the manufacturer an all-in-one box, easy to use solution for automating their test stand. With its compliment of analog and digital input and outputs it was able to measure all of the signals from the different sensors and provide the necessary control for the test. Using the Profisignal Klicks software they were able to create an application to measure and display all of the required data and automatically generate the test reports. The Delphin systems allowed them to improve their product quality by providing more complete and accurate data and improving their test stand throughput to measure more parts and spot problems sooner.

For more information on the Delphin Data Acquisition Systems, or to find the ideal solution for your application-specific needs, contact a CAS DataLogger Application Specialist at **(800) 956-4437** or www.DataLoggerInc.com.