

Coker Valve Monitoring in a Refinery

Measurement & Control Solution for Manufacturer

CAS DataLoggers provided the measurement and control solution for a large manufacturer of valve systems used in many different industries. The company produces ball, needle, choke, control, gate, and other types of valve systems with many different diameters. One of its customers was a refinery using a custom 3-way switching valve in order to direct oil flow into different coking towers. However, the operation of the valve was periodically unreliable and caused costly shutdowns in the refining process. Therefore, a reliable coker valve monitoring solution capable of connecting to many different kinds of sensors was needed to monitor the correct operation of the valve with high accuracy and automatically analyze the data. This device would also need to be simple to configure and operate as well as include data analysis software and a modular design to accommodate possible expansion to add more input and output channels in the future.



Installation

The manufacturer installed a [Delphin ProfiMessage Data Acquisition & Control System](#) close to the valve control unit in order to record all data describing the valve's operation and movement. From the many available configurations, management selected a ProfiMessage data acquisition system with an 8 channel ADFT input module featuring synchronous fast sampled analog inputs. The DAQ system was placed into an explosion-proof enclosure in the hazardous zone; its compact design allowed it to fit neatly into the small available space inside the enclosure. Real-time communication to the control room was enabled by a wireless spread spectrum radio link connected to the Ethernet port of the system.

The ProfiMessage system measured the 3-phase motor current consumption and voltage. The installed sensors included a strain gauge for torque measurement, a motor voltage transducer, 2 control circuit voltage transducers, and 3 motor current probes. The strain sensor measured torque during the movement of the refinery valve. The inputs were configured for 1 kHz sample rate each, and the [data acquisition system](#) recorded on all 8 channels simultaneously onto on-board memory. Data transfer was accomplished through the wireless radio link.

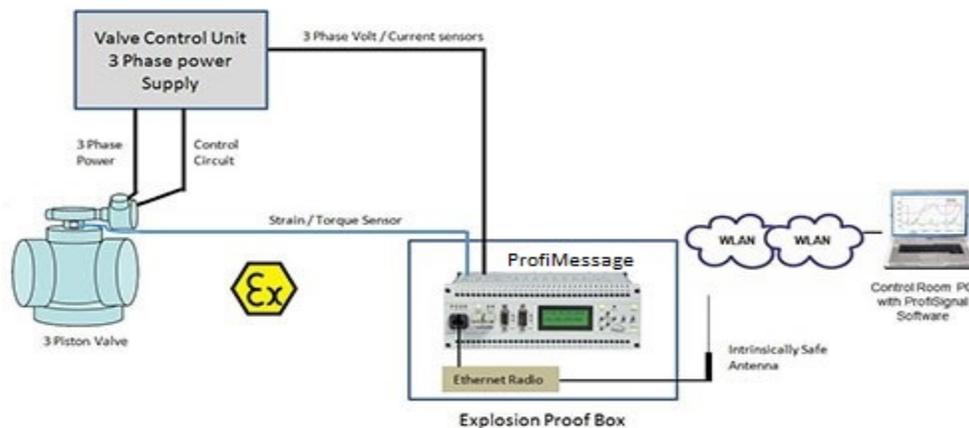


Figure 1. Installation of the ProfiMessage

The internal programmable logic channels of the ProfiMessage were configured in such a way so that the data storage was triggered at a specific threshold level of motor current consumption, ensuring that only relevant data during the valve movement was stored. These logic functions also allowed the user to configure the ProfiMessage device with event-based functions to alarm on specific conditions.

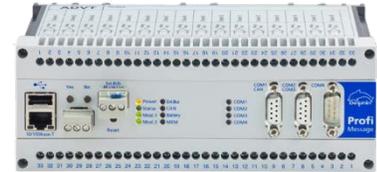
Usage for Coker Valve Monitoring

The Delphin ProfiMessage provided a modular and scalable system capable of highly accurate measurements with up to 24-bit resolution. The system measured all the data from each valve cycle only recording data when values were outside defined, normal operating levels. An event trigger automatically uploaded data from the system to a PC in the central control room via a wireless Ethernet network.

Data analysis and processing was facilitated using Delphin's powerful [ProfiSignal Software](#). Refinery management were specifically interested in the relationship between RMS motor current consumption and the torque profile during the valve movement, which gave a clear indication when the valve was performance was degrading and allowed them to schedule maintenance action before failures could occur.

Benefits

The manufacturer benefited in several key ways after installing the Delphin [ProfiMessage system](#) in its customer's refinery. The ProfiMessage's modular design offered the customer a wide range of I/O modules to select the best ones for this application, with different modules available for any number of channels and sensor types. Likewise, the system's number of outputs could be easily expanded whenever needed. The ProfiMessage data acquisition system was highly accurate and reliable, and the customer was easily able to continually monitor the valve to check its performance and schedule maintenance before its operation could fail, preventing unscheduled interruptions in processing. Automatic downloads from the DataService Configurator software were uncomplicated to set up and streamlined the data acquisition process, leading to efficient data analysis and problem identification.



For more information on coker valve monitoring systems, [Delphin systems](#), or to find the ideal solution for your application-specific needs, contact a CAS Data Logger Applications Specialist at **(800) 956-4437** or visit our website at www.DataLoggerInc.com.