Process Analyzer Sampling Conditioning System / Touch Screen Interface Provides

LOCAL MONITORING & CONTROL WINDOW

for Smart Systems and can be seen and demonstrated on the Parker Technology Touring Facility

by: **Glenn Geis,** Senior Systems Engineer
Instrumentation Products Division, Parker Hannifin Corporation

A complete solution for the next generation smart sample handling systems is the product of Parker Hannifin Corporation's Instrumentation Products Division which has linked products of its Instrumentation and Automation Groups with pressure and flow monitoring sensors supplied through a teaming agreement with Honeywell Sensing & Control to provide. The link between the Parker's IntraFlow™ sample conditioning system, and CTC™ touch screen Human Machine Interface (HMI) controllers, as well as Honeywell Sensotec sensors provides technicians with key sample pressure and flow conditions regarding sample flow to process analyzers. Parker has produced both the CTC™ touch screen and Intraflow™ modular sub-plate mounted sampling devices for a number of years. Coupled with smart sensors from Honeywell Sensotec, Parker's recently developed HMI application specific software interface provides end user customers at petroleum refineries and chemical process plants with dynamic and remote sample handling system monitoring capabilities that have never before been available.

"This system is a real game changer in our industry", said a major oil refinery Analytical Manager, "Our process analyzers have outperformed our sample systems for years, making them the weak link in our ability to deliver critical process control information to our internal operations customers. The smart system solution not only solves that problem, it reduces our cost of ownership".

IntraFlow™ is a compact, modular, sub-plate mounted sample conditioning system which eliminates much of the maze of plumbing common to most analyzer houses in chemical and petrochemical operations. Sample conditioning systems are required to deliver representative process pipe samples to process analyzers.

"Many times refiners rely on the accuracy of their sampling and conditioning equipment isn't performing accurately any analysis performed on the sample is inaccurate. If this condition persists according to subjective maintenance schedules, it can produce costly mistakes in the output stream including the loss of materials produced and repeating the entire production process."

The new method measures pressure drop across a restricted orifice as a predictor of sample flow. This information is transmitted by wire (4 to 20 mA signal) to a PLC were the signals are evaluated and managed before being sent to the CTC touch screen providing a constant check on input filter performance. Software resident on the touch screen unit provides early warning of filter performance that may be trending toward inaccuracy. A determination can be made to service the filter at this point if necessary to avoid inaccurate or lost production. Network connectivity via an Ethernet or OPC port provides remote access to the information, which improves the productivity of customer's maintenance technicians.

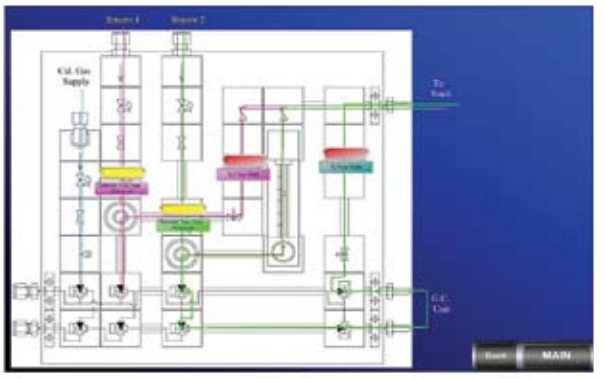

FIGURE 1

FIGURE 2

Figure 1 exhibits a HMI display panel where the system health is visibly displayed on a "real time" color coded information screen which also includes digital readouts. This information is used to determine the status of the sample handling system. The information displayed on this screen will assist the technician in quickly determining the health of the sample system based on the colored background of the digital readout boxes which are located on each process stream. The technician can obtain a quick view of the HMI screen with the simple push of a button. If the stream color and the digital display background match, the system is considered to be within proper operating parameters. In the event that the digital readout background has changed to a warning color the technician can then determine what corrective action should be taken.

In the past the process facility technicians did not have much input into the design and configuration of a sample handling system, even though they would be the ones who would be ultimately responsible for the operation and maintenance of the system. Parker Hannifin determined that the technicians are an invaluable resource

when designing a state of the art Smart Sample Handling System.

A mobile technology tour facility was designed and fitted with a wide range of product offerings and solutions. This touring technology facility is set up at the various customer facilities with ease. The touring facility not only demonstrates the wide range of products and solutions Parker can provide but is also used as a portable training and learning center. Numerous ideas and solutions have been developed in a very short time utilizing this type of user friendly environment.

Some of the ideas which have been developed and implemented within the informal setting seem simple at first but are very beneficial to the end consumer. For instance a technician requested that a parts listing or bill of materials be displayed on one of the information display panels in the HMI for this particular sample system. This allowed the technician to have the correct parts information on the sample system at all times. At another meeting there was a suggestion as to the method of how to monitor "out of parameter" conditions. If it has been determined that a system function is moving away from the ideal operation parameter the CTC™ HMI will send a work request via an Ethernet connection to the responsible technician. This allowed the technician to know when a problem has occurred and what type of problems was present. The HMI will also log the information in an Excel™ spreadsheet thereby creating a data history table. This Ethernet connection can be networked to submit a part(s) request to the supply facility. The technician can then simply stop by the supply facility on his way to the sample system and pick up the part. Because the part has already been pulled from stock and ready for pickup he can be on his way in minutes. This has helped to improve the responsiveness of the field technician and minimizing unnecessary downtime. The rapid response of the technician and proactive system repair improves the integrity of the entire process system and facility operations.

A number of other informative panels have been installed which help to control and tell the status of the sample system.

FIGURE 3

The panel in figure 3 is used to control the various solenoid valve operations and display the operation or system information. Note that when you utilize a Touch screen HMI to host and control the sample system and functions you no longer need to purchase push buttons and or selector switches. These buttons and switches can be incorporated into the display panel and can be easily modified in the event of an engineering change request. This will reduce the initial costs associated with a "new" control system. The panel, symbol displays and associated colors along with the desktop background can be custom designed for virtually any location or special function. A standard library of device symbols and templates have been developed which are incorporated as required to ensure that the technician in charge of system understands the information which is presented to them. Also embedded in the panels are the help screens. The help screens are used to assist the technician or engineer in the field with information that will assist them in performing a very simple or an even complex task. System training information can be in the form of movies or animations. This information can be installed on the HMI system to allow a person to view a "refresher" course right on sight. The technician can review this information prior to disassembly of a component or system. They can review safety information or verify the proper handling procedures prior to the work being performed. In figure 4 you can see the sequence which demonstrates the proper method to rebuild a typical switching valve.

FIGURE 4

On the help screen in figure 4, you see that the proper size of the allen wrench is displayed, spare part catalog information and the factory contacts are available to insure that the job is completed in a timely fashion. The technician does not have to go to the maintenance library and look the information up. This information can also be linked to the central engineering library if so desired.

Successful maintenance is the key to sample system up time. Sample system up time equates to the process system functioning properly which as we all know helps to ensure that the process is reliable and that the total organization can deliver a great bottom line.

The Parker Technology Touring Facility is a great method to transfer information to the people who need it the most and it also allows the technician / engineer in the field to have a voice as to what type of products or systems will solve their problems now and in the future.

The combination of the CTC™HMI, IntraFlow™ and the teaming of the Honeywell Sensotec sensors have led to a very robust Smart Sample Handling System and thereby improving the uptime and profitability at numerous process facilities. The enhanced data acquisition and information go hand in hand with state of the art analysis for the chemical and petroleum process industry.