好处来自更智能的取样系统

Siemens Industry, Inc.
Industry Automation

Process Analytics
What is a Smarter Sample System?

Smarter: *adjective*
Used to describe a higher intelligence

Intelligence: *noun*
Used to describe the product resulting from the collection, processing, integration, analysis, evaluation, and interpretation of available information
Definition of a Control Element

“Disambiguation of a term”

A device which is integrated into or within a process control loop for the express purpose to provide input into or receive logic from the control loop in order to effect an action thereby manipulating the process.
Functions of a Sample Conditioning System

- Valve Control (stream or bottle selection, atmospheric reference, other)
- Pressure controllers or sensors
- Flow controllers or sensors
- Temperature controllers and sensors
- Switches (Binary Information)

Interconnection to analyzers expensive
Pilot Valve Module

- Internal technology made by Swagelok
- Provides individual control of up to 6 stream select valves or block valves (SSO and ARV)
- I.S. allows only 4 active at a time
- Mounts in ~3.8 cm x ~11.4 cm mounting space
Pressure / Temperature Sensor

- Internal technology made by Swagelok
- Measures pressure and temperature with single component
- Mounts in 3.8 cm x 3.8 cm mounting space

Swagelok Pressure-Temp.
Sensor for Siemens SSSI
Multi-Variable Sensor

- Internal technology made by CIRCOR Tech.
- Measures sample flow, pressure above and below orifice and temperature with single component
- Mounts in 3.8cm x 7.6cm mounting space
Siemens SSSI bus includes a “multi-purpose” I/O module

- Multiple analog and digital I/O channels provided
- Connects directly to Siemens SSSI bus
- DIN rail mounting
- Intrinsically safe module (may require site approval with any particular connected component)

I/O Extension Module is certified and rated for use in hazardous and rugged environments.

Module to be available for use with MicroSAM to provide low-cost external I/O capability
## Buyers and Motivations

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<thead>
<tr>
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<th>Capital $</th>
<th>EPC Bid $</th>
<th>Maintenance $</th>
<th>Budget Limits</th>
<th>Beat the Budget</th>
<th>Owner</th>
<th>Project Spec</th>
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<td>Project Engineers</td>
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“Road Blocks – Buyers and Motivation”

Project Engineers
• What does it save?
• Had no run time in the field – No data to support Value claim!

Engineering Procurement
• Not in the Specification

Systems Integrator
• Did not adjust their approach to design
• Designed Traditional and tried to “Mimic” design in substrate
• Did not capitalize on Man-Hour savings – Bid the same man-hours
• Did not adapt to smaller footprint
Sample Systems may cause as much as XX% of all maintenance required by a process analyzer

Lack of Available Skilled Labor

Predictive Maintenance
Sample Systems may cause as much as XX% of all maintenance required by a process analyzer

Lack of Available Skilled Labor

Predictive Maintenance

Quality of Measurement
Sample Systems account for the majority of field maintenance

It would be desirable to add sensors and automated controls to these systems to facilitate and reduce maintenance

In a traditional integration, this is difficult and expensive...!
Resistance to Change

SP76 ACCEPTANCE

Systems Integrators

Engineering Procurement

Capital Project Manager

PROCESS OWNER
IS SP76 Right for Your Process?
- Installation Foot Print –
Continuous Monitoring has Value!

Do you really know how well your sample system is working?
Continuous Monitoring has Value!

Do you really know how well your sample system is working?
Do you really know how well your sample system is working?
Continuous Monitoring has Value!

Temperature Comparison

- SCS
Continuous Monitoring has Value!

Temperature Comparison

- Ambient
- SCS
Value….It’s There!

Repetitive Event

Matching the component to the process is key for success.

Customer Comment

“Since upgrading the system, our callouts have almost stopped for this system. We did get 1 call out….but actually had to change a filter”
Improved measurement validity and reliability

- Continuous monitoring of system
- Validity assured during upsets, bad weather or storm conditions, holidays and other times of lowered maintenance
- Continuous data validation possible on critical or quality-mandated measurements
Maintenance cost reduction

- Reduction of walk-by inspection
- Capability for preventative and predictive maintenance
  
  **Example:** decreasing flow measurement or pressure convergence can indicate filter degradation where as simple flow loss alarms occur only when failure has already occurred

- Enables remote support troubleshooting
Remote Valve Control Modules are mounted inside the SCS—allowing pneumatic valve control, eliminating bundles of pneumatic tubing from the GC. Cables connecting components, the GC and power supply are chemically resistant, support intrinsic safety and EMI suppression standards and use stainless-steel-jacketed connectors.
...Thank You...

Flow

Extended Communications

Pressure

I/O

Valve Control

IFPAC 2013 Slide 26 "I-081" Benefitting from Smarter Sample Systems