

Q: Why do I need smart products/systems? My systems are fine the way they are.

A: Smart systems can provide critical information about your sampling system that can help improve plant profitability and safety. As an example, using smart technology can alert your analyzer technician that the sample filter is clogging and needs to be replaced. Such timely alerts can help ensure that you always have sample flow to your analyzer, allowing the analyzer to provide results for your process control system.

Q: Are new construction projects (large plants) integrating more sophisticated systems such as Swagelok® Intelligent Control Module™ (ICM™) products instead of the old, conventional approach?

A: Yes. We are seeing great interest in smart sampling systems from customers who are planning/designing new facilities or plant expansions. Many mention the need to use automation to supplement the shrinking pool of skilled analyzer technicians.

Q: Do I need to purchase the components from Swagelok and integrate myself?

A: Swagelok offers design integration services to review your application, assist in product selection, and design automated fluid systems to meet your needs. Swagelok can also build your sample system, provide programming and configuration services, and work with your plant personnel to ensure correct installation and hook-up into your network. We understand that customers may want to integrate components themselves, work with a third party integrator, or work directly with Swagelok. We are organized to help you achieve your objective of making your systems smart.

Q: Where can I install your smart products/systems?

A: Swagelok smart products are certified for use in Class 1, Division 1 / ATEX Zone 0 hazardous locations, so both the intrinsically safe ICM product and PTX pressure and temperature transducer can be mounted inside a sampling system cabinet that does not need to be purged. The sampling system cabinet can be mounted on the outside of the analyzer house as usual. A Power/Communication (Power/Comm) cabinet, provided by Swagelok should be mounted inside the analyzer house. The ICM product can also be mounted inside the Power/Comm cabinet if site layout requires it.

Q: How can I incorporate smart products into a sampling system retrofit project?

A: If your existing sampling system uses devices that produce either a 0 to 5 volt (V) or 4 to 20 milliamp (mA) output, an ICM product and Power/Comm cabinet can be easily added to capture those signals and transmit that data onto your plant communications network. If your existing sampling system uses conventional components, a possible retrofit project could include replacing a rotameter and pressure and temperature gages with two Swagelok intrinsically safe PTX pressure and temperature transducers, one Swagelok ICM product and one Power/Comm cabinet. Together, the PTX transducers and ICM product will provide sample system pressure and temperature (measured) and flow (calculated using differential pressure from the PTXs) and make it available to the plant-wide network.

Q: Do I need to use modular (MPC) components?

A: No. The Swagelok® intrinsically safe PTX pressure and temperature transducer is available with either a conventional tube fitting or SP-76 modular (MPC) process connection. The ICM product can be used with either conventional or modular components.

Q: How will your smart system connect to our analyzer(s)?

A: If you have:

- ABB model PGC5000 analyzers, the connection will be plug-and-play from the analyzer to the ICM since they both use the CANopen[®] communication protocol.
- ABB analyzers other than PGC5000, you will need to purchase a hardware/software upgrade
- Other analyzers can use their digital outputs for stream selection and analog inputs to monitor pressure, temperature, and flow obtained from the smart sample system. This is accomplished via a Class 1 Division 2 Operator Control Station (OCS) with touch screen (provided by Swagelok as part of a smart sampling system solution), integral CANopen interface, and wide variety of digital and analog I/O.

Q: How do the smart products interface with my plant communication network?

A: The ICM product communicates using the CANopen communication protocol via the network connection port on its front face. The CANopen cable is connected to a gateway device housed in the Swagelok Power/Comm cabinet which converts the CANopen signals to your plant's communication protocol such as Modbus TCP over Ethernet. If you have two separate communication networks, one for process data and one for maintenance data, Swagelok can provide the appropriate gateway device to allow data transmission on one or both plant networks.

Q: Which plant-wide communication protocols do you support?

A: We can furnish gateway devices that will convert CANopen to virtually every open standard protocol in the marketplace. Gateways are generally not available for vendor-proprietary protocols.

Q: Can your smart sampling system provide data to data historian software packages like [Siemens[®] Analyzer System Monitoring \(AnSM\)](#) or [Invensys AMADAS](#)?

A: Yes. Swagelok smart products/systems can transmit key parameters to data historian packages like AnSM and AMADAS. Both of these historians support reading Modbus TCP tag tables. The Operator Control Station (OCS) in the Power/Comm cabinet acquires all of the tag data from the smart sample system via CANopen and populates a Modbus TCP table with the data. The OCS has two physical Modbus TCP ports to facilitate access to sample system data from multiple networks.

Q: Does Swagelok provide Graphical User Interface (GUI) software to monitor sampling system data?

A: Swagelok can provide fully assembled, integrated smart sample system from the Custom Solutions team at our Global Technology Center in Solon, Ohio. GUI software is not typically part of our scope of supply, but it can be provided for an additional fee if desired by the customer.

Q: Can a Swagelok Power/Comm cabinet support multiple smart sampling systems? If so, how many?

A: The base model Power/Comm cabinet supports monitoring the pressure, temperature, and flow of up to eight fluid streams. It also supports control and monitoring of up to 24 pneumatically controlled stream selection valves (SSVs).

Q: What other types of devices/sensors can the ICM product power?

A: The ICM product accepts intrinsically safe power (up to 12 volts) and boosts it up to 24 volts for loop-powered sensors that are connected to any of the four analog ports of the ICM product. Any sensor that operates on up to 24 volt power can be powered through the ICM product.

Q: How do I identify the number and types of smart products and Power/Comm cabinet(s) needed for my project?

A: Along with your local sales and service representative, Swagelok corporate or field associates will work to identify the quantities and types of smart products you will need based on the number and location of data points (“tags”) you wish to capture. Based on that information, Swagelok can provide either a) a component quote for integration by others, or b) a quote for a fully assembled, integrated smart sample system from the Swagelok Custom Solutions[®] team at our Global Technology Center in Solon, Ohio.

Q: How does the ICM product calculate flow?

A: Two PTX transducers are placed on either side of an orifice (such as a Swagelok[®] VCR[®] flow restrictor), to measure upstream and downstream pressure. The ICM product captures these measurements from the transducers, determines the differential pressure, and calculates flow based on differential pressure, the flow coefficient C_V , and the specific gravity of the system fluid.

Q: The ICM product specs show the analog input range from 0 to 20 milliamps (mA). Isn't the typical convention 4 to 20 mA?

A: The reason why we measure from 0 to 20 mA is so we can detect misbehaving 4 to 20 mA sensors. If we measure from 0 to 20 mA, then sensor values below 4 mA can be used to provide diagnostic information, and the ICM product can pass this diagnostic information to the network. The ICM product can scale the process variable of interest to anywhere between 0 and 20 mA. For example, for a Swagelok PTI loop-powered 4 to 20 mA industrial pressure transducer the ICM product would map 4 mA to 0 pressure and 20 mA to full scale pressure and deliver the process variable value to the network accordingly.

Intelligent Control Module, Swagelok – TM Swagelok Company

CANopen – TM CAN in Automation e.V.

DeviceNet – TM Rockwell Automation

Lua – TM Faculdades Catolicas ASSOCIATION BRAZIL

Siemens - Siemens Aktiengesellschaft

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