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Case Study

Industrial enterprises gain engineering interoperability, flexibility, and simplicity with new Siemens multi-fieldbus I/O module

When the automation experts at Siemens distributor Viking Electric learned the new Siemens ET 200SP MultiFieldbus I/O module could communicate with third-party PLCs via a combination of Ethernet IP, Modbus TCP or PROFINET, they knew a wide range of customers who could benefit from new levels of standardization – quickly deploying solutions in three different industries and opening doors in others.

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Customer: Viking Electric, based in St. Paul, Minnesota.

Challenge: Open customer minds to new possibilities and avoid opportunity costs.

Solution: Demonstrate the cost-effectiveness, simplicity, and flexibility of the Siemens SIMATIC ET 200SP MultiFieldbus I/O module.

Results: Deliver new levels of standardization, plus greater engineering interoperability, flexibility, and simplicity – and make OEM solutions Industry 4.0-capable and world-ready.

Henry Ford once famously described the available color choices for his Model T automobile when he said, "Any customer can have a car painted any color he wants, so long as it is black." That limitation was because, as revolutionary as his assembly line concept was for the times, it depended on standardization for the efficiency needed to make his cars affordable for the masses.

Today, mass customization of vehicles and other products is possible due to advancements in programmable logic controllers (PLCs) and their ability to deliver commands and gather production data over a factory floor using various fieldbus protocols to link I/O modules to field-level devices.

But despite these advancements in industrial automation and control technologies, many younger engineers of industrial machines and plant processes find themselves limited by PLC and I/O choices their predecessors made years, if not decades, before them. This can be frustrating in the age of Industry 4.0, as industrial digitalization and the Internet of Things (IoT) connectivity accelerate, making production and markets ever more competitive.

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That's why the automation specialists at Viking Electric – a major supplier of electrical components and services in the U.S. Upper Midwest – go to great lengths to educate their OEM and end-user customers on all the options that emerging technologies offer. For example, these technologies can provide greater standardization and third-party interoperability to avoid vendor lock-in, while also boosting production, simplifying operations, improving engineering flexibility. One such a technology is the new Siemens SIMATIC ET 200SP MultiFieldbus I/O module – one device with three communication protocols that can handle both digital and analog signaling.

Challenge: Open customer minds to new possibilities and help them stay competitive while avoiding growing opportunity costs

With innovation as one of its core values, Viking Electric knows how its busy customers can overlook the latest industrial technology advancements or even avoid considering them, fearing the disruption risks they could bring to production. "Engineers often get comfortable with the status quo or what they know, even if much better solutions are available," says Lead Automation Specialist Jamie Bratsch.

"A big part of our job is to educate them to what newer, more advanced technologies, like those from the Siemens Totally Integrated Automation (TIA) portfolio, can do for them."

Jamie Bratsc

At the same time, Bratsch notes, customers can be taking just as big a risk of missing out on the competitive advantages and other benefits new components, products, and solutions can provide their production lines or machinery. "Of course, we call those opportunity costs," he says. "And the older the technology currently being used is versus the newer technology, generally the greater the opportunity costs are and the more they will grow with each passing year, as downtime, repairs, and spare-part scarcity mount."

Solution: Demonstrate the cost effectiveness, simplicity, and flexibility of the Siemens SIMATIC ET 200SP MultiFieldbus I/O module

Bratsch points to the Siemens SIMATIC ET 200SP MultiFieldbus I/O module an example of the kind of advanced industrial technology on which Viking Electric has built a solid reputation among its customers for innovative solutions to some of their toughest challenges. With two RJ45 ports, the I/O module can communicate simultaneously with Siemens PLCs and other devices via PROFINET or with similar third-party components via Ethernet/IP or Modbus TCP.

"This communications flexibility can open doors to a lot of options including extending the value of depreciated but still operating legacy PLCs, I/O, drives, and other components, while building a bridge to an Industry 4.0 future for a plant's infrastructure with greater digitalization and IoT connectivity," Bratsch says. He further explains that Industry 4.0 capabilities requiring advanced digitalization, such as remote operations, diagnostics, and even predictive maintenance via condition monitoring using artificial intelligence (AI), can be better enabled by having I/O able to handle three of the world's most commonly used industrial communication protocols.

The three general categories of applications for the SIMATIC ET 200SP MultiFieldbus I/O module are:

- **OEM machine builders and series machine construction,** using Ethernet/IP for industrial production discrete, process, and hybrid solutions;

- **Tunnel builders and operators,** especially those needing to incorporate Modbus TCP with Digital Addressable Lighting (DALI) and Ethernet as well as push-pull ventilation systems;

- **Energy management,** including Schneider Energy Meter and Siemens SIMATIC Energy Suite solutions using Modbus TCP, for reducing energy consumption and costs in plant facilities.

Additional key features and benefits of the SIMATIC ET 200SP MultiFieldbus I/O module include:

- **Simplified project planning, engineering, programming, and commissioning** using the Windows 10-based Multi-Fieldbus Configuration Tool (MFCT), saving time and effort.

  Users can use the MFCT to set the IP addresses of the field-level devices, the device name, and the I/O, then they can export the appropriate files (e.g., Global Data Space (GDS) or Electronic Data Sheet (EDS) files) to their respective PLC types, including those from Rockwell/Allen-Bradley, Schneider Electric, ABB, and others using one of the three communication protocols.

- **Multi-protocol coexistence for fast deterministic data exchange simultaneously** between different brands of PLCs using different Ethernet protocols. This provides greater I/O flexibility and standardization in configuring automation and controls for different plant systems. Different PLCs can communicate using their respective protocols with the same field-level devices, enabling device-sharing that can help simplify and reduce spare parts inventories. Information can be exchanged between the different PLCs without complex programming.
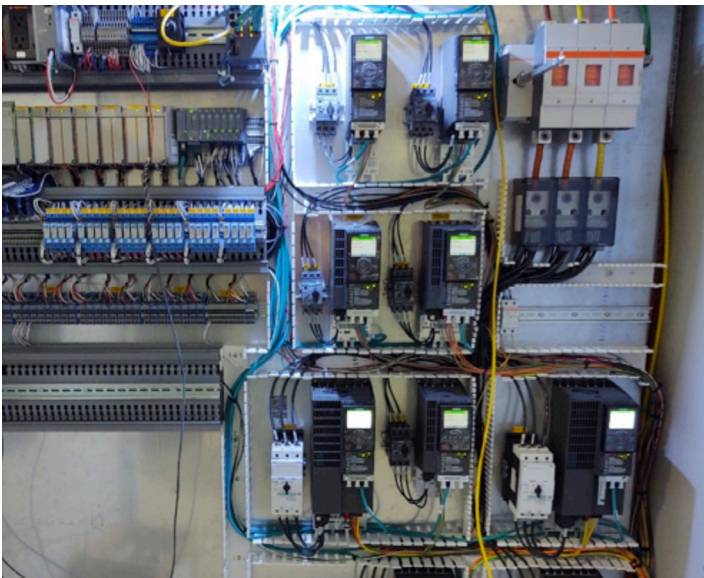
- **Compact form factor enables the I/O module to fit into most control cabinets** with one slot for a BusAdapter, so the same I/O station can be used, independent of the fieldbus protocol. The complete range of SIMATIC ET200 SP modules can be used with the MultiFieldbus, up to 64 ET200 SP I/O modules plus 16 compact ET200 AL modules, programmable in the TIA Portal. No special gateways are needed. If a replacement is needed, plug-and-play hot-swapping can be done and relevant parameters are automatically transferred, to keep downtime to a minimum.

Results: Deliver new levels of standardization, plus greater engineering interoperability, flexibility, and simplicity — and make OEM solutions Industry 4.0-capable and world-ready

The product's introduction was timely. "Coincidentally, we had several customers in mind with similar needs at the time," he says. "They all had limited space in their control cabinets, so compact I/O density along with both digital and analog I/O capabilities were critical considerations for them."

One of the customers was a large glass manufacturer. "The customer wanted an I/O platform that was cost effective, had a small form factor, and also had built-in diagnostics to generate alarms and notifications to plant staff," Bratsch recalls. "Their existing system controller was a Rockwell CompactLogix PLC, but because the point I/O platform required a specialty power distribution module, the cost was almost double compared to what we provided using the ET 200SP MultiFieldbus I/O module."

The SIMATIC ET 200SP MultiFieldbus I/O module met their requirements perfectly, according to Bratsch. To demonstrate its functions, he outfitted a hard-shell Pelican utility case with the module, plus a power supply, connected to a CompactLogix PLC as well as a Siemens SIMATICS PLC. He also added in a Siemens SINAMICS G120 drive to show how it, too, could communicate with either controller. Two other customers upgraded their plants using the SIMATIC ET 200SP MultiFieldbus I/O module, as well. One, a vegan cheese maker, incorporated it into an anaerobic digester for wastewater treatment.

Another was a dairy application needing it to run a series of valves, pumps, and flow meters – 30 I/O points in all and a combination of digital and analog throughputs.

"With our demo environment, we were able to show these customers how the ET 200SP MultiFieldbus I/O module worked and its native integration of their data structures," he says. "For example, the EDS files that the MFCT automatically generates are native to the Rockwell environment. Once the customers saw how it could map both the digital and analog I/O, we won the deals. We also got the chance to show them how the SINAMICS G120 drive via Ethernet/IP could work and won that sale, too."

For Viking Electric's OEM and systems integration customers, Bratsch sees a tremendous advantage in using the ET 200SP MultiFieldbus I/O module to make their machinery both Industry 4.0-capable and world-ready. As one modest example, he points to the device's QR code and smartphone app that enabled the maintenance teams at his customers to download wiring diagrams and user manuals. "They really liked that feature," he says. "It's a nice touch, to be sure, but the I/O module's other features like its multifieldbus protocols and built-in remote diagnostics, all backed by Siemens global service and support, are a powerful combination that can help our OEM and systems integration expand their markets beyond our region to the rest of the world, too."