Maximizing Fieldbus Installations with Second Generation Device Couplers

Up-front engineering is the key

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‘By some estimates, there are now Fieldbus installations in more than two dozen countries around the world.’ Foundation Fieldbus and Profibus are popular. No argument about that. By some estimates, there are now Fieldbus installations in more than two dozen countries around the world. Yet, for all its operational advantages, Fieldbus can prove tricky to install. Without correct connections, any anticipated ROI can be wiped out as technical complications can delay setting up a plant and take a long time to recoup in operational savings. For this reason, second generation device couplers have recently gained attention as the essential link that not only holds the entire system together, but also can make or break a new installation. In response, engineers and process control vendors are increasingly specifying device couplers that incorporate features such as auto termination, short circuit protection, and visual circuit checking as a means to ensure that new installations proceed as planned. "Having the right devices in the field is really important, as this can directly affect a business financially," says Chris Peters, an automation consultant with Logical Innovations, a leading DCS systems integrator in Virginia. "If you have device couplers with features that enable you to start up quickly, then you're in much better shape."

Shortening Ramp-Up Time

Process engineers in all fields - from pharmaceutical, specialty chemical and petroleum, to food and beverage - recognize that timing is everything. The sooner the process starts, the sooner the profits accrue. The same holds true for most manufacturing industries. Whether beginning from a barren "greenfield" or expanding or upgrading an existing plant, a quick ramp-up from installation to operation of the process control system can significantly improve "time to market." On the other hand, future operational reliability cannot be sacrificed in favor of speed of installation. Fortunately, Foundation Fieldbus and Profibus offer advantages to address both concerns, which is why many existing plants are now upgrading antiquated analog SCADA (Supervisory Control And Data Acquisition) and

DCS (Distributed Control System) systems into the digital world of Fieldbus. Advantages include: a standardized physical interface; multi-drop capability to reduce wiring needs; expanded process data to better evaluate and optimize operations; interoperability between devices so that users aren't locked into one vendor; and intrinsic safety options. Still, in order to realize these gains, the entire system must be installed quickly and correctly. Plant engineers who design and specify their own systems, as well as process control vendors who do this work, know full well the challenges posed when installing a new plant control system. Every aspect of the system must complement the other parts in order to ensure a trouble-free installation. "The big thing with Fieldbus is that you're going to save time and money, from both a wiring perspective and from a start-up perspective," says Peters. "But if you don't have it installed correctly and it doesn't start up right away, then you don't really achieve the savings potential that you're supposed to by using this technology. This is where attention to device couplers can make a big difference."

Device Couplers: Bridging the Gap

As the vital link between devices such as temperature and pressure transmitters, and the process control system, device couplers could be likened to the master link of a chain. Just as a chain is only as strong as its weakest link, so must device couplers excel at their appointed task of routing sensor inputs onto the bus toward the control head-end, and then routing commands back to the proper control devices. In general, second generation Fieldbus device couplers reduce the design efforts of systems integrators and the wiring workload for field installers by enabling fast and easy connection and disconnection of Fieldbus devices into the required segments. Beyond that, however, the individual features of the device coupler can make a significant difference in whether a system installs and starts up quickly or not. "Some of these features actually help you diagnose problems," notes Peters. "Other important attributes include auto-termination and short circuit protection. I like the MooreHawke device couplers because they have all of this." Offered by Moore Industries-International, Inc., of North Hills, CA, MooreHawke device couplers are complete packages based on IP66 field enclosures complete with cable glands to suit field wiring. The company's TRUNKGUARD&#153 units provide "second generation" attributes such as automatic segment termination for 4, 8, 10 or 20 Foundation Fieldbus H1 or Profibus PA devices. "We recently configured a control system for a chemical processing plant for Delta T Corp. and we helped them commission the facility," says Peters. "With input from us, the plant managers and engineers at Delta T specified the MooreHawke device couplers. About two dozen were called for." "This was a greenfield facility, designed and built out of a corn field" adds Tim Gale, Senior I&C Engineer for Delta T Corp. of Williamsburg, VA. Delta T designs, enhances and integrates technologies such as molecular sieve adsorption, fermentation, distillation and evaporation for customers in the energy and chemical processing industries. "We're pretty sensitive to the time it takes to get to market with our plants, so anytime we can save in construction or commissioning, that certainly helps us," continues Gale. "The MooreHawke device

couplers worked well for us in this regard." The TRUNKGUARD units offer several features that represent recent developments in device coupler technology. "The auto-terminator feature is probably the biggest thing that helps in start-up," notes Peters. "In most Fieldbus installations it seems like you always have termination issues. You can spend 2-3 days worth of time trouble shooting a certain segment that has the wrong number of terminators on it. But if you use the MooreHawke device couplers, which have the auto-terminator function, then you don't have to worry about termination. It just happens." Second generation device couplers like the TRUNKGUARD employ unique "end-of-line" sensing circuits that provide fully automatic segment termination to assure that local parts of a segment will continue to function if remote parts are accidentally disconnected. "The auto-terminator feature helped prevent any wiring errors; it's almost foolproof," says Gale. "Another big benefit of using these particular units is their circuit protection." While older generation device couplers employ "current-limiting" when a short occurs on the spur between the device and the coupler, the usual "lock-in" load is 60 mA, and no less. The danger of locking in this much current is the risk of causing other devices to receive insufficient current, in which case they drop off of the network. Whereas the MooreHawke device couplers utilize a fold-back technique which locks in a small 2 mA load - just enough to turn on an LED light - and then removes the device from the segment. Once the short is removed, the coupler automatically resets the device on the network. "The short circuit protection is a really good feature, notes Peters. “It also helps the installation process go quicker." Once installed, modern device couplers can also improve the reliability of the control system through diagnostic capabilities in excess of what Fieldbus has to offer by itself. Each MooreHawke coupler, for instance, contains LED indicators to provide status checks at a glance. Intuitively, the red LED indicates a fault in the spur; green, an intact healthy spur. This status information extends to each spur, so for a 10-spur device coupler there would be 20 LEDs - a pair for each spur. Second generation device couplers further accelerate field commissioning and routine monitoring by providing easy access points for hand-held communicators such as Fieldbus trouble-shooting devices. Quick attachment of probes helps maintenance personnel track down any potential problems in the system.

Specifying Device Couplers That "Pay"

Currently, as much as 80 percent of all new plant control systems that utilize bus technology are Foundation Fieldbus compliant, and the trend is expected to continue. This adds increased importance to the device couplers that connect everything. With all the benefits they stand to offer, it pays for plant management to become involved in the specifying process to ensure that these new tools find their way into new plants, retrofits and expansions. "The key to any successful Fieldbus installation is up-front engineering," stresses Peters. "Get it designed well and it will pay off for you." "I can't quantify how much money it saved us, but it did save us time - and time is money," says Gale. "I also believe that the pricing on the MooreHawke device couplers was more competitive than others. In that case, it did save some hard dollars up-front."

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