Connected devices keep the heart of industrial automation beating

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During an era when the population is increasing and there always seems to be a race against time, efficient industrial production is becoming more vital than ever. Manufacturers feel the pressure of producing an increased number of products while still maintaining a high level of quality. Even manufacturers in regions with low labor costs are focused on increasing the sophistication of their automation systems because they know that failing to do so could jeopardize their position in the global economy.

At the heart of industrial automation is a new generation of advanced intelligent sensors and motor drives connected through low-latency and real-time networks to high-performance programmable logic controllers (PLC) and Human-Machine Interface (HMI) systems. Because time is money for manufacturers, an efficient production line that runs as fast as possible and achieves an acceptable level of quality can help increase production as well as the business’s bottom line. In order for industrial automation to be successful, sensors must be fast and reliable to be able to monitor or measure conditions on the production line very quickly. And then the network must communicate this information with minimum latency and no interruptions. A host of industrial communications protocols such as PROFIBUS/ProfiNet, Ethernet/IP, EtherCAT, POWERLINK, SERCOS III and others are typically called upon to achieve the communications performance required. And processing elements, such as PLCs, must respond in real time or the production rate will decrease causing profits to fall.

Components of Industrial Automation
Industrial automation systems are typically made up of four major components that are connected to each other by low-latency and real-time high-speed communications. The four elements are: sensors, human machine interface panels, PLCs and motor drives. In an industrial automation system, these four elements work together to ensure a rapid response on the part of the PLC, resulting from sensor or operator inputs.

Sensors
Today's factory automation systems rely on "smarter" sensors more than ever. Before, sensors used to be limited to monitoring and measuring data, but now, they have the capability to analyze the information as well. Sensors have become more intelligent, allowing them to process data in real time. Sensors can perform several functions such as identifying temperature, motion, optical objects and positioning, weight, acceleration, chemical composition, gases, liquid flow and many other aspects of the physical world.

Human machine interface (HMI)
The human machine interface is a unit or subsystem that communicates with the person who is controlling the machine. Most HMIs on industrial automation systems typically incorporate a graphical display subsystem such as a touch screen due to its intuitive ease-of-use.

Programmable Logic Controllers (PLC)
Generally, PLCs or programmable logic controllers are systems based on microcontrollers or microprocessors, which accept inputs from the sensors and other motor drives distributed throughout the factory and from the system's human operators. The PLC will initiate actions based on the information provided from these two sources to manage the processes taking place in the production line.

Motor drives
Motor drives are the parts that respond to the directions of the PLC and control a motor. A motor converts electrical energy to mechanical energy to drive devices such as conveyor belts and assembly lines. Typically, sensors are attached to motors to get the actual motor position and send the information in real time. The PLC and/or the drives would respond to this information with instructions to tightly control the motor speed and position.

Taken as a whole, today's industrial automation systems are real time and highly precise connected systems capable of accurately controlling high-speed processes. Innovative solutions make industrial communications more affordable and more accessible while driving greater automation and productivity.

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