

IoT Connected Control Systems: Making the Smart Factory Safe

The internet has brought about the rise of the smart factory. And there is no doubt that it's in growth mode, with industry research showing that the smart factory market is growing 10% every year as more and more organizations adopt the latest techniques. The technology that is driving the smart factory is the Industrial Internet of Things (IIoT), the name given to the network of machines often on a factory floor that can communicate with each other, enabling new and exciting levels of integration. This new data-driven industrial revolution is known as Industry 4.0.

A smart factory can be described as a facility where the production process – the factory floor – is connected to control systems to create a single entity. By creating a process that takes input generated by a wide range of sources, from customer demands to the functioning of the machines themselves, it is possible to work more efficiently and to adapt more quickly to changing requirements.

The Advantages of the Smart Factory

Italian manufacturer [Salvagnini](#) has long believed in creating a direct interface between customers and production. As long ago as 1985, Salvagnini had created the Automatic Job Shop that allowed the company to respond directly to customers' requirements. By using automatic machines with state-of-the-art communications, Salvagnini was able to create a truly "lights-off" factory.

The Internet of Things has allowed this concept to achieve new levels of integration. Salvagnini has applied the technology at the heart of the Industry 4.0 revolution to create a responsive and flexible service that places production directly in the hands of the customer. Using cloud services, the Salvagnini solution allows customers to specify their requirements and communicate them directly to the production line. As production commences, the customer can monitor the process, with Salvagnini on-hand to provide support as necessary.

There are practical concerns that accompany the placing of customers at the center of the manufacturing process. The possibility of full remote operation is one of the benefits of a true Industry 4.0 installation and can be seen in nearly every IIoT application.



Making the Smart Factory Safe

The vision of a true "lights-off," remotely operated factory is never quite achievable. While many aspects of production can be left to industrial automation, there will always be the need for human operators to access the factory floor for maintenance and troubleshooting. These operators must be kept safe, and this is the role of systems and equipment that work collaboratively.

The goal of an IoT-connected control system that operates as a single entity is to ensure that system can operate efficiently without risking injury to operators. In the case of production equipment that is operated by computers, it is vital that the machinery is equipped with a range of devices that can respond immediately should an unsafe situation develop.

The first key component of safety systems will be sensors, which can take many forms. From simple door switches that detect if equipment is left in an unsafe condition to more sophisticated solutions including safety light curtains that serve as an alternative to physical barriers. These will detect if a foreign body – for example, the hand of an operator – enters a safety-critical space.

Sensors are only part of the solution. In an integrated smart factory, sensors need to communicate quickly with other systems so that appropriate actions can take place without delay. This requires highly reliable connectors and cables that can provide the rapid communication necessary to ensure safety is maintained. They also require computing power that can respond with the minimum latency.

Challenging Environments

The task of delivering a robust safety system is made even more complex by the conditions. The manufacturing industry creates an unforgiving environment. Depending on the processes taking place, the factory floor can be home to extreme temperatures, humidity, vibration and shock and even harsh chemicals. In addition, there will often be moving machinery that creates significant risks to anyone nearby.

The use of autonomous mobile robots has become common within the smart factory, being used for a variety of roles including the transportation of raw materials and the distribution of completed products. Not only do these robots need to navigate their way around the factory to be in the right place at the right time, but they also need to be able to identify hazards and act quickly to maintain safety.

Whether it employs the latest autonomous mobile robots or more traditional fixed machinery, the smart factory is powered by the latest developments in the Industrial Internet of Things and Industry 4.0. These innovations are allowing manufacturers to be more flexible and responsive, ensuring that they place the needs of their customers at the heart of their processes.

As this new autonomous technology becomes common on the factory floor, the need will grow for IoT-connected control systems that operate as a single entity. Manufacturers will need sensors that can withstand the tough conditions in the industrial environment, linked with connectors that provide reliability and security.

Connecting the Factory of the Future

Molex has the technical expertise, industrial experience and global footprint to develop connectors and solutions for the latest functional safety requirements. Molex is helping to enable the factory of the future, using advanced connectivity solutions to remove the barriers between the manufacturer and the customer, along with the safety systems required to equip the true “lights-off” factory.

In a recent [customer case study](#), we explore how Molex supported Salvagnini with their integration of cutting edge IIoT advancements. Download the case study to learn more about how a shared industry 4.0 commitment accelerated the development of compact, IP67-rated products to support increasingly smaller and more powerful machines that must perform reliably in the most rigorous environments. Molex’s proven knowledge of Industrial Ethernet architecture, broad product portfolio and local technical support proved invaluable in finding and fixing a critical connectivity problem to improve operational efficiencies.



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