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ADVANCED FACTORIES 2018: HOW A MORE CONNECTED FACTORY IS TRANSFORMING MANUFACTURING

The Advanced Factories annual trade-show is the place where innovation shapes Industry 4.0, the body of knowledge that formalizes the Fourth Industrial Revolution. It embodies the linkage between the physical and digital world. The reason for its existence is explained by the ever-growing personalized demand on the markets, which is forcing companies to rethink their production, their supply chains and their workforce.

Industry 4.0 is based on two pillars, on the one hand, the so-called Cyberphysical Systems, and on the other hand the Internet of things. Currently, the Internet of Things is already transforming manufacturing and industrial operations through deeper visibility and greater connectivity. There is a nearly unlimited potential for improvement.

With these profound tranformations, manufacturers and industrial operators will have to reconsider machinery and facility design methodologies, technology implementation and safety issues.

At ADVANCED FACTORIES 2018, two major trends are affecting the industrial plants:

- The development of the connected factory to improve productivity and efficiency.
- The rethinking of facility and machinery design methodologies to address ergonomics and safety risks.

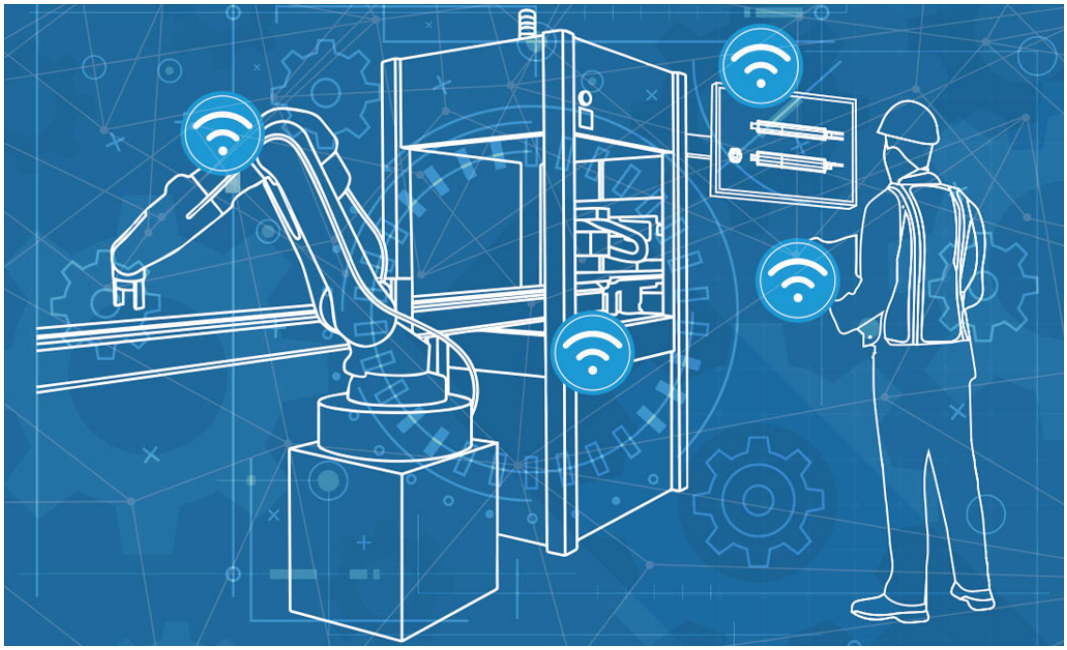
THE DEVELOPMENT OF THE CONNECTED FACTORY

The connected factory consists of industrial operations that are smart, secure and connected, using sensors and machinery that communicate among them. By sharing information across global and remote operations, the productivity improves and the innovation enhances the manufacturing process.

THE RETHINKING OF THE MACHINERY DESIGN

Not only the traditional hazards, but also the ergonomic and usability issues for a broad range of workers should be taken into account. Therefore, some questions and consideration have to be kept in mind:

- Do operators have to lift materials? How can the manufacturers design more supportive machinery to alleviate the operators?
- Do maintenance technicians have to bend or twist awkwardly when providing maintenance?
- How can these operations be performed more safely, more ergonomically and more efficiently?



Safety systems integrated with machinery controls can be very effective in mitigating risks. In this field, electric linear actuators are often at the root of the solution because they can work easily with machinery controls and give the desired feedback. The main reasons for working with electric linear actuators are:

- Their movement is reliable, safe and accurate.
- They can be operated with batteries.
- They do not consume any power while at rest.

The installation is simple and maintenance-free.

As components of the Industry 4.0, the linear electric actuators have to be able to monitor different values and a have varying control options.

Electronic monitoring options:

- **Current monitoring:** This is a critical safety feature that trips the actuator if overloaded.
- **Voltage monitoring:** This prevents the actuator from operating in an environment outside of the correct range.
- **Temperature compensation:** This option allows the actuator to push the rated load at lower temperatures without the nuisance tripping.
- **Temperature monitoring:** This monitors internal temperatu If it is out of the acceptable temperature range, the actuator shuts down after completing the extension or retraction.

Enhanced control options:

- **Analog position feedback:** A potentiometer provides a voltage signal for the user to determine the position, speed and direction.
- **Digital position feedback:** An encoder provides a single pulse train signal to determine the position and speed.
- **End-of-stroke indicator:** Provides an external signal that indicates when the actuator has reached the end of stroke.
- **Low-level power switching:** Onboard electronics limits current draw at switches or contacts to a predetermined maximum in mA, enabling a simplified and less expensive system design. These low-current signals can be used to program actuators to extend, retract or stop the trajectory, providing a soft start. This improves safety by reducing the hazard of electrical shock and puts less stress on system batteries and charging systems. An auto hibernation features also helps improve efficiency by reducing power consumption during idle or dwell periods.
- **Dynamic braking:** This feature reduces coast, which will improve repeatability and positioning capability.
- **CAN BUS:** This technology secures communications in integrated systems by providing a standard messaging structure for communications among network nodes guided by an electronic control unit.

The transformation of the manufacturing and industrial operations is already underway. Those companies that implement these changes early and adopt new technology will ultimately prevail in the global economy.