



Vacuum Solutions for the Intelligent Factory
Ready for Industry 4.0

Industry 4.0 – The Smart Production

Networked Factory

What Actually is Industry 4.0?

The “fourth industrial revolution” describes the transition of production work towards the intelligent factory. The increased networking of production and IT processes makes this flexible, efficient and sustainable. In the future, products will plan, control and optimize their own production process without human intervention. Humans will continue to dictate the pace, but with the best possible support in their work.

Visions and Benefits of Industry 4.0

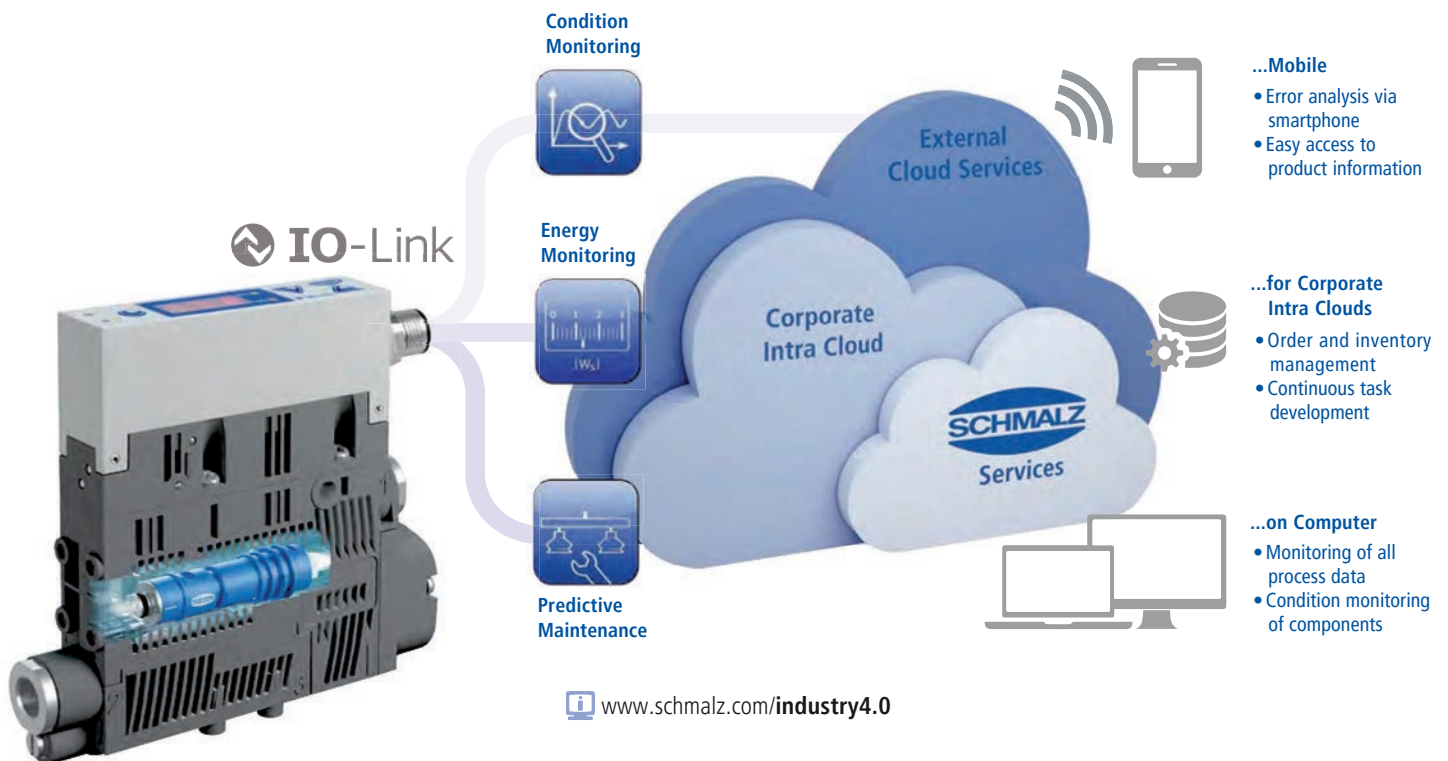
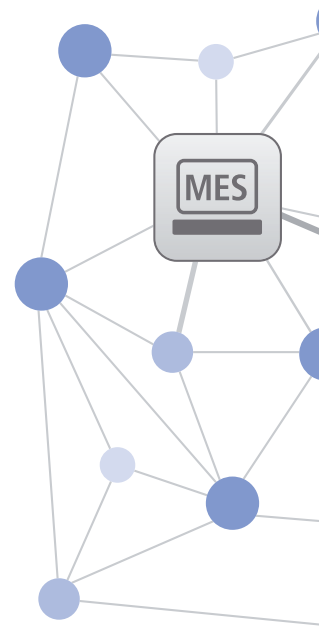
- Production becomes highly flexible, highly productive and resource-efficient
- Individualization (batch size of 1) under efficient high volume production conditions
- The increasing complexity of production and processes becomes manageable
- Autonomous production units organize themselves on an “ad hoc” basis – the product determines its own production process

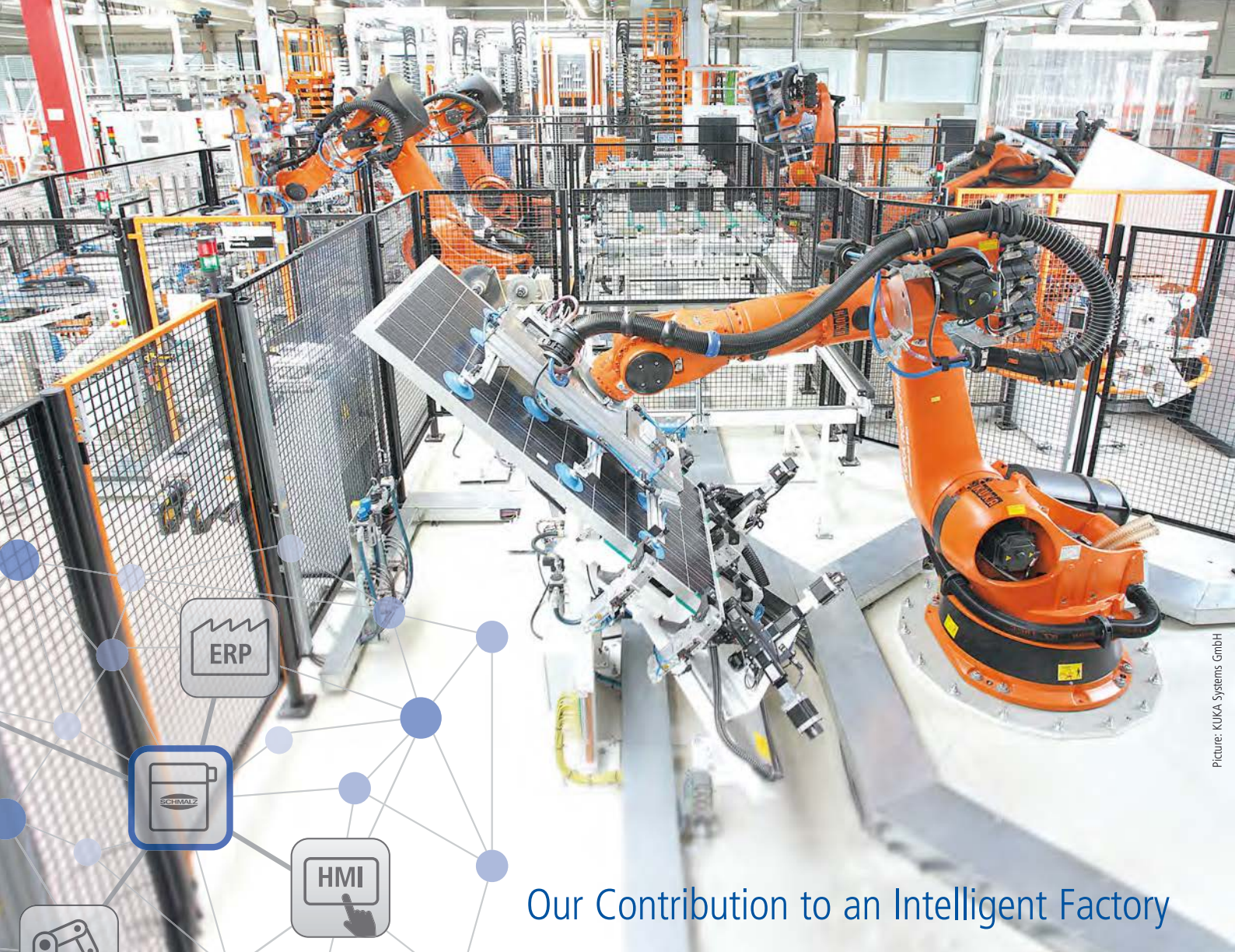
Energy and Process Control Data as a Basis for Industry 4.0

The basis for intelligent functions is that all of the relevant process data is available in real time. Schmalz provides an entire range of so-called smart field devices for this purpose: They are fitted with comprehensive energy and process control functions, they gather and interpret data and make it available. This allows Schmalz to support its customers to gear up for Industry 4.0 – the switch to the intelligent factory.

Visible and Intelligent Smart Field Devices Provide Valuable Data for the Smart Production of Tomorrow

Intelligent compact ejectors, for example, allow for both efficient product operation and efficient control of the entire process. All of the parameters that are relevant to energy and performance throughout the vacuum system are recorded, monitored, and analyzed via IO-Link here. Compatible systems and services connected through IO-Link, such as intra clouds or cloud services, are used to make the information visible in the different integration stages and output channels. This enables a higher degree of transparency and productivity in automated processes. The energy monitoring function guarantees optimal energy consumption throughout the system. The system status is monitored using condition monitoring, which increases system availability substantially. The predictive maintenance function improves the performance of the gripping system.





Picture: KUKA Systems GmbH

Our Contribution to an Intelligent Factory

As the Leader in Vacuum Technology, Schmalz is Supporting its Customers on the Path Towards Industry 4.0



“The greatest benefit of Industry 4.0 is maximum productivity with highest transparency and minimal downtime.”

Walter Dunkmann
Head of Business Unit
Vacuum Automation

Experts agree that in future, no company competing at an international level can afford to ignore Industry 4.0. Today, enterprises need to set a course for tomorrow and be ready for networked production. People, machines and resources interact in the factory of the future. Strongly individualized products are created through highly flexible and resource-efficient production. There is extensive integration of customers and business partners and value-added processes.

There is still a long way to go until this vision becomes a widespread reality. Schmalz has already started along this path and is supporting their customers with innovative and future-proof solutions. Our work was focused on intelligent process communication long before any mention of Industry 4.0. In 2008, we launched the world's first vacuum generator with IO-Link interface, making it Industry 4.0 ready. Today we are the first manufacturer to combine sensor and actuator functions in a 4.0 compatible device.

The ultimate aim of all our efforts and activities is to help our customers achieve more productive, efficient and flexible production processes through the use of intelligent vacuum solutions, thus enhancing their ability to compete.

Vacuum Components with Integrated Intelligence

Ready for the Future

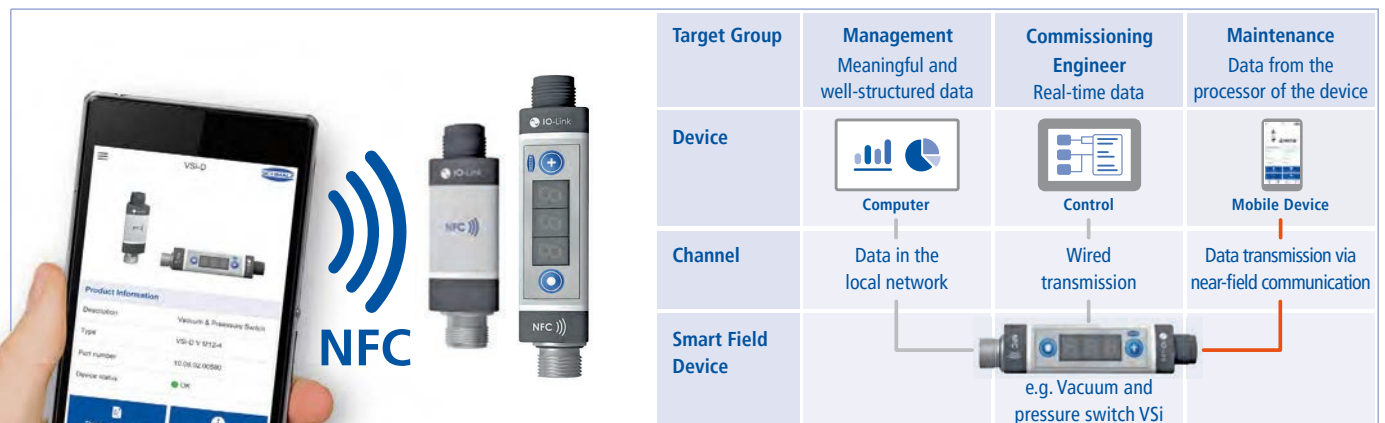
Our Smart Field Devices Understand „Industry 4.0“

Vacuum generators, as well as vacuum and pressure switches and needle grippers from Schmalz, come with the intelligence to communicate in the factory of tomorrow. They gather all important process data, interpret the data and communicate via IO-Link up to the master level.



Near Field Communication (NFC) – Direct and Fast Communication as a Productivity Boost for Industry 4.0

In addition to IO-Link as a common communication channel Schmalz offers with NFC other communication options for the operation of its smart devices. These capture data directly from the process and transfer the data via NFC to the Smartphone. No separate power source is needed for data transmission. The process data is displayed together with maintenance and service information on the smartphone. In addition to reading, writing over NFC will soon be possible. This means parameters can be transferred from the smartphone to the Schmalz product using NFC. The parameterization then requires a smartphone app.



Energy Consumption and Processes Under Control

Energy and Process Data as a Basis for Industry 4.0

Smart Field Devices with Comprehensive Functions for Energy and Process Control

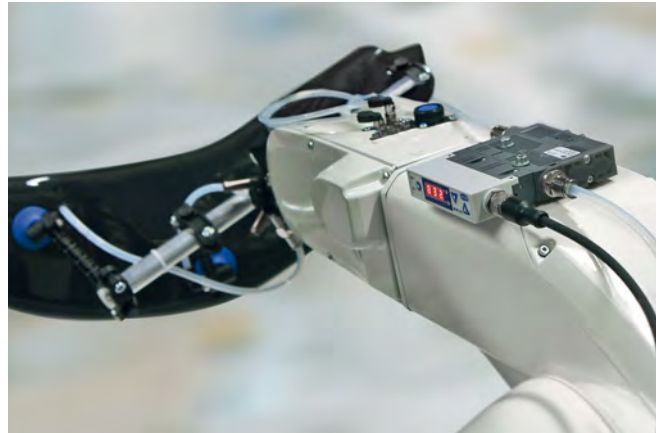
The diagnostic functions of Energy Monitoring and Condition Monitoring provide a maximum process transparency and control energy consumption. An enhanced performance and quality of gripping systems enables predictive maintenance.



Energy Monitoring

For the Optimization of Energy Consumption in Vacuum Systems

- Current energy consumption captured as real values
- Energy efficiency of vacuum system optimized even before start of operations
- Trend analysis per component, per production cycle and per shift
- Identification of disproportionate energy consumption
- Visualization in the system controller



The energy efficient compact ejectors SCPSI constantly monitor energy consumption.



Condition Monitoring

For Increasing System Availability

- Continual monitoring of process parameters relevant to system functioning (e.g. leaks and operating pressure for ejectors or stroke and cycle times for needle grippers)
- Maximum system availability through detailed analysis of system condition and early detection of errors
- Fast and efficient troubleshooting in individual system parts or in the overall system
- Cost savings due to minimization of downtimes



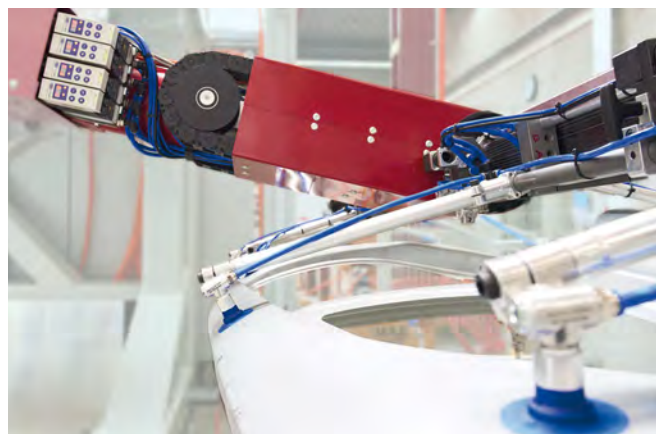
Through NFC data from the vacuum and pressure switch VSI is transmitted directly to the smartphone, where it can be then evaluated and adjusted.



Predictive Maintenance

For Increasing Performance and Quality of Gripping Systems

- Measurement of flow resistance and leak tightness in the gripping system
- Quick and easy system optimization through evaluation of gripper system performance
- Identification and prevention of faulty configurations
- Monitoring of performance relevant process data and early recognition of changes in system condition (e.g. leakage or contamination)



The compact ejectors SXMPI allow the user a scheduled and preventive maintenance without downtime during operation.



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