



## Industrie 4.0 The future of automation

Products with IO-Link

- Grippers
- Rotary distributors
- Clamping and braking elements
- Spindles

THE KNOW-HOW FACTORY



 IO-Link

# INDUSTRIE 4.0

The world in which we live is changing. It is likely to be changing faster than we are able to observe in the snapshot of time. In the mechanical engineering and automation field, this shift, truly a new industrial revolution, is described with the buzzword „Industrie 4.0.“ This ensures the merging of the fields of typical engineering sciences and IT, the networking of components, machines and entire factory complexes are referred to within one overarching term. Ultimately, it outlines a more comprehensive solution approach for future challenges in the production environment of tomorrow. Zimmer Group views this shift in production from different perspectives. First, the technological shift described here is evident worldwide and its effects on production and the flow of goods are visible. However, topics such as human-machine interaction as well as qualifications and the demographic trends in the work environment should also be included in a comprehensive view. This holistic approach to Industrie 4.0 enables Zimmer Group to open up its full potential of market opportunities to its customers, which provides the optimal networking of components, machines and people in the production environment and during the production process.

## ► Why the name Industrie 4.0?

The first industrial revolution was brought about in the 18th century by the invention and use of steam engines and the mechanization of manual labor; the second industrial revolution began at the start of the 20th century as a result of electrical mass production. The third industrial revolution came as a result of using electronics and computer technology for manufacturing and production automation in the beginning of the 1970s. Today, the virtual world and the real one are merging together in production; this is referred to as the fourth industrial revolution.

## ► The shifting production world

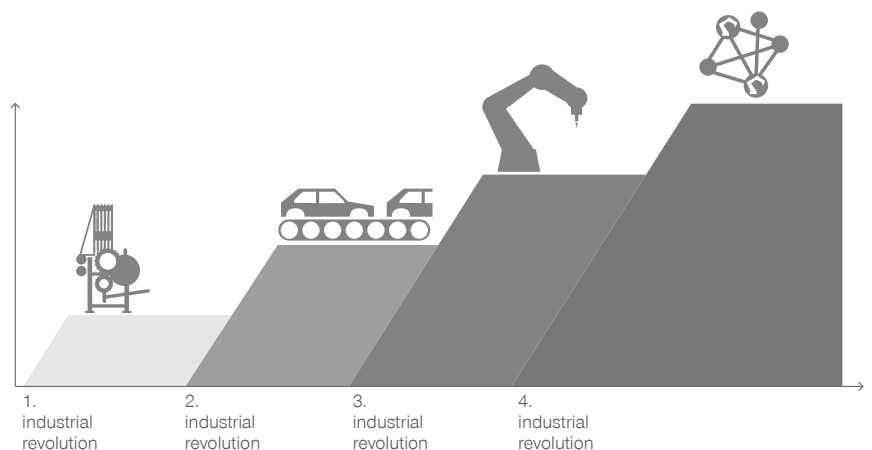
The increasing levels of digitalization and networking are changing the entire industrial chain of production. Ultimately, this outlines a more comprehensive solution approach for future challenges in all modern industrial societies. These challenges can be categorized roughly into four areas. The first area is demographic change in society and its implications. The second area consists of widely diversified product portfolios and smaller produced lot sizes. This requires new, flexible and highly efficient production methods because of the increasing desire of purchasers for customized products. The most accurate term for this type of production organization would have to be mass customization on-the-fly. The third area consists of improving the competitiveness of goods and services in a dynamic market for the future. The fourth and final area is making an impact on the industry in the future and the need for high resource and energy efficiency on a worldwide level.

## ► Production is becoming faster, more flexible, more efficient and is creating added value

As a result of Industrie 4.0, billions of machines, systems, actuators and sensors worldwide will be able to communicate with each other and exchange information from now on. This will make it possible for an enterprise to not only make its production significantly more efficient but also align it much more flexibly to the needs of the market. Cloud-based services are changing the nature of physical ownership. The efficiency of a component is no longer measured only in cycle times; instead, it is increasingly measured by its ability to communicate with its production environment and respond to changes in the requirements profile.

## ► Industrie 4.0: Better production

Industrie 4.0 is the driving force of innovation, growth and flexible, secured production. Meanwhile, the standards from the markets are increasing simultaneously. The market demands, at increasingly shorter intervals, new, high-quality products that can be offered on a customized basis. The production of tomorrow also means production that has mastered the requirements of the 21st century.



# INDUSTRIE 4.0

---

## ► Factories organize themselves

Information technology, telecommunications and the manufacturing industry are merging - the autonomy of the means of production continues to grow. No one can say, however, precisely what smart production will look in the future.

One thing is certain: machines in plants of the future will largely organize themselves, supply chains will assemble themselves automatically and orders will be converted directly into production information which will then lead right into the production process. Despite this, humans who design and monitor all of the processes and procedures using their intelligence and their experience will still play an essential role in the world of Industrie 4.0.

## ► IO-Link, the interface of Industrie 4.0 components

IO-Link is the first standardized IO technology worldwide for communication from the control system to the lowest level of automation. This IO-Link standard is used as a fieldbus-independent point-to-point connection. Zimmer Group uses IO-Link to integrate intelligent components into virtually any automation environment. Here, the individual sensors or actuators, which are known as IO-Link devices, are connected to an IO-Link master. Their task is to handle the communication between the respective control system and the connected IO-Link devices. Additionally, the most important parameter data is stored in its memory. This data is exchanged between the control system and the IO-Link device using the IO-Link protocol. In the case of an intelligent gripper, for example, this could be the intensity of the gripping force or gripping speed. Since these parameters can be changed at any time by the PLC, IO-Link makes it possible to adapt or even to adjust the gripper to a different product version.

## ► Easily installed, with many advantages

IO-Link is easy to install and integrate. Moreover, it reduces and standardizes wiring effort. A standardized, unshielded 5-wire cable is sufficient for producing the point-to-point connection. Previous investments are protected to a great extent as a result of maintaining tried-and-tested cabling structures and compatibility with conventional wiring.

## ► COMPONENTS

In the future, production systems and machines will build upon autonomously acting and intelligent mechatronic components and assemblies. More and more functions will be integrated directly into the assemblies and data processing will increasingly take place decentrally in the component. These functions will network, organize and configure themselves in order to take over functions from the higher-level control level or to take over some of its workload. The Zimmer Industrie 4.0 components communicate via IO-Link, which ensures the connection is made easily using an M12 plug that carries all of the signals as well as the power.

## THE FOLLOWING FEATURES CHARACTERIZE INDUSTRIE 4.0 COMPATIBLE COMPONENTS:

### ► Simple installation:

- The connection via a plug / M12, which carries the signal and power, ensures the installation is sped up and sources of errors are excluded
- Components are registered to the higher level process control system, transmit information about their capabilities and are subsequently scheduled into the production process
- High level of flexibility during the parameterization process through option to either edit parameter sets or „teach“ them

### ► Easy to operate

- Creating, storing and restoring device parameters

### ► Extended diagnostics and preventive maintenance

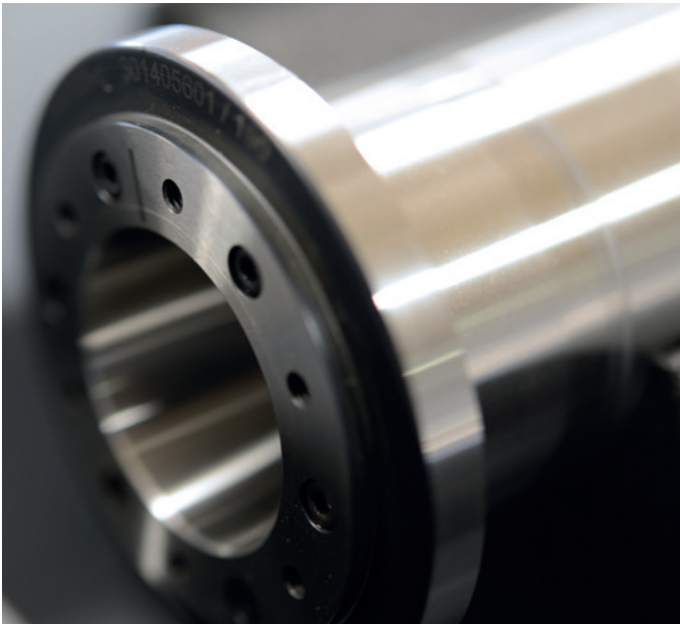
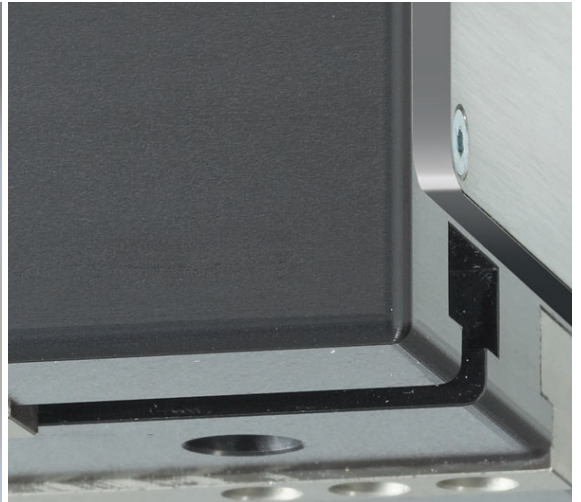
- High-quality system and process diagnostics from the sensor/actuator level to the host system. Analog value transmission without loss up to 20 m
- Option of active data recording
- Short changeover times thanks to central parameter and recipe management, including for field devices
- Reduced standstill times thanks to system-wide diagnostics all the way to the components and fast troubleshooting - thanks to predictive maintenance of the IO-Link components

### ► Can be replaced during ongoing operation

- Interchangeability/initialization during ongoing operation possible
- Highest possible machine availability thanks to very fast and accurate interchangeability

# INDUSTRIE 4.0

## PRODUCTS OF ZIMMER GROUP



# INDUSTRIE 4.0

## PRODUCTS OF ZIMMER GROUP

### ▶ HANDLING TECHNOLOGY



- ▶ Grippers
- ▶ Rotary distributors

### ▶ LINEAR TECHNOLOGY



- ▶ Clamping and braking elements

### ▶ MACHINE TOOLING TECHNOLOGY



- ▶ Spindles

### ▶ SYSTEM ARCHITECTURE OF THE IO-LINK PRODUCTS

