

## Qualification for Industry 4.0

**FESTO**

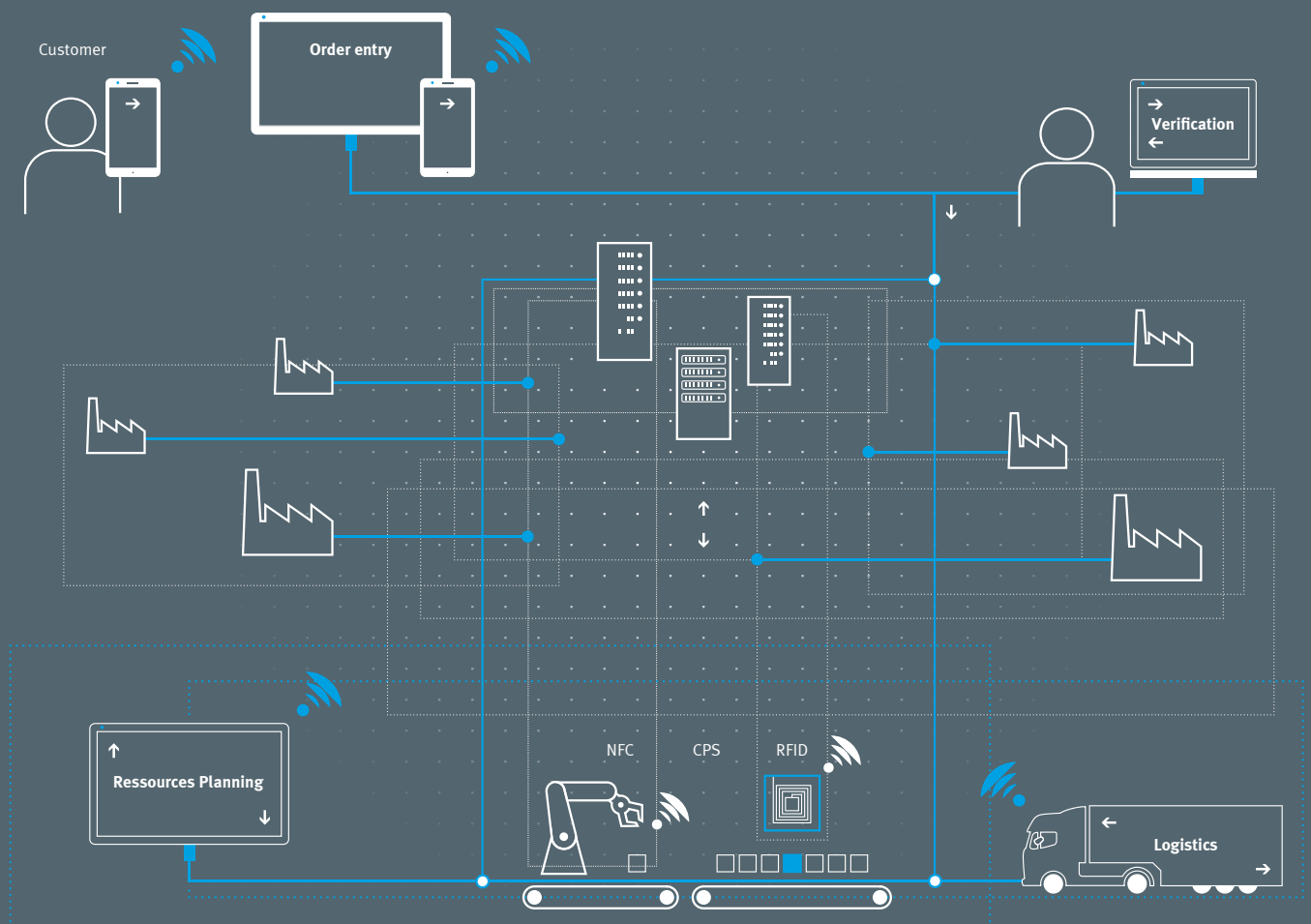


# Industry 4.0 is all about future production processes

## The centerpiece: the Smart Factory

Industry is undergoing fundamental change. After mechanization, industrialization and automation, it has now reached the threshold of the fourth revolution: digitization and networking. In the near future, the manufacturing processes used in factories today will be rendered more productive, more intelligent, more controllable, and more transparent. Industrial processes will be networked with each other, incorporating modern communication and information technologies to create enduring improvements in the production process. With the help of these new digital production methods, companies will be able to respond to individual customer requirements more easily, sharpening their competitive edge in global markets.

Intelligent production facilities being planned today – so-called Smart Factories – signify individuality and flexibility, and use intelligent solutions to make uniquely configurable products possible at an affordable price. The fundamental paradigm shift will occur via decentralized, self-organizing production. Production systems will no longer be centrally controlled. Instead, they'll communicate directly with the products to determine which production steps the workpiece has to go through.





# Technology, people, and education

## Planning production from a broad perspective

The approach to Industry 4.0 is more than just a technological development. Changes in production scenarios and automation technology have just as great an effect on people and the education they require, as on corporate structures and processes. Festo is convinced that an all-inclusive solution incorporating technology, people, and education is the key to success.

### Technology

Tomorrow's production systems will be based on decentralized intelligence, and autonomously functioning, mechatronic modules. Ongoing automation of the processes will be made possible by digitization and networking. As an innovations leader and a global supplier of automation technology, Festo is working on basic technologies and intelligent components which will serve as the foundation for Industry 4.0 production systems.

### People

These advanced trends in production will not only affect technical industrial processes, but even more so, the people who work in the factories. People and technology will be more interconnected in complementary ways, and Festo is already working to ensure their success.

### Education

Festo is also ensuring the skills evolution of qualified personnel and junior employees for current and future changes in the workplace. These changes will require employees who are 4.0 specialists and possess interdisciplinary skills uniting classic mechatronics qualifications with sound IT knowledge and high levels of social competence. The world's leading service provider for technical education, Festo Didactic, supports its customers in qualifying themselves for digital production.





# People and the Smart Factory

## Preparations for changing roles

In order for Industry 4.0 to succeed, the training and qualification of skilled employees will have to be adapted to the new requirements of digital production. Among other things, this will affect:

- The use of mobile terminal devices, such as tablets and smartphones, in production
- Planning and organization for the networking of intelligent system components and modules
- Integration of facilities into ERP systems
- Vertical networking of production sites throughout the value added chain via the virtual world of the Internet

Employees will play an important role as problem solvers, experienced experts, and decision makers within these manufacturing networks that consist of virtual and mechatronic production sequences. They will remain irreplaceable in the future as idea generators, and developers of new products and work processes, enabling their capabilities and skills to continuously evolve into an essential resource.

Festo Didactic transforms its extensive practical experience with digital production into comprehensive training programs, modules, and content so that qualified personnel and junior employees are well prepared for their changing roles in the Smart Factory, and the demands of Industry 4.0.





# Qualification for Industry 4.0

## Our comprehensive, forward-looking program

In order to develop expertise for using and working with the latest digital industry technologies within the framework of Industry 4.0, we offer a comprehensive approach with a special training program.

### Learning Systems

Our learning systems are equipped with innovative industrial technologies, so that the knowledge required for digital production can be imparted in a practical manner, while simultaneously developing skills through hands-on trial and error. This approach involves:

- Cyber-physical systems
- RFID and NFC technologies
- Intelligent vertical and horizontal networking
- Plug & produce
- Monitoring of system states and energy consumption
- Mobile robotics

### Train-the-Trainer

In order to support and prepare the teachers and instructors, we offer train-the-trainer sessions, as well as seminars dealing with various topics covering all aspects of the CP Factory – the universal Industry 4.0 research and learning platform. We empower you so that you'll be able to make ideal use of these systems in your teaching environment.

### Training and Consulting

Companies can also profit from our comprehensive approach. Festo Didactic is your expert, trainer, and process support team. We assist you for the long-term, implementing solutions that combine work with learning and are eventually integrated into your production sequences. Additionally, and with your input, we establish customized fundamental and advanced training programs, ensuring solutions that are exactly what you need.

### Industry 4.0 Online Community

Developing lasting knowledge is the result of continuous learning, as well as idea and knowledge exchanges with others. Our Industry 4.0 online community provides you with this platform, enabling you to continuously expand your understanding through connections and conversations with other teachers.

### Festo's involvement in the Plattform Industrie 4.0

The "Plattform Industrie 4.0" initiative is sponsored by the VDMA, ZVEI, and BITKOM associations. Various companies from business and science are working together on the development of technologies, standards, and business models for Industry 4.0, as well as their implementation in actual practice. Festo is part of this initiative and sits on the board of directors as well as in the steering committee – [www.plattform-i40.de](http://www.plattform-i40.de).

### Cooperation with SAP

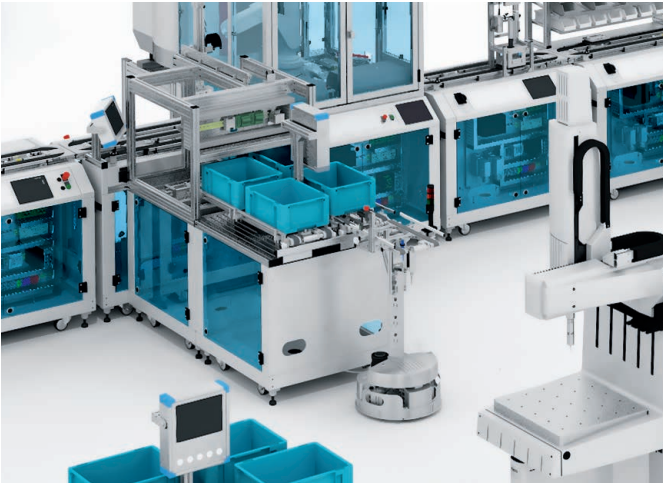
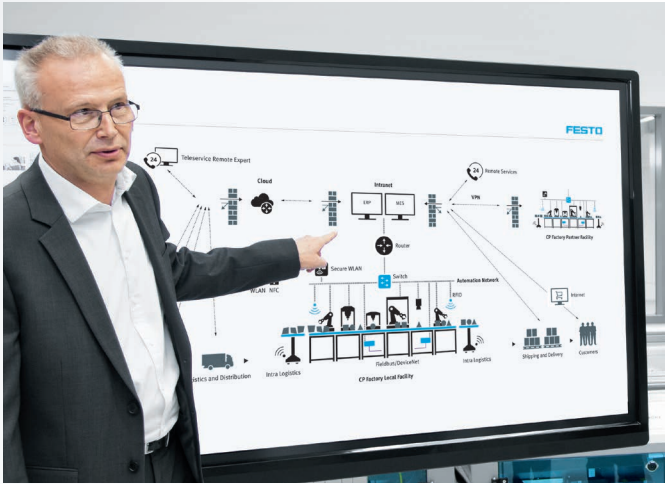
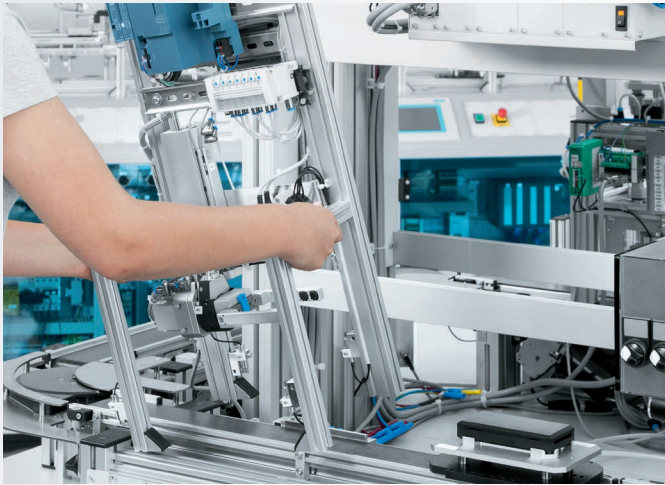
SAP University Alliances and Festo Didactic have developed a curriculum, for which member universities receive training materials in order to be able to train and qualify young talent for the production world of tomorrow. The training program makes reference to the CP Factory from Festo Didactic, which supplies the hardware for the Open Integrated Factory. This factory joins production and IT into an efficient manufacturing system which is self-controlled using SAP technology and applications.

### Research projects

Festo is actively organizing future production and is involved in numerous Industry 4.0 research projects which are subsidized by the German federal government. Together with partners from industry and science, highly promising solutions are being developed, such as an open engineering platform for autonomous, mechatronic-automation components, autonomics for Industry 4.0, and energy self-sufficient sensors for the optimization of resource efficiency in the OPAK, ESIMA, MetamoFab, APPsist and SOPHIE projects.

### SmartFactory<sup>KL</sup> initiative

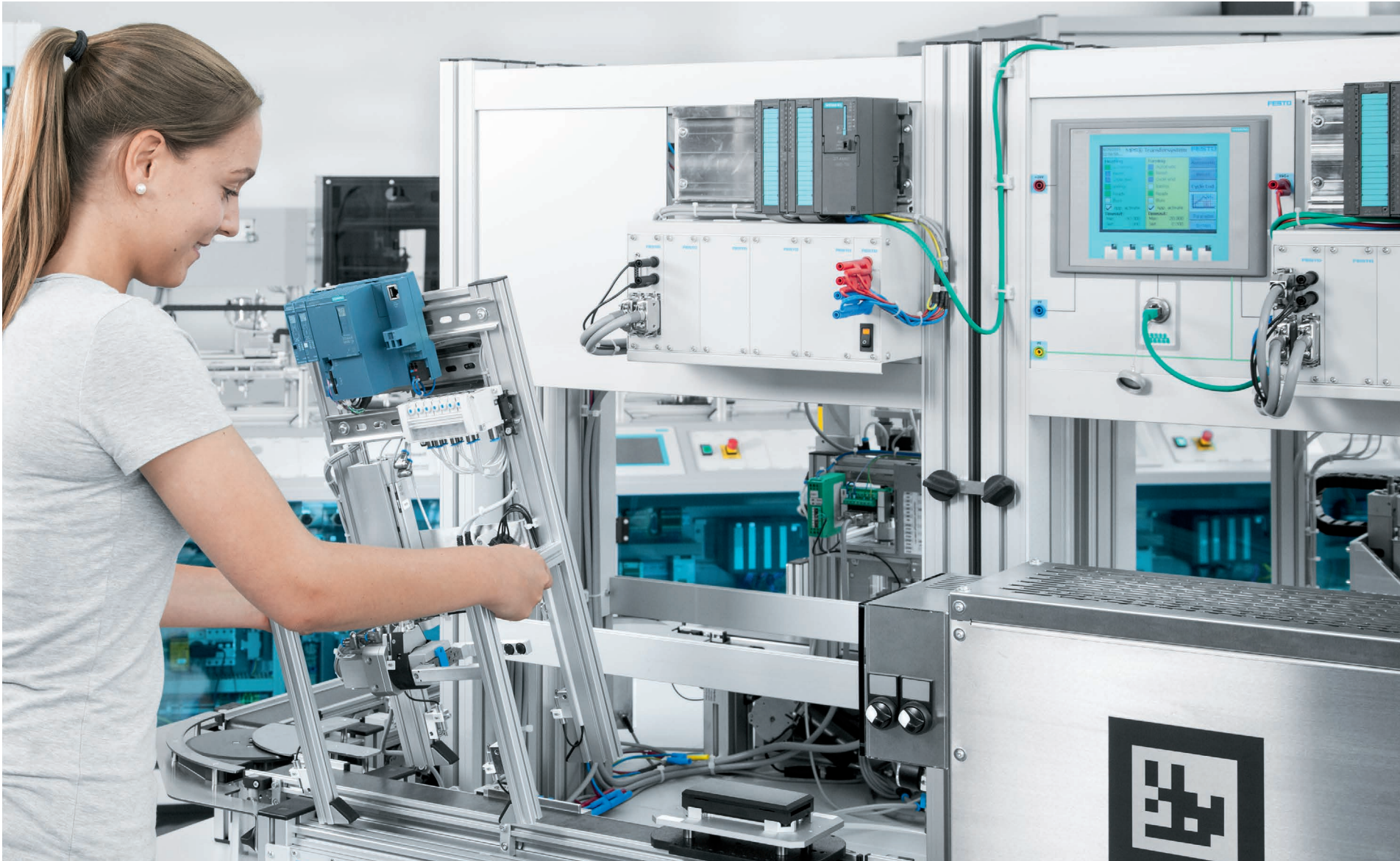
Within the framework of the SmartFactory<sup>KL</sup> technology initiative, Festo is working together with renowned partners on new concepts, standards, and solutions. In the future, these will serve as the basis for highly-flexible automation technology. The partners are developing innovative factory systems based on a manufacturer-independent demonstration and research platform, within which the vision of Industry 4.0 is already becoming reality – [www.smartfactory.de](http://www.smartfactory.de).





# Step-by-step toward Industry 4.0

## Festo Didactic's progressive learning system



**Festo Didactic has developed a directed Industry 4.0 learning system for progressive training, beginning with fundamentals.**

This learning system offers a wide range of training levels – from individual modules through a complete system network – to meet your particular requirements. Needs-specific content ensures that, through an extensive variety of Industry 4.0 applications, learners gain the knowledge that they require.

Our system is based on the modular and expandable I4.0 project workstation. Future specialists progress through three stages of skills expansion, familiarizing themselves with digital production technologies and applications. This learning process ends with an introduction to the Smart Factory, based on plug & produce.

Our expandable learning system can be used progressively, beginning with the modular I4.0 project workstation and the Cyber-Physical (CP) Lab – in which several workstations are connected into a realistic, industrial pallet circulation system – through to the universal-networked CP Factory.

This makes it possible to demonstrate all tasks required for future production and train them successively.

### Modular and expandable – Advancing to the Smart Factory



#### The I4.0 project workstation

The modular I4.0 project workstation forms a solid foundation for continuing training to the much more complex Smart Factory. Learners get hands-on experience using a full-fledged Industry 4.0 component, supplemented with practical content based on the fundamentals of mechatronics, as well as control and automation technology. Three expansion capabilities augment the individual module with training in:

- Pallet transfer system
- Cyber-physical systems
- Plug & produce

#### CP Lab

Once work on the I4.0 project workstation is completed, learners can progress to the CP Lab. The CP Lab replicates a complete process – networking of the system, information flow in complex systems, process planning, and manufacturing execution systems (MES) that process data. In addition, the CP Lab can be linked to the CP Factory by the mobile robot Robotino® or the selector module.

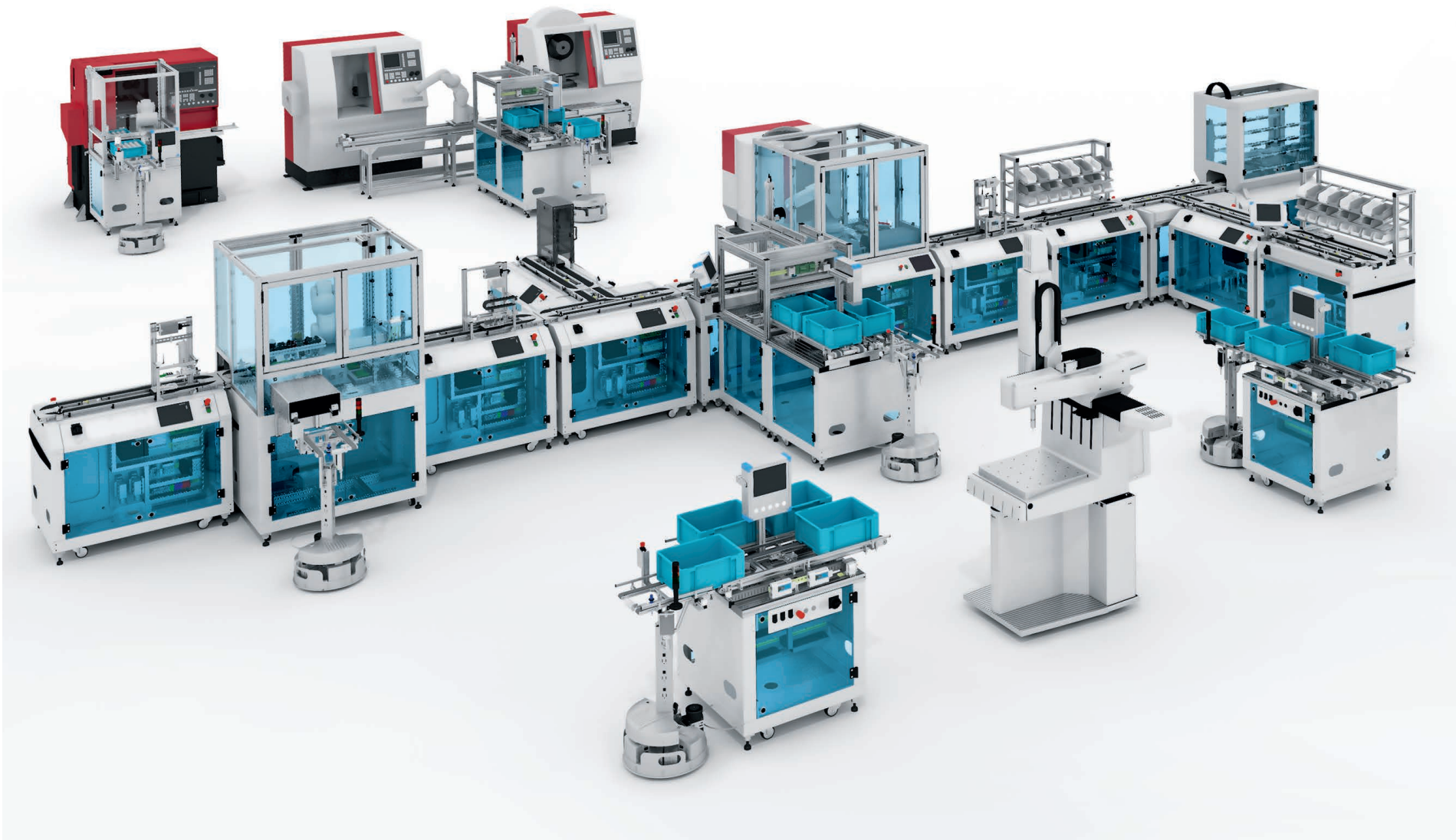
#### Seamless transition to the CP Factory

CP Factory – the universal research and learning platform – is the highest level of Festo Didactic's progressive, modular training concept for Industry 4.0. The I4.0 project workstation fits into the CP Lab and the CP Factory both functionally and didactically. This allows previously acquired skills to be expanded upon with more advanced Industry 4.0 content.



# CP Factory

## The universal Industry 4.0 research and learning platform



**Cyber-physical systems (CPS)** permit intelligent networking of people, products, and production equipment. They fulfill the prerequisites for digital production by integrating Internet-based communication networks with physical production systems.

The Cyber-Physical Factory is the apex of our progressive, modular learning system for training in Industry 4.0. It authentically replicates the stations of a real production system, integrating relevant mechatronic and automation technologies. With its training flexibility and expandability, the CP Factory represents numerous aspects of the Industry 4.0 value chain, including:

- Integration of manufacturing divisions into digital production
- Automated and manual assembly
- Logistics in autonomous systems
- Production planning and production control/MES
- Lean production as a basis for Industry 4.0
- Smart maintenance to monitor systems and system states
- Quality assurance in Smart Factories

Training is expanded further by topics such as systems networking and the use of open, configurable systems, communication standards and data-based job control, RFID and NFC technologies, as well as the acquisition of information via mobile devices.

You can customize the CP Factory for concentration on the topics most relevant to your needs in industrial automation technology, configuring in minutes your preferred factory layout.

### Adaptable layout for flexible manufacturing with the latest Industry 4.0 applications



#### Modular system varies training content

The arrangement flexibility of the individual modules, as well as the ability to add a variety of applications, are at the core of the CP Factory and determine the training content of the various stations. Processes such as drilling, press-fitting, and heating can be replicated, as can logistics processes, i.e., storage and withdrawal of materials and material transport with autonomous robots.

#### Open interfaces for quick changeovers

The CP Factory addresses the real-world experience of the changeable factory. Standardized interfaces allow application modules to be exchanged in a matter of minutes, and uniform, preassembled system cables permit fast layout changes and commissioning. Thus, one or more production lines focusing on the desired areas of automation, are created very quickly.

#### Industry 4.0 applications in actual practice

Key issues such as RFID, near field communication, professional cloud, and the step-by-step introduction of CPS, as well as plug & produce methods can be imparted in a highly practical manner with the CP Factory. All production data are brought together in the MES4 production control system, which has been developed in accordance with Industry 4.0 requirements. Open databases with transparent interfaces fulfill the prerequisites for learning and experimentation.



# Training and Consulting

## Competency development for Industry 4.0



**Industry 4.0 will change vocational requirements for almost all related positions within a company. Targeted skills development allows you to provide continuing support during this process and beyond.**

Changing working conditions place great demands on employee knowledge and skills. Our Industry 4.0 solutions address the following issues:

- Data analysis, interpretation, and evaluation
- Integration of components and modules into complex communication systems
- Elimination of process data irregularities
- Configuration of parameters for production orders
- Operation of hybrid systems

With our customized training formats and content, we support you in qualifying your skilled personnel to best prepare them for the demands of digital production. Our comprehensive Industry 4.0 training program combines highly-automated learning systems with corresponding seminars, contemporary digital training media, and the latest didactic methods.

As Festo Didactic, we place special importance on competency development, because competence is more than just qualification. Competence makes it possible for your employees to cope with complex, dynamic situations in a self-sufficient manner. And these are skills your employees will need in order to operate, maintain, configure, and repair your Industry 4.0 production systems.

### From industry – for industry

#### Customized training and seminars



#### Seminars based on the CP Factory

These seminars deal with individual Industry 4.0 technologies and work tasks with relevance to Industry 4.0. In an initial seminar, participants become familiar with the layout, structure, and interrelationships of the CP Factory, and gain an insight into the early training topics. A second seminar prepares participants for working with a versatile production system and covers the use of big data and smart maintenance, the generation of production statistics, and the analysis of typical system states. Both seminars are based on the CP Factory.

#### Customer-specific training

If you operate one or more Industry 4.0 systems and are looking for a training program matched to the specific needs of your employees, then look no further. We will work with you to discuss your needs, define new work tasks, and develop a precisely-matched training session or training program. Our focus will be on developing employee competency so that they are well-prepared to execute their new tasks, as well as manage future challenges.

#### Industry 4.0 expert meetings

Festo Didactic offers one-day expert meetings where Industry 4.0-relevant topics, such as augmented reality, CPS, and the Smart Factory, are explained in a concrete, compact, and concise fashion. The learning factory at Festo's Global Production Center in Scharnhausen, Germany, provides an ideal setting for these events, where modern production technology meets highly practical training.



# Festo Didactic

## Pioneering today's innovations in technical education

Festo Didactic is the world-leading provider of equipment and solutions for industrial education. Our product and service portfolio offers holistic solutions in all fields of industrial automation technology, such as pneumatics, hydraulics, electronics, electrical engineering, mechatronics, CNC technology, energy efficiency and mobility, renewable energies, industrial maintenance, HVAC and telecommunications.

We design and implement learning systems, learning environments/laboratories, learning factories, e-learning solutions and training programs, and also offer complete learning centers that train people to perform in highly dynamic and complex industrial environments. Our goal is to maximize learning success in educational institutions and industrial companies around the globe.

**Festo Didactic is part of the Festo Group**  
Festo is a leading, world-wide supplier of automation technology, and with Festo Didactic, the world-leading provider of technical education solutions. Over the last 50 years, as a globally-oriented and independent family company with headquarters in Esslingen, Germany, Festo has become the performance leader in its industry. This success is attributed to its continuing innovations and problem-solving competence in all aspects of pneumatics, as well as its unique and wide range of technical training and education programs.



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