LN

LUCAS-NÜLLE

INDUSTRY 4.0
SMART FACTORY

Training that prepares
you for the future

Industry 4.0
Smart Factory

Smart Factories
Digitalization in Industry

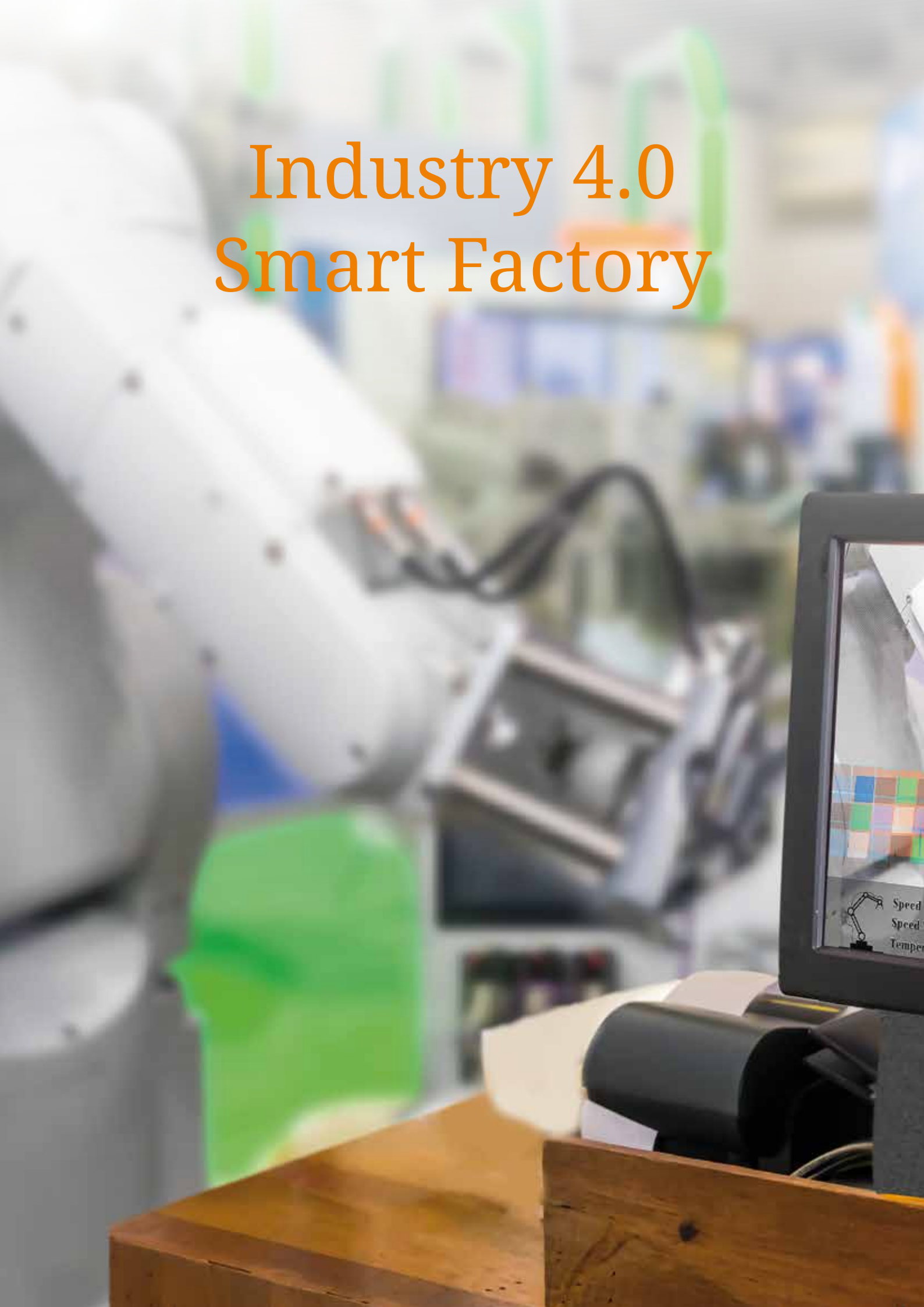Smart factories are characterized not only by adaptability and resource efficiency. Their most important features are versatile production, networked systems and the ability to pass on all information to the cloud (a cyber-physical system, or CPS for short). The main component is an ERP (Enterprise Resource Planning) system operating in the cloud.

The Internet of things is coming!
Didactical Training Solutions by Lucas-Nülle
training systems allow you to provide training
that covers the principles and technical capabilities
of a smart factory:

- Customer-specific production

- Connection of production to the internet (CPS)

- Virtual system planning by means of 3D simulation

- Energy- and time-efficient operation

- Compliance with rules and system safety

- Modularity for all requirements

- Unique Enterprise Ressource
Planning System (ERP)

Basic skills for the
Smart Factory

For a modern production facility to operate successfully, all the plant components have to work perfectly together. In addition, achieving something like this requires more well trained specialists who have mastered fundamental skills.
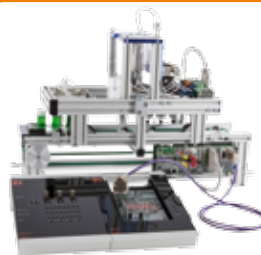
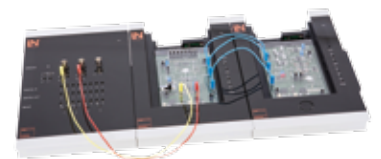CBS1 Industrial Bus Systems

CID 1 RFID in Logistics
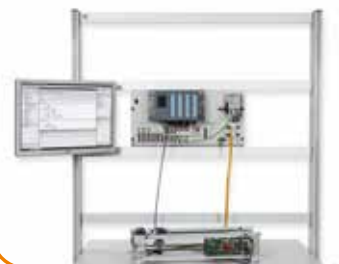
UniTrain
Fundamentals
of Robotics

UniTrain course:
Pneumatics/
Electropneumatics

Mechatronics
with UniTrain

UniTrain course:
Compact Automation

CSF smart factory;
flexible in line with customer
requirements

3.

IMS Virtual: Virtual
start-up of production

2.

1.

Lucas-Nülle's product range offers solutions for all
requirements. From basic UniTrain sets to industrial
project applications, comprehensive training is provided
for the smart factory.

Cyber Physical System

A Cyber Physical System (CPS) as the Basis for Networking

In the age of smart factories, flexible and intelligent manufacturing is essential. An intelligent conveyor belt system offers complete flexibility. All information from its sensors are uploaded directly to the cloud via a PROFINET connection.

The advantages for you:

- Programming and functional testing of station without time-consuming set-up
- Automatic recognition of station by means of coding
- No reprogramming necessary when replacing station with multi-station project
- The conveyor belt system and a station form a unit
- Fast and easy replacement of entire units, resulting in minimal production stoppage
- Rapid production switch-over: the base remains while the station is replaced
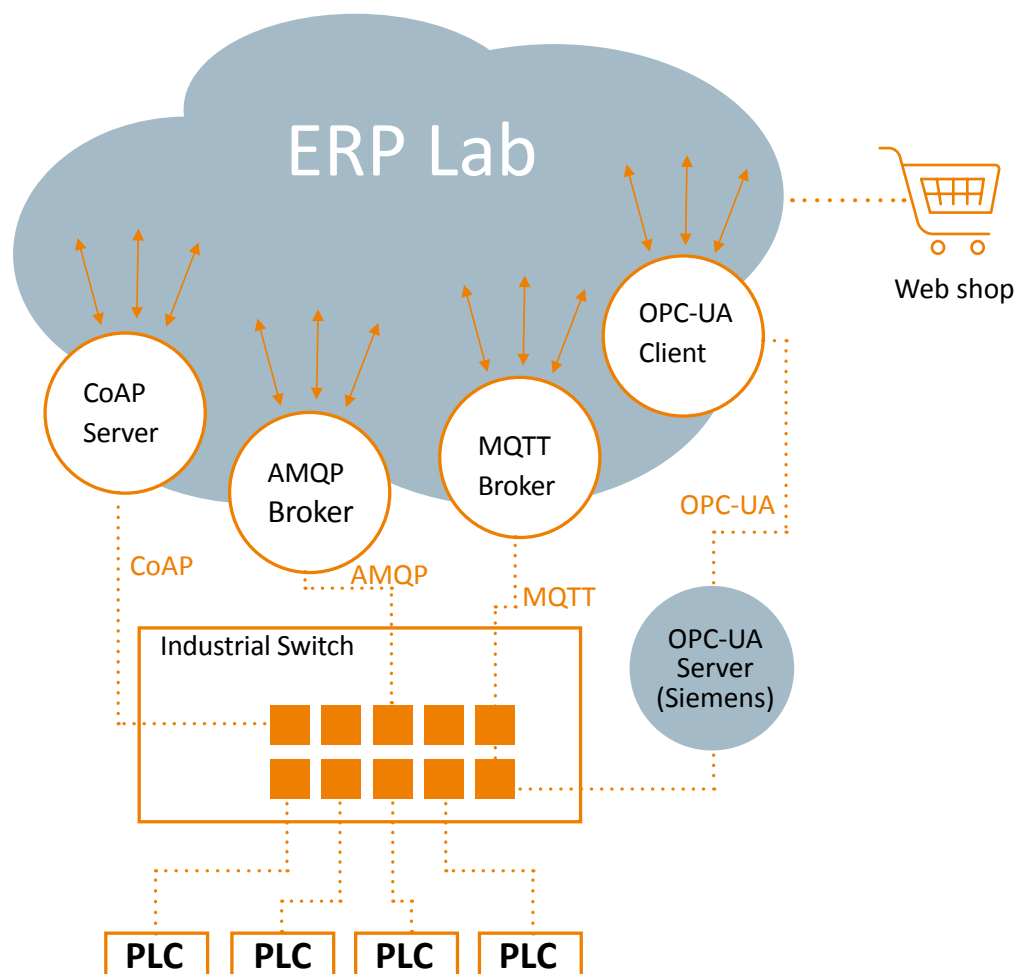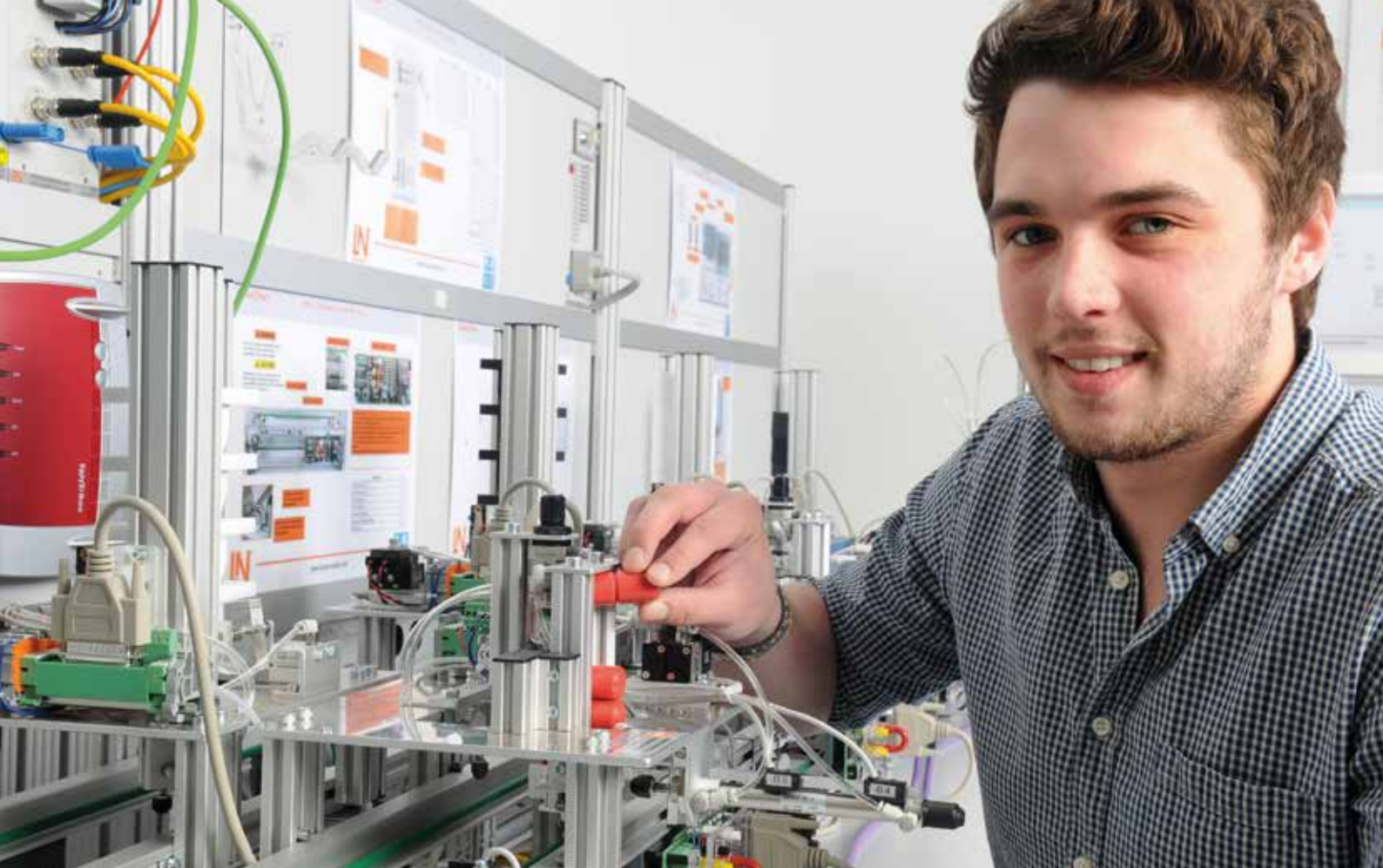
Data in the Cloud

Production in a smart factory does not merely involve uploading all the information from sensors to the cloud. The raw material inventory and the current position of workpiece carriers are also important data. All this information is assembled in the cloud where an enterprise resource planning system (ERP) can process it. This enables centralized and intelligent control of production.

- Connection to the cloud

- Web shop

- ERP and MES

- SCADA

- Operating data acquisition (ODA)

- Machine data acquisition (MDA)

- Production and manufacturing planning

- Cloud-based data exchange

- Server with ERP system

The advantages for you:

ERP Lab

CoAP Server

AMQP Broker

MQTT Broker

OPC-UA Client

Web shop

OPC-UA

CoAP

AMQP

MQTT

OPC-UA Server (Siemens)

Industrial Switch

PLC   PLC   PLC   PLC

Data in the Cloud

CSF 1 Smart Factory with IMS

The smart factory system can be used for fully automatic production of a three-part vehicle in up to eight different combinations. A touch panel allows you to select a graphic of the desired vehicle assembly, which is saved when production is authorized. Since the stations are fully networked via PROFIBUS and PROFINET, it is possible to perform real time function monitoring and diagnosis.

- Conveyor belt system: dual-belt conveyors with DC drive motors and a variable speed three-phase drive motor
- Identification system: an RFID identification system transmits the desired workpiece assembly to the processing stations
- Control level: manufacturing job configuration from a governing PC, process visualization and operating data acquisition
- Connection of process control console to TCP/IP
- Networking via PROFIBUS and PROFINET

The advantages for you:
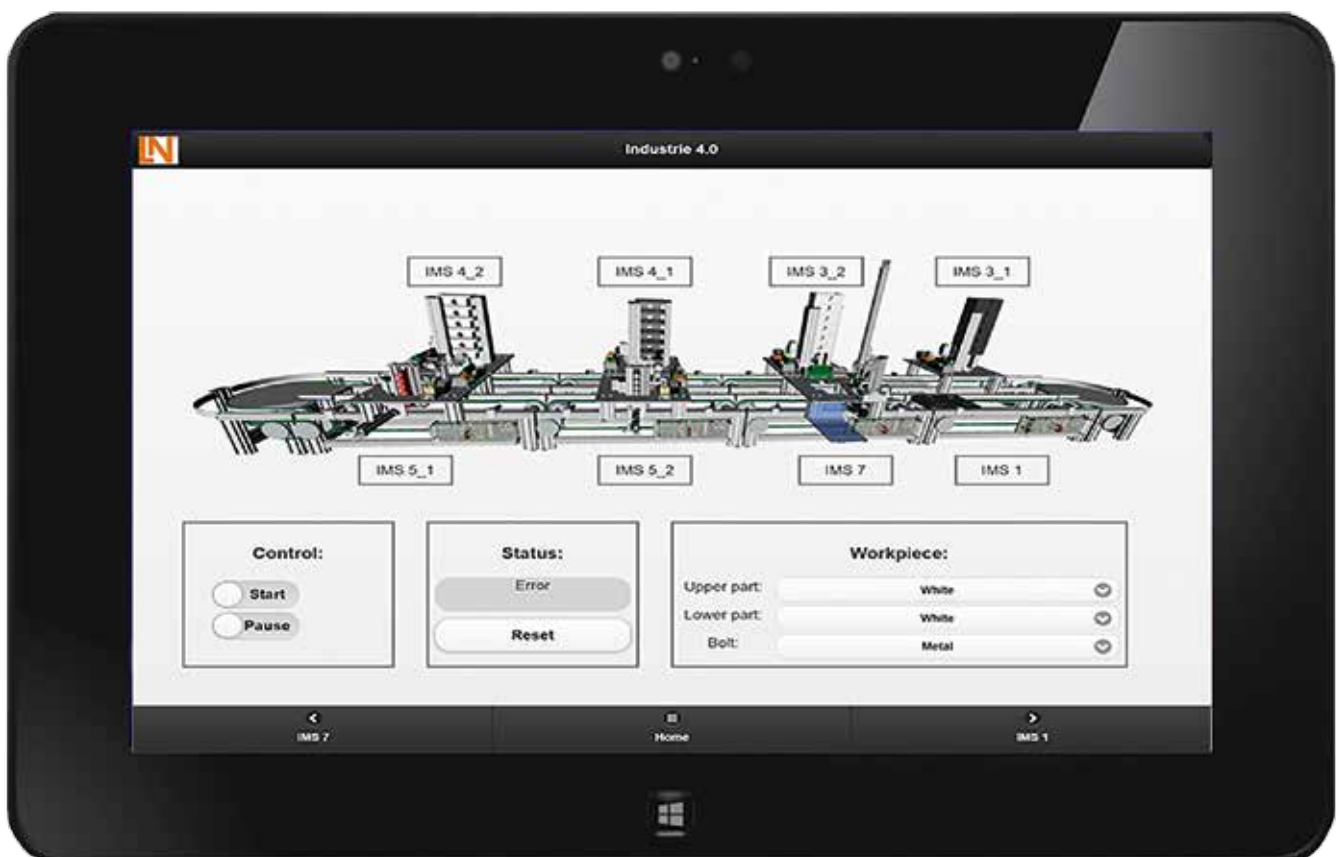
Smart Factory

WLAN Control

CSF 2 WLAN Control Extension Set

Control and monitor your IMS system or even individual stations using any WLAN device, such as a tablet, smartphone or notebook. Only a browser is required to call up the PLC system's web interface.

No additional software or apps need to be installed.

The advantages for you:

- Clear depiction of the entire system and individual stations
- Control and monitoring via a WLAN-capable device with a browser installed
- Operation and observation via display
- Signal status displayed directly on the WLAN device
- The WLAN device can be used to set signals and therefore control the system's actuators
- Testing of individual station functions in maintenance mode

CSF 3 Expansions Set for Smarter Production

Extend your CSF 1 basic smart factory system. An extension set includes two additional read/write heads. These allow the required processing step to be requested before any type of module and enable the current status to be written after each module. This means that the current production status can always be ascertained.

The advantages for you:

EXPANDED PRODUCT RANGE:

• Twelve different products

HMI:

• Display of stations which are actively operating

• Fault display and analysis

• Manage order lists

• Systematic processing of orders.

STATISTICS:

• Product variation: how often has each product been manufactured

• Number of faults: how often has each station failed

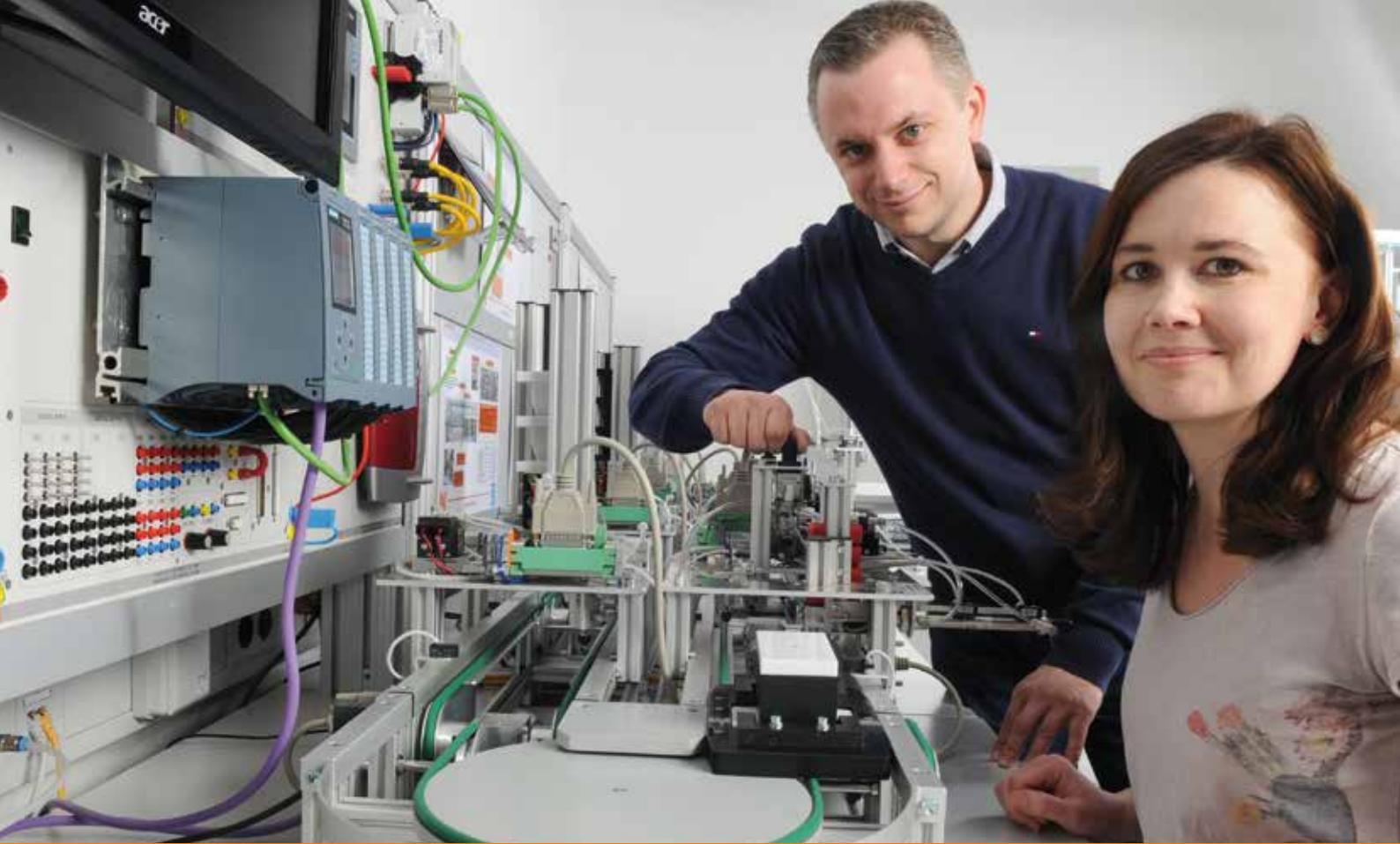• Station operating cycles: adjustment of maintenance intervals

Smart Production

Enterprise Resource Planning with Web Shop

CSF 4 ERP Lab

The ERP lab is an ERP (Enterprise Resource Planning) system specially adapted for instructional purposes. In contrast to ERP systems' industrial solutions, the ERP lab does not require long training periods. The student can concentrate directly on the essential aspects of programming and setting up an ERP system. The accompanying course software describes how the ERP system works; it also provides students with support in programming and setting up the system.

The advantages for you:

- ERP and MES
- SCADA
- Operating data acquisition (ODA)
- Machine data acquisition (MDA)
- Production and manufacturing planning
- Cloud-based data exchange
- Warehouse management

INTEGRATED WEB SHOP:

- Configurable Web shop
- Ordering via the internet
- Personalized ordering
- Different prices for different versions
- Information on lead times
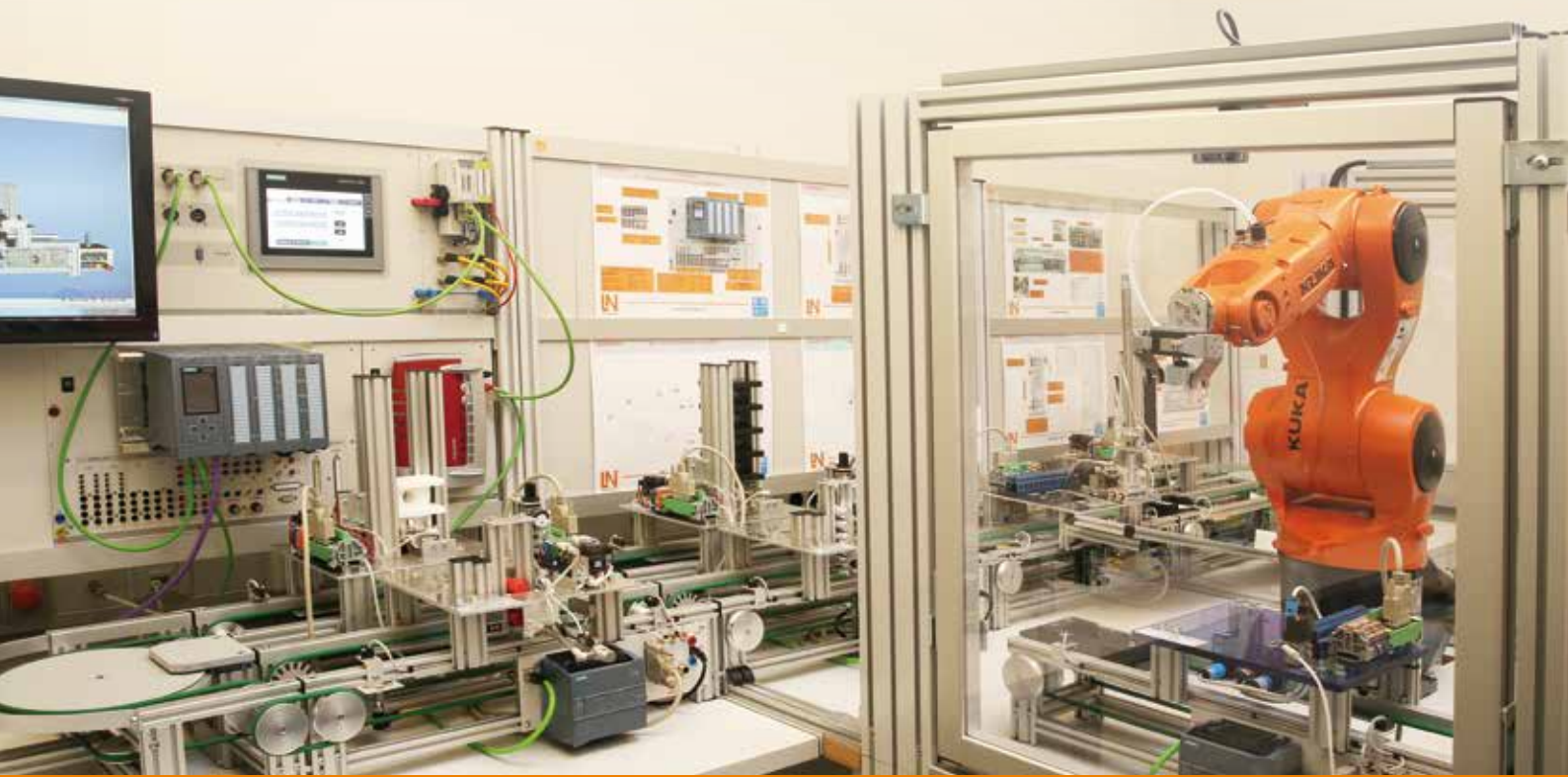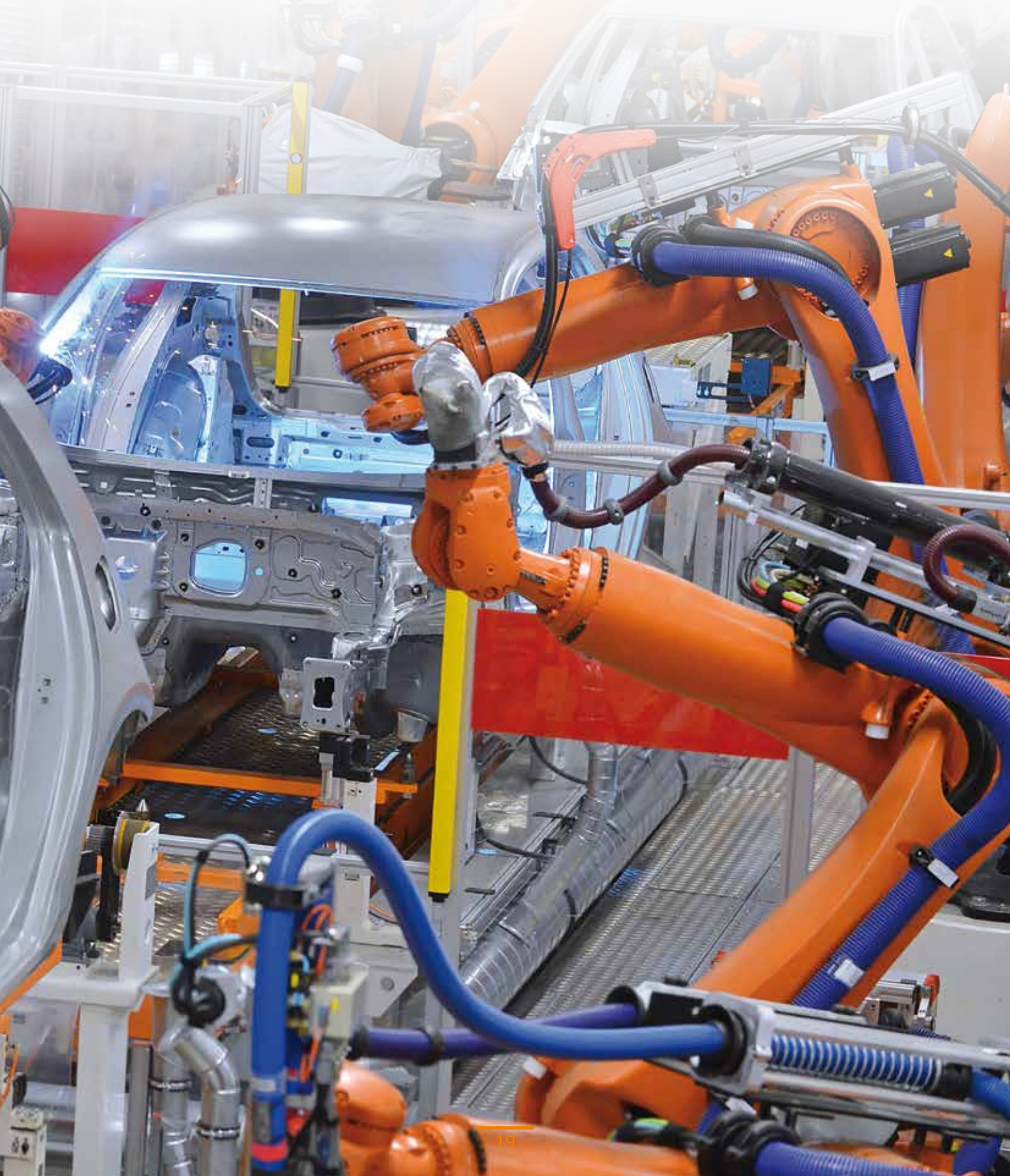
Combination Possibilities

The Lucas-Nülle training systems' modular design allows you to expand to any degree of complexity in accordance with your requirements. The combined use of an industrial robot allows you add additional production methods.
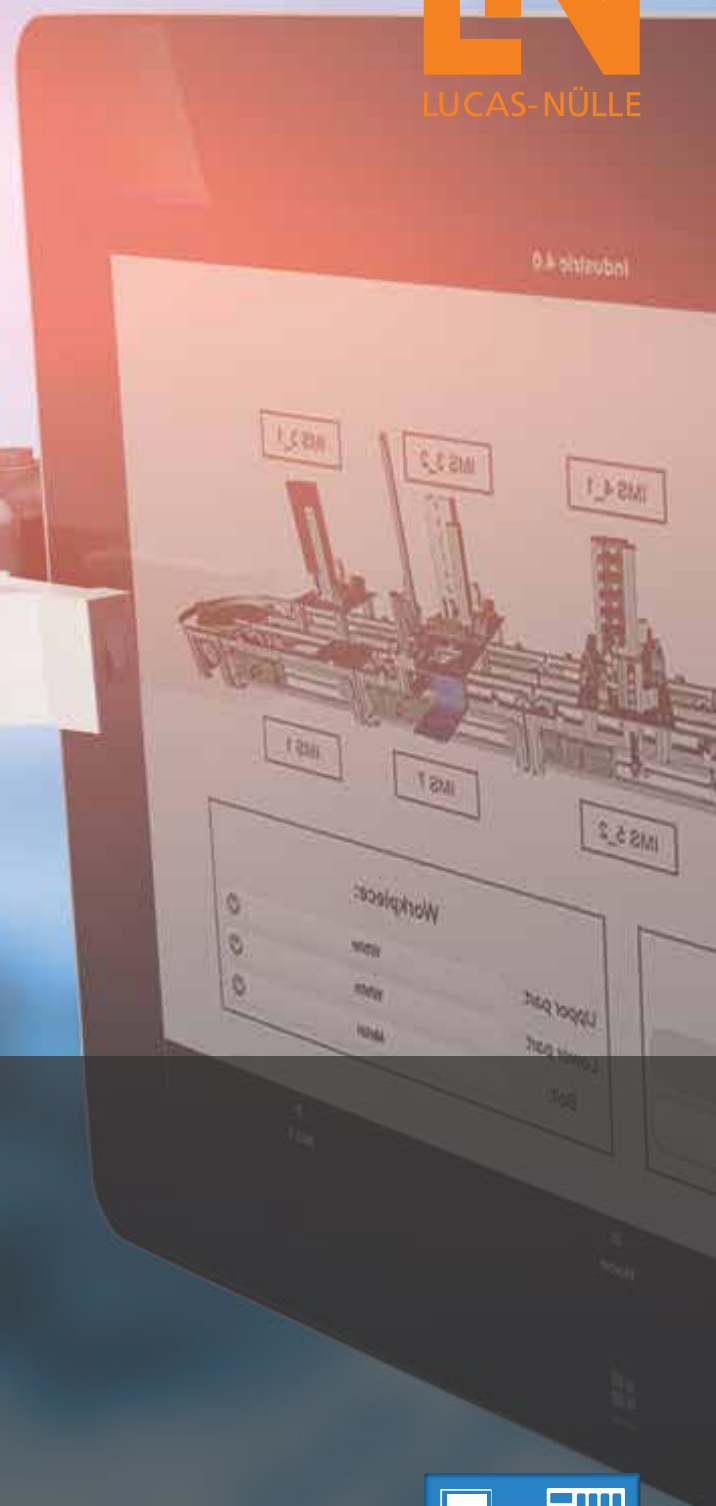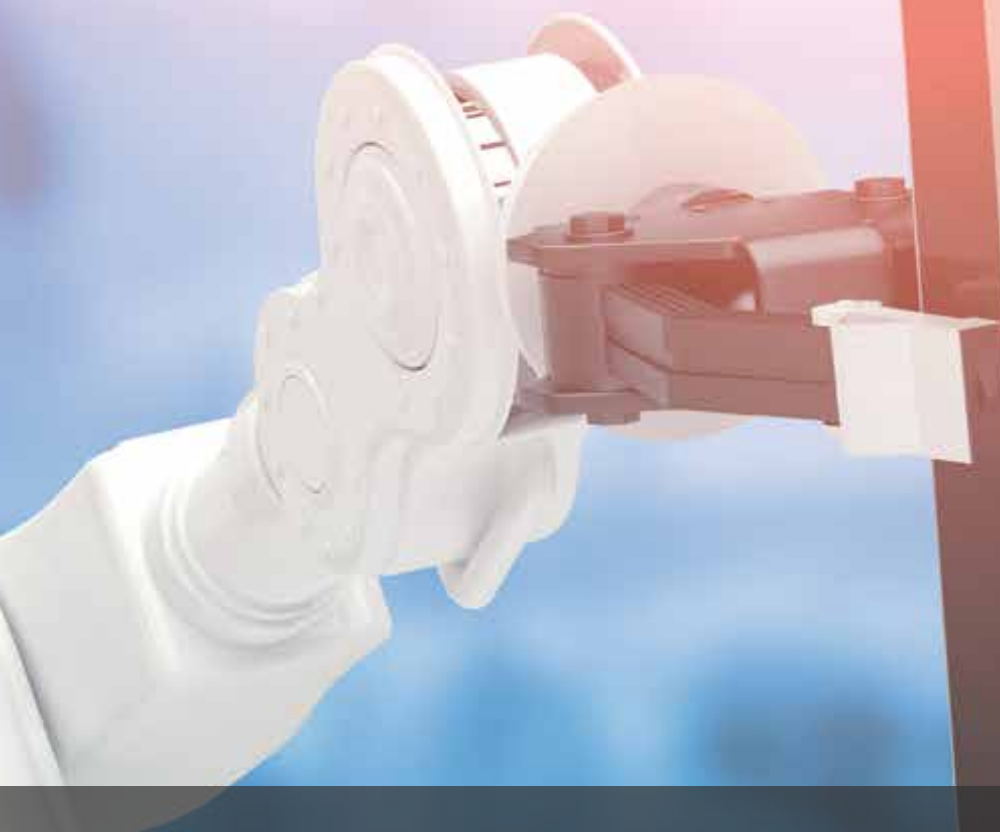
By extending the CNC Pro Trainer from HELLER, you can provide practical training that covers all the relevant competencies, processes and interrelated aspects in a realistic way, from development to production and assembly through to delivery.

The advantages for you:

- Industrial robot planning
- Flexible extension of subject areas
- Real machining with full machine configuration
- Original industrial components
- Depiction of reality using model that is true to the original
- System tolerates user operating errors (student proof)
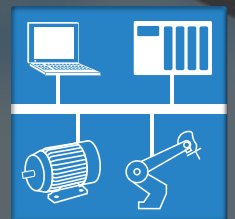- Safe, reduced-hazard operation

Combinations with Robotics and CNC

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