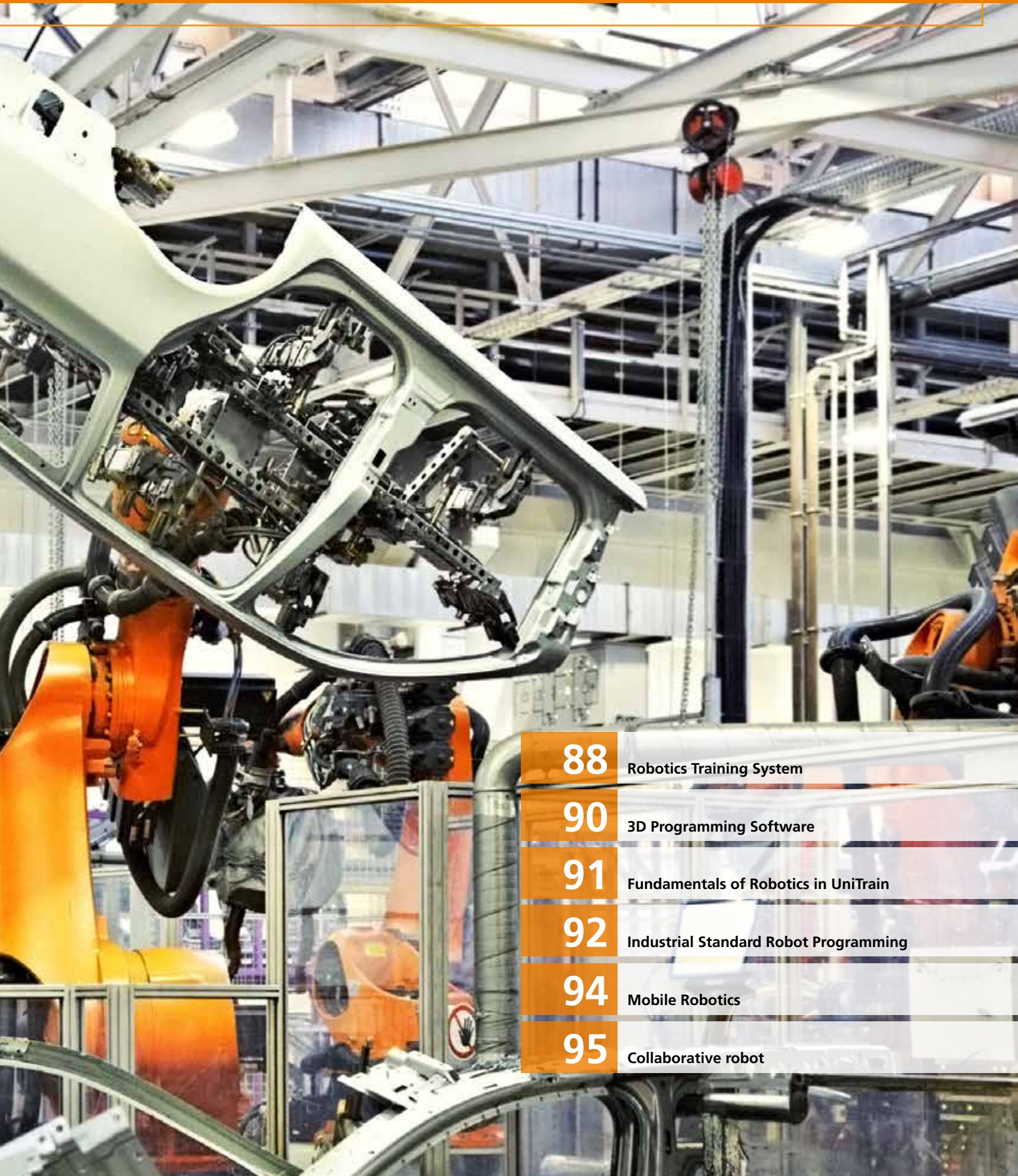




Robotics



88 Robotics Training System

90 3D Programming Software

91 Fundamentals of Robotics in UniTrain

92 Industrial Standard Robot Programming

94 Mobile Robotics

95 Collaborative robot

Robotics Training Systems

Starting in the World of Robotics

Robots now play a key role in modern, highly automated and efficient production processes. This training package "Fundamentals of robotics" guides the automation or mechatronics engineers of the future step by step through the basics of robotics, how to handle and program robots and shows how they can work in optimum fashion with automated systems.

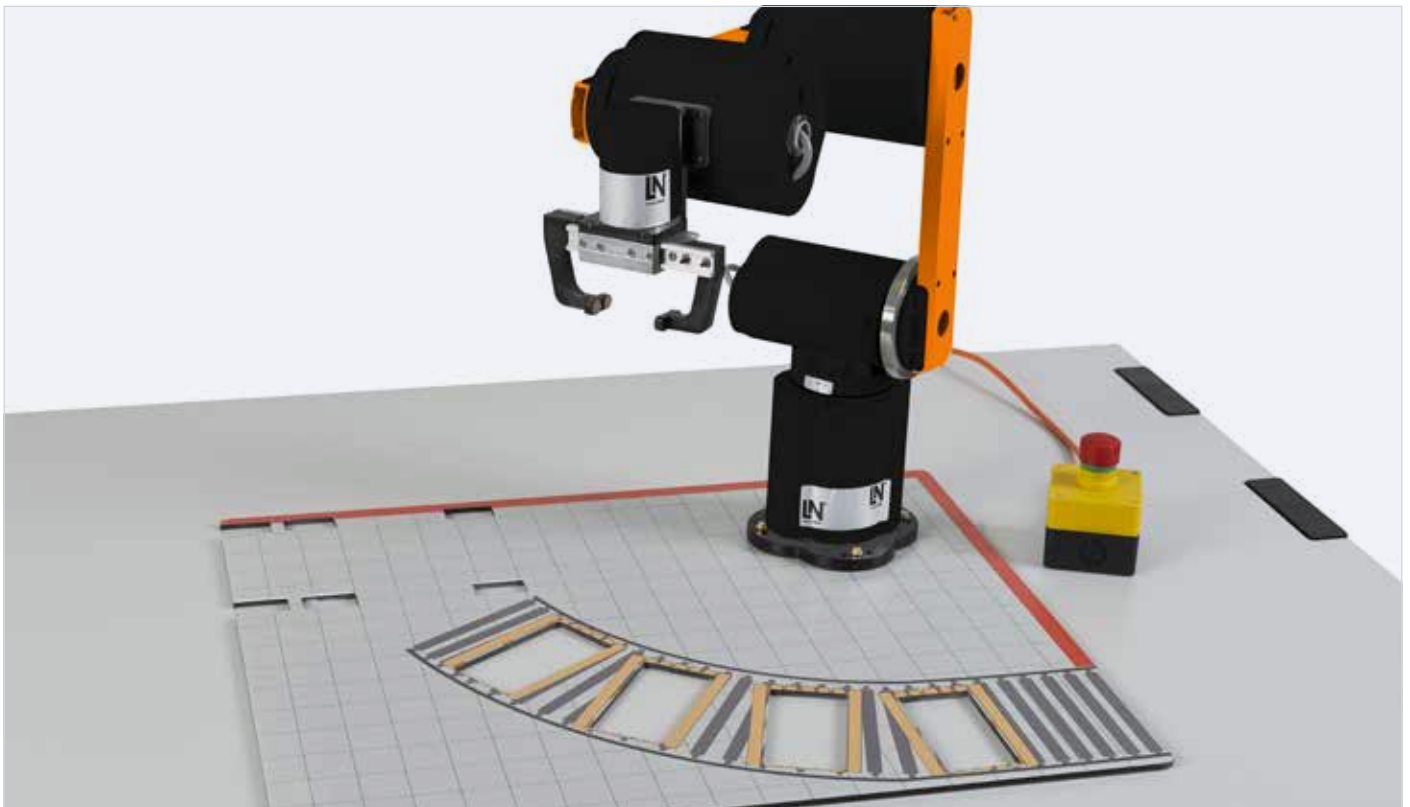


Your benefits

- Multimedia courses with theory, animation, experiment instructions and evaluation capability
- Comprehensive background theory in order to understand multiple-axis robots and the safety systems they require
- The apparatus is intrinsically safe (no safety measures need to be taken)
- Many interesting experiments with a 4-axis robot, conveyor belt and a PLC system
- Robot can be programmed via supplied 3D simulation software
- The material learned can easily be applied to actual industrial robots

Training System

The **Mover4** is a four-axis robot arm designed for use in schools and colleges. The Mover4 HD allows realistic automation scenarios to be simulated. It can be set up as a movement platform and combines physics, mathematics and information technology in such a way that they are made tangibly real. The robot arm has four serial axes and can therefore move through three dimensions and tilt its gripper hand to specific angles.



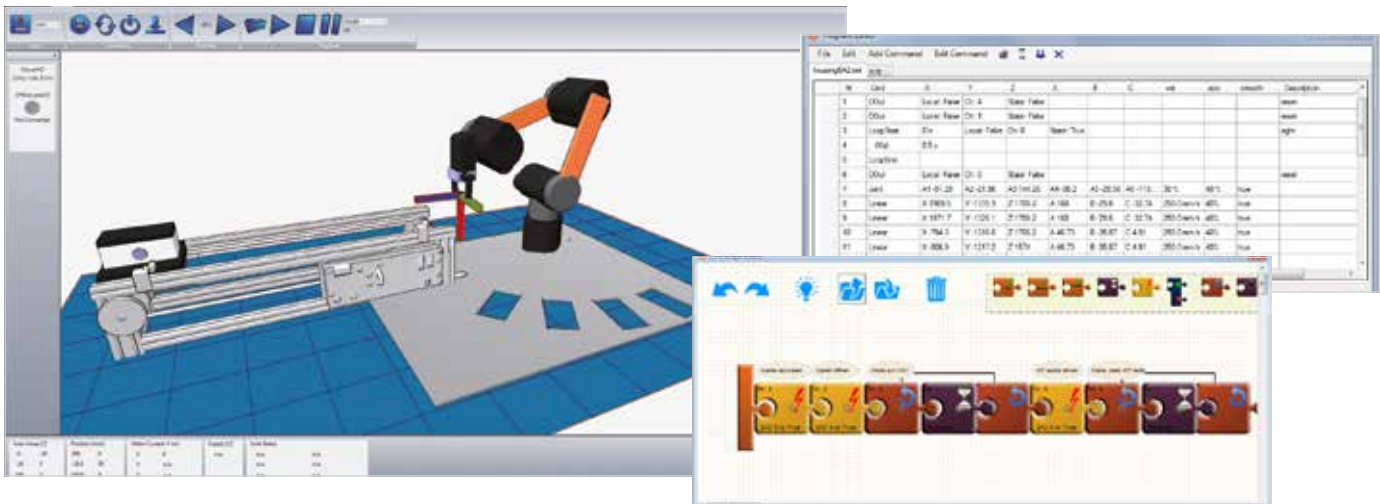
Your benefits

- 3D programming software
- Payload: 500 g
- Max. range: 550 mm including gripper hand
- Electrically operated parallel grippers
- Ports: 9-pin I/O, CAN programming interface
- Positioning accuracy: 1 mm
- Weight: 3.5 kg
- Power: 12 V via 230 V plug-in power supply, < 60W
- A PC is required to control operations

Robotics Training Systems

3D Programming Software

The **CPRog control software** provides a modern user interface and interactive 3D graphics for a direct introduction to the movement of a robot arm. The robot can be operated via keyboard or joystick. Programs can be created and modified using a graphic editor or a text editor. Licensing allows a set for a whole classroom to be installed.



Your benefits

- Parallel operation and programming (3D model and actual robot arm)
- Stand-alone programming (3D model only)
- Integration of static and dynamic objects into the 3D environment
- Professional programming with loops and sub-routines



Combine our basic robotics equipment set with our mechatronics system

Our mechatronics system (IMS®) provides numerous different ways of setting up a production line. Whatever IMS® stations you use, the robot can be a useful enhancement to any of them. Its base plate is designed for universal use meaning it can easily be connected to a conveyor belt or production line.

Fundamentals of Robotics with UniTrain

The UniTrain course “Fundamentals of robotics” lets you learn the basic terminology and the techniques for controlling robots quickly and easily. You can apply what you have learned to any industrial robot. This means that equipment set CRT 11 eliminates any obstacles to a start in robotics.

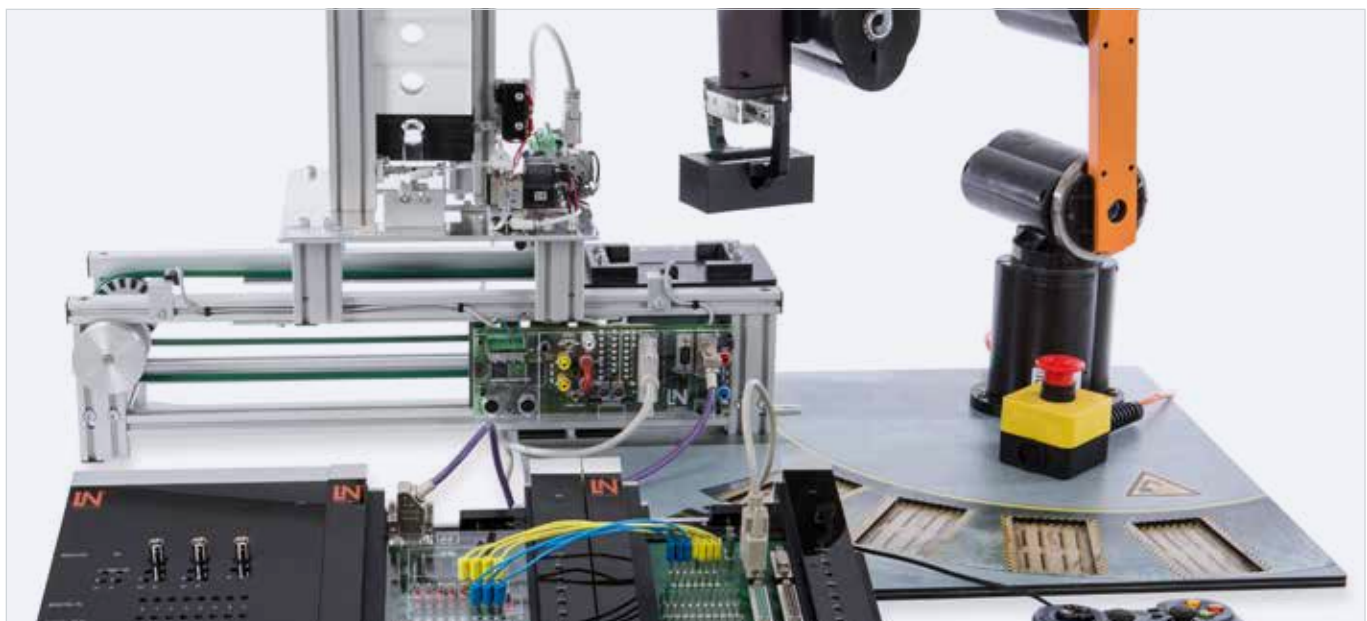


Training contents

- Gripping methods for a robot
- Programming of movements
- Coordinate systems for a robot
- Speed and acceleration
- Singularities and symmetries
- Digital inputs and outputs
- Typical programming patterns
- Program structures
- Final experiment

Robots in Mechatronics Applications

You can extend equipment set CRT 11 by adding a mechatronics station. Use the four pallet storage positions on the base plate and program the complete function sequence for a mechatronics application.



CRK 10 – Robot programming to industrial standards

Situation

The Kuka KR6 R700 sixx model is a 6-axis industrial robot which allows for work, control and programming on a professional level. The straightforward design of the Teach Pendant software ensures that there is an easy introduction to programming for the students. Project work can be transferred between robots and PCs using direct connection via Ethernet.



Your benefits

- Compact, fast acting industrial robot with 6 degrees of freedom
- Professional learning system: permits true-to-life learning
- International automobile standard: corresponds to conventional industrial design
- Programming via Teach Pendant
- Project planning possible via included software
- Connection to PLC via PROFINET

Project Work with Robot

Project equipment for testing

Situation

After a workpiece has been manufactured, the robot retrieves the finished component and deposits it in the "Testing" station. A variety of sensors are used to determine whether the workpiece has been assembled properly. After inspection the finished part is returned to the production line.



Project equipment for disassembly

Situation

After a workpiece has been manufactured, it is determined that this part has not been properly assembled. The robot retrieves the part from the production line and deposits it at the disassembly station. With the aid of the robot, this station dismantles the workpiece into its component parts. The robot then uses a sorting operation to place the individual component parts in their storage locations.



Mobile Robotics

AGV – automated guided vehicle system with collaborative 6-axis robot arm

The system is comprised of a collaborative, mobile robot with an additional collaborative 6-axis robot arm. These new-generation autonomous, mobile robots are currently revolutionising the way materials are being transported within the facilities of companies. Operation of automated guided vehicle systems (AGV) is ensured using camera systems without any magnetic loops installed in the flooring.



Your benefits

- Remote monitoring and control
- Interface to the Lucas-Nülle production planning system for the commissioning of orders
- Route planning based on destination coordinates/destination stations
- Travelling proceeds on planned route to destination
- Obstacle detection en route, deceleration/stop
- Determination and tracking of evasion paths
- Creation of a map from scanner data and localisation and movement within it
- Manual creation of local area maps with walls, work stations and permitted paths
- Emergency stop button

Collaborative robots

The robot is easy to program and can be set-up quickly and features safe and collaborating operating response. Thanks to its intuitive software even inexperienced operators can quickly learn the basics of programming. Desired path points are entered simply by moving the robot arm into the desired position.



Your benefits

- Electrical gripper: adjustable grip force from 3 N up to 40 N
- Adjustable grip stroke up to 110 mm
- Camera system for object recognition, taught-in objects are reliably gripped regardless of their location
- Robot arm can be moved freely by hand
- PROFINET connection to PLC possible
- Safety: Operational safety tested and approved by TÜV NORD in compliance with: EN ISO 13849:2008 PL d