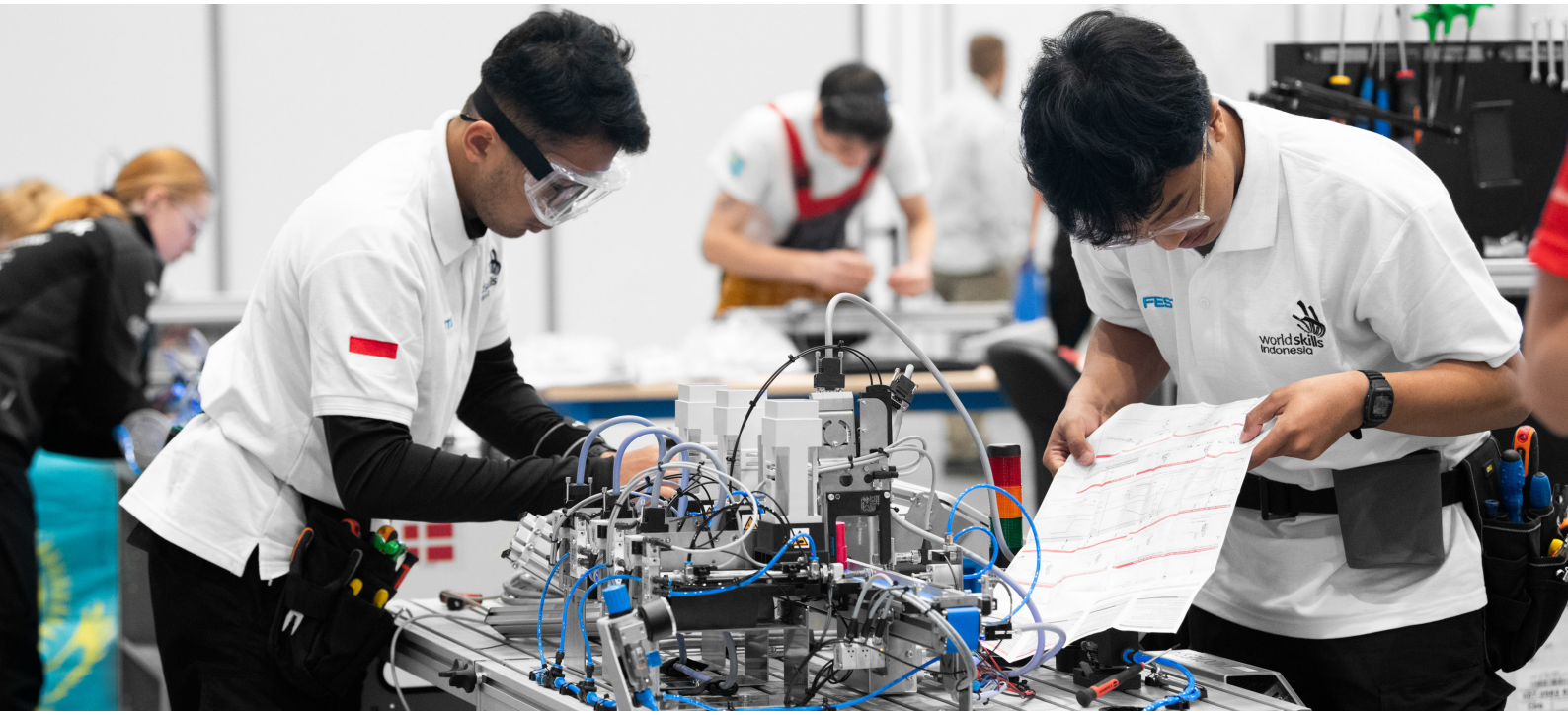
Train Students Like WorldSkills Champions: Prepare Mechatronics Technicians for Modern Industry



Skills competitions are true career accelerators and meaningful opportunities for teaching and learning—at school and on the competition floor.

Skill 04 Mechatronics is one of the most popular disciplines at WorldSkills competitions. For more than 30 years, competitors worldwide have trained and competed using our Modular Production System (MPS), developing advanced automation skills aligned with real industrial environments.

Whether you take part in a competition or not, explore how the mechatronics skills competition standard, practical tasks, and training equipment can inspire your teaching and support industry-relevant training for your students.

Develop Core Skills for Mechatronics Technicians

Industry demands technicians who can build, integrate, program, commission, and troubleshoot complex automated mechatronics systems under real-world conditions. WorldSkills translates these industry requirements into its Mechatronics Occupational Standard.



Why use the standard as a starting point for teaching?

The occupational standard is an **industry-validated framework** that defines what students need to know and be able to do at a professional level. More than just competition documentation, it serves as a high-value teaching and curriculum resource for mechatronics, control and electrical technology, and factory automation programs.

Educators can use the standard in multiple ways:

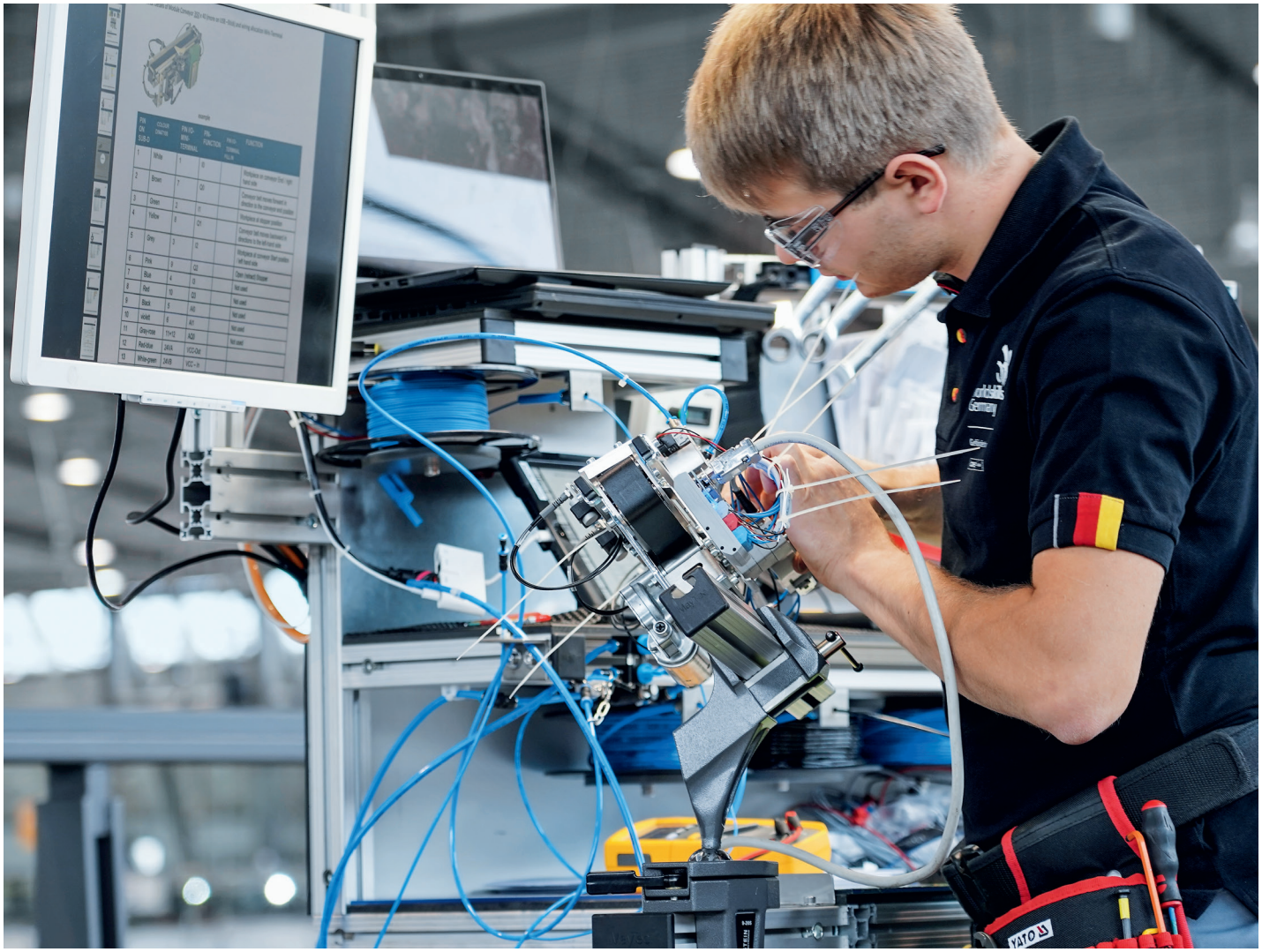
- Prepare students for skills competitions or enrich regular coursework using competition-level criteria
- Align automation and mechatronics instruction with real workplace expectations
- Design hands-on projects and challenges grounded in authentic job scenarios

From standard to tasks: How the competition shapes learning

The competition brings the occupational standard to life by translating it into a realistic, end-to-end industrial project completed over three days. For teachers, it offers a concrete example of how professional competencies can be integrated, practiced, and assessed in authentic conditions.

The project unfolds through clear phases—familiarization, design and planning, assembly, programming, commissioning, and finally optimization, troubleshooting, and documentation. Each phase mirrors how skills are developed and applied in the workplace, providing a useful reference for structuring learning activities and progression in the classroom.

→ View the full occupational standard



Overview of the WorldSkills Mechatronics Occupational Standard

Section	What Competitors Do
Work Organization & Management	Apply health, safety, and environmental principles in mechatronics environments. Organize work efficiently, select and use tools and materials safely, manage time and resources, contribute to teamwork, and minimize waste and energy consumption while maintaining high working standards.
Communication & Interpersonal Skills	Interpret technical documentation and communicate effectively with clients, team members, and stakeholders. Use technical language, digital communication tools, and reporting methods to explain complex systems, respond to requirements, and document work clearly and accurately.
Developing Mechatronics Systems	Design, assemble, and commission complete mechatronic systems combining mechanical, electrical, pneumatic, robotic, sensor, and safety components. Integrate PLCs, HMIs, vision systems, and robots according to industrial standards and documentation.
Using Industrial Controllers	Configure and integrate industrial controllers (PLCs) into mechatronic systems. Set up fieldbus and industrial networks, including OPC-UA, manage interfaces and signals, and ensure reliable communication between controllers, HMIs, sensors, and peripheral devices.
Software Programming	Develop control programs for mechatronic systems using standard industrial software. Program PLCs and HMIs, process digital and analogue signals, visualize system operation, and implement reliable communication and coordination between controllers.
Circuit Schematics	Read, interpret, and design pneumatic, hydraulic, and electrical schematics. Use modern software tools to design circuits that comply with mechatronic standards and support safe, reliable system operation.
Analysis, Commissioning & Maintenance	Test, commission, and analyze mechatronic systems and modules. Diagnose faults, collect and analyze data, optimize system performance, repair components, apply Total Productive Maintenance (TPM) principles, and measure energy consumption using appropriate sensors and tools.

Meet the MPS, the Official Competition Equipment

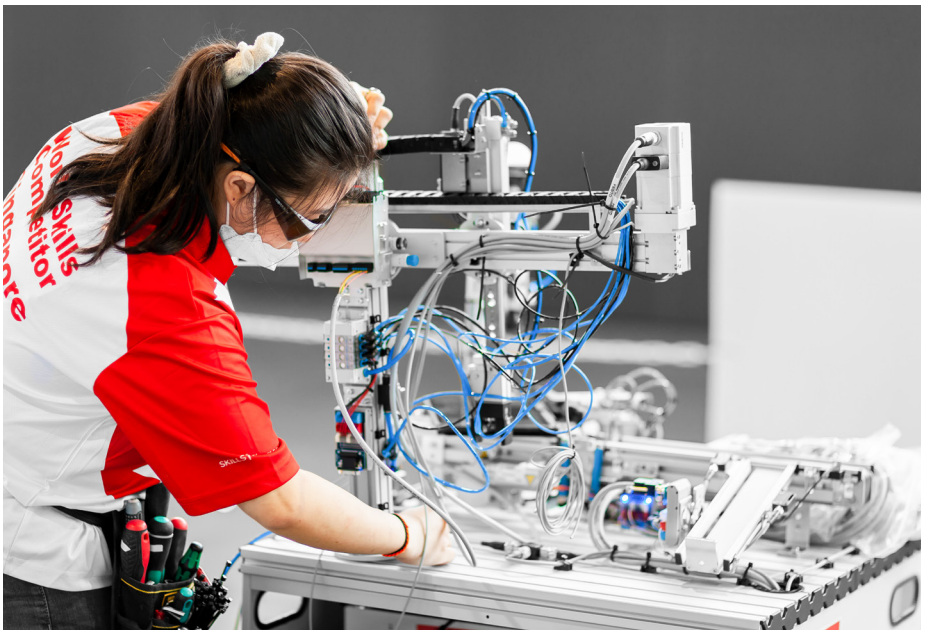
To prepare young competitors for a championship—or to provide classroom training that mirrors real production lines—the Modular Production System (MPS) offers an ideal learning platform, delivering strong relevance to modern manufacturing.

What is the MPS?

The MPS is a modular, industry-based training factory that enables students to design, build, program, commission, and maintain automated production systems in a realistic classroom environment.

It consists of a series of modular, interconnected stations such as distribution, testing, processing, handling, sorting, and/or assembly, that together model a complete automated production line.

The challenge? Set up a functioning system with sevelral stations and get it running without errors.



How is the MPS used for the competition?

Competitors receive multiple tasks to build an MPS system according to given specifications. They integrate mechanical, pneumatic, electrical, and control components into one coherent and reliable automated system.

Typical tasks include:

1 | Task interpretation and planning

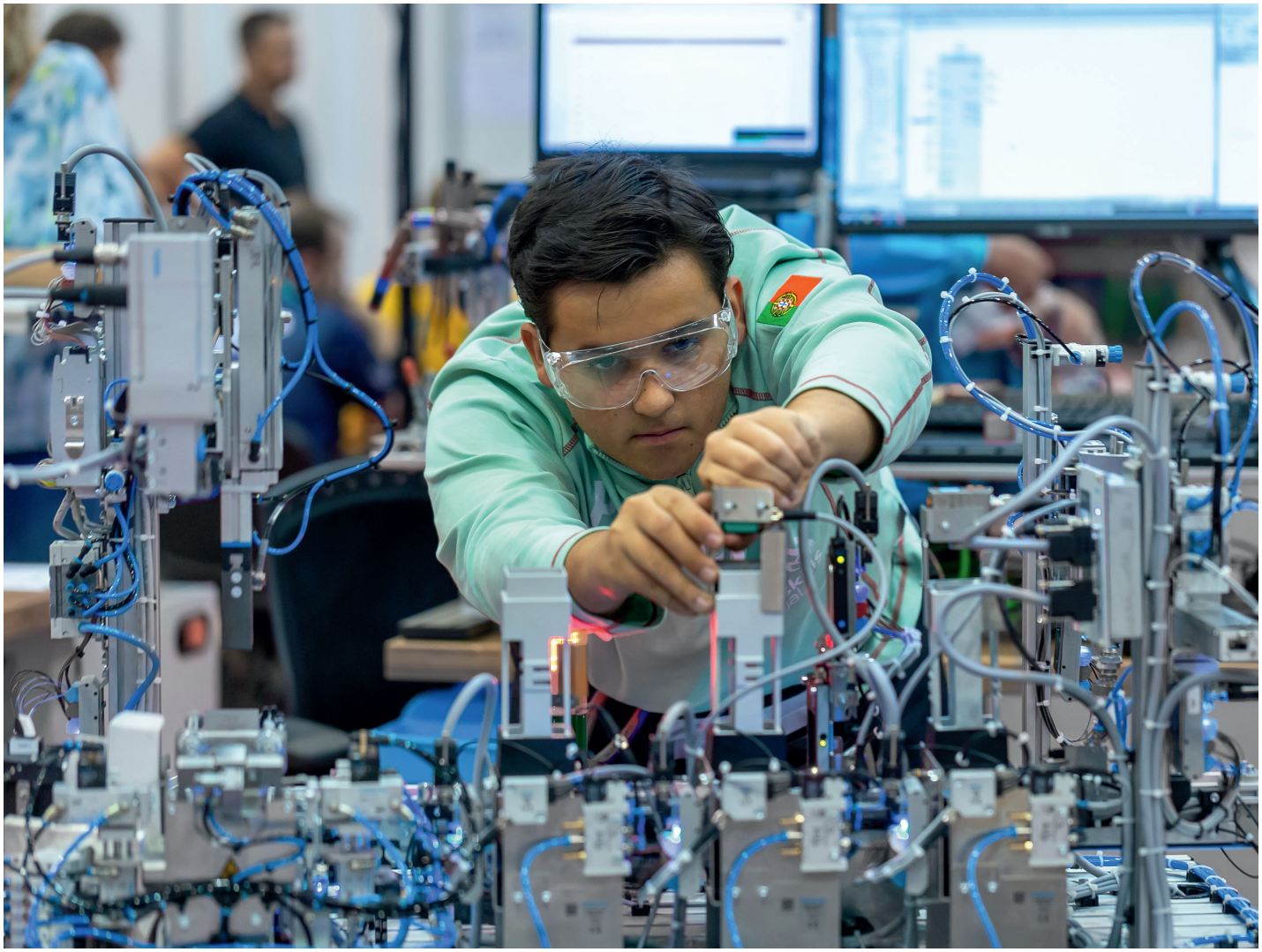
- Read and interpret task descriptions.
- Analyze a production scenario.
- Derive sequences, I/O lists, and function descriptions from specifications.

2 | Mechanical assembly and adjustment

- Assemble or modify MPS modules.
- Mount cylinders, slides, grippers, sensors, and other components.
- Adjust stroke lengths, end positions, and sensor brackets to achieve full functionality.

3 | Circuit setup and control

- Connect cylinders and valves with tubing according to pneumatic diagrams.
- Verify correct actuator motion and end-position sensing.
- Electrical installation and signal testing
- Wire sensors, actuators, and valve terminals to PLC I/O modules.
- Connect power supplies, emergency stops, and safety relays.
- Label and route cables neatly, then test each input and output.



4 | PLC programming, networking, and IO-Link

- Implement automatic sequences.
- Apply step chains or state machines, interlocks, and start/stop logic.
- Integrate safety components, including emergency stops, safe states, and manual or jog modes.

5 | HMI creation and operation

- Design HMI screens for start/stop functions, mode selection, status indication, counters, and alarms.
- Provide clear diagnostic and status information.

6 | Commissioning and process optimization

- Run the mechatronic system in manual and automatic modes to verify the complete cycle.
- Adjust timings, speeds, and parameters to improve reliability and cycle time.

7 | Troubleshooting and maintenance

- Identify and correct introduced faults in a systematic manner.
- Replace components, update documentation after changes, and restore full system functionality.

Turn competition tasks into classroom exercises

Get inspired by past competition tasks to have your students perform them. Check the task “Assembly, programming and commissioning of a 3-magazine station with conveyor” from WordSkills Lyon 2024:

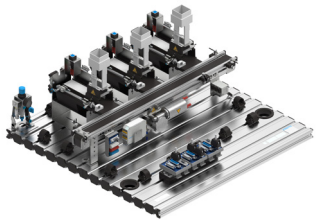
→ Access the downloadable PDF

Recommended Training Equipment for Mechatronics

Choose the package that fits your needs. Optional accessories expand learning possibilities—ideal for both competition preparation and mechatronics and automation training. Contact our experts to build the right package for your needs.

Package 1 | Your basic training set

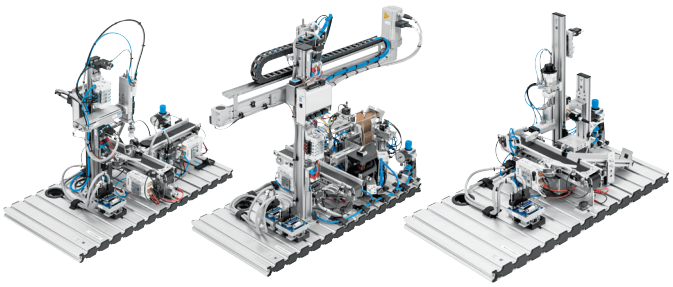
A perfect starting point in the fundamentals of factory automation that you can later expand by combining other MPS stations.



Using the **MPS Distributing Pro station**, learners build, wire, program, and operate a complete distribution process. This station is used in almost all competition editions, so it's ideal for competition preparation.

Package 2 | Your complete production line

The best possible way to explore multiple scenarios and prepare for the competition!



Adding the **MPS Joining, Packing, and Measuring stations** to the Distribution Pro station allows learners to develop technical expertise across multiple stages of an automated production process.

Package 3 | From the basics to Industry 4.0 on a single system



The MPS 400 is a flexible miniaturized production system that replicates real industrial workflows for hands-on training in automation, mechatronics, and Industry 4.0.

Built as an individual workpiece-flow learning factory, it combines physical stations with digital networking to provide a realistic and scalable training environment. Use it for competition training or for regular classes.

Key features

- Modular production line with distributing, joining, measuring, and sorting stations (several configurations possible)
- Integrated Industry 4.0 technologies including RFID, IO-Link sensors, and industrial networks
- Web-based software environment with didactic MES for transparency, traceability, and data-driven learning
- Scalable learning factory supporting automation, mechatronics, and smart manufacturing training

Equipment used during the competitions may be purchased at a special price after the event. Please contact your local Festo representative for information on availability and sales conditions.

+ Accessories

Install your stations on mobile and ergonomic trolleys, and pick **accessories** to tailor your package to your needs, such as:

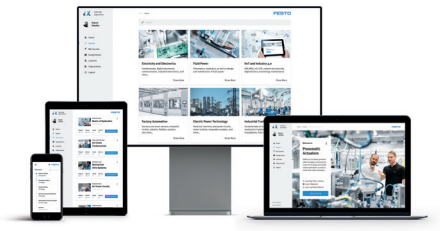


- A **signal tower** to easily monitor the system status.
- One of our **EduTrainer PLCs** and **HMIs** to control each station.
- A **Simulation Box** for quick system commissioning and testing.
- An **air flow sensor** for more energy efficiency.

Important note: As official sponsor, Festo provides the MPS stations at the competition venue for the duration of the event. However, in accordance with WorldSkills regulations, competitors are required to bring their own PLC, HMI, programming software, connection cables, power supply, tools, and design workshop equipment.

+ Digital learning option

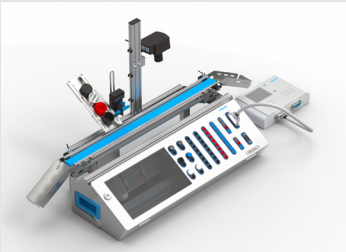
Find ready-to-use learning content for your equipment on the digital portal Festo LX.



- AI-powered content creation tools
- Wide expanding library of learning content
- Various subscription options
- LMS integration available

Explore past WorldSkills project tasks:
create your free account on
→ **Festo LX**

An all-round, compact I4.0 training system



The SkillsConveyor is an excellent option for foundational training in automation and mechatronics, as well as extra competition preparation, focusing on core installation, wiring, sensing, and control skills before advancing to full production lines such as MPS 400.

- Modular design to expand learning
- Integration with other systems from Festo
- Digital learning content on Festo LX

Ready to Move Forward?



FESTO

worldskills
Global Premium Partner

Whether your objective is to prepare students for WorldSkills competitions or to integrate competition-grade training into everyday teaching, we support you in building a learning environment aligned with your needs and educational aspirations.

Considering embarking on the WorldSkills journey with your students?
Here are the main steps to get started:

Step 1
Learn about the competition on your national WorldSkills website.

Step 2
Identify motivated and committed students to represent your institution.

Step 3
Register them for the regional skills competition, the first step on the pathway to higher-level events, such as national and international competitions.

Step 4
Develop a training program based on the occupational standard and tasks from past competitions.

Step 5
Select training equipment suited to the required skills and learning objectives.

Contact your Festo local company.
Leverage expert guidance, practical advice, and technical insight from our specialists.

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