

MecLab[®]

Mechatronics Training System

FESTO

MecLab[®]

Mechatronics Training System

MecLab[®] Hardware

Stack Magazine Station
Conveyor Station
Handling Station

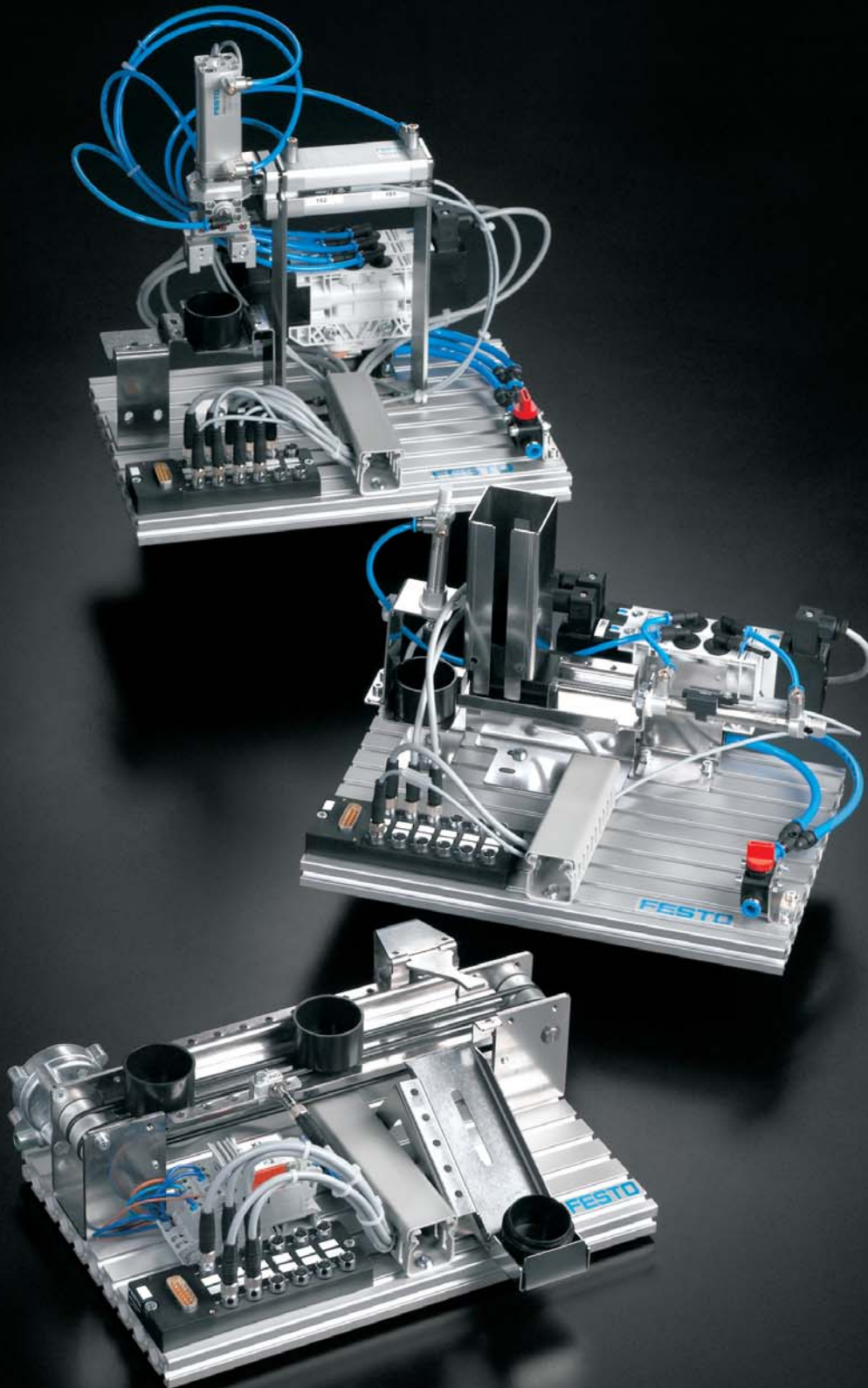
MecLab[®] Accessories

FC 100 Compact Control System
Control Package
Compressor

Complementary Media

Software and Courseware

MecLab and STEM



Create an Effective
Learning Environment

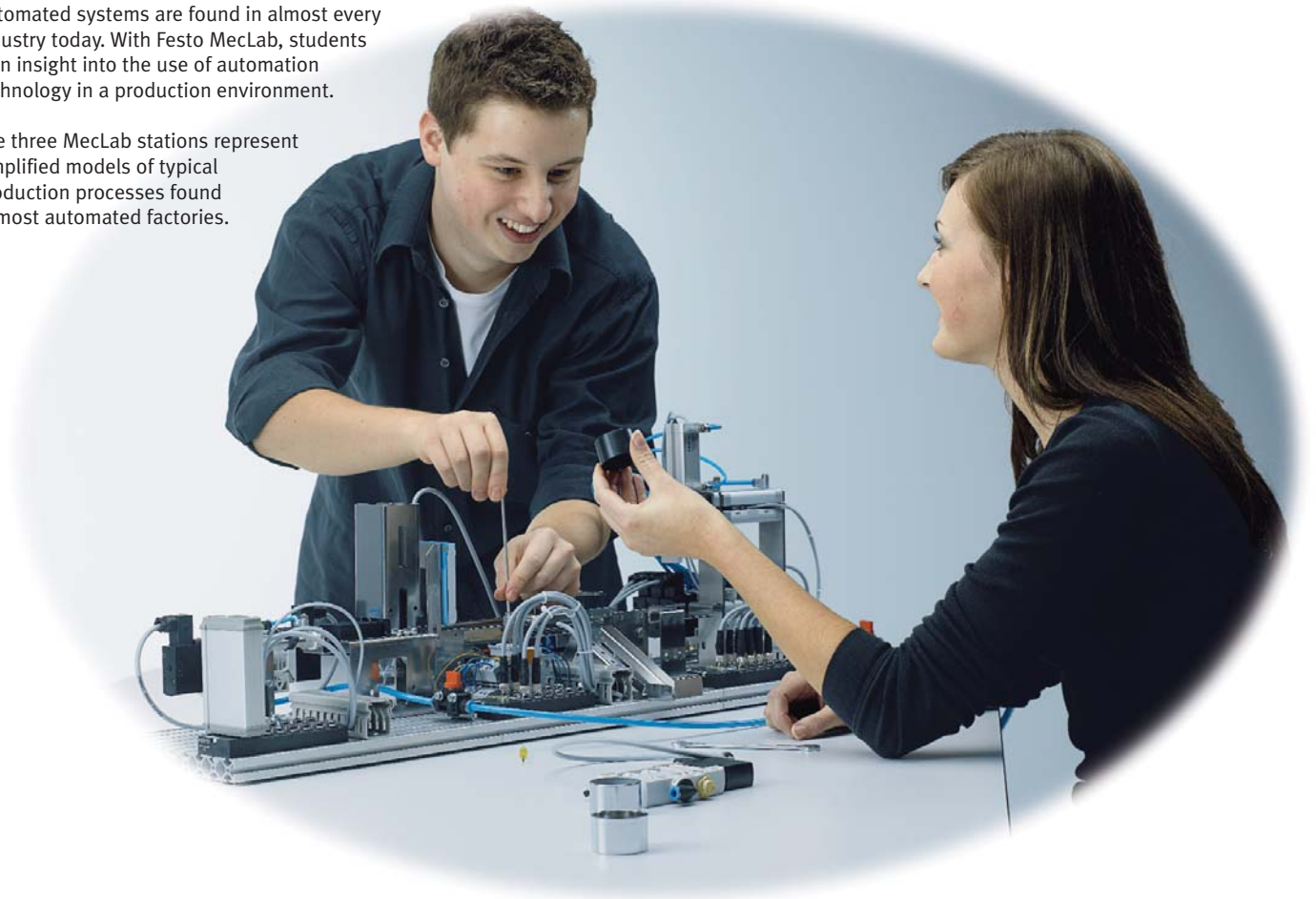
www.festo.com/uslearningsystems

MecLab® Mechatronics Training

Automation Training System

Automated systems are found in almost every industry today. With Festo MecLab, students gain insight into the use of automation technology in a production environment.

The three MecLab stations represent simplified models of typical production processes found in most automated factories.



Learning Objectives

MecLab covers a variety of topics and objectives including:

- Introduction to industrial automation
- Technical terms
- Planning, developing, and building automated systems
- Technical documentation
- Building models and creating simulations
- Open and closed-loop control systems
- Pneumatic and electrical actuators, sensors and controllers
- Using computers as tools for programming and simulation

Realistic and Challenging

MecLab replicates industrial production processes using only industrial components.

The system includes a range of exercises designed to challenge the student in a “hands-on” environment of constructing, modifying, and programming an automated Mechatronic system.

All necessary tools and hardware required for making modifications are included. Wiring of the electrical components is simple, using standard industrial connectors.

Modular and Flexible

MecLab stations can be used individually. Each station performs a practical function and safely demonstrates the characteristics of a fully automated process.

The stations can be joined together to form more complex “production lines”.

Students can take on the role of engineer and design special exercises and projects, including joining the three stations together to form a mini production line.

Contact your local Festo representative for a customized quotation.

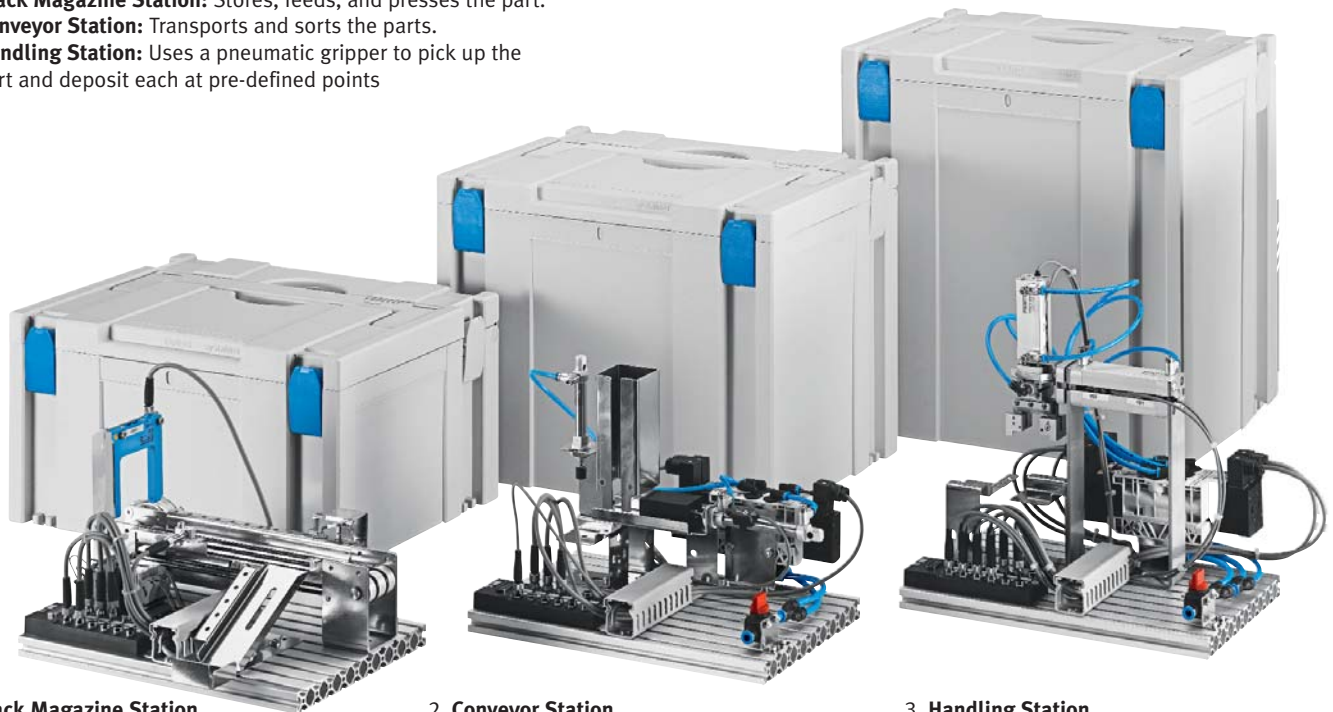
The MecLab[®] System

MecLab[®] Hardware

Each system is delivered in its own storage unit fully assembled and ready for immediate use. It is sturdy and capable of withstanding the rigors of a school environment.

There are three different functions:

1. **Stack Magazine Station:** Stores, feeds, and presses the part.
2. **Conveyor Station:** Transports and sorts the parts.
3. **Handling Station:** Uses a pneumatic gripper to pick up the part and deposit each at pre-defined points



1. Stack Magazine Station

2. Conveyor Station

3. Handling Station

The Complete Package

Contains everything you need for working with MecLab:

- Stack Magazine Station
- Conveyor Station
- Handling Station
- Compressor
- EasyPorts
- Power Supplies (24 vdc)
- FluidSIM Software
- Documentation on CD-ROM
- Work pieces
- Tools
- Hardware set
- Storage Containers

Documentation on CD-ROM

The system includes a CD-ROM with:

- **Start-up Instructions**
Detailed step-by-step instructions show how to connect the stations to the computer and how to write simple programs. Suggestions for lesson planning are included.
- **Textbook (Electronic Version)**
Explains the basics of pneumatics, electrical engineering, electrical actuators, sensors, and control technology.
- **Workbook (Electronic Version)**
Contains 5-7 exercises per station, prepared worksheets in *.doc format, and exercise solutions.
- **PowerPoint Presentations**
Also includes videos and technical data for all components.

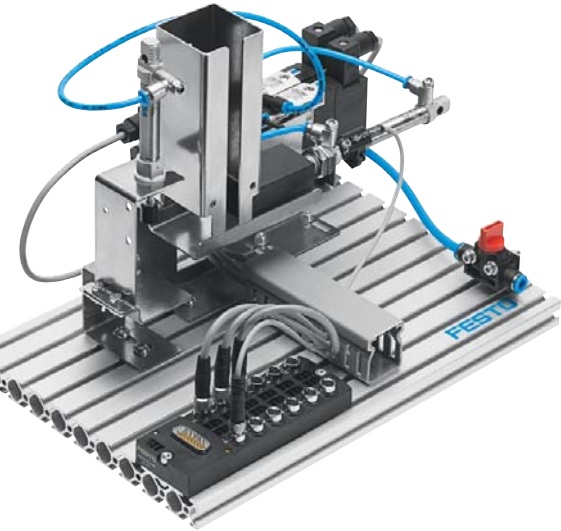
Control with FluidSIM[®] Software

The stations are controlled with FluidSIM for MecLab software and the EasyPort interface.

- FluidSIM is used for creating and simulating pneumatic, electrical circuits and programmable logic controllers. With its universal PC interface, FluidSIM can directly control each MecLab station.
- Students are able to create and simulate an electro-pneumatic circuit then create a control program for the MecLab station.
- FluidSIM is supplied as a school license for six seats.
- Students can run exercise solutions via software simulation before testing them on the station.
- The software provides information at the click of a mouse about all components and includes informative and animated sequences.

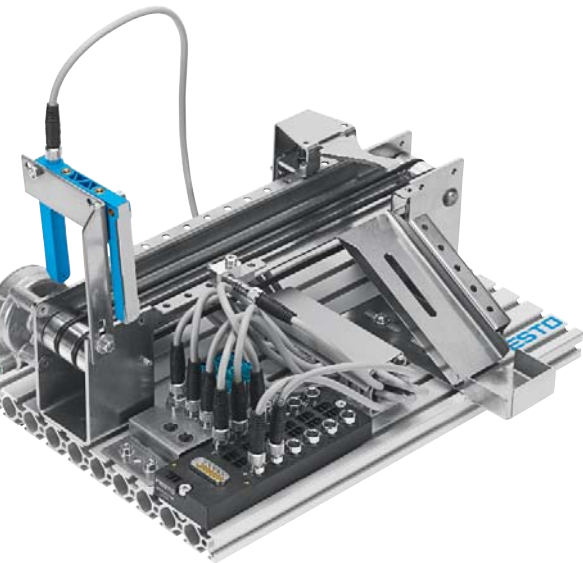
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MecLab® Stations



1. Stack magazine station 548704

Accessories (not included)
Control package 549787
Compressor 13061655



2. Conveyor station 548705

Accessories (not included)
Control package 549787

1. Stack Magazine Station

Function

In an automated production line, work pieces are stored and fed into the process in a timed sequence. This is the function of the MecLab Stack Magazine Station. It stores, transfers, and presses each work piece.

Work pieces stored in the stack magazine are pushed out by a horizontally positioned cylinder. A second, vertically positioned cylinder replicates a press-fit process (e.g., pressing a lid onto a can).

All processes are controlled electro-pneumatically. The included magnetic reed switch can be used to verify the position of a cylinder.

Technical learning objectives

- Basics of pneumatics
- Single-acting cylinders
- Double-acting cylinders
- Solenoid valves
- Sensor technology
- Pneumatic plumbing
- Electrical wiring
- Relay control systems

Scope of delivery

- Stack magazine module
- Press-fit unit module
- Multi-pin plug distributor
- 2 solenoid valves
- 2 cylinders
- 1 magnetic reed switch
- Aluminum profile plate
- Tool set
- Work pieces
- Storage container
- Equipment trays
- CD ROM containing all documentation
- FluidSIM® software

2. Conveyor Station

Function

In many production assembly lines work pieces are transported between “process stations” via conveyor belts.

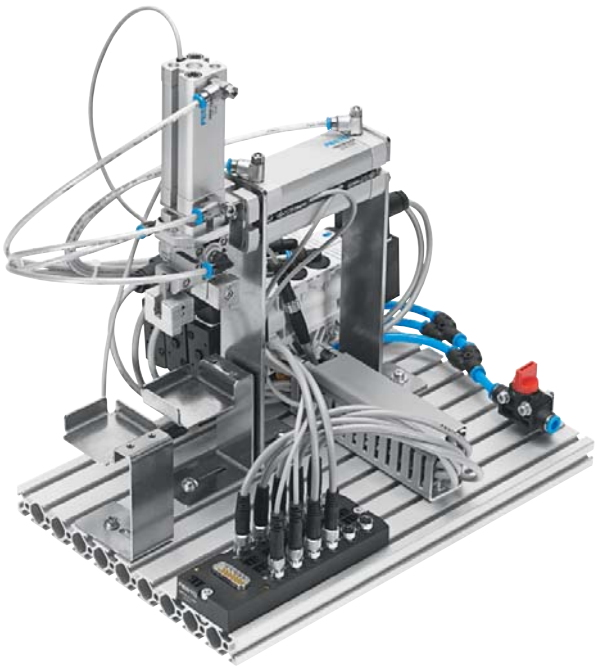
The Conveyor station in MecLab provides realistic simulation of an industrial work piece transport system. The drive motor can be made to run forward and in reverse. Work pieces are detected, classified, and sorted by color.

Technical learning objectives

- Control of direct current motors
- Inductive sensors
- Optical sensors
- Relay circuits
- Polarity reversal circuits
- PLC programming
- Control using logic operations
- Construction and wiring

Scope of delivery

- Conveyor belt module with DC motor
- Solenoid as stopper/deflector
- Multi-pin plug distributor
- Inductive sensor
- Optical sensor (light barrier)
- Aluminum profile plate
- Tool set
- Work pieces
- Storage container
- Equipment trays
- CD ROM containing all documentation
- FluidSIM software



3. Handling station 548706
 Accessories (not included)
 Control package 549787
 Compressor 13061655

3. Handling Station

Function

Whether it's a simple pick & place operation or highly complex assembly work – handling systems are always involved. Handling devices range from simple, two-axis systems to highly complex industrial robots with six axes.

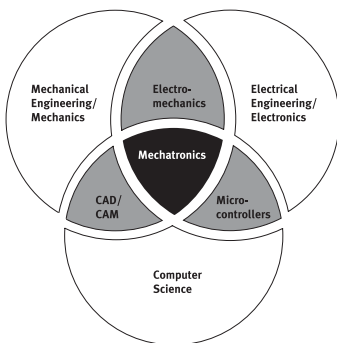
The Handling station in MeLab consists of pneumatic cylinders with simple bearing guides and two axes. The work piece is held by a pneumatic gripper. The system can be used to transport the work piece between stations or to join two work piece halves together.

Technical learning objectives

- Basics of pneumatics
- Double-acting cylinders
- Grippers
- Solenoid valves
- Sensor technology
- Pneumatic plumbing
- Electrical wiring
- Relay control systems
- Logic control
- PLC controllers
- Sequencing operations

Scope of delivery

- Handling module
- 3 solenoid valves
- 4 magnetic limit switches
- 2 pneumatic cylinders with simple bearing guide
- 1 pneumatic gripper
- Multi-pin plug distributor
- Aluminum profile plate
- Tool set
- Work pieces
- Storage container
- Equipment trays
- CD ROM containing all documentation
- FluidSIM software



Mechatronics

Mechatronics is the synergistic combination of mechanical engineering, electrical engineering, electronics, information technology, and systems thinking, utilized in the design of products and automation processes.

Festo Learning Systems products provide the ideal environment for Mechatronics training.

Technical training objectives include the ability to:

- Analyze functional relationships in mechatronic systems
- Manufacture mechanical components
- Follow information and energy flow in electrical, pneumatic, and hydraulic sub-systems
- Plan and organize work flow
- Commission, troubleshoot, and repair mechatronic systems
- Communicate using industrial network protocols, including DeviceNet™ and ProfiBus

MecLab[®] Accessories

Compressor for MecLab[®]

Low-cost, ultra-quiet compressor for MecLab. Well suited for use in classrooms. Supplies up to three stations.

Includes filter regulator, quick disconnect and pressure relief fittings.

Order no. 13061655



Compact Control System FC 100

A hand held compact controller.

Actuators can be activated manually by pressing the appropriate keys. The sequence of outputs and inputs are saved as a complete operational program

The FC 100 can also be programmed in CoDeSys.

Order no. 548676



Control Package

EasyPort with power supply unit and connecting cables

The control package contains everything you need to control the MecLab system:

EasyPort:

6 digital input and output ports 24 vdc;
USB interface to PC including USB connecting cable

Power supply unit with 24 vdc output voltage;
protected max. output current:1.88 A
supply voltage 115 vac,1.5 A, 50 – 60 Hz

Order no. 549797



Media Software & Courseware



Software

Excellent resources for:

- Programming
- Experimentation
- Simulation
- Visualization
- Operating and monitoring

To complement the MecLab training system, we recommend the following Web based technology (WBT) programs:

- WBT Fascination of technology
- WBT Pneumatics
- WBT Electro pneumatics
- WBT Sensor technology 2
- WBT Actuators – DC motor
- WBT Open- and closed-loop control

Detailed information and free demo versions available at www.festo-didactic.com

Courseware

Our recommendations for MecLab:

- Textbook: Pneumatics, Basic level
- Textbook: Electro-pneumatics, Basic level
- Textbook: Proximity sensors
- Set of posters on pneumatics

Detailed information, free sample extracts, and online download of curriculum at www.festo-didactic.com

MecLab and STEM

MecLab is designed to support concepts in Science, Technology, Engineering and Mathematics by encouraging students to experiment with computerized control of fluid power devices.

Students solve the same industrial motion control problems that industrial engineers face daily in a production environment.

Students will observe and measure electrical and fluid power laws as they design systems to move, assemble, and sort work pieces within the system modules. They will gain the ability to design and evaluate production processes and procedures, based on the efficiency of motion and energy conservation.

Common automation technologies that are part of the MecLab system include pneumatics, PLC logic control, sensor technology, relay control, basic electricity, and DC motor controls.

Learning Systems Mechatronics Training System

The Festo Meclab® Mechatronic Trainer seamlessly integrates with:



Learning Systems Modular Production Systems

- Teach Industrial Automation using actual factory processes
- PLCs control working factory models
- Use actual industrial components



MPS® won the Worldidac Award in 1998, 2000, 2002



Learning Systems Roadmap to Mechatronics

- Hardware and simulation software to teach mechatronics
- Fluid power, PLC control, robotics and sensors
- ICIM and FMS flexible manufacturing training systems



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