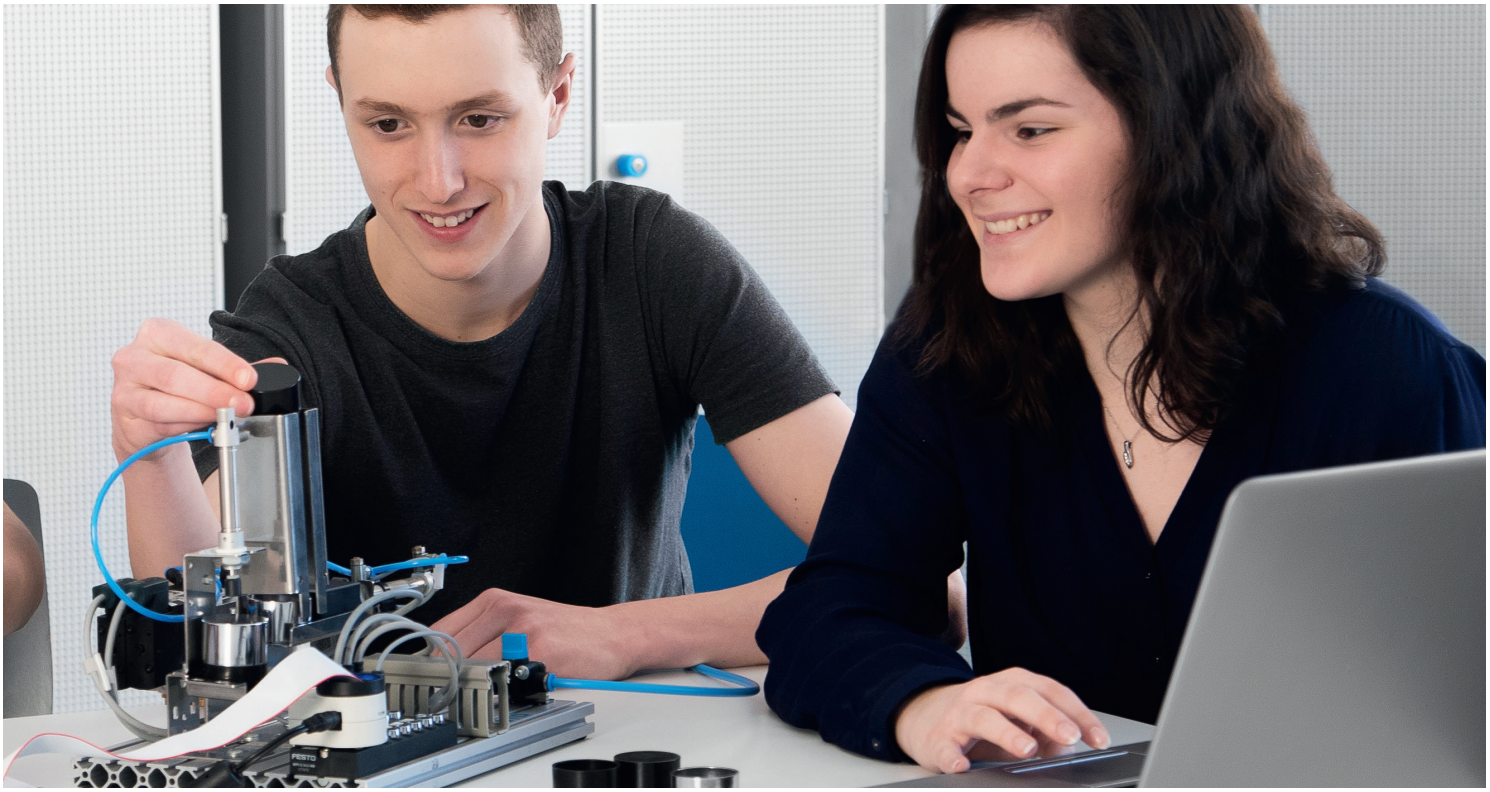
Understanding Technology. Shaping the Future. With MecLab.

The Preferred Learning System for Entry into Automation Technology

FESTO



Understand the basics of automation with MecLab – and contribute to a digital and future-proof world. The learning system enables a structured introduction to central topics of industrial automation technology and combines theoretical basics with realistic applications.

Through project-oriented work, pupils learn to analyze, plan and implement technical processes – comparable to practice-oriented mechatronic training in a school context.

MecLab offers technical education with relevance – for teaching that combines understanding, application and future competence.

Realistic and challenging

The three MecLab stations represent simplified models of typical production processes found in most automated factories using only industrial components. Each station has a specific function:

- The **Conveyor Station** transports and sorts the parts.
- The **Stack Magazine Station** stores, feeds, and presses the part.
- The **Handling Station** uses a pneumatic gripper to pick up the part and deposit each at predefined point

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

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.

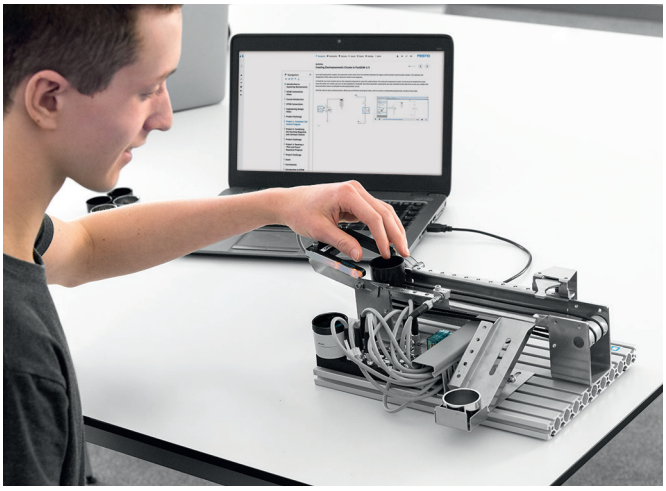
Students can take on the role of an engineer and design special exercises and projects, including joining the three stations together to form a mini production line.

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

For more information about MecLab, visit our → **website**



Course material
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.

The system includes a CD-ROM with the electronic version of:

Instructor's Guide: 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: Explains the basics of pneumatics, electrical engineering, electrical actuators, sensors, and control technology.

Workbook: Contains 5-7 exercises per station, prepared worksheets in *.doc format, and exercise solutions.

This course material can be downloaded from our website. Further STEM education content is also available in digital format on the digital portal Festo LX.

Control with FluidSIM Light/MecLab
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 Light/MecLab is supplied as a school license for 8 seats per station. The purchase of additional license packages (8-seat license) is possible at any time.

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.

More information → **click here**

Recommended Learning Material

Courseware



Download the "MecLab Courseware" for free → **click here**



Festo LX for Education in STEM is our all-in-one platform solution with access to all STEM related content, features and the AI supported authoring tool, for your perfect learning experience in schools.

Topics covered amongst others in our STEM and Bionics courses: Electrical Engineering, Mechatronics, Metal Working and CAD, Sensors, Robotics and Coding, Renewable Energies, Water and Process Engineering.

1-year subscription	8219895
3-year subscription	8219896
5-year subscription	8219897

Note: Unlimited number of users with 100 concurrent users.

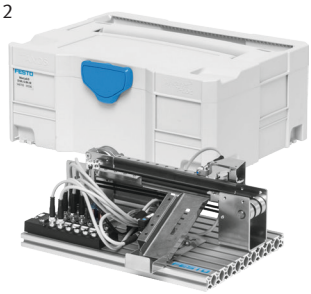
More information → **click here**

MecLab
Individual Stations

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1 Stacking Magazine Station

Function
In an automated production line, workpieces are stored and fed into the process in a timed sequence. In MecLab, this is the job of the Stacking Magazine Station. It stores and feeds each workpiece. Workpieces 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
– Fundamentals of pneumatics
– Single-acting cylinders
– Double-acting cylinders
– Solenoid valves
– Sensor technology – magnetic limit switches
– Pneumatic plumbing
– Electrical wiring
– Relay control systems

Scope of delivery
– Stacking magazine module
– Press-fit unit module
– Multi-pin plug distributor
– 2x solenoid valves
– 2x cylinders
– 1x magnetic reed switch
– Aluminum slotted profile plate
– Tool set
– Workpieces
– Systainer storage container
– Equipment trays
– FluidSIM Light/MecLab software (8-seat license) and documentation

Order no.	**548704**

Recommended accessories:

Control package	8075749
Compressor ➔ Page 6	

2 Conveyor Station

Function
Transporting workpieces from one manufacturing station to the next is an important task in production. In the real world, driverless transport systems, forklift trucks and above all conveyor belts are used for this purpose. The Conveyor Station in MecLab allows realistic simulation of an industrial workpiece transport system. The drive motor can run forwards and backwards; workpieces can be detected with the sensors and distinguished from one another. The solenoid allows workpieces to be separated or rejected onto the slide.

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 slotted profile plate
– Tool set
– Workpieces
– Systainer storage container
– Equipment trays
– FluidSIM Light/MecLab software (8-seat license) and documentation

Order no.	**548705**

Recommended accessories:

Control package	8075749

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 axis. The Handling Station in MecLab consists of pneumatic cylinders with simple bearing guides and two axis. The workpiece is held by a pneumatic gripper. The system can be used to transport the workpiece between stations or to join two workpiece halves together.

Technical learning objectives
– Fundamentals of pneumatics
– Double-acting cylinders
– Grippers
– Solenoid valves
– Sensor technology
– Pneumatic plumbing
– Electrical wiring
– Relay control systems
– Control logic
– PLC controllers
– Operation sequencing

Scope of delivery
– Handling module
– 3x solenoid valves
– 4x magnetic limit switches
– 2x pneumatic cylinders with simple bearing guide
– 1x pneumatic gripper
– Multi-pin plug distributor
– Aluminum slotted profile plate
– Tool set
– Workpieces
– Systainer storage container
– Equipment trays
– FluidSIM Light/MecLab software (8-seat license) and documentation

Order no.	**548706**

Recommended accessories:

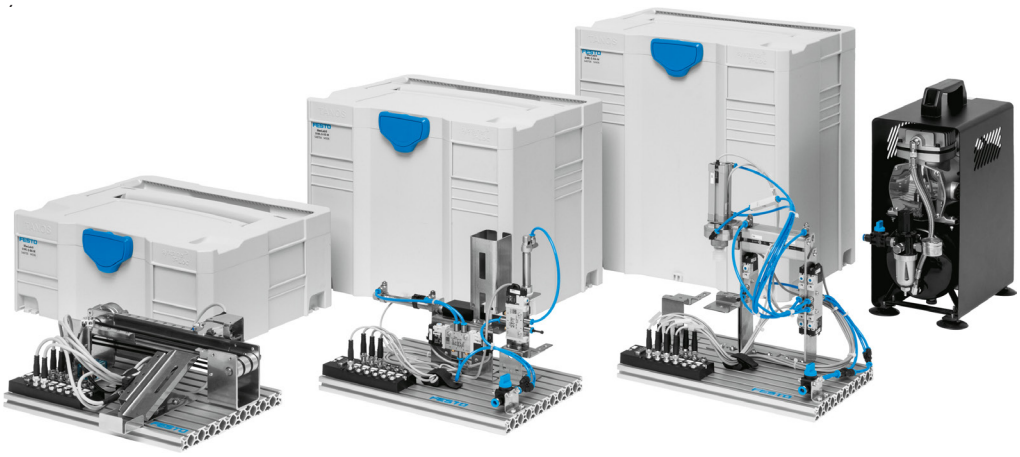
Control package	8075749
Compressor ➔ Page 6	

MecLab
Complete Package, Expansion Set, Software

4 **Complete Package MecLab**

Contains everything you need for working with MecLab:
– Stack Magazine Station
– Conveyor Station
– Handling Station
– Compressor
– 3 x EasyPorts
– 3 x Power Supplies (24 vdc)
– FluidSIM Light/MecLab Software
– Documentation on CD-ROM
– Workpieces
– Tools
– Hardware set
– Systainer storage containers

120 V	**556276**
230 V	**549786**



5 **MecLab Expansion Set**

This expansion set contains a range of components for realizing your own project ideas packed in a practical Systainer.

Scope of delivery
– 2x double-acting cylinders with one-way flow control valves
– 2x solenoid valves
– 1x diffuse sensor
– 2x magnetic limit switches
– 1x profile kit
– 1x profile plate
– 1x electrical button
– 1x electrical switch
– 1x indicator light

Order no.	**556245**

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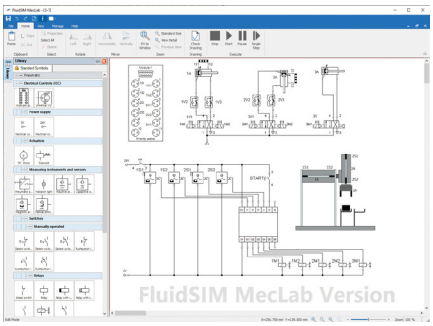


6 **FluidSIM 6 Light/MecLab**

The package includes an 8-seat license for updating to the current version or as an extension of existing licenses already provided with the MecLab stations or complete package. FluidSIM 6 Light/MecLab covers the following topics:
– Basics of electropneumatics
– Basics of digital technology

Order no.	**8169296**

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Recommended Accessories
Control Options

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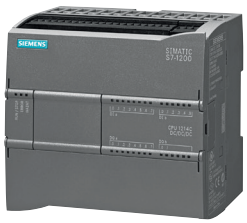
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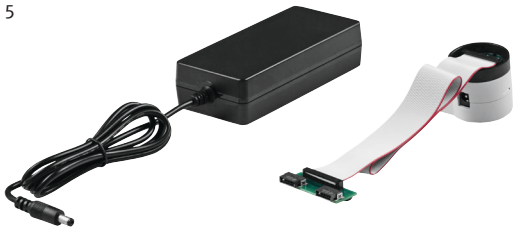
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1 **The control package – Process Interface with Power Supply and Connecting Cables**

It contains everything you need for controlling MecLab: EasyPort Mini EasyKit – Process Interface V2
– 6 digital or analog input and output channels
– Maximum current per output channel 0.5 A, 24 V (digital) or 0...10 V / 6 mA ±3% (analog)
– Digital input switching threshold 5.2 V hysteresis 1.4 V or analogue 0...10 V, Ri > 10 kΩ
– Power supply 24 V DC, ±10% via a 2.1 x 5.5 mm DC plug
– The status of the digital inputs/outputs and the module's ID appear on a 64 x 48 pixel monochrome graphic display
– EasyLab software can also be used to program the module
– USB 2.0 interface to connect to a PC via micro USB socket
– Micro USB 2.0 connecting cable
– Short circuit proof
Power supply unit
– 24 V DC output voltage
– Output current max. 2.5 A
– Supply voltage 100...240 V, 1.3 A, 50...60 Hz
– Short circuit proof
– Dimensions: 49.5 x 114.5 x 33 mm

Order no.	**8075749**

Accessories (not included)
Power cable → next page

2 **Trainer Package LOGO! 8**

FluidSIM contains a software-based minicontroller, e.g., as an introduction to the LOGO!, the minicontroller from SIEMENS. Package includes:
– 6 x LOGO! 12/24 RCE (V8) with 8 digital inputs and 4 digital outputs
– 6 x extension modules with 4 additional digital inputs and 4 digital outputs
– 6 copies of programming software LOGO! Soft Comfort V8

Order no.	**8040049**

3 **Connecting Cable**

Connecting cable with 15-pin D-Sub connector and free cable ends for connecting a LOGO! to the multi-pin plug distributor of a MecLab station. Connecting cable for the end-position controller SPC 11 with 4 mm safety plugs.

Order no.	**177673**

4 **Trainer Package SIMATIC S7-1200 DC/DC/DC**

Consisting of:
– 6x SIMATIC S7-1200, CPU 1215C, compact CPU, DC/DC/DC, 2 PROFINET Port, onboard I/O: 14 DI 24 V DC; 10 DO 24 V DC; 0.5 A; 2 AI 0...10V DC, 2 AO 0...20 mA DC, power supply: 20.4...28.8 V DC, Program/data memory 125 kB
– 6x SIMATIC S7, STEP 7 BASIC floating license, E-SW, SW and documentation on DVD, class A, license key on USB stick, 2 languages (DE, EN), reference HW: S7-1200
– 6x SIMATIC NET, Industrial ETHERNET TP XP Cord RJ45/RJ45, CAT 6 A, crossed TP cable 4x2, length 6 m

Order no.	**8092587**

Connecting Cable SysLink – D-Sub (not shown)

Cable for connection MecLab stations with sub-assemblies that have a 24-pin SysLink plug.

Order no.	**560752**

5 **MecLab Interface**

MecLab Interface is a component that bridges a Microcontroller Development System (TP 1515 PIC or TP 1516 Arduino) with any MecLab Station. It allows control of the station by the microcontroller located on TP 1515 or TP 1516. Using the visual programming software Flowcode, students can quickly and easily code a microcontroller to perform a sequence of actions on the station. The program is uploaded to the microcontroller and test run on the station. Two variants are available, depending if your MecLab Stations are equipped or not with the EasyPort Mini EasyKit with Power supply and Connecting cables.

Complete version	**8136430**
Add-on version	**8127367**

Recommended Accessories
Compressors and Power Supply Units

1



2



3



1 **Compressor for MecLab**

Low-cost compressor for MecLab with only 53 DB (A), making it well suited for use in classrooms. Supplies up to 4 stations. Complete with pressure regulator, water separator, 5 m tubing 6 mm in diameter and 3 T-distributors.
– Pressure: max. 400 kPa (4 bar)
– Suction capacity: 20 l/min
– Reservoir capacity: 2.5 l
– Dimensions: 310 x 150 x 370 mm

Design: 230 V/50 Hz
With mains cable suitable for:
DE, FR, NO, SE, FI, PT, ES, AT, NL, BE, GR,TR, IT, DK, IR, ID
Order no. **548707**

Design: 120 V/60 Hz with IEC power cable to NEMA 5-15
Order no. **556275**

2 **Compressor**

Oil-lubricated, extremely quiet (45 dB (A)) compressor. Ideally suited for use in classrooms. Comes with pressure regulator with gauge and water separator. Supplies up to 8 stations.
– Pressure: 800 kPa (8 bar)
– Suction capacity: 50 l/min
– Reservoir capacity: 24 l
– Compressed air outlet: ¼" or KD4

Design: 230 V/50 Hz
With power cable suitable for:
DE, FR, NO, SE, FI, PT, ES, AT, NL, BE, GR, TR, IT, DK, IR, ID
Order no. **91030**

Design: 120 V/60 Hz with IEC power socket and plug to NEMA 5-15
Order no. **565440**

Compressor accessories
(not shown)

– Coupling socket (KD3-CK-4 and KD4-1/4-A)
– Coupling plug (KS4-CK-4)
– 6 x Tubing (silver 2.5 m)
Order no. **102725**

3 **Tabletop power supply unit**

– Input voltage: 85...265 V AC (47...63 Hz)
– Output voltage: 24 V DC, short-circuit-proof
– Output current: max. 4 A
– Dimensions: 75 x 155 x 235 mm

Without power cable
Order no. **8049633**

With power cable, 1.3 m, suitable for:
DE, FR, NO, SE, FI, PT, ES, AT, NL, BE, GR, TR, IT, DK, IR, ID
Order no. **162417**
US, CA, Central America, BR, CO, YU, EC, KR, TW, TH, PH, JP
Order no. **162418**
GB, IE, MY, SG, UA, HK
Order no. **162419**
AU, NZ, CN, AR
Order no. **162380**
CH
Order no. **162381**
ZA, IN, PT, SG, AE, HK, (GB)
Order no. **162382**

Power Cable

IEC power socket and plug to NEMA 5-15.
Order no. **350362**

Power Cable (not shown)

One end designed as a C7 IEC power socket and one end with a country-specific plug. Type: Connector as per BS 1363 for GB, IE, MY, SG, UA, HK, AE
Order no. **8060969**

Mains Cable for Small Appliances
(not shown)

One end designed as a C7 IEC power socket and one end with a country-specific plug. Type: Connector as per AS 3112 for AU, NZ, CN, AR
Order no. **8060970**

One side designed as a connector and one side with a country-specific plug.
DE, FR, NO, SE, FI, PT, ES, AT, NL, BE, GR, TR, IT, DK, IR, ID
Order no. **247661**
US, CA, MX, BZ, GT, HN, SV, NI, CR, PA, CU, PR, JM, BR, CO, EC, KR, TW, TH, PH, JP
Order no. **350362**
GB, IE, MY, SG, UA, HK
Order no. **350363**
AU, NZ, CN, AR
Order no. **350364**
CH
Order no. **350366**
ZA, IN, PT, SG, AE, HK, (GB)
Order no. **350367**

Recommended Accessories
Actuators, Sensors

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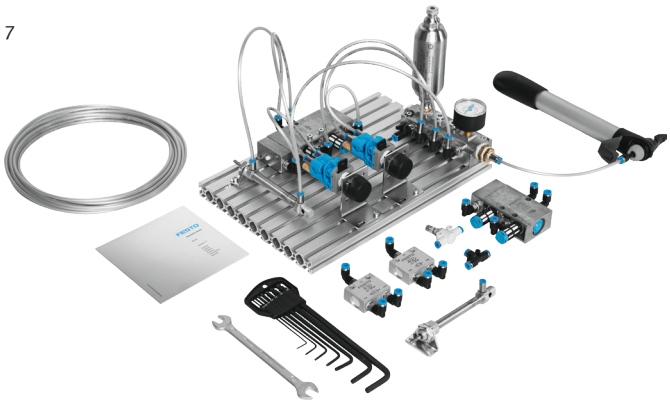
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7



1 Double-Acting Cylinder to Complement MecLab

Double-acting cylinder, Ø 10 mm, stroke 50 mm, complete with one-way flow control valves, foot mounting and retaining screws.

Order no.	**556248**

2 Light Barrier MecLab

Fork light barrier, fork width 50 mm, complete with connecting cable and mounting material.

Order no.	**549791**

3 Fiber-Optic Sensor MecLab

Fiber-optic diffuse light sensor, complete with optical fibers, connecting cable and mounting material.

Order no.	**549792**

4 Inductive Sensor MecLab

Inductive sensor, cylindrical design with external thread M5, switching distance 0.6 mm, complete with connecting cable and mounting material.

Order no.	**549793**

5 Vacuum Grippers MecLab

Vacuum gripper kit for Handling station as replacement for mechanical gripper, complete with vacuum nozzle, suction pad Ø 20 mm and mounting material.

Order no.	**549796**

6 Electrical Signal Input/Output MecLab

Electrical input and output elements for MecLab.

– 1x electric button (normally open and normally closed)
– 1x electrical control switch
– 1x indicator light LED

Complete with mounting hardware and connecting cable.

Order no.	**556249**

7 Modular System P-Starter

Beginner's set for the introduction to pneumatics, automation and logic for technology teaching in general education schools.

Scope of delivery:
– 1x double-acting cylinder
– 1x single-acting cylinder
– 1x 5/2-way valve, monostable, pneumatically actuated
– 1x 5/2-way valve, bistable, pneumatically actuated
– 2x 3/2-way pushbutton valve
– 1x And valve
– 1x Or valve
– 1x flow control valve
– 1x aluminum profile plate, one-piece
– Mounting material for cylinders and valves
– Tube
– Tool kit
– Plastic storage tray
– Detailed documentation on CD (de/en/es/fr): Collection of exercises with more than 18 exercises and solutions as well as didactic notes for use in the classroom; accompanying material with numerous colored illustrations, diagrams of principles, photos and sectional views; safety instructions; copyright included.

Order no.	**8022999**

More accessories (valves, cables...) and spare parts are available on our website.

Recommended Accessories
Station Extensions

1 **Pneumatic Stamping Unit MecLab**

Press-fit unit for attaching to the stacking magazine station or conveyor, comprising single-acting cylinder with 25 mm stoke and 10 mm diameter, complete with one-way flow control valve, mounting bracket and mounting screws.

Order no. **549805**

2 **Slide MecLab**

Slide for transporting or storing workpieces, 40 mm in diameter, for maximum 3 workpieces, mounting surface for sensors and actuators Complete with mounting accessories.

Order no. **549797**

3 **Tray, Low MecLab**

Support plate for retaining workpieces with 40 mm diameter and 39 mm height. Complete with fixing material.

Order no. **549798**

4 **Tray, High MecLab**

Holding tray for retaining workpieces 40 mm in diameter and 62 mm in height. Complete with mounting accessories.

Order no. **549799**

5 **Stopper and Deflector MecLab**

Lifting magnet for mounting on both sides of the conveyor belt, function deflector or stopper, complete with connecting cable and mounting material.

Order no. **549795**

6 **Workpieces set MecLab**

Workpiece set consisting of 6 plastic cans in silver, red and black (2 of each), diameter 40 mm, height 25 mm, and 6 lids.

Order no. **549800**

7 **Profile Plate MecLab**

Profile plate with dimensions 200 x 300 mm, 20 mm thick, groove spacing 20 mm. Complete with self-adhesive rubber feet.

Order no. **556246**

8 **Mounting Kit MecLab**

Mechanical construction parts for the expansion of MecLab. Composition of aluminum profiles 20 mm x 20 mm in lengths 120 mm and 180 mm. Complete with fixing material.

Order no. **556247**

9 **Connector Two MecLab Profile Plates**

Connector for two aluminum slotted assembly boards with 20 mm grid dimension. Complete with mounting screws.

Order no. **549802**

10 **Extension Kit MecLab**

Range of components for realizing your own project ideas. All in a practical Systainer.
– 2x double-acting cylinders with one-way flow control valves
– 2x solenoid valves
– 1x diffuse sensor
– 2x magnetic limit switches
– 1x profile kit
– 1x profile plate
– 1x electrical button
– 1x electrical switch
– 1x indicator light

Order no. **556245**

11 **Dolly Truck for Systainer MecLab**

Rolling board for transporting T-LOC Systainers sizes I to V. Four guide rollers, two of which have parking brakes.

Order no. **8143501**

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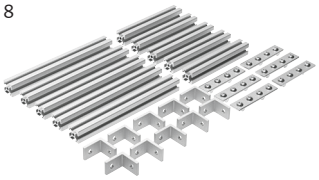
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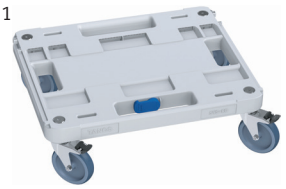
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