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UniTrain

UniTrain is a multimedia e-learning system with integrated, mobile electronics lab for general education and advanced training in electrical engineering and electronics.

UniTrain courses



UniTrain courses

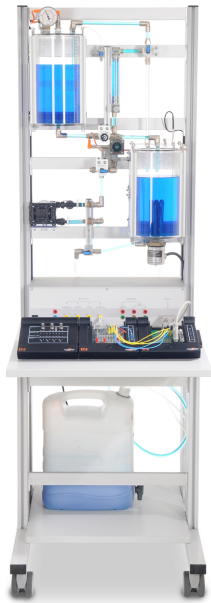
UniTrain industrial process automation courses



UniTrain industrial process automation courses

From closed-loop control of individual systems to flexible automation of entire processes, the various courses convey the fundamental, the principles and the properties of components used in automated processing and production plant with the aid of animations and numerous experiments involving authentic equipment. Multiple experiments cover investigation of controlled systems, determination of step responses and optimisation of control loops. Training also covers the use of useful aids such as Bode and Nyquist plots in authentic experiments.

IPA 1 compact station



IPA 1 compact station

Professional automatic control of pressure, temperature, level and flow-rates

The compact station with 4 integrated controlled systems is the optimum solution for typical production processes in the most varied of industries. The system's modularity permits various configurations to be implemented in the safety of the laboratory environment.

Training content:

- Design, wiring and commissioning of a process engineering plant
- Selection, deployment and connection of different sensors
- Measurement of electrical and process-control variables like liquid level, flow-rate, pressure and temperature
- Deployment and connection of transducers
- Design, assembly and commissioning of control loops
- Analysis of controlled systems and control loops
- Putting continuous and discontinuous controllers into operation
- Setting parameters and optimising P-action, PI-action and PID-action controllers
- Design of open-loop and closed-loop programmes
- Operating and monitoring processes
- Inspection, maintenance and repair
- Networking process engineering systems

List of articles:

Pos.	Product name	Bestell-Nr.	Anz.
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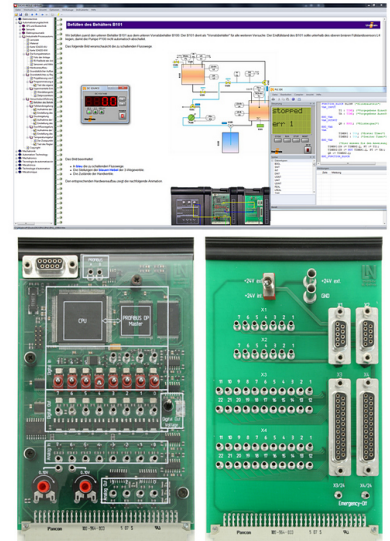
1	Course - Process technology: IPA 1 Compact station	CO4204-3E	1
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Includes:

- 1 Experiment card containing CPU with PLC functionality and PROFIBUS-DP master interface, 8 digital inputs with simulation switches and status LED, 8 digital outputs with status LED connected via 2mm socket, 8 analog inputs with 10-bit resolution, 4 analog outputs, potentiometer for simulating analog inputs, selectable levels for digital signals 5/24V DC, level for analog signals 0-10V, external PROFIBUS devices may also be connected
- IMS system connection card
- Labsoft browser and course software

Course content:

- Principle design of analog sensors
- Principles of closed-loop controls
- Programming your own controller
- Experiment-based determination of PID controller parameters
- Automatic liquid level control
- Automatic pressure control
- Automatic flow-rate control
- Automatic temperature control with two-point controller
- Course duration: approx. 8 h



2	IPA compact station	LM9550	1
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Professional automatic control of pressure, temperature, volumes and flow-rates.

The compact station with 4 integrated controlled systems is the optimum solution for typical production processes in the most varied of industries. The system's modularity permits various configurations to be implemented in the safety of the laboratory environment.

IPA compact station consisting of:

- 2 tanks (each 7,5 ltr)
- pressure vessel
- Plug in Pipe System
- support frame
- supply tank

Dimensions:

- Width: 600 mm (23,62")
- Depth: 900 mm (35,43")
- Height: 1810 mm (71,26")



Sensors:

- 4 capacitive sensors
- Ultrasonic sensor
- Flow sensor
- Pressure sensor
- PT100 Temperature sensor
- Manometer -1 bar to 1,5 bar (-14 psi to 20 psi)

Actuators:

- Pump max. 3,4 l/min at 1,2 bar
- Heating 1000 W

Electrical:

- 3HU supply channel with transformer and control
- Integrated power supply 24 V DC
- Motor controller with digital and analog control
- IMS Connection DSUB 25

Your benefits

- P-, I-, D-, PI-, PID-, Two-step- and Cascade control
- Real hands-on practice thanks to the use of industrial components
- Typical process engineering sensors for temperature, liquid level, flow-rate and pressure
- Can be combined with any open-loop and closed-loop systems from industry and education
- Can be expanded using additional IPA stations: mixing, filling, corking and uncorking
- Can be integrated into IMS® (Industrial Mechatronic System)
- Activation of the individual controlled systems simply by adjusting the ball valves
- Flexible pipe tubing system permits fast changes to the flow scheme or integration of other components
- Cascade control option
- Pump control direct or speed-controlled
- Separate operation of the 4 controlled systems possible
- Manual operation without additional devices direct or via simulation switch

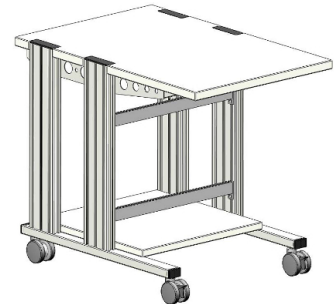
**3 Mechatronics aluminium profile carriage without table-top frame
600 mm x 900 mm (WxD)**

ST7200-3R

1

This enables the combination of mechatronics sub-systems with the training panel system.

- Sides made of aluminium profiles with grooves for attachment of a wide variety of add-on components (e.g. monitor holders, C-profile rails, safety and signalling equipment)
- 2 Natural brushed aluminium profile rails to accommodate DIN A4 experiment panels under the table top
- Inward-facing brush strips guarantee that training panels are protected and ensure that plug connections can be plugged in and out without any noise during experiments.
- Suitable for use as a support for 3 HU power supply ducts
- Aluminium profile with grooves for attachment of a wide variety of add-on components (e.g. PC holders, extension boards, C-profile rails)
- 4 Steerable double casters, 2 with brakes
- Table top 600x30x900 mm (WxHxD), base plate 525x30x525 mm made of highly compressed multi-layer chipboard conforming to DIN EN 438-1, colour light grey, with 0.8-mm slightly textured veneer (Resopal) conforming to DIN 16926
- Frame with solid, impact-resistant protective edging made of 3-mm thick plastic, coloured grey RAL 7047 throughout
- Coatings and glue are PVC-free
- Attached 5-way socket strip with switch
- Height of table top 760 mm
- Supplied as a kit for self-assembly



Additionally required:

Pos.	Product name	Bestell-Nr.	Anz.
4	25-pin serial interface cable, Sub-D plug/socket	LM9061	1

25 pin Sub-D connection cable

- Length: 2 m
- Connection: 25-pin plug / 25-pin socket
- Pin assignment: 1:1



IPA 2 mixing station



IPA 2 mixing station

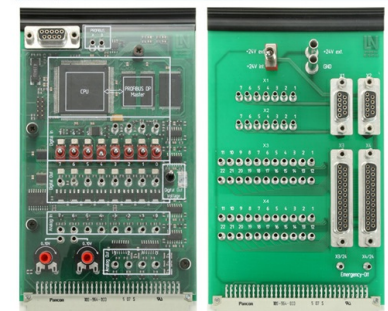
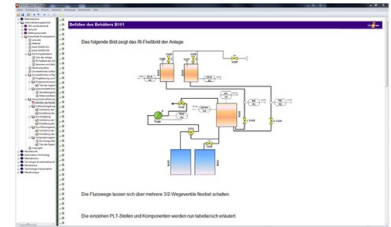
The IPA mixing station allows a precise mixing of pre-defined formulations. It is the optimum solution for typical production processes in the most varied of industries. The system's modularity permits diverse configurations to be implemented in a safe laboratory environment.

Training content:

- Setup, wiring and start-up of a process plant
- Selection, application and connection of various sensors
- Measurement of electrical and process variables such as filling level and flow rate
- Formulation control
- Use and connection of measurement transducers
- Setup and operation of control loops
- Analysis of controlled systems and control loops
- Operation of continuous and discontinuous controllers
- Parameterization and optimization of P-, PI- and PID controllers
- Design of open-loop and closed-loop control programs
- Process handling and monitoring
- Inspection, maintenance and repair
- Networking of process plants

List of articles:

Pos.	Product name	Bestell-Nr.	Anz.
5	<p>Course - Process technology: IPA 2 Mixing station</p> <p><u>Delivery includes:</u></p> <p>Experiment board with:</p> <ul style="list-style-type: none"> • PLC-card • IMS system connection card • Labsoft browser and course software <p><u>Training content:</u></p> <ul style="list-style-type: none"> • Piping and instrumentation (P & I) diagram • Sensors and actuators for system • Filling level determination • Mixing function • Pumping out function • Cleaning function • Paint reservoir filling function • Course duration: 4.5 h approx. 	SO4204-3F	1
6	<p>IPA mixing station</p>	LM9551	1



Mixing formulations:

The IPA mixing station allows a precise mixing of pre-defined formulations of two differently coloured liquids. A control system permits accurate dosage and mixing of the components. The finished liquid can be conveyed to a further station. The system's modularity permits diverse configurations to be implemented in a safe laboratory environment.

The mixing station consists of:

- 2 tanks
- 1 reactor vessel
- Plug-in pipe system
- Support frame
- Supply tank
- Sump
- Sensors:
- Capacitive sensors
- Flow sensors
- Filling level sensor with 0...10V analog output

Dimensions:

- Width: 600 mm (23,62")
- Depth: 900 mm (35,43")
- Height: 1810 mm (71,26")

Actuators:

- Pump with safety pressure switch
- 3/2-way process valves
- 2/2-way process valves
- 3/2-way solenoid valve
- Compressed-air maintenance unit with pressure reducer and manometer

Electrical system:



- 3HU supply channel with transformer and controller
- Integrated power supply 24 VDC
- Motor controller with digital and analog control
- IMS connection DSUB 25

Your benefits:

- Hands-on practice thanks to a use of industrial components
- Process engineering sensors for filling level and flow rate
- Can be combined with any open-loop or closed-loop system from industry and vocational education
- Can be expanded using additional IPA stations:
Compact station, filling, corking and uncorking
- Can be integrated into IMS® (Industrial Mechatronic System)
- A flexible plug-in system permits quick adaptation to flow schemes and integration of other components
- Pump control (direct or speed-dependent)
- Manual operation without additional devices, directly via a simulation switch

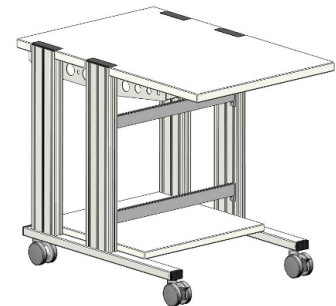
**7 Mechatronics aluminium profile carriage without table-top frame
600 mm x 900 mm (WxD)**

ST7200-3R

1

This enables the combination of mechatronics sub-systems with the training panel system.

- Sides made of aluminium profiles with grooves for attachment of a wide variety of add-on components (e.g. monitor holders, C-profile rails, safety and signalling equipment)
- 2 Natural brushed aluminium profile rails to accommodate DIN A4 experiment panels under the table top
- Inward-facing brush strips guarantee that training panels are protected and ensure that plug connections can be plugged in and out without any noise during experiments.
- Suitable for use as a support for 3 HU power supply ducts
- Aluminium profile with grooves for attachment of a wide variety of add-on components (e.g. PC holders, extension boards, C-profile rails)
- 4 Steerable double casters, 2 with brakes
- Table top 600x30x900 mm (WxHxD), base plate 525x30x525 mm made of highly compressed multi-layer chipboard conforming to DIN EN 438-1, colour light grey, with 0.8-mm slightly textured veneer (Resopal) conforming to DIN 16926
- Frame with solid, impact-resistant protective edging made of 3-mm thick plastic, coloured grey RAL 7047 throughout
- Coatings and glue are PVC-free
- Attached 5-way socket strip with switch
- Height of table top 760 mm
- Supplied as a kit for self-assembly



Additionally required:

Pos.	Product name	Bestell-Nr.	Anz.
8	25-pin serial interface cable, Sub-D plug/socket	LM9061	1

25 pin Sub-D connection cable

- Length: 2 m
- Connection: 25-pin plug / 25-pin socket
- Pin assignment: 1:1



Additionally recommended:

In areas where there are high levels of humidity the membrane dryer with water trap should be used to avoid condensation:

Pos.	Product name	Bestell-Nr.	Anz.
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9 Compressor, low-noise

SE2902-9L

1

Extremely quiet compressed air system with compressor motor, thermo switch and automatic pressure switch. Tanks made of special steel with security valve and non-return valve, master pressure gauge, condensation drain, stop valve and maintenance unit

- Motor output: 0.34 k W
- Suction capacity: 50 l / min
- Power consumption at 8 bars: 2.9 A
- Pressure: 8 bars
- Tank capacity: 15 l.
- Noise level: 40 d B (A) / 1 m
- Operating voltage: 230 V AC
- incl. tube and connection set
- Dimensions: 500x410x410 mm (HxWxL)
- Weight: 19 kg



10 Tubing and accessory set for mechatronics systems

LM9670

1

Universal tubing and accessory set with the required components and adapters for connecting a compressor to mechatronic systems.

- 1 x Compressor connector with plug-in sleeve 8 mm
- 1 x Plug adapter 6 mm / 8 mm
- 1 x Plug adapter 4 mm / 6 mm
- 2 x Angle connectors 4 mm
- 5 x T-connectors 4 mm
- 5 x T-connectors 6 mm
- 5 x T-connectors with 6 mm / 4 mm adapters
- 20 m polyurethane tubing, 4 mm
- 10 m polyurethane tubing, 6 mm
- 10 Stoppers for plug connectors 4 mm
- 1 x 3/2 directional control valve, manual, 5 mm



11 **IDG3 membrane dryer with rapid coupling and filter AF20 with water trap**

LM9671

1

Membrane dryer, a reliable, effective and cost-efficient alternative for compressed air drying.

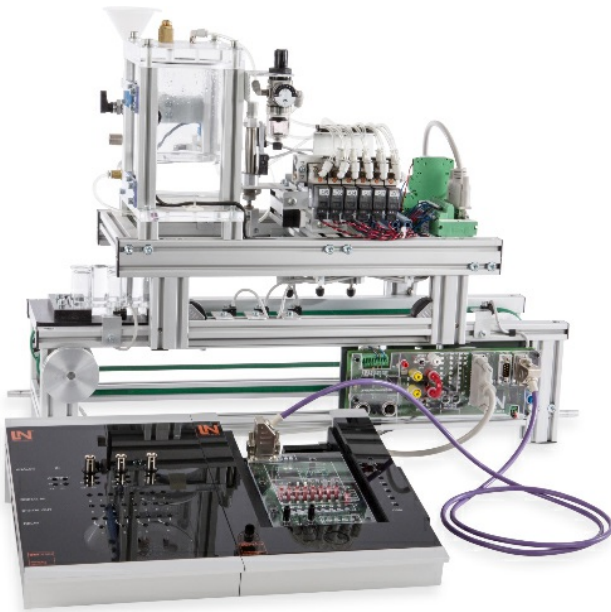
- Compact and light
- No power supply required
- Built-in noise suppressor reduces noise development from venting air
- Non-heating and vibration-free



Air filter, high-quality filter water trap

- Double-sided internal thread 1/4"
- Semi-automatic drainage
- High-quality 50 Micro filtering
- Supplies clean compressed air
- Replaceable filter element
- Compact design

IPA 3 filling station



IPA 3 filling station

Enabling a filling of bottle groups in defined doses, this station is the optimum solution for typical production processes in the most varied of industries. The system's modularity permits various configurations to be implemented in a safe laboratory environment.

Training content:

- Setup, wiring and start-up of a process plant
- Selection, application and connection of various sensors
- Measurement of electrical and process variables such as filling level
- Use and connection of measurement transducers
- Design of open-loop and closed-loop control programs
- Process handling and monitoring
- Inspection, maintenance and repair
- Networking of process plants

List of articles:

Pos.	Product name	Bestell-Nr.	Anz.
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12	Course - Process technology: IPA 3 Filling station	SO4204-3G	1
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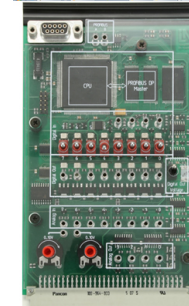
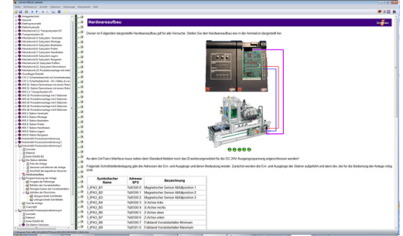
Delivery includes:

Experiment board with:

- PLC-card
- IMS system connection card
- Labsoft browser and course software

Training content:

- Fundamentals of sensors and actuators
- Filling reservoir
- Cleaning/emptying of reservoir
- Filling bottles
- Course duration: 4.5 h approx.



13	IPA filling station	LM9552	1
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Bottle filling:

The IPA filling station is mounted on a conveyor belt and allows an accurate filling of bottles. Six bottles placed on a carrier are positioned below the filling station. The bottles are filled with a coloured liquid to a defined level. Once all bottles have been filled, the carrier is transported to the next station.

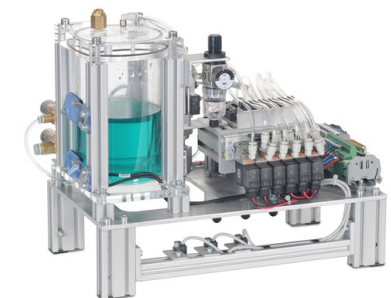
The filling station consists of:

- 1 liquid tank
- Dosage unit for small quantities from 4...10 ml
- Supply tank
- Double-suction unit

Sensors:

- Capacitive sensors
- Flow sensors
- Magnetic sensors

Actuators:



- Positioning cylinder for X-axis
- Dosage cylinder
- Stop cylinder
- Motors
- Dosage pump
- 2/2-way process valves
- 3/2-way solenoid valve
- 4/2-way solenoid valve
- Compressed-air maintenance unit with pressure reducer and manometer
- Exhaust-air throttle valves

Electrical system:

- IMS connection DSUB 25

Your benefits:

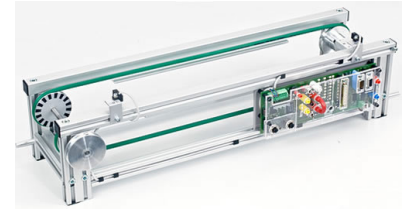
- Hands-on practice thanks to a use of industrial components
- Can be combined with any open-loop or closed-loop system from industry and education
- Can be expanded using additional IPA stations:
Compact station, mixing, corking and uncorking
- Can be integrated into IMS® (Industrial Mechatronic System)
- Control along all three axes
- Modular design for quick and easy assembly
- Immediate application, thanks to hardly any need for wiring

14 Double conveyor belt segment, 24 V motor

LM9606

1

Basic mechatronics module driven by a variable speed 24-V geared motor and complete with end-limit sensors and integrated PROFIBUS DP slave. Designed for basic experiments on a conveyor system or for incorporation into a complex mechatronics system for controlling the flow of materials. The conveyor belt conveys work pieces on carriers and can be used to link individual sub-systems. It is designed for connection to a PLC control system. It can be combined with other conveyor belts, 'curve' units or transfer junctions. IMS stations can be connected directly to the belt and jointly controlled via PROFIBUS.



- Length = 600 mm/23,6", width = 160 mm/6,3",
- belt width = 120 mm/4,7"
- Geared motor, 24 V DC
- Pulse width modulation system for controlling belt at various speeds
- Continuous speed adjustment via potentiometer or analogue input, 0-10 V
- Manual switches for movement to left or right
- 2 inductive end-limit sensors
- 2 x M12 interfaces for additional actuators/sensors
- Sockets for emergency shut-off circuit (disconnection of all voltage to output modules)
- External power supply via 4-mm safety sockets or co-axial power connector
- 9-pin SUB-D connector for contactors, LOGO! or PLC
- Incremental encoder disc for detecting position and speed via optical sensors
- Visualisation as interactive 3D model in IMS-virtual database
- Control requirements: 4 x digital inputs, 3 x digital outputs

PROFIBUS DP slave module:

- Address range: 16 digital input/outputs
- PROFIBUS DP connector: 9-pin DSUB socket
- Rotary switch for setting address
- Transmission rates of up to 6 Mbits/s
- GSD file for use with control software (e.g.: STEP7)
- 25-pin DSUB socket for connecting IMS station
- Output current: 500 mA (total current: 1 A)
- Variable speed control of conveyor belt via PROFIBUS

15 IMS capacitive sensor for conveyor belt, incl. mounting

LM9678

2

Capacitive sensor for detecting whether a workpiece is present on the workpiece carrier. The holder permits fast and simple attachment to the IMS conveyor belt. The sensor's connection line is equipped with an M12 connector to connect the sensor directly to the IMS system.



16 **Workpiece transport pallet**

LM9520

1

Pallets for carrying and transporting workpieces on conveyor belts. The pallet has a 4-bit identification code.

- Length = 180 mm/7,1", width = 119 mm/4,7",
- height = 15 mm/0,6"
- Position sensor
- 4-bit identification code



17 **Sixpack for IPA**

LM9560

2

"Six-pack" crate made of polished transparent acrylic to accommodate up to six bottles.

The six-pack is suitable for use with the IMS workpiece carriers

Includes 7 bottles with bottle tops.

Dimensions: 50 x 100 mm²



18 **IPA container for transport pallet**

LM9561

1

Container made of polished transparent acrylic, for emptying the tank from the filling station.

The palette container is the perfect fit to the IMS work piece carrier.

Capacity approx. 190ml

Dimensions: internal diameter 70mm, height 50mm



Additionally required:

Pos.	Product name	Bestell-Nr.	Anz.
19	25-pin serial interface cable, Sub-D plug/socket	LM9061	1

25 pin Sub-D connection cable

- Length: 2 m
- Connection: 25-pin plug / 25-pin socket
- Pin assignment: 1:1



Additionally recommended:

In areas where there are high levels of humidity the membrane dryer with water trap should be used to avoid condensation:

Pos.	Product name	Bestell-Nr.	Anz.
20	Compressor, low-noise	SE2902-9L	1

Extremely quiet compressed air system with compressor motor, thermo switch and automatic pressure switch. Tanks made of special steel with security valve and non-return valve, master pressure gauge, condensation drain, stop valve and maintenance unit

- Motor output: 0.34 k W
- Suction capacity: 50 l / min
- Power consumption at 8 bars: 2.9 A
- Pressure: 8 bars
- Tank capacity: 15 l.
- Noise level: 40 d B (A) / 1 m
- Operating voltage: 230 V AC
- incl. tube and connection set
- Dimensions: 500x410x410 mm (HxWxL)
- Weight: 19 kg



21 Tubing and accessory set for mechatronics systems

LM9670

1

Universal tubing and accessory set with the required components and adapters for connecting a compressor to mechatronic systems.

- 1 x Compressor connector with plug-in sleeve 8 mm
- 1 x Plug adapter 6 mm / 8 mm
- 1 x Plug adapter 4 mm / 6 mm
- 2 x Angle connectors 4 mm
- 5 x T-connectors 4 mm
- 5 x T-connectors 6 mm
- 5 x T-connectors with 6 mm / 4 mm adapters
- 20 m polyurethane tubing, 4 mm
- 10 m polyurethane tubing, 6 mm
- 10 Stoppers for plug connectors 4 mm
- 1 x 3/2 directional control valve, manual, 5 mm



22 IDG3 membrane dryer with rapid coupling and filter AF20 with water trap

LM9671

1

Membrane dryer, a reliable, effective and cost-efficient alternative for compressed air drying.

- Compact and light
- No power supply required
- Built-in noise suppressor reduces noise development from venting air
- Non-heating and vibration-free



Air filter, high-quality filter water trap

- Double-sided internal thread 1/4"
- Semi-automatic drainage
- High-quality 50 Micro filtering
- Supplies clean compressed air
- Replaceable filter element
- Compact design

IMS furniture

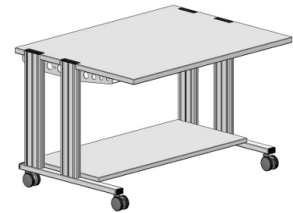
IMS furniture

The IMS furniture system is used together with the Industrial Mechatronics System. The mobile trolleys can be used for individual components or sub-systems. In order to build complex, mechatronics systems, the trolleys can be lined up alongside one another and can be supplemented by frames to accommodate training panels. A power console allows the trolley to be equipped with a wide variety of 3 HU modules. The trolleys can be extended by means of various add-ons attachable to the aluminium rails to make up a multi-function PC experiment trolley.

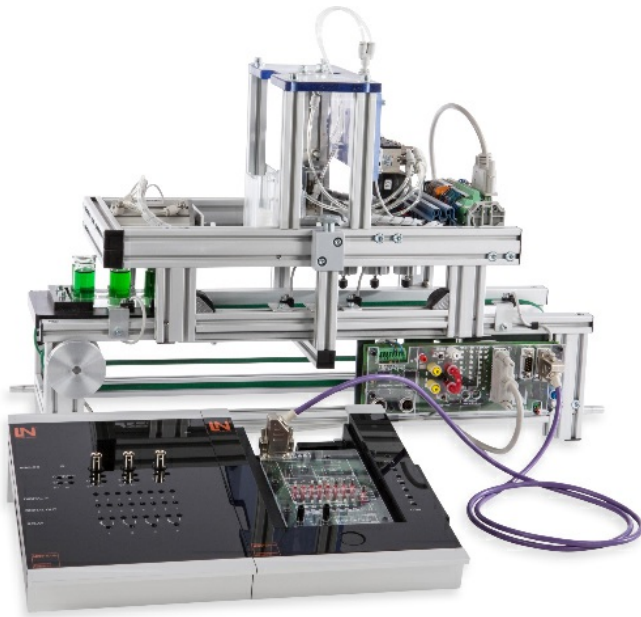
Pos.	Product name	Bestell-Nr.	Anz.
23	SybaPro mobile IMS experiment trolley, 1200mm	ST7200-3U	1

These mobile, mechatronics trolleys with aluminium rails that can be lined up alongside one another are specially designed to accommodate mechatronics set-ups with production lines or pallet rotation systems. The trolleys can be cascaded and are equipped with strong table-top connectors for this purpose.

- The mobile experiment stand is delivered in kit form and needs to be assembled by the customer
- Aluminium rail with integrated grooves to accommodate a wide variety of add-on components (e.g. PC shelf, extension panels, C rails)
- 4 swivelling dual casters, including 2 with brakes
- Work top 1200 x 30 x 900 mm (WxHxD)
- Base board 1125 x 30 x 525 mm (WxHxD) e.g. to accommodate compressors or hydraulic equipment
- Boards with highly compressed multi-layer chipboard conforming to DIN EN 438-1, colour light grey, with 0.8-mm slightly textured veneer (Resopal) conforming to DIN 16926
- Work top frame with impact resistant protective edging made of 3 mm thick coloured plastic, colour RAL 7047
- Coating and adhesives are PVC-free
- 5-way socket strip with switch attached underneath
- Height of worktop 760 mm



IPA 4 corking station



IPA 4 corking station

Enabling a water-tight sealing of bottle groups, this station is the optimum solution for typical production processes in the most varied of industries. The system's modularity permits various configurations to be implemented in a safe laboratory environment.

Training content:

- Setup, wiring and start-up of a process plant
- Selection, application and connection of various sensors
- Use and connection of measurement transducers
- Design of open-loop and closed-loop control programs
- Process handling and monitoring
- Inspection, maintenance and repair
- Networking of process plants

List of articles:

Pos.	Product name	Bestell-Nr.	Anz.
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24	Course - Process technology: IPA 4 Corking station	SO4204-3H	1
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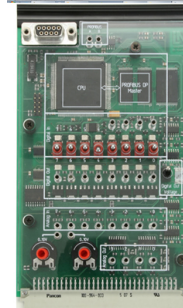
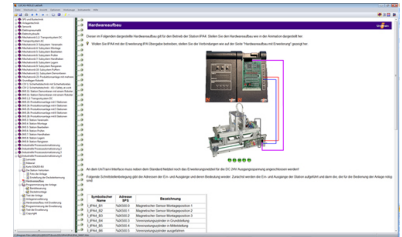
Delivery includes:

Experiment board with:

- PLC-card
- IMS system connection card
- Labsoft browser and course software

Training content:

- Course duration: approx. 4.5 h



25	IPA corking station	LM9553	1
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Bottle corking:

The IPA corking station is mounted on a conveyor belt and allows a water-tight corking of bottles by means of plastic caps. Six bottles filled with coloured liquid and placed on a carrier are positioned below the filling station. The bottles are then sealed by means of a pressing cylinder. Once all bottles have been corked, the carrier is transported to the next station.

The corking station consists of:

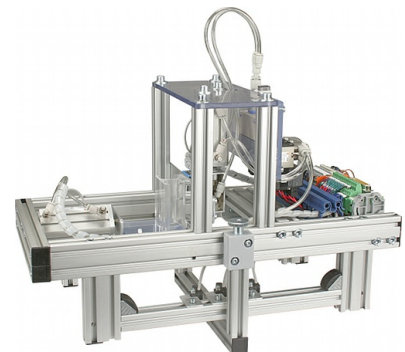
- 1 magazine for bottle caps
- 1 pressing cylinder
- 1 separating cylinder
- 3 stop cylinders

Sensors:

- Capacitive sensor for filling-level monitoring
- Micro-switch for filling-level monitoring
- Magnetic limit sensors
- Optical sensors

Actuators:

- Stop-cylinder, dual action
- Pressing cylinder, twist-proof with dual action



- Separating cylinder, twist-proof with dual action
- 3/2-way solenoid valve
- 4/2-way solenoid valve
- Exhaust-air throttle valves

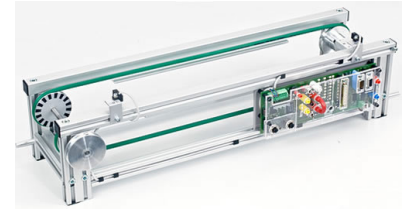
Electrical system:

- IMS connection DSUB 25

Your benefits:

- Hands-on practice thanks to a use of industrial components
- Can be combined with any open-loop or closed-loop system from industry and education
- Can be expanded using additional IPA stations:
Compact station, mixing, filling and uncorking
- Can be integrated into IMS® (Industrial Mechatronic System)
- Demonstration of process flows
- Modular design for quick and easy assembly
- Immediate application, thanks to hardly any need for wiring

Basic mechatronics module driven by a variable speed 24-V geared motor and complete with end-limit sensors and integrated PROFIBUS DP slave. Designed for basic experiments on a conveyor system or for incorporation into a complex mechatronics system for controlling the flow of materials. The conveyor belt conveys work pieces on carriers and can be used to link individual sub-systems. It is designed for connection to a PLC control system. It can be combined with other conveyor belts, 'curve' units or transfer junctions. IMS stations can be connected directly to the belt and jointly controlled via PROFIBUS.



- Length = 600 mm/23,6", width = 160 mm/6,3",
- belt width = 120 mm/4,7"
- Geared motor, 24 V DC
- Pulse width modulation system for controlling belt at various speeds
- Continuous speed adjustment via potentiometer or analogue input, 0-10 V
- Manual switches for movement to left or right
- 2 inductive end-limit sensors
- 2 x M12 interfaces for additional actuators/sensors
- Sockets for emergency shut-off circuit (disconnection of all voltage to output modules)
- External power supply via 4-mm safety sockets or co-axial power connector
- 9-pin SUB-D connector for contactors, LOGO! or PLC
- Incremental encoder disc for detecting position and speed via optical sensors
- Visualisation as interactive 3D model in IMS-virtual database
- Control requirements: 4 x digital inputs, 3 x digital outputs

PROFIBUS DP slave module:

- Address range: 16 digital input/outputs
- PROFIBUS DP connector: 9-pin DSUB socket
- Rotary switch for setting address
- Transmission rates of up to 6 Mbits/s
- GSD file for use with control software (e.g.: STEP7)
- 25-pin DSUB socket for connecting IMS station
- Output current: 500 mA (total current: 1 A)
- Variable speed control of conveyor belt via PROFIBUS

27 **Workpiece transport pallet**

LM9520

1

Pallets for carrying and transporting workpieces on conveyor belts. The pallet has a 4-bit identification code.

- Length = 180 mm/7,1", width = 119 mm/4,7",
- height = 15 mm/0,6"
- Position sensor
- 4-bit identification code



28 **Sixpack for IPA**

LM9560

1

"Six-pack" crate made of polished transparent acrylic to accommodate up to six bottles.

The six-pack is suitable for use with the IMS workpiece carriers

Includes 7 bottles with bottle tops.

Dimensions: 50 x 100 mm²



Additionally required:

Pos.	Product name	Bestell-Nr.	Anz.
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29 **25-pin serial interface cable, Sub-D plug/socket**

LM9061

1

25 pin Sub-D connection cable

- Length: 2 m
- Connection: 25-pin plug / 25-pin socket
- Pin assignment: 1:1



Additionally recommended:

In areas where there are high levels of humidity the membrane dryer with water trap should be used to avoid condensation:

Pos.	Product name	Bestell-Nr.	Anz.
30	Compressor, low-noise	SE2902-9L	1

Extremely quiet compressed air system with compressor motor, thermo switch and automatic pressure switch. Tanks made of special steel with security valve and non-return valve, master pressure gauge, condensation drain, stop valve and maintenance unit

- Motor output: 0.34 k W
- Suction capacity: 50 l / min
- Power consumption at 8 bars: 2.9 A
- Pressure: 8 bars
- Tank capacity: 15 l.
- Noise level: 40 d B (A) / 1 m
- Operating voltage: 230 V AC
- incl. tube and connection set
- Dimensions: 500x410x410 mm (HxWxL)
- Weight: 19 kg



31	Tubing and accessory set for mechatronics systems	LM9670	1
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Universal tubing and accessory set with the required components and adapters for connecting a compressor to mechatronic systems.

- 1 x Compressor connector with plug-in sleeve 8 mm
- 1 x Plug adapter 6 mm / 8 mm
- 1 x Plug adapter 4 mm / 6 mm
- 2 x Angle connectors 4 mm
- 5 x T-connectors 4 mm
- 5 x T-connectors 6 mm
- 5 x T-connectors with 6 mm / 4 mm adapters
- 20 m polyurethane tubing, 4 mm
- 10 m polyurethane tubing, 6 mm
- 10 Stoppers for plug connectors 4 mm
- 1 x 3/2 directional control valve, manual, 5 mm



32 **IDG3 membrane dryer with rapid coupling and filter AF20 with water trap**

LM9671

1

Membrane dryer, a reliable, effective and cost-efficient alternative for compressed air drying.

- Compact and light
- No power supply required
- Built-in noise suppressor reduces noise development from venting air
- Non-heating and vibration-free



Air filter, high-quality filter water trap

- Double-sided internal thread 1/4"
- Semi-automatic drainage
- High-quality 50 Micro filtering
- Supplies clean compressed air
- Replaceable filter element
- Compact design

IMS furniture

IMS furniture

The IMS furniture system is used together with the Industrial Mechatronics System. The mobile trolleys can be used for individual components or sub-systems. In order to build complex, mechatronics systems, the trolleys can be lined up alongside one another and can be supplemented by frames to accommodate training panels. A power console allows the trolley to be equipped with a wide variety of 3 HU modules. The trolleys can be extended by means of various add-ons attachable to the aluminium rails to make up a multi-function PC experiment trolley.

Pos.	Product name	Bestell-Nr.	Anz.
33	SybaPro mobile IMS experiment trolley, 1200mm	ST7200-3U	1

These mobile, mechatronics trolleys with aluminium rails that can be lined up alongside one another are specially designed to accommodate mechatronics set-ups with production lines or pallet rotation systems. The trolleys can be cascaded and are equipped with strong table-top connectors for this purpose.

- The mobile experiment stand is delivered in kit form and needs to be assembled by the customer
- Aluminium rail with integrated grooves to accommodate a wide variety of add-on components (e.g. PC shelf, extension panels, C rails)
- 4 swivelling dual casters, including 2 with brakes
- Work top 1200 x 30 x 900 mm (WxHxD)
- Base board 1125 x 30 x 525 mm (WxHxD) e.g. to accommodate compressors or hydraulic equipment
- Boards with highly compressed multi-layer chipboard conforming to DIN EN 438-1, colour light grey, with 0.8-mm slightly textured veneer (Resopal) conforming to DIN 16926
- Work top frame with impact resistant protective edging made of 3 mm thick coloured plastic, colour RAL 7047
- Coating and adhesives are PVC-free
- 5-way socket strip with switch attached underneath
- Height of worktop 760 mm

