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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 mechatronic courses



UniTrain mechatronic courses

UniTrain multimedia courses on the topic of mechatronics provide the knowledge and skills required to understand, control, operate and maintain modern, automated mechatronics installations. With the aid of animations and numerous experiments, the various individual sub-systems are introduced, any necessary instrumentation or pneumatic cylinders are set up and adjusted and the active processes are explained. Individual mechatronic components and sub-systems are set up with the aid of detailed step-by-step instructions and automated sequences are programmed to control the equipment by means of a programmable logic controller. This should make moving up to an industrial PLC system a simple task.

IMS 1.3: AC transport system



IMS 1.3: AC transport system

The conveyor belt system is the element that connects all of the subsystems and thus forms the backbone of the entire production line. In the IMS® production line the conveyor belt systems are self-contained modules, which can be integrated with the sub-systems as needed. Basic processes like “positioning” and “speed” can be demonstrated with just this simple system. The three-phase motor with a frequency converter allows the speed to be continuously modified.

Training objectives for AC transport system

- Making controlled movements on a single axis
- Generating ramps for the frequency converter
- Incremental positioning of a workpiece carrier
- Disabling movement forwards or backwards
- Program for monitoring slip and whether a machine is stopped
- Safe handling of various safety circuits and locks.

List of articles:

Pos.	Product name	Bestell-Nr.	Anz.
1	Course - Mechatronics 1.3: Transfer system with three-phase drive	SO4204-8L	1

Includes:

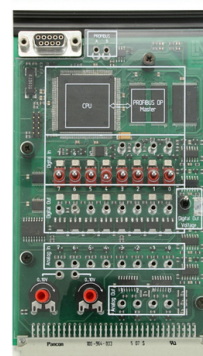
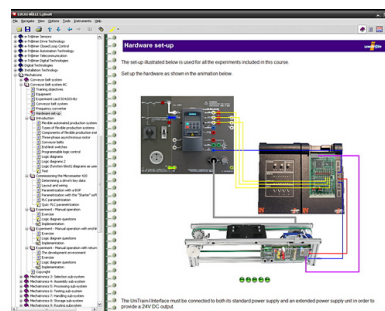
- 1 Experiment card featuring CPU with PLC functionality and PROFIBUS-DP master interface, 8 digital inputs (4 using 2-mm sockets) with simulation switches and status LEDs, 8 digital outputs with status LEDs using 2-mm sockets, 8 analog inputs with 10-bit resolution, 4 analog outputs, potentiometer for simulating analog inputs, selectable level for digital signals 5/24V DC, 0- 10V for analog signals, port for external PROFIBUS equipment
- Profibus cable 1,5m
- CD-ROM with Labsoft browser, programming and course software

Components additionally required to complete the course:

IMS1.3 AC transfer system (Conveyor belt)

Course contents:

- Assembly, configuration and testing of mechanical components
- Control of speed and direction using a frequency converter drive
- Automatic sequence control via programmable logic control
- Implementation of movement in manual mode
- Automatic transport of a pallet with a programmed delay
- Programming movement sequences using end-limit switches
- Slip monitoring
- Course duration: 5 h approx.



2 Double conveyor belt segment, 3x 230V

LM9607

1

Basic mechatronics module with 230V asynchronous geared motor, end-limit sensors and 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 workpieces 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"
- Asynchronous geared motor, 3 x 230 V AC
- 2 End-limit sensors
- 2 x M12 interfaces
- PLC interface: 9-pin SUB-D connector
- PLC requirements: 4 x digital inputs

Integrated PROFIBUS DP slave:

- Address range: 16 digital input/outputs
- PROFIBUS DP connector: 9-pin DSUB socket
- Rotary switch for setting address
- Transmission rates of up to 6 Mbit/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)

3 Workpiece transport pallet

LM9620

1

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

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



4 Frequency converter MM420, industrial type 0.75kW 1-phase incl. LCD operat. unit

CO3636-5F

1

New generation industrial converters, adapted for educational purposes, with microprocessor control and IGBT. Based on the Siemens MICROMASTER 420 and including the following special features:

- Control inputs and outputs with 4-mm safety sockets can be used for a variety of applications.
- Power outputs with 4-mm safety sockets as well as a 5-pole compact socket for connection to a conveyor belt.
- FCC control (flux-current control) for high quality drive response even under changing load
- Multi-point characteristic (variable V/f characteristic), V/f characteristic
- Integrated PI-action controller
- Various means of operation including operating panel or free software tool.
- Modular system of converter options
- Variable run-up and reversing times (0 to 650 s)
- Compound braking for controlled rapid braking
- 4 filter frequencies for protecting the machine from resonance
- Automatic restart
- Smooth connection to rotating motor leading to longer motor life
- Designed for use in IT networks
- Integrated circuit breaker/overload function
- Nominal power: 0.75 kW
- Input voltage: 200...240V, 47...63Hz
- Output voltage: 0...3x input voltage
- Output frequency: 0...650Hz
- Overload factor: 150% (60s)
- Dimensions: 297 x 228 x 130 mm (HxWxD)
- Weight: 3kg



5	Cable for connecting frequency converter to AC conveyor belt	LM9673	1
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For connection of a frequency converter to three-phase conveyor belt IMS1.3.

- Connector plug 3pin+earth 16A/400V
- Connector plug Han3A



Accessories:

Pos.	Product name	Bestell-Nr.	Anz.
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6	Adapter - connection cable, 4/2mm (100cm, white)	SO5126-6V	4
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Connection cable with one 2mm connector and one 4mm connector for connections between 2mm and 4mm laboratory connection systems.

- Connector typ: 2mm system / 4mm system
- cabel length: 100 cm
- color: white



7	Safety connecting plug 4mm with tap (2x), blue, 1000V/32A CAT II	SO5126-3V	1
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Moulded insulation

- both sides with touch protection (safety plug + safety sockets), distance 19mm
- transition resistance max. 6mΩ
- rated data: 1000V/32A CAT II
- colour blue



8 **Safety connecting plug 4mm with tap (2x), black, 1000V/32A CAT II** SO5126-3R

1

Moulded insulation

- both sides with touch protection (safety plug + safety sockets), distance 19mm
- transition resistance max. 6mΩ
- rated data: 1000V/32A CAT II
- colour black



9 **RS232/485 interface module for converter Micromaster**

LM8900

1

Add-on module for connection between PC and frequency converter

- Voltage-isolated RS232 interface with Sub-D plugs
- 3m standard cable
- Dimensions: 62.5 x 75 x 19mm (WxHxD)
- Weight: 0.3kg



10 **Serial interface cable 9/9 pole**

LM9040

2

9-pin SUB-D cable

- Length: 2m
- Connector: 9-pin plug/9-pin socket
- Pin assignment: 1:1



11 **Single-phase power supply with switch, circuit breaker and earth-contact socket**

CO3211-1A

1

Power supply 230 V/16 A

- Automatic circuit breaker 16 A
- Main switch
- Earth-contact socket
- Output: 4-mm safety sockets
- Dimensions: 297 x 228 x 155 mm. (HxWxD)
- Weight: 0.8 kg



12 **Safety connecting plug 4mm with tap (2x), blue, 1000V/32A CAT II**

SO5126-3V

1

Moulded insulation

- both sides with touch protection (safety plug + safety sockets), distance 19mm
- transition resistance max. 6mΩ
- rated data: 1000V/32A CAT II
- colour blue



13 **Safety connecting plug 4mm with tap (2x), green/yellow, 1000V/32A CAT II**

SO5126-3W

1

Moulded insulation

- both sides with touch protection (safety plug + safety sockets), distance 19mm
- transition resistance max. 6mΩ
- rated data: 1000V/32A CAT II
- colour green/yellow



14 **Safety measurement cable (4mm) , 25cm, white**

SO5126-8F

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Safety measurement lead with stackable, contact-proof 4mm plugs

- colour: white
- length: 25 cm
- cable cross-section 2,5 mm²
- ratings deliver: 600V CAT II, 32A



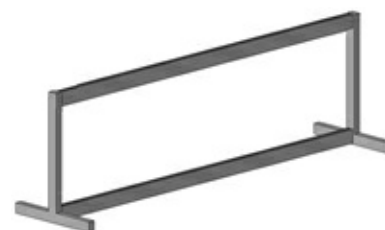
15 **Panel mounting frame for table, T-shaped base, 1 level**

ST8003-1V

1

Panel mounting frame with aluminium profile rails for mounting experiment panels of height matching DIN A4 (297mm). Die Aluminium profile rails with inward-facing brushes allow for rapid and quiet mounting of experiment panels without tools.

- Side pieces with T-shaped base under the bottom rail
- Side pieces made of rectangular steel tubing (30x20x2mm), powder coated grey surface (RAL 7047)
- 2 natural brushed aluminium profile rails with inward-facing brush rails
- Can be set up on laboratory benches with or without power supply ducts or on any other existing surface
- Dimensions WxH: 724 x 400 mm, 1 level



Optional Accessories:

Pos.	Product name	Bestell-Nr.	Anz.
16	PROFIBUS-DP interface module for converter Micromaster	LM8902	1



Additionally required:

Pos.	Product name	Bestell-Nr.	Anz.
17	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 kW
- Suction capacity: 50 l/min
- Power consumption at 8 bars: 2.9 A
- Pressure: 8 bars
- Tank capacity: 15 l.
- Noise level: 40 dB(A)/1m
- Operating voltage: 230V AC
- incl. tube and connection set
- Dimensions: 500x410x410 mm (HxWxL)
- Weight: 19 kg



18	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, 4mm
- 10 m polyurethane tubing, 6mm
- 10 Stoppers for plug connectors 4 mm
- 1 x 3/2 directional control valve, manual, 5 mm

