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Fundamentals of Automotive Technology Trainer



Fundamentals of Automotive Technology Trainer

Teaching fundamentals is always the vital cornerstone for solid and efficient education. Several training courses have been specifically developed for this topic area to teach trainees step by step the basic knowledge to be covered in detail at a later date. The courses are particularly suited for school education and require little or no previous knowledge.

Each multimedia course starts by imparting the theoretical foundations before solidifying that knowledge by means of practical measurements. The particular focus is on handling measuring instruments and the way that simple electric circuits operate.

UniTrain - Electronic and Electrical Trainer



UniTrain - Electronic and Electrical Trainer

Please choose your product:

Fundamentals of Automotive Electrics



Fundamentals of Automotive Electrics

This training system is your introduction to the fascinating world of electronics in vehicles. All the circuits are pre-fabricated and can be put into action simply by plugging in a few jumpers. Apart from the hardware for the experiments, the system also features an extensive multimedia course. In addition, special attention has been paid to using and handling measuring instruments in conjunction with customers' vehicles.

Version for European vehicles (IEC DIN/EN)



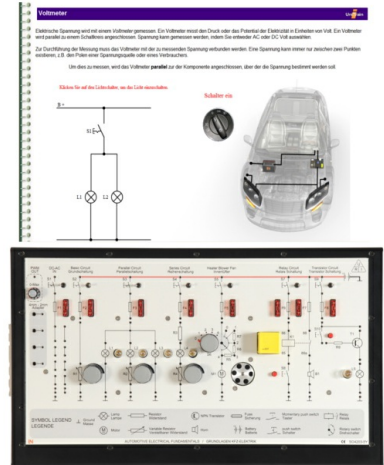
Version for European vehicles (IEC DIN/EN)

List of articles:

Pos.	Product name	Bestell-Nr.	Anz.
1	Course Automotive 18: Fundamentals of automotive electrics (Europe/South America/Africa)	SO4205-1G	1

Includes:

- Experiment board equipped with
 - set of lamps
 - set of resistors
 - transistor
 - relay
 - fuses
 - switches
 - motor
- CD-ROM with Labsoft browser and course software



Training Content

Electrical principles specifically explained for automotive applications

- Voltage DC, AC and PWM
- Resistance
- Current
- Ohms law
- Series and parallel and mixed circuits
- Understanding automotive circuits, wiring diagrams and electrical symbols

Automotive electrical component testing and diagnosis

- Fuses
- Relays
- Switches
- Transistors
- Potentiometers
- DC motors
- Light globes
- Power supplies

Automotive circuits

- Brake light circuit
- Instrument panel dimmer circuit
- Heater blower fan variable speed circuit
- Horn circuit

Use of typical automotive diagnostic tools found in the workshop

- Digital Multimeter
- Voltmeter
- Ohmmeter
- Ammeter
- Test light
- Oscilloscope

Diagnosing of common automotive circuit failures and components with built in automatic fault switching in the following areas

- Open circuits
- Short circuits
- Faulty components

Additionally required:

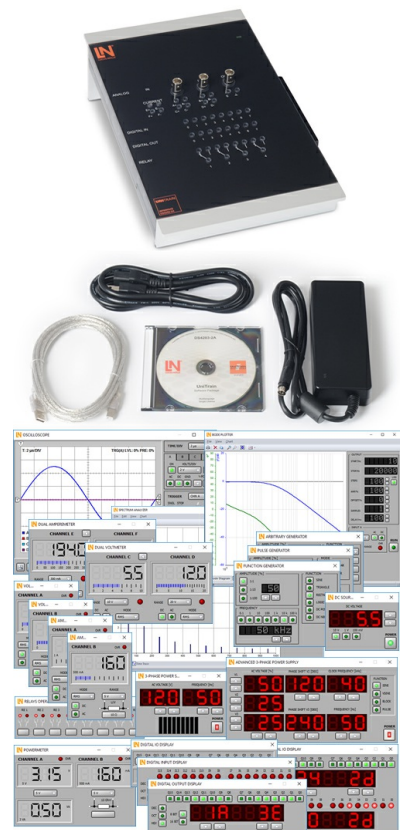
The UniTrain-I system is a computer-based training and experimentation system for vocational and further training and education in the areas of basic and advanced electrical engineering and electronics. Its multimedia courses combine cognitive and hands-on (haptic) training units into a comprehensive unified concept, specifically enabling students to acquire skills in the handling of equipment. Starting with basic courses and advancing to cover a huge variety of electrical engineering and electronics topics, a wide range of multimedia courses is available for study in school or in professional and advanced training courses. The UniTrain-I system is completely self-contained and can be used anywhere at any time. The multimedia learning environment the system provides high degrees of motivation, and maximum learning effectiveness in laboratories, at work or at home. It thus becomes a guarantor for effective and efficient study. Access to the multimedia courses and control of virtual instruments and experiment hardware is provided by LabSoft, the system's open experiment platform. The courses teach the theoretical building blocks and provide experiments to be carried out using the course-specific experiment hardware. The intelligent measurement interface supplies the analog and digital measuring and control I/O and represents, in combination with the system's virtual instruments, a high quality item of laboratory equipment. In addition, students' progress can be monitored and electronically documented on the basis of fault finding experiments with faults simulated by the hardware as well as tests of knowledge. The electrical and electronic circuits needed for the experiments are connected to the system with the aid of an Experimenter module.

Pos.	Product name	Bestell-Nr.	Anz.
2	UniTrain Interface with virtual instruments (basic VI)	CO4203-2A	1

The UniTrain Interface is the central unit of the UniTrain system. It incorporates all inputs and outputs, switches, power and signal sources and measurement circuitry needed to perform experiments. The Interface is controlled via the connected PC.

Equipment:

- 32-bit processor with storage memory for measurements
- USB interfaces, transfer rate 12 Mbits/s
- WLAN/WiFi interface, 2.4 GHz, IEEE 802.11 b/g/n
- Simultaneous connection of any number of Experimenters via serial bus system
- High-quality designer casing with aluminium feet and surface-hardened Plexiglas front panel
- Suitable for accommodating in training panel frames for DIN A4 training panels
- Designed for connection of 2-mm safety measuring leads
- Multi-coloured LEDs for displaying status
- Adjustable analog output, +/-10 V, 0.2 A, DC – 5 MHz, via BNC and 2-mm sockets
- 4 Analog differential amplifier inputs with 10 MHz band width, safe for voltages up to 100 V, sampling rate 100 mega samples, 9 measuring ranges, memory depth 4 x 8 k x 10 bits, inputs via BNC (2 inputs) or 2-mm sockets (4 inputs)
- 2 Analog inputs for current measurement, overcurrent-protected up to 5 A, sampling rate 250 kilo samples, 2 measuring ranges, resolution 12 bits, connection via 2-mm sockets
- 3 variable analog outputs +/- 20V, 1 A, DC-150 Hz (requires CO4203-2B)
- 16-bit digital signal output, of which 8 bits are accessed via 2-mm sockets, TTL/CMOS, clock frequency 0 – 100 kHz, electric strength +/- 15 V
- 16-bit digital signal input, of which 8 bits are accessed via 2-mm sockets, memory depth 16 bit x 2 k, TTL/CMOS, sampling rate 0 – 100 kHz, electric strength +/- 15 V,
- 8 Relays, 24 V DC/1 A, of which 4 are accessed via 2-mm sockets
- Dimensions: 29.6 x 19 x 8.6 cm



- External power supply with wide range input 100-264 V, 47-63 Hz, output 24 V/5 A
- Weight (including power supply): 2.1 kg

Virtual instruments (meters and sources):

- 2 x Voltmeter VIs, 2 x Ammeter VIs: AC, DC, 9 ranges, 100 mV to 50 V, true RMS, AV
- 1 x Power meter, 9 ranges, 100 mV to 50 V
- 1 x VI with 8 relays, 1 x Multimeter VI: multimeter display (optional LM2330, LM2331 or LM2322) in LabSoft
- 1 x 2-channel ammeter VI: AC, DC, 2 ranges, 300 mA and 3 A, TrueRMS, AV
- 1 x 2-channel voltmeter VI: AC, DC, 9 ranges, 100 mV to 50 V, TrueRMS, AV
- 1 2-/4-channel oscilloscope: band width 10 MHz, 25 time ranges, 100 ns/div to 10 s/div, 9 ranges 20 mV/div to 10 V/div, trigger and pre-trigger, XY and XT modes, cursor function, addition and multiplication function for 2 channels
- 1 x VI Spectrum Analyzer: 9 voltage ranges 100 mV to 50 V, input frequency range 3 Hz to 1 MHz, time domain display
- 1 X VI Bode-Plotter: 9 voltage ranges 100 mV to 50 V, frequency range 1 Hz - 5MHz, time domain display and locus diagram
- 1 x Adjustable DC voltage VI 0 - 10 V
- 1 x Function generator VI: 0.5 Hz - 5 MHz, 0 - 10 V, sine, square, triangular,
- 1 x Arbitrary generator VI, 1 x Pulse generator VI
- 1 x VI with 16 digital outputs, 1 x VI with 16 x digital inputs, 1 x VI with 16 digital input/outputs. Display modes: binary, hex, decimal and octal numerals
- 1 x Three-phase power supply VI, 0 - 150 Hz, 0 - 14 Vrms, 2 A (requires CO4203-2B)
- 1 x Adjustable DC power supply VI, 3 x (-20 V - +20 V), 2 A (requires CO4203-2B)
- 1 x Three-phase power supply VI with additional phase-shift and clock rate adjustment (requires CO4203-2B)

Includes:

- Interface
- Power supply
- Power lead
- USB cable
- CD with basic software
- Operating manual

System requirements:

- Personal computer with Windows Vista, Windows 7, Windows 8, Windows 8.1, Windows 10 (32 or 64 bit)
- CD-ROM drive for installing software

- USB port for connection to Interface

3 UniTrain measurement accessories, shunts and connection cables

CO4203-2J

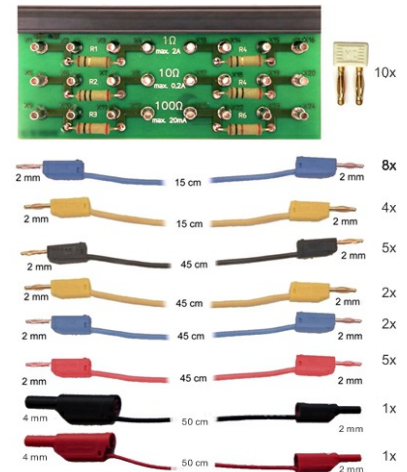
1

Shunt resistors on a PCB, for current measurement using the analog inputs of the UniTrain system.

- 6 Shunt resistors: 2 x 1 ohm, 2 x 10 ohm, 2 x 100 ohm
- Screen print of symbols for identifying resistors, the voltage taps and current inputs
- 24 x 2-mm sockets
- Dimensions: 100 x 40 mm

Set of connection cables 2mm (28 pcs) for UniTrain consisting of:

- 8 x connection leads 2mm, 15cm, blue
- 4 x connection leads 2mm, 15cm, yellow
- 5 x connection leads 2mm, 45cm, black
- 2 x connection leads 2mm, 45cm, yellow
- 5 x connection leads 2mm, 45cm, red
- 2 x connection leads 2mm, 45cm, blue
- 1 x safety adapter lead 4mm to 2mm, 50cm, black
- 1 x safety adapter lead 4mm to 2mm, 50cm, red
- 10 x 2-mm connector plugs / Plug spacing 5mm, white



Additionally recommended

Pos.	Product name	Bestell-Nr.	Anz.
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4 UniTrain storage case for experiment board

SO4203-2V

1

Sturdy aluminium case with moulded foam block to accommodate an experiment board

- Capable of accommodating 1 experiment board and smaller accessories
- Lockable padlock; stable padlock hinge
- Colours: aluminium, black, chrome
- Dimensions: 600 x 450 x 175 mm
- Weight: 2.5 kg



5 Multi13S digital multimeter

LM2330

1

Universal precision lab multimeter and temperature meter with IR interface for high-quality, universal measurement and testing in educational settings, power plants, process control installations etc.

- 3¾-digit multimeter; resolution: $\pm 3,100$ digits
- Measurement classification CATII-1000 V
- Can be connected to UniTrain system via IR interface
- Voltage and current measuring ranges: 30 mV-1000 V DC, 3 V-1000 V AC; 3 mA-16 A DC; 30 mA-10 A AC
- Resistance ranges: 30 ohm-30 Mohm
- Special functions: °C for temperature measurements using PT100/1000 thermocouple (optional accessory)
- Continuity and diode testing
- Automatic range selection and battery shut-off, min./max. and data hold function
- Safety fuse for current measurement range up to 300 mA
- Protection against high currents in the mA range for nominal voltage of 1000 V
- Display with bar chart and backlighting
- Includes protective sleeve, measuring leads, 1 x spare fuse, 9V battery, calibration certificate



6 Test lamp

LM8205

1

Vehicle voltage tester. Due to its small current consumption of 1.5 mA, the CAR-CHECK tester is particularly well suited to finding faults with electronic components. Conventional test lamps often cause damage to these. Polarity indication via two LEDs.

- Nominal voltage range: 3...48 V
- Length of lead: 150 cm
- Weight: 0.2 kg

