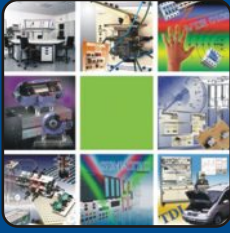


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www.elwe-energy.com

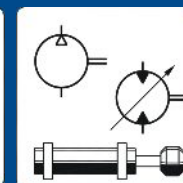
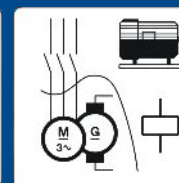
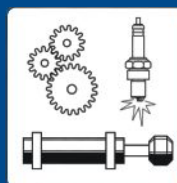
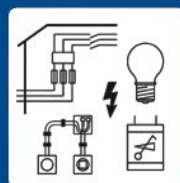
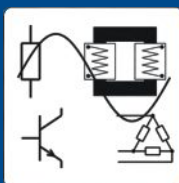
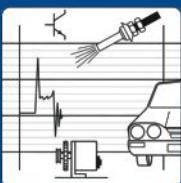
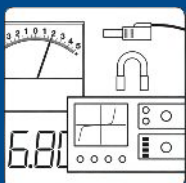


ELWE® Technik

*innovative
future oriented
high-performance*

Education is the future

Selected Topics of Automotive Technology



Company profile

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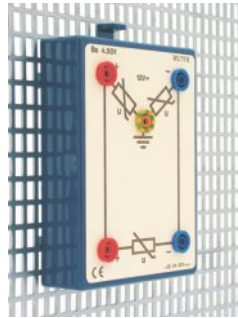
Educational concept

-- we make technology easy to understand with:

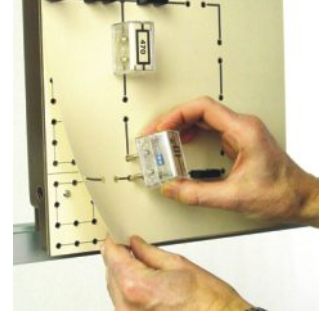
Experimental
Panel Systems



Experimental
Modular Systems



Experimental
Plug-in Systems



Experimental panels, with easy to read switching position symbols, circuit diagrams and result effect diagrams for each current experiment are mounted in a straightforward manner into the experimental frames. These offer outstanding communicative possibilities for theoretical, teacher-oriented lecturing and presentation work.

The experimental modules for application in the grid walls offer similar possibilities as our panel system and promote self-learning and training of the theoretical content during active, practical and instructional conditions. The modules allow themselves to be flexibly arranged on the wall-mount leaving the table area free for training literature and exercise books.

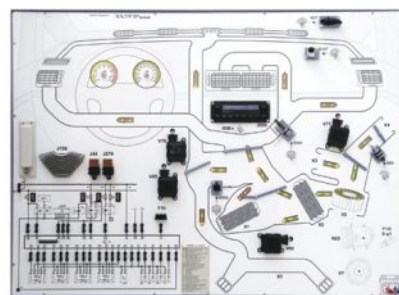
The Experimental Plug-in System consists of electrical components in a Makrolon® casing together with their associated overlay-masks. These masks, specifically dedicated to each experiment, allow only the opening of the relevant circuitry in the universal plug-in panel offering trainees a highly effective and transparent learning method during their period of basic training.

Experimental
Portable Systems



Our Experimental Portable System and Trainer consists of compact, portable cases most of which are fitted with their appropriate powersupply, metering units and connection cables. Their mobility allows them to be used practically anywhere "in the field" thus avoiding costly commercial or educational premises and can be quickly and easily set up for operation, (please refer to our conventions of use)

Experimental
Wall Systems



More complex systems, such as in the automotive or automation technology areas of study and further in the electrical braking and motor drive technologies, are reproduced by us as fully functional wall systems. These systems, most of which can be directly connected to the Trainee Metering Station, provide the student with a "live" working atmosphere.

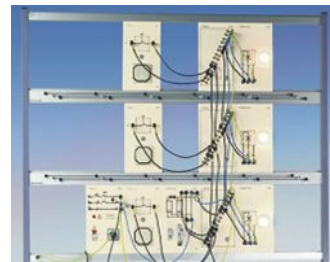
Each different experimental system is conceived, designed and manufactured in direct accordance to the relevant didactical and methodical requirements. Through our consideration of professional practical experience in each topical area and the application of original automotive components, our systems are able to offer that feeling of "real life" conditions during the entire educational process. The distinctively printed and easily comprehensible markings for the circuit symbols, circuit diagrams together with the clearly and orderly arranged experimental assemblies makes even the most complicated circuitry easy for the student to follow and understand. The rigorous integration of safety devices, including all connector

elements, guarantees a safe handling of the experimental units. A further comprehensive range of accessories is available.

Didactically and exemplary conceived methods in the experimental instructions guarantee success in the deployment of the experimental units and the learning process. All systems are --

-- always flexibly integrable in our:

Professional Practice Systems and Training Environment Furnishings



Through our comprehensive programme for training environment furniture which we develop and manufacture in-house, we are able to offer an optimal solution for every room and educational institution.

Whether the systems are with aluminium or steel elements, as laboratory, computer or workshop fittings, with power supplies, experimental frames or wall mounts, with storage cupboards, stools or accessories for the training environment - ELWE has always got the right solution for your wishes.

Experimental equipment and training environment furnishings make ELWE a competent all-rounder for turn-key training environments in educational facilities.

With this topical catalogue we have now compiled a selection of the most frequently requested items within our product range. The products concerned generally involve a complete technically furnished environment including the necessary cables, constructional elements and the related training literature. We will be only too pleased to answer any further questions on this subject.

ELWE Technik GmbH

Elwestraße 6

38162 Cremlingen

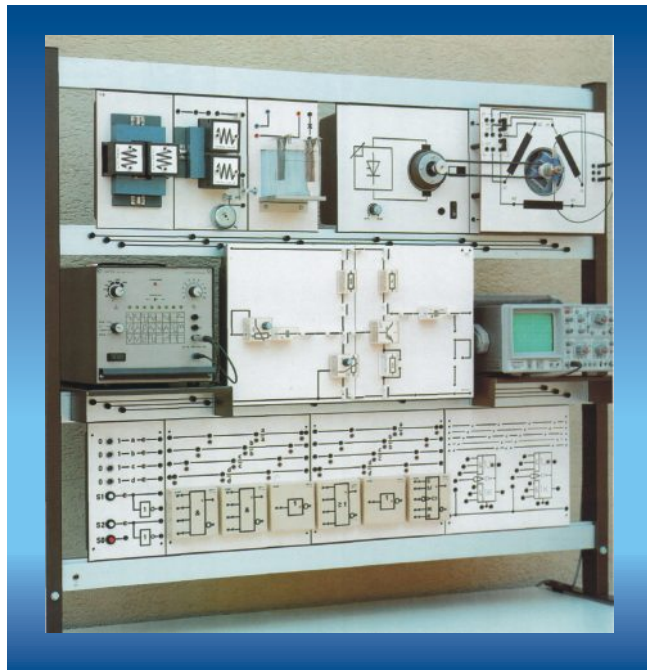
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Equipment - TG 1K "Principles of electrotechnology for automotive professions"



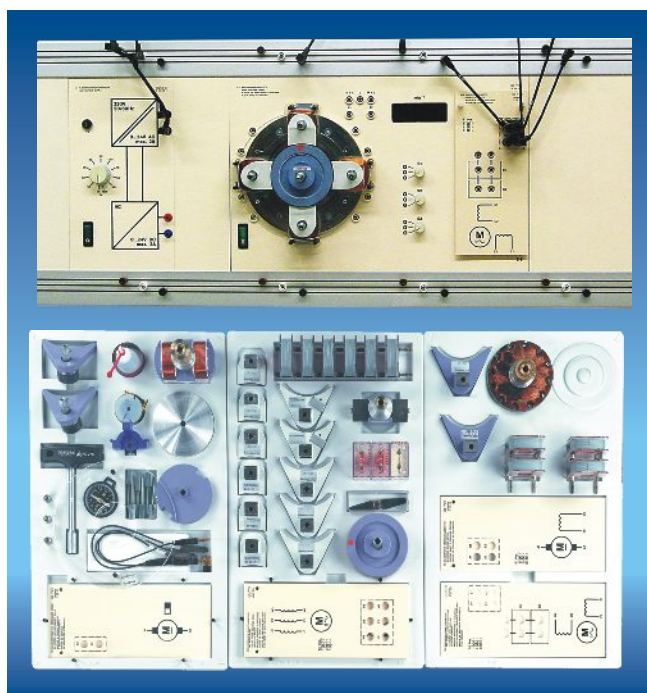
Ordering information

Equipment "Principles of electrotechnology for automotive professions"

Article No. :

8-0101300-000-10-0

TG 2K - supplementary equipment for "Principles of electrotechnology for automotive professions" (electrical machines)



System description

The ELWE section 1K is an outfit including demonstration units, power supplies, metering equipment and accessories for carrying out experiments in the thematic area "Principles of electrotechnology for professions in the automotive industry". The essential element is a Universal Plug Panel which is built into an experimental frame or stand. Masks, pertaining to each individual experiment, are laid over the Universal Plug Panel allowing the plug-in elements to be inserted into the "free" 4mm sockets. The over-layer masks and plug-in elements enable a quick and comprehensible lay-out of the assembly which is also easy to comprehend from greater distances. Comprehensive instructions for the experiments are included in this system. In each of the 17 experimental groups are presentations of numerous didactically and methodically prepared experiments with photographic illustrations of the arrangement of the units together with complete descriptions of the exercise processes.



Experimental / Training Topics

Metering technology, voltage, current, resistance, resistor circuits, resistance metering process, electric heat, electrochemistry, magnetism, transformers, condensers, induction, RLC circuits, resonating circuits, rectifiers and many more.

A more exact description and listing of the possible experiments is available on request or will be included in an offer.



System description

The ELWE area section 2K is an outfit extension to the thematic area "Principles of electrotechnology for automotive professions". It embraces the fundamentals of electrical machines (generators and motors). This supplementary outfit contains all the necessary components for the experiments.



Experimental / Training Topics

Principles of a direct-current generator, a three-phase generator and a direct-current motor. Assembly of a direct-current generator, a three-phase generator and a direct-current motor.

A more exact description and listing of the possible experiments is available on request or will be included in an offer.



Ordering information

Supplementary equipment for TG 2K (electrical machines)

Article No:

8-0102100-000-10-0

TG 6K - Supplementary equipment to "Principles of electrotechnology for automotive professions" (electronic)



System description

The ELWE area section 6K is an outfit extension to the thematic area "Principles of electrotechnology for automotive professions" (electronic).

With this supplementary outfit you receive all the components and appliances necessary for the execution of the experiments described in the experimental manual.



Experimental / Training Topics

VDR, NTC and PTC resistor, diode characteristics, characteristics of a Z diode, hall generator, transistor as an electronic regulating resistor (rheostat), NPN transistor, transistor characteristics, Darlington transistor, emitter circuit, collector circuit, basic circuit, thyristor, LED, Schmitt trigger (threshold detector), comparator, P, PI, PD, PID controller and many more.

A more exact description and listing of the possible experiments is available on request or will be included in an offer.



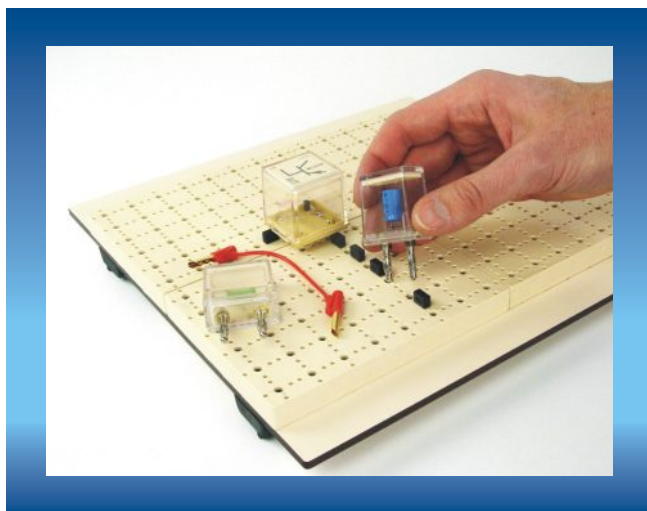
Ordering information

Supplementary equipment - TG 6K (electronic)

Article No.:

8-0101306-000-10-0

TG 7K - Supplementary equipment to "Principles of electrotechnology for automotive professions" (digital technology)



System description

The ELWE area section 7K is an extended outfit to the thematic area "Principles of electrotechnology for automotive professions" (digital technology). This outfit contains all the components and appliances described in the experimental instructions for the basic outfit version.



Experimental / Training Topics

and-, or-, non-linkage, Karnaugh-Veith tables, NAND, NOR element, RST break-over element, Asynchronous, synchronous modulo 5/6 counter and many more.

A more exact description and listing of the possible experiments is available on request or will be included in an offer.



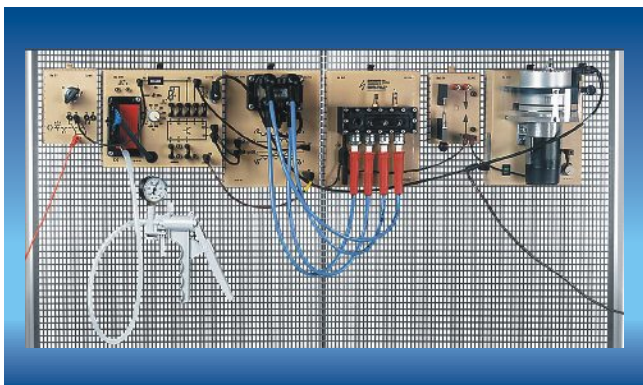
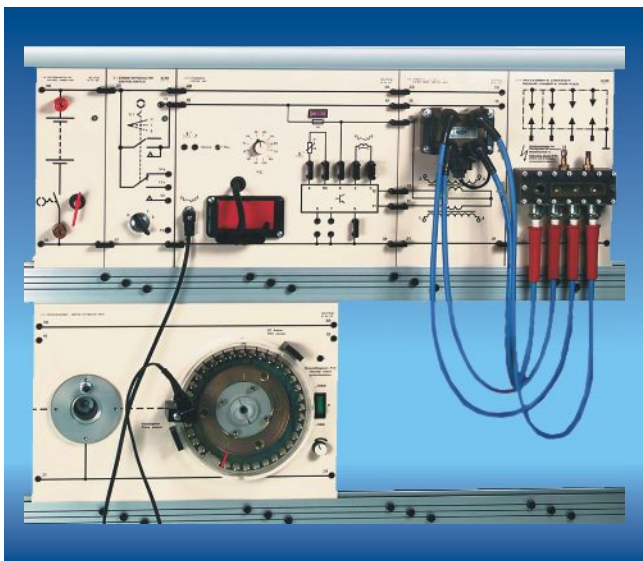
Ordering information

Supplementary equipment TG 7K (digital technology)

Article No.:

8-0101307-000-10-0

Ignition Systems



System description

In the area of ignition systems, ELWE Technik GmbH presents a wide range of different possibilities by putting a very broad demonstration programme at the disposal of the instructors and trainees. In addition to the outfits mentioned here, single components may also be set up for individual exercises and experiments.

The fundamentals presented here begin with "pulse generation" following right through to the subject "fully electronic ignition systems".



Experimental / Training Topics

Pulse generation, ignition systems, fault simulation, contact-, transistor- map-based ignition systems, fully electronic ignition systems and many more.

A more exact description and listing of the possible experiments and contents of the individual outfits is available on request or will be included in an offer.



Ordering information

The following outfits and products are currently available for delivery:

Basic outfit "ignition systems"

Demonstration panel	8-0103171-000-10-0
Exercise	8-0203171-000-10-0

Outfit " Fault simulation in ignition systems"

Demonstration panel	- - -
Exercise	8-0203172-000-10-0

Outfit " Contact regulated ignition systems"

Demonstration panel	8-0103181-000-10-0
Exercise	8-0203181-000-10-0

Outfit "Transistor ignition systems"

Demonstration panel	8-0103190-000-10-0
Exercise	8-0203190-000-10-0

Outfit " Map-based ignition"

Demonstration panel	8-0103200-000-10-0
Exercise	8-0203200-000-10-0

Outfit " Fully electronic ignition"

Demonstration panel	8-0103210-000-10-0
Exercise	8-0203210-000-10-0

Training System "Dual ignition block"

Demonstration panel	8-0103220-000-10-0
Exercise	- - -

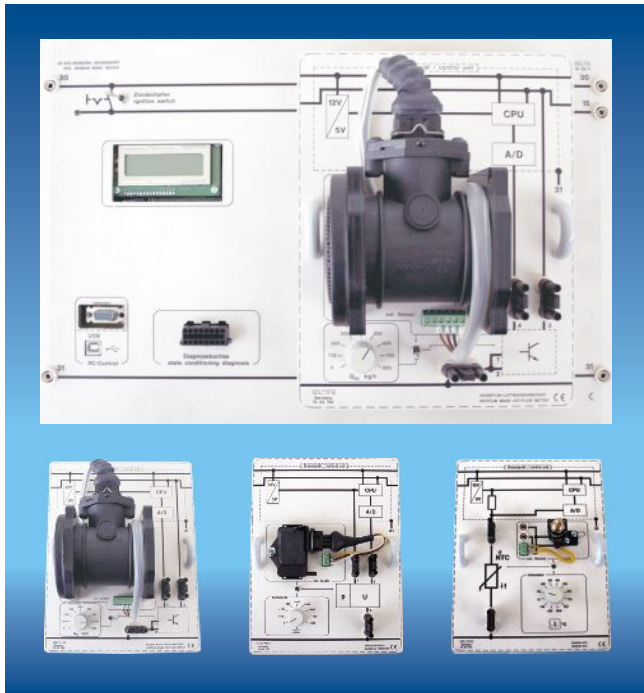
Training System "Pulse generation in motor vehicles"

Demonstration panel	- - -
Exercise	8-0203090-000-10-0

Training System "Magnetic field ignition"

Demonstration panel	8-1003240-100-10-0
Exercise	- - -

Sensors / Actuators



Experimental / Training Topics

The system is for application in the following areas:

- Examination and maintenance of control and regulating systems (training field 4)
- Diagnosis and maintenance of motor management systems (training field 7)



Ordering information

Basic unit - sensor / actuator diagnostic

Article No.: 8-1003750-001-11-0

Sensors / Actuators Sensors / actuators - please enquire -



System description

The compact ELWE automotive diagnostic system employs the original motor vehicle sensoric and actuators with their specific basic circuitry enabling demonstrations and examinations to be made in-step with practice.

The automotive diagnostic system consists of a basic unit and mountable panels which contain the sensor/actuators appropriate to the system.

The Micro-processor circuit in the basic unit, depending on which mountable panel is used, simulates the corresponding sub-function of an original automotive sensor.

The system has practically no set-up time and is immediately ready for operation. However, a 12V power supply (car battery or 12V mains adaptor) is necessary.

The advantages

- A basic unit
- A range of mountable panels with the original sensors and actuators
- Short set-up time / compact assembly
- USB socket for updates
- OBD II diagnostic socket
- Switch with control LED for "ignition"
- Internal micro-controller
- Automatic recognition of the sensors
- Double spaced LCD display
- Usable as a table unit or in an A4 experiment frame
- Diagnostics covering the complete signal path
- In-step with practice and future-proof

The sensors / actuators

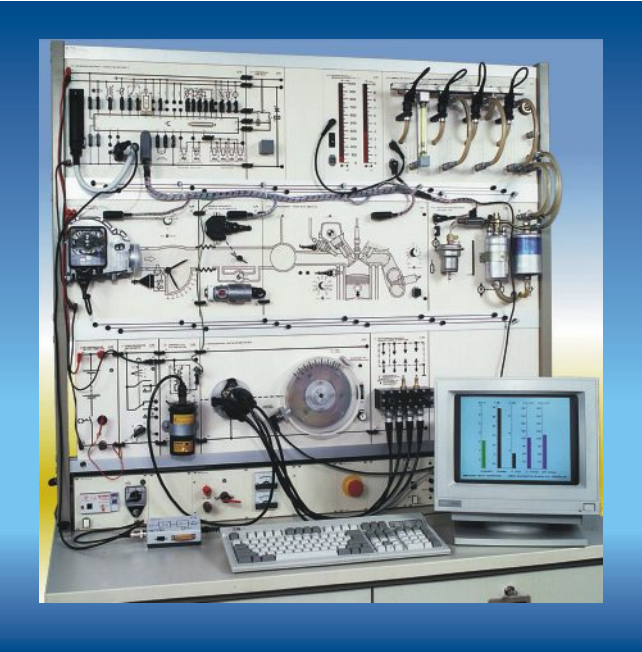
- Air volume metering unit
- Hot-wire air-flow meter
- Hot-film air-flow meter
- Cooling fluid temperature sensor with switch
- Air temperature sensor
- Manifold pressure sensor
- Distance frequency generator
- Knock sensor
- Lambda probe
- Throttle valve potentiometer
- Oil quality sensor
- Idling adjuster
- DC motor
- Step motor
- Steering angle sensor
- Ultrasonic sensor
- Rain sensor
- Brightness sensor
- Common rail injector

!!! The speciality of this system is !!!

The system can be extended as much as you wish. Updates for future sensors and actuators can be downloaded from our homepage via the built-in USB connection so that the system will remain up-to-date for many years to come!

Motronic M 1.5

Motor management panel system
electronic petrol injection



Ordering informatic

Motor management system "Motronic M 1.5"
Article No.: 8-0103375-000-10-0



System description

The ELWE experimental panel system "Motronic" distinguishes itself through a transparently arranged schedule of technology. The electrical wiring of the sensors and actuators to the control unit can be quickly and reliably installed with the help of a cable-loom with sturdy plug connectors. All the connections on the control unit are made using the 4mm sockets and bridge-plugs and may also be used as metering points. Faults in the equipment can be directly induced by removing a bridge-plug enabling the effects on e.g. the angular ignition spacing and injection amounts to be demonstrated and studied. An automotive interface and associated software are available enabling a comfortable display read-off and analysis of the metering and control signals. A connection socket for ELWE trainee metering stations is also available.



Experimental / Training Topics

- | | |
|----------------------------------|--------------------------------------|
| ■ Part names | ■ Readout of the fault codes |
| ■ Motor temperature feeler | ■ Lambda control circuit |
| ■ Analysis from circuit diagrams | ■ Gauging in the fuel system |
| ■ Air volume meter | ■ Ignition-angle map |
| ■ Classification of the signals | ■ Engine speed and benchmark counter |
| ■ Throttle valve switch | ■ Idling speed and regulator |
| ■ Overrun fuel cut-off | ■ Start control |
| ■ Wide-open throttle enrichment | |

EDC



Ordering informatic

Diesel injection system
Article No.: 8-0103411-000-10-0

Currently available:
Article No.: 8-0103400-000-10-0



System description

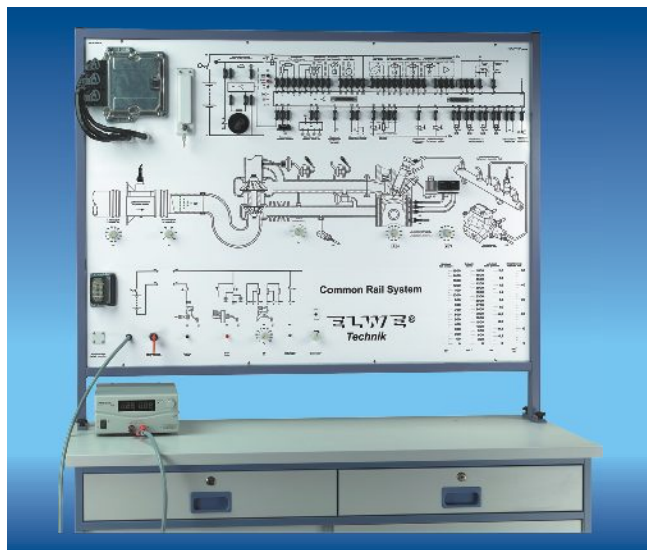
The ELWE experimental panel system EDC distinguishes itself through a transparently arranged schedule of technology and the compact assembly of a driving and injection system. The injection pump distributor together with a drive consisting of a squirrel-cage motor and a frequency converter, the tank, the filter and the four injection valves are mounted on a mobile chassis. The electrical wiring of the sensors and actuators to the control unit can be quickly and reliably installed with the help of a cable-loom. All control unit connections are made over 4mm sockets and bridge-plugs the removal of which generate faults in the equipment and further allowing them to be clearly examined. The relevant software can be used in conjunction with an interface connected to the original diagnosis socket to access the actual metering and control data. A connection for a Trainee Metering Station is also available.



Experimental / Training Topics

- | |
|--|
| ■ Part names |
| ■ Analysis from circuit diagrams |
| ■ Classification of the signals |
| ■ Readout of the fault codes |
| ■ Gauging in the fuel system |
| ■ Idling speed and regulator |
| ■ Fault-finding with multimeters |
| ■ Fault-finding with micro-processor controlled test equipment |

Common Rail Technology Training System



System description

The common rail technology is the most widely used diesel injection system in present day automotive production throughout the world. Instead of using the previous method consisting of a mechanically complicated distributor pump and pressure dependant injection nozzles, a much more simply built high-pressure pump with a constant flow rate delivering a pressure of up to 1200 bar and piezo, electrically operated injection valves was introduced.

The background is a common rail motor management sytem from the firm Renault® using components from the firm Bosch® which distinguishes itself through the following performance characteristics:

- Well laid out, intelligible technology schematics
- Separate, mobile engine assembly
- Built-in original automotive components
- The connection of workshop test equipment or the ELWE automotive interface to the standardised diagnosis socket: meter all arising measurent data
- All the control unit connections, which may also be used as metering points, can be made using the 2mm safety-sockets and 2/19mm safety bridge-plugs
- 4 easilly visible LED bargraphs for engine speed, injection flow, charging-air pressure, and rail pressure
- Socket strip for the connection of the ELWE automotive metering station which makes it possible to meter, display and analyse test-data directly in front of the students



Experimental / Training Topics

Metering and analysing the given resulting values using the ELWE automotive interface, ELWE Car Tec or workshop testing units.

It is possible to meter, display and analyse the test data directly at the student's work area from the socket strip for the ELWE automotive metering stations.



Ordering information

Common Rail Training System

Article No.:

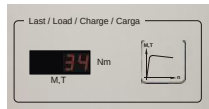
8-0103440-000-10-0

Motor management

Stationary motor



Permanent display of the following values:



Engine torque



Current and voltage settings of the brake



Oil pressure



System description

Functional 4 cylinder engine, "open" motor control unit for free programming, integrated electrical brake to simulate load, separate indicator for oil pressure and the braking values, comprehensive software to illustrate the alignments and engine conditions, large screen for an extended display of the data, integrated PC for the system control.



Experimental / Training Topics

Align, alter and optimise the motor characteristic map using comprehensive software. The engine conditions, which are possible to adjust, are displayed in 23 maps e.g.

- two injection maps (2D, 3D, text)
- two ignition maps (2D, 3D, text)
- Adjustment - cooling liquid temperature/injection (2D)
- Adjustment - intake air temperature/injection (2D)
- Adjustment - battery voltage/injection period (2D)
- Adjustment - throttle valve SHUT/injection period (2D)
- Adjustment - throttle valve OPEN/injection period (2D)
- Adjustment - air pressure/injection (2D)

Display instrument view or alphanumeric from:

- Engine speed
- Manifold pressure (engine load)
- Ignition timing
- Injection period
- Throttle valve position
- Cooling liquid temperature
- Intake air temperature
- Battery voltage
- Lambda probe voltage

Setup of all necessary motor parameters aligned to suit one engine. Diverse optional adjustments such as datalogging, fast alignment of the ignition and component adjustments.



Ordering information

Motor management Stationary engine

Article No.:

8-1503640-000-10-0

Motor FSI



Fig. similar



System description

Original car engine, 1.6L 85 KW FSI, fully operational, from the actual model range of Volkswagen (Golf/Touran). Mounted on a mobile aluminium support frame, with faulted circuitry and a test-point box (signal take-off point).

Original circuit diagrams, repair guidelines and assembly instructions in English are included in the delivery.



Experimental / Training Topics

- Dismantle the engine and reassemble
- Gaskets and flywheel/clutch plate - remove and re-install
- Dismantle and re-assemble pistons and con-rods
 - adjust the timing
- Remove and re-install the cam-shaft casing
- Remove and re-install the cylinder-head
- Check the compression
- Maintenance of the valve-train assembly
- Remove and re-install lubrication system parts
- Remove and re-install fuel system parts
- Maintenance of the ignition system
- Examination of the OBD/HU
- Remove and re-install cooling system parts
- Injection
- all alignment work on the engine

Possible circuit faults:

- Exhaust-gas recirculation system deviation
- Injection valve cylinder no.2
 - N31, electrical fault in electrical circuit
- Sensor for air-intake temperature
 - G42 signal is too high
- Bank 1, cam-shaft misalignment
 - N205 Interruption
- Filler-cap breather-valve
 - N80 interruption
- Control signal intake-manifold throttle for air-intake control interruption
- Regulating valve for fuel pressure
 - N276 interruption
- Sensor for accelerator pedal alignment
 - G79 signal too low
- Sensor for engine speed
 - G28 no signal
- Sensor for fuel pressure
 - G274 electrical fault in electrical circuit
- Potentiometer for intake-manifold throttle
 - G336 short-circuit to negative
- Potentiometer for exhaust-gas recirculation
 - G212 signal too low
- Sensor for fuel pressure, underpressure
 - G410 short-circuit to negative
- Bank 1 cam-shaft position sensor
 - G40 interruption / short-circuit to positive



Ordering information

Motor Training Stand FSI

Article No.:

8-1503650-000-10-0

Motor TDI



Fig. similar



System description

Original car engine 1.9 l 77KW TDI, fully functional from the actual model range of Volkswagen (Golf / Touran). Mounted on a mobile aluminium support frame, with faulted circuitry and test-point box (signal take-off point).

Original circuit diagrams, repair guidelines and assembly instructions in English are included in the delivery.



Experimental / Training Topics

- Dismantle engine and re-assemble
- Gasket and flywheel/clutch plate - remove and re-install
- Gasket and flywheel/clutch plate - remove and re-install
- Remove and re-install the cam-shaft casing
- Remove and re-install the cylinder-head
- Check the compression
- Maintenance of the valve-train assembly
- Remove and re-install lubrication system parts
- Remove and re-install fuel system parts
- Examination of the OBD/HU
- Remove and re-install cooling system parts
- Injection
- all alignment work on the engine

Possible circuit faults

- Sensor 2 for accelerator pedal alignment
 - G185 signal too low
- Valve for pump/nozzle cylinder no. 3
 - N242 electrical fault in electrical circuit
- Fuel temperature sensor
 - G81 interruption/short-circuit to positive
- Air volume meter
 - G70 signal too low
- Fuel pump relays
 - J17 interruption
- Reserve fuel indicator sensor
 - G1 interruption/short-circuit to positive
- Control signal for preheat control unit
 - Electrical fault in electrical circuit
- Cam-shaft position sensor
 - G40 no signal/sporadic
- Engine speed sensor
 - G28 unplausible signal
- Terminal 15 and on-board power-supply terminal 50
 - Electrical fault in electrical circuit
- Engine control unit no signal/communication



Ordering information

Motor Training Stand TDI

Article No.:

8-1503660-000-10-0

Functional Model - "Half Golf V"



System description

A vehicle from the actual model range of Volkswagen (Golf / Touran) is cut through the middle. The vehicle is fully functional. For the purpose of this examination, the vehicle has had various circuit faults built into it.

The fuel is in a 10 litre safety-tank behind the seats. The parts of the on-board electronic for the rear of the vehicle have been mounted on a panel on the rear of the car. The engine and gear-box are fully functional but for safety reasons, the power transmission to the front wheels has been removed.



Experimental / Training Topics

- Negative wiring interruption - fuel pump
- Additional resistor RH side light 27 Ohms
- Negative wiring interruption - engine speed sensor
- LIN wiring interruption - screen-washer motor
- RPM feeler interruption - RH rear
- Interruption - bonnet contact switch
- Additional resistor - screen-washer pump 4.7 Ohms
- Interruption - reserve fuel sensor
- Interruption - intake-manifold throttle potentiometer
- Terminal 30 is lying on pin 2 of the glove compartment light

The functional model allows all necessary practical work to be carried out from inspection, fault finding through to real repairs right up to the middle support of the vehicle.



Ordering information

Functional Model "Half Golf V"

Article No.:

8-1503851-000-10-0

This functional model can be delivered with different motorisation e.g. diesel (TDI) or petrol (FSI) on request.

Starter Kit CAN Bus



Ordering information

Starter Kit CAN Bus

Article No.:

8-0203720-000-10-0



System description

The training model "Starter Kit CAN bus" was conceived by ELWE with the intention of providing a well-founded educational training basis at an affordable price. The system is mounted on a metal plate and is immediately ready for instructional use following the connection to its power supply. Included in this unit is the "comfort" bus from a Skoda Fabia. The installation with its visibly accessible cable-loom provides a practical introduction to the world of networked vehicle systems. Thanks to the open structure of the training system and the possibility to extend it, further basic knowledge of the operational functions of modern lighting and signalling equipment can be imparted.



Experimental / Training Topics

The training system is suited for use both by instructors and students and offers possible applications in e.g.:

- Measuring and evaluating the CAN bus basic signals
- Initiating all wiring related CAN bus faults
- Developing diagnostic strategies
- Application of the diagnostic tester
- Reading measurement blocks
- Reading-out the fault memory

CAN Bus Multi with subordinate LIN Bus



System description

The ELWE Training System CAN Bus networking capacity creates the best possibilities to project a transparent method of understanding into the operational functions of increasingly complex data- network technology in modern vehicles. The clear structure of the circuit layouts, the didactically sinful arrangement of the metering sockets and integration of original automotive components makes it possible to organise highly effective, activity-oriented training schemes.



Ordering information

Training System CAN Bus Multi

Article No.:

8-0103730-000-10-0

For further recommendation

Original Golf V lighting installation

8-0103731-000-10-0

ELWE lighting installation

8-0103732-000-10-0



Experimental / Training Topics

The system applies to the training areas:

- Training field 3 "Examining and maintaining electrical and electronic Systems"
- Training field 12 "Examining and maintaining networked systems (automotive mechatronic engineer)"
- Training field 13 "Diagnosing and maintaining chassis, comfort and safety systems (automotive mechatronic engineer)"

The system distinguishes itself through the following points:

- Adopts existing lighting components and/or new original vehicle lamp units
- Clear overview of the system through printed on circuit layouts
- All signals are accessible through 2 mm sockets
- Adaptor field with 2 mm and 4 mm metering sockets
- Dash panel insert (combi instrument)
- Integrated 16-pole OBD II diagnosis socket for connection of a diagnostic tester (e.g. VAG 5052 or the CAN data-bus compatible diagnosis unit VAG Com
- Integrated, lockable switch panel for the generation of faults for exercise and examination purposes
- Direct metering and fault finding in elementary lighting components
- Flexible metering possibilities: PC (with dongle and diagnosis software), multimeters, oscilloscope
- Introduction to the workshop practice

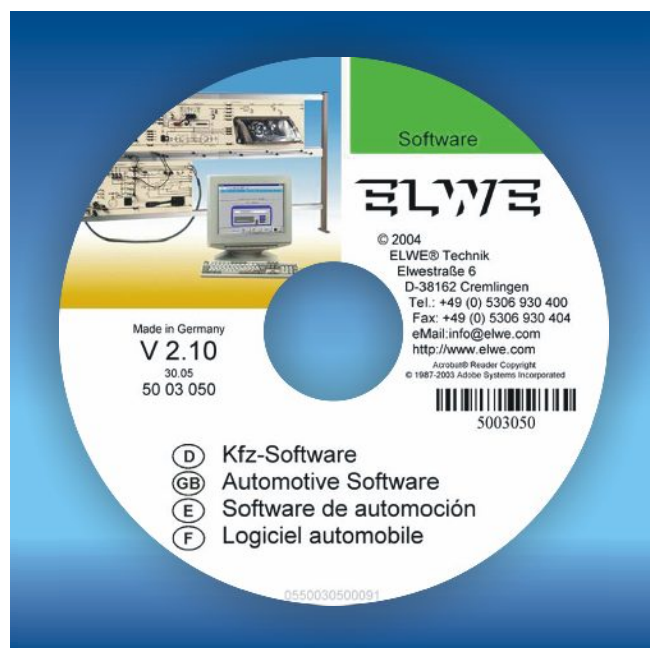
Trailer recognition

8-0103733-000-10-0

Rain sensor

8-2203756-000-12-0

CAN-bus Soft



System description

With the outfit CAN-bus Soft, ELWE has created an introduction to the concept of rudimentary education in the area of bus systems at a minimal cost. The system, consisting of software with a dongle, cable and nodes, is used for setting up the required bus connections and analysis in conjunction with either two computers or one computer together with a CAN-bus System (Starter Kit CAN-bus, CAN-bus Multi etc.).



Experimental / Training Topics

The training system is suited for use both by instructors and students and offers possible applications in e.g.:

- Metering and analysing the CAN-bus basic signals
- Switching faults to the CAN-bus
- Developing diagnostic strategies
- Applying the diagnostic tester
- Reading measurement blocks

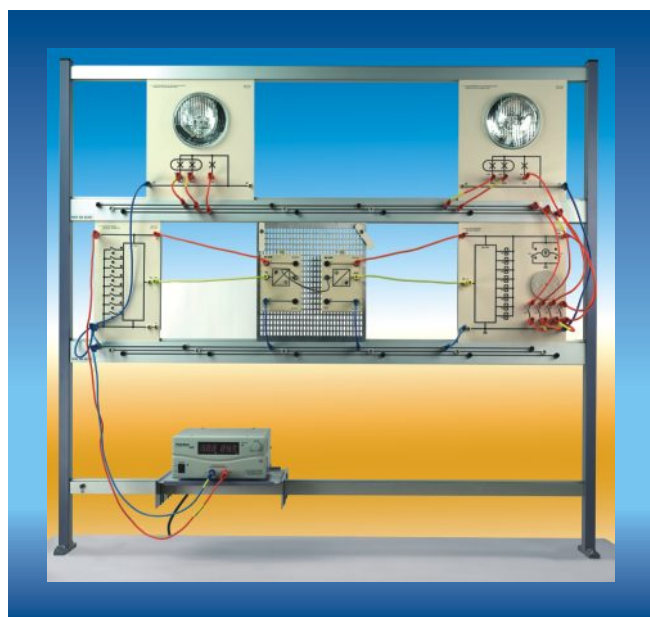


Ordering information

Training System "CAN-bus Soft" - Single user licence
Article No.: 8-5003060-010-10-0

The accessories can also be delivered individually. Enquire about multiuser licences.

Unidirectional Bus



System description

As basis for the complete bus technology, ELWE has developed an Experimental Panel System together with an Experimental Module System with multiplex transmitter and receiver. With little time and expense it is possible to demonstrate in a comprehensible manner how a large number of component or functions can be apparently simultaneously controlled over a single dual-core cable or common optical cable. These systems are fully functional. The combination of this system with the outfit "Main Lighting" will raise the attention of the trainees to a higher degree and make the advantages of using the bus technology much more obvious.



Experimental / Training Topics

- Fundamentals of the bus technology
- Signal diagnostics
- Assembly of the connections



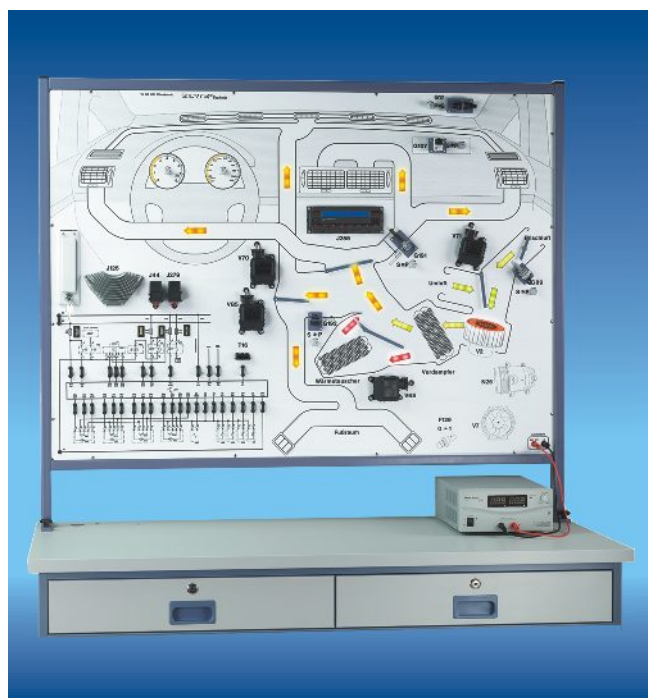
Ordering information

Training System "Unidirectional Bus"
Article No.: 8-0103710-000-10-0

Cooling Cycle



Climatronic



System description

In order to present and consolidate knowledge for establishing a pleasant climate in a vehicle, the firm ELWE Technik has divided this subject into 2 topics, "Refrigerant Fluid Circulation" and "Climatronic". So, two training systems have originated which concern themselves comprehensively with the essential content of the subject matter. We have developed, on the one hand, a refrigerant fluid circulation model in an experimental stand representing two different refrigeration methods (refrigerant fluid circulation with an expansion valve or restrictor valve) which are put into operation by a magnetic valve. This experimental stand is ideally suited for technological training applications in other different areas of refrigeration. On the other hand, we have developed a second experimental stand which demonstrates the distribution of warmth and cold and so the creation of a desired climate in a motor vehicle.

Only original components, exclusively from the commercial motor vehicle production, have been installed in the experimental stands.

The system "Temperature and Climate in the Vehicle" is characterised through the following points.

Advantages of the Refrigerant Fluid Circulation

- Coloured technological schematics
- Overlay mask depending on refrigeration method
- Inspection glass for refrigerant fluid
- Well visible 7 segment LED displays
- Representation of the refrigerant fluid pressure with an analogue pressure gauge
- Concealed and lockable fault simulator
- Easily transportable (with FVS option)

Advantages of Climatronic

- Original automotive control unit "Climatronic"
- Original actuators and sensors
- Exposition of the complete temperature and ventilation distribution
- Well visible LED arrays showing the distribution of air and temperature within the ventilation and heating systems.
- OBD II Interface
- Concealed and lockable fault simulator
- Easily transportable



Experimental / Training Topics

- Demonstration of the different refrigerant fluid circulation
- Maintenance work on air-conditioning equipment (filling / bleeding / disposal)
- Fault investigation in refrigerant fluid circulation system
- Diagnostic of the aggregates
- Inspection glass to show the flow of the refrigeration fluid
- Diagnostics of the original components
- Technology schematic with original VW control unit
- Reading-off fault codes from the control unit
- Measuring all data from the accessible metering points.
- Fault diagnostic at the OBD II interface
- Operating modes of the various sensors and actuators
- Representation of the different air and temperature currents



Ordering information

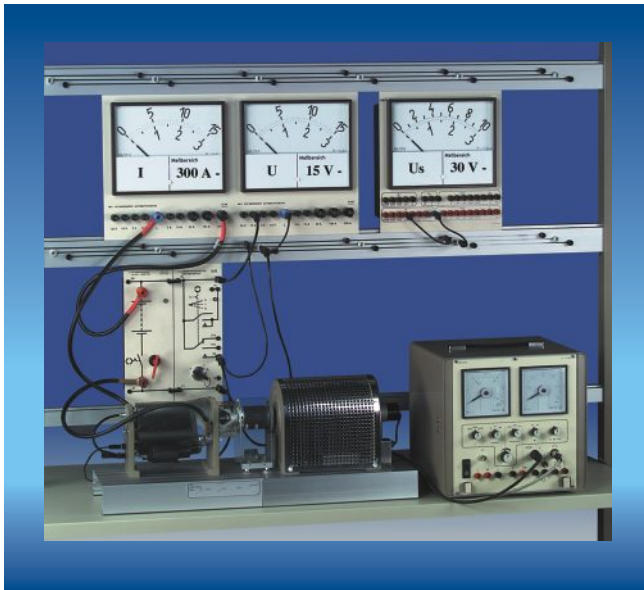
Experimental Stand "Cooling Cycle"

Article No.: 8-1503610-101-01-0

Experimental Stand "Climatronic"

Article No.: 8-1503611-000-01-0

Starter Motor



Ordering information

Training Unit "Starter Motor"

Article No.:

8-0103165-000-10-0



System description

With the training system "Starter" ELWE offers a unit which enables the reproduction of different loading conditions which occur when a motor vehicle is started. For this purpose, we have mounted an original starter motor with 12V, 0.6KW onto an aluminium beam and fitted the proper connecting cables (16mm²) to it. With the application of additional devices (brake, braking control unit, clutch-plate and clutch housing) we are able to simulate the necessary conditions needed for measuring currents.



Experimental / Training Topics

- Influence of the starter current on the applied voltage of the battery
- Dependency starter torque - starter current
- Dependency starter rev. count - starter current
- Record the characteristic of a starter with a meter

ABS (Anti-Blocking System)



Ordering information

Panel "Control Unit - ABS"

Article No.:

8-1003510-000-10-0

Panel "Vehicle - Spare Panel ABS"

Article No.:

8-1003511-000-10-0

Panel "Fault Simulator ABS"

Article No.:

8-1003515-000-10-0



System description

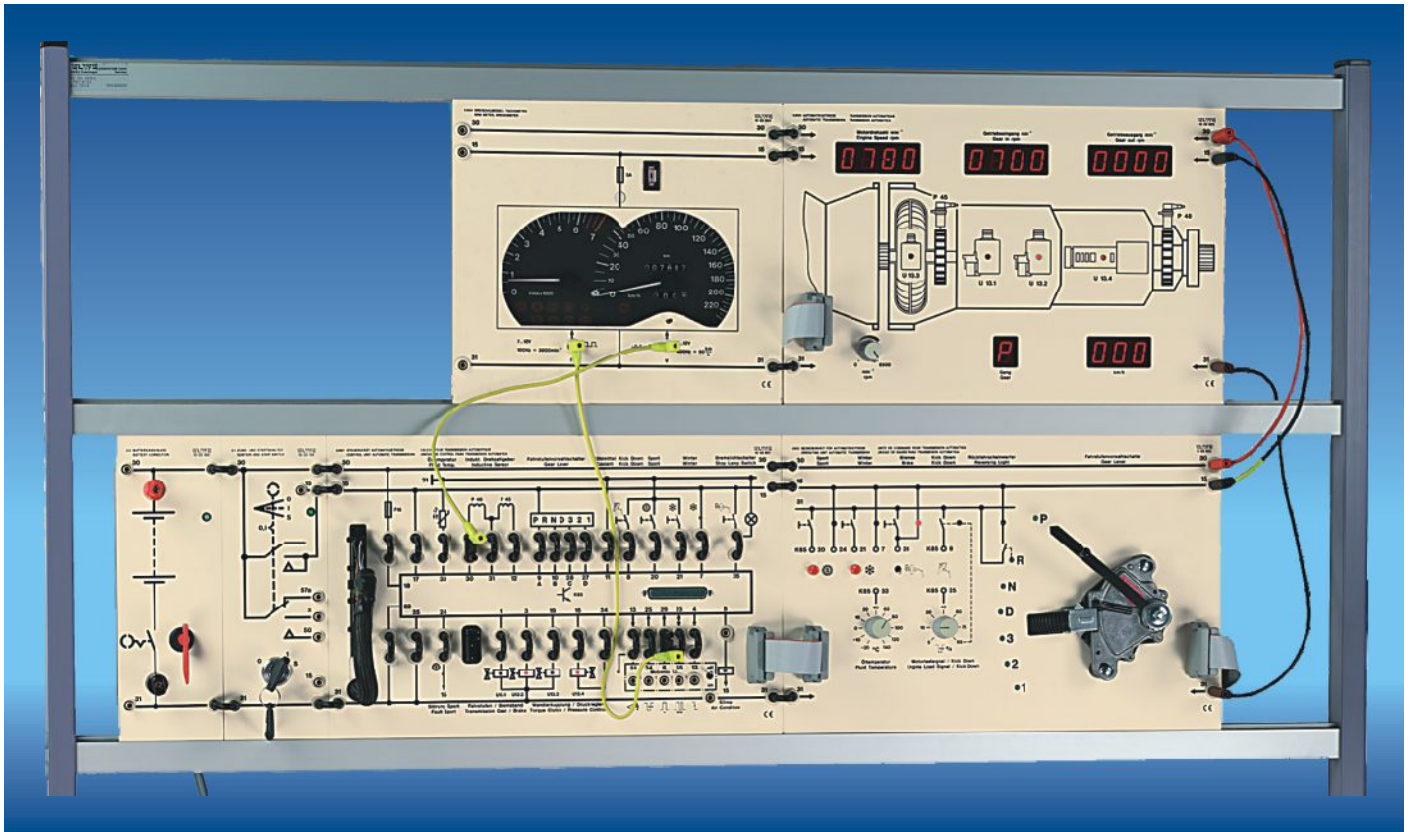
With the Panel System "ABS" ELWE offers a training system which demonstrates the most relevant working parts and their functions in an ABS brake. The system comprises of different panels which reflect and demonstrate the technological schematics. All relevant functions can be reproduced and analysed. Adjacent to the panel with the control unit, which also allows the necessary metering, is another panel for "Vehicle i.e. Wheel Simulation" with microprocessor controlled motors and in addition, another panel for the fault simulation.



Experimental / Training Topics

- Measuring all relevant data at the control unit
- Metering and analysing from the diagnostic socket with the appropriate testers or software
- Implementation and analysis of different braking procedures in real-time, slow-motion and single steps
- Simulation and practice of typical mistakes which occur in common practice
- Switching conditions of the magnetic valves and relays

Automatic gear-box



System description

There is an increasing tendency for vehicles to be fitted with automatic gear-boxes. ELWE has therefore developed a training system to demonstrate the workings of automatic gear change and provide a transparently comprehensible method for studying its' operational relationship to motor management. In general, the training system consists of an electronic facsimile of an automatic gear-box such as those installed into the Opel Vectra range of vehicles and includes original working parts such as the "Control Unit" and the "Gear Lever".

Basically, only three experimental panels are required for the assembly of an inexpensive training system which, through its' comprehensive operational structure, is able to clearly demonstrate all functional interrelationships in a unique manner. Flat flexible cables enable the uncomplicated connection of the experimental panels. Additional metering units and function generators are not required.

This training system allows not only the connection to Student Metering Stations but also access to the fault memory of the control unit using the necessary software via the diagnostic interface. A connection for the Student Metering Station is available. Furthermore, there is the possibility to simply couple an existing Motronic M1.5 to the automatic gear-box via five 4mm cables.



Experimental / Training Topics

- Control unit for gear-change switch - Automatic gearbox
- Read-out of the fault memory's practical diagnosis using a PC or system tester
- Investigation of the operational conditions: Economy / Kick-down / Sport / Winter
- Investigation of the conditions P, R, N, D1, 2, & 3
- Operating the brake pedal
- Oil temperature in 11 stages
- Motor load signal continuously variable between 5% and 85%
- Realistic synthesis of a gear change under engine speed and road speed conditions



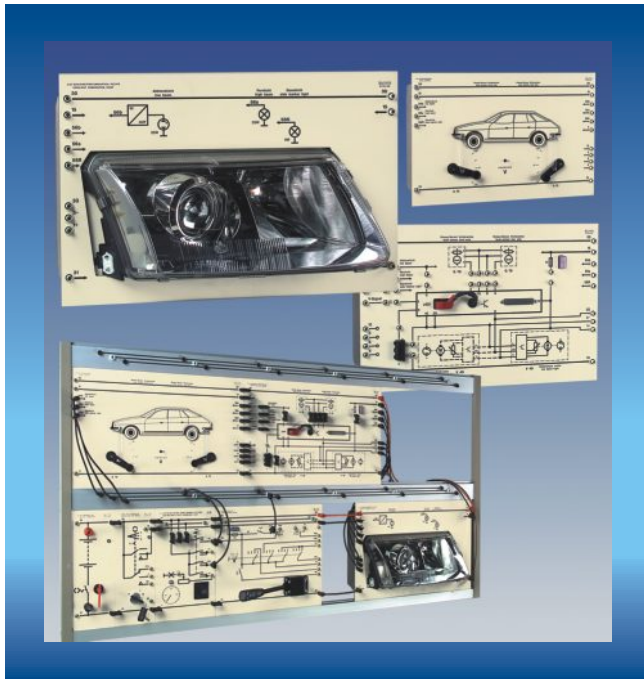
Ordering information

Automatic gear-box - Outfit

Article No.:

8-0103600-000-10-0

Headlamp Levelling



Ordering information

Training system "Headlamp Levelling"

Article No.:

8-0103118-000-10-0



System description

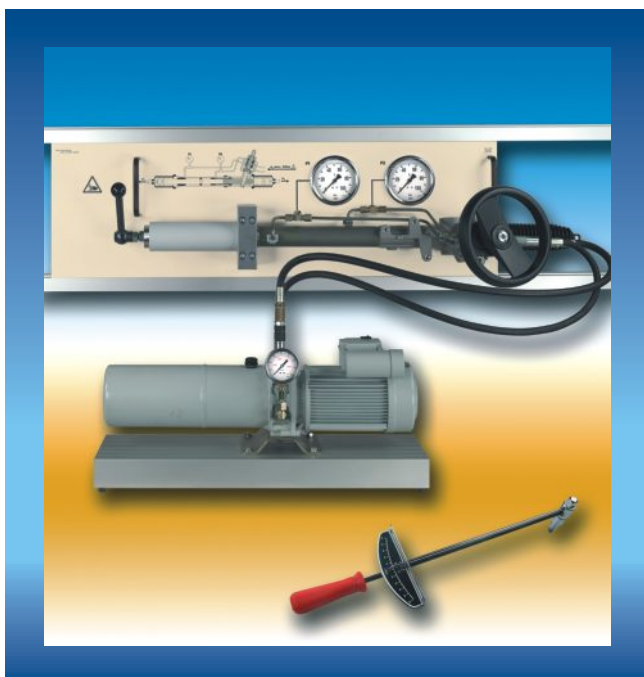
Safe driving in dark situation requires that the lighting and the traffic conditions remain easily distinguishable and particularly in the absence of disturbing side-effects. This is why electric discharge lamps are slowly replacing filament halogen lamps in vehicles. New traffic regulations now specify the integration of an automatic headlamp levelling regulation for this kind of system. Even when any change in the angle of pitch occurs, the headlamp levelling control maintains a constant angle of the dipped beam. With the training system developed by ELWE, it is possible to investigate the structure, function and diagnostics of such a system quickly and clearly. This system also includes a connection to a Student Metering Station.



Experimental / Training Topics

- Simulation of different changes in the pitch and speed of the vehicle
- Original diagnostic interface for the basic adjustments and coding
- Diagnosis of the controlling elements and fault evaluation via the ELWE Automotive Interface, ELWE CarTec or with a VAG fault reading unit
- Measuring the lamp current

Powered Steering



System description

The most important component of this ELWE system is a rack hydraulic steering unit from the firm VW. This system includes an experimental panel fitted with steering, hydraulic valves and power take-off, two gauges for measuring the oil pressure, rotary disc for adjusting the steering shaft load and a steering wheel. Furthermore, a hydraulic power unit with pressure tank for the power steering, electric motor for the pressure control valve and a mains connection.



Experimental / Training Topics

- Investigation and analysis of the operation of power steering under the influence of different loading conditions



Ordering information

Experimental Panel "Power Steering"

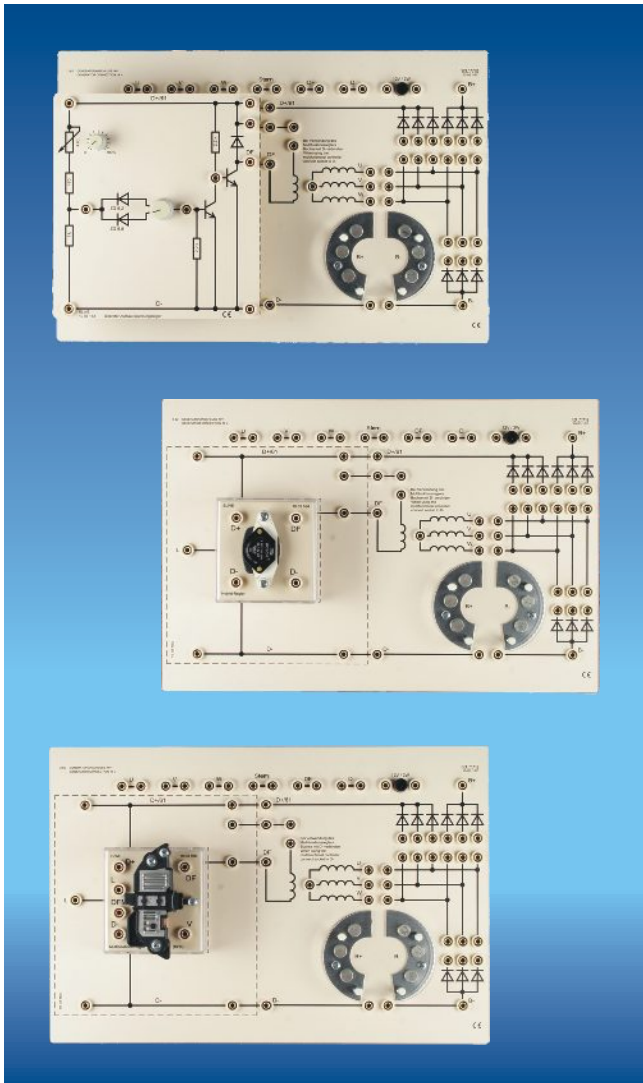
Article No.:

8-1003590-000-10-0

Hydraulic Power Unit

8-1503590-100-10-0

Automotive Generator



System description

The new tutorial model "Automotive Generator" demonstrates the generation of electrical power in modern vehicles. Furthermore, it illustrates the operating modes of the newest voltage regulators such as the multi functional and hybrid regulators. Progressively successive experiments enable the student to develop an understanding for the generation of electrical power and its' further applications in motor vehicles. The didactically oriented structure enables practical measurements to be made with original automotive parts.

Advantage of this system

- Open structure
- Demonstrates the generation process of 3-phase alternating voltage in motor vehicles Rectification of the alternating voltage
- Functionality of the regulating system
- Generator with individually accessible exciter and field windings.
- Neutral point of the field winding is removed and can be connected via 4mm plug
- System consists of an generator, rectifier panel and three voltage regulators. Rectifier panel with metering points and fixture sockets for different regulator types
- Generator maximum load 35 A at 14 V



Experimental / Training Topics

- Generation of 3-phase alternating voltage in the alternator stator winding
- Influence of the magnetic field in the exciter winding on the voltage induced in the stator winding
- Influence of the rotational speed on the level of induced voltage in the stator winding
- Development of the three-star centre-tap connection
- Results of the six-star bridge circuit
- Explanation of the term "residual rippling"
- Preregulation
- Regulators with discrete components
- Functionality of the Z diode as setpoint device
- Working principle of the hybrid control and the multi-functional regulator
- Development of the diagnostic strategy

The model can be installed in the training fields 4 and 5 enabling the implementation of an activity-oriented approach at all levels.



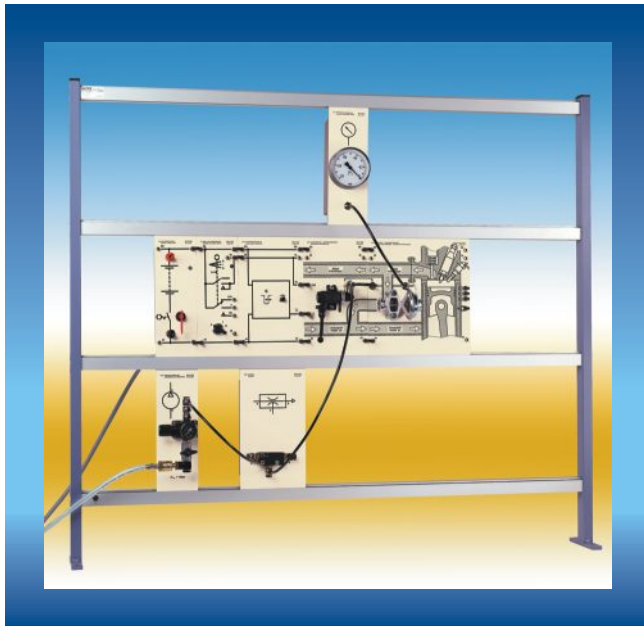
Ordering information

Training System "Motor Vehicle Alternator"

Article No.:

8-0103162-000-10-0

Exhaust-gas Recirculation



System description

ELWE has developed a model for exhaust-gas recirculation consisting of a number of experimental panels. The essential components of this outfit include an electro-pneumatic pressure converter together with the exhaust-gas recirculation valve. The exhaust-gas recirculation valve is regulated by the electro-pneumatic pressure converter by means of low-pressure. The required low-pressure is generated by an ejector which is supplied with compressed-air. The square-wave signal, which is normally supplied by the motor control unit, is generated in this case by a pulse-width generator and applied as input-signal to the of the electro-pneumatic pressure converter. The duty cycle of the square-wave is adjustable from 0 to 100% by means of a potentiometer. The system can be combined with the ELWE outfit "EDC". The "EDC" control unit then delivers the square-wave signal for the electro-pneumatic pressure converter instead of the pulse-width generator.



Experimental / Training Topics

- System Assembly
- Complete all electrotechnical and pneumatic connections
- Clarification of the workflow through an easily visible technological schematic.
- Gathering and analysing the measurement data



Ordering information

Training System "Exhaust-gas Recirculation"

Article No.:

8-0103491-000-10-0

Hydraulic Brake Trainer



System description

A comprehensively thorough knowledge together with special practical abilities are essential requirements for the proper and responsible maintenance and repair of hydraulic braking systems for vehicles. In order to learn these skills in a practical and safe way, ELWE has developed a compact and inexpensive training outfit.

The trainer includes a dual-circuit braking system incorporating original parts: disc-brake, drum-brake, brake load distributor and tandem brake-cylinder which are all mounted in a comprehensible manner on a stainless-steel panel. Three easily accessible and logically arranged measuring points for the hydraulic pressure are provided with self-closing metering connections. A brake light is connected to a built-in hydraulic pressure switch (power supply from an integrated 1.5V battery). Both the disc-brake and the drum-brake can be turned by hand and can be disassembled. The drum-brake has a section cut-out to enable the viewing of the brake cylinder and brake shoe operation. In addition to this, for the purpose of demonstrating the assembly or installation procedure of the drum-brake, the inner mounting flange together with the drum-brake can be withdrawn from the axle without the necessity to remove the hydraulic brake pipes. The effect of the handbrake on the drum-brake can be investigated. A basic adjustment of the handbrake is possible. The trainer can be safely stored in a stackable plastic case with a lid.



Experimental / Training Topics

- Investigating the operational function of a dual-circuit hydraulic braking system
- Filling the brake system with brake fluid and bleeding it
- Preparing and replacing hydraulic brake pipes
- The maintenance of brake cylinders (e.g. replacing sealing members)
- Measuring wear on the cylinder, brake disc and brake pads
- Checking the functional status and leak tightness of the braking system
- Checking the brake pressure and the adjustment of the braking power
- Carrying out examination of brake circuit 1 (disc-brake, front axle): contact pressure of the pads, operating pressure of the brake light switch, brake pressure
- Carrying out examination of brake circuit 2 (drum-brake, rear axle): brake pressure in the brake main cylinder, brake pressure in the tread brake cylinder



Ordering information

Hydraulic Automotive Brake System Trainer

Article No.:

8-2403001-000-10-0

Goods Vehicle Air Brake



System description

A goods vehicle compressed-air brake system with ABS valves can be clearly examined and understood with the aid of the exemplary methodical and didactical ELWE training systems which have been developed together with the implementation of components from the firm Wabco. Only original goods vehicle braking system parts have been used.

The advantage of this modular system is:

For use not only in laboratory exercises but also for theoretical training. Compact and comprehensible test arrangement.

All pneumatic connections and metering points can be quickly and safely made with quick connectors, some being of a self sealing type.

Different coloured compressed air pipes and electrical connector cables support a well defined and structured experimental assembly.

The compressed-air can be supplied either with a compressor (8 - 12 bar) or through a central compressed-air system.



Experimental / Training Topics

- Step-wise assembly of the experiments according to the training progress
- Learning / training with the application of original goods vehicle parts from the firm Wabco
- The fitting out of the equipment can be extended according to technological development at a reasonable price
- Knowledge transfer using technologically reasonable technological schematics



Ordering information

Set "Motor Vehicle without ABS"

Article No.: 8-0103500-000-10-0

Extension "Single Axel Trailer without ABS"

Article No.: 8-0103501-000-10-0

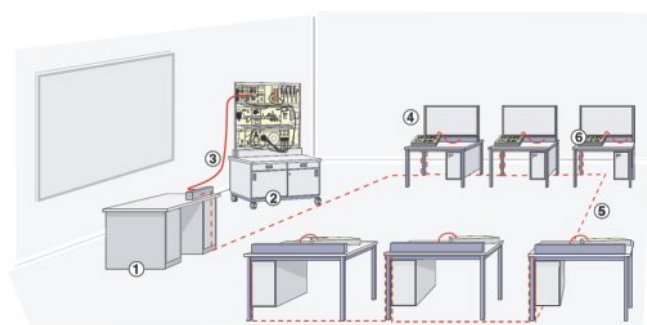
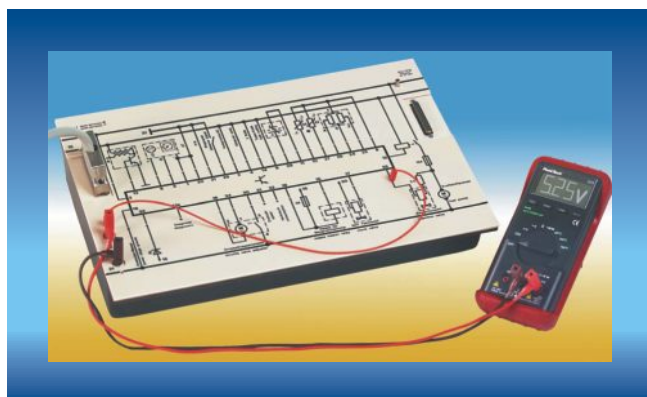
Extension "ABS valve for Motor Vehicle"

Article No.: 8-0103502-000-10-0

Extension "ABS valve for Single Axel Trailer"

Article No.: 8-0103503-000-10-0

Measurement-station for students



- ① Instructor's work place with supply duct
- ② Mobile experimental stand with demonstration test assembly
- ③ Screened, 37 way, run-around multicore cable - 5 m
- ④ Trainee work place with supply duct and grid wall mount
- ⑤ Screened, 37 way, run-around multicore cable circuit, laid in the floor.
- ⑥ Metering Station - Basic Unit with a mask for the test assembly.



System description

In order to also give the student the possibility to perform independent metering activities on complex experimental panel systems such as motor management systems, anti-blocking systems, alternators or headlamp levelling control, ELWE Technik GmbH has developed a Practice Metering Station especially for this task. With the help of the Metering Station - Basic Unit and the appropriate lay-on mask † for the experiment, every student can, independent from each other, perform measurements of the real input and output signals of the original control unit in the experimental assembly. The connection of the Practice Metering Station to the original control unit follows through a screened, 37 way all-round multicore cable with a 37 multi-pin connector.

With the elementary installation (see diagram below), all practice metering stations are connected in series (max. 15 units).

A concealed signal cable distribution would be recommendable in automotive practice rooms (see diagram above).

The signals from the original control unit of the experimental assembly in the mobile experimental stand ② are transmitted via the 5 m long multicore ③ to the 37 multi-pin Sub-D connector socket of the ducting unit at the instructor's work station ①. The 37 pin Sub-D sockets at the trainee work stations are connected to the 37 pin Sub-D socket at the instructor's work station via a protectively laid, run-around multicore cable ⑤.

In both versions, the signals in all practice metering stations are isolated from the signal distribution cable in order to avoid interference or short-circuiting i.e. ensuring that the other metering stations and the original control unit are not affected by a metering fault on one of the trainee metering units.

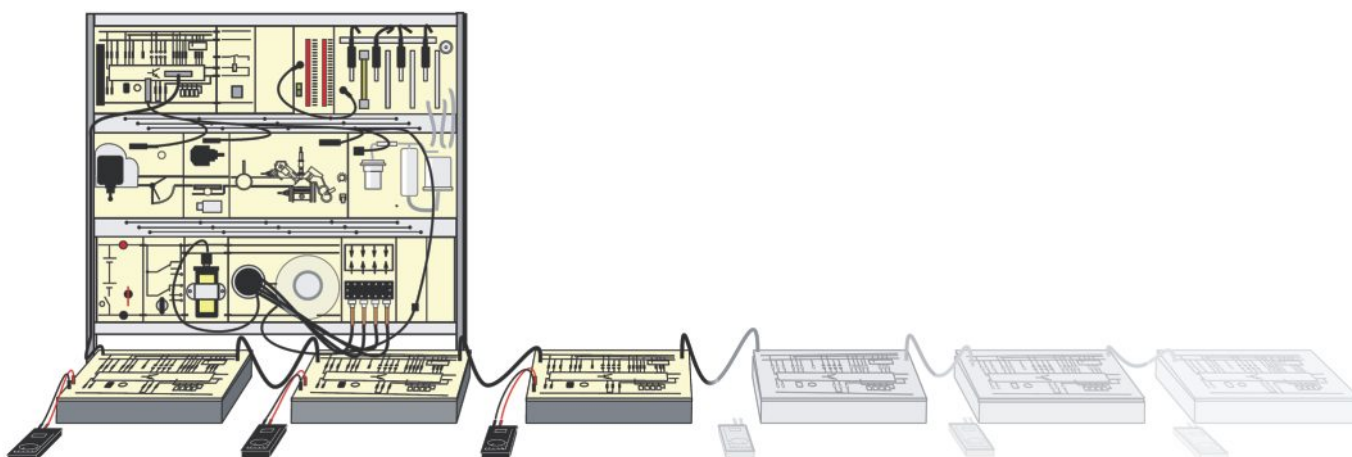


Ordering information

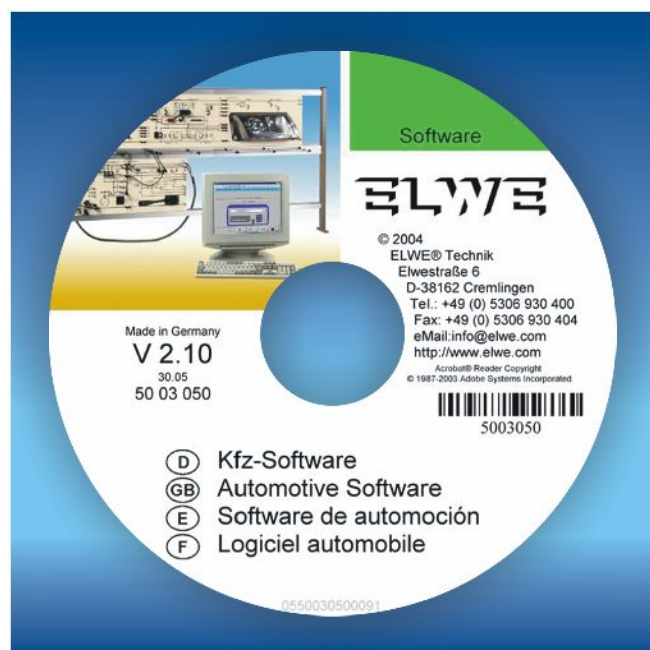
Measurement-station for students

Article No.:

8-0203301-000-10-0



ELWE software for motor vehicles



System description

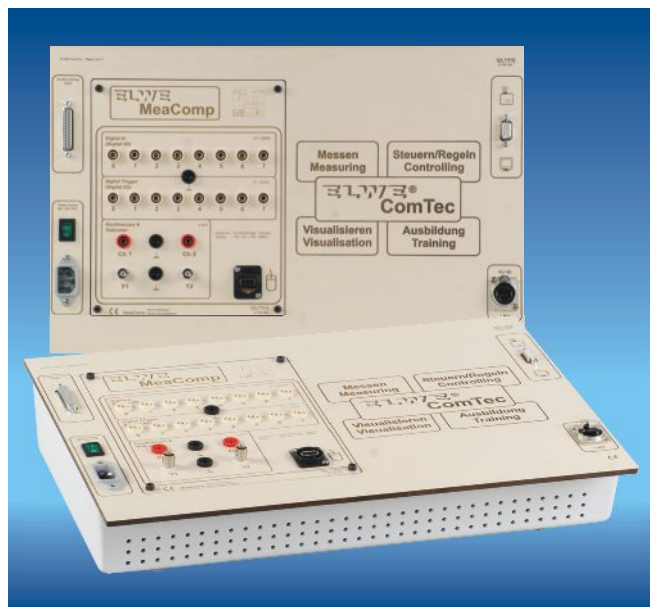
We offer a variety of software products for data processing based on measurement techniques and connection of ELWE training equipment to a PC system or, for example, the ELWE CarTec measurement system. This software allows direct connection to the training equipment, for example via an OBD II interface, and the processing and display of the values of the respective system. Please contact your local ELWE agent or us directly for additional information and a quote.



Ordering information

WinAT	-- Automatic gearbox	
Article No.:		8-5003051-000-10-0
WinEDC	-- Electronic diesel regulation Diesel	
Article No.:		8-5003052-000-10-0
WinABS	-- ABS	
Article No.:		8-5003053-000-10-0
WinM1P5	-- Motronic 1.5	
Article No.:		8-5003054-000-10-0
WinEL51	-- VAG diagnostic 1551	
Article No.:		8-5003055-000-10-0
WinCOM	-- Common rail	
Article No.:		8-5003056-000-10-0
WinFSI	-- FSI	
Article No.:		8-5003057-000-10-0
WinML4.1	-- Motronic 4.1	
Article No.:		8-5003058-000-10-0
WinMOMO	-- Mono-Motronic	
Article No.:		8-5003059-000-10-0
CAN System	-- CAN-bus software	
Article No.:		8-5003060-000-10-0

ELWE Car Tec



System description

With the development of the ELWE Com Tec component we have created a system which is able to carry out all the demands of technical measurement functions in the training and advanced training field. This equipment, which employs a PC compatible metering system, also allows the integration of the necessary interfaces and software in order to fulfill the requirements in the subject area of automotive technology, e.g.; with the ELWE Car Tec.

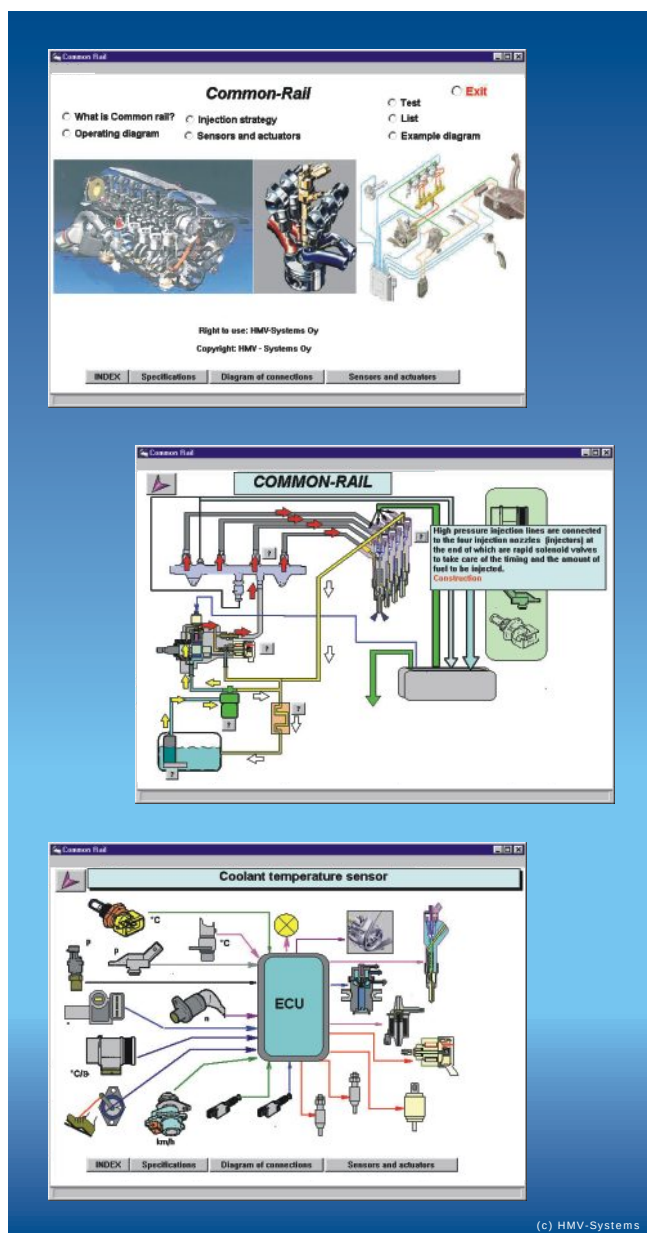
We are therefore in the position to deliver to you a communication system for your automotive product from ELWE where the appropriate software interfaces has already been installed thus avoiding the necessity of a further PC or laptop. The graphical display of measurements according to each kind of software can be projected with a beamer or transmitted through your PC network.



Ordering information

Please request an offer according to your wishes and specifications.

Training software for the automotive field of study



System description

This software enables the student to learn the mode of operation in the subject of automotive technology on an independent basis, inclusively associated functional schematics, the technical terms and practice related causes of faults. Individual themes can be worked on step-wise through dialogue with the trainees. The graphics, displaying intricate sectional and perspective drawings of components together with animated sequences and explanatory texts guide the student, according to their individual learning progress, through the chosen topic. Examination exercises are also graphically supported and enable students to instantly assess their self-gained knowledge. The results of these tests are immediately displayed following the end of the examination and depending on the circumstances, a repeat of the self-test sequence will be recommended.

Performance characteristics

Clearly arranged operational sequences, precisely illustrated details, comprehensive descriptions, guidance through operational instructions, technical documentation, transmission of data and further processing in Microsoft programmes, test exercises for students, control of learning progress.



Experimental / Training Topics

The following automotive topics are available:

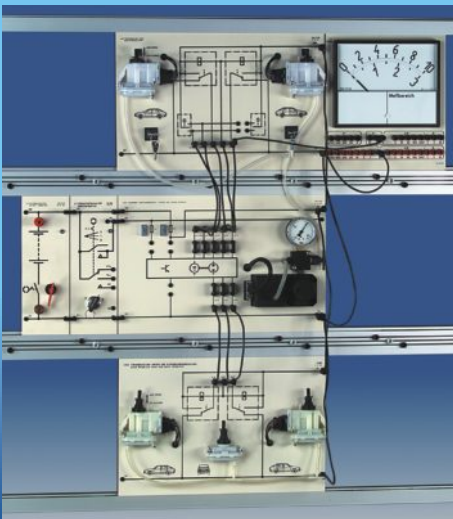
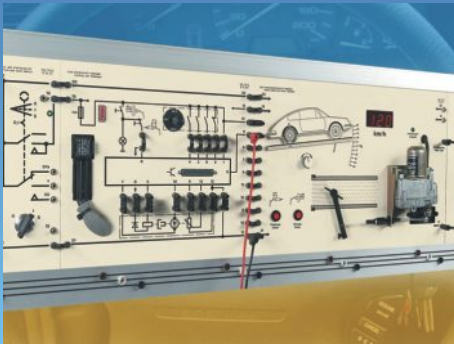
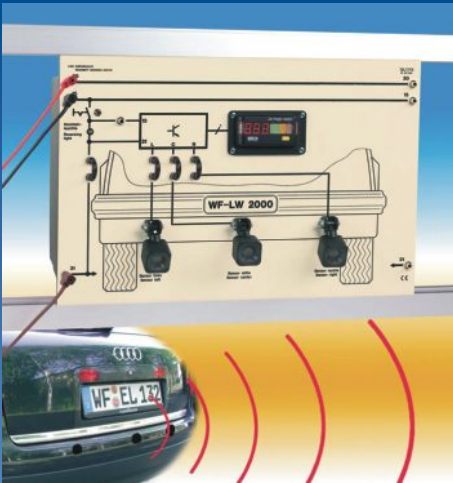
- Brake System
- Basic Electrics
- Automotive Electrics
- Ignition System
- Direct Ignition
- Motronic
- M1.5 Mono-Jetronic
- Motronic VW Vr6 EDC of the VW 1.9 TDI
- Common Rail
- Exhaust Technology
- Compressed Air Brakes
- Airbag
- CAN-bus
- ABS/ASR
- ESP



Ordering information

Please request an offer or contact your authorised ELWE Technik field representative.

General



Due to the extensive choice of training systems and training units which our Company "ELWE Technik" has to retain for its customers, we are unable to present all articles in this Thematic Catalogue.

Especially within the area of automotive technology, we would like to steer your attention to the following topics which are also included in our programme.

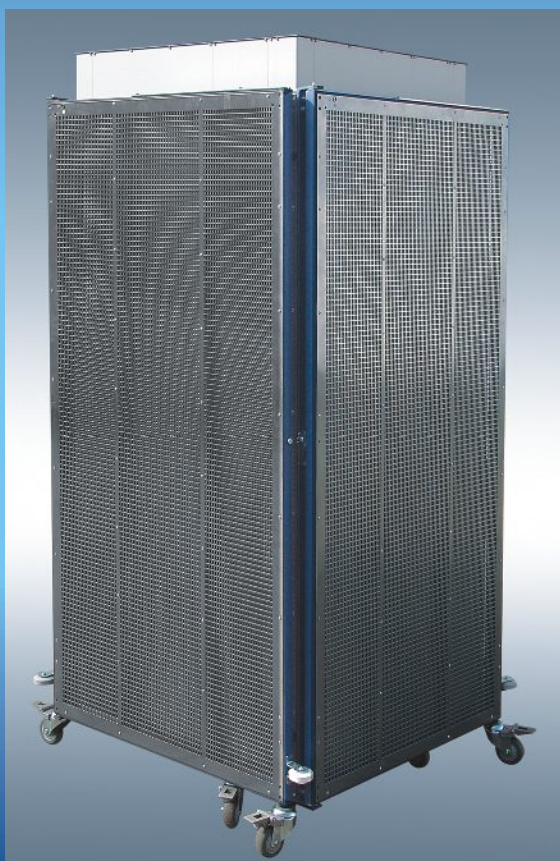
- Parking Assistance
- Cruise Control
- Headlamps
- Additional Lighting
- Indicators
- Windscreen wipers and washer equipment
- Fuel Management
- Lambda Probe
- Fuel Supply and Flow Metering
- Central Locking



Ordering information

We would be only too pleased to submit an offer to you on these topics and depending on the circumstances involved, we can realise and implement special requirements in given thematic areas at short notice. Please contact us and consider your wishes as being our assignment.

Laboratory Furnishings & Training Station



Furnishings

In addition to around 5,000 different products for training systems and appliances, ELWE Technik GmbH offers a multitude of standardised possibilities for laboratory furnishings to satisfy all customer demands. Parallel to the standardised items we are also capable of producing customised products in our own furniture workshops where individual requirements can be manufactured in a variety of materials such as aluminium, steel pipe, wood and plastics. You can choose within a wide range of possibilities where, but quite naturally, you can submit plans for your own special environment e.g. front panels on which all necessary connections for mains, PC networks and compressed air can be installed together with the possibility of integrating metering units and power supplies into the assemblies themselves. One of our most innovative systems is a multifunctional, mobile "Training Station" which presents virtually unlimited applicational possibilities in all areas of training and advanced education. In practical terms this means that our practice related systems can be planned, installed, extended, if necessary programmed or parametered and finally tested for nearly all areas of the study curriculum.

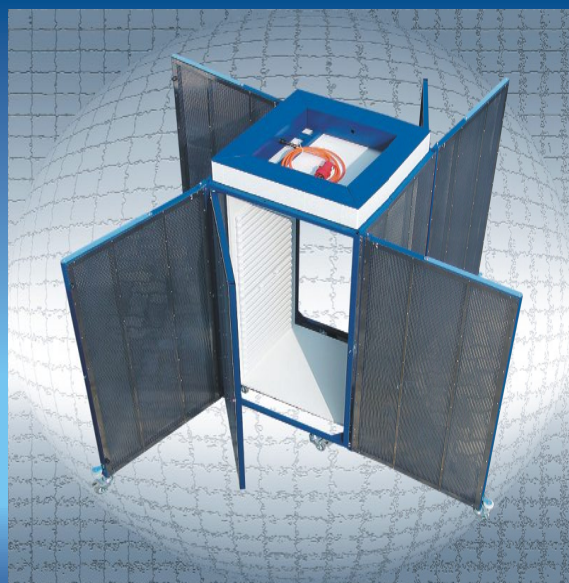
The mobile training station offers huge economical advantages over classical tutorial environments in laboratories and training workshops including the possibility to apply various and flexible training methods.



Ordering information

Please contact our sales staff who will be only too pleased to assist you in the conception and planning of your class-rooms. Classroom furnishings from ELWE, the elegant, efficient and practical solution for your training environment.

- - High quality - - Ergonomic - - Practical - -
- - Robust - - Low cost - -



- 1 Validity
We supply our products exclusively according to the General Terms of Business stated below. These will be valid for all of our services unless expressly stated otherwise in writing.
- 2 Conclusion of agreement
 - 2.1 Our offers are subject to change without notice. Orders will only be accepted if they have been acknowledged by us in writing or by fax. The same will apply for additional agreements and changes of agreement.
 - 2.2 Figures, drawings, weights and measurements are only be approximate values.
- 3 Prices
 - 3.1 The prices are net amounts plus VAT. They include delivery without erection or assembly, ex works, without packaging.
 - 3.2 We will charge the following prices for packing and transport to subsequent domestic buyers:
50% of the purchase order value for orders with a purchase value less than 20,- Euro.

25 % for a purchase order of	20,- to 100,- EUR,
15 % for a purchase order of	100,- to 200,- EUR,
8 % for a purchase order of	200,- to 350,- EUR,
1,5 % for a purchase order of more than	350,- EUR.
- 4 Terms of payment
 - 4.1 Our invoices are to be paid in Euro within 30 days from the date of invoice without deduction for discounts.
 - 4.2 If the buyer is in arrears, we are entitled to claim interest on these arrears at a rate applied by the Federal German Bank to its main refinancing operations, plus one percentage point (1%). We reserve the right to a higher rate if necessary.
 - 4.3 In the case of justified complaints regarding our services, a possible right by the buyer to withhold payment will be restricted to the amount of payment required to cover the fault. If we have given security, the right of withholding payments will be excluded. The withheld security may be paid off with a bank surety.
 - 4.4 The buyer may only deduct an amount from our charges, if these are indisputable or have been firmly established.
 - 4.5 Only our main accounting department in Cremlingen will be entitled to collect these charges.
- 5 Dates of delivery
 - 5.1 The date of delivery quoted on our acknowledgement of order will, at the time of taking the order, be a non-binding first possible date. We reserve the right to change the date of delivery due to manufacturing or transport reasons.
 - 5.2 Delivery on schedule assumes that the buyer does not wish to change our services after receiving the specific acknowledgement of order. Agreed changes may reasonably extend the delivery deadline without prior agreement.
 - 5.3 Part deliveries are acceptable.
 - 5.4 In the event of breakdowns through no fault of our own, e.g. due to fires, strike actions or lockouts and in the event of other delays of delivery caused by an act of God at our factory or at the location of other suppliers, the delivery deadline will be extended accordingly. This is unless the buyer proves that further waiting time is no longer acceptable.
- 6 Transfer of risks
The risk is transferred to the buyer, even when prepaid freight has been provided in the agreement.
 - 6.1 In the case of delivery without erection or assembly, when the shipment of the operational goods has been delivered to a carrier or has been collected, the packaging must be completed with great care. The type of shipment will be selected to the best of the supplier's judgement. Upon request and at the expense of the buyer, the supplier will insure the shipment against breakage, damage in transit and damage caused by fire.
 - 6.2 In the case of delivery including the erection or assembly on the day of acceptance.
 - 6.3 If the shipment, the delivery or the beginning of or the erection or assembly itself be postponed upon request by the buyer or due to reasons justified by the buyer, the risk will be transferred to the buyer for the time of the delay; however, the supplier will be obligated to supply the necessary insurance upon request by and at the expense of the buyer.
 - 6.4 We will organise the mode of transport taking into consideration the requirements of the buyer to a large extent. Additional costs caused by differing requirements by the buyer will be charged to his account.
- 7 Delivery, assembly and inspection
 - 7.1 The buyer must supply temporary staff for unloading the lorry and for the transport to the place of use at the buyer's expense and in co-operation with us.
 - 7.2 The assembly provided in the agreement will only begin when the interior of the place of use has been completed. In particular the floor must be laid and the walls and the ceiling must be painted. The fulfilment of safety requirements by the customer regarding access to the place is mandatory.
 - 7.3 If we undertake the erection, we will only undertake the assembly and the erection of the furnishings. The furnishings and equipment assembled by us must always be connected to the domestic electrical installation at the place of use, i.e. from our supply terminal to the respective piece of furnishing. The exact position and dimensioning of the points for the connection of the furnishings to the domestic electrical installation must be co-ordinated with us.
 - 7.4 Locations, in which delivered equipment is stored, must be lockable.
 - 7.5 Special features of the floor and the walls, such as installed cables, underfloor heating and others, must be declared by the buyer before the beginning of the assembly, otherwise we will not be liable for any possible damage and consequences resulting hereby. The electricity required for assembling will be supplied free of charge at the location of assembly.
 - 7.6 If the date of assembly is not kept for reasons that lie within the responsibility of the buyer, the fitters e.g. could not assemble the equipment due to poor building progress or a lack of electrical energy, our resulting costs and the costs for a delay of assembly that has not been agreed upon or a delay of the assembly date will be covered by the buyer.
 - 7.7 After finishing the assembly, the final acceptance of the assembled furnishings must be carried out immediately in the presence of our fitter responsible for the assembly. The buyer must be informed in good time about the finished assembly.
 - 7.8 If the transport is provided by one of our company-owned lorries, the beneficiary must check the individual positions on the delivery note in the presence of our agent or the person delivering and acknowledge receipt. Later complaints about missing items will not be accepted.
- 8 Reservation of ownership
The ownership of the goods supplied and/or assembled by us will remain with us until all the costs arising from our business transaction have been fully paid.
- 9 Warranty
 - 9.1 Immediately upon delivery, the buyer must thoroughly check the supplied goods. Identified defects must be submitted in writing within a period of two weeks.
 - 9.2 Once the goods have been accepted, any defects which were obvious at the time of acceptance are exempted.
 - 9.3 Our warranty covers one (1) year for any furnishings supplied by us.
 - 9.4 Our warranty covers six (6) months for electrical, gas, water and pneumatic fittings mounted into the furnishings as standard subassemblies or switchgear as well as for gas, water and pneumatic solenoid valves and related subassemblies, also for contractors, fuses, remote switchgear and auxiliary switches as well as for supplied refrigerators, incubators and drying apparatus, laboratory rinsers and ventilators.
 - 9.5 Our warranty covers six (6) months for training equipment.
 - 9.6 For material, manufacturing or mounting defects we either provide replacement or repair. The buyer will only be entitled to a replacement or a reduction in price if further attempts to repair are deemed unreasonable. The rejected goods may only be sent back with our approval.
 - 9.7 Slight deviations to dimension and shape, as well as non-correctable colour deviations due to the nature of the materials, will not entitle the buyer to complain. Otherwise we reserve the right to allow changes from the sales documents, the offer and the confirmation of the offer, if the changes are technically necessary or constitute a technical improvement.
 - 9.8 We will not be liable for the loss or damage of delivered goods that have been stored by the buyer or the beneficiary of the goods before the final acceptance due to reasons that lie within the buyer's risk (e.g. due to non-progressing building works).
- 10 Place of performance, place of jurisdiction
The place of performance for our services and the payment by the buyer is Cremlingen / Germany.
The place of jurisdiction will only be Braunschweig / Germany (postcode: 38100).

We can offer you a variety of different equipment and we would be pleased to send you an individual offer.
Please let us know your requirements. If you want we can also send one of our skilled consultants to you.

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