Simulators

# VB 4503E HYBRID AND ELECTRIC SYSTEM SIMULATOR - electrical

This simulator allows the study of all the operating features of an automobile with a hybrid system (internal combustion engine and electric motor) or completely electric.

It is composed of a panel operated by computer with a silk-screened diagram which explains the positioning of the car components and indicates the features of the system by showing different colours on the panel. Moreover light indicators are on the panel to show for the operation of the system.

Through the computer, the teacher can monitor the entire system and the operational states entered by the students. Moreover, the faults can be inserted and checked by the teacher and with the use of the software practical and theoretical topics can be constantly followed.

An english manual is supplied together with thw unit.

The silk-screened panel shows:
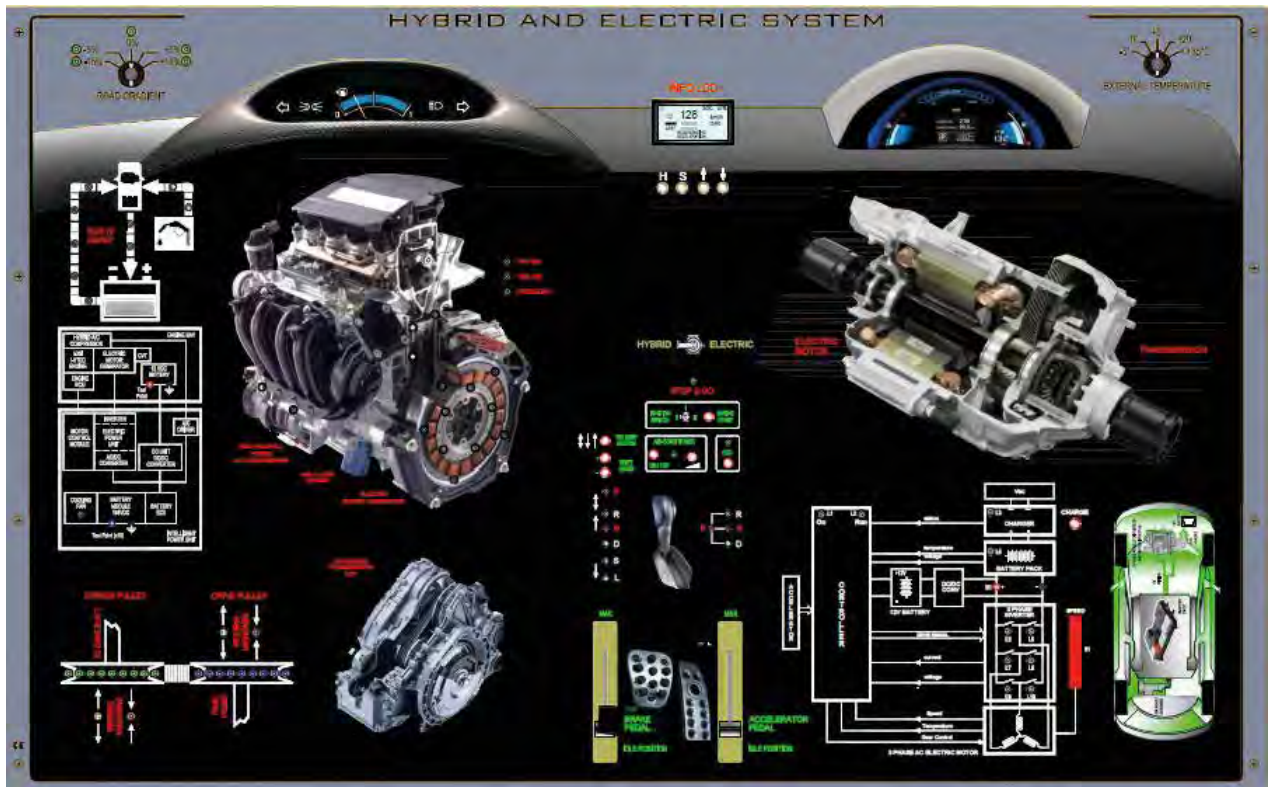
Indicative picture for reference only

Hybrid system:

- Intelligent Power Unit
  - Battery unit (Ni-MH cells)
  - ECU battery
- Electric Unit:
  - Synchronous 3-phase Electric Motor/Generator with permanent magnets
  - Eco Assist System
- Gasoline Unit :
  - Gasoline Engine
  - i-DSI
  - i-VTEC
  - ECU
- CVT
- A/C Compressor- dual-scroll hybrid mode
- Cooling Fan
- Motor Control Module
- Electric Power Unit
- DC Unit
- A/C Driver

Electric System

- High-voltage battery module, (Li-ion cells)
- Recharging system by external AV
- 12 V battery and recharging
- Electric motor control system
- 3-phase inverter for managing the electric motor
- Inverter control signals and sensors for the voltage and current measurement
- 3-phase AC motor with integrated transmission system
- Integrated sensors in the AC three-phase motor

The simulator is complete with Training Software and with Control Software.
The software guides the student through the learning, simulation and experiments performance, tests and troubleshooting.

Approx. weight and dim.:

Cm: 104x35x66
Net Weight: kg 16

VB 4504 EMISSION CONTROL

Didactic equipment - This Trainer studies the devices and the systems used for controlling and reducing the emissions of gasoline engines. The trainer illustrates the operation, the electric signals and all the sensors and the actuators that are used in modern automobiles to reduce the emission of noxious gases. The Trainer covers the following study and experiment subjects:

1. General structure of the management system for a gasoline engine
2. Composition of the exhaust gases in Otto cycle engines
3. Preparation and control of the fuel
4. Lambda regulation
5. Re-circulation of the exhaust gases, anti-evaporation of the fuel and thermal post-combustion
6. Sensors and actuators used in the systems for reducing the exhaust gas
7. Control unit (ECU) and CAN-BUS
8. Analysis of the electric signals of sensors and actuators
9. Troubleshooting with traditional instruments
10. Troubleshooting with OBD self-diagnosis

Approx. weight and dim.:

Cm:	*62x23x43h*
Net Weight:	*kg 10*

Indicative picture for reference only
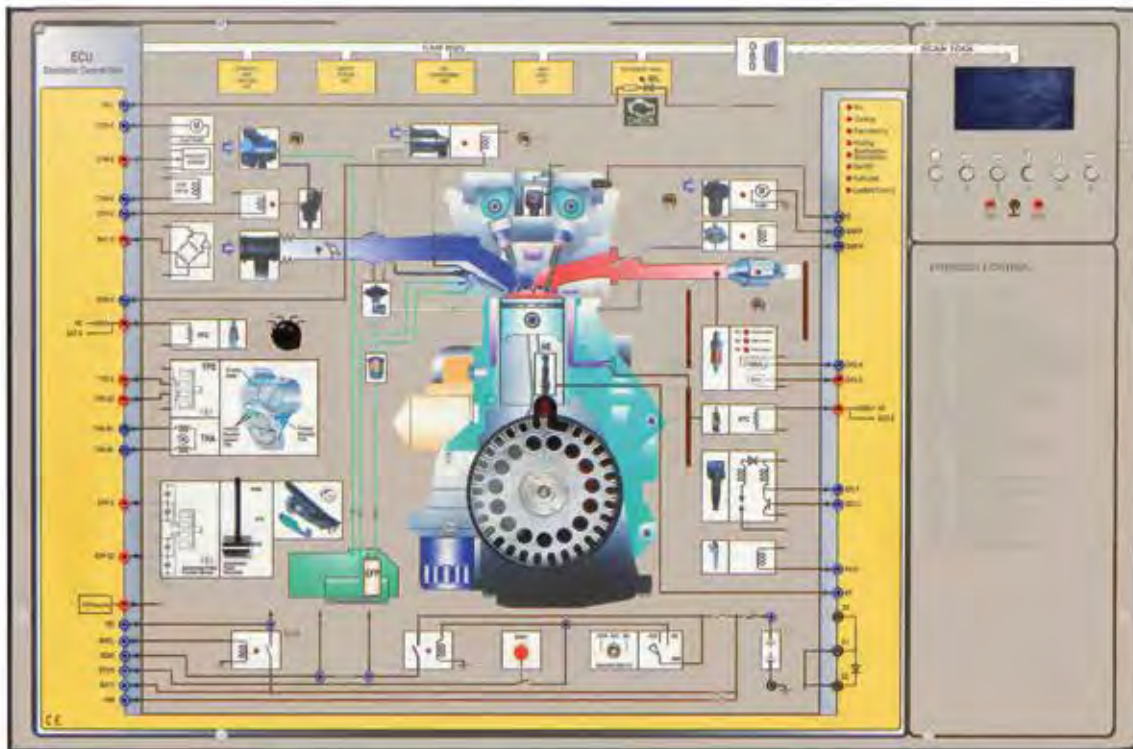
Main features

- *Autonomous operation*
  The trainer is able to operate autonomously, without connection to PC. Moreover, it is provided with a USB interface to connect to a computer for data acquisition, graphic visualization, eTraining.

- *Use of some real components*
  The trainer is provided with an electric motor, with phonic wheel and magnetic sensor for position and rotation speed. The electric motor 'simulates' the operation of the real engine (all the operations are made at a speed 10 times lower than the real one of the engine: between 80 and 600 rpm). This allows visualizing on LED the operation of the different devices: spark plugs, injectors, etc. On the LCD display the actual speeds are visualized (rpm from 800 to 6000). All the signals (on LED and terminals) is synchronized with the rotation of the phonic wheel and this makes 'real' the operation of the trainer.

- *'Real' signals*
  All the signals at the test points are real.
  They are equal in value, shape, time to the signals found in a real automobile.

- *Graphic Display and Keyboard*
  The trainer uses a graphic display and a keyboard for the visualization of the interesting parameters during the operation and for the selection of quantities and functions to be visualized.

- *'Integrated' Instrumentation*
  The Trainer contains the Instruments that are normally used on the field for the operation of troubleshooting in automobiles, both the 'traditional' ones, such as the multimeter, and the 'new' ones, such as the ScanTool for the OBD diagnosis.

- *Digital voltmeter*
  It allows performing all the voltage measurements on the system, without the need for external instrumentation.

- *Digital oscilloscope*
  It allows checking the waveforms at all the Test Points of the system and to operate in the same modes of a real oscilloscope.

- *Tester OBD-II (SCANTOOL)*
  It allows operating in the activities of fault finding in the same modes of a Scantool connected to an automobile through the OBD socket.

It is supplied with manual in English language.

VB 9148E COMMON-RAIL DIRECT INJECTION SIMULATOR FOR DIESEL ENGINE - electrical

This simulator allows the study on HDI (CDI - CR) injection systems for diesel engines.
It is composed of a screen panel with a mimic diagram which shows the entire analysis of the circuit of the fuel of the electrical/electronic control circuit and of all its components. The whole cycle of a common rail direct injection diesel engine is replicated on the panel.
The behaviour of components and circuits can be simulated on the basis of operating conditions that students and teachers can control directly on the panel or through computer. Teachers can keep continually under control the simulation by the measuring through analogue and digital devices so that the students can carry on working on the fault finding without any interruption.
The software is structured so to balance theory with practical experiences, troubleshooting and tests.

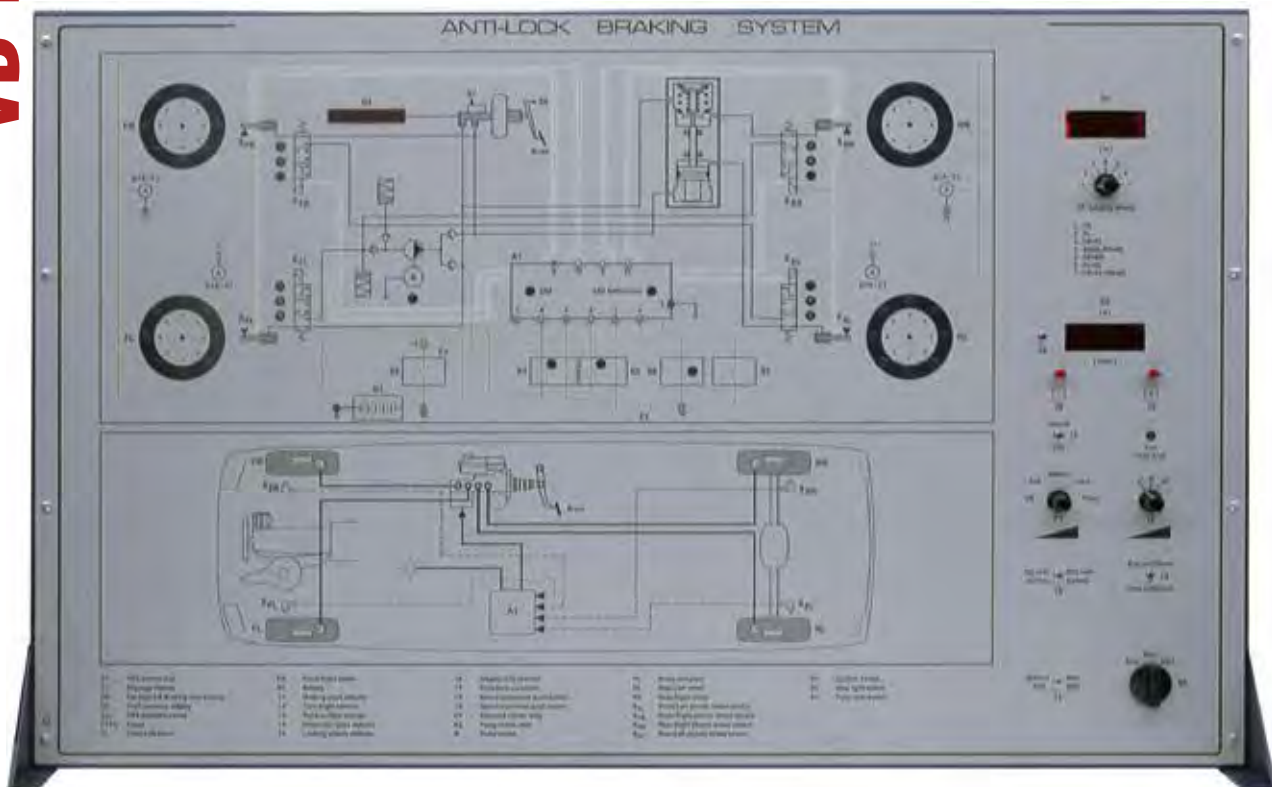*Indicative picture for reference only*

Main components:
- Common rail with
  - electro-injectors
  - fuel pressure limiting valve
  - pressure sensor
- sensors for:
  - accelerator pedal position
  - over-supply pressure
  - air temperature
  - engine temperature
  - engine rpm
  - air mass
- electronic control board
- pneumatic actuator for the variable geometry turbine
- computerized workstation connected to the management system
- fuel tank with pre-filter
- high pressure electro-pump
- flow limiter

Approx. weight and dim.:

Cm: 104x35x66h
Net Weight: kg 16

VB 12274E ABS SIMULATOR - electrical

This simulator has been created to show how modern car ABS systems operate.

Experiments :

- *How ABS operates:*
  - *with one wheel speed sensor disconnected*
  - *when wheels are rotated at different speeds*
  - *when wheels are rotated at same speed*
  - *with destroyed hydraulic valve*
  - *with hydraulic valve stuck*
  - *with different relative speed turn of wheels*
- *How to detect:*
  - *Low fluid level*
- *How to measure:*
  - *Pressure during operation*
  - *Different control signals in the ABS system*
- *How Hydraulic ABS valve operates*
- *How brake system works:*
  - *when the electronic brake unit is disconnected*
  - *when there is leakage*
- *Self-diagnostic control*
- *Fault diagnosis process*

An educational manual with a theoretical and practical study is supplied.

Approx. weight and dim.:

Cm: 104x35x66h
Net Weight: kg 16