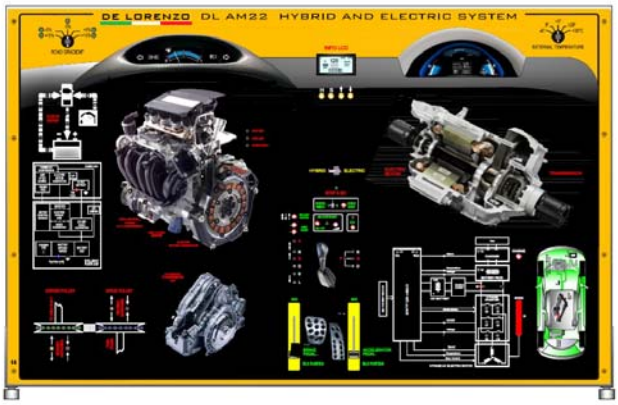
AUTOTRONICS

HYBRID AND ELECTRIC SYSTEMS



DL AM22

With this simulator it is possible to study all the operating characteristics of an automobile with a hybrid system (internal combustion engine and electric motor) or totally electric.
The simulator consists of a panel operated by PC with a mimic diagram for the clear positioning of the components. The different zones of the mimic diagram are presented with different colours and shades to emphasize the peculiar characteristics of the system. The mimic diagram is also fitted with light indicators so as to enable the observation of the operation of the system.
It is possible to visualize on the screen of the PC the available information and this allows a continuous monitoring of the system. The operating conditions are entered by the students. The insertion of faults is carried out through the simulator or from an external PC.
The simulator is provided with a software to enable students to follow step-by-step the theory and the exercises. The whole exercise procedure is carried out on the simulator. The system is also provided with technical manuals for theory and exercises.

Hybrid system
Gasoline Unit, including:

- Gasoline Engine, with a bank of 4 cylinders and multipoint sequential injection
- i-DSI: Intelligent Double Sequential Ignition
- i-VTEC: Intelligent Variable-valve Timing and Electronic-lift Control
- Engine ECU (electronic control unit for managing the thermal motor)

Electric Unit, composed of:

- Synchronous Three-phase Electric Motor / Generator with permanent magnets
- Eco Assist System

Continuously Variable Transmission (CVT)
Dual-Scroll Hybrid A/C Compressor
Intelligent Power Unit, that includes:

- Battery Module, composed of Ni-MH cells
- Battery ECU, electronic control unit for managing and controlling the charging state (SOC) of the Battery Module
- Cooling Fan, for cooling the battery module
- Motor Control Module, for the synchronization of the electric motor with the petrol engine
- Electric Power Unit, with inverter for power supplying the electric motor and AC/DC converter for the current supplied by the motor operating as a generator
- DC Unit, it regulates the quantity y of direct current at 12 V supplied by the DC-DC converter
- A/C Driver, for managing the Dual-Scroll Hybrid A/C Compressor

Electric System
The sub-systems that form the fully electric solution, that are analyzed through the simulator and that are represented on the synoptical panel are the following:

- High-voltage battery module, made of Li-ion cells
- Recharging system with external alternate voltage
- 12 Volt battery and its recharging
- Electric motor control system
- Three-phase inverter for controlling the electric motor
- Inverter control signals and voltage and current measurement sensors
- Three-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 Training Software guides the student through the following phases: learning, simulation and experiments performance, tests and troubleshooting.