



HYBRID SYSTEM



DL AM20

With the simulator DL AM20 it is possible to study all the operating characteristics of a hybrid system that uses a parallel coupling between an internal combustion unit and a three-phase electric motor.

This simulator is an educational system designed in vertical frame, bench-top, so the students have the capability to watch the theoretical and practical study of the automotive systems. It includes colour mimic diagram that clearly shows the structure of the system and allows the location of components on it.

The simulator consists of a panel operating by PC with mimic diagram for the clear positioning of the components. The various zones of the mimic diagram are presented with different colours and shades to emphasize the peculiar characteristics of the system. The mimic diagram is fitted with light indicators so as to enable the observation of the control.

The display of the information available at the PC monitor allows the continuous monitoring of the educational system.

The operational conditions are entered by the students. The insertion of faults is carried out by the PC.

The simulator is accompanied by relevant software to enable the student to follow step-by-step the theory and the exercise. The whole exercise procedure is carried out on the simulator. The system is accompanied by technical manuals for theory and exercises.

The subsystems that form the hybrid solution and that are analyzed by means of the simulator and shown on the synoptical panel are the following:

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 of direct current at 12 V supplied by the DC-DC converter
- A/C Driver, for managing the Dual-Scroll Hybrid A/C Compressor

The simulator is provided complete with Training Software and Control Software.

The Training Software guides the student through the following phases: learning, simulation and experiments performance, tests and troubleshooting.