

EAU-961

Diesel Injection Engine Training Unit

With particle filter

Didactic equipment for studying the operation of direct diesel injection engines with a common rail electronic control system and particle filter. The equipment incorporates the latest generation of common rail 4-cylinder in line diesel engine (1.6L Duratorq TDCi 110CV) with particle filter, mounted on a mobile functional support in running order, equipped with all the components and accessories necessary for its correct operation under similar conditions to those in a vehicle. Engine developed by FORD and PSA.

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Teaching application

The teaching model is based on activities with genuine car parts arranged to facilitate the student's learning process:

- The application is real, with all of the parts of the motor to be learned about effectively integrated (verification of the injection system operating parameters, analysis of gases, starter and charging circuits, reading diagrams, etc.).
- Help in significantly reducing procedural activities learning time, thanks to the easy accessibility to the components, connectors and verification points. In addition, the characteristics of a car mounted motor are preserved.
- The instructor has the possibility of demonstrating the various systems and how to check the symptoms of different malfunctions.
- It enables students to develop diagnostic capabilities using professional tools and to repair break-downs.
- It is motivational for the students.

Teaching characteristics

The student will develop many skills using this equipment:

1. Motor and system maintenance.
2. Instrument operation for verification and diagnosis.
3. Simulation of malfunctions, verification and symptom recognition.
4. Diagnosis and repair of break-downs.
5. Circuit Analysis.
6. Diagram interpretation.
7. Verification and analysis of components and systems.
8. Use and interpretation of technical documentation.
9. Finding and identifying components.
10. Maintenance of starter and charging systems.



Teaching features

Integrated into the control panel, there is a system enabling the measurement of static and dynamic signals from the injection system, as well as the relays used by the system, analysis, diagnostics and repair of break-downs, including:

- Terminal plate for the analysis and diagnosis of the electrical-electronic signals used in the system.
- Module to generate malfunctions and breakdowns representative of those that could really appear in a vehicle, including the starter and injection systems as well as others which control the operation of the motor.
- Equipment usage authorization switch.
- Indicators for batteries, alarm groups, operating hours, etc.
- Adjustable accelerator, ignition key, instrument panel, safety switch, ON-OFF switch.



Classroom management and student evaluation via SIRVAUT software integrated in the equipment.

User Manual.

Contains equipment usage rules, characteristics, maintenance, safeties, and a theoretical description of the operation of the different systems that are incorporated in said trainer.

Practice Activities Manual.

Proposes the different types of practical that can be carried out on the trainer by students. Individual identification of components, identification of systems, verification of sensors and actuators, verification of U.C.E. input signals, verification of U.C.E. output signals, reproduction and identification of fault symptoms, fault seeking and location, reading of diagnostic codes, proposed defect resolution, virtual repairs, etc.

Teachers Manual.

A specific manual for the teacher, which indicates potential faults that can be generated on the trainer, its usage, and which components or systems it affects. This manual also includes solutions for student's practical activities, in addition to presenting additional complementary activities.

Wiring diagram manual.

This is a manual of diagrams similar to that used in automobile repair workshops that will help in the activities where circuits are followed, in locating and identifying installations, and in determining the breakdowns that have been initiated in the trainer.



Technical characteristics

- Direct Diesel Injection system with common rail electronic control at a pressure of 1600 bar, equipped with pre-injection, injection and postinjection.
- Complete anti-pollution system with: Catalyser, FAP particle filter and FAP system additive tank.
- Intercooler for cooling intake air.
- Variable geometry turbocompressor with electronic control cap.
- The engine incorporates the following sensors:
 - Hot wire air measurement sensor.
 - Antiparticle filter pressure sensor.
 - After catalyser exhaust gas temperature sensor.
 - Boost pressure sensor.
 - Intake air temperature sensor and post-turbo air intake temperature sensor.
 - Revolution and crankshaft position sensor.
 - Camshaft position sensor.
 - Ramp high-pressure sensor.
 - Diesel oil temperature sensor.
 - Vehicle speed sensor.
- Charging system composed of an alternator with incorporated regulator, intelligent regulation control system and charging indicator on the instrument panel.
- Accelerator electronic.
- Electronic starter system with passive antitheft (PATS) and a status indicator.
- Fuel tank with a level indicator on the instrument panel and fuel cap opening sensor.
- Complete cooling circuit.
- Electronic Control unit and standard diagnosis EOBD (EOBDII) connection.
- Battery.
- Instrument and Control function panel with:
 - RPM indicator
 - Motor temperature indicator
 - Coolant temperature
 - Fuel level indicator
 - Oil pressure indicator
 - Battery charge indicator
 - Motor malfunction warnings
- Safety systems made up by:
 - Starter block switch.
 - Emergency switch.
 - Internal protection of test terminal strip against potential short-circuits to safeguard the electronics in the systems.

BREAKDOWNS

Using a repair program system, the trainer can introduce malfunctions or breakdowns to the motor.

There are two options:

- Interactive computer-aided virtual repair system for breakdowns (SIRVAUT) which enables not only breakdown analysis but also virtual repair generating a history log for evaluation by the instructor.
- Manual breakdown repair system (using switches).



- Low oil pressure triggers an alarm and the motor stops.
- Belt guard with a safety micro-interrupter.
- Moving parts and hot areas are protected.
- The equipment is mounted on wheels.
- Dimensions and Weights:
 - Equipment dimensions: 1.150 x 1.290 x 1.425 mm.
 - Package dimensions: 1.400 x 1.500 x 1.650 mm.
 - Package weight: 430 Kgs.

New original components

An original new motor (not rebuilt).



Relays, fuses, and an anti-start (PATS) employed in the system.



Operating hours timer.



direct diesel injection engine trainer

- Genuine new motor.
- Antipollution system (with particle filter)
- Power supply system.
- Starter and charging system.
- Security System.
- Diagnosis.
- Breakdown repair.

