❖ **Image**

❖ **General features**

Power supply:

- The fuel for Engine

- 220V - 50Hz for operation of Computer and Oscilloscope

Operating voltage:

- Battery 12 V/35A, charge by internal power supply, with electronic protection against overloads and short-circuits.

- The equipment is provide with wheels and includes a working top with key-locked drawer.

- The structure is of steel sections painted with durable epoxy paints

Dimensions:

-1100x1000x1200 mm

Course books

- The Trainer comes with a course book, which includes:

– A section dedicated to the theoretical treatment

❖ **Overview**

Multi-Point injection and ignition system, this trainer offers a complete range of experiments on one of the most advanced electronic control systems for injection and ignition. It is use in four-cylinder engines with multi-point intermittent fuel injection. The system includes an electronic unit that detects the signals from the various sensors.

❖ **Features**

1. Toyota engine of model 4A-FFE completed

2. Motor-driven pump and its driving relay

3. In-line filter with pulsation dampening

4. Double Lambda sensor for reducing pollution and controlling the catalytic converter

5. 4 injectors with manifold of transparent plexiglass

6. Fuel recovery pipe

7. Solenoid valve for recirculation fuels vapors

8. Sensor for the pressure of intake air with its own simulator

9. Sensor for the temperature of the engine with its own simulator

10. Potentiometer of the accelerator pedal for setting the engine load

11. Ignition key with locking system

12. Electronic control unit for a good operation of the system

13. Body computer for controlling the diagnostic line via OBD1 connector

of the topics and to a description of the circuit or component

– A section which acts as a guide to the learner for the practical experiments and for carrying out measurements, adjustments and calibrations of electrical circuits and electronic devices

– A section on fault finding the programmed faults

❖ **Learning objectives**

Adjustment of the ignition angle, carried out with a stroboscopic lamp in relation to the:

– Engine speed

– Absolute pressure in intake manifold

– Position of butterfly valve

– Engine temperature

– Battery voltage

Analysis of the control of injection times *(with oscilloscope or diagnostic tester)* in relation to the:

– Engine speed

– Absolute pressure in intake manifold

– Temperature of the intake air

– Engine temperature

– Battery voltage

– Lambda factor

Analysis of the waveform of the actuator-driving signal in constant idling with the oscilloscope

Analysis of the waveform of the signal coming from the speed sensor with the oscilloscope

Checking the conditions for cut-off at the

14. 4 spark plugs

15. Static ignition coil 16. Most advanced gazol

17. Analyzing the control of ignition angle

18. Analyzing the waveform of the signal enabling the motor-driven throttle valve

19. Microprocessor faults simulators, especially designed to enable the Teacher to inset various types of faults in the system and then to assess the troubleshooting processes carried out by the students with their proper instruments. The system can restart its right operation only after the student has typed the code of the faulty component using the same simulator.

20. Test points on all the connections of the electric components, for a thorough monitoring of the system.

21. Computer connection RS 232 serial interface

22. Trainer power supply: 220 V-50 Hz with magneto thermal differential switch with warning light and emergency stop push-button

23. Trainer operating voltage 12 VDC, generated by a battery and battery charger

24. Trainer fitted with castors and a working top with key-locked drawer.

25. Structure in steel sections painted with epoxy paints.

26. Exhaustive textbook in English

27. Diagnostic tester *(Vietnamese and English)*. Professional PC based for faults finding can be used for: reading and display engine parameters,

maximum number of engine speed

Analysis of faults, irregularities, and operational defects:

– Insertion of non destructive faults *(cut-off, short circuits, contact resistances, etc.)* by means of the microprocessor system of fault insertion

– Fault-finding methods with traditional instruments *(millimeters, oscilloscope, etc.)*

– Data collection and reading, signaling of malfunctions, fault location by guided diagnosis and information upon operator's request, given through diagnostic tester *(Tester is a computer based)*

reading and display faults, erasing memorized faults, activation of actuators

28. Interactive software SW can be used by a PC *(excluded)* connected to the trainer via a suitable serial interface

29. Computer, control software and oscilloscope is included as picture above

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