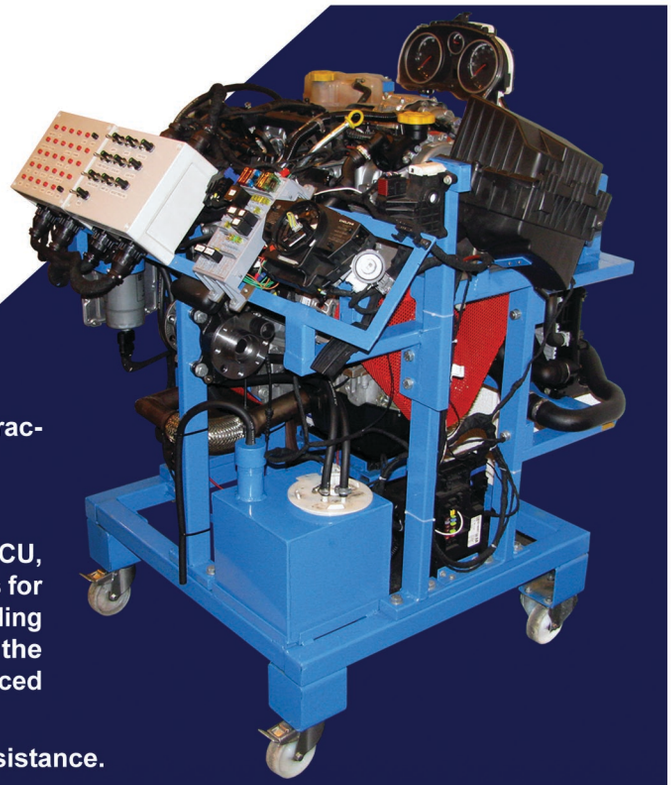
THE EDPRO13
Engine Simulation Rig

FOR THE EDUCATION & TRAINING SECTOR



Specification

A full running and moveable engine test rig that can be used as a practical classroom teaching aid.

Based on a Vauxhall Astra diesel engine Euro 5 1.3 with CAN

Fitted with adaptor run box, clocks and gauges, wiring harness, ECU, ABS, fuel tank, break out boxes with heavy duty snap on connectors for intensive use, battery, cooling and exhaust systems, turbo, fault finding facility emphasis on new technology, safety, the curriculum, the environment and value for money. Where possible we have introduced faults for a variety of conditions.

1.Open circuit 2.Short to voltage 3.Short to ground 4.High resistance.

There may be some circuits where a short to battery will not be possible due to the risk of damaging components. Another design feature is a central point for taking voltage readings and scope measurements without having to remove connectors. The reason for this is that constant removal of connectors does damage them and makes them unreliable.

On top of this we will integrate sub systems like the electrical functionality of the ABS controller. This will include the wheel speed sensors.
This unique product will allow trainers to set faults within the electronic management system. Allowing students to fault find using diagnostic equipment with live scenarios.

Functionally excellent and very user friendly

This would be useful in many different learning scenarios and environments

Another advantage was the ABS system as it also allowed fault finding to be shown

David Kirkman - The GM Academy

You had the ability to simulate short circuits, open circuits and high resistances on a wide range of sensors and also having ABS speed sensors fitted that produced wave patterns, when testing with an oscilloscope and operated the speedometer.

The engine test rig was fitted with two break out boxes, one allowed students to diagnose faults and also allowed an oscilloscope to be connected in order to identify waveforms from various sensors such as, crankshaft position sensor, accelerator position sensor and injectors.
The other break out box enabled the tutor to simulate the short circuit, open circuit and high resistance faults as previously mentioned.

Martin Wilson - Brooksby Melton College

The simulation rig comprises of 2 electronic centres:

1

The first centre is used for wave form measurements and can be customised to bespoke client requirements. Features typically include a test point that covers the ECU connector for use with a scope when the engine is running:

- **Crank signal**
- **Injector signals**
- **Camshaft signal**
- **Relationship between crank and cam**
- **Pedal position relationship**
- **Wheel speed sensor signal- manual operation**
- **Diagnostic port**

2

The second centre is used to create faults within the electrical and management systems of the engine, and can also be customised to bespoke client requirements. Typical fault setting available:

- **Cooling fan fault either none operational or fan running with ignition on**
- **Pedal position signal pull to ground to simulate a trapped wire**
- **Sensor fault**
- **Mass airflow fault**
- **EGR fault**

Contact: +44 (0) 121 522 6633 www.powertrainsolutions.co.uk

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