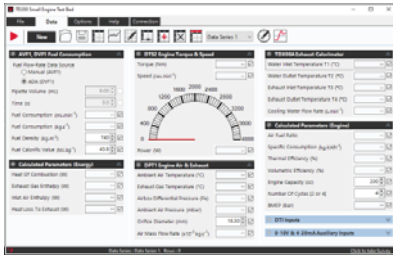


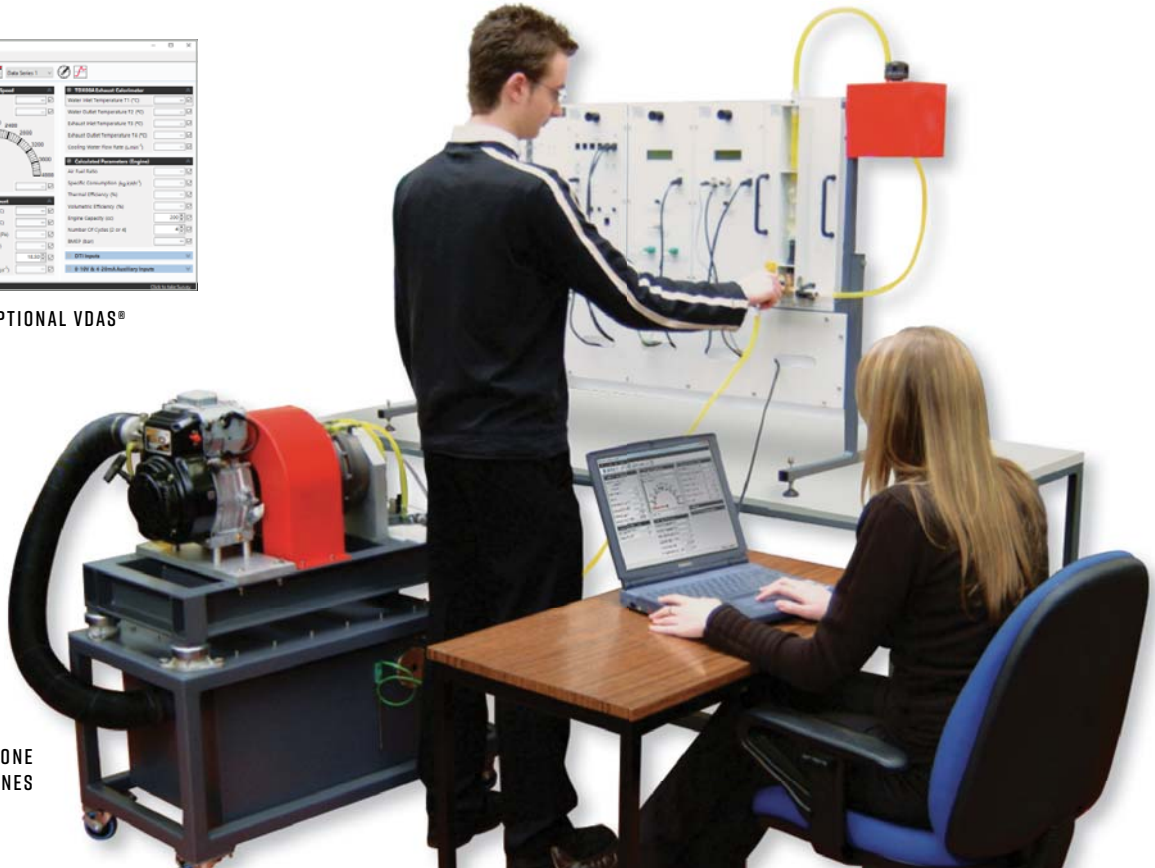
# SMALL ENGINE TEST SET

**VDAS®** TD200

Trolley-mounted, mobile engine test bed with benchtop instrumentation for investigations into the fundamental features of internal combustion engines. Requires at least one of the four available engines.



SCREENSHOT OF THE OPTIONAL VDAS® SOFTWARE



SHOWN FITTED WITH ONE OF THE OPTIONAL ENGINES

## KEY FEATURES

- Enables a wide range of investigations into the characteristics of four-stroke, single-cylinder petrol and diesel engines
- Four-stroke diesel and four-stroke petrol engines available separately
- Includes comprehensive instrumentation
- Optional ancillaries available to extend the range of study even further
- Test bed trolley mounted for mobility
- Quick, convenient and accurate engine mounting and changeover
- Robust, simple hydraulic dynamometer
- No need for large electrical supplies
- Instrumentation and test bed are separate to avoid vibration being transmitted to measuring devices
- Self-sealing couplings enable quick and efficient connection and disconnection of fuel lines with minimum loss or spillage of fuel
- Works with TecEquipment's Versatile Data Acquisition System (VDAS®)

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**VDAS**<sup>®</sup> TD200

## DESCRIPTION

A versatile hydraulic engine test bed with comprehensive instrumentation. The equipment requires minimum services, installation and outlay. When used with one of TecQuipment's optional single-cylinder engines, it safely and effectively enables study and demonstrations of the most important features of the engine. In addition, optional ancillaries are available to extend the range of study, demonstrations and investigations even further.

The equipment is fully compatible with TecQuipment's Versatile Data Acquisition System (VDAS<sup>®</sup> available separately). Using VDAS<sup>®</sup> enables accurate real-time data capture, monitoring and display, calculation and charting of all relevant parameters on a computer (not supplied) making tests quick and reliable.

The main components of the test set are:

- a heavy fabricated portable bed
- a benchtop instrumentation frame

The bed sits on a trolley for portability. It includes a robust, precision-machined, trunnion-mounted hydraulic dynamometer. A significant advantage of using a hydraulic dynamometer is that no large electrical supplies are required as the engine power is dissipated into the water used to load the dynamometer.

The dynamometer applies load according to the flow rate and level of water in the casing. An accurate needle valve controls the flow rate and level. An electronic load cell measures torque. The engines (available separately) are supplied pre-mounted on a sturdy precision base plate. When the engine is initially mounted onto the test bed or exchanged with an alternative engine, dowels and slots locate the engine quickly, accurately and reliably. To enable students to measure air flow, an air-box and orifice plate are located underneath the engine bed on the trolley.

The instrumentation is mounted on a sturdy frame. The frame has a single power inlet and several power outlets to supply the various display units (either those provided as standard or those provided as optional extras). The instrumentation and test bed are separate in order to avoid vibration being transmitted from the engine to the measuring devices.

The engines (available separately) include an exhaust thermocouple, dynamometer coupling, hoses and fittings. TecQuipment can also supply the engines with pre-modified cylinder heads and cranks for connection to TecQuipment's Engine Cycle Analyser (ECA100 available separately). Each engine includes a colour-coded fuel tank with self-sealing couplings. The couplings ensure the engines can be connected and disconnected quickly and efficiently with minimum loss or spillage of fuel. For convenience and safety, the fuel tank can be removed for filling or for storage in a fuel locker when not in use. Removing the fuel tank also prevents unauthorised use of the equipment.

## AVAILABLE EXPERIMENT MODULES

- Four-Stroke Petrol Engine (TD201 or TD211)
- Four-Stroke Diesel Engine (TD202 or TD212)
- Electric start versions of the above (TD201ES, TD211ES, TD202ES and TD212ES)

## ESSENTIAL ANCILLARIES

- Manual Volumetric Fuel Gauge (AVF1)

OR

- Automatic Volumetric Fuel Gauge with Digital Read-Out (DVF1)

## RECOMMENDED ANCILLARIES

- Versatile Data Acquisition System – frame-mounted version (VDAS<sup>®</sup>-F)
- Exhaust Gas Calorimeter TDX00a
- Engine Cycle Analyser ECA100
- Cylinder Head pressure Transducer ECA101
- Crank Angle Shaft Encoder ECA102
- ECA100S Bundle consisting of of ECA100, ECA101, ECA102 (see above)
- Gel Battery for use with Electric Start (ES) engines only TD200b

## STANDARD FEATURES

- Supplied with comprehensive user guide
- Five-year warranty
- Made in accordance with the latest European Union directives
- ISO9001 certified manufacturer

## ESSENTIAL SERVICES

### WATER SUPPLY:

Approximately 5 litres per minute at 1 bar minimum

### ELECTRICAL SUPPLY:

Single-phase a.c. 90–240 V, 50/60 Hz

### EXHAUST OUTLET:

A 2.5m exhaust is supplied with the TD200 or the local laboratory exhaust can be used (both need an outlet to atmosphere and to comply with local emission regulations)

**NOTE:** TecQuipment supplies a 1" BSP threaded stub adaptor with each test engine for connection to the TecQuipment exhaust.

### ACOUSTIC SILENCER:

Specification dependent upon exhaust system

# ≡ SMALL ENGINE TEST SET

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## OPERATING CONDITIONS

### OPERATING ENVIRONMENT:

Well ventilated laboratory

### STORAGE TEMPERATURE RANGE:

-25°C to +55°C (when packed for transport)

### OPERATING TEMPERATURE RANGE:

+5°C to +40°C

### OPERATING RELATIVE HUMIDITY RANGE:

80% at temperatures < 31°C decreasing linearly to 50% at 40°C

## SPECIFICATIONS

TecQuipment is committed to a programme of continuous improvement; hence we reserve the right to alter the design and product specification without prior notice.

### INSTRUMENTATION DIMENSIONS (FULLY ASSEMBLED WITH FUEL TANK):

Width 1400 mm x depth 300 mm x height 820 mm

### BED AND TROLLEY DIMENSIONS (WITHOUT ENGINE):

Width 950 mm x depth 475 mm x height 1050 mm

### WEIGHT (PACKED TOTAL):

300 kg

### DYNAMOMETER:

Hydraulic variable fill

### MAXIMUM ABSORPTION:

7.5 kW @ 7000 rev.min<sup>-1</sup>

### TYPICAL ENGINE RANGE:

3 to 4 kW, 3000 rev.min<sup>-1</sup>, 150 to 250 cc

### SPEED MEASUREMENT:

Proximity pick up and digital display

### TORQUE MEASUREMENT:

Strain gauged load cell and digital display

### AIR CONSUMPTION MEASUREMENT:

Air-box and orifice plate, pressure transducer and digital display

### AMBIENT AIR TEMPERATURE AND BAROMETRIC PRESSURE MEASUREMENT:

Thermocouple, pressure transducer and digital display

### EXHAUST TEMPERATURE MEASUREMENT:

Engine thermocouple and digital display

### FUEL CONSUMPTION:

Precision volumetric fuel gauges (analogue or automatic digital versions available)

### NOTE:

- The engines supplied have very similar or equivalent specifications to that used by TecQuipment to generate the sample results. However, some performance variations will occur.
- The characteristics of some engines may vary as the latest emission regulations come into force
- For the latest performance information please refer to the engine manufacturer's website.