



## Thermodynamics

## TD302

## Four-Stroke Diesel Engine

***A four-stroke, single-cylinder diesel engine with modified cylinder head and crank, for use with TecEquipment's Regenerative Engine Test Set (TD300)***



- For safe and effective studies and demonstrations of a four-stroke, single-cylinder diesel engine
- For use with TecEquipment's Regenerative Engine Test Set (TD300)
- Modified for use with optional Pressure (ECA101) and Crank Angle (ECA102) Transducers and Engine Cycle Analyser (ECA100)
- Wide range of investigations possible
- Quickly and accurately mounts on the test bed
- Includes colour-coded fuel tank with quick-release couplings

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- An ISO 9001 certified company

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## Description

High-quality, cost-effective four-stroke, single-cylinder diesel engine for use with TecEquipment's Regenerative Engine Test Set (TD300). Adapted specially for education to enable effective laboratory testing and demonstrations, the engine includes an exhaust thermocouple, a half-coupling to link to the test bed dynamometer, and all essential hoses and fittings. In addition, each engine includes a colour-coded fuel tank with self-sealing couplings.

The couplings ensure the engine 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.

The engine has a modified cylinder head and crank. These allow use with the Cylinder Head Pressure Transducer (ECA101 available separately) and the Crank Angle Encoder (ECA102 available separately). These can then connect to the Engine Cycle Analyser (ECA100 available separately) to extend the range of experiments possible.

The engine is mounted on a sturdy precision bed plate. The bed plate has dowels and slots which align and locate it accurately with the dynamometer test set. This minimises the time spent replacing one engine with another.

If a mains power failure or emergency stop occurs, interlocking relays on the engine immediately cut the fuel supply. In addition, to prevent transmission of accidentally ignited flames or explosions, the air inlet includes a flame arrestor.

## Standard Features

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

## Experiments

When used with TecEquipment's Regenerative Engine Test Set (TD300), investigations into the performance and characteristics of a four-stroke diesel engine, including:

- Torque, speed and power relationship
- Brake mean effective pressure
- Engine performance curves
- Air and fuel consumption
- Volumetric and thermal efficiencies

When used with TecEquipment's Regenerative Engine Test Set (TD300), Cylinder Head Pressure Transducer (ECA101), Crank Angle Encoder (ECA102) and Engine Cycle Analyser (ECA100) students can investigate further features including:

- Plotting  $p-\theta$  and  $p-V$  diagrams
- The thermodynamic cycle of an internal combustion engine
- Indicated mean effective pressure
- Indicated power
- Comparison of brake and indicated mean effective pressures
- Mechanical efficiency of the engine

## Essential Base Unit

- Regenerative Engine Test Set (TD300)

## Recommended Ancillaries

- Cylinder Head Pressure Transducer (ECA101)
- Crank Angle Encoder (ECA102)
- Engine Cycle Analyser (ECA100)

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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

*Noise levels:*

The noise level produced by this engine exceeds 95 dB at the operator position, therefore you must wear ear defenders when you use it.

### Specification

*Dimensions:*

Nett: 560 mm high x 500 mm wide x 460 mm and 75 kg

Packed: 0.22 m<sup>3</sup>

*Engine capacity:*

462 cc

*Power:*

Approximately 7 kW at 3600 rev.min<sup>-1</sup>

*Maximum Speed:*

Approximately 3600 rev.min<sup>-1</sup>

*Cooling:*

Air cooled

**Note: All values stated are approximate and subject to variation**

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