



P8170

TWIN CYLINDER ENGINE TEST BED

FEATURES

- ◆ Self contained teaching facility
- ◆ Alternative engine types
- ◆ Comprehensive instrumentation
- ◆ Closed loop speed control
- ◆ Torque measurement by load cell
- ◆ Regenerative D.C. dynamometer

APPLICATIONS

- ◆ Full and part load performance
- ◆ Volumetric efficiency
- ◆ Fuel consumption mixture loops
- ◆ Air/Fuel ratio
- ◆ Frictional power losses
- ◆ Heat balance and energy studies

INTRODUCTION

Cussons P8170 Twin Cylinder Engine Test Bed has been designed to provide a self-contained teaching facility for internal combustion engine technology. Comprehensive instrumentation together with a flexible 'easy to operate' control system allows a wide range of experimental work to be undertaken.

A choice of engine types is available to enable students to study the various characteristics of different engine designs and fuel types. Additional instrumentation and accessories are available from Cussons' range to expand the experimental capabilities of the basic test bed.

DESCRIPTION

Two main components form the basis of the test bed. First of all the welded steel baseplate complete with D.C. dynamometer, drive coupling and safety guard, spring type anti-vibration mountings, exhaust silencer, flexible pipe and provision for engine mountings. Secondly the framework/console which is positioned over the test bed carrying all instrumentation and controls, fuel system with flow measurement by burette, air flow measurement system, multi-point temperature indicator together with all the electrical circuits necessary for control of the dynamometer and engine.

DYNAMOMETER

The dynamometer used is a trunnion mounted swinging field D.C. electrical machine capable of absorbing a maximum load of 20 kW at a speed of 4000 rpm. A strain gauge load cell system is incorporated with mechanical overload protection and suitable calibration equipment is also provided. A toothed wheel and magnetic pick-up is used for speed measurement and feedback to the control system. The dynamometer is capable of either motoring or absorbing power and is also used as a method of starting the engine.

CONTROLS

The test bed is arranged for manual control of the engine and dynamometer with a key switch for engine starting, manual throttle/rack control, and interlocked selection of dynamometer operating mode. The dynamometer control system is a micro-processor controlled fully regenerative thyristor drive allowing the dynamometer to run as either a motor or a generator at constant speed. The speed is set by a 10 turn potentiometer mounted on the front panel.

INSTRUMENTATION

The following instrumentation is included:

Engine manifold vacuum gauge
Engine oil pressure gauge
Speed indicator (digital with analogue trend)
Load indicator (digital with analogue trend)
Fuel flow meter - twin bulb burette
Air flow meter - orifice plate and sloping manometer
Temperature indicator - ten way temperature indicator and type K thermocouples

1. Air inlet
2. Fuel
3. Oil
4. Exhaust manifold
5. Exhaust inlet to calorimeter*
6. Coolant inlet to calorimeter*
7. Exhaust outlet from calorimeter*
8. Coolant outlet from calorimeter*
9. Engine coolant inlet*
10. Engine coolant outlet*

* For use with optional equipment

ENGINES

The test bed is designed to accept a wide range of engines whose power ratings fall within the dynamometer operating envelope. Where engines are supplied by Cussons they are suitably modified and mounted on a steel base which may be easily and quickly fitted to the test bed. A list of standard engines offered by Cussons is given below:

P8171 - Twin Cylinder Air-Cooled Spark Ignited 4-Stroke Engine

P8172 - Twin Cylinder Air-Cooled Compression Ignition 4-Stroke Engine

P8173 - Twin Cylinder Water-Cooled Compression Ignition 4-Stroke Engine

NOTE: Alternative engines may be supplied against individual customers requirements, subject to availability.

OPTIONAL ACCESSORIES

- P4600 4 Channel Comprehensive Electronic Engine Indicating & Combustion Analysis System for Gasoline & Diesel
- P4605 4 Channel Basic Electronic Engine Indicating & Combustion Analysis System for Gasoline & Diesel
- P8260 Exhaust Gas Calorimeter - fitted with safety relief valve, 4 x type K thermocouples, raw water flowmeter, coolant pipework and isolating valve.
- P8166 Lean/Rich Mixture Device for carburettor controlled spark ignited engines.
- P8168 Coolant Flow Meter - turbine type.
- P8169 Cooling Module including all valves pipework etc. and temperature control system (essential for water cooled engines).

SERVICES

Electrical Supply:- 380/415 volt, 3 phase 50/60 Hz rated 40A

Cooling Water:- 1500 litre/hour (for use with water-cooled engines only)
15 mm diameter

Exhaust:- 1½ in. BSP bore pipe

PHYSICAL DETAILS

	Nett Weight	Length	Width	Height
	kg	mm	mm	mm
P8170	750	2000	800	1700

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