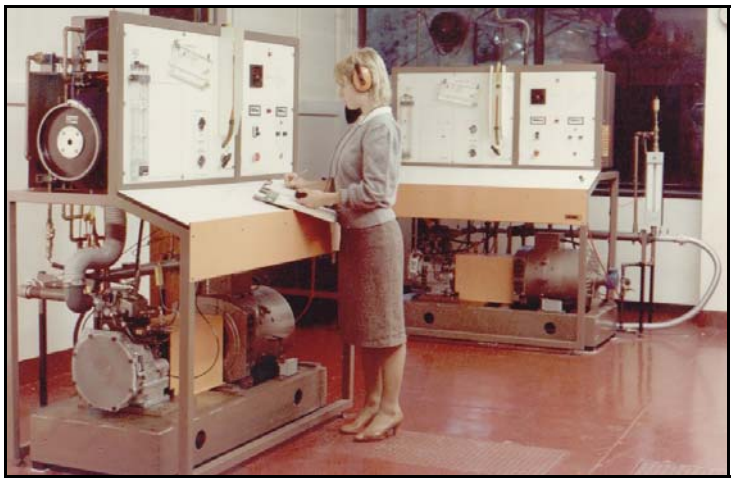
cussons
TECHNOLOGY



P8160
SINGLE 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

The Cussons P8160 Single 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 DC electrical machine capable of absorbing a maximum load of 10 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 microprocessor 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)
Load indicator (digital)

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, although Cussons reserve the right to substitute alternative engines.

P8161 - 4-Stroke Spark Ignited Engine (Air cooled)

Specification: Briggs & Stratton 4 stroke air-cooled engine, 305 cc, max. power 7 kW (9.4 BHP) at 3600 rpm, max. torque 18.0 Nm at 2500 rpm.

P8162 - 2-Stroke Spark Ignited Engine

Specification: US Motor Power 820, 2 stroke air-cooled engine, 134 cc max. power 7 kW (9.3 BHP) at 7000 rpm and 10 Nm at 4000 rpm. NB - This engine drives the dynamometer through a 2 to 1 reduction belt.

P8163 - 4-Stroke Compression Ignited Engine

Specification: Farymann 18D 4 stroke air-cooled engine, 290 cc, max. power 4.5 kW (6.2 BHP) at 3500 rpm, max. torque 14.5 Nm at 2500 rpm.

P8164 - 4-Stroke Spark Ignited Engine

Specification: Engine type to be advised 4 stroke water cooled engine, upon request.

P8165 - 4-Stroke Compression Ignition Engine

Specification: Farymann 18W 4 stroke water cooled engine, 290 cc, max. power 5 kW (6.8 BHP) at 3500 rpm, max. torque 16 Nm at 2400 rpm.

P8191 - 4 Stroke Variable Compression, Spark Ignition Engine

Specification: Briggs and Stratton, 4 stroke air-cooled engine, 392 cc, max. power and torque are dependent on the compression ratio selected.

P8193 - 4 Stroke Variable Compression, Compression Ignited Engine

Specification: Lister Petter AC1, 4 stroke air-cooled engine, 304 cc, max. power and torque are dependent on the compression ratio selected.

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.

P8261 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 ignition engines.

P8168 Coolant Flow Meter - turbine type.

P8169 Cooling Module including all valves pipework etc. and temperature control system.

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	lb	m	in	m	in	m	in
P8160	640	1408	1900	75	750	29.5	1700	67

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