

P8150

AUTOMOTIVE ENGINE TEST BED

INTRODUCTION

The Cussons Automotive 3 Engine Test Bed and associated equipment has been specially developed for teaching the theory and practice of internal combustion engine technology. The unit is self-contained and very completely instrumented so that a comprehensive series of experiments can be carried out.

DESCRIPTION

The instrumentation is of high accuracy, including a sensitive electric dynamometer, enabling valid and repeatable test results to be obtained. The engine can be supplied with a special cylinder head fitted with facilities for multi-channel indicator diagram traces. Additional cylinder heads for the gasoline engine of varying compression ratios are included to enable the effects on engine performance to be studied.

All instrumentation and controls are carried on the control panel, of melamine laminate which displays a multi-colour flow diagram (see Fig. 1) giving a clear indication of all measurements which are identified by symbols and located by illuminated tell-tales arranged in a logical sequence to facilitate readings. A standard feature is the torque weighing system incorporating a strain gauge load cell and analogue read out giving very precise results.

There is also a multi-point remote reading thermometer system which enables all necessary temperatures, high and low, to be displayed on a single instrument on the panel. All the equipment is exceptionally easy to operate and control and there are interlocks to prevent damage from incorrect operation or malfunction.

OPERATION

Experimental work that can be carried out with the Automotive 3 Engine Test Bed includes the following:

1. Throttled Loops - plot brake specific fuel consumption on a base of brake mean effective pressure and derive brake thermal efficiency.
2. Full Throttle Power Curves - BMEP and brake power plotted on a base of rev/sec.
3. Mixture Strength Determination (gasoline only) - plot typical mixture range curves or 'fish hooks'.
4. Spark Advance Characteristic (gasoline only) - the ignition timing is continuously variable.
5. Friction (motoring losses) - measure with the dynamometer.
6. Heat Loss Determination - by analysis of the cooling air throughput.
7. Engine Exhaust Temperature - under different operating conditions.
8. Engine Volumetric Efficiency - with inlet air flow meter.
9. Complete Energy Balance - with exhaust calorimeter.
10. A selection of gasoline cylinder heads enables the above experiments to be carried out under different conditions of cylinder compression.

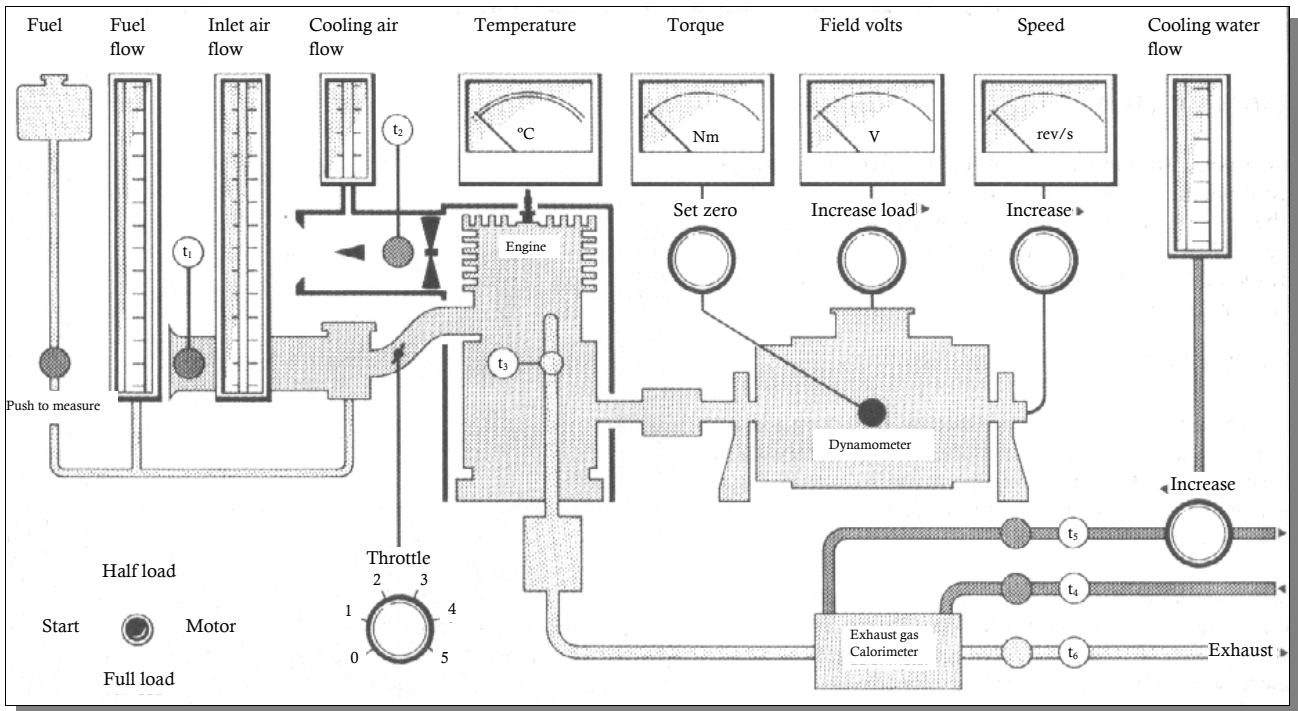


FIG.1 FLOW DIAGRAM

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Tender Specification

Spark Ignited (Otto) Engine Test Bed on self-contained moveable stand comprising:

Engine, (4 stroke, single cylinder, air cooled) furnished with variable mixture strength carburettor, variable timing ignition system, flywheel machined for electronic indicating equipment, special cylinder head tapped for transducer, complete with two additional cylinder heads at different compression ratios of 5:1, 6.5:1 and 8:1. Other compression ratios are available as additional accessories on request, eg., 4:1.

Directly coupled swinging field dynamometer capable of absorbing 5 kW and starting and motoring the engine over the full speed range.

Mains voltage power pack.

Five colour instrument panel with flow diagram fitted fuel flow meter, multi-range thermometer / pyrometer, tachometer and torque meter.

Reservoir with resilient damped panel, calibrated orifice, connecting passage to carburettor and manometer (scaled mm water).

Multi-tube gas/water heat exchanger furnished with flow measurement system and temperature tappings.

Services Required

220 / 240 volt 50 / 60 Hz single phase operation. For other voltage to special order.

Cooling water supply and drain for exhaust gas calorimeter.

Optional Accessories

P4600 - Indisyst 4 channel comprehensive electronic engine indicating and combustion analysis system.

P8155 - Compression ignition 4 stroke, single cylinder air cooled 3.5kW engine for P8150.

PHYSICAL DETAILS

	Nett Weight		Length		Width		Height	
	kg	lb	m	in	m	in	m	in
P8150	204	450	1.3	51	0.6	24	1.6	62

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