



Internal Combustion Engine Test Stand C100



- *A Regenerative Engine Test Bed With A Range of Optional Engines Up to 4kW Output.*
- *Allows Investigation of Torque-Speed, Power-Speed, Specific Fuel Consumption and Thermal Efficiency Over a Wide Range of Conditions.*
- *Optional Engines Are Quickly Installed.*
- *Optional Computerised Data Acquisition Upgrade*
- *Two year Warranty.*



Introduction

The internal combustion engine test stand provides a useful introduction to both heat engine theory and fundamental thermodynamic analysis. The measured parameters also give students experience of a wide range of instruments and measurement techniques.

The **Hilton Internal Combustion Engine Test Stand C100** allows students to investigate the performance of a range of optional internal combustion engines. The unit will provide interesting and instructive experimental work for all students, and will be of particular interest to those studying:

- **Thermodynamics**
- **Energy Conservation**
- **Mechanical Engineering**
- **Plant and Process Engineering**
- **Automotive Engineering**
- **Fluid Mechanics**

Experimental Capabilities

- Measurement of the Torque-Speed and Power-Speed Curves for An Internal Combustion Engine at a Wide Range of Throttle/Fuel Injector Settings
- Measurement the Specific Fuel Consumption at Constant Speed and Varying Power Output
- Measurement Air-Fuel Ratio and Engine Thermal Efficiency at a Range of Throttle / Fuel Injector Settings.
- Investigation of Engine Internal Friction at a Range of Engine Speeds.
- Investigation of the Above Parameters on a Range of 4 and 2 Stroke Gasoline engines and 4 Stroke Diesel Engine.

Description

A robust floor mounted engine test stand with modular instrumentation and control system.

A regenerative dynamometer includes both torque and speed control together with direct reading dynamometer digital display.

The dynamometer will accept engines up to 4kW shaft power output.

Engine speed and all relevant temperatures are also displayed on digital panel meters on the remote instrumentation console.

Air to the engine passes through an intake orifice and pulsation damper. The flow measurement orifice is connected to a panel mounted manometer to allow differential pressure measurement.

Fuel flow is measured using a calibrated volumetric fuel gauge.

Each of the optional engines are pre-installed on a standard mounting plate that is designed to allow quick and easy installation on the test bed. Each engine is supplied with a suitable fuel tank and supply system with quick release self sealing fuel couplings.

Operator safety is ensured by a range of interlocks and safety cut out devices.

Optional Data Acquisition Upgrade.

An optional computerised data acquisition upgrade CC101A is available to enable all relevant system parameters to be automatically recorded on a PC for further analysis and display. Data may also be transferred to spreadsheet format for complex analysis and calculation. This upgrade can be factory fitted prior to delivery or supplied later as a user installed upgrade.

Specification

A floor mounted modular internal combustion engine test stand with regenerative dynamometer and a range of optional internal combustion engines up to 4kW shaft power.

A separate instrumentation console allows measurement and display of the engine torque, speed, air consumption, fuel consumption, inlet air temperature and exhaust gas temperature.

An optional computerised data acquisition upgrade is available that allows all relevant system parameters to be automatically recorded on a PC.

The unit is supplied with a detailed experimental operating and maintenance manual giving example experimental results and sample calculations.

Accessories and spares for two years normal operation together with a full two year warranty are also included as standard.

Dimensions

Approximate:-

Height: 70cm Depth: 190cm
Width: 60cm Weight: 160kg.



Services Required

Electrical:

A: 380-415 Volts, 3Phase 50Hz, with NEUTRAL and earth/ground, Line current up to 16A

B: 210-220 Volts, 3 Phase 50/60Hz (With earth/ground). Line current up to 32A

Accessories and Spares

Unit supplied with:

One experimental operating and maintenance manual in either English, Spanish or French. Accessories and spares for 2 years normal operation. List available on request.

Ordering Information

Order as: C100 Internal Combustion Engine Test Stand.

With optional:-

- C100A Optional 4 Stroke Gasoline Engine
- C100B Optional 4 Stroke Diesel Engine.
- C100C Optional 2 Stroke Gasoline Engine.
- CC101A Data Acquisition Upgrade.

Electrical Specification

Either:

A: 380-415 Volts, 3 Phase, 50Hz (With NEUTRAL and earth/ground).

B: 210-220 Volts, 3Phase, 50/60Hz (With earth/ground).

Language

Either: English, Spanish, French.

Optional Items, Order as:

- C100A Optional 4 Stroke Gasoline Engine
- C100B Optional 4 Stroke Diesel Engine.
- C100C Optional 2 Stroke Gasoline Engine.
- CC101A Data Acquisition Upgrade.

Shipping Specifications

Net Weight: 185kg

Gross Weight: 240 kg. (approx.)

Packing Case Dimensions:

150 x 120 x 90 cm (approx.)

Also Available On Request

Further detailed specification.

Additional copies of instruction manual.

Recommended list of spares for 5 years operation.

Optional Extra CC101A **Data Acquisition Upgrade**

Hardware details

The Optional Computerised Data Acquisition Upgrade CC101A consists of a 21 channel Hilton Data logger (D103), together with pre-configured, ready to use, Windows™ compatible educational software.

Factory fitted coupling points on the C100 allow installation of the upgrade to the unit at any time in the machine's extensive life.

The Hilton Data logger (D103) connects, using the cable supplied, to a standard USB port on the user-supplied PC. If more than one logger is required connection is via a second USB port or standard USB hub.

The combined educational software and hardware package allows immediate computer monitoring and display of all relevant parameters on the C100.

Software Details

The pre-configured menu driven Software supplied with the Computer Upgrade CC101A allows all recommended experiments involving the electronic transducers and instruments on the C100 to be carried out with the aid of computerised data acquisition, data storage and on-screen data presentation. This enhances student interest and speeds comprehension of the principles being demonstrated.

Students are presented with either raw data for later hand calculation or alternatively data may be transferred to most spreadsheets for computerised calculation and graphical presentation.

Data may be stored on disc and displayed at any time using the software supplied. Alternatively data may be transferred to any compatible spreadsheet together with individual time and date stamp on each reading for complex analysis.

Additional Data Logging Facility Supplied As Standard

The D103 is the third generation of Hilton Data Logger.



It comprises an industrially proven 21 channel interface with 8 thermocouples (type T and K as standard) / differential voltage inputs ($\pm 100\text{mv DC}$), 8 single ended DC voltage inputs ($\pm 8\text{v}$), 4 logic or frequency inputs and one mains voltage input. In addition there are on board 12v DC, $\pm 5\text{V DC}$ and $\pm 15\text{v DC}$ power supplies for most commercially available transducers.

The Hilton Data Logging software supplied as standard with the CC101A package allows the D103 to be disconnected from the C100 and used together with most standard transducers as a stand alone computer data logger for the instrumentation and monitoring of existing laboratory equipment using locally sourced industrial transducers. The software is also backwards compatible with our many second generation D102 data loggers that are already in use worldwide.

Full data logger command protocol and communications details are provided in an extensive user manual that allows other software applications to communicate with the logger via the USB interface. Users can write their own software, typically in LabView, Matlab, C, C++, Visual Basic etc. This further expands the student project capabilities of the CC101A package from teaching and demonstration into the field of research and postgraduate study.

Computer Hardware Requirements

The menu driven Software supplied with the Computer Upgrade CC101A will operate on a PC which has at least 0.5Gb Mb ram, VGA graphics, 1Gb hard drive, CD drive and an available USB port. The software is Windows 2000, XP and 7 compatible.

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