



Two Stage Compressor Test Unit F865



- *Allows Investigation of a Single and Two Stage Compressor (with, or without intercooling) at a Range of Delivery Pressures.*
- *Safe and Suitable For Student Operation.*
- *Instrumentation Allows Detailed Analysis of Compressor Performance.*
- *Optional Computerised Data Acquisition Upgrade*
- *Two year Warranty.*



Introduction

The reciprocating air compressor 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 Two Stage Compressor Test Unit F865** allows students to investigate the performance of a two stage compressor and the energy saving benefits of intercooling. 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

- Investigation Of Variation In Air Flow Rate, With Compressor Pressure Ratio:- With And Without Intercooling
- Investigation Of Variation In Volumetric Efficiency With Compressor Pressure Ratio:- With And Without Intercooling
- Investigation Of Variation Of Isothermal Efficiency With Compressor Pressure Ratio:- With And Without Intercooling
- Investigation Of The Compressor Performance Relative To Electrical Power, Shaft Power, And Heat Loss:- With and Without Intercooling

Description

A bench mounted unit with belt driven two stage reciprocating air compressor that may be operated as a single stage, two stage, or two stage with and without intercooling system.

Instrumentation allows the drive power to be measured together with the motor speed.

Compressor speed is measured through the fixed pulley ratio between the drive motor and compressor. The intake air passes through an orifice for flow measurement to a vessel that reduces intake pulsations and allows various intake conditions to be established. Valves allow an intercooler between the low and high pressure stages to be included or removed from the circuit to demonstrate and investigate comparative performance.

Valves also allow the unit to be operated in single stage or two stage mode with and without intercooling.

The intake, intermediate and delivery pressures are indicated on dial gauges and all of the relevant system temperatures are recorded by thermocouple sensors connected to multiple selector switches and a digital temperature indicator.

The flow measurement orifice is connected to a panel mounted manometer to allow differential pressure measurement.

Air is delivered to a receiver fitted with a high pressure cut out and relief valve for operator safety.

A throttle valve allows discharge pressure to be controlled and adjusted.

Specification

A free standing, belt driven, two stage reciprocating air compressor that may be operated as a single stage, two stage or two stage with and without intercooling system.

An intake vessel reduces intake air pulsations and a high pressure air receiver is connected to the compressor discharge.

Intake and discharge air pressures are measured together with the air flow rate and motor drive power.

Integral thermocouples record all relevant system temperatures and are connected to a multi-way selector switch and digital temperature indicator.

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

Height: 130cm Depth: 90cm
Width: 134cm Weight: 100kg.



Services Required

Electrical: A: 380-415 Volts, Three Phase, 50Hz
(With earth/ground).

Line current up to 10A at 230v

Or

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

Line current up to 20A at 110v

Water: 3 litres/minute at 20m head

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: F865 Two Stage Compressor Test Unit

Electrical Specification

Either: A: 380-415 Volts, Three Phase, 50Hz
(With earth/ground).

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

Language

Either: English, Spanish, French.

Shipping Specifications

Net Weight: 100kg

Gross Weight: 180 kg. (approx.)

Packing Case Dims: 150 x 120 x 90 cm (approx.)

Packing Case Volume: 1.09m³ (approx)

Also Available On Request

Further detailed specification.

Additional copies of instruction manual.

Recommended list of spares for 5 years operation.

Optional Extra FC866A Data Acquisition Upgrade

Hardware details

The Optional Computerised Data Acquisition Upgrade FC865A 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 F865 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 F865.

Software Details

The pre-configured menu driven Software supplied with the Computer Upgrade FC865A allows all recommended experiments involving the electronic transducers and instruments on the F865 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 FC865A package allows the D103 to be disconnected from the F865 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 FC865A 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 FC865A 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.

Ordering Information

Order as: Data Acquisition Upgrade FC866A

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