



Single Stage Compressor Test Unit F860



- *Allows Investigation of a Single Stage Compressor 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 Single Stage Compressor Test Unit F860** 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 intake and delivery pressure
- Measurement of air flow rate.
- Measurement of all relevant system temperatures
- Determination of the volumetric and isothermal efficiency.
- Measurement of drive power and electric motor shaft power.

Description

A bench mounted unit with a belt driven reciprocating air compressor.

The drive motor is mounted in bearings and allows the torque required to drive the compressor to be measured using an integral balance.

With the measured torque and motor speed the shaft power required to drive the compressor may be determined. Compressor speed is measured through the fixed pulley ratio between the drive motor and compressor.

Panel mounted meters allow the motor electrical input to be compared to the measured shaft power.

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. The intake 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.

Optional Data Acquisition Upgrade

An optional computerised data acquisition upgrade FC861A 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 bench mounted, belt driven, single stage reciprocating air compressor with a motor dynamometer allowing measurement of the motor shaft power.

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, motor drive speed and torque.

Integral duplex 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: 114cm Depth: 60cm
Width: 94cm Weight: 80kg.



Services Required

Electrical:

A: 220-240 Volts, Single Phase, 50Hz (With earth/ground). Line current up to 10A at 230v
Or

B: 110-120 Volts, Single Phase, 60Hz (With earth/ground). Line current up to 20A at 110v

Accessories and Spares

Unit supplied with:

One experimental operating and maintenance manual in either in English, Spanish or French.

Accessories and spares for 2 years normal operation.

List available on request.

Ordering Information

Order as: F860 Single Stage Compressor Test Unit

Electrical Specification

Either: **A:** 220-240 Volts, Single Phase, 50Hz
(With earth/ground).

or

B: 110-120 Volts, Single Phase, 60Hz
(With earth/ground).

Language

Either: English, Spanish, French.

Shipping Specifications

Net Weight: 80kg

Gross Weight: 140 kg. (approx.)

Packing Case Dims: 130 x 120 x 70 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 FC861A Data Acquisition Upgrade

Hardware details

The Optional Computerised Data Acquisition Upgrade FC861A consists of a 21 channel Hilton Data logger (D103), together with pre-configured, ready to use, WindowsTM compatible educational software.

Factory fitted coupling points on the F860 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 F860.

Software Details

The pre-configured menu driven Software supplied with the Computer Upgrade FC861A allows all recommended experiments involving the electronic transducers and instruments on the F860 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 (± 100 mv DC), 8 single ended DC voltage inputs (± 8 v), 4 logic or frequency inputs and one mains voltage input. In addition there are on board 12v DC, ± 5 V DC and ± 15 v DC power supplies for most commercially available transducers.



The Hilton Data Logging software supplied as standard with the FC861A package allows the D103 to be disconnected from the F860 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 FC861A 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 FC861A 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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