# *Pressure Measurement Bench F110*


- ***Allows Investigation of Different Methods of Pressure Measurement.***
- ***Introduces Students to Pressure Calibration Methods.***
- ***Allows Investigation Above And Below Atmospheric Pressure.***
- ***Optional Deadweight Tester with Optional Digital Readout.***
- ***Optional Computerised Data Acquisition Upgrade***
- ***Two year Warranty.***

# Introduction

The Hilton F110 Pressure Measurement Bench allows students to investigate measurement of one of the fundamental parameters that will be present in almost every branch of engineering and physics. The unit is bench mounted and self-contained having its own means of pressure generation.
The Hilton F110 Pressure Measurement Bench will provide interesting and instructive experimental work for students of all disciplines and particularly those studying.

- **Aeronautical Engineering**
- **Chemical Engineering**
- **Mechanical Engineering**
- **Plant and Process Engineering**
- **Refrigeration**
- **Air Conditioning**
- **Physics**

# Experimental Capabilities

- Investigation of Manometer Pressure Measurement Methods.
- Investigation of Pressures Above and Below Atmospheric Pressure
- Investigation of Manometer Fluid Density Effect.

# Description

A bench top, panel mounted U tube and inclined tube manometer together with a positive pressure Bourdon tube pressure gauge and compound (positive and negative) pressure gauge. A means of creating measureable pressures is also provided. The manometers allow investigation of the use of U and inclined tubes for pressure measurement and demonstrate the use of fluids of different density. All of the manometers and the panel mounted pressure gauges may be interconnected and linked to the common pressure source supplied. The action of the supplied pressure source may be reversed to generate pressures below atmospheric pressure. This allows the concept of “gauge” and absolute pressure to be investigated.

# Specification

Pressure Measurement Bench F110
**Comprising:**
A panel mounted set of U tubes and an inclined tube manometer and pressure gauges together with a simple pressure/vacuum source allows comparison of different types of manometer and manometer fluid. A simple pressure/vacuum source and hoses allow all the panel mounted instruments to be linked.

Optional extras include:

| | |
|---|---|
| Deadweight Tester | F110A |
| Pressure Transducer & Digital Display | F110B |
| Data Acquisition Upgrade | FC111A |

# Safety

Non-toxic manometer fluid and low pressure operation with incompressible fluid in the deadweight tester.

# Dimensions

**Panel:**
Height: 650mm Depth: 300mm
Width: 750mm Weight: 30kg

# Accessories and Spares

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

## Services Required

| | |
|---|---|
| F110 | None |
| F110A | None |
| F110B | See below |
| FC111A | See below |

**Electrical:**
Either
**A**: 220-240 Volts, Single Phase, 50Hz (With earth/ground).
Or
**B:** 110-120 Volts, Single Phase, 60Hz (With earth/ground)

## Ordering Information

**Order as:** Pressure Measurement Bench F110

## Electrical specification:

Either:-
A: 220-240 Volts, Single Phase 50Hz (with earth / ground)
B: 110-120 Volts, Single Phase 60 Hz (with earth / ground)

## Language

Either: English, Spanish, French.

## Also Available On Request

Further detailed specification.
Additional copies of instruction manual.
Recommended list of spares for 5 years operation.

## Optional Extra F110A
**Deadweight Tester**

## Specification

An optional bench mounted deadweight tester (F110A) with weights and a bourdon tube pressure gauge with clear front panel to allow viewing of the dial mechanism is also available. The deadweight calibrator F110A introduces students to the concept of Pressure = Force/Area by allowing calibration of a bourdon tube pressure gauge. A set of precision weights allow discrete points of known pressure to be generated. To assist in student understanding the bourdon gauge has a clear front, allowing viewing of the tube and pointer mechanism.

## Experimental Capabilities

- Calibration of Bourdon tube pressure gauge

## Ordering Information

**Order as:** Deadweight Tester F110A

## Services Required

F110A None

# *Optional Extra F110B*
# *Pressure Transducer & Digital Display*

**Note:** the F110B must be preceded by the F110A.

## *Specification*

Addition of the optional Pressure Transducer and Digital Display F110B (to the optional deadweight tester F110A) allows students to calibrate an electronic transducer and relate the pressure points to the electronic signal.

## *Experimental Capabilities*

- Pressure/voltage calibration with optional Electronic Pressure Transducer and Digital Display F110B for use with deadweight tester F110A

## *Ordering Information*

**Order as:** Pressure Transducer & Digital Display F110B

## *Services Required*

F110B

Either:-

A: 220-240 Volts, Single Phase 50Hz (with earth / ground)

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

# *Optional Extra FC111A*
# Data Acquisition Upgrade

**Note**: the FC111A must be preceded by the F110A and F110B.

Addition of the optional FC111A Data Acquisition system (together with F110A and F110B) allows students to calibrate the electronic pressure transducer and relate the signals directly to displayed pressure on a (locally supplied) computer. The data acquisition system allows very simple multi-point calibration with a graphical interface.
The 21 channel data acquisition system and user configurable software may also be disconnected from the unit and used with any suitable transducer for data collection on any other Hilton or non-Hilton equipment.

**Hardware details**

The Optional Computerised Data Acquisition Upgrade FC111A consists of a 21 channel Hilton Data logger (D103), together with pre-configured, ready to use, Windows TM compatible educational software.

Factory fitted coupling points on the F110 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 F110.

**Software Details**

The pre-configured menu driven Software supplied with the Computer Upgrade FC111A allows all recommended experiments involving the electronic transducers and instruments on the F110 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 (±100mv DC), 8 single ended DC voltage inputs (±8v), 4 logic or frequency inputs and one mains voltage input. In addition there are on board 12v DC, ±5V DC and ±15v DC power supplies for most commercially available transducers.

The Hilton Data Logging software supplied as standard with the FC111A package allows the D103 to be disconnected from the F110 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 FC111A 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 FC111A 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 FC111A


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