



Boyle's Law Demonstrator H050



- *Investigation of Boyle's Law ($pv = \text{Constant}$).*
- *Allows investigation above and below atmospheric pressure.*
- *If available, allows investigation with other safe gases.*
- *Two Year Warranty.*



Introduction

The Hilton H050 Boyle's Law Demonstrator allows rapid demonstration of the principles of Boyle's Law.

The unit is bench mounted and self-contained having its own compressor/vacuum pump.

The Hilton H050 Boyle's Law Demonstrator will provide interesting and instructive experimental work for all students studying fundamental gas laws and will be of particular interest to those studying:

- **Thermodynamics**
- **Heat Transfer**
- **Chemical Engineering**
- **Mechanical Engineering**
- **Plant and Process Engineering**
- **Refrigeration**
- **Air Conditioning**
- **Physics**

Experimental Capabilities

- Demonstration of Boyle's Law $pV = Constant$ for air and other safe gases.
- Investigation of the characteristic equation of a gas $pV = mRT$ at ambient temperature

Description

Two sealed glass cylinders with access valves are mounted on a base board and connected via a tube. One cylinder performs the measuring function and the other is used to pressurise the volume of gas contained above oil in the measuring cylinder. The measuring cylinder is fitted with a compound gauge designed to measure the gas pressure both above and below atmospheric pressure.

The height of oil and hence the volume of gas in the measuring cylinder is measured using a graduated scale. A thermometer in the measuring cylinder allows the temperature of the gas in the measuring cylinder to be determined.

A small compressor provides a means of adjusting the pressure of the test gas above and below atmospheric pressure. The compressor is mounted on the base board and controlled by a panel mounted switch.

A pressure switch and relief valves ensure operator safety.

Operation

The volume of gas in the measuring chamber can be adjusted by a control valve at the base of the pressurising chamber and measured using the graduated scale on the measuring chamber. The

compressor is used to adjust the pressure above hydraulic oil in the pressurising chamber and this is transmitted to the test gas via the oil. Changes in oil height and hence test gas volume are measured at the same time as pressures are recorded. Pressure and volume data may be plotted to demonstrate the $pV = Constant$ Boyle's Law relationship.

For more advanced students the volume of gas in the chamber may be related to the mass m of air in the chamber. By evaluating the data recorded the characteristic gas equation $pV = mRT$ or $PV/mT = Constant$ may be investigated.

Specification

Unit for demonstrating Boyle's Law

Comprising:

Bench mounted measuring cylinder containing test gas and bourdon tube pressure gauge as well as a pressure relief valve. All necessary valves, pressure gauge, measuring scale and thermometer for air pressure, temperature and volume measurement.

Pressurising glass cylinder with pressure relief valve
Diameter 100 mm, Height 220 mm approximately
Compressor 230V, 50 Hz, 500W. Compressor can also be used as vacuum pump.

Safety

Relief valve in each cylinder plus high pressure cut out switch on compressor power supply.

Residual current circuit breaker and combined main switch/miniature circuit breaker.

Dimensions

Height: 600mm Depth: 610mm
Width: 610mm Weight: 30kg

Accessories and Spares

Unit supplied with:

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

Accessories and spares, suitable for 2 years normal operation. List available on request.

Services Required



Electrical: A: 500W 220-240 Volts, Single Phase,
50Hz (With earth/ground).
Line current up to 2A at 230v

B: 500W 110-120 Volts, Single Phase,
60Hz (With earth/ground).
Line current up to 4A at 110v

Ordering Information

Order as: Boyle's Law Demonstrator H050

Electrical Specification

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

B: 110-120 Volts, Single Phase
60Hz (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.

P A Hilton Ltd.

Horsebridge Mill, King's Somborne,
Stockbridge, Hampshire, SO20 6PX, England.

Telephone: National (01794) 388382

International **+44 1794 388382**

Fax: (01794) 388129

E-mail **sales@p-a-hilton.co.uk**

