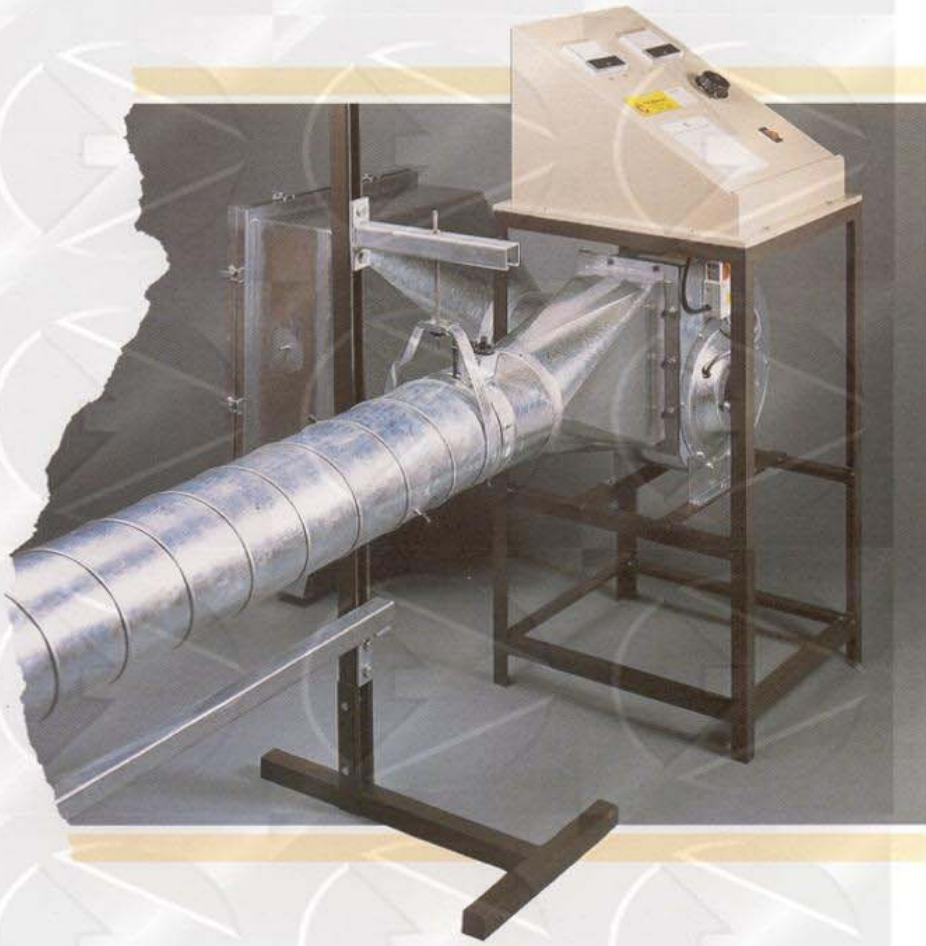


Ventilation Trainer B500

P.A. Hilton Ltd.

B500

Introduction

The use of full air conditioning systems for controlling the environmental conditions within buildings is increasing rapidly. In order to ensure economical and efficient operation of such plant, the use of more complex controls, including computers, has become necessary.

However, even the most complex and technolologically advanced control system will be of little use if the air distribution system of the building has not been commissioned to the design specification. Air dampers and fan controls have to be adjusted in order to ensure that the correct amount of conditioned air is distributed to all areas within the building structure.

Understanding the commissioning procedures is extremely difficult and unfortunately in the past most building services engineers have had their first experience when in employment actually carrying out the process on site.

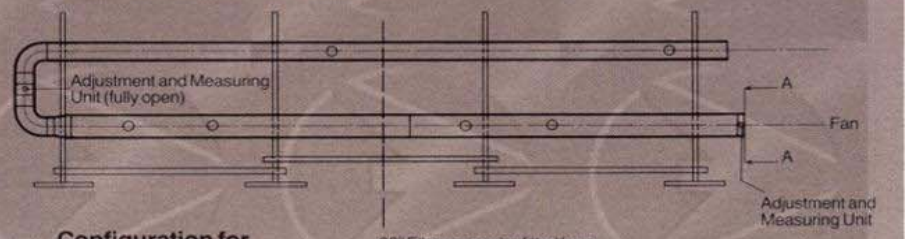
The Hilton Ventilation Trainer B500 has been designed to provide training establishments with a flexible, realistically scaled system that students can assemble in a variety of combinations and then commission to achieve a set of "Design Conditions".

The unit utilises the fabrication and assembly techniques used in commercial air handling equipment and this helps familiarise students with the types of components they will meet in industry.

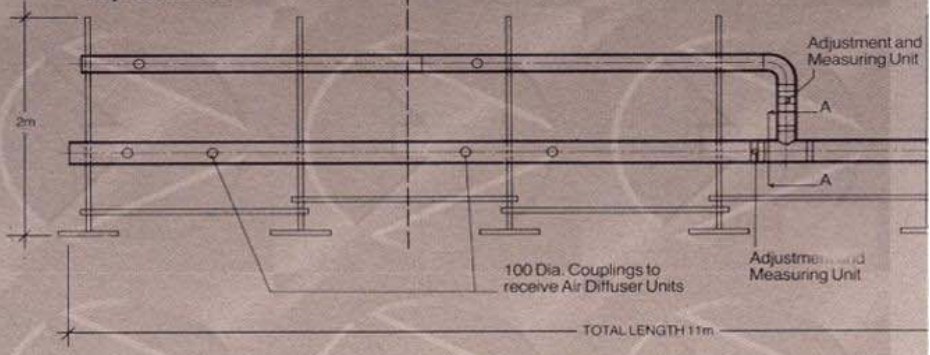
The unit is applicable for the teaching of students in:

- Building Services
- Refrigeration and Air Conditioning
- Mechanical Engineering
- Plant Engineering
- Marine Engineering

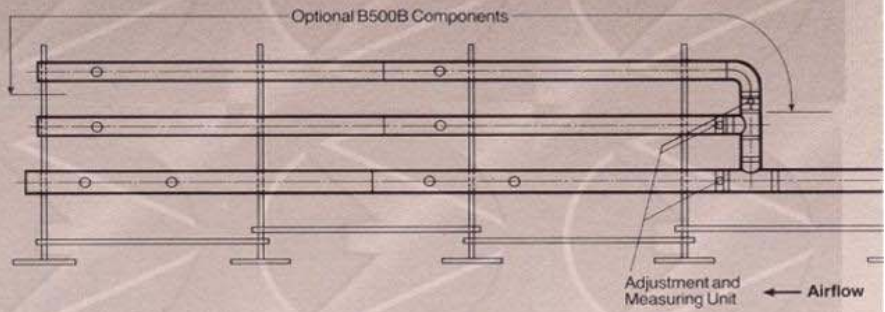
Configuration for Line Balancing



Configuration for Branch Balancing Experiments



Configuration with Optional Extra B500B fitted



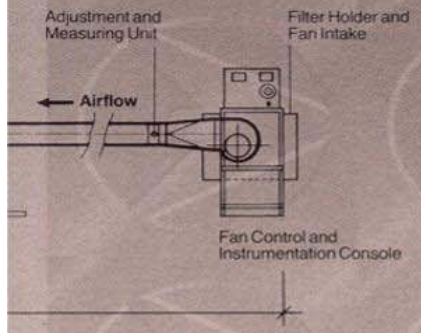
Experimental Capabilities

The standard package B500 enables the following training exercises to be undertaken:

- Examination of typical components, fabrication, installation and assembly techniques used in air handling systems.
- Investigation of pressure losses in bends, branches, changes of section and over straight lengths of duct, together with the variation in pressure drop with velocity.
- Determination of the 'k' factor for the pressure loss of the above components in each particular configuration.
- Investigation of the fan pressure and volume flow characteristics at various supply voltages.
- Examination of standard types of panel and bag filters and their pressure drop against face velocity.
- Measurement of air flow rate using pitot-static traverse, orifice pressure differential and anemometer methods.
- Balancing of air flow distribution in a series or two branch parallel distribution system using either main damper or fan speed flow control.
- Addition of the B500B (see diagram) allows an additional parallel branch and two diffusers to be investigated.
- Addition of the B500C (see diagram) allows an additional tee branch and two diffusers to be investigated.
- Addition of the B500D Ductwork Leakage Test Set allows students to carry out commissioning leak testing on all of the above components.

Ventilation Trainer B500

With the standard B500 either configuration downstream of A-A may be established.



Description

A glass reinforced plastic control console is mounted on top of the steel fan stand. The fan unit has a delivery of between 0.1 and 0.3 m^3/s dependent upon the ductwork resistance and supply voltage.

The console contains a variable transformer for fan speed control, together with a voltmeter and ammeter for measurement of supply voltage and current. The unit has a combined switch and overload circuit breaker and a separate 30mA residual current circuit breaker for added safety.

A square to round fan intake transition also accepts standard 600mm × 600mm filters. The rectangular to round fan discharge transition connects to the 200mm diameter ductwork using standard push fittings.

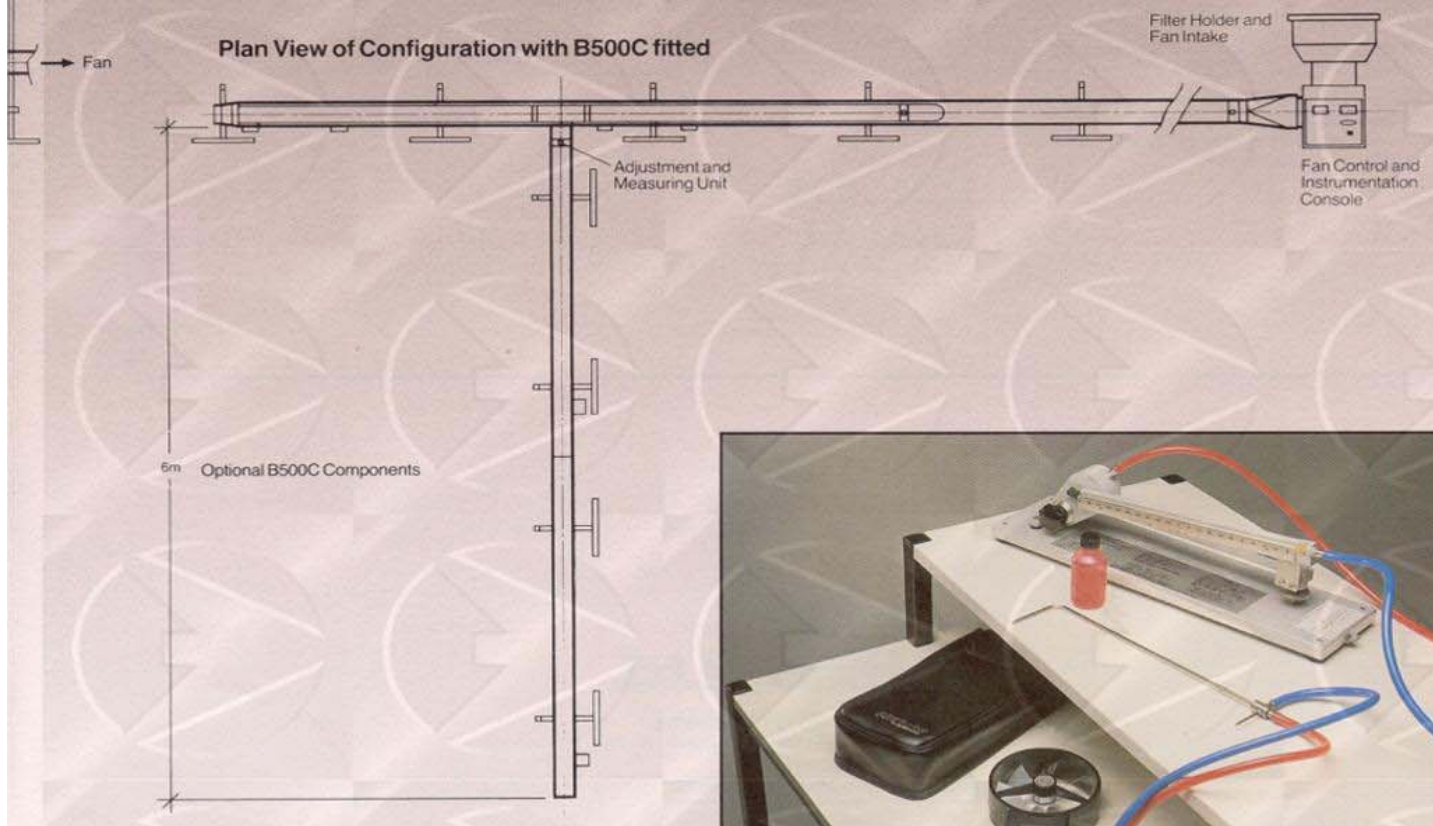
All ductwork and connections are manufactured from heavy gauge galvanised steel and may be connected in the forms indicated in the diagrams.

The ductwork is supported from standard air distribution isolation mounts hung on galvanised steel pedestals that are rigidly linked together. Components may be readily assembled into either of the two standard configurations and the additional optional branches added.

Two types of air supply diffuser units are supplied and these, together with the manometer, pitot-static tube and hand held anemometer supplied, allow investigation of discharge velocity patterns.

The optional B500D ductwork leakage tester is a complete test apparatus used by commissioning engineers for leak testing ductwork on site. The leak rates for unsealed or poorly assembled joints, as well as open inspection holes, may be investigated. This provides students with valuable experience of commissioning procedure which is becoming increasingly important with the introduction of more stringent fire regulations.

Plan View of Configuration with B500C fitted



B500 Instrumentation Package

B500

Specification

B500 Ventilation Trainer

A realistically scaled ventilation training unit capable of enabling students to study both basic airflow and fluid mechanics as well as the more complex process of commissioning and balancing a multi ducted air distribution system.

The unit consists of a foreward curved variable speed centrifugal fan and integral control console together with a rectangular air intake and filter holder.

The fan has a supply pressure of up to 350 Nm^{-2} and a flow rate of approximately 1400m^3h^{-1} depending upon the blockage factor.

The fan discharges directly into a 200mm dia. galvanised steel duct and this connects directly to the distribution ductwork.

Sufficient components are supplied with the unit to enable parallel branch and line balancing experiments to be undertaken. A minimum of 6 air supply points are provided that may be balanced on the assembled unit to supply a range of airflows.

A portable manometer, pitot static tube and hand held anemometer allow a large range of experiments to be undertaken.

B500B (OPTIONAL)
The optional extra duct configuration B500B allows the addition of a third parallel branch and two air supply units.

B500C (OPTIONAL)
The optional extra duct configuration B500C allows the addition of a 6m branch and two air supply units.

B500D (OPTIONAL)
Optional Extra B500D Ductwork leakage tester allows investigation of the structural integrity of the ductwork.

DIMENSIONS

Height:	2000mm
Length:	10000-11000mm (Approx.) (depending upon configuration)
Depth:	3000-9000mm (Approx.) (larger dimension only if B500C included)
Weight:	320 kg (nominal)

ACCESSORIES & SPARES

Unit is supplied complete with:

- Experimental Operating and Maintenance Manual in either English, French, German or Spanish.
- Standard accessories including a schematic diagram in one of the above languages.
- Spares sufficient for 2 years operation under normal conditions.
- A spares package for 5 years normal operation is also available. Details available on request.

SERVICES REQUIRED

Electrical:
Either: A 1.5 kW single phase 220/240 Volts 50Hz. (with earth/ground)
or: B 1.5 kW single phase 110/120 Volts 60Hz (With earth/ground)

SHIPPING SPECIFICATIONS

Nett Weight:	320 kg
Gross Weight:	627 kg (Approx.)
Packing Case Size:	4.089 × 0.838 × 1.43m (Approx.)
Packing Case Volume:	4.9m^3 (Approx.)

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