H-6925
Fluid Circuit Demonstrator

Purpose

The Hampden **Model H-6925** Fluid Circuit Demonstrator provides complete facilities for the investigation of the phenomena associated with incompressible fluid flow in conduits.

Description

Each unit comes factory-equipped with mobile carrier, supply storage tank, centrifugal water pump, cylindrical clear tank, interchangeable brass Venturi flowmeter, interchangeable Orifice flowmeter (optional Orifice plates available), manometer, electrical controls, and the four-pipe network. Both of the flowmeters incorporate zero clearance fittings for interchangeability and inserting optional metering devices.

Shown **Model H-6925-CDL** Fluid Circuit Demonstrator with Computer Data Logging Option
Dimensions: 72”H x 108”W x 30”D Standard Weight: 780 lbs.

Specifications

Pipe Friction

There are four lengths of pipe, each one having a pair of pressure taps spaced 48" apart and one located midway. The distance from the ends of the pipes to the pressure taps is based upon a ratio involving the pipe diameter in order to minimize tube exit and entrance effects. These pipe lengths have nominal diameters of 3/8" NPT, 1/2" NPT, 3/4" NPT and 1" NPT respectively. The pressure taps can be connected to the differential pressure manometer.

Pipe Fitting Head Loss

There are different pipe fittings which are fitted with pressure taps:

- 90° short elbow
- 90° long (sweep) elbow
- Tee
- Gate Valve
- Ball Valve

Flowmeter

The water flow rate is measured by a differential pressure manometer connected across the metering device.

Manometer

The **Model H-6927-10** Digital Differential Pressure Manometer is battery operated, uses a backlit 3-1/2 digit display with automated shut-off and low battery indicator.

It consists of the digital differential manometer mounted on a backplate and includes a three-valve manifold, two angle bleeder needle valves, associated fittings and interconnection tubing.

Supply Pump And Tank

The supply pump has a ½ HP motor with centrifugal pump providing 10 gallons per minute at 50ft. head. The tank is polyethylene Nalgene® with a 15 gallon capacity.

Cylindrical Tank

The cylindrical tank is manufactured of polycarbonate clear tube.

Electrical Controls

This panel contains a Ground Fault Interrupt circuit breaker, pump control switch with pilot light, and 10-ft. power cord.

Mobile Carrier

This is 72" high, 108" wide by 30" deep, with two swivel casters with brakes and two fixed casters. This unit is manufactured of 2" square mechanical tubing with 12 gauge support channels.

Services Required

Electrical:	120V AC-1Ø-60Hz 15A
Water:	Fill tank
Waste:	Drain tank

All Hampden units are available for operation at any voltage or frequency

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Experiment Capabilities

The head loss caused by fluid friction in straight pipes and the effects of fluid velocity, pipe diameter, and surface roughness can be studied in detail. The experiments can be carried out over a wide range of Reynolds' numbers.

The head loss due to flow separation in pipe fittings and valves can also be investigated. These include bends of different radii and a tee. In addition, the flow rate versus head loss characteristics of control valves can be studied as well as the operating characteristics of flowmeters.

1. Pressure Drop Profile
2. Friction losses for pipe length, tube sizes and flow rates.
3. Equivalent length of pipe of the same nominal size as a pipe fitting which exhibits similar characteristics due to internal friction.
4. Friction factor "f" and relative roughness "ε/D" for pipes of different dimensions.
5. Reynold's number
6. Maximum flow giving streamline characteristics and the minimum flow giving turbulent characteristics when approached with increasing and decreasing velocities; also, the flow ranges of laminar, transition and turbulent flow.
7. Characteristics of a venturi flowmeter
8. Characteristics of a sharp-edged orifice flowmeter
9. Static pressures and back pressure (venturi flowmeter)
10. Relationship between flow rate and static head, and between flow rate and pressure difference within the pressure range covered by the orifice plate.
11. Relationship between tank head and pump capacity
12. Nomographs
13. Calibration curves

Options

Metering Sections

Pitot Tube	**H-6925-10**
Flow Nozzle	**H-6925-11**
Vortex	**H-6925-12**
Vortex w/CDL	**H-6925-12-CDL**
Turbine	**H-6925-13**
Turbine w/CDL	**H-6925-13-CDL**
Magnetic Flow	**H-6925-14**
Magnetic Flow w/CDL	**H-6925-14-CDL**
Differential Pressure Transducer Pkg.	**H-6925-15**
Venturi Profile Valve Kit	**H-6925-16**

Orifice Plates

Bore Diameters

0.7343"	**H-6925-20**
0.5772"	**H-6925-21**
0.3824"	**H-6925-22**
0.2846"	**H-6925-23**
0.2546"	**H-6925-24**

Spool Sections

Valves

Globe	**H-6925-30**
Butterfly	**H-6925-31**
Needle	**H-6925-32**
Expansion/Contraction	**H-6925-33**

Fittings

Extended Bushing	**H-6925-40**
Eccentric Couplings	**H-6925-41**
Reducers	**H-6925-42**

Pipe Friction Sections

1/2" Plastic & Steel Pipe Set	**H-6925-50**

Pump

Centrifugal Pump Option **H-6925-99**
H-REM-LD-D Load Cell *(for above)*

Accessories Storage Cart

Mobile Storage Cart **H-6925-MR**

Computer Data Logging *

Computer Data Logging can be added, which incorporates:

4- Differential pressure transducer with 4-20mA output signals. There are 4 different ranges.
1- Watt-Transducer with 0-10V output signal (measures the motor active power)
1- Type T thermocouple
1- Power supply module
1- Isolated RS-232 to RS422/485 converter
1- Analog input module type-T
1- Analog multichannel input module

The analog outputs are factory wired to National Instruments I/O modules where the signals are converted and terminate to a USB port. Templates for LabVIEW® control software are included. LabVIEW® Software and laptop computer are included.

Order **Model H-6925-CDL** ◆

* These options available at time of original order only, not available as after market options.

All Hampden units are available for operation at any voltage or frequency

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