

Furnace Demonstrators

Educational Training Equipment for the 21st Century

Bulletin 236-110A

H-FPST-1 Flame Propagation and Study Trainer

Purpose

The Hampden **Model H-FPST-1** Flame Propagation and Study Trainer is used to investigate the physical behavior of flame and flame control whenever fuels are burned.

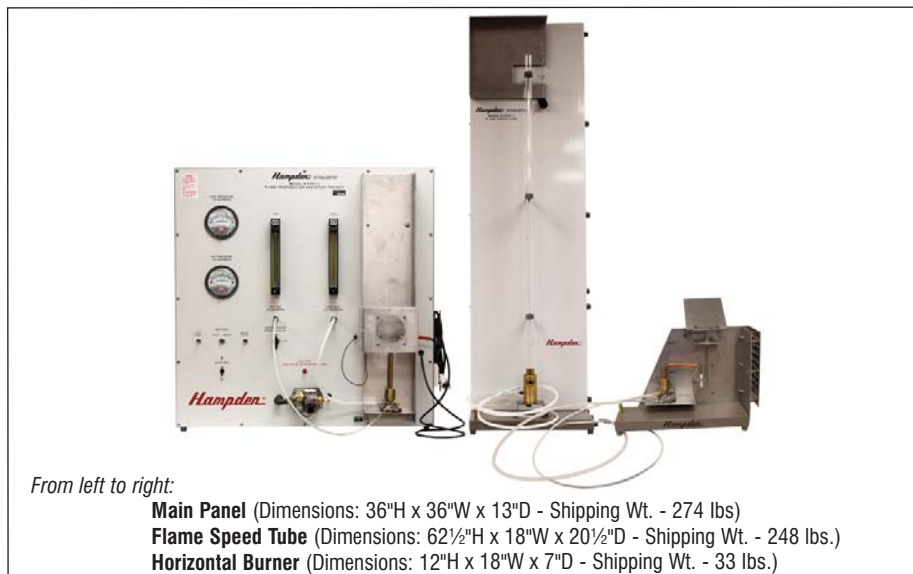
Description

The trainer system is comprised of 4 modules:

- Main Panel
- Flame Speed Tube Module
- Horizontal Burner Module
- Combustion Air Supply Pump

Main Panel Module consists of:

- Electrical control panel with control circuit breaker with pilot light and switches for selecting ignition modes (manual/electronic), triggering ignition sequences, and controlling the combustion air pump.
- Fuel flow meter with flow control valve for fuel flow monitoring and control.
- Panel mounted manometer for monitoring fuel pressure to the burner
- Air flow meter with flow control valve for combustion air flow monitoring and control.
- Panel mounted manometer for monitoring combustion air pressure to the burner.
- Electronic direct spark ignition control module.
- Electronic direct spark ignition flame integrity sensor for main panel burner.
- Direct spark igniter (15,000V) for main panel burner.
- Electrically controlled main gas valve.
- Main burner mounted in a heat shield channel.
- Pressure regulator and mounting bracket for a standard 14.1 oz. propane fuel cylinder (propane cylinder not supplied).
- 6 different size burners
 - Brass - 1/2", 5/8", 3/4", and 1" O.D.
 - Pyrex Glass - 5/8" and 1" O.D.
- Air inlet pressure gauge and pressure relief valve.
- Electrically operated air solenoid valve.



From left to right:

Main Panel (Dimensions: 36"H x 36"W x 13"D - Shipping Wt. - 274 lbs)

Flame Speed Tube (Dimensions: 62½"H x 18"W x 20½"D - Shipping Wt. - 248 lbs.)

Horizontal Burner (Dimensions: 12"H x 18"W x 7"D - Shipping Wt. - 33 lbs.)

- Brass ball valve (for air solenoid bypass).
- 24 VAC transformer for electronic direct spark ignition package.

Flame Speed Tube Module consists of:

- A support panel with heat shields, which allows for both horizontal and vertical operation of the flame speed tube.
- Pyrex glass 1" O.D. flame speed tube 48" long with brass adapter.
- Brass burner base with fuel and air inlet ports
- Fuel and combustion air lines for connection to the main panel.
- PVC - purging cap to allow the flame speed tube to be filled with a combustible air/fuel mixture

Horizontal Burner Module consists of:

- Bench top support panel with heat shields.
- Burner base with 90° horizontal burner. (5/8" O.D. Cu. tubing)
- Fuel and combustion air lines for connection to the main panel.
- Electronic direct spark ignition flame integrity sensor.
- Direct spark igniter.

Also Supplied:

- Piezoelectric hand held igniter
- Spare parts kit
- Air line - 3/8" with Quick Disconnect Fittings.

AREAS FOR STUDENT INVESTIGATION

- Flame liftoff (Blowoff)
- Flame flashback
- Flame stability diagrams
- Flame stability limits
- Flame speed and air/fuel ratio

STUDENT PROJECTS

- Directional change on flame speed
- Horizontal & vertical flame movement
- Changing cross-section in flame speed

Services Required

- 120V AC - 60Hz
- Standard 14.1 oz. Propane Cylinder

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

Hampden
ENGINEERING CORPORATION



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