



Change of State of Gases Apparatus (SMT-HT-02)

The SMT-HT-02 apparatus unit enables two changes of state to be studied experimentally: isothermal change of state, also known as the Boyle-Mariotte law, and isochoric change of state, which occurs at constant volume. Transparent tanks enable the change of state to be observed. Air is used as the test gas. In the first tank, positioned on the left, the hermetically enclosed air volume is reduced or increased using a compressor and hydraulic oil. This results in an isothermal change of state. The compressor can also operate as a vacuum pump. If the changes occur slowly, the change of state takes place at an almost constant temperature. In the second tank, positioned on the right, the temperature of the test gas is increased by a controlled electric heater and the resulting pressure rise is measured. The volume of the enclosed gas remains constant. Temperatures, pressures and volumes are measured electronically and digitally displayed on Touch LCD Display.

The unit has Touch LCD display for visualization of process and the measurements. The Unit is also connected to Software for computer connectivity and data analysis. The Touch screen and computer software is included in the package.

TECHNICAL SPECIFICATIONS

Specifications:

- Touch LCD with GUI Interface for better monitoring and accurate measurement of Plant variables.
- Experimental investigation of gas laws.
- Transparent measuring tank 1 for investigation of isothermic change of state.
- Hydraulic oil filling for changing volume of test gas.
- Built-in compressor generates necessary pressure differences to move the oil volume.
- Compressor can also be used as vacuum pump.
- 5/2-way valve for switching between compression and expansion.
- Transparent measuring tank 2 for investigation of isochoric change of state.
- Electrical heater with temperature control in tank 2.
- Sensors and digital displays for temperatures, pressures and volume.
- ESOLS DAQ Software for monitoring and control.



Technical Data:

- Compressor / vacuum pump:
 - Power output: 70W.
 - Pressure at inlet: 200mbar.
 - Pressure at outlet: 2bar.
- Temperature controller: PID, 300W, limited to 80°C.
- Measuring ranges:
 - Temperature:
 - Tank 1: 0 to 80°C.
 - Tank 2: 0 to 80°C.
 - Pressure:
 - Tank 1: 0 to 4bar abs.
 - Tank 2: 0 to 2bar abs.
 - Volume:
 - Tank 1: 0 to 3L.
- 230V, 50Hz, 1 phase
- Dimension and weight:
 - LxWxH: 900x550x900mm.
 - Weight: approx. 50kg.
- Touch LCD with GUI Interface for better monitoring and accurate measurement of Plant variables.
- ESOLS DAQ Software for monitoring and control.
 - Graphical visualization.
 - Security mechanism for login.
 - USB Connected
 - Compatible with Windows 7,8.1,10.
- Digital Instrumentation
- Capability to modify according to end user.
- Can be used in Research Purposes.

Experiments:

- Demonstrating the laws of state changes in gases experimentally.
- Isothermal change of state, Boyle-Mariotte law.
- Isochoric change of state, Gay-Lussac's 2nd law.