Features

- Operation with negative pressure and positive pressure
- Precise pressure measurement
- Experiments according to Clément-Desormes

Gas laws belong to the fundamentals of thermodynamics and are dealt with in every training course on thermodynamics.

Expansion of Ideal Gasses Apparatus 32384 enables the user to examine the expansion of ideal gases. The focus is on the experimental determination of the adiabatic exponent of air using the Clément-Desormes method.

The main components of the experimental unit are two interconnected cylindrical tanks. Positive pressure can be applied to one tank, negative pressure can be applied to the other tank. To generate the positive pressure and the negative pressure in the tanks, the tanks are connected to each other via a compressor. The pressure equalization can either take place with the environment or with the other tank through a bypass. Due to the high velocity of the pressure compensation the change of state is quasi adiabatic. Ball valves are used for pressure equalization.

Precise pressure measurement technology is integrated in the tanks to enable the determination of the adiabatic exponent using the Clément-Desormes method. The measured temperatures and pressures are recorded, transmitted to the software and displayed.

Optional DAQ software of 32384 offers all the advantages of software-supported experimental procedure and analysis.

Specifications

- 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 volumes
- Optional DAQ software with control functions and data acquisition via Windows 7

Technical Specifications

- Compressor / vacuum pump - power output: 60W
  - Pressure at inlet: 213mbar
  - Pressure at outlet: 2bar
- Temperature controller: PID, 300W, limited to 80°C
- Measuring ranges
- Temperature
  - Tank 1: 0…80°C
  - Tank 2: 0…80°C
- Pressure
  - Tank 1: 0…4bar absolute
  - Tank 2: 0…2bar absolute
- Volume
  - Tank 1: 0…3L

Optional DAQ Software & Sensors
Level sensor:
- Type: capacitance type

Note: Specifications are subject to change.

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- MOC: S.S 316
- Total height: 540mm
- Output: 4-20mA Analog signal

Pressure sensor:
- Type: Capacitive type
- Range: 0 to 4 Bar Gauge
- Qty: 02nos
- Output: 4-20mA Analog signal
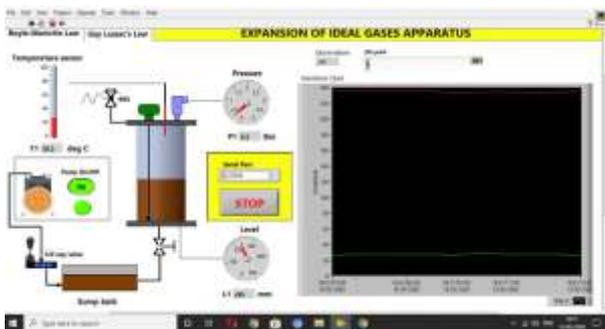
Temperature controller:
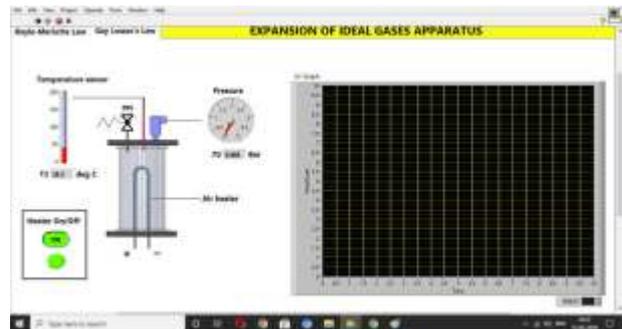- Qty: 01nos

Temperature sensor:
- Type: Resistive type
- Model: PT100
- Range: 0 to 400° C
- Qty: 03nos
- DAQ device:
- Make: SCITECH
- Analog channel: 15nos
- Digital channel: 45nos

Screenshots:

Isothermal change of state by Boyle-Mariotte law	**Isochoric change of state by Gay-Lussac's law**

Experiments
- Determination of the adiabatic exponent according to Clément-Desormes
- Isothermal change of state by Boyle-Mariotte law
- Isochoric change of state by Gay-Lussac's law
- Idiabatic change of state of air
- Isochoric change of state of air

Requirements
- Mains Power 220 – 240V @ 50Hz, 1Ph

Note: Specifications are subject to change.

Tesca Technologies Pvt. Ltd.

IT-2013, Ramchandrapura Industrial Area, Sitapura Extension,
Near Bombay Hospital, Vidhani Circle, Jaipur-302022, Rajasthan, India,
Tel: +91-141-2771791 / 2771792; Email: info@tesca.in, tesca.technologies@gmail.com
Website: www.tescaglobal.com