

**Features:**

- Illustrative model of a radial compressor<sup>1</sup>
- Transparent delivery pipe and intake pipe<sup>1</sup>
- Software for data acquisition, visualization and operation<sup>1</sup>
- Part of the fluid energy machines

Radial compressors are used to compress gases. The medium is drawn in axially to the drive shaft by the rotation of the rotor and flows through the rotor rotating at high speed. By means of centrifugal force, the medium is accelerated towards the outer edge and is compressed in this manner.

The experimental unit provides the basic experiments to get to know the operating behavior and the important characteristic variables of radial compressors.

Tesca Centrifugal Compressor Demonstration Apparatus features a two-stage radial compressor with variable speed via a frequency converter, an intake pipe and a delivery pipe. The intake and delivery pipes are transparent. A protective plate placed in front of the inlet of the

intake pipe prevents larger objects from being drawn in or the clogging of the intake opening. The airflow is adjusted by a throttle valve at the end of the delivery pipe.

The experimental unit is fitted with sensors for pressure, temperature, and speed. The flow rate is determined via differential pressure measurement on the intake nozzle.

The microprocessor-based measuring technique is well protected in the housing. All the advantages of software-supported experiments and evaluation are offered by the software and the microprocessor. The connection to a PC is made by USB.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

**Specifications:**

- Functioning and operating behavior of a radial compressor
- Two-stage centrifugal compressor with drive motor
- Variable speed via frequency converter
- Transparent intake and delivery pipes
- Throttle valve for adjusting the airflow in the delivery pipe
- Protecting plate at air inlet for undisturbed airflow
- Determination of flow rate via intake nozzle
- Display of differential pressures, flow rate, speed, electrical power consumption, and hydraulic power output, temperatures, and efficiency
- Microprocessor-based measuring technique
- Unit-specific software for data acquisition and operation via USB under Windows Vista or Windows 7

**Technical Specifications:**

Intake pipe

- Inner diameter: 44mm

Note: Specifications are subject to change.

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- length: 84mm

Delivery pipe

- Inner diameter: 34mm
- Length: 200mm

Two-stage radial compressor

- Power consumption: 1000W
- Speed: 1000...16000min<sup>-1</sup>
- Pax. flow rate: 180m<sup>3</sup>/h
- Pax. head: 235mbar

Displayed / measuring ranges

- Differential pressure (stage 1 / stage 2):  
0...350mbar
- Flow rate: 0...120m<sup>3</sup>/h
- Temperature: 2x 0...100°C
- Speed (compressor): 0...21000min<sup>-1</sup>
- Electrical power consumption: 0...1000W

**List of Experiments:**

- Operating behavior and characteristic variables of centrifugal compressor
- Recording of the compressor curve for both stages
- Effect of the rotor speed on the pressure
- Effect of the rotor speed on the flow rate
- Distribution of stage pressure ratios
- Effect of compression on the temperature increase
- Determination of hydraulic power output and efficiencies

**Services Required:**

1. Electrical Supply, 240/440V, 3Ph, 50 Hz.

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