

# HM 280

## Experiments with a radial fan



### Learning objectives/experiments

- operating behaviour and characteristic variables of a radial fan
- recording the fan characteristic (pressure difference as a function of the flow rate)
- effect of the rotor speed on the pressure
- effect of the rotor speed on the flow rate
- effect of different blade shapes on the fan characteristic and efficiency
- determination of hydraulic power output and efficiencies

### Description

- 2 interchangeable rotors
- transparent delivery pipe and intake pipe
- GUNT software for data acquisition, visualisation and operation
- part of the GUNT Labline fluid energy machines

Radial fans are used to transport gases with non-excessive pressure differences. The medium is drawn in axially to the drive shaft of the radial fan and is deflected by 90° by the rotation of the rotor and discharged radially.

The experimental unit provides the basic experiments to get to know the operating behaviour and the most important characteristic variables of radial fans.

HM 280 features a radial fan with variable speed via a frequency converter, an intake pipe and a delivery pipe. The transparent intake pipe is fitted with guide plates for flow guidance and with a flow straightener to calm the air. This enables precise measurements even with heavily reduced operation. The air flow is adjusted by a throttle valve at the end of the delivery pipe.

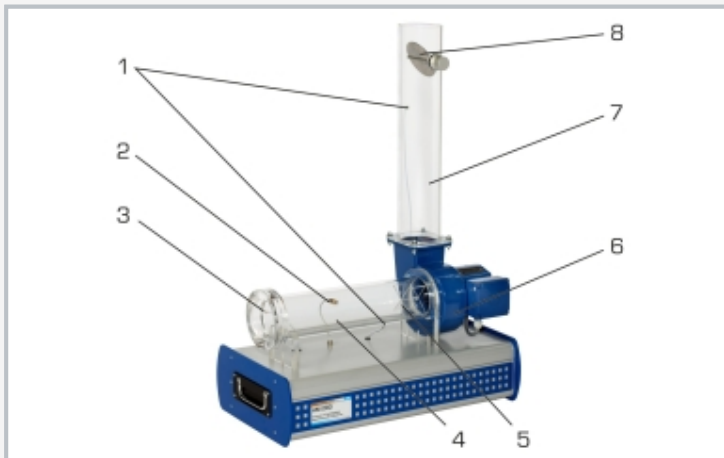
To demonstrate the effect of different blade shapes two rotors are included in the scope of delivery: one rotor with forward curved blades and one with backward curved blades. The rotors are easily interchangeable.

The experimental unit is fitted with sensors for pressure and temperature. The flow rate is determined via differential pressure measurement on the intake nozzle. The microprocessor-based measuring technique is well protected in the housing. The measured values are transmitted directly to a PC via USB where they can be analysed using the software included.

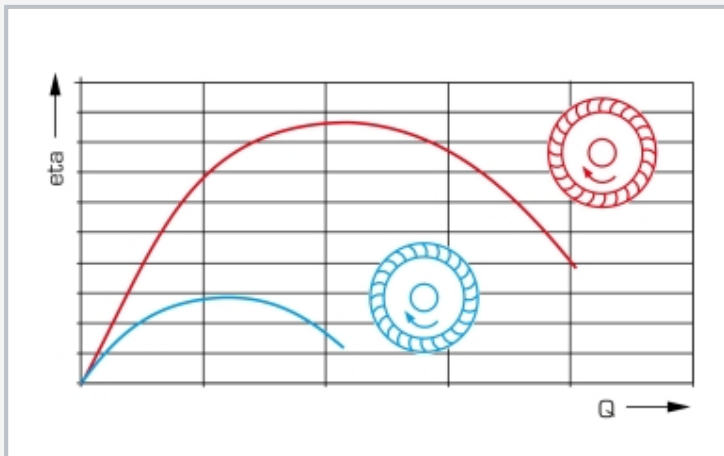
All the advantages of software-supported experiments with operation and evaluation are offered by the GUNT software and the microprocessor.

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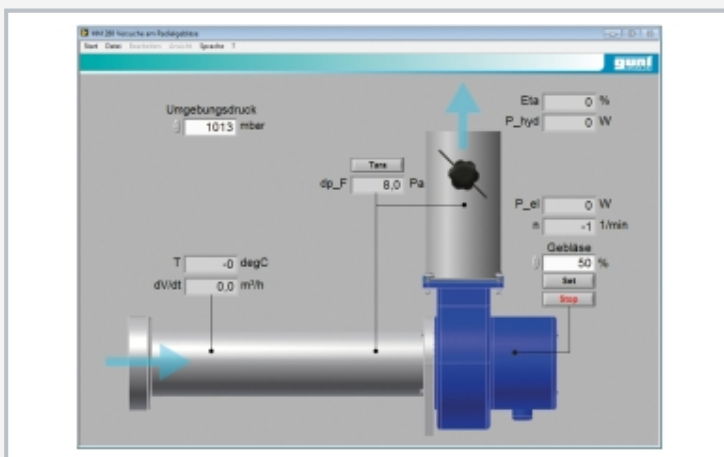
## Experiments with a radial fan



1 measuring points for pressure, 2 measuring point for temperature, 3 inlet nozzle with measuring point for static pressure, 4 intake pipe, 5 guide plates, 6 radial fan with drive motor, 7 delivery pipe, 8 throttle valve



Efficiencies in comparison; red: rotor with forward curved blades, blue: rotor with backward curved blades;  $\eta$  efficiency,  $Q$  débit



Operating interface of the powerful software

### Specification

- [1] functioning and operating behaviour of a radial fan
- [2] radial fan with 3-phase AC motor
- [3] variable speed via frequency converter
- [4] transparent intake and delivery pipes
- [5] throttle valve to adjust the air flow in the delivery pipe
- [6] interchangeable rotors: 1 rotor with forward curved blades and 1 rotor with backward curved blades
- [7] determination of flow rate via intake nozzle
- [8] display of differential pressure, flow rate, speed, electrical power consumption and hydraulic power output, temperature and efficiency
- [9] due to integrated microprocessor-based instrumentation no additional devices with error-prone wiring are required
- [10] display and evaluation of the measured values as well as operation of the unit via software
- [11] GUNT software with control functions and data acquisition via USB under Windows 10

### Technical data

#### Intake pipe

- inner diameter: 90mm
- length: 430mm

#### Delivery pipe

- inner diameter: 100mm
- length: 530mm

#### Radial fan

- power consumption: 110W
- nominal speed: 2800min<sup>-1</sup>
- max. volumetric flow rate: 480m<sup>3</sup>/h
- max. pressure difference: 300Pa

#### Measuring ranges

- differential pressure: 0...1800Pa
- flow rate: 0...1000m<sup>3</sup>/h
- temperature: 0...100°C
- speed: 0...3300min<sup>-1</sup>
- el. power consumption: 0...250W

230V, 50Hz, 1 phase  
 230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase  
 UL/CSA optional  
 LxWxH: 670x340x940mm  
 Weight: approx. 20kg

### Required for operation

PC with Windows

### Scope of delivery

- 1 experimental unit
- 2 rotors
- 1 GUNT software + USB cable
- 1 set of instructional material

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Optional accessories

020.30009

WP 300.09

Laboratory trolley