

# HM 215

## Two-stage axial fan



### Description

- two axial fans in series configuration or in individual operation
- three-hole probe for determining pressure and velocity profile

Axial fans are connected in series in plants to increase the pressure. In theory, connecting two fans in series doubles the pressure increase.

The HM 215 trainer allows the investigation of a two-stage axial fan. A measuring device is used to determine the pressure and velocity distribution.

The trainer includes a measuring section with two identical axial fans. The carefully designed nozzle contour and a flow straightener at the air inlet ensure a uniform velocity distribution with little turbulence in the measuring section. The fans are equipped with outlet guide vane systems. These guide mechanisms redirect the angular momentum of the outflow in the axial direction and allow an increase in pressure. The fan speed is adjustable. A throttle valve is installed in the outlet. It can be used to adjust the air flow rate through the pipe.

A pipe bend may optionally be installed to rotate the flow at the outlet of the measuring section. One of the fans can be removed from the measuring section so that the remaining fan can be studied in individual operation.

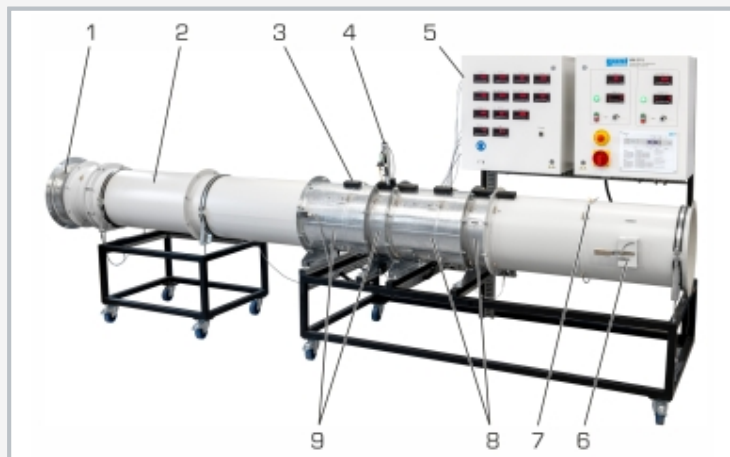
In the measuring section there are measuring connections to detect the differential pressures and temperatures. The flow rate is measured via an inlet nozzle. The differential pressure and the angle of attack are detected radially at rotors and guide vane systems by means of the 3-hole probe. This enables the display of different pressure and velocity profiles. The measured values are read from digital displays and can at the same time be transmitted via USB directly to a PC where they can be analysed using the software included.

### Learning objectives/experiments

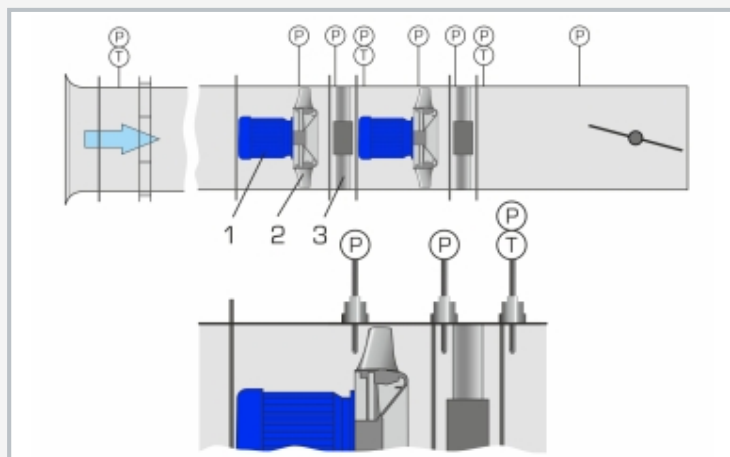
- determining the fan characteristic
- series configuration or individual operation of axial fans
- determining the energy balance
- determining the radial pressure and velocity distribution on rotor and guide vane system by means of a probe

# HM 215

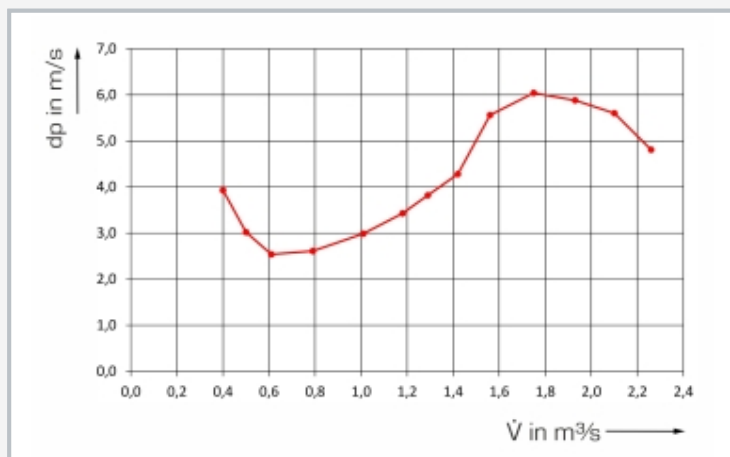
## Two-stage axial fan



1 nozzle with flow straightener, 2 intake pipe, 3 mounting for measuring device, 4 measuring device with three-hole probe, 5 switch box, 6 throttle valve in the outlet, 7 pressure measuring point, 8 fan, 9 fan



Position of the measuring points  
1 motor, 2 blade, 3 guide vane; P pressure, T temperature; blue arrow: flow direction



Fan characteristic

### Specification

- [1] investigate two-stage axial fan
- [2] two identical single-stage fans in series configuration or individual operation
- [3] fans both with variable speed via frequency converter
- [4] flow-optimised nozzle and flow straightener for smooth, low-turbulence flow
- [5] air flow in the pipe section can be adjusted via throttle valve
- [6] optional pipe bend at the outlet for flow deflection
- [7] measuring device with three-hole probe for determining the differential pressure on rotor and guide vane system
- [8] sensors for pressure and temperature upstream and downstream of each fan
- [9] volumetric flow rate measured via inlet nozzle
- [10] GUNT software for data acquisition via USB under Windows 10

### Technical data

2 fans

■ drive motor rated output: 3,45kW

■ max. pressure difference: 798Pa

■ speed of one fan: max. 3300min<sup>-1</sup>

■ speed of two fans: max. 3600min<sup>-1</sup>

Measuring section inner Ø: 400mm

Measuring ranges

■ temperature: 0...100°C

■ volumetric flow rate: 0...5,12m³/s

■ differential pressure: ±20mbar

■ speed: 0...3600min<sup>-1</sup>

■ radial position of the probe: 0...100mm

■ angle: ±15°

400V, 50Hz, 3 phases

400V, 60Hz, 3 phases

LxWxH: without pipe outlet: 4325x975x1800mm

Length with pipe outlet: 5225mm

Weight: approx. 250kg

### Required for operation

PC with Windows recommended

### Scope of delivery

- 1 trainer with 2 fans
- 1 pipe bend
- 1 measuring device
- 1 set of measuring hose with quick-release couplings
- 1 GUNT software + USB cable
- 1 set of instructional material

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Optional accessories

for Remote Learning

GU 100

Web Access Box

with

HM 215W

Web Access Software