HM 287
Experiments with an axial turbine

Description

- **illustrative model of an axial turbine**
- **transparent turbine housing**
- **adjustable, wear-free eddy current brake as turbine load**
- **GUNT software for data acquisition, visualisation and operation**
- **part of the GUNT-Labline fluid energy machines**

The axial turbine operates as a reaction turbine as used in gas tubines and steam turbines. The water flows through a stator where it is deflected and accelerated. Then, the water hits then the blades where it delivers kinetic energy and pressure energy and puts the rotor in motion. The water pressure steadily decreases from the inlet to the outlet.

The trainer provides the basic experiments to get to know the operating behaviour and the most important characteristic variables of axial turbines.

HM 287 features a closed water circuit with an axial turbine, a centrifugal pump and a water tank. The stator and the rotor of the turbine are mounted in a transparent housing and can be observed during operation. The loading device is outside of the housing. The eddy current brake generates a defined load. The eddy current brake is specially developed by GUNT. It is wear-free and can be finely adusted. The flow rate is adjusted using a valve.

The trainer is fitted with a sensor for pressure (turbine inlet). The torque produced by the turbine is determined via an electronic force sensor. The speed is measured with an optical speed sensor. The flow rate is determined by an orifice plate with differential pressure measurement.

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

Learning objectives/experiments

- principle of operation of an axial turbine
- determination of the power output
- determination of the efficiency
- recording of the characteristic curve
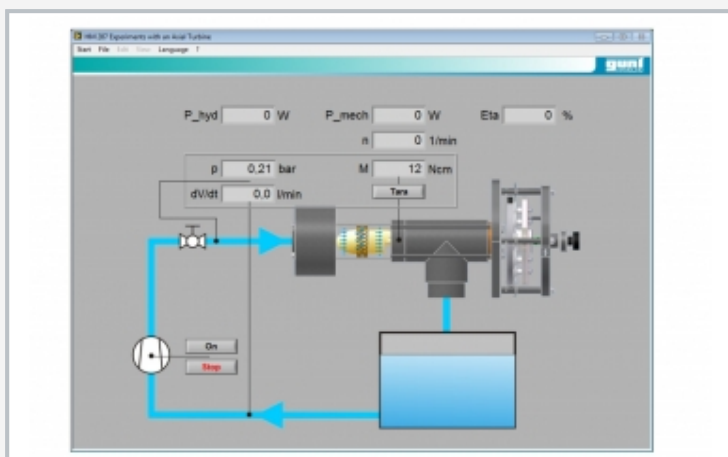- comparison of experiment and calculation

HM 287
Experiments with an axial turbine

1 valve for adjusting the flow rate, 2 switch cabinet, 3 flow rate measurement with measuring orfice and differential pressure measurement, 4 pump, 5 tank, 6 eddy current brake, 7 axial turbine
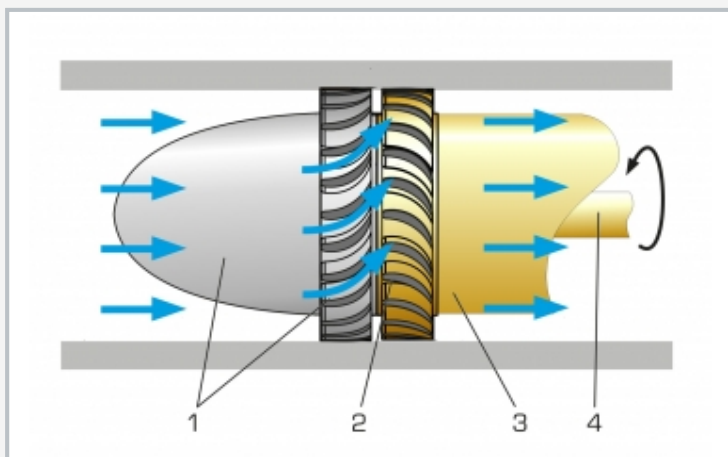
Principle of operation of an axial turbine: 1 stator, 2 rotor, 3 housing, 4 shaft

Operating interface of the powerful software

Specification

- [1] functioning and operating behaviour of an axial turbine
- [2] closed water circuit contains axial turbine, pump and water tank
- [3] transparent housing for observing the stator and the rotor
- [4] turbine load using the wear-free and adjustable eddy current brake
- [5] valve for adjusting the volumetric flow rate
- [6] force sensor to determine the torque on turbine shaft
- [7] measurement of turbine speed with optical speed sensor
- [8] pressure measurement on inlet side
- [9] determination of volumetric flow rate using differential pressure measurement across a measuring orifice
- [10] microprocessor-based measuring technique
- [11] GUNT software with control functions and data acquisition via USB under Windows 7, 8.1, 10

Technical data

Axial turbine
- power output: approx. 130W at 3500min^{-1}
- rotor, outer diameter: 50mm
- blade length: 5mm

Pump
- power consumption: 1,02kW
- max. flow rate: approx. 375L/min
- max. head: 13,7m

Measuring orifice
- diameter: 44mm
- differential pressure sensor: 0...0,1bar

Measuring ranges
- flow rate: 500L/min
- pressure (inlet): 0...5bar
- torque: 0...2Nm

230V, 50Hz, 1 phase
120V, 60Hz, 1 phase
UL/CSA optional
LxWxH: 1200x800x950mm
Weight: approx. 135kg

Required for operation

PC with Windows

Scope of delivery

- 1   trainer
- 1   GUNT software CD + USB cable
- 1   set of instructional material

We reserve the right to modify our products without any notifications.