HM 283

Experiments with a centrifugal pump

Description

- **determination of characteristic pump variables**
- **closed water circuit**
- **GUNT software for data acquisition, visualisation and operation**
- **part of the GUNT Labline fluid energy machines**

Centrifugal pumps are turbomachines which are used to transport fluids. The rotation of the pump impeller generates centrifugal forces. These forces are used to deliver the water.

The experimental unit provides the basic experiments to get to know the operating behaviour and the important characteristic variables of centrifugal pumps.

HM 283 features a closed water circuit with water tank and a centrifugal pump with variable speed via frequency converter. The pump housing is transparent. This enables to observe the pump impeller in operation and the occurrence of cavitation.

Valves in the inlet and outlet of the pump allow the setting of different pressure conditions.

The experimental unit is fitted with sensors for pressure, temperature and flow rate. 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.

Learning objectives/experiments

- principle of operation of a centrifugal pump
- recording of pump characteristics
- effect of speed on head
- effect of speed on flow rate
- determination of pump efficiency
- cavitation effects
- effect of incorrect direction of rotation

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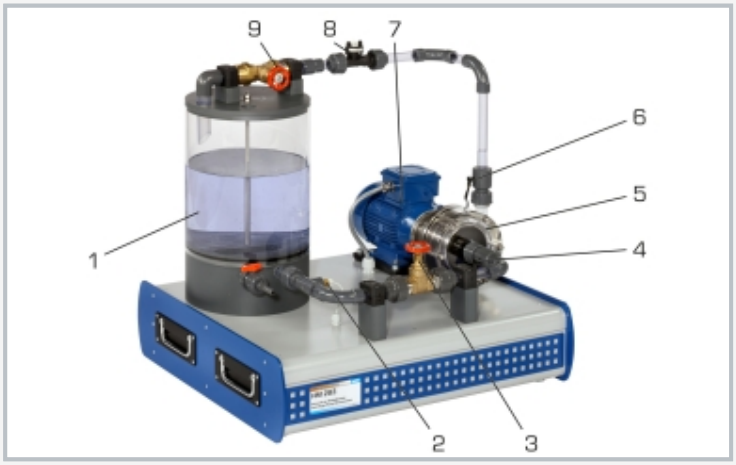
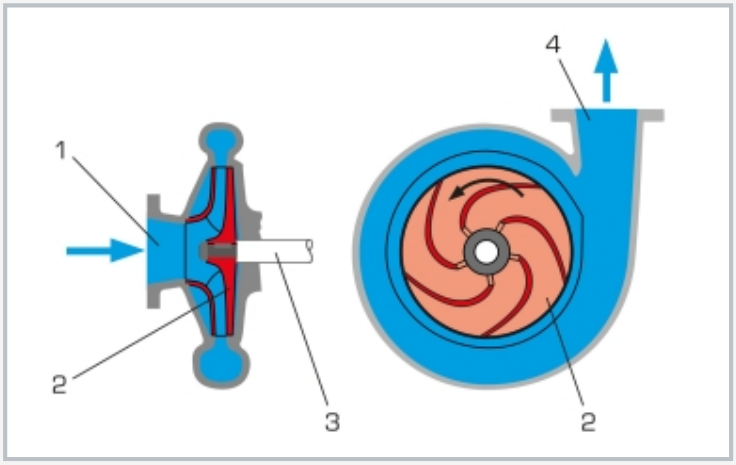
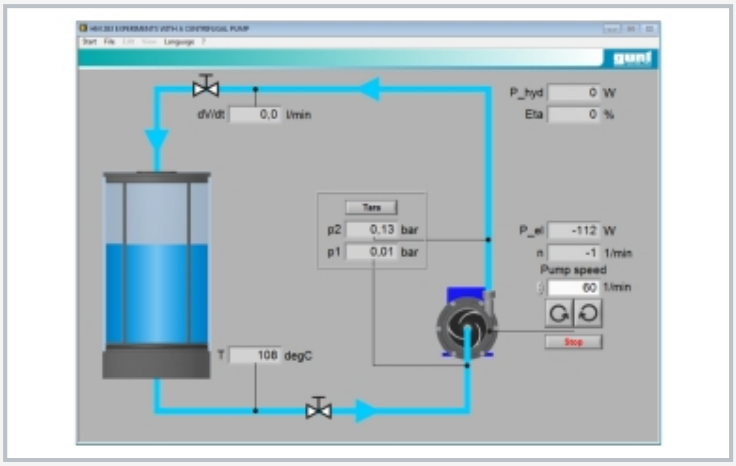


1 water tank, 2 temperature sensor, 3 valve at intlet, 4 pressure sensor at inlet, 5 pump, 6 pressure sensor at outlet, 7 motor, 8 flow meter, 9 valve at outlet



Principle of operation of a centrifugal pump
1 water inlet, 2 pump impeller, 3 pump shaft, 4 water outlet



Operating interface of the powerful software

Specification

[1] functioning and operating behaviour of a centrifugal pump
[2] closed water circuit contains centrifugal pump with drive motor and a transparent water tank
[3] transparent housing for observing the pump impeller
[4] variable speed via frequency converter
[5] adjustment of pressure conditions at inlet and outlet side of the pump by valves
[6] sensors for pressure at inlet and outlet side of the pump, temperature and flow rate
[7] due to integrated microprocessor-based instrumentation no additional devices with error-prone wiring are required
[8] display and evaluation of the measured values as well as operation of the unit via software
[9] GUNT software with control functions and data acquisition via USB under Windows 10

Technical data

Centrifugal pump with drive motor
- power consumption: 370W
- speed: 0...3000min^{-1}
- max. flow rate: approx. 40L/min
- max. head: approx. 10m

Water tank: approx. 15L

Measuring ranges
- pressure (inlet): ±1bar
- pressure (outlet): 0...5bar
- flow rate: 3,5...50L/min
- temperature: 0...130°C

230V, 50Hz, 1 phase
230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase
UL/CSA optional
LxWxH: 660x590x720mm
Weight: approx. 46kg

Required for operation

PC with Windows

Scope of delivery

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

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Optional accessories

020.30009	WP 300.09	Laboratory trolley