

Product Name :
Astra Scientific Demonstration of Francis Turbine

Product Code :
Fluid Mechanics Lab0009



Description :

Astra Scientific Demonstration of Francis Turbine

Technical Specification :

DESCRIPTION:

The experimental unit consists of the Francis wheel, the control device with adjustable guide vanes, a band brake for loading the turbine and a housing with a transparent front panel.

The transparent cover enables you to observe the water flow, the wheel and the guide vanes during operation. Adjusting the guide vanes modifies the angle of incidence and thus the speed of the impeller.

Water turbines are turbo machines utilizing waterpower. The Francis turbine is part of the reaction turbines, which convert the pressure energy of the water into kinetic energy in the control device and in the impeller. The water is fed in the control device by means of a spiral housing. The flowing water is accelerated in the control device by the adjustable guide vanes and directed onto the vanes of the impeller. The redirection and further acceleration of the water in the impeller generates an impulse, which is transmitted to the Francis wheel.

Operating Principle of a Francis Turbines the model of a Francis turbine demonstrating the function of a reaction turbine.

The turbine torque is determined by force measurement on a band brake

and is read on spring balances. For measuring the rotational speed, a non-contact speed sensor, A manometer shows the water pressure at the turbine inlet.

FEATURES:

- Design and function of a Francis turbine
- Determination of torque, power and efficiency
- Graphical representation of characteristic curves for torque, power and efficiency
- Determination of mechanical output
- Determination of efficiency
- Recording of characteristic curves
- Investigation of the influence of the guide vane position on the power output
- Velocity triangles

SPECIFICATION:

- Turbine

Output: approx. 350W at 1500min^{-1} , 270L/min, H=15m

Max. Speed: 3000min^{-1}

Rotor

11 blades

Medium diameter: 60mm

Distributor

7 vanes

Angle of attack: $0\ldots 20^\circ$

- Measuring ranges

Torque: 0...9,81Nm

Pressure: 0...4bar abs.

Speed: 0...4000min



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