

**Product Name :**  
Computerized Francis Turbine Trainer

**Product Code :**  
NLAB-MECHANICALAB220011



**Description :**

Computerized Francis Turbine Trainer

**Technical Specification :**

The developed closed water circuit consists of a tank with optional cooling, a centrifugal pump and a flow control valve for adjusting the inlet pressure. The transparent operating area of the turbine enables an optimal view of water flow, rotor and guide vanes during operation. By adjusting the guide vanes the angle of attack, the cross-section and thus the output of the turbine are changed. An asynchronous machine is used as a generator for loading the turbine. A pump with variable speed via frequency converter provides for an energy efficient operation.

The speed of the turbine is recorded by means of an inductive, non-contact position sensor at the generator shaft. The generator is equipped with a pendulum bearing and with a force sensor to determine the torque.

The pressures at the inlet and outlet of the turbine, the temperature and the flow rate are recorded by sensors. The measured values are displayed digitally and can be processed further on a PC.

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## FEATURES

Investigation of the conversion of hydraulic into mechanical energy

Determination of the mechanical power and hydraulic power of the turbine

Determination of efficiency

Recording of characteristic curves

Investigation of the influence of the guide vane position

Velocity triangles

## SPECIFICATIONS:

Hydraulic power: 2,1kW at 1500min-1

Mechanical power: approx. 1,4kW at 1500min-1

Rotor, D: 165mm, 8 blades

8 guide vanes, angle of attack adjustable: 0...23°

Centrifugal pump, multistage

Variable speed

Power consumption: 5,5kW

Max. Flow rate 900L/min

Pump head 42m

Asynchronous machine as generator

Output: 2,2kW at 1440min-1

Tank: 550L

Measuring ranges

Temperature:: 0...100°C

Pressure (inlet):  $\pm 1$ bar (turbine)

Pressure (outlet): 0...6bar (turbine)

Flow rate: 0...1000L/min

Torque: 0...20Nm

Speed: 0...3000min-1

Power: 0...2200W (generator)

400V, 50Hz, 3 phases

400V, 60Hz, 3 phases, 230V, 60Hz, 3 phases

## Naugralabequipments

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