FLUID MECHANICS

AUTONOMOUS FRANCIS TURBINE – COMPUTERIZED ELECTRICAL BRAKE

DL DKH042

The system can simulate a small scale Francis turbine, especially designed for educational purposes. It can study the behavior and the characteristics of this type of turbine.

The turbine housing is partially transparent so that the turbine operation driven by the water flow and movement of the guide fins for the inlet flow regulation of the turbine can be observed

The trainer includes also a built-in regulating valve at the water inlet allowing the possibility to work with a different flow. The electric braking can grant the working at different speeds.

The turbine works autonomously thanks to the system complete of water tank, pump and all necessary instruments based on a movable trolley.

TRAINING OBJECTIVES

- Characteristic curves of the turbine:
  - Torque - speed (M -n).
  - Brake power – rotational speed (Pe-n).
  - Performance – rotational speed (η- n).
  - Torque - U (M- U).
  - Brake power - U (Pe-U).
  - Performance - U (η-U)
- Curves of Iso-yield.
- Joint performance, turbine- electric generator.
- Study and acquisition the characteristic curves of a centrifugal pump.
- Acquisition of the overall performance of a pump station.

TECHNICAL DESCRIPTION

This computerized system allows to display all variables on the integrated workstation

Requirements:

Power supply: single phase 230V/50Hz.

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TECHNICAL DATA

Brake Type:

- Electric brake

Turbine characteristics:

- Type: Francis
- Impeller material: bronze
- Impeller diameter 80mm
- Turbine weight: 15kg
- Number fixed fins: 10
- Number of the guide fins: 6
  (from 0 to 100% adjustable)
- Power: 100W
- Rated speed: 4,000rpm

Framework

- The system is made of an anodized aluminum structure, with a 130 litres' tank and a pump where the necessary turbine flow is generated

Electronic components:

- Pressure transducer
- Differential pressure gauge
- Tachometer
- Load cell for torque
- Data-acquisition board

Accessory:

- Computer with software