



DIDACTIC SYSTEM FOR STUDY AND TRAINING OF THE PELTON TURBINE WITH 150 WATT DC GENERATOR AND POWER INJECTION TO THE ELECTRIC NETWORK DL SPH 33



A bench developed to power a double jet Pelton turbine to convert hydraulic power into electric power and inject this energy to the mains. The equipment is designed to study the functions and measurements of a complete hydraulic/electric generation system with a real turbine simulating a typical hydroelectric generation.

The front of the turbine is transparent so that you can see how the turbine uses the energy transfer between a water jet and its rotor. The system can be transported and operated in a totally autonomous way, being composed of a water tank, pumps and all the necessary elements for the performance of didactic exercises.

POSSIBLE PRACTICES:

Turbine characteristic curve:

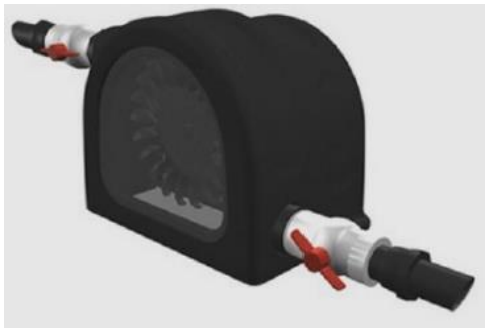
1. Pressure / Speed (M-n)
2. Power / Speed
3. Performance / Speed
4. Generator characteristic curve
5. System efficiency curves



FLUID MECHANICS

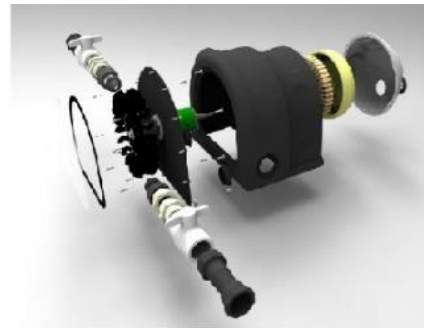
PUMP TECHNICAL FEATURES

- Power: 2 HP
- Inlet diameter: 1 "
- Outlet diameter: 1 "
- Power: Three-phase with Inverter
- Flow: 2 liters / sec.
- RPM: 0-3600 RPM



TECHNICAL FEATURES OF THE TURBINE

- Number of blades: 20
- Flow rate: 5 m³ / h² max.
- Tube diameter: 52 mm
- Water Inlets: 2
- Jet diameter: 6.2 mm
- Speed: 1489 rpm
- Maximum power: 200 W
- Output voltage (no load): 42 V.
- Output voltage (with load): 20 V.
- Wire section: 4 mm²
- Maximum current: 18 A



TECHNICAL FEATURES OF THE ELECTRIC BOX AND MEASUREMENT SYSTEM:

The electric panel contains the main switch and the inverter. The connection to the mains is made with a single-phase earth cable. A small frame supports the electrical measuring instruments, i.e. an analog DC voltmeter; an analog DC ammeter, a single-phase meter and a digital RPM meter. The inverter HMI displays the parameters used to drive the pump, as well as the power consumed.

TECHNICAL FEATURES OF THE SYSTEM

The system includes, in addition to the previously indicated items, a total flowmeter (liters/sec) and a complete pressure gauge. The system also has a Grid-Tie type inverter as an electrical charge that injects the available energy directly into the laboratory grid. The system thus defined allows the measurement of the DC energy of the generator and the AC energy in alternating current injected into the laboratory grid.

TECHNICAL FEATURES OF THE HYDROSTATIC BENCH

The hydrostatic bench is designed as a table with minimum dimensions of 1700 x 1000 x 25 mm, supported by an aluminum frame with its own wheel for a transportable system. It has a 200-liter tank and a pump that simulates a height of approximately 10 meters. The water storage tank has a lid to prevent the accumulation of dust and particles, keeping the water in excellent condition for use.

REQUIREMENTS: Power: 1600VA 200 liters of water

THE SYSTEM INCLUDES: Student and teacher manual with suggested exercises.