



VDAS® MFP101

CENTRIFUGAL PUMP MODULE

Allows students to study and perform tests on a centrifugal pump and optional turbines: to understand how they work and calculate their performance



TYPICAL SCREENSHOT OF THE OPTIONAL VDAS® SOFTWARE



SHOWN FITTED WITH THE UNIVERSAL DYNAMOMETER (MFP100), THE TURBINE DYNAMOMETER AND A TURBINE

- Centrifugal pump mounted in a mobile frame with full instrumentation
- Part of TecEquipment's Modular Fluid Power range that connects with the Universal Dynamometer (MFP100) as a common motive power source for a cost-effective solution
- Allows students to study and test a popular fluid power machine
- Inlet and delivery valves for a wide range of operating conditions
- Connection plate with schematic diagram clearly shows the water flow circuit and how parts of the module connect to each other
- Fully variable speed, for a range of test results
- Turbine dynamometer and turbines (available separately) – Propeller, Francis and Pelton
- Includes digital pressure display
- Can connect to TecEquipment's Versatile Data Acquisition System (VDAS®)



CENTRIFUGAL PUMP MODULE

DESCRIPTION

For use with and driven by the Universal Dynamometer (MFP100), the Centrifugal Pump Module is part of TecQuipment's Modular Fluid Power range. The Centrifugal Pump Module is ideal for student experiments, demonstrations and projects.

Centrifugal pumps are common machines used to move water and other fluids in many applications. These can be domestic water systems, agriculture, sanitation and many industrial applications.

The module includes a centrifugal pump, a Venturi flowmeter, valves, a reservoir and instrumentation; all mounted on a robust, mobile trolley for ease of use. The separate Universal Dynamometer (MFP100) measures and displays the speed and torque of the pump to calculate and display mechanical (shaft) power. Electronic pressure transducers measure the pump inlet and delivery pressures and the Venturi differential pressure (flow rate). Speed is fully variable up to the maximum allowable for the pump.

The centrifugal pump is also the power source for the optional turbines: a Pelton wheel, a Francis turbine and Propeller turbine (all available separately). The turbines fit on the separate Turbine Dynamometer (MFP101a). You can only test one turbine at a time.

The Turbine Dynamometer fits onto the Centrifugal Pump Module. The centrifugal pump delivery pipe then connects to the turbine. A pressure transducer on the Centrifugal Pump Module measures the turbine inlet pressure. The turbines and Turbine Dynamometer allow students to test three different turbines to find how they work and perform.

When used with an optional stroboscope, students can 'freeze' the image of the moving turbines and water flow to improve their understanding of the turbines.

For quick and reliable tests, TecQuipment can supply the optional Versatile Data Acquisition System (VDAS®). VDAS® gives accurate real-time data capture, monitoring and display, calculation and charting of all the important readings on a computer (PC is not supplied).

STANDARD FEATURES

- Supplied with comprehensive user guide
- Five-year warranty
- Made in accordance with the latest European Union directives

LEARNING OUTCOMES

- Centrifugal pump performance and characteristics, typically head against flow and efficiency against flow
- Variation of pump performance with inlet pressure
- Variation of pump performance with speed
- Non-dimensional performance characteristics
- Flow measurement using a Venturi

AVAILABLE EXPERIMENT MODULES

- Pelton Wheel (MFP101b)
- Propeller Turbine (MFP101c)
- Francis Turbine (MFP101d)

ESSENTIAL BASE UNIT

- Universal Dynamometer (MFP100)

RECOMMENDED ANCILLARIES

- VDAS-F (frame-mounted version of the Versatile Data Acquisition System)
- Stroboscope (ST1)

ESSENTIAL SERVICES

ELECTRICAL SUPPLY (FOR THE UNIVERSAL DYNAMOMETER):

Single-phase 230 VAC, 50 Hz at 20 A

Two-phase 220 VAC, 60 Hz at 20 A

WATER SUPPLY:

Self-contained water circuit: needs approximately 200 litres of cold, clean water

FLOOR SPACE NEEDED:

2 m x 1.5 m



CENTRIFUGAL PUMP MODULE

OPERATING CONDITIONS

OPERATING ENVIRONMENT:

Laboratory

STORAGE TEMPERATURE RANGE:

-25°C to +55°C (when packed for transport)

OPERATING TEMPERATURE RANGE:

+5°C to +40°C

OPERATING RELATIVE HUMIDITY RANGE:

80% at temperatures < 31°C decreasing linearly to 50% at 40°C

SPECIFICATIONS

NETT DIMENSIONS:

1800 mm x 1670 mm x 800 mm

PACKED DIMENSIONS:

2.25 m³

NETT WEIGHT:

172 kg

PACKED WEIGHT:

Approximately 250 kg

POWER:

1.5 kW (from Universal Dynamometer)

MAXIMUM PUMP SPEED:

2800 rev.min⁻¹

MAXIMUM FLOW RATE:

4 L.s⁻¹ (nominal)

MAXIMUM DELIVERY PRESSURE:

2.5 Bar (nominal)

INSTRUMENTS AND MEASUREMENTS:

- Pressures: transducers and digital displays
- Flow: Venturi and differential pressure transducer
- Torque, speed and power: Measured and displayed digitally by the Universal Dynamometer (MFP100)

NOTE: Outlets on the back of the motor drive of the Universal Dynamometer electrically power the digital displays.