



## P3130 WIND TURBINE ABSORBING DYNAMOMETER

### Description

The wind turbine dynamometer is designed to test small size wind power type turbines of up to 450mm diameter by absorbing and measuring the energy produced by the turbine. The equipment is sized to allow its use inside a laboratory without the use of a wind tunnel.

The equipment includes a speed controlled wind generator fan giving a maximum discharge flow of 10m/s in a 500mm diameter duct. This wind speed is considered to be representative of wind speed ratings for this size of turbine. A stepper motor is used which will produce sufficient power at reduced rotational speeds thus eliminating the requirement for a step up gearbox or belt drive system. The stepper motor is directly connected to the turbine shaft to produce AC current. This is rectified into dc and a variac is used to adjust the load before dissipating the energy into an air-cooled resistive load bank. The voltage, current and turbine speed are measured and data logged.

### Extent of supply:

The equipment comprises a wind fan generator and turbine dynamometer, an instrumentation box and a PC with flat screen monitor.

### The wind turbine dynamometer and wind generator fan assembly

The wind generator fan and wind turbine dynamometer are mounted on a steel frame supported from the floor on vibration isolators. The wind fan is located within a 500mm duct and the discharge flow is passed through a honeycomb type flow straightening element to reduce the swirl induced in the air before exiting the duct into the face of the test turbine. The wind fan speed is accurately controlled by varying the fan speed with an inverter drive module.

The turbine dynamometer is mounted on a vertical pedestal supported from the frame. The pedestal has +/- 10 degrees yaw adjustment in relation to the airflow axis from the fan. Airflow speed can be measured before and after the wind turbine using a pitot static tube. This is mounted vertically and has a scale and clamp allowing radial adjustment of the probe and variations in the flow speed to be determined. The differential pressure is measured with a low range differential pressure transducer mounted in the instrumentation box.

