

Automated Educational Medium Wind Tunnel



NAIRI-STEM
science - technology - engineering - math



Overview

The automated medium wind tunnel is an affordable scientific and research laboratory bench. It can be useful for carrying out research and hands-on works in the high and secondary educational institutions. Due to its affordability, the medium wind tunnel makes it possible to simulate tests performed using more expensive, large-scale wind tunnels.

The automation and control system of the wind tunnel is based on multifunctional control and measurement equipment which allow taking measurement from the sensors, as well as controlling the air flow speed in the wind tunnel test section.

Measurement and control of the wind tunnel performed by special software developed in NI LabVIEW graphical programming environment. The laboratory bench should be used along with a personal computer.

Hands-on Works

1. Wind tunnel design and operation.
2. Investigating the properties of air.
3. Measuring wind speed in the test section using Bernoulli's principle.
4. Determining the dependence of wind speed on fan speed.
5. Measuring the longitudinal force impacting geometric shapes in the test section
 - 5.1. Measuring the longitudinal force affecting a geometric shape depending on wind speed.
 - 5.2. Measuring the longitudinal force affecting a geometric shape depending on the shape's geometry.
6. Calculating the Mach number.

Technical Specifications

Power consumption	up to 1800 W
Maximum air velocity in the test section	25 m/s
Maximum motor rotation speed	2000 RPM
Pressure sensors array channels	8
Pressure measurement range for each channel	± 7 kPa
Test section dimensions (L x W x H)	(483x292x292) mm
Wind tunnel dimensions (L x W x H)	(2020x910x910) mm
Weight	net - 70 kg gross - 110 kg

Operation Conditions

Environment temperature	from +10°C to +35°C
Relative humidity	no more than 80 % at 25°C

