

AERODYNAMIC SERIES

This modular product series is developed in alignment with core topics from the aerodynamics curriculum, integrating fundamental theory with innovative design to support structured, hands-on experimentation.

It enables students to systematically explore key aerodynamic principles, master essential theoretical and analytical methods, and acquire practical skills in experimental operation and engineering simplification.

By bridging theoretical knowledge and real-world application, the system fosters students' ability to analyze physical phenomena, solve practical aerodynamic problems, and develop a solid foundation for advanced study and research.

AERODYNAMICS

01 Fundamental Equations of Fluid Motion

- Continuity Equation
- Momentum Equation
- Energy Equation

► Fundamental Module F100

02 Fundamental Theory of Low-Speed Airfoils and Wings

- Aerodynamic Characteristics of Flow Around Airfoils
- Aerodynamic Performance of Low-Speed Wings
- Lifting Line Theory

F111 Airfoil Pressure Distribution Module

► F116 Flight Demonstration Wind Tunnel
F130 Low-Speed Wind Tunnel

03 High-Speed Compressible Flow

- Speed of sound / Mach number / Stagnation state / Thrust reversal
- Flow characteristics in nozzles

F301 Nozzle Performance Test Bench

► ET202 Nozzle Pressure Distribution Apparatus

04 Compressible Flow Around Airfoils and Wings

- Subsonic flow around thin airfoils and wings
- Transonic flow around airfoils
- Supersonic flow around airfoils

► F380 Intermittent Supersonic Wind Tunnel

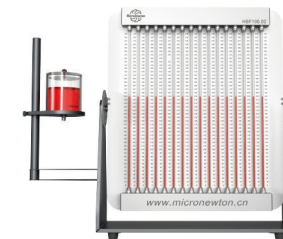
05 Boundary Layer Flow

- Characteristics of flat plate boundary layer flow
- Physical characteristics of turbulent boundary layers
- Flow characteristics in pipes

► F103 Flat Plate Boundary Layer Module

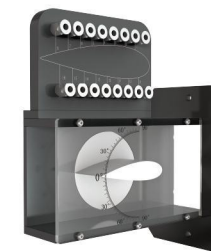
► F104 / F105 Circular Pipe Turbulent Flow / Square Bend Pipe Flow Module

► F106 / F303 Wall Effect Module / Gas Flow Friction Loss Apparatus



F101-Multi-Tube Manometer Module

Simultaneous display of 16-channel pressure measurements.



F111-Airfoil Pressure Distribution Module

Used for studying the pressure distribution along the cross-section of an airfoil.



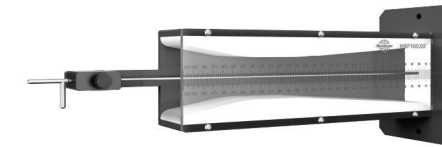
F108A-Smoke Generator

Smoke generation device for flow field visualization and tracing.



F108-Flow Visualization Experiment Module

Used to visualize airflow.



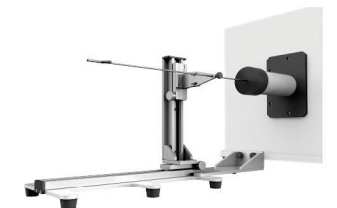
F102-Bernoulli Equation Experiment Module

Used to verify Bernoulli's equation experimentally.



F103-Flat Plate Boundary Layer Experiment Module

Used to study the effects of different surface roughness on boundary layer thickness and velocity distribution.



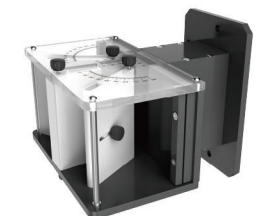
F104-Circular Pipe Turbulent Flow Experiment Module

Used to investigate the characteristics of turbulent flow in circular pipes.



F105-Square Bend Pipe Experiment Module

Used to study the flow characteristics of air passing through curved ducts.



F106-Wall Effect Experiment Module

Used to investigate wall effects (Coanda effect).

► F100 Basic Aerodynamics Experiment Bench



This product serves as the foundational test bench to be used with various aerodynamics experimental modules. Its main functions are to straighten airflow and regulate air volume.

It offers good expandability and flexibility, enabling a wide range of aerodynamics experiments by integrating different functional modules.



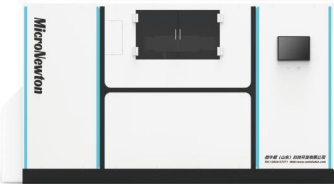
F107-Drag Force Analysis Experiment Module

Used to study drag forces around multiple modules.



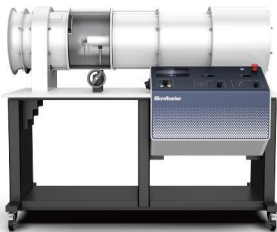
► F130 Low-Speed Wind Tunnel

A fundamental platform for studying low-speed aerodynamic principles and verifying related theories. Compatible with various test units and models for conducting multiple experiments. Supports customization and experimental expansion.



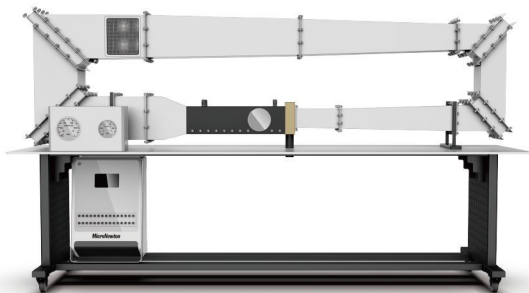
► FR150 Extreme Aerospace Environment Wind Tunnel

Simulates extreme aerospace conditions.



► E504 Wind Turbine Power Generation System

Demonstrates wind-to-electricity conversion and effects of blade design.



► F380 Intermittent Supersonic Wind Tunnel

This product is widely used as a fundamental experimental platform for studying the basic aerodynamic principles of subsonic and supersonic flows, as well as for validating and developing related theories.

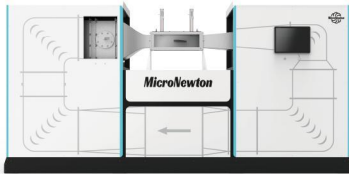


Wind Tunnel Product Series

The wind tunnel series includes flight demonstration wind tunnels, low-speed wind tunnels, supersonic wind tunnels, and environmental wind tunnels. We also offer customized wind tunnels tailored to specific test section dimensions and wind speeds based on customer requirements, enabling simulation of different wind speeds, varying temperature and humidity conditions, and dust environments.

The wind tunnels can be equipped with independently developed testing units such as a three-component balance, smoke generators, and 32-way pressure measurement systems. These allow measurement of lift, drag, pitching moment, and observation of flow field changes around the model inside the wind tunnel.

We support customization of model accessories and offer a variety of wind tunnel experiments through the integration of different functional experimental modules.



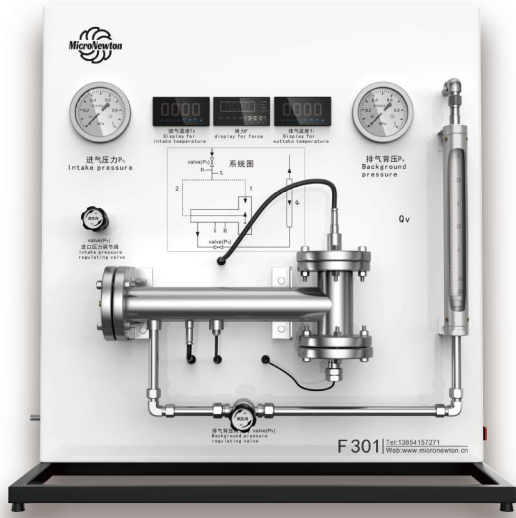
► FR150D Low-Speed Icing Wind Tunnel

A research wind tunnel designed to study aircraft anti-icing and de-icing performance.



► F116 Flight Demonstration Wind Tunnel

An educational wind tunnel used to study fixed-wing aircraft wing performance and flight principles, including takeoff, cruise, stall, and landing.



► F301 Nozzle Performance Test Apparatus

Used to study the effects of inlet pressure and back pressure on nozzle jet velocity.

1. Demonstrates nozzle choking phenomenon
2. Investigates impact of intake pressure and ambient back pressure on jet velocity
3. Analyzes actual vs. theoretical jet velocity
4. Studies jet velocity variations under different inlet and back pressures
5. Examines nozzle efficiency
6. Explores relationships between jet thrust, inlet pressure, back pressure, and thrust per unit airflow
7. Supports custom nozzles and additional functions for extended applications

► F303 Gas Flow Friction Loss Experiment Apparatus

Used to study pressure losses of compressible fluids in various pipes and Reynolds numbers.

1. Investigates basic pipe friction characteristics
2. Studies pipe friction coefficients at different Reynolds numbers
3. Analyzes fluid friction coefficients in compressible flow
4. Examines pressure loss and recovery when flow direction changes suddenly
5. Studies pressure loss in pipe bends



► ET202 Nozzle Pressure Distribution Experiment Apparatus

Measures pressure distribution in convergent and convergent-divergent (Laval) nozzles and studies actual flow rates of compressible fluids.

1. Demonstrates nozzle choking phenomenon
2. Observes over-expansion and under-expansion with shock waves in the nozzle
3. Studies relationship between inlet pressure and flow velocity inside the nozzle
4. Examines effect of ambient back pressure on flow velocity inside the nozzle
5. Investigates combined impact of inlet pressure and back pressure on nozzle flow speed
6. Analyzes pressure distribution in three nozzle types under various inlet-to-outlet pressure ratios
7. Supports additional custom functions and expansions