MECHANICAL ENGINEERING

Excellence in education
for over 30 years

Manufactured in the UK 1993

www.matrixtsl.com

MECHANICAL ENGINEERING

Our range of mechanical engineering products now covers multiple topics. Fundamental mechanics, Structures and Fundamental Fluids as well as a new product for the study of Aerodynamics; relevant to both mechanical and aerospace engineering students. All of the products in this range are designed to teach students the key principles of the topics in a practical way – linking the mathematics of engineering to practice. All products are portable and can be easily packed away and stored, meaning that your classroom can be used as both classrooms and labs.

LEARNING CENTRE

Enter the product code on the learning centre to find the curriculum

PRODUCT NAME

PRODUCT CODE

Range Coverage

Statics Fundamentals
CP6368

Statics Fundamentals
FM1883

Materials Fundamentals
CP0876

Materials Fundamentals
FM1292

Dynamics Fundamentals
CP1505

Dynamics Fundamentals
FM3935

Mechanisms Fundamentals
CP2840

Mechanisms Fundamentals
FM0759

Motion Studies with Light Gates & Wireless Dynamic Carts
CP5099

Linear and Rotational Dynamics
HP5099-2

Thermodynamics
CP4261

Thermodynamics Kit
HP4159

Fundamental Fluids
CP2599

Fluids Fundamentals
FM1000

Bending Moments
CP1843

Bending Moments
ST8801

Shear Force
CP4708

Shear Force
ST4484

Reactions of a Simply Supported Beam
CP3604

Reactions of a Simply Supported Beam
ST0454

Bending Stress
CP1877

Bending Stress
ST5671

Deflection of Beams
CP1879

Deflection of Beams
ST9544

Torsion of Rods
CP8231

Torsion of Rods
ST0386

Pin Jointed Frameworks
CP8026

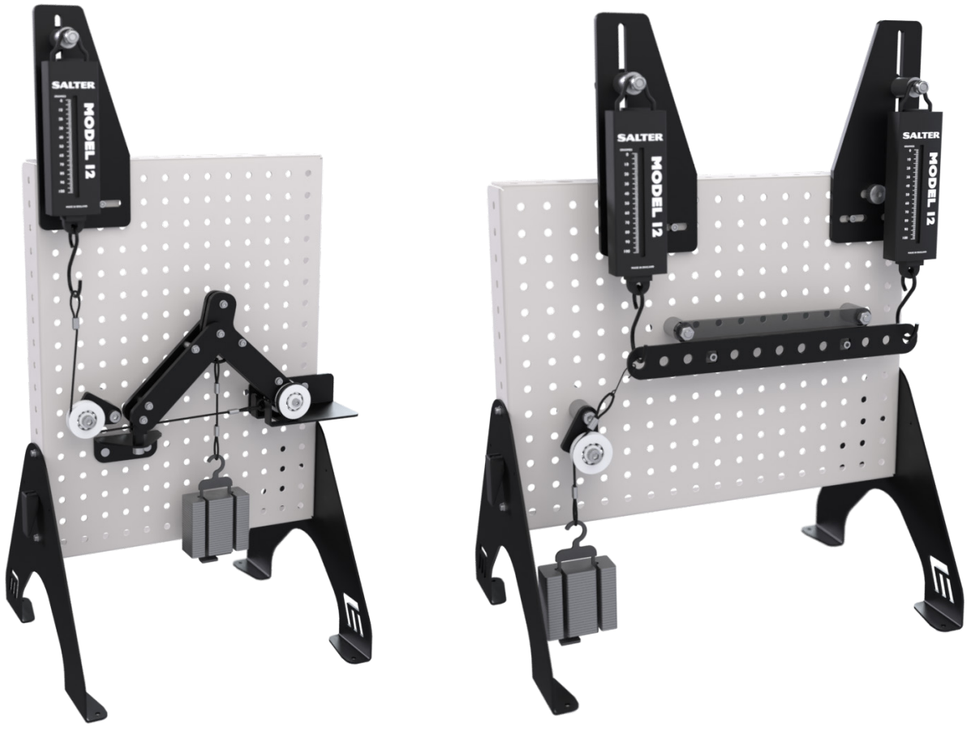
Pin Jointed Frameworks
ST6365

Aerodynamics
CP0704

Wind Tuunel 125
AV5289

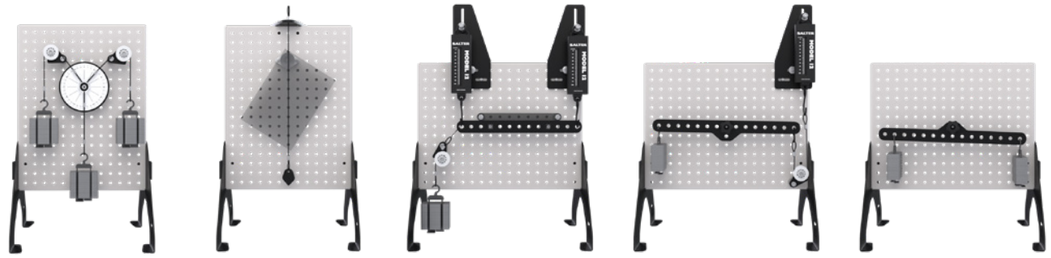
Fundamental MECHANICS

The Fundamental mechanics range allows students to study the basic principles of mechanical engineering required in many engineering courses. Four kits are available in the main fundamentals range; Fundamental statics, Fundamental materials, Fundamental dynamics and Fundamental mechanisms. A complete set combines all of these in to one easy to use, robust and storable lab system. Each kit includes a rugged metal panel with removable legs, the components needed for the experiments and a rugged storage tray. The experimental components are hard-wearing and high quality, meaning they stand up to the rigours of an educational lab. We are also able to provide experimentation kits for the study of Linear and Rotational Dynamics – including data-logging - and Thermodynamics principles.



Statics Fundamentals FM1883

This set of equipment covers the needs of students studying forces, moments, beams and more. Students use the storable work panel (included) to construct a range of experiments, which allow you to study a full course in static engineering systems. A full 10-hour workbook is included free of charge in the Learning Centre for this kit.



LEARNING OBJECTIVES & EXPERIMENTS:

- Forces (mass, force, weight, combining, parallelogram, triangle and polygon
- Centre of gravity
- Units of weight and mass
- Free body diagrams
- Force vectors
- Coplanar forces
- Bow's notation
- Principles of moments and moment of forces
- Distinguishing between moments and torque
- Equilibrium of forces
- Levers and the term mechanical advantage
- Simply supported beams
- Concentrated and uniform distributed loads
- Different types of pinned supports

SCAN TO VISIT PRODUCT PAGE

FUNDAMENTAL MECHANICS | FUNDAMENTAL FLUIDS | STRUCTURES | AEROSPACE

Materials Fundamentals FM1292

This set of equipment covers the needs of students studying torsion, stress and strain, elastic constants, Young's Modulus and more. Students use the storable work panel (included) to construct a range of experiments, which allow you to study a full course in material principles. A full 10-hour workbook is included free of charge in the Learning Centre for this kit.

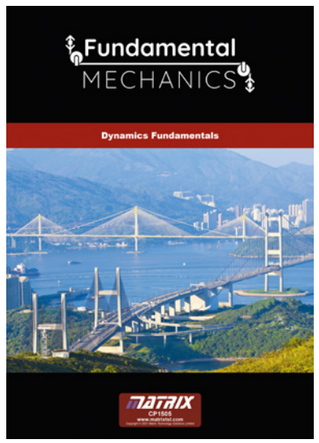
LEARNING OBJECTIVES & EXPERIMENTS:

- Torsion of rods
- What effect has Polar second moment of area on torque and modulus of rigidity
- What effect has torque, shape, length and material on rod deflection
- Tensile test using plastic, aluminium and mild steels
- Understand the terms stress and strain
- Introduction to Youngs modulus for different materials
- Terms elastic deformation and plastic deformation
- Terms yield strength and ductility
- Shear force tests
- Shear stress and shear strain
- What effect has second moment of area on beam deflection
- What effect has load, shape, length and material on beam deflection
- Different types of supports for beams

SCAN TO VISIT PRODUCT PAGE

Dynamics Fundamentals FM3935

This set of equipment covers the needs of students studying pulleys, static and sliding friction, mechanisms and energy conversion. Students use the storable work panel (included) to construct a range of experiments, which allow you to study a full course in dynamic engineering systems. A full 10 hour workbook is included free of charge in the Learning Centre for this kit.



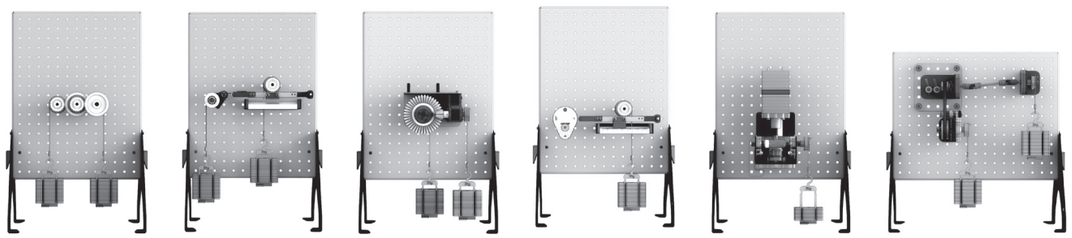
LEARNING OBJECTIVES & EXPERIMENTS:

- Kinetic and gravitational energy parameters and principles
- Dynamic parameters and principles
- Newton's Law of Motion
- Mechanical efficiency and advantage
- Flywheel experimentation
- Toggle mechanisms
- Single and compound Pulley experimentation
- Static and sliding friction on Inclined planes (with frictional surfaces and rollers)

SCAN TO VISIT PRODUCT PAGE

Mechanisms Fundamentals FM0759

This set of equipment covers the needs of students studying gears, cranks, different shapes of cam and drive systems integrated with universal joint using chain/belt transmission system.' Students use the storable work panel (included) to construct a range of experiments, which allow you to study a full course in Mechanisms. A full 10 hour workbook is included free of charge in the Learning Centre for this kit.



LEARNING OBJECTIVES & EXPERIMENTS:

Gears (Mechanical Advantage (MA), Efficiency and Gear Ratio):
- Simple Gear
- Compound Gear
- Rack & Pinion Gear
- Bevel Gear
- Worm Gear
- Screw Jack

Cams (Displacement Analysis):
- Tangent Cam
- Snail Cam
- Eccentric Cam
- Crank (Force and Displacement Analysis)

Drive System (MA, Efficiency and Gear Ratio):
- Universal Joint
- Belt Transmission
- Chain Transmission

SCAN TO VISIT PRODUCT PAGE

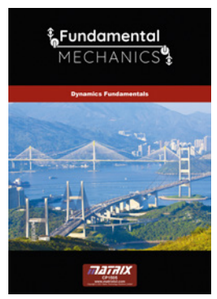
Complete Fundamentals FM9458

This full set of equipment allows students to understand the principles of fundamental statics, materials, dynamics and mechanism engineering systems in one portal set of equipment.

Included in this equipment are the full contents of the following kits:

Statics Fundamentals
Materials Fundamentals
Dynamics Fundamentals
Mechanisms Fundamentals

The user receives everything in neat, Gratnell's trays and each solution includes a work panel (4 in total). Four, 10 hour workbooks are included free of charge in the Learning Centre for this kit.



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Linear and Rotational Dynamics HP5099-2

The linear and rotational dynamics kit includes a wireless dynamics system, wireless rotary motion sensor and accessories kit and 2 wireless light gates. Being wireless, the components can be set up anywhere in the room, with results sent straight to your screen and student's devices simultaneously.

This kit allows students and teachers to carry out a range of experiments in dynamics with investigations.

The equipment is supplied with 2 curriculum workbooks, a suite of worksheets and teacher support material.

LEARNING OBJECTIVES & EXPERIMENTS:

- Velocity
- Acceleration
- Newton's law
- Forces
- Collisions
- Conversion of momentum and energy

SCAN TO VISIT PRODUCT PAGE

Thermodynamics Kit HP4159

This kit allows engineering students to carry out a wide range of practical experiments in Thermodynamics to help them understand the temperature related behaviour of mechanical systems. The kit includes experimental apparatus including metal blocks with heating elements, linear rods with heaters, Leslie cube and Jolly bulb. The kit also includes measuring instruments such as digital thermometers, energy meter, and infrared thermometer. A downloadable manual covers all experiments and includes teacher's notes. A unique feature of the kit is that all the experiments can be completed just with electricity as the heat source – no Bunsen burner is required.

Additional power supply required. Please enquire for further information.

LEARNING OBJECTIVES & EXPERIMENTS:

- Heat capacity of liquids
- Heat capacity of solids
- Linear expansion of heat
- Heat absorption
- Heat radiation
- Expansion of gases – Charles' law
- Boyle's law

SCAN TO VISIT PRODUCT PAGE

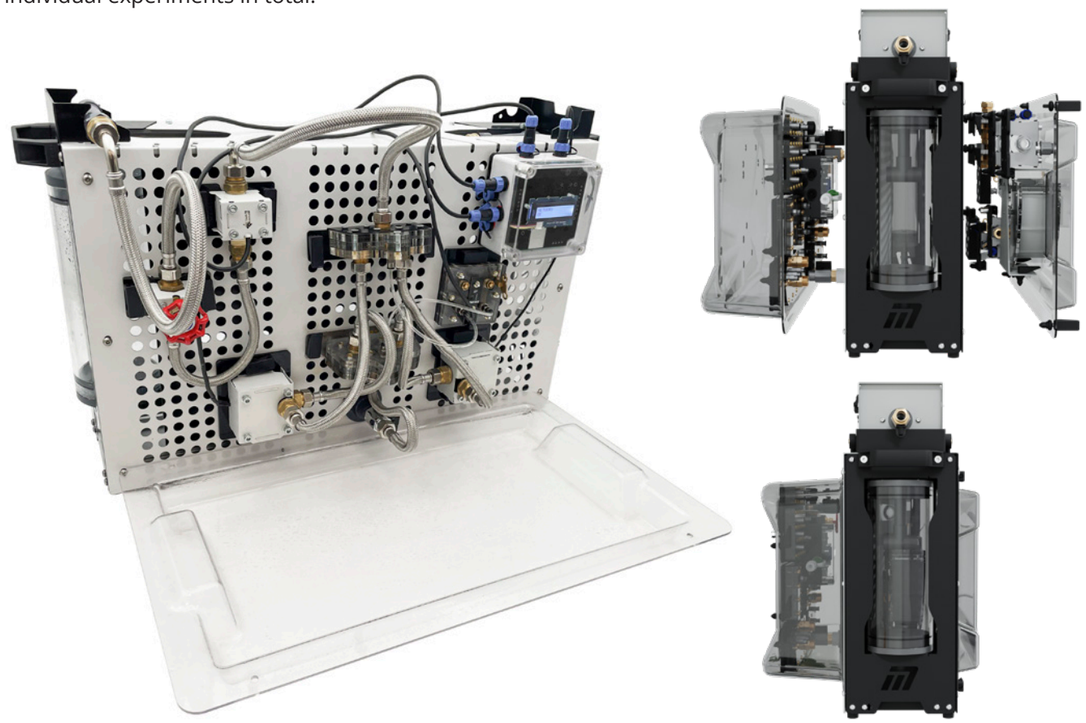
Fundamental FLUIDS

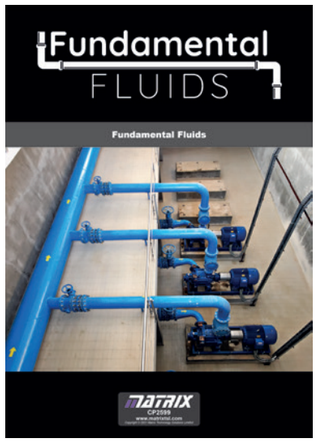
The study of fluid mechanics and the forces on them is becoming increasingly popular. With applications in a wide range of disciplines, including mechanical, civil, chemical and biomedical engineering, the Fundamental Fluids range from Matrix allows students to gain a hands-on understanding of the key principles. A main workstation is supplied along with sixteen individual components, which allows students to build nine different experiments without the need for any additional tools. Six of the experiments are connected via USB to the pressure and flow sensors, which allows results to be automatically plotted on a graph for analysis. The remaining three experiments are carried out and plotted manually.
Each component is attached to the main workstation with quick release latches, allowing students to quickly build and dismantle each experiment. A full free curriculum is provided with easy-to-follow worksheets.

FUNDAMENTAL MECHANICS | FUNDAMENTAL FLUIDS | STRUCTURES | AEROSPACE

Fundamental Fluids FM1000

Our Fundamental Fluids kit is designed to meet the needs of those studying fluid mechanics principles at college and university level. The system is supplied with a series of learning apparatus (see outlined on the following pages), hoses with robust gaskets and a rugged metal workstation. The system can be packed away and stored when not in use. Each of the apparatus is attached within the workstation and two protective covers are attached to the front and back to offer protection. The flow pipes drop down into the unit and the viscosity apparatus attaches to the top of the workstation to create one compact storable unit. This kit provides nine individual experiments in total.





LEARNING OBJECTIVES & EXPERIMENTS:

- Calibration of a Bourdon gauge
- Centre of pressure on a partially and fully submerged plane
- Viscosity apparatus, demonstrating Stoke's law
- Use of manometers and different types (multitube manometer, U-tube manometer and inclined manometer)
- Bernoulli's equation and using a Venturi tube as a flow meter
- Losses in bends, measuring and comparing pressure losses of different bend geometries
- Centrifugal pump characteristics, experimentally determining the pressure/flow rate characteristics of a pump and determining the overall efficiency
- Series pumps, experimentally determining the pressure/ flow characteristics of 2 pumps connected in series configuration
- Parallel pumps, experimentally determining the pressure/ flow characteristics of 2 pumps connected in parallel configuration

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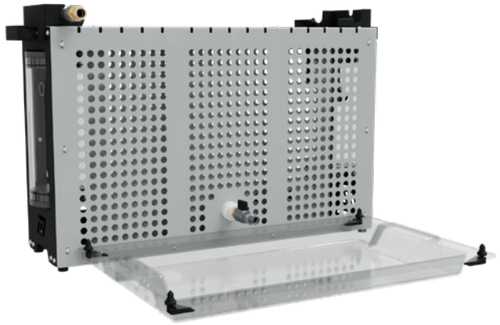
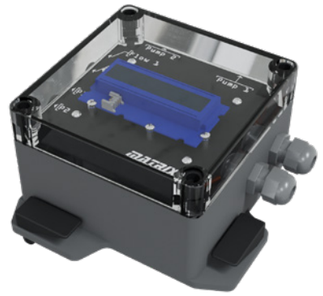


Main Workstation

The main workstation is built of rugged steel and has a built-in panel which allows you to easily clip on the required component. Two water tanks, with a combined capacity of 3L, along with inbuilt connectors, allows students to quickly set up each experiment. When in storage, the flow pipes drop down into the frame, all components are stored within, the drip tray doubles as a back panel to enhance protection.

Control Box

Working with a PC connection, the control box is the brain of the apparatus. Allowing simultaneous control of 2 pumps, while taking readings from 2 flow and 2 pressure sensors, the LCD screen gives students an instantaneous readout. The readings are passed from the control box to the PC software, which plots results for student analysis. The data can also be logged and loaded into Excel for further investigation by students.



Pump Module

The Pump module has an operating voltage of 6-24v and produces a free-flow flow rate of 13 litres/min. It works alongside the control box, to pump water around the apparatus. It features brass connection points for increased longevity

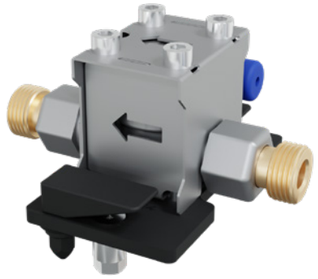
Differential Pressure Sensor

The Differential pressure sensor module is used to measure pressure in the fluid circuits, it features:

- True wet/wet differential sensing
- Easy-to-use, built-in air bleeding system
- Pressure sensing range 0-30 PSI (0-200000 Pa)
- Robust construction, simple push fit fittings using 4mm tube

Fundamental Fluids FM1000

FUNDAMENTAL MECHANICS | FUNDAMENTAL FLUIDS | STRUCTURES | AEROSPACE



Flow Sensor

The Flow sensor module houses a calibrated turbine flow sensor. It is used to provide flow rate readout in the app and on the control module screen.

It can measure 0-30l/min

It has robust brass fittings for repeated assembly/ disassembly.

Bourdon Gauge

The Bourdon gauge calibration module is used to compare a known, dead-weight acting through a piston/cylinder of known diameter with the reading on the Bourdon gauge.

The apparatus allows students to determine the accuracy of the Bourdon gauge and highlights the limitations of using these devices.

Multitube Manometer

The multitube manometer module permits comparative pressure measurement between 0 and 120mm of water (0-1200Pa).

The module features:

- Three input pressure ports at the bottom, each connecting to a single vertical limb.
- One reference pressure port that is common to all three limbs at the top.
- A pipette filler (supplied) as a convenient method of applying a reference pressure to the top pressure port.

The pressure ports are self-sealing, push-in fittings and connections are made using 4mm push-in pneumatic tubing. This allows direct comparative measurements to be made between the three input pressure ports.

U-Tube & Inclined Manometer

The U-tube and inclined manometer has a measurement range of 0-110mm.

4mm tubing is attached to the pressure ports using easy-to-use push-in fittings. The inclined manometer indexes to positions at 30°,60° and 90° from horizontal.

Losses in Bends Module

The losses in bends module consists of a clearly visible fluid path with 3 different 90° bend geometries.

Each of the bends have self-sealing pressure ports before and after each bend so the pressure drop can be measured using the multitube manometer module.

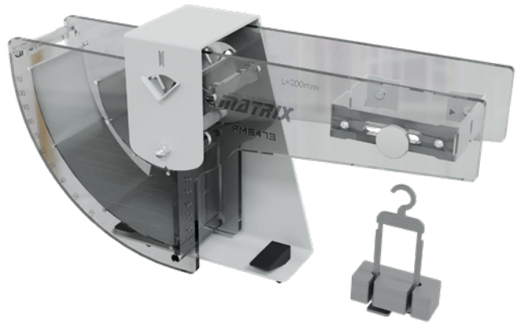
Viscosity Apparatus

The viscosity apparatus consists of a 100mm diameter clear acrylic tube filled with vegetable glycerine.

This assembly is housed in a sturdy metal enclosure which protects it whilst in storage or being transported.

It features ¼-turn valves at the top and bottom to enable releasing and retrieving spherical samples used in the experiment.

The experiment demonstrates Stoke's law. Students determine the viscosity of the glycerine by measuring the terminal velocity of spherical samples through the fluid.



Centre of Pressure Module

The Centre of pressure module is used for determining the centre of pressure of partially and fully submerged surfaces. This experiment is carried out manually by students who are able to take readings and plot them within the curriculum for analysis.

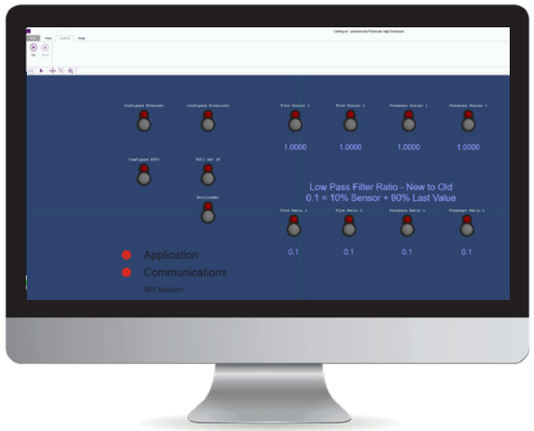
Venturi Tube Module

The Venturi tube module is used to investigate Bernoulli's principle.

The flow section is constricted resulting in a pressure drop.

Pressure ports at the widest and narrowest section permit attaching the differential pressure sensor for automated readings or the manometer module can be attached to enable manual readings.

Fundamental Fluids FM1000



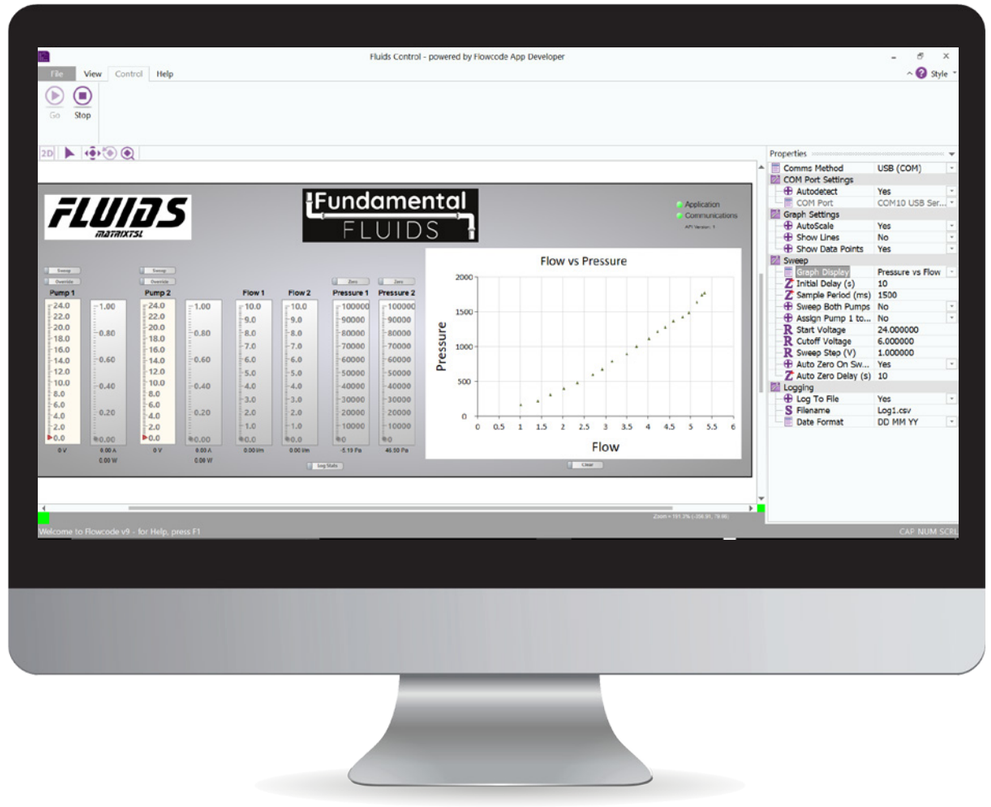
Fluids Configure Application

Each of the sensors are calibrated prior to shipping and the electronic control module is sent with these calibration values.

The user can re-calibrate each of the sensors in situ using the fluids configure application.

This application also allows the user to alter the filter that is applied to the instantaneous sensor readings.

Each of the buttons shown above opens a dialog box for changing the values for each of the settings.



Fluids Control Application

Readouts for pumps show instantaneous voltage, Current and Power as well as live displays for flow and pressure sensors.

Manual control of the pumps is provided by clicking and dragging the red slider, alternatively the exact pump voltage(s) can be set using the override button

User can alter parameters to suit their experiment. The sweep function automatically sets the pump voltage to 24V and decreases in steps defined by the user. Data for each sensor is recorded and the resulting graph is plotted live. This data can also be logged in a time stamped .CSV file for more thorough analysis.

STRUCTURES

These new kits for the **study of structures** cover seven commonly taught principles of structures across college and universities worldwide, in the subject area of mechanical engineering.

Each of the seven kits in this range features a robust, metal work panel which is fitted with removable legs (which can attach to the reverse of the panel for storage purposes). A carry handle and plastic moulded cover is also supplied to protect the system from any damage when not in use.

The experimental components are rugged and designed to stand up to the challenges of an educational lab. Connection to a PC is through a simple USB, meaning users can export data from their experiments to Excel for analysis and simulation. Power is provided through the PC connection or through connection to a simple wall plug.

Each work panel is also supplied with built-in LCD's which are connected to an on-board controller and provide the user with a manual method of collecting results from their experiments.

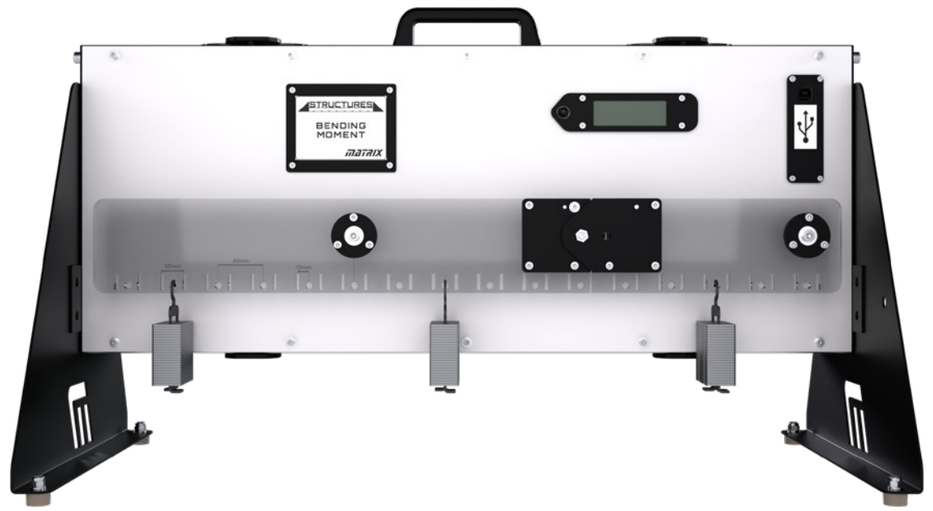
Bending Moments — ST8801

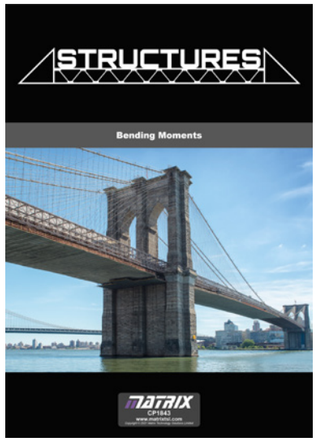
This kit allows students to apply loads to hangers suspended along a beam held between two supports. One support allows rotational movement, acting as a pinned support, whilst the other allows translational movement, acting as roller support. A load cell measures the bending moment due to the load applied by the student and students can then create positive and negative bending moments.

Point loads and uniformly distributed loads can be applied across the beam in order for students to gain experience of various different situations for their experimentation.

An integrated load cell measures the force applied across the cut and is displayed on the built-in LCD display. The display has a push button zero feature for experimental setup.

The equipment is powered by a USB cable to PC or wall plug. If the USB is connected via a PC port, data acquisition can be output directly into Excel or further experimental analysis and simulation.





LEARNING OBJECTIVES & EXPERIMENTS:

- Bending moment at the cut due to a varying single point load
- Bending moment at the cut due to a moving single point load
- Bending moment at the cut due to a uniformly distributed load
- Bending moment at the cut due to a point load and uniformly distributed load in superposition

SCAN TO VISIT PRODUCT PAGE

FUNDAMENTAL MECHANICS
FUNDAMENTAL FLUIDS
STRUCTURES
AEROSPACE

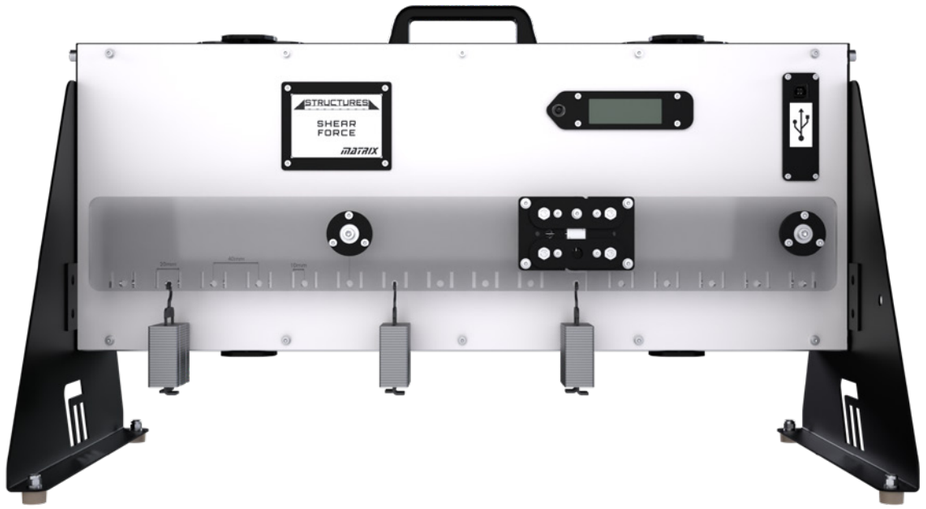
Shear Force ST4484

This kit allows students to apply loads to hangers suspended along a beam, held between two supports. One support allows rotational movement, acting as a pinned support, whilst the other allows translational movement, acting as roller support. A load cell measures the bending moment due to the load applied by the student and students can then create positive and negative shear force.

Point loads and uniformly distributed loads can be applied across the beam in order for students to gain experience of various different situations for their experimentation.

An integrated load cell measures the force applied across the cut and is displayed on the built-in LCD display. The display has a push button zero feature for experimental setup.

The experiment is powered by a USB cable to PC or wall plug. If the USB is connected via a PC port, data acquisition can be output directly into Excel or further experimental analysis and simulation.



LEARNING OBJECTIVES & EXPERIMENTS:

- Shear force at the cut due to a varying single point load
- Shear force at the cut due to a moving single point load
- Shear force at the cut due to a uniformly distributed load
- Shear force at the cut due to a point load and uniformly distributed load in superposition

SCAN TO VISIT PRODUCT PAGE

Reactions of a Simply Supported Beam ST0454

This product allows student to explore the behaviour of reaction forces on beam with supports. Two ‘simply supported’ supports are attached to load cells so that a precise measure of reactional force can be measured for a loading parameter.

The load cell output is connected to the LCD displays and the USB interference for data acquisition, for further experimental analysis.

The beam has a measure indicator for accurate distance measured between supports, while both support blocks can slide along the rail for exploring the behaviour of varying length.

The beam has incremental pins for hanging weights on at different places to create different point loads and can balance the weights on top to create uniformly distributed loads. Overhanging point loads can be achieved to create negative reaction forces to show direction of forces. This allows student to explore reactional forces that are positive and negative and the principle of superposition.

LEARNING OBJECTIVES & EXPERIMENTS:

- Reactions due to point loads
- Reactions due to UDL’s
- Reactions due to overhangs
- Reactional force change due to varying distance between supports.

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FUNDAMENTAL MECHANICS | FUNDAMENTAL FLUIDS | STRUCTURES | AEROSPACE

Bending Stress ST5671

The bending stress Structures product provides students with a beam with 4 strain gauges attached to it. These strain gauges are then connected into the back panel allowing simple 4mm connections to conduct the experiment.

The experiment explores the bending stress in a beam with applied loads. Using equations for bending deflection and stress, the theoretical value can be compared to the output of the experiment. The strain gauges can be connected up using the 4mm banana cables into 3 different Wheatstone bridge configurations. Students can then explore the behaviour of a quarter bridge, half bridge and full bridge configuration. High precision resistors are used to make up the Wheatstone bridge in the absence of a strain gauge.

The LCD display shows the millivolt change of the output from the Wheatstone bridge. With a zero button to reset the experiment.

The experiment is powered by a USB cable to PC or wall plug. If the USB is connected via a PC port, data acquisition can be output directly into Excel or further experimental analysis and simulation.

LEARNING OBJECTIVES & EXPERIMENTS:

- Stress and strain relationship
- Strain gauges as instruments
- Finding the neutral axis by experiment and calculation
- Quarter, half and full Wheatstone bridge applications, with advantages and disadvantages

SCAN TO VISIT PRODUCT PAGE

Deflection of Beams ST9544

This kit allows students to utilise a range of beams in order to understand the elastic properties of beams and cantilevers.

Beams can be fitted to one support to form a cantilever, or between two supports with different fixing methods, forming simply supported and fixed or ‘encastre’ beams.

Students apply loads and measure the deflection. This product includes a set of ‘specimens’ of different metals for comparison of the elastic properties. It also allows the student to vary the length of the beam to see how this affects the magnitude of deflection for a given load.

The Digital Mitutoyo dial has its own display, but it is connected to the USB interface to allow data acquisition via USB.

LEARNING OBJECTIVES & EXPERIMENTS:

- Beam bending formula
- Deflection due to point loads and UDLs (uniformly distributed loads)
- How beam fixings affect deflection of: Simply supported beams, Fixed or ‘encastre’ beams, Cantilever beams, Propped cantilever
- Shape of a deflected beam
- Beam length and deflection
- Beam material and deflection — the elastic (Young’s) modulus
- Beam cross-section and deflection — the Second Moment of Area (‘I’ value) – and material stiffness

SCAN TO VISIT PRODUCT PAGE

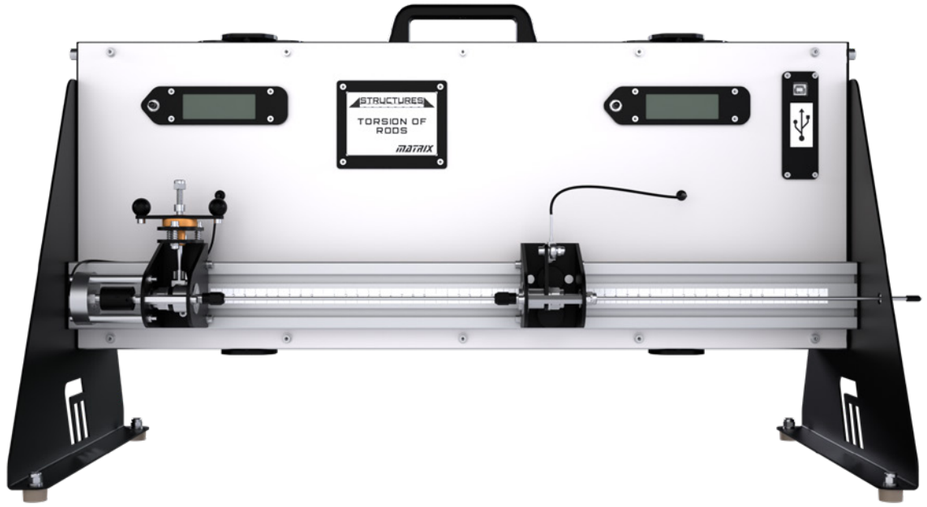
Torsion of Rods ST0386

This kit allows students to understand the torsional elastic properties of rods. Students choose from a selection of test rods and fit them to the experimental work panel. They can adjust the distance between the chucks for tests on varying rod length. Each chuck includes pointers that work with the scale on the platform for accurate positioning.

Students apply angular deflection to the specimen using a chuck which includes a precision potentiometer to measure the angular deflection, which is then displayed on the LCD display. The other chuck connects to a load cell to measure the resulting torque, which is displayed on the other LCD display. Students use textbook beam equations to predict the deflection and torque relationship and compare the calculated results with the measured results. This helps confirm the reliability of the textbook equations and the accuracy of the experiment results.

This product includes a set of rods of different metals for comparison of the elastic properties, dimensions and polar second moment of area ('J' value). It also allows the student to vary the effective length of the rods to see how this effects the magnitude of deflection for a given torque.

The angle and load cell output is connected to the USB interface.



LEARNING OBJECTIVES & EXPERIMENTS:

- Torsion formula
- Rod length and angle of twist relationship
- Rod material and angular deflection—the elastic (shear) modulus (G)
- Rod cross-sectional dimensions and torsion—the polar second moment of area (J)

SCAN TO VISIT PRODUCT PAGE

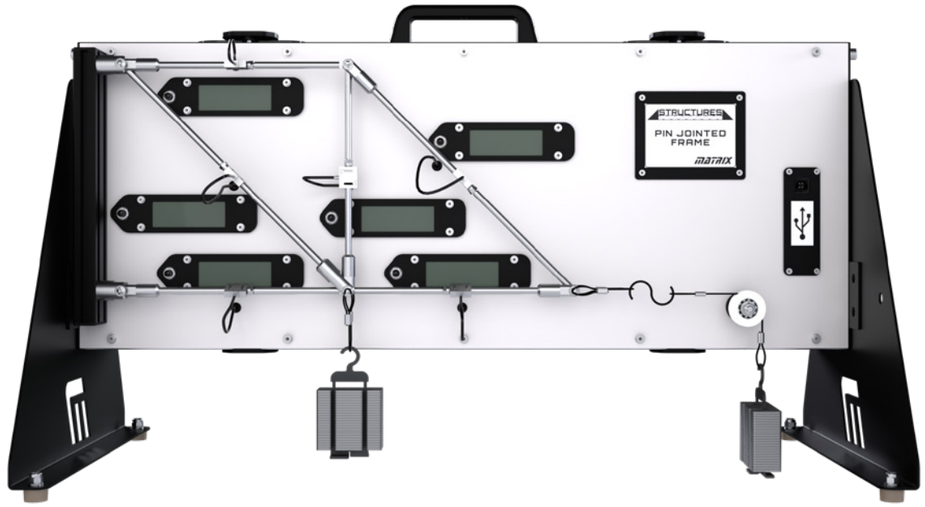
Pin Jointed Frameworks ST6365

This kit allows students to apply loads in different places on the pin joint framework to explore the tension and compression forces within each structure member. 6 load cells on each of the 6 structure members are connected directly to an LCD display for the output and to the USB inference for data acquisition.

Zero buttons next to the LCD display allows student to zero the load cell output and setup the experiment each time.

Two hanging positions allow students to explore the idea of redundancy in frameworks and how load is transmitted through the system. A magnetic pulley also allows students to apply angled loads as well.

Students will learn to analyse the structure members using method of joints and method of sections, while using Bow's notation.



LEARNING OBJECTIVES & EXPERIMENTS:

- Method of joints
- Method of sections
- Bow notation's
- Principle of superposition for multiple loads redundancy

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Complete Structures Kit ST1795

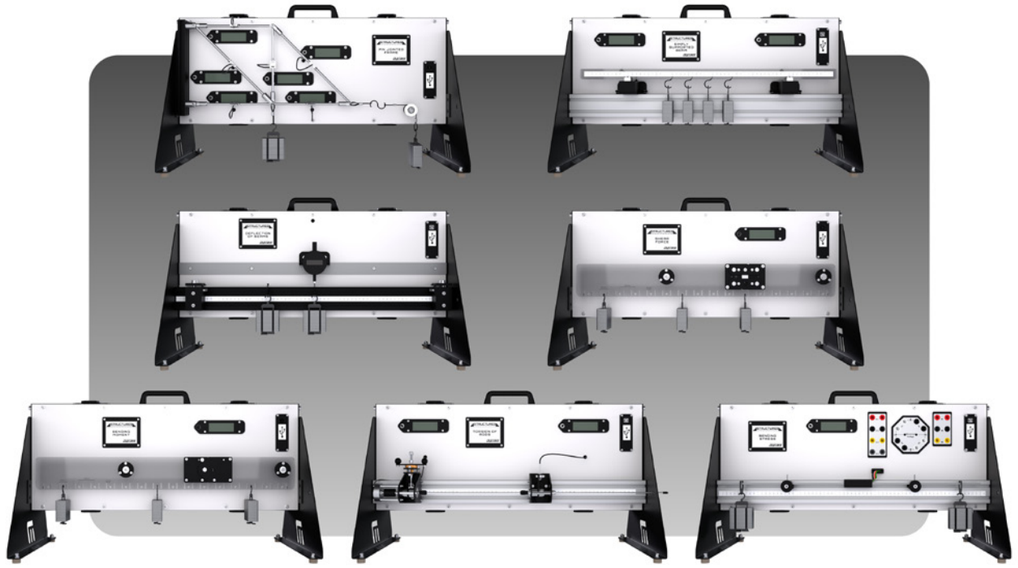
The complete set of Structures includes seven kits to teach students the commonly taught principles of Structures across colleges and universities worldwide, in the subject area of mechanical engineering.

Each of the kits in this range features a robust metal work panel which is fitted with removable legs. The legs attach to the back of the equipment for safe storage when not in use. A carry handle and plastic moulded cover is also supplied to protect the system from any damage when not in use.

The experimental components are rugged and designed to stand up to the challenges of an educational lab. Connection to a PC is through a simple USB, meaning users can export data from their experiments to Excel for analysis and simulation. Power is provided through the PC connection or through a simple wall plug.

Each work panel is also supplied with built in LCD's which are connected to the on-board controller, in order to provide the user with a manual method of collating results from their experiments.

See individual kits for learning outcomes.



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All solutions from Matrix come with a full free curriculum. This is easily accessed from our Learning Centre on the website and includes full student worksheets and teachers notes.

LEARNING CENTRE

SCAN TO VISIT LEARNING CENTRE

WIND TUNNEL 125

The new Wind Tunnel 125 is designed to teach students the key principles of aerodynamics. Our wind tunnel teaches students the basics of drag, lift, flow patterns, air flow, pressure distribution over aerofoils.

The wind tunnel system meets the requirements of many courses taught within mechanical engineering, as well as delivering outcomes in aerospace training, and the needs of various modules of Part 66 of the European Aviation Safety Agency syllabus, which is internationally recognised as the gold standard for training Aerospace maintenance engineers.

Wind tunnel curriculum and data acquisition software is provided at no additional cost. What's more this system is compact and storable. It is supplied in a bespoke, custom-made flight case, meaning labs can be utilised for various requirements day to day.

In aerospace, you will find new training systems focusing on areas including:

- Electrical and electronic fundamentals in aviation
- Digital techniques and principles
- Avionics EFIS system
- Wind tunnel for study of aerodynamics
- Various mechanical principles including fluids
- Electrical machines and motor drives

As is true of all our engineering solutions, our kits are low power, curriculum mapped, rugged, portable and space saving. We offer a full learning package including required hardware, software and curriculum (which is freely available to all in our online Learning Centre).

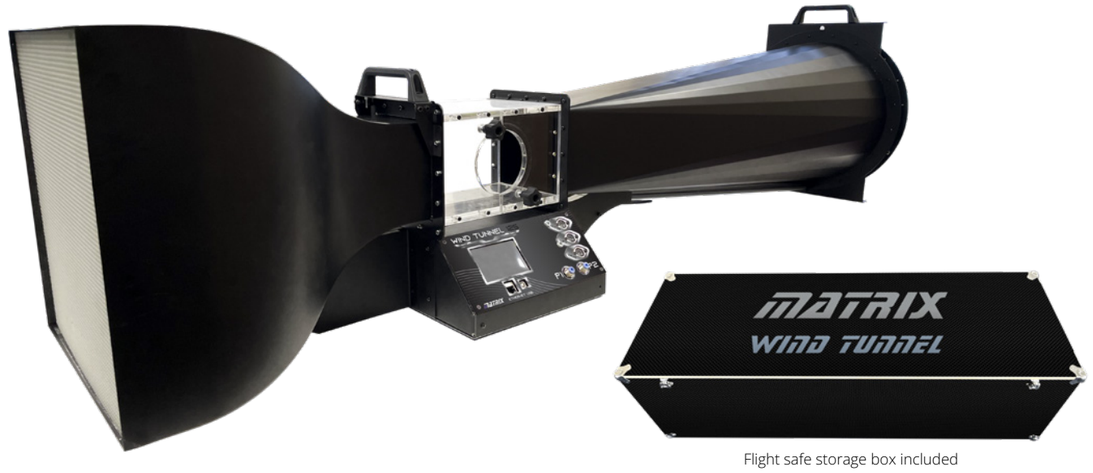
Wind Tunnel 125 AV5289

This compact open-circuit sub-sonic wind tunnel is designed for benchtop use. The wind tunnel is designed for teaching aerodynamic principles and exploration of fluid flow. Suitable for college to undergraduate teaching, it features a computer controlled fan, data acquisition and multiple experimental setups, controlled by a touch screen interface. The wind tunnel has a 125mm transparent test section and 25m/s wind speed.

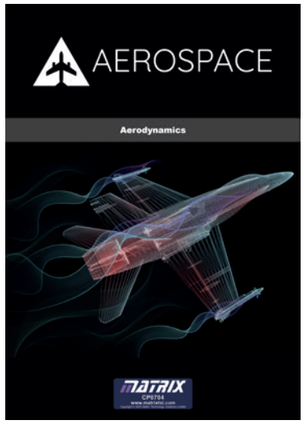
The wind tunnel has a honeycomb structure built into the contraction nozzle (ratio 9.2:1) which ensures uniform flow through the test section. The clear test section allows for visibility and clear understand of the experimental behaviour. The air exits through a variable speed controlled fan, with a finger guard covering the back.

Built-in data acquisition allows users to have direct output of pressure readings from pitot static tube and pressure tappings. It also allows for real time lift and drag force components to be logged. Different drag shapes are provided along with multiple NACA profile aerofoils. Simple thread attachment allows students to design their own test pieces for analysis.

A smoke generator can be used to create streamline smoke trails over the test objects for visualisation of flow patterns.



Flight safe storage box included



LEARNING OBJECTIVES & EXPERIMENTS:

- Bernoulli's equation
- Air flow over aerofoils
- Air flows around blunt and streamlined shapes
- Pressure distribution around a cylinder and aerofoil.
- Lift and drag forces for blunt and streamlined shapes
- Flow visualisation
- Manometers

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