Product Catalog

Engineering Educational Equipment

2023

ABOUT ESSOM

INTRODUCTION

The company was founded in 1986 by a group of capable engineers. Our main objective is to design and manufacture engineering laboratory equipment for engineering education. In addition, we also market scientific and other engineering equipment for education as well as equipment for the surface finishing industry from our overseas partners.

QUALITY ASSURANCE

ESSOM has been certified to ISO 9001 since 1999. The scope of certification includes Design and Manufacture of engineering equipment as well as Sales and Services. All our engineering education products have been designed by our experienced and well-qualified engineers. Parts and materials are sourced from approved supplier/material lists and must pass receipt inspection. In-process inspection is carried out at key manufacturing stages with final inspection after completion. All new products must pass strike design test before market introduction.

PRODUCTS

Development of new products is based on market requirements as well as trends in educational innovation and technological development. Most of our equipment are available for inspection and/or test run in our factory show room. Popular items are normally deliverable from stock. In addition, we can build special equipment for research and other purposes to meet client special requirement as well as providing assistances in planning new laboratory.

WHAT'S NEW?

We added our new products with an NEW icon right next to the equipment name. Most of our equipment are now integrated with WiFi feature for real-time data logging and remote display on smartphone (iOS and Android). A learning software for online/offline training is also ready to serve you. Lastly, we are currently online on social media (Facebook, YouTube). A lot of useful information and videos are available online.

Dear Customers,

Welcome to the ESSOM 2023 brief catalog. Products are arranged in groups for quick references, Fluid mechanics, Thermodynamics, Renewable energy, Property of materials, Machine elements, Structures, and Chemical engineering. With the ISO 9001:2015 Quality Management System, we are committed to the Continuous Improvement policy particularly on product design and appearance as well as instruction manual improvement to be among the world leaders in this field of engineering education. We appreciate your continued suggestions and supports to help us serve you better.

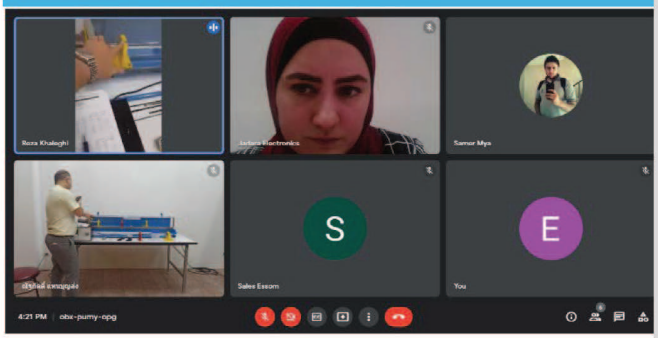
Please visit our website www.essom.com for more information.

Thank you

(Naris Srinilta)
Managing Director

AFTER SALES SERVICE

ONLINE and ON-SITE TRAINING



MM325 Whirling of Shaft Apparatus
Yarmouk University, Jordan

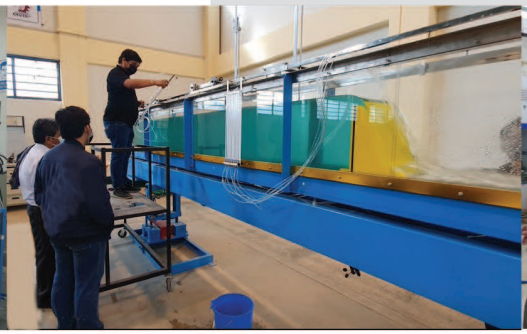
SERVICES

We maintain over 20 well-trained engineers, scientists and a number of experienced technicians readily available to provide services such as equipment set up, installation commissioning and operation. Essom provides diverse training such as online, on-site training and training in the factory for quality assurance of the services.

WARRANTY

All equipment is assured that they passed factory final test before delivery. ESSOM standard warranty is also served against workmanship and defects of materials under normal operating conditions. The warranty extension is available upon request. We guarantee that all products will be taken care of by ESSOM service through their lifetime.

TH 130 Mini Steam Turbine Power Plant
National University of Technology, Islamabad, Pakistan



HF 530 Tilting Flow Channel, 300 mm wide
Universidad Nacional Hermilio Valdizan Pillco Marca, Peru

HF315 Permeability Apparatus
Asian Institute of Technology, Bangkok, Thailand

FACTORY VISIT, INSPECTION AND TRAINING

ST323 Deflection of Beams and Cantilevers
National University of Sudan, Sudan

RE310 Educational Wind Turbine
Mirpur University of Science and Technology, Pakistan

MT553 Turbo Jet Engine
University of Perpetual Help System Dalta, Philippines

EXHIBITION AND FACTORY VISIT

We are a member of Worlddidac Asia and we have been participated the exhibition since 1995. More than that, we aim to be among the world leaders in engineering education equipment.

worlddidac MEMBER

ESSOM booth at Worlddidac Asia and Factory Visit 2019

We supply worldwide over 60 countries.

ESSOM

CONTENTS

Scan the code to view the full PDF version of the catalog or each product group at different sections separately. Click on **product code** or **videos icon** for quick access to detailed product catalog in Essom website or video clips.

- Hydraulics bench and accessories
- Pump and turbine test accessories
- Hydrostatic test accessories and equipment
- Miscellaneous
- Piping loss test sets
- Other flow measurement and studies
- Hydrology
- Sediment flow channels
- Tilting flow channels
- Pump test set
- Turbine test set

TESTIMONIALS

I have been using the ESSOM laboratory equipment since 2011 and found these up to my full satisfaction. The significant parameter is the value of money. The equipment is cost effective and don't compromise the quality at any level. Quality sensors are used for precise measurements in all of equipment while rugged and durable parts increase the effective life of equipment. Another advantage is the possibilities of equipment to be tailored as per specific requirements/ situations. Their aftersales service and response to queries is exceptionally surpassing, at least, in our region of the world. I am satisfied with the products I have used so far.

Dr. Engr. Muhammad Atiq Ur Rehman Tariq
Associate Professor
College of Engineering and Science
Victoria University, Melbourne, Australia

HYDRAULICS BENCHES

The hydraulics bench is a primary unit to provide water supply and flow measurement for various experiments on fluid properties. Each experiment requires specific accessories. Learning software is available for most of experiments.

HB100 Hydraulics Bench

This apparatus is designed for providing water supply and volumetric flow rate measurement.

HB100G Hydraulics Bench, Gravimetric

This apparatus is designed for providing water supply and gravimetric flow rate measurement.

HB100N Hydraulics Bench, Neo

This apparatus is designed for providing water supply and flow rate measurement. Includes sensor and digital display.

HB101 Basic Hydraulics Bench

This apparatus is designed for providing water supply and volumetric flow rate measurement.

HYDRAULICS BENCH ACCESSORIES

Stainless steel weir plates

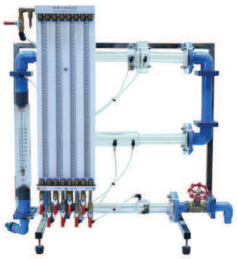
HB013 Flow over a Notch

HB101-013 Flow over a Notch Channel

This apparatus is for the study of head against discharge, coefficient of discharge and demonstration of flow over notched weirs.

HB015 Bernoulli's Theorem Apparatus

A clear acrylic venturi tube to measure the coefficient of discharge. Total head probe and manometers are provided with pressure tappings along the venturi tube.



HB016 Flow Meters

This apparatus is for determining the coefficients of discharge and losses for different flow measuring devices including orifice, venturi, pitot tube, rota meter and ISA nozzle (optional).

HB016P Pitot Tube Apparatus

This apparatus is for the study of velocity distribution of water flow in pipe, flow velocity and coefficient of discharge measurement.

HB017 Pipe Friction

This apparatus is for measuring pressure drop when water flows through a vertical pipe or horizontal (optional) for both laminar and turbulent flows.

HB018 Bends and Fittings Friction

This apparatus is for the measurement of pressure drops across various pipe bends and fittings and for the estimation of loss coefficient on various types of pipes, pipe fittings and valve settings.

HB019 Orifice and Jet Flow

This apparatus allows the determination of jet trajectory, velocity and discharge coefficients for two different orifice diameters.

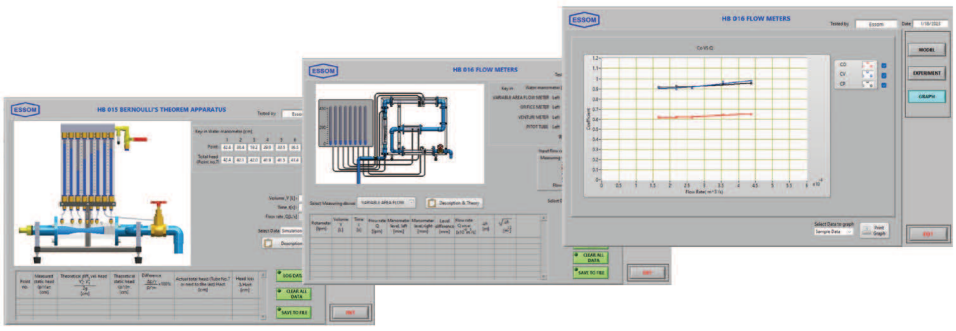
OPT

Learning Software

User friendly learning software's are designed for most of experiments to swift the experiment process. It also extends the power of practical training and can be suitably applied in e-learning, hybrid learning and classroom-based learning.

Features

- Practical training
- Data collection
- Result analysis
- Data export
- Online/Offline operation

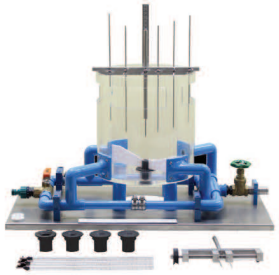


HB020 Impact of a Jet

This apparatus provides measurement of force developed by a jet of water impacting on different stationary targets.

HB021 Flow Through an Orifice

This apparatus allows the measurement of contraction and velocity coefficients, discharge coefficient for an orifice discharge as well as the study of outlet jet diameter and outlet velocity.



HB022 Free and Forced Vortex, Rotating Paddle

This apparatus is designed to produce and measure free and forced vortices by determination of the surface profile and velocity.

HB022A Free and Forced Vortex, Rotating Tank

This apparatus is designed to produce and measure free and forced vortices by determination of the surface profile and velocity.

HB024 Osborne Reynolds Apparatus
HB024H Osborne Reynolds Apparatus, Horizontal Test Pipe

This apparatus provides a visualization of laminar, transitional and turbulent flows as predicted by Osborne Reynolds.

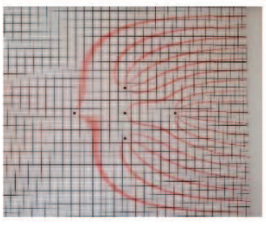
HB024

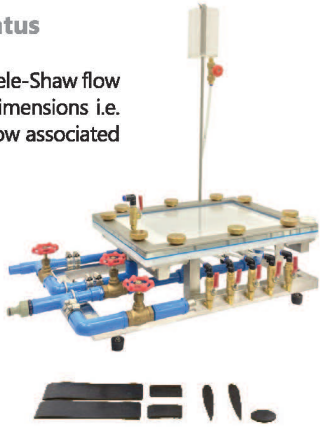
HB024H

Water heating unit OPT

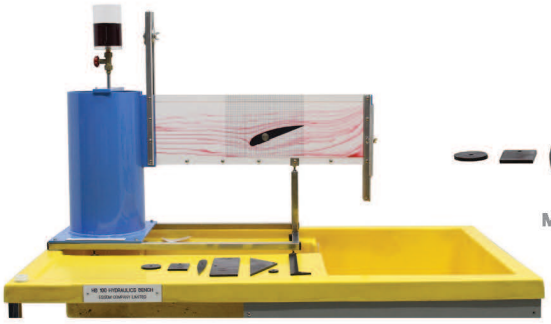
HB026 Laminar Flow Apparatus

This apparatus is designed to study Hele-Shaw flow streamlines of laminar flow in two dimensions i.e. flow around immersed bodies and flow associated with sinks and sources.





Models



Models

HB027 Mini Flow Channel

This apparatus demonstrates primary characteristics of flow in an open channel including flow patterns over or around immersed objects.

HB041 Cavitation Panel

This apparatus is for demonstrating the liquid vaporization under low pressure due to high flow velocity.

PUMP AND TURBINE TEST ACCESSORIES

These apparatuses demonstrate turbine and pump characteristics, i.e. pressure, speed, torque, output power and efficiency.

HB023A Mini Axial Flow Propeller Turbine

Metal guide vanes and runner. Transparent guide vane and runner section. Mechanical brake with spring balances, low range pressure gauge and hand tachometer.
Output: Over 10 W

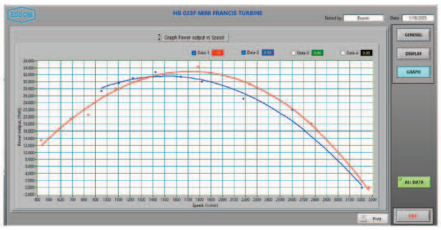
HB023AI Mini Axial Flow Impulse Turbine

Metal runner and housing. Transparent discharge section. Mechanical brake with spring balances, pressure gauge and hand tachometer.
Output: Over 25 W

HB 023F MINI FRANCIS TURBINE

Metal runner, non-corrosion metal housing and transparent window. Mechanical brake with spring balances, pressure gauge and hand tachometer.
Output: Over 25 W

Learning software display OPT

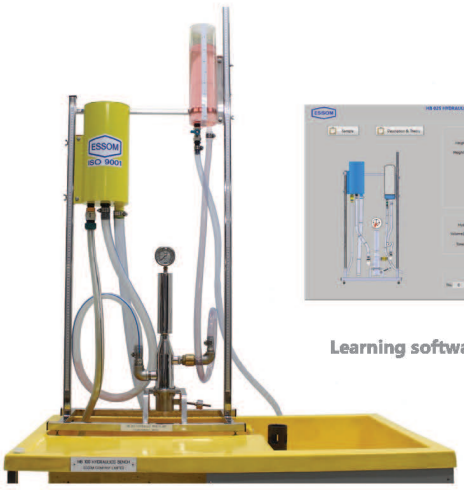


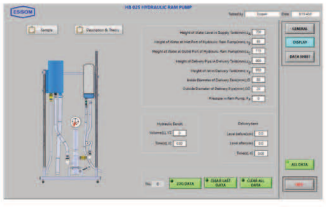
HB 023K MINI KAPLAN TURBINE

Metal runner, non-corrosion metal housing and transparent window and runner section. Mechanical brake with spring balances, pressure gauge and hand tachometer.
Output: Over 15 W

HB 023P MINI PELTON TURBINE

Stainless steel runner and nozzle and housing with transparent window. Mechanical brake with spring balances, pressure gauge and hand tachometer.
Output: Over 40 W





Learning software display OPT

HB 025 HYDRAULIC RAM PUMP

Demonstration of the effect of hydraulic ram where a large supply of flowing water at lower head is made to deliver a small amount of water at a higher head.

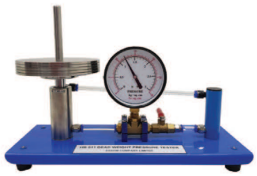
HB029 Centrifugal Pump

This apparatus is designed for studying centrifugal pump performance and characteristics.

HB030M Series and Parallel Pumps, Multi Speeds

This apparatus is designed for studying head vs flow rate characteristics of two multi speeds pumps connected in series or parallel.

HYDROSTATIC TEST ACCESSORIES AND EQUIPMENT



HB011 Dead Weight Pressure Tester

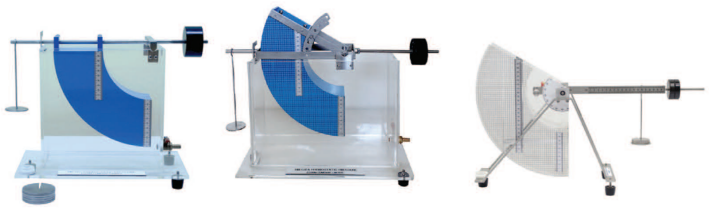
This apparatus is used for the study of the calibration of a pressure gauge and the determination of gauge errors as a function of true pressure.

HB014 Metacentric Height

This apparatus is designed to determine the metacentric height of a floating body and the height variation with the tilt angle as well as illustrate the floatation characteristics.

HB012 Hydrostatic Pressure
HB012A Hydrostatic Pressure, Tilting Submerged Quadrant
HB012B Hydrostatic Pressure, Tilting Jar Quadrant

These apparatuses allow the moment caused by a fluid thrust on a wholly or partially submerged plane surface to be measured directly.



HB012 HB012A HB012B

HB205 Fluid Statics and Manometer

This is a bench top apparatus for the study and measurement of liquid under hydrostatic conditions by using manometers.

HB210 Pressure Measurement Apparatus

This apparatus is for studying the basic pressure measuring devices, i.e. manometers, pressure and vacuum gauge as well as pressure gauge calibration.

HF111 Particle Drag Coefficients

This apparatus is designed to study drag coefficients of ball sphere of different materials, shapes and diameters as well as determine the liquid viscosity.

HB200 Hydrostatics Bench

The apparatus includes equipment for calibration, determination, measurement and demonstration of properties/ behavior of fluid in hydrostatic conditions.

HB201 Hydrostatics panel

MISCELLANEOUS

SP111 Archimedes Principle Apparatus

This apparatus is for demonstration of how the buoyancy acting on a submerged body in a liquid corresponds to the weight of the displaced liquid.

SP112 Pascal's Apparatus

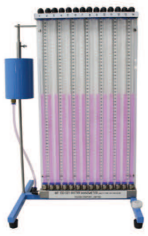
This apparatus demonstrates the pressure at the bottom of a liquid column in a vessel depends only on the height of the column but not on the shape of the vessel.

SP113 Boyle's Law Apparatus

This apparatus demonstrates the relationship between pressure and volume of gas at constant temperature by using pressure from an outside supply.

SP114 Surface Tension Apparatus

This apparatus is designed for measuring the surface tension of liquids.



MA216

MW102M, 102, 108

MA204

Manometer Series

These apparatuses consist of water, inclined water, and mercury manometers for both water and air pressure measurements. Various ranges are available.

PIPING LOSS TEST SETS

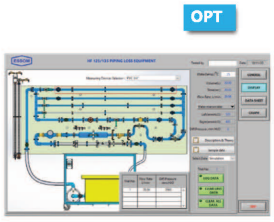
HF125 model designed for the study of losses in straight pipes, bends, fittings and valves are available. In addition, primary flow measuring devices are added for HF135 model.

HF125 Piping Loss Apparatus, Small
HF135 Piping Loss Apparatus, Large

This is a panel required Hydraulics Bench or external water supply for studying the friction losses in pipes, pipe fittings and valves as well as for determining coefficients of discharge in primary flow measuring devices (only in HF135).

HF125

OPT



Computer interface unit display

HF135

OTHER FLOW MEASUREMENT AND STUDIES

HF150 Pipe Network Apparatus

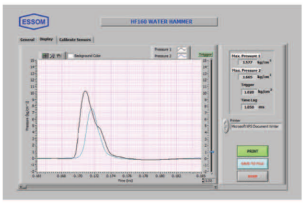
This apparatus is designed to measure the flows and pressure drops in a wide range of pipe network configuration, e.g. individual pipe, series pipes, parallel pipes, double pipes, and ring main.

HF235 Flow Measurement Test Set

This apparatus is for investigating the flow rate of venturi meter, orifice meter, pitot tube, variable area flow meter, water meter and measuring tank as well as for determining coefficients of discharge.

HF160 Water Hammer Apparatus

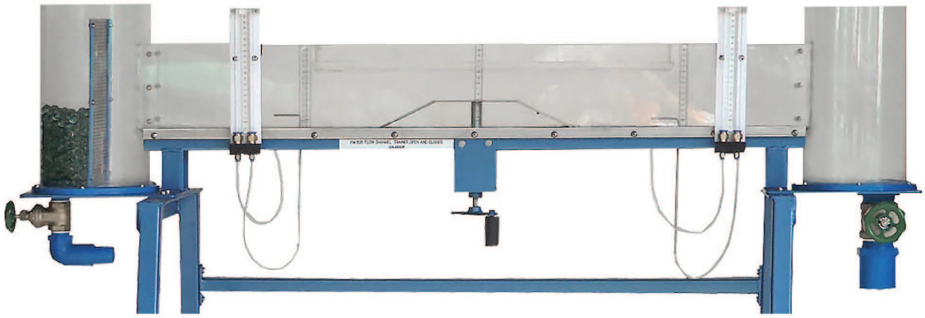
This apparatus is for studying the effects of both pipe surge and water hammer by using two separate straight pipes with a constant head tank as well as to determine the velocity of sound and pressure profiles. Includes software for data display and analysis by computer.



Computer interface unit display

HF509 Open Channel and Closed Channel Flow

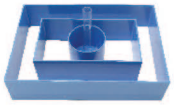
This is a floor standing open channel which can be quickly converted into a closed channel. Flow over weirs, flow under gate, energy dissipation and hydraulic jump can be studied in open channel flow. Bernoulli and continuity equations, pressure measurements as well as flow velocity calculation are experimented under closed channel flow.



HYDROLOGY

HF311 Ground Water Flow Apparatus

This apparatus is for studying the hydrological principles of ground water flow, hydraulic profile with one outlet, two outlets, concentric cove, square ditch between inlet and outlet including application of the flow to certain engineering constructions.



Models

HF315 Permeability Apparatus

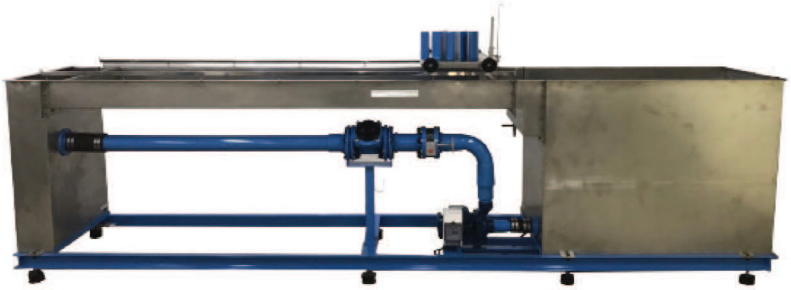
This apparatus is for studying the water flow nets through a permeable media such as flow under a sheet pile, seepage through an earth embankment and uplift pressure on structures.

HF401 Basic Hydrology Apparatus

This apparatus is for studying the basic hydrology including rainfall/runoff relationships, simulation of multiple and moving storms, sediment transport and meanders in simulated rivers.

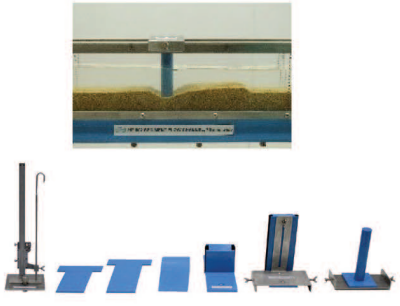
SEDIMENT FLOW CHANNELS

Accessories



HF501 Sediment Bed and Flow Visualization Tank

The apparatus is for studying the mobile bed formation, erosion of sand bed around piers or branch canal and two-dimensional flow observation around pier and branch canal.



Accessories

HF502 Sediment Flow Channel, 75 mm wide

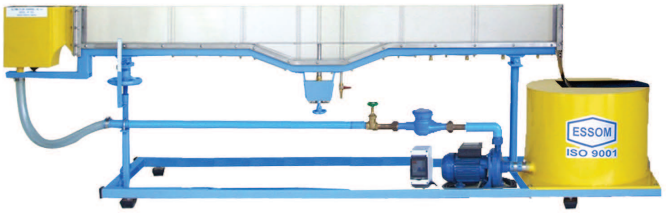
This is an open channel for studying the bed forms with change in flow and slope as well as flow phenomena without sediment.

TILTING FLOW CHANNELS

Several sizes of flow channels are available as per standard below. Other test section lengths are available upon requested. Accessories are installed on the channel for studying on various flow phenomena and sediment studies. The flow channel is supplied with necessary systems e.g. water circulating, tilting and flow measurement. Computer control is available as an option.

SMALL SIZE

HF505A



HF505 Flow Visualized Channel, 50 mm. wide (2 m. long)
HF508 Tilting Flow Channel, 75 mm. wide (2.5 m. long)
(Benchtop unit) (A) = with bed adjustment

MEDIUM SIZE

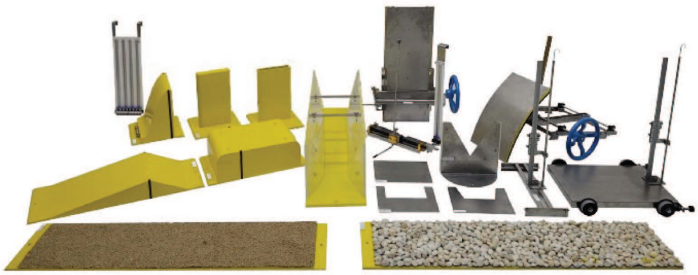
HF515A

Tilting Flow Channel (3-6 m. long)
HF507, 75 mm. wide
HF510, 100 mm. wide
HF515, 150 mm. wide
(A) = with bed adjustment

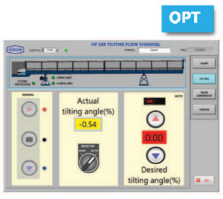
LARGE SIZE

HF530 Tilting Flow Channel, 300 mm. wide (5-12.5 m. long)

Optional Accessories



HF560 Tilting Flow Channel, 600 mm. wide (12-18 m. long)



Computer interface unit display

Optional Accessories

PUMP TEST SET

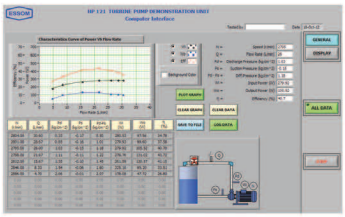
Several pump test sets are available for fixed speed, multi speed and variable speed control. Measuring instruments may be analog or digital and a computer interface is provided for either data display, analysis or computer control operation. These are self-contained units for studying pump characteristics, efficiency and flow rate vs head of pumps.

PUMP DEMONSTRATION UNIT, COMPUTER INTERFACE

HP104 Advanced Inverter with Computer Interface Unit

The unit consists of an advanced inverter for controlling and indicating motor speed as well as power. The digital display with computer interface unit for sensors can be used for HP111, HP121, HP131, HP141 and HP301.

Computer interface unit display



A bench top unit with a pump and motor, storage tank, sensors and software.

HP111	Centrifugal Pump
HP121	Turbine Pump
HP131	Gear Pump
HP141	Reciprocating Pump
HP301	Series and Parallel Pump

HP301

HP104

COMPACT PUMP TEST SET

NAME	Fixed speed  HP115	Variable speed  HP115V	Multi speed  HP115M
Centrifugal Pump	HP115	HP115V	HP115M
Turbine Pump	HP125	HP125V	-
Gear Pump	HP135	HP135V	-
Reciprocating Pump	HP145	HP145V	-
Series and Parallel Pump	-	HP305V	HP305M

HP405B Compact Multi Pump Test Set, Inverter Speed Control

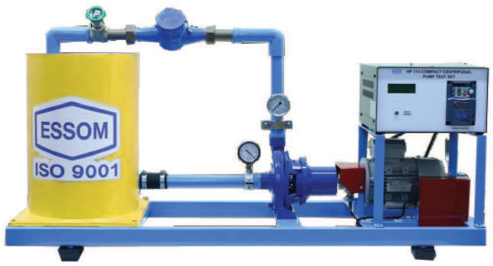
A bench top unit for centrifugal, turbine, reciprocating and axial flow pumps, each with a motor. Common control unit for inverter and selector switch, storage tank and measuring instruments.

HP305V Compact Series and Parallel Pump Test Set, Variable Speed

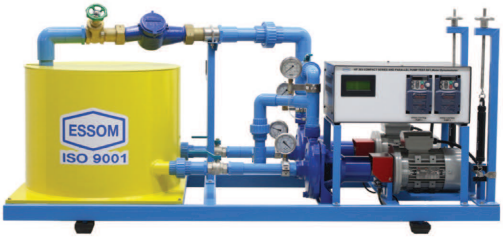
HP305M Compact Series and Parallel Pump Test Set, Multi Speed

COMPACT PUMP TEST SET WITH TRUE PUMP INPUT

These are self-contained bench top units for studying pump characteristics, efficiency and the flow rate vs head of pumps. Each pump will be driven by a motor dynamometer for measuring torque and speed to find true pump input power. Speed control is done by an inverter.



HP113 Compact Centrifugal Pump Test Set, Motor Dynamometer



HP303 Compact Series and Parallel Pump Test Set, Motor Dynamometer

HP405 Compact Multi Pump Test Set, Motor Dynamometer

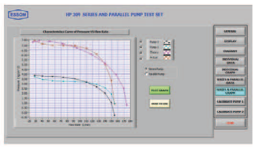
Similar to HP405B with motor dynamometer.

PUMP TEST SET

These are self-contained floor standing units.

OPT

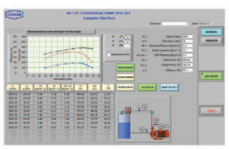
Learning Software Display



HP119V Centrifugal Pump Test Set, Variable Speed

OPT

Learning Software Display



HP309V Series and Parallel Pump Test Set, Variable Speed

TURBINE TEST SET

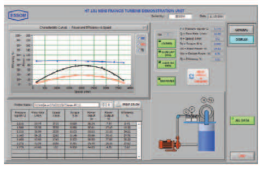
Several sizes of turbine test sets are available for mini, compact and large units. The turbine test sets are also offered as self-contained where turbines will be placed on a water supply unit with measuring instruments equipped. These instruments may be analog or digital. A computer interface is provided for either data display, analysis, or computer control operation.
These units are used to study, power input, output, efficiency under various flow rates and heads including racing characteristics of each turbine.

MINI TURBINE DEMONSTRATION UNIT

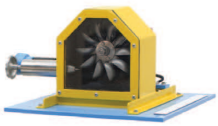
Each turbine unit with maximum output 15-40 W is supplied with speed and torque sensors. It is designed to be used with HT110 Mini Turbine Service unit. Several types of turbines can be alternatively placed on a common water supply with control and measuring instruments.

HT110 Turbine Service Unit

This service unit provides a water supply and input power measurement for a mini turbine demonstration unit.



Computer interface unit display

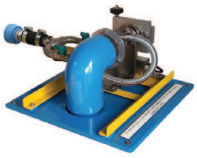


HT121
Mini Pelton Turbine Demonstration Unit, Computer Interface

Metal runner, nozzle and housing with transparent window.

HT131
Mini Francis Turbine Demonstration Unit, Computer Interface

Metal runner, adjustable guide vanes non-corrosion metal housing with transparent window.



HT151AI
Mini Axial Flow Impulse Turbine Demonstration Unit, Computer Interface

Metal runner nozzle and casing with transparent section.

HT161
Mini Kaplan Turbine Demonstration Unit, Computer Interface

Metal runner, adjustable guide vanes non-corrosion metal casing with transparent window and runner section.

HT151A
Mini Axial Flow Propeller Turbine Demonstration Unit, Computer Interface (Self-contained)

Metal runner with transparent casing guide vane and runner section. 0.55 kW pump and storage tank.
Speed, pressure, flow and torque sensors.

MINI TURBINE TEST SET

These are self-contained bench top units.

HT201
Mini Pelton Turbine Test Set

HT301
Mini Francis Turbine Test Set

HT501A
Mini Axial Flow Propeller Turbine Test Set

HT501AI
Mini Axial Flow Impulse Turbine Test Set

HT601
Mini Kaplan Turbine Test Set

COMPACT TURBINE TEST SET, 400-450 W

These are self-contained bench top units.

HT203 Compact Pelton Turbine Test Set

HT403 Compact Cross Flow Turbine Test Set

HT603 Compact Kaplan Turbine Test Set

HT303 Compact Francis Turbine Test Set

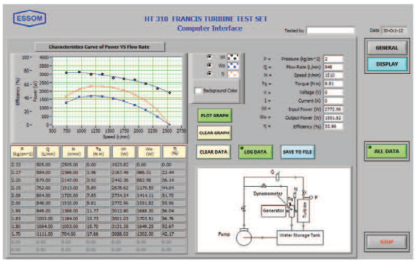
LARGE TURBINE TEST SET, 800 - 2,000 W

These are large turbine test set with 7.5 kW pump, storage tank and measuring instruments. Direct coupling electric generator.

HT310 Francis Turbine Test Set

Stainless steel runner. Bronze casing with adjustable guide vanes and transparent window to observe runner and guide vane position.

- HT210 Pelton Turbine Test Set
- HT310 Francis Turbine Test Set
- HT410 Cross Flow Turbine Test Set



Computer interface unit display OPT

MULTI TURBINE TEST SET

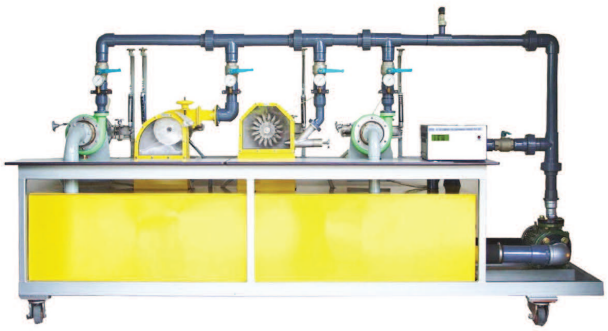
These are multi turbine units for comparisons of each turbine performance.

HT701 Mini Pelton/ Francis Turbine Test Set

Maximum output: 25-40 W.

HT702 Compact Pelton/ Francis Turbine Test Set

Maximum output: 400 - 450 W.



HT703 Multi Turbine Test Set (3 or 4 Turbines)

Maximum output: 400 - 450 W.

- Fan & blower and compressor demonstration units
- Compact fan & blower test sets
- Air compressor test sets
- Wind tunnels

TESTIMONIALS

The advice I am giving always to all my engineering students and colleagues is above all to study the lab apparatuses overwhelmingly the state-of-the-art ESSOM lab apparatuses for instructional purposes and student's utilization are quantum leaps upward. I am confident that ESSOM will not only be soon at par with the world-wide giant manufacturers in this arena but will have leapfrog products for science and engineering research as well.

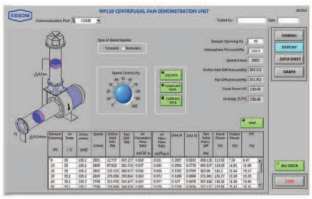
Prof Dr Imtiaz Hakeem
BSc Mech Eng
(UET, Peshawar, Pakistan)
PhD; DIC (Imperial College, London)
Department of Mechanical Engineering
Sarhad University of Science & IT
Peshawar, KPK, Pakistan

FAN, BLOWER AND COMPRESSOR DEMONSTRATION UNITS

These demonstration units are for studying the characteristics, e.g. flow rate vs pressure, input, output, effects of speed on performance and overall efficiency. The industrial fan or blower are also available.

MP110 Centrifugal Fan Demonstration Unit, Computer Interface

A bench top unit with centrifugal fan, motor, inlet orifice, outlet damper; sensors. Includes software for data display and analysis by software.

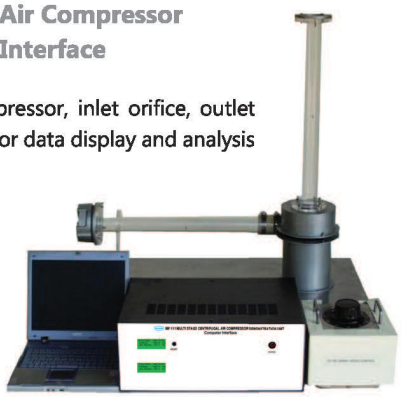


Computer interface unit display

MP111 Multi Stage Centrifugal Air Compressor Demonstration Unit, Computer Interface

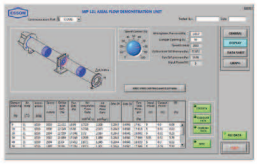
A bench top unit with two stage compressor, inlet orifice, outlet damper and sensors. Includes software for data display and analysis by software.

Computer interface unit display



MP121 Axial Flow Fan Demonstration Unit, Computer Interface.

A bench top unit with axial flow fan and motor, inlet orifice, outlet damper, flow straighteners and sensors. Includes software for data display and analysis by software.



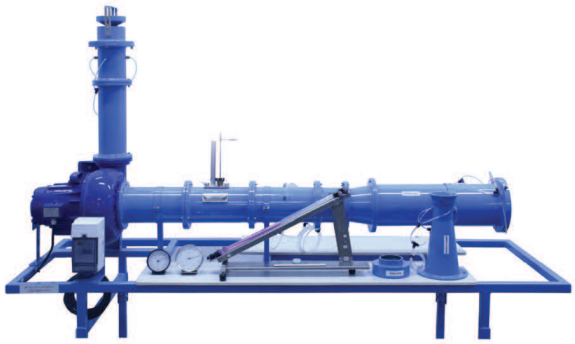
Computer interface unit display

COMPACT FAN AND BLOWER TEST SETS

This equipment is designed to the study of air flow measurement performance of fan, blower and compressor as well as related flow.

MP100 Air Flow Bench

A centrifugal fan with motor, inlet pipe, outlet pipe with damper, flow straighteners, orifice plate, nozzle, inlet cone, travelling pitot, inclined and multi tube manometers and optional items.



Flow around a bend

Bernoulli's experiment

Drag apparatus

Boundary layer

Dispersion of jet

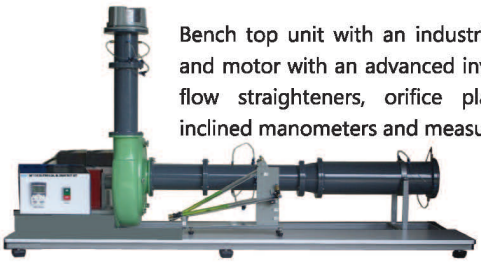
Flow visualization

MP115 Compact Centrifugal Fan Test Set

Bench top unit with centrifugal fan, motor, advanced inverter, inlet orifice, outlet damper, inclined manometer, hand tachometer, thermometer and barometer.

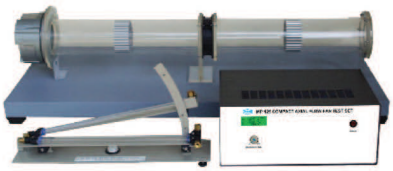
MP119 Centrifugal Blower Test Set

Bench top unit with an industrial centrifugal blower and motor with an advanced inverter, outlet ampere, flow straighteners, orifice plate, Venturi nozzle, inclined manometers and measuring instruments.



MP124 Axial Flow Fan Test Set

Bench top unit with an industrial axial flow fan with motor and an advanced inverter, flow straightener, guide vane, outlet damper, measuring instruments and other optional items.

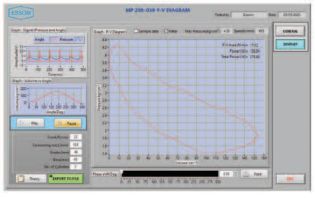


MP125 Compact Axial Flow Fan Test Set

Bench top unit with axial flow fan and motor, inlet orifice, outlet damper, speed indicator, inclined manometer, ammeter, voltmeter, thermometer and barometer.

AIR COMPRESSOR TEST SETS

MP201



Computer interface unit display OPT

MP201 Single Stage Air Compressor Test Set, Air Cooled
MP202 Two Stage Air Compressor Test Set, Air Cooled
MP203 Two Stage Air Compressor Test Set, Air-Water Cooled

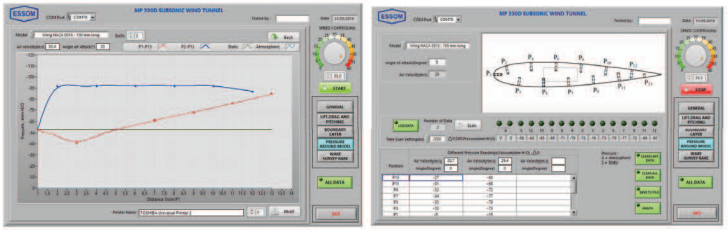
This apparatus is for studying the reciprocating air compressor characteristics, e.g. volumetric efficiency, isothermal efficiency, pressure ratio, temperature ratio as well as the effects of compressor speeds and inter cooling (optional).

WIND TUNNELS

Subsonic Wind Tunnel, Downstream Fan
MP315D, 150X150 mm
MP330D, 300X300 mm
MP340D, 400X400 mm
MP360D, 600X600 mm

This equipment can be used to measure the pressures and velocities, estimate the drag coefficients of various bodies and lift-drag-pitching coefficients of aerofoils, demonstrate the pressure distribution around a model and investigate the boundary layer at a flat plate as well as visualize the stream lines by using a smoke generator.

Computer interface unit display OPT

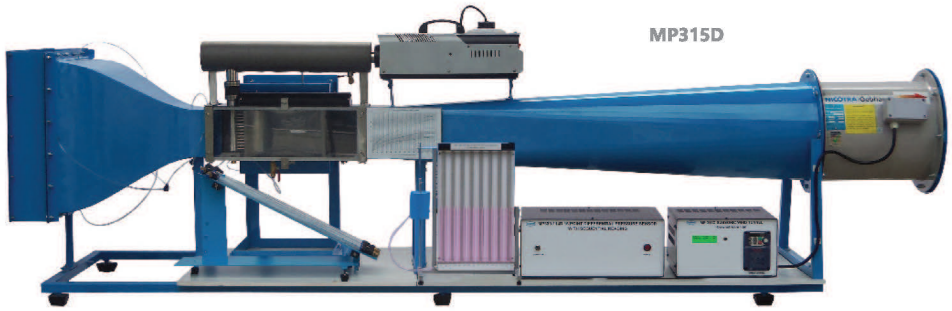


Optional equipment

- Three component balance
- Pitot-static probe
- Yaw probe
- Wake survey rake
- Models for a study of lift, drag and pitching
- Flutter wing
- Pressure wing
- Pressure cylinder
- Boundary layer plate with probe
- Smoke generator set

MP330D

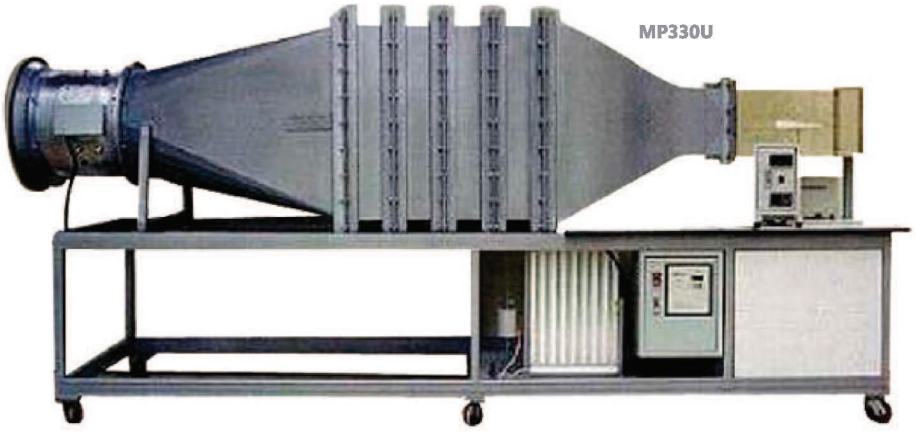
MP315D



MP142 Air Flow Visualization

This equipment is for studying streamline visualization of flow around models, boundary separation on bodies and effects of angle of attack in laminar and turbulent flow observations.

MP330U



MP330U Subsonic Wind Tunnel, Upstream Fan

THERMODYNAMICS

- Internal combustion engines test beds
- Mini steam power plants
- Training boilers
- Compact steam power plants
- Gas turbines
- Heat exchangers
- Heat transfer
- Air conditioning and refrigeration

TESTIMONIALS

The steam power plant trainer acquired by the Mapua University is instrumental in conveying engineering knowledge and skills to our engineering students. Modern instrumentation and controls as well as data processing were also integrated to its system. experiments prescribed by our ME program are covered by the equipment specifications and would require less effort to modify the system to adopt to other requirement. Therefore, the equipment enhances our capability to do research and provide a real-life experience to our students. With this regard, we are greatly satisfied with the quality and as well the after sales service of the manufacturer.

Engr Roel John C Judilla,
PME, ASEAN Eng Professor,
Mapua University, Philippines

TH451 Expansion of Ideal Gas, Computer Interface NEW

the apparatus is for testing of thermodynamic process by using air as an ideal gas. Includes software for data display and analysis by software.

TH450 Perfect Gas Apparatus, Computer Interface NEW

The apparatus is designed to demonstrate Boyle's Law principle using air as an ideal gas. Sensors and indicators are provided for pressures, volume (level), and temperatures. Includes software for data display and analysis by computer.

INTERNAL COMBUSTION ENGINES TEST BEDS

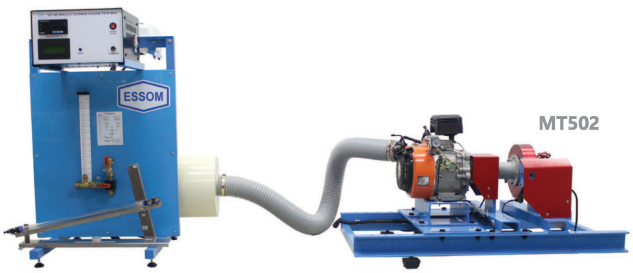
These test beds are for the measurements of speed, torque, output power, fuel consumption, air flow rate and temperatures of single-cylinder or multi-cylinder gasoline/diesel engines in order to determine performances such as efficiency, Air/Fuel ratio etc. Computer interface and computer control options are available.

TYPE OF DYNAMOMETER	Single cylinder			Multi-cylinder	Industrial
	MT501	MT502	MT503	MT505	MT507
Mechanical brake	•				
Hydraulic brake		•	•	•	•
Generator			•		
Air cooled eddy current		•	•	•	•
Water cooled eddy current		•	•	•	•

MT501 Single Cylinder Engine Test Bed
Engine up to 5 kW with basic measuring instruments.

MT502 Single Cylinder Engine Test Bed
Engine up to 5 kW.

MT503G Single Cylinder Engine Test Bed
General purpose / agricultural engine over 5 kW.

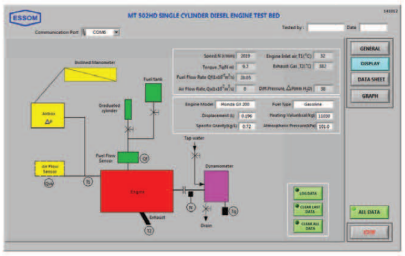


MT502

MT505 Automotive Engine Test Bed

Multi cylinder gasoline and diesel automotive engine test bed, with measuring instrument.

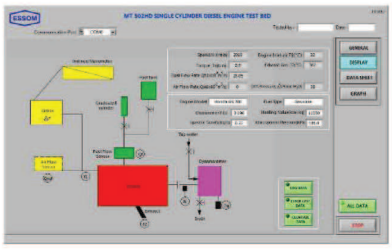
OPT . Computer Interface
. Computer Control



MT507 Industrial Diesel Engine Test Bed

The test bed is intended for low speed, high torque industrial engine such as marine engines and truck engines, with measuring instrument.

OPT . Computer Control



MT520 Exhaust Gas Calorimeter

This apparatus is an exhaust gas-water heat exchanger for using with an engine to determine mass flow rate and heat carried away by the exhaust gas.

OPT **Computer interface unit display**

MT511 Motorcycle Dynamometer

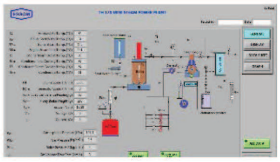
This apparatus is a floor mounted chassis type dynamometer for testing a motorcycle. It is used to study the relationship of power and vehicle speed at a throttle position.

MINI STEAM POWER PLANTS

A miniature power plant is for studying the thermodynamic process, fuel consumption, power generation, heat balance, energy utilization, Rankine cycle efficiency and also the effects of temperature and superheated (optional) on overall plant efficiency as well as efficiencies of boiler and condenser.

TH120 Mini Steam Power Plant

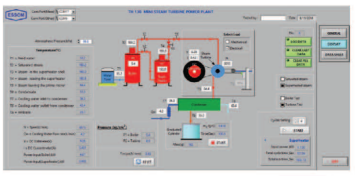
An educational miniature power plant consisting of feed water tank with hand feed pump, gas fired boiler, single cylinder double acting reciprocating steam engine, condenser, generator-dynamometer loads and measuring instruments.
Maximum power: approx. 7 W



Computer Interface Display OPT

TH130 Mini Steam Turbine Power Plant

A miniature modern power plant consisting of feed water tank with feed pump, gas fired boiler, super heater (optional), single stage impulse steam engine, condenser, generator-dynamometer loads and measuring instruments.
Maximum power: approx. 10 W

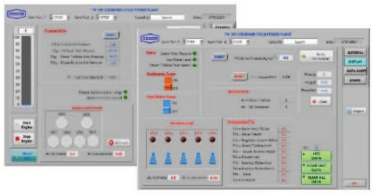


Computer Interface Display OPT

TH155 Combined Cycle Power Plant NEW

This equipment is an educational unit which is similar to a modern combined cycle power plant. It consists of gas turbine power plant, steam turbine power plant, monitoring and controlling instrument and software for data display and analysis by computer.

Steam turbine power plant maximum power: approx. 55 W
Gas turbine power plant maximum power: approx. 700 W



Computer Interface Display

TRAINING BOILERS

TH101 Training Boiler, 100 kg/h
TH102 Training Boiler, 200 kg/h
TH105 Training Boiler, 500 kg/h

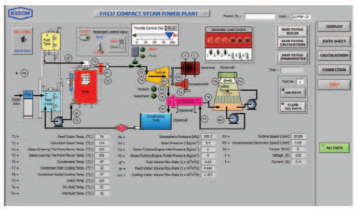
A set of steam boiler and standard accessories are for studying boiler performance including measurements of pressure, temperature and flow rate as well as calculation of the heat combustion, heat addition to steam and boiler efficiency.

TH101

TH124 Marcet Boiler

This equipment is for the demonstration of the relationship between pressure and temperature of saturated steam by temperature – pressure curve.

COMPACT STEAM POWER PLANTS



Computer Interface Display OPT

TH135 Compact Steam Power Plant, 0.5 kW
TH136 Compact Steam Power Plant, 1.0 kW
TH137 Compact Steam Power Plant, 1.5 kW

Steam power plant is used to determine the efficiencies of boiler, turbine generator, overall power plant and Rankine cycle, as well as the heat transfer efficiencies of condenser and cooling tower.

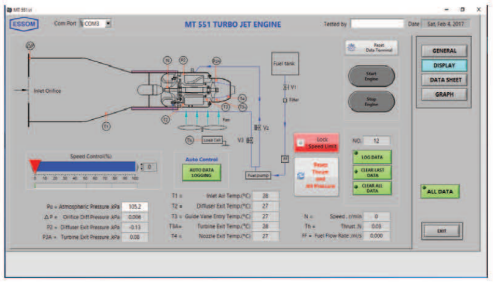
Optional Accessories:
- Electric boiler instead of diesel boiler
- Electric super heater
- Dynamometer for mechanical power measurement
- Computer interface or computer control

GAS TURBINES

The turbo jet engine and two-shaft gas turbine with a radial flow compressor and an axial flow turbine are used to study the thermodynamic process, the relationship of static thrust with turbine speed and input-output power with propulsive efficiency or mechanical/electrical power output (two-shaft gas turbine only i.e., MT560 and TH150). Complete with sensors, signal convertor and software for data display, analysis and control by computer.

MT551 Turbo Jet Engine, 70N Thrust
MT552 Turbo Jet Engine, 160N Thrust
MT553 Turbo Jet Engine, 200N Thrust

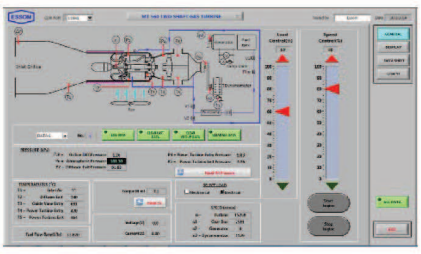
A single stage gas turbine with different thrust capacity is available.



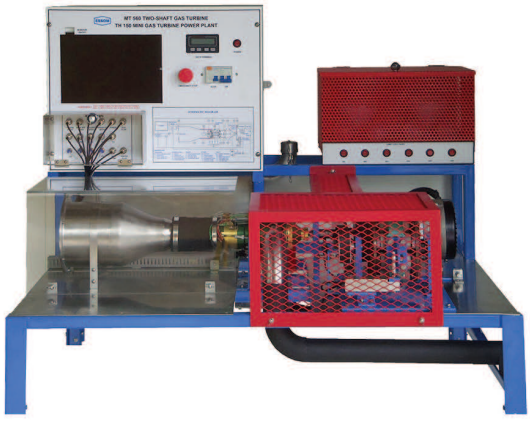
Computer Interface Display

MT560 Two-Shaft Gas Turbine Engine
TH150 Mini Gas Turbine Power Plant

Gas turbine and power turbine with mechanical power and electrical power measurement.



Computer Interface Display



UNISA has purchased all its Thermodynamics equipment from ESSOM, and herewith we would like to express our satisfaction with the products. The equipment is effective; experiments are repeatable with a high degree of accuracy and a great deal more value for money. We have commissioned some of the equipment and are now in the process on commissioning the Steam Power Plant. The Boiler is working well. I am pleased with the progress made so far. I hope we will have a good working relationship, throughout the considerable long life-span of this equipment.

T. Sithebe
Lecturer
Department of Mechanical &
Industrial Engineering
University of South Africa
(UNISA)

HEAT EXCHANGERS

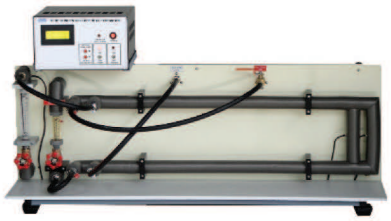
TH215 Cross Flow Heat Exchanger, Metal-to-Air NEW

This apparatus is for studying heat transfer between two mediums in cross flow heat exchanger. It is used to determine heat transfer rate, heat transfer coefficient, dimensionless parameters and relevant flow properties.

TH217 Cross Flow Heat Exchanger, Water-to-Air NEW

This apparatus is for studying heat transfer from hot water to cross flow air such as in automobile radiator. It is used to determine the heat transfer coefficient as well as the effects of flow rate and temperature differences.

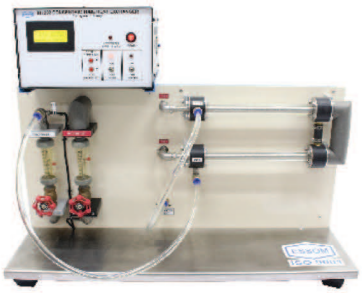
Heat exchanger apparatus is for studying heat transfer through different heat exchangers under parallel or counter flow condition. It is used to demonstrate the heat transfer coefficient as well as effects of flow rate and temperature differences. The opaque type has higher heat transfer area

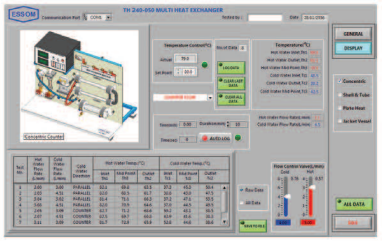


Heat exchanger	Opaque	Transparent
Concentric	TH201	TH202
Shell and tube	TH211	TH212
Plate	TH221	-
Jacketed vessel With coil and stirrer	TH231	-
Multi	TH240	TH241

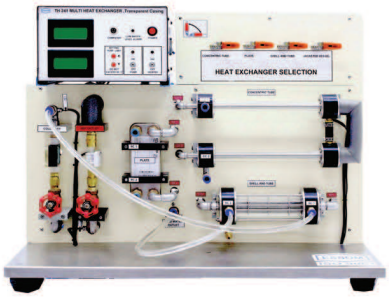
TH201 Concentric Tube Heat Exchanger

TH240 Multi Heat Exchanger





Computer interface unit display OPT



TH202 Concentric Tube Heat Exchanger, Transparent Casing

TH241 Multi Heat Exchanger, Transparent Casing

HEAT TRANSFER

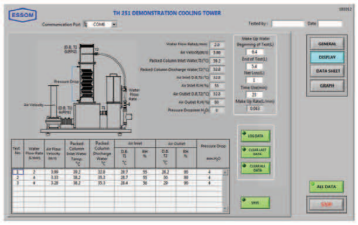
TH318 Unsteady state heat transfer NEW

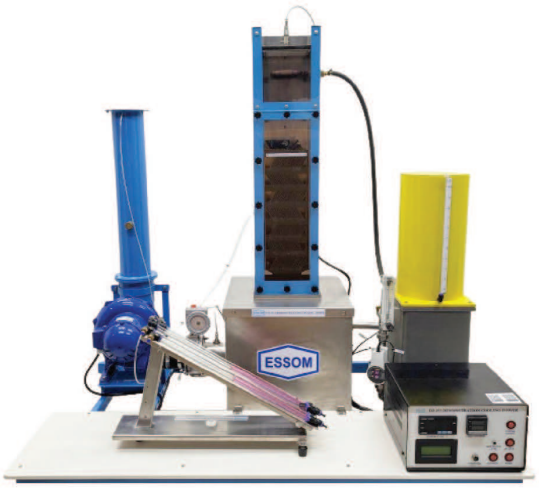
This apparatus designed for experimental investigation of unsteady state heat transfer by conduction and convection of different shape, size and material properties as well as the transient temperature analysis.

TH251 Demonstration Cooling Tower

A cooling tower demonstration unit is for observation of water flow patterns and distributions, measurements of water and air flow rates, temperatures and humidities as well as cooling tower performance.

Computer interface unit display OPT





TH261 Evaporation Unit NEW

The evaporation unit is designed for studying of the evaporation process. The unit consists of a heated tank, a transfer pump, evaporated tube, water cooled condenser which required outside water supply and measuring instruments.

TH312 Thermal Conductivity of Non-Metallic-Materials

This apparatus is for determination of thermal conductivity of non-metallic materials by using guarded hot plates.

TH260 Boiling Heat Transfer Unit

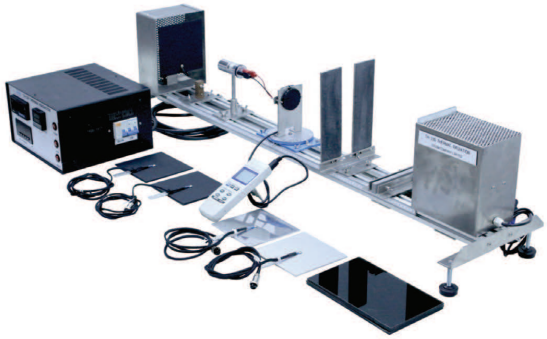
This apparatus is for observation of evaporation process in a heated tank, determination of heat transfer efficiency and also studying the effects of pressures and temperatures on evaporation.

TH310 Heat Conduction, Computer Interface

The apparatus consists of two parts including linear and radial heat conduction studies such as a multi-section bar for a metal disc, heat conduction along a simple or composite bar, effects of cross section area, surface contact and insulation on heat transfer. Includes software for data display and analysis by computer.

TH320 Free and Forced Convection

This apparatus is used for the studying of heat transfer of free (natural) and forced convection for different surfaces, i.e. flat, cylindrical and finned heater in a vertical duct. Temperatures and distributions on each surface are also available as well as the calculations of heat transfer coefficient, efficiency and heat transfer rate.



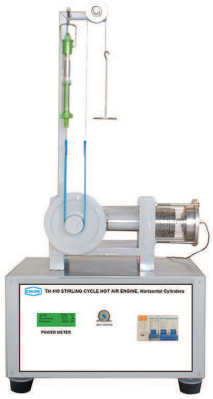
TH330 Thermal Radiation

The apparatus is used for studying radiation heat transfer by using a radiant heat and/or a light source. The experiment is inverse square law for light and thermal radiation, Lambert's cosine law for light, Lamberts law of absorption, Stefan-Boltzmann's law, emissivity of various surfaces, Kirchhoff's law and area factor by using heat source.

TH501 Temperature Measuring Apparatus

This bench top unit is used for studying temperature measurement of several commonly used devices as well as understanding related principles and the air humidity.

The Stirling cycle hot air engines are used for studying the relationship between torque-speed, output-speed, efficiency-speed characteristics for a given input.



TH410 Stirling Cycle Hot Air Engine, Horizontal Cylinders

The engine with two horizontal cylinders for hot air generation and power generation and measuring instruments. Maximum output power: Over 1000 mW.

TH411 Stirling Cycle Hot Air Engine, Vertical Cylinders

The engine with two vertical cylinders for hot air generation and power generation. with outside water supply to cooled hot air cylinder, and measuring instruments. Maximum output power: Over 900 mW.

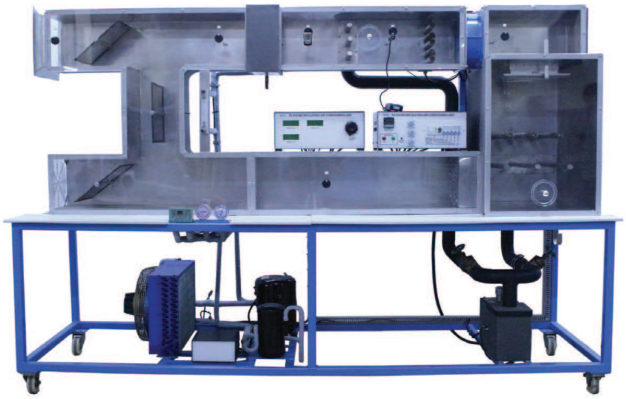
TH413 Stirling Cycle Hot Air Engine Vertical Twin Power

The engine with a large water-cooled vertical cylinder for hot air generation and two power cylinders, and measuring instruments. Maximum output power: Up to 3000 mW.

AIR CONDITIONING AND REFRIGERATION

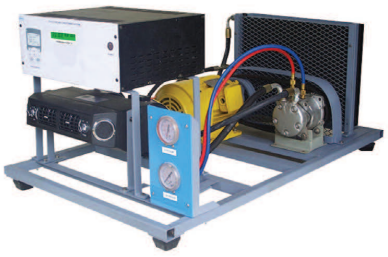
TH518 Recirculation Air Conditioning Unit, With Climatic Chamber

This apparatus is a recirculating air conditioning unit with transparent windows and a climatic chamber for familiarization of open or recirculating air conditioning system, determination of different heating components on psychrometric chart and recirculating and mixing processes of moist air, demonstration of refrigeration cycle on pressure-enthalpy diagram of the refrigerant and energy balance as well as effects of climatic chamber heat loads.



TH510 Split Type Air Conditioner System
TH511 Split Type Air Conditioner System, Inverter Control

This apparatus is used for the demonstration of split type air conditioning operation. Temperatures and pressures at various points are provided as well as the studying of layout, process diagram and remote-control operation.



TH512 Car Air Conditioning System

This apparatus is for studying of layout and process diagram, recognition of typical faults and repair on a car air conditioner, simulations of system faults (optional), cyclic process thermodynamic and observation of pressures and temperatures.trol operation.

TH516 Laboratory Air Conditioning System

This is an open circuit air conditioning system for familiarization and determination of different heating processes on psychrometric chart, demonstration of refrigeration cycle on pressure-enthalpy diagram of the refrigerant and energy balance.

TH522 Ice Maker Test Rig

The test rig is intended for studying ice making process, familiarization with ice making system and components.

TH525 Air-to-Water Heat Pump

The heat pump system is used to demonstrate how heat is transferred from air to water. It is used to determine the air-to-water heat pump operation, energy balance, performance, overall heat transfer coefficients and effects of loads variation.

TH527 Refrigeration Trainer

A refrigeration system is used to investigate energy balances at compressor, condenser and evaporator, familiarize with refrigeration cycle and components and also determine the overall heat transfer coefficients, energy balances and effects of load variation.

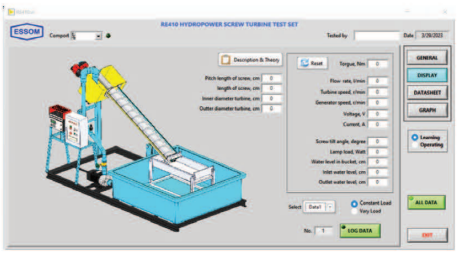
TH520 Basic Refrigeration System

This unit is used for demonstration of a normal household refrigerator operation, observation of pressures and temperatures, study of layout and process diagram using a P-h diagram.

TH513 Water Cooled Chiller System

NEW

The unit is used for studying chiller system. The unit consists of an air handling unit, a compressor, a water-cooled condenser, a cooling tower unit, and measuring instruments.



Computer Interface Display OPT

RE410 Screw Turbine Hydro Power Plant NEW

This is a self-contained set unit for studying the power generation by a hydropower screw turbine.
The unit consist of a storage tank and a pump, a hydropower screw turbine with interchangeable pitches, variable tilting angle, a generator dynamometer which is connected to the turbine, a lamp load bank, and measuring instruments. Relationship of turbine torque and speed, mechanical/electrical power output at various condition and overall powerplant efficiency at various electrical load are determined

RE210 Solar Electricity

This unit is for studying how to generate, store and consume electricity converted from solar energy. Voltage and current characteristics of solar panel, effect of shading and panel inclination on performance are demonstrated under overload protection.

RE440 Mini Hydro Power Plant

This unit is for studying the power generation by a selectable hydraulic turbine where the relationship of torque and speed at various conditions are determined. Mechanical and electrical outputs including efficiencies are also measured and calculated.

Computer Interface Display

RE310 Educational Wind Turbine, Computer Interface

RE311 Educational Vertical Axis Wind Turbine, Computer interface NEW

This unit is for studying the wind turbine characteristics including the relationship of turbine output and wind speed, turbine efficiency and also the effects of blade angle and number of blades as well as the wind power calculation. Includes software for data display and analysis by computer.

RE490 Low Head Hydraulic Turbine Test Rig

This is a closed-circuit test facility for design and development of low head hydraulic turbine. The test rig consists of pump, head tank, tail tank, dynamometer and measuring instrument.

STRENGTH AND PROPERTIES OF MATERIALS

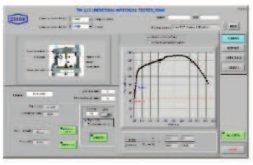
- Universal testing machine
- Fatigue testing machine
- Creep testing machine
- Torsion testing machine
- Impact testing machine
- Deflection and load
- Stress and strain

Universal Testing Machine

TM113A, 30 kN.
TM113B, 30 kN., Ball screw
TM115A, 50 kN.
TM115B, 50 kN., Ball screw

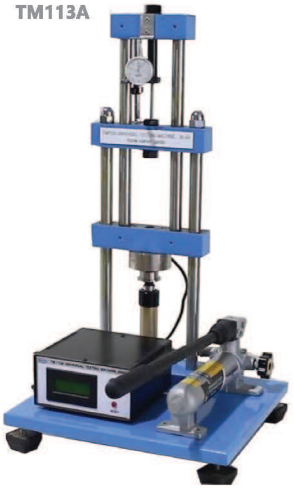
This is a simple universal testing machine including tension, compression, bending, deep draw, shear, brinell hardness and spring compression.

Computer Interface Display OPT



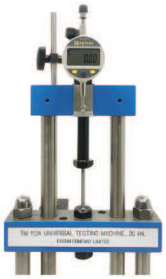
TM115B

TM113A

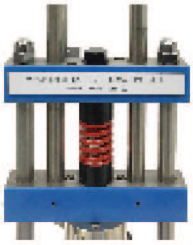


Universal Testing Machines Accessories

Tension Test



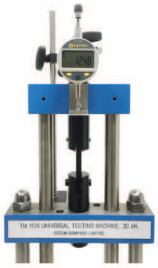
Compression Test of Springs



Compression Test of Non-Ferrous Materials

Bending Test

Shear Test



Brinell hardness Test

Deep Draw Test

TM221 Creep Testing Machine

This apparatus is used for testing the materials with high creep such as lead and plastics. It is used to study the characteristics such as creep phenomena of materials under different stresses and temperatures.

TM211 Fatigue Testing Machine

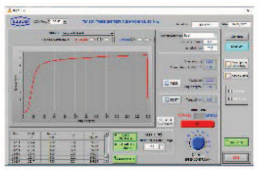
This apparatus is used for studying the effects of fatigue by using a rotating cantilever specimen, effects of bending stress and different radius at fracture section as well as the Wohler diagram.

Torsion Testing Machines

TM201: 30 Nm,
TM202: 75 Nm,
TM203: 200 Nm

This apparatus is for studying the extensive range of torsion tests, characteristics of materials under plastic deformation, relationship of torque and twist angle under elastic deformation, determinations of modulus of rigidity, yield shear stress, modulus of rupture, comparison of twist angle for forward and reverse directions, relationship between twist angle, length and size of specimens.

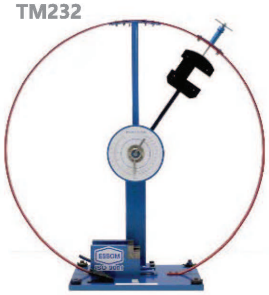
TM201



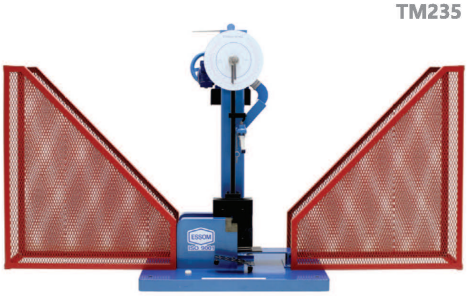
Computer Interface Displays OPT

Computer Interface Displays OPT

TM232



TM235



TM232 Impact Testing Machine, 25/50 J

TM235 Impact Testing Machine, 150/300 J

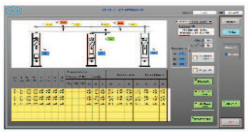
These apparatuses are for determination of fracture resistance of materials by Charpy or Izod test (optional) that is notched bar impact work, impact strength, effects of notch form and material heat treatment on impact work (optional).

TM411 Strut Buckling Apparatus

This apparatus is for demonstration of the buckling on struts under various end conditions, determination of the flexural rigidity, comparation of the theoretical value, load- deflection and crippling loads for strut as well as effects of side load and eccentric load (Optional).

Computer Interface Display OPT

Computer Interface Display OPT

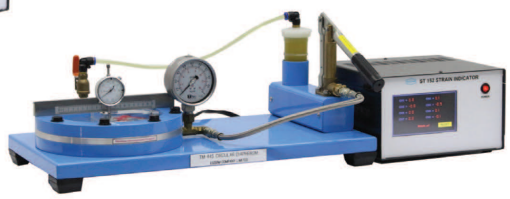


TM415 Beam Apparatus

This beam apparatus is for use in a wide range of beam experiments with simple, built-in and sinking supports measuring of point loads, support reactions and beam deflections with two supports and various point loads. It is used for determination of flexural rigidity and elastic modulus.

TM442

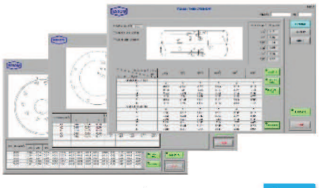
TM445



TM441

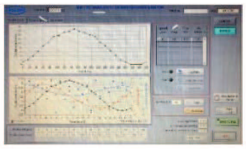
TM441 Thin Cylinder
TM442 Thick Cylinder
TM445 Circular Diaphragm

The thin cylinder is for studying the stresses in a thin wall cylinder /thick cylinder /circular diaphragm, measurement of strains and stresses under internal pressures, and comparison of theoretical stresses- strains with experimental values.



Computer Interface Display OPT

- Mechanism for motion study
- Force and motion study
- Mechanical engineering test sets
- Vibrations



MM220C Cam and Follower Analysis

NEW

This mechanism demonstrates relative motion between a rotating eccentric member (cam) in degrees and a sliding member (follower) translation in millimeters such as found in internal combustion engine. The follower can be flat face or roller type. Software for data display and analysis by computer (separately supplied).

MM101 Center of Gravity Apparatus

MM102 Simple Moments Apparatus

NEW

MM103 Reaction of Beams Apparatus

MM105 Torsional of Spiral Spring Apparatus

MM 111 Relation Between Angular and Linear Speeds Apparatus

MM 112A Work Done by A Variable Force, Tangential Effort

MM 112B Work Done by A Variable Force, Vertical Effort

MECHANISM FOR MOTION STUDY

MM211H Slider Crank

This mechanism demonstrates the relative motion between a crank rotation in degrees and a slider translation in millimeters.

MM212H Four Bar Linkage

This mechanism demonstrates the relative motion between a crank rotation in degrees and another link oscillation (swinging) in degrees.

MM213H Slotted Link

This mechanism demonstrates the relative motion between a crank rotation in degrees and a slider translation in millimeters through another oscillating link resulting in quick return for slider motions.

MM214H Whitworth Quick Return

This mechanism demonstrates the relative motion between a crank rotation in degrees and a slider translation in millimeters through another offset rotating member resulting in quick return for slider motion.

MM215H Scotch Yoke

This mechanism demonstrates the relative motion between a crank rotation in degrees and a yoke translation in millimeters.

MM216H Oldham Coupling

This mechanism demonstrates the relative angular motion in degrees between two shafts with parallel but displaced axes.

MM217 Hooke's Universal Joint

This mechanism demonstrates the relative angular motion between two intersecting shafts through shifting balls such as found in rear drive shaft of an automobile.

MM218 Constant Velocity Joint

This mechanism demonstrates the relative angular motion between two intersecting shafts through shifting balls such as found in front drive shaft of an automobile.

MM219H Geneva Stop

This mechanism demonstrates the relative angular motion in degrees between two parallel shafts – one with continuous rotation and the other with intermittent rotation.

MM220H Cam and Follower

This mechanism demonstrates the relative motion between a rotating eccentric member (cam) in degrees and a sliding member (follower) translation in millimeters such as found in internal combustion engine.

MM222

MM221 Epicyclic Gear Train
MM222 Double Epicyclic Gear Train
MM223 Triple Epicyclic Gear Train

This mechanism demonstrates the relative angular motion in degrees between shafts with common axis by using sun and planetary gears to produce a forward speeds and a reverse

MM312 Torsional Oscillations Apparatus

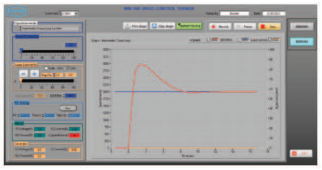
This mechanism demonstrates the torsional oscillations of single or multi-rotor and/or geared systems with low natural frequencies.

MACHINE ELEMENTS AND THEORY OF MACHINES

FORCE AND MOTION STUDY

MM460 Speed Control Trainer NEW

This trainer unit is for studying fundamental motor speed control (PID) in various system via modern technology. Includes software for data display, set the parameters, control and analysis by computer for various experiments.



Computer interface unit display

MM240 Simple Geared System

This apparatus is for studying the acceleration of a geared system under different gear ratios, inertia of mass and geared system as well as efficiency of a geared system.

MM242 Comprehensive Geared System

This apparatus is for studying the acceleration and mass inertia of a geared system, determinations of input and output powers and also effects of speed and load on efficiency as well as geared system efficiency under different gear ratios.

Computer interface unit display

MM245 Automotive Gear System, Manual Transmission, Computer Interface

This apparatus is for studying effects of speed and load on gear system and efficiency under different gear ratios. The input power, output power and efficiency are also determined. The output shaft will be extended in case of studying the acceleration of an automotive gear system (optional).

MM325 Whirling of Shafts Apparatus NEW

This apparatus is for studying the critical rotational speeds on simply loaded of various shafts, effects of end conditions, variations of shaft diameter and supported length, loaded shaft (with mass disc), eccentric loading as well as demonstration of basic whirling.

MM340 Static and Dynamic Balancing Machine, Computer Interface

This apparatus is for studying balancing principles including single plane or two planes for both lab and field and also the balancing machine calibration.

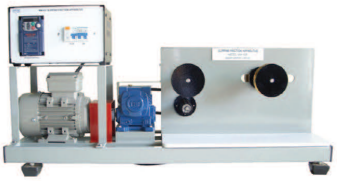
Computer interface unit display

MM343 Static and Dynamic Balancing Apparatus

This apparatus is for demonstration of simple balancing technics, i.e static and dynamic balancing of the system as well as demonstration of balanced and unbalanced system by actual running of the apparatus.

MM431 Slipping Friction Apparatus

This apparatus is for determination of sliding friction coefficient by using an oscillating bar for different types and sizes of materials



MM440

MM441 Gyroscope, Single Motor
MM440 Gyroscope, Two Motors

This apparatus is for studying the relationship between gyroscopic torque, rotor speed and precession as well as determination of moment of inertia and nutation study.

MM445 Centrifugal Force Apparatus, Computer Interface

This apparatus is for studying the relationship between centrifugal force, rotating mass, angular velocity, and distance from the axis of rotation.

MM450 Governor Apparatus

This apparatus is for studying motion and operation as well as the relationship between speed and displacement at various weights of Porter, Proell and Hartnell governors.

MM500 MECHANICAL ENGINEERING TEST SETS

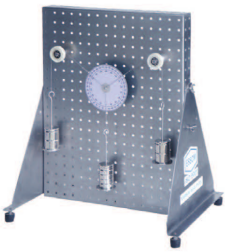
A wide variety of machine elements and mechanisms with over 20 sets and more than 60 experiments. Each set can be mounted on the basic panel (MM500-001) by quick fitting screws and supplied in compact plastic box.

MM501 Basic Panel,

The tilted panel is made from a perforated stainless-steel sheet mounted on two supports with adjustable footings.

MM511 Forces Set

This set is for studying centers of gravity, force triangle, non-concurrent forces, force polygon, Bow's notation and work done by variable work force (optional).



MM512 Moments Set

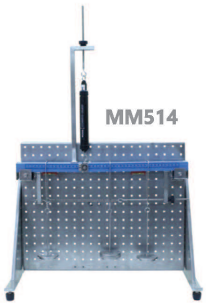
This set is for studying beam reactions, beam balances, bell crank lever, rigid beam, principles of moments, 1st, 2nd and 3rd orders of levers.

MM513 Bending Moment Set
MM514 Shear Force Set
MM515 Shear Force and Bending Moment Set

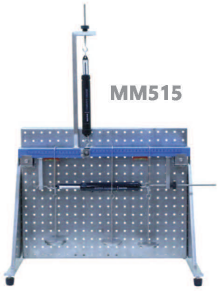
This apparatus is for studying bending moment of a beam and shear force under loads.

MM513

MM514

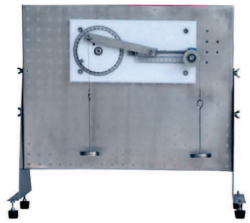


MM515



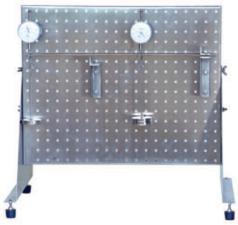
MM517 Crank and Toggle Set

This apparatus is for studying turning moment versus crank resistance at different crank angles.



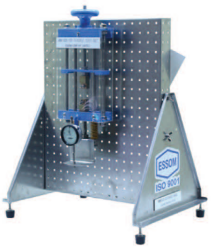
MM521 Deflection of Beams and Cantilever Set

This set is for studying beam length versus deflection, beam material versus deflection, effect of moment of inertia on deflections and effect of beam supports on deflection.



MM532 Tensile Test Set

This apparatus is for studying tensile test to failure to determine elastic limit, yield and ultimate strength of specimens.



MM533 Torsion Set

This set is for studying angle of twist versus specimen length, specimen material and moment of inertia.

MM534 Spring Test Set

This set is for studying Hooke's law for spring compression, tension and parallel, series spring tests.

MM535 Potential and Kinetic Energy Set

This set is for studying kinetic and potential energy in a pendulum, static potential energy in a spring and kinetic energy in a flywheel.

MACHINE ELEMENTS AND THEORY OF MACHINES

MM541 Inclined Plane Set

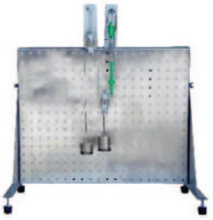
This set is for studying forces on an inclined plane, rolling and sliding friction on different surfaces and effect of inclined angle.

MM542 Rotating Friction Set

This set is for studying efficiency of a screw jack, different busing materials, effect of bussing diameter and lubrication.

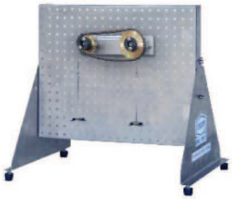
MM551 Pulley Set

This set is for studying fixed, movable and compound pulleys, Weston differential pulley, wheel and axle.



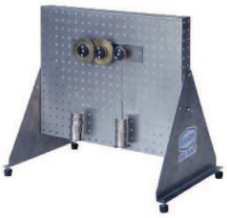
MM552 Belt and Chain Drive Set

This set is for studying chain and belt system power and efficiencies.



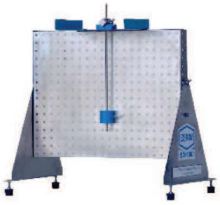
MM553 Gear Trains Set

This set is for studying characteristics of spur gears for single and compound trains, bevel gear, worm and wheel.



MM561 Simple Harmonic Motion Set

This set is for studying simple harmonic motion of, bifilar, trifilar, compound, Kater's pendulums and spring-mass system.



MM562 Centrifugal Force Set

This set is for studying relationship of centrifugal force with rotating speed, mass and distance from axis of rotation.

MM571 Bar Linkages Set

This set is for studying four bar linkages, straight line linkages, pantograph and Ackermann steering.

MM572 Cam and Follower Set

This set is for studying relation of cam rotation versus follower linear displacement for different types of cam and follower.

MM573 Rotary-Translation Motion Set

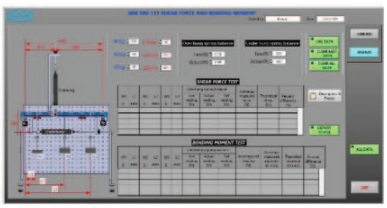
This set is for studying relation of rotary motion and translation in slider crank, slotted link and quick return mechanism and step pulley.

MM574 Rotary Motion for Two Shafts Set

This set is for studying relative angular motion of parallel shafts but displaced axes and intersecting shafts at various angles.

MM575 Intermittent Motion Set

This set is for studying relationship between rotary motion and start-stop angular motion.



Learning Software Display OPT

Learning software is available for most of experiments.

MM 113 JIB CRANE APPARATUS NEW

The equipment is designed to study forces in jib crane elements. Load is applied at the junction of jib and tie to produce tension and compression in tie and jib respectively.

VIBRATIONS

MAIN FRAMES

MM320-001

MM320-005

MM320 Universal Vibration Apparatus

This apparatus is used for studying a wide range of vibration experiments namely simple, complex and reverse or Kater's pendulum, bifilar / trifilar (optional) suspension, center of percussion, mass-spring, free and forced vibrations, lateral vibration, torsional vibration as well as damped/undamped vibration absorption.

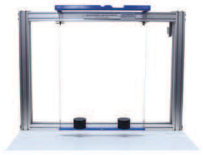
MM320 ACCESSORIES

Simple Pendulums

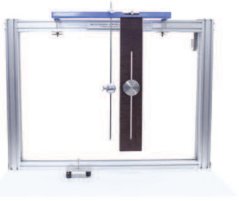
Compound Pendulum.

Reversible Pendulum (Kater Pendulum)

Bifilar Suspension and Trifilar Suspension (opt).

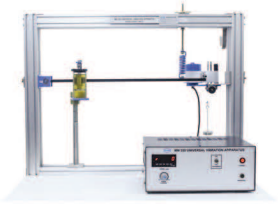


Center of Percussion

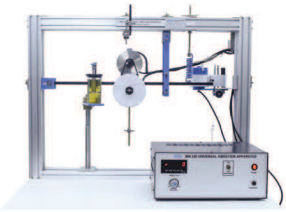


Mass-spring Apparatus.

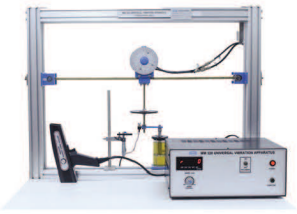
Free Vibration Apparatus.



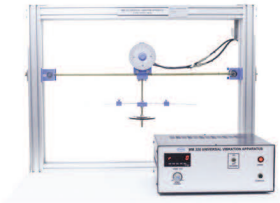
Forced Vibration Apparatus.



Lateral Vibration Apparatus



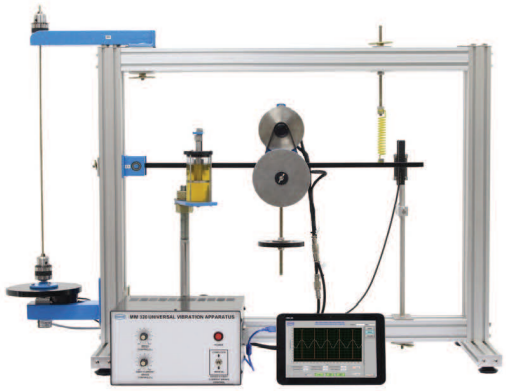
Undamped Vibration Absorber



Torsional Vibration Apparatus, Single rotor system Two rotors system

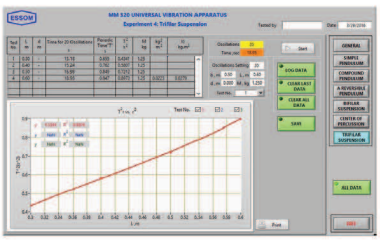
Torsional Vibration Apparatus, single rotor with damping

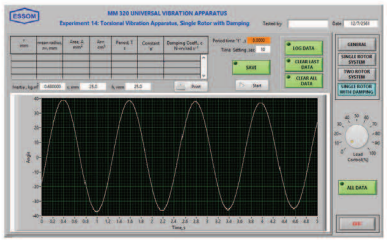
MM321 ACCESSORIES



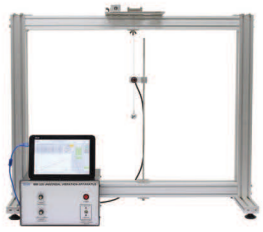
MM321 Universal Vibration Apparatus, Computer Interface

This apparatus is used for studying a wide range of vibration experiments namely simple, complex and reverse or Kater's pendulum, bi/tri filar suspension, center of percussion, mass-spring, free and forced vibrations, lateral vibration, torsional vibration as well as damped/undamped vibration absorption. Includes software for data display and analysis by computer.

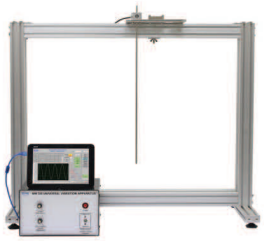




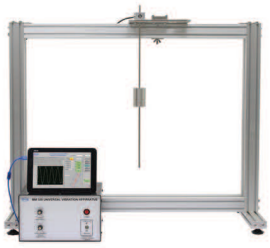
Simple Pendulums.



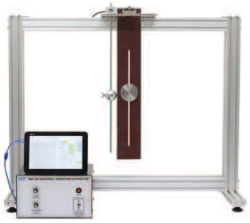
Compound Pendulum.



Reversible Pendulum (Kater Pendulum)

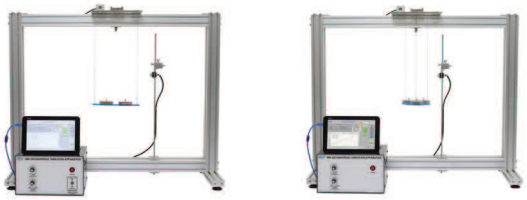


Center of Percussion

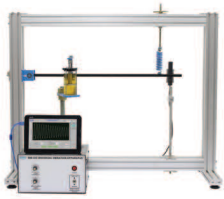


Mass-spring Apparatus.

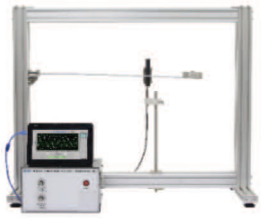
Bifilar and Trifilar Suspension.



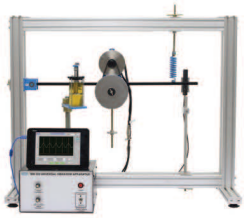
Free Vibration Apparatus.



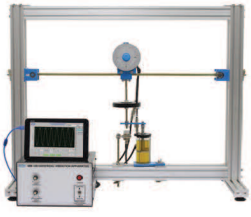
Free Vibration of a Cantilever



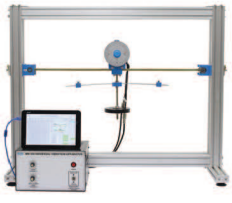
Forced Vibration Apparatus.



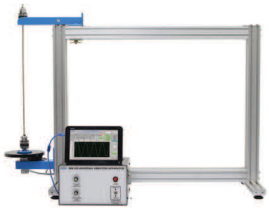
Lateral Vibration Apparatus



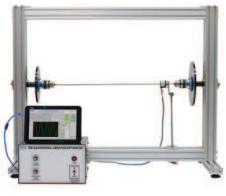
Undamped Vibration Absorber



Torsional Vibration Apparatus, single rotor with damping

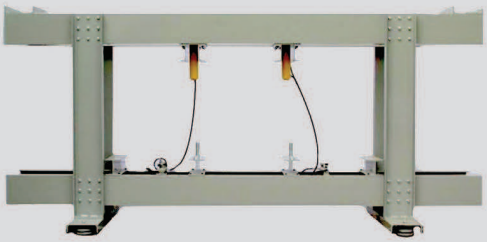


Torsional Vibration Apparatus, two rotors system



- Force and moment
- Bridge and arch
- Deflection and stress
- Strength of materials
- Torsion

MAIN FRAMES



ST400 Universal Base Frame

A universal test frame with accessories for testing actual beam or truss with capacity 300 kN.

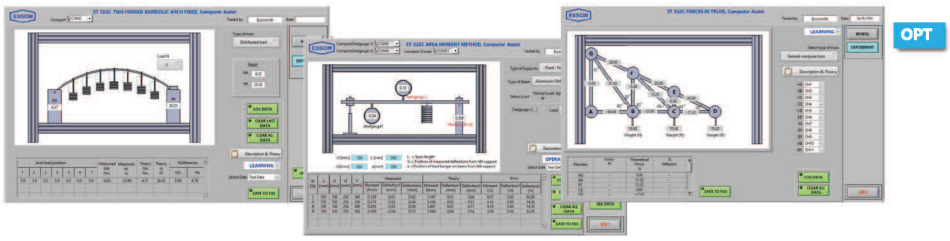
ST300 Universal Structural Frame
ST305 Universal Base Frame

Frame of aluminum profile with adjustable footings, for attachment of structural models and accessories.

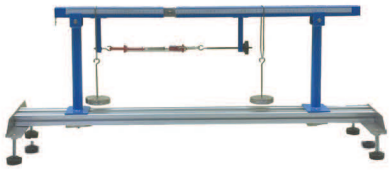
ST300

ST305

This equipment requires a frame (ST300 or ST305) where the test accessories are attached for performing experiments. Supporting accessories are used for installation and/or measurement. A Computer Assist set (optional) includes computer interface unit and digital measurements with output signals.

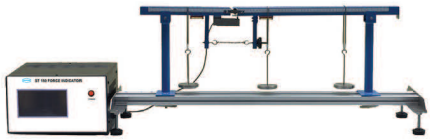


FORCE AND MOMENT



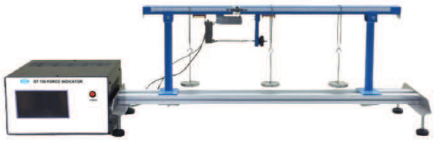
ST311 Bending Moment

This apparatus is used for measurement of bending moment on a section of a beam and comparison of experimental results with theoretical values.



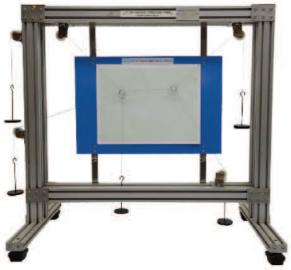
ST312 Shear Force

This apparatus is used for measurement of shear force on a section of a beam and comparison of experimental results with theoretical values.



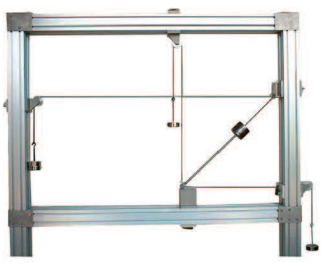
ST3112 Shear Force and Bending Moment

This apparatus is used for measurement of both shear force and bending moment in the same beam.



ST317 Equilibrium of Forces

This apparatus is used for studying the equilibrium of concurrent and non-concurrent forces in a single plane.



ST318 Equilibrium of a Rigid Body

This apparatus is used for measurement of the ground and wall reaction as a weight is moved up a rigid ladder.

ST319 Three Dimensional Equilibrium

For studying the equilibrium of five concurrent and non-concurrent forces in a three-dimensional system.

STRUCTURE AND ACCESSORIES

ST320 Equilibrium of a Beam

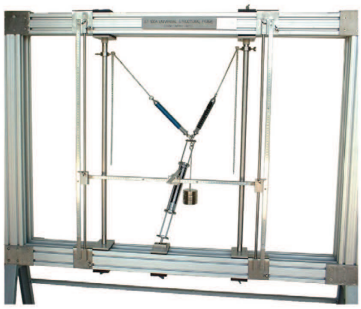
For measurement of support reactions of a simple beam or cantilever in equilibrium under different loads

ST322 Area Moment Method

For verification of the deflections and slopes of a beam by area-moment method.

ST355 Suspension Cable NEW

for studying the inter-action between suspension cables and load measuring supports with uniform or non-uniform distributed load on the catenary cable.



ST373 Tension Coefficients

For demonstrating the use of tension coefficients in resolving three-dimensional forces.

BRIDGE AND ARCH

ST 313 Influence Line Apparatus

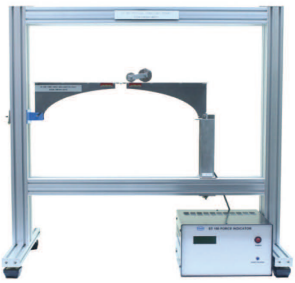
For investigation of reactions under various conditions of load at all supports along a three-span bridge.

ST331 Two-Hinged Parabolic Arch

For direct measurement of the horizontal component of the abutment thrust of a two- hinged parabolic arch by using a simple model.

ST332 Two Hinged Parabolic Arch, Fixed End

For measurement of horizontal thrust and end fixing moments of the abutment.



ST333 Three Hinged Arch

For measurement of horizontal abutment thrust for symmetrical and unsymmetrical three hinged arch using a combination of concentrated and distributed loading.

ST351 Simple Suspension Bridge

For measurement of cable tension resulting from uniformly distributed and point loads on the rigid deck.

ST352 Suspension Bridge

For studying the inter-action between suspension cables and load measuring supports with uniformly distributed and point load on the rigid deck.

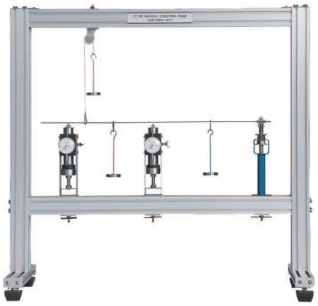
DEFLECTION AND STRESS

ST 315 Shear Center

For determination of the plane of traverse loading without twisting for selected standard sections.

ST316 Unsymmetrical Cantilever

For studying a cantilever deflection and determining shear center.



ST321 Continuous Beam

For measurement of reactions for a two- span continuous beam with and without settlement of a support.

ST323 Deflection of Beam and Cantilevers

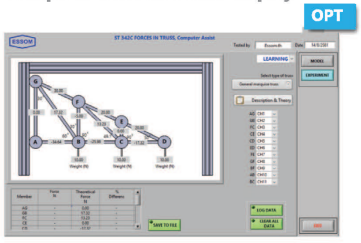
For measurement of deflections and slopes of a beam under bending.

ST326 Virtual Work

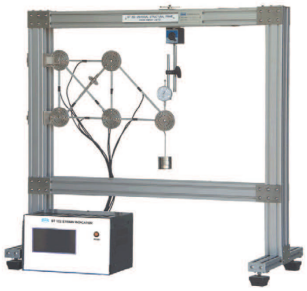
For studying the principle of virtual work to the derivation of redundant reactions.

Computer assistance unit display

OPT



ST341



ST342

ST341 Redundant Truss

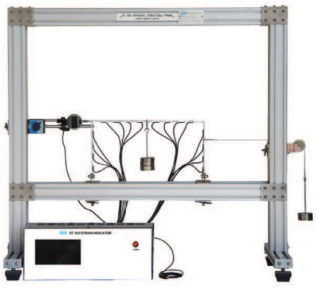
ST342 Forces in Truss

For measurement of deflection and axial forces in pin-joint trust members when a redundant member is added.

STRUCTURE AND ACCESSORIES

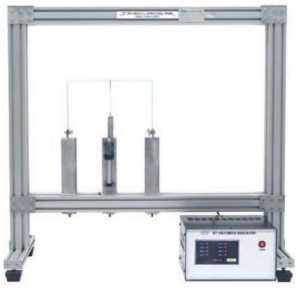
ST360 Deflection of Frames

For comparison of experimental and theoretical deflections of a rectangular portal, an open square and an "S" frame.



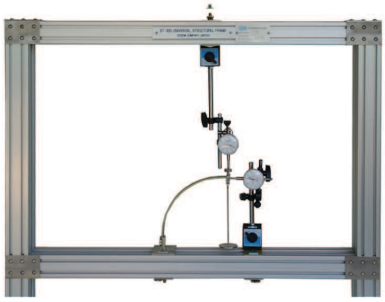
ST361 Bending Moment in a Frame

For measurement of strain hence loading moment of vertical and horizontal members of a portal frame.



ST362 Plastic Bending of a Frame

For studying on the relation between deflection of a portal frame under loads in plastic condition.



ST365 Deflection of Curved Bars

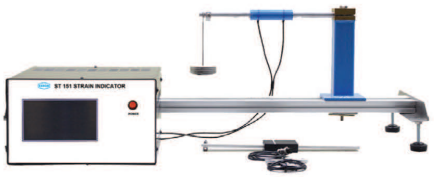
For measurement of horizontal and vertical deflection of curved bars under loads.

ST370 Column Buckling

For studying an elastic strut buckling under load with different end conditions.

STRENGTH OF MATERIAL

ST343



ST340

ST340 Strain and Stress of Material

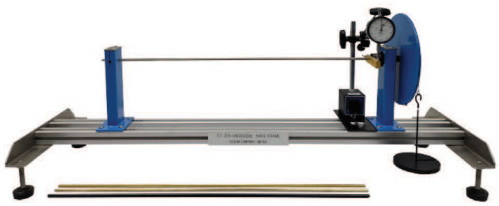
ST343 Strain Gauges

For demonstrates the use of strain gauge in measuring strain of material under bending, torsion, combined bending and torsion and tension (optional) stress.

ST345 Tensile Modules of Elasticity

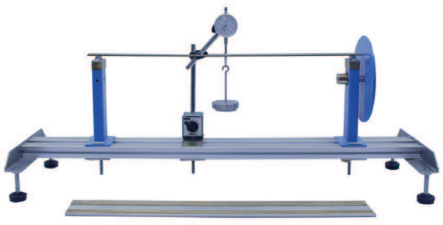
For measurement of the modulus of elasticity of materials in the form of rods.

TORSION



ST375 Torsion of Rods and Tubes

For the investigation of torsion and torsional rigidity in rods and tubes at different length and materials



ST376 Torsion and Bending

The apparatus is used for torsion and bending tests on different length and materials.

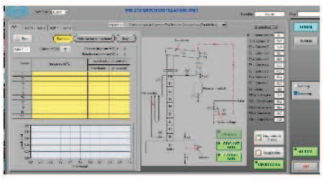
- Chemical engineering
- Unit operation
- Process control
- Food technology

CHEMICAL ENGINEERING

CF510 Batch Distillation Unit

CF511 Continuous Distillation Unit NEW

This apparatus demonstrates the separation of a mixture. It is for comparison of plate and packed columns, determination the relationship between pressure drop across column and boil up rate, column efficiency and boil up rate at total reflux, manual control of reflux ratio as well as studying temperature profiles and mass balance across the system.



Computer Interface Display OPT

CF510 CF511

CF100 Liquid Sedimentation Apparatus

This apparatus is designed to study the settling characteristics and particle sizes of suspended solid as well as effects of suspension height and concentration on sedimentation rate and flocculent.

CF120 Deep Bed Filter Column

This apparatus is a demonstration unit for the water treatment with suspended particles by sand filtration used for understanding the principles of depth filtration, the relationship of filter differential pressure and flow rate, the observation of pressure drop against time as well as the demonstration of back washing.

CF101 Stirrer Mixing Tank
CF102 Fluid Mixing Tank

The mixing tank is for studying the mixing of solid/liquid suspensions or two immiscible liquids i.e., the visualizations of mixture and flow. The power/speed/torque of different impellers are displayed.

CF400 Kinetic Reactors in Series

This apparatus is designed for the study of multi stage mixing process, dynamic process of stirred tank reactors in series, chemical reaction and time constant using a dead-time coil as well as effect of flow rate

CF501 Fixed and Fluidized Bed Apparatus

This equipment is for studying the fluid bubbling phenomena (air and water) in the fixed and fluidized beds, visualizing of the fluidization, observing the difference between particulate and aggregate fluidization and verifying the Carman - Kozeny equation.

CF502 Fluidization and Heat Transfer

This apparatus is for studying the behavior of fluidized bed for various types of granular materials, the effects of superficial velocity, immersion depth, and granular size on the surface heat transfer coefficient, investigating the effect of distributor design on the bed behavior as well as demonstrating the separation by particle size and density.

CHEMICAL ENGINEERING AND FOOD TECHNOLOGY

UNIT OPERATION

CF520 Solid Liquid Extraction NEW

This apparatus designed to study the fundamentals of the separation process by the extracted soluble solid with solvent which is in liquid phase. The unit can run on multiple stage (maximum 3 stages) with batch and continuous operation also as the co-current, counter-current and cross-flow direction.

CF503 Gas Absorption Column

This equipment is for studying the liquid-gas absorption principles in a packed column and determining including mass transfer coefficient, mass balancing and hydrodynamic characteristics of a packed column.

PROCESS CONTROL

CF301 Flow Control Trainer NEW
CF302 Level Control Trainer
CF303 Pressure Control Trainer
CF304 Temperature Control Trainer

This apparatus is fully integrated educational process control experiments for flow, level, pressure and temperature. These parameters can be controlled manually or automatically with proportional, integral and derivative (PID) control. The computer interface unit with software provides the ability to monitor and control all processes.

Computer Interface Display OPT

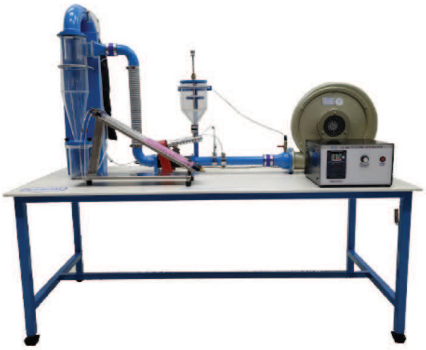
FOOD TECHNOLOGY

CF110 Filter Press Apparatus NEW

This apparatus is a demonstration unit for clarifying the intermediate products such as suspension water. Learning the principal of a plate and frame filter press, fundamental of cake filtration (Darcy's equation)

CF210 Tray Dryer

This apparatus is a basic unit for studying the tray drying by hot air and the effects of particle size, air velocity, air temperature through the drying curves.



CF200 Cyclone Separator

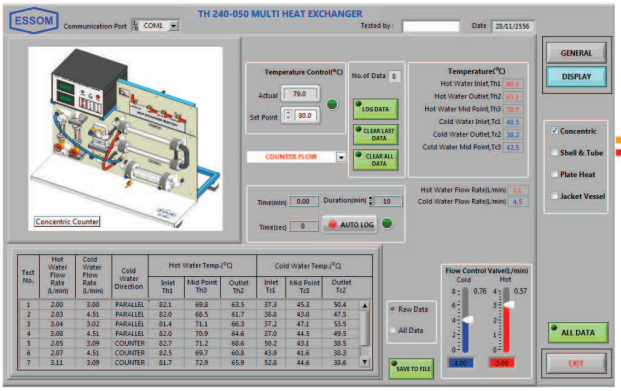
This apparatus is for studying the principle of two-phase flow by using a centrifugal blower the velocity profile of air and the material separation in the cyclone.

SOFTWARE AND MANUAL

COMPUTER SOFTWARE

Essom user friendly software's are designed for most of experiments to swift the experiment process. It also extends the power of practical training and can be suitably applied in e-learning, hybrid learning and classroom-based learning.

- Data collection
- Result analysis
- Data export
- Online/Offline operation



LEARNING SOFTWARE

This software supports both online/offline training with information on equipment description, relevant theory, experiment procedures, required calculations upon manually entering input data, analysis and printout.

OPERATING SOFTWARE

Computer Interface (Learning Software included); for significant parameter(s), data acquisition (capture, display, graph and/or data export) and sensor(s) instead of standard measuring instrument(s). WiFi feature for data logging and/or real-time display remotely on smartphone (iOS and Android) is used.

Computer Control (Computer Interface included); accessories are used in place of relevant manual adjustment with an additional software for equipment controls by computer.

There are cases where only some relevant live signals are available and some data are entered manually. This is called **Computer Assist**.

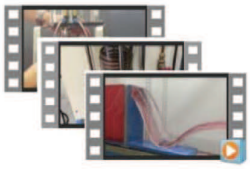
WiFi FEATURE

Most of our equipment are compatible with WiFi feature. With this Realtime display feature all measured parameters can be remotely visualized and stored on smartphones.

MANUAL

All ESSOM equipment is supplied with Instruction Manual which include the details Part 1 (Receipt of Goods, Installation and Commissioning), Part 2 (Product Information and Theory), Part 3 (Operation and Experiment Procedures); and Part 4 (Relevant Information).

Instruction Video



Instruction Manual

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There are useful technical specifications available in website. You can find and download all products.

ESSOM

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"Continuous improvement is our mission."

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