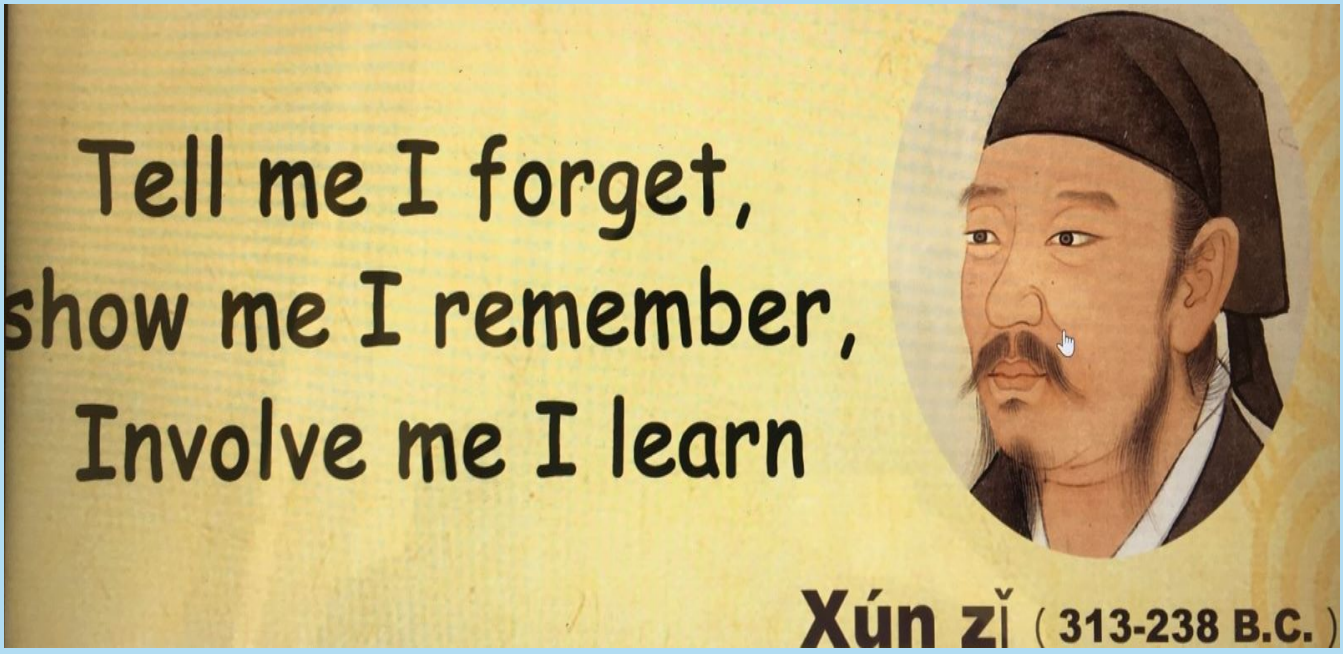
YOGECO CORPORATION
Scientific Equipment

PHYSICS

SMART LEARNING & SMART EDUCATION



2019

Ras Beirut-Caracas-Yacoubian Bldg.—Tel.: 01/ 352328 –Fax: 01/ 740080 P.O. Box: 14-5280 Beirut - Lebanon yogeco@cyberia.net.lb
رأس بيروت، كركاس، بناية يعقوبيان، بلوك A، هاتف : 01/352328 – فاكس: 01/740080 – ص.ب: 145280 المزرعة، بيروت 1105 2030 لبنان

مؤسسة **يوجكو**

Dear School Administrators and Teachers,

Since 1978, ***YOGECO Corporation*** *has been importing educational and scientific products from over 14 countries. These products include laboratory equipments, teaching aids, audio-visuals, multimedia equipments, specialized computers,* ***interactive whiteboards*** *and* ***LED displays****… **YOGECO Corporation** is also a leader in manufacturing furniture and benches for laboratories, classrooms as well as special blackboards.*

What differentiates ***YOGECO Corporation*** *is its high stocking level which assures quick, if not prompt deliveries; and in its aim to assure a long-term cooperation with its clients,* ***YOGECO Corporation*** *provides a distinguished after sales services and maintenance by a very specialized team of technicians.*

Kindly do not hesitate to contact us for any requirement and we assure you that we will do our best to satisfy you with our services, our prices and the quality of our products as well.

Sincerely yours,

YOUSSEF F. GEBRAN
General Manager

Chers Directeurs et Professeurs,

Depuis 1978, la société ***YOGECO*** *est au service de l'éducation comme importateur de produits scientifiques et éducatifs de plus de 14 pays différents, notamment des équipements de laboratoire, de tout genre de matériel d'enseignement et d'audiovisuels, de multimédia durcis, de* ***tableaux*** *et* ***affichage LED interactifs*** *et de bien d'autres. Aussi, la société* ***YOGECO*** *a gagné une renommée remarquable dans la fabrication de mobilier scolaire, de paillasses de laboratoire ainsi que des tableaux muraux.*

La quantité considérable de matériels disponibles en stock nous permet une livraison presque immédiate de tous les besoins de nos clients avec un service après-vente efficace et rapide dirigé par un groupe de techniciens hautement qualifiés.

Restant à votre disposition pour satisfaire tous vos besoins en vous offrant les meilleurs services avec des rapports qualité prix uniques,

Sincèrement,

YOUSSEF F. GEBRAN
Directeur Général

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Data-Logger

NEW PRODUCT

9 sensors in ONE device!
All-in-One Interface!

User Guide

	Sensor List	Input Range	Resolution
①	RGB Color	1 to 65535 counts 4 Channels (RGB and C)	1count
②	Light	1~188,000 lux	0.1 lux(22bit)
③	UV	0 ~ 11 UV index	0.1 UV index
④	Heart Rate	0 ~ 250 BPM	1 BPM
⑤	Tri-axial Acceleration	±2g, ±4g, ±8g 3 Channels (X/Y/Z)	0.004g (±2g)
⑥	Magnetic Field	-4 to 4 gauss	0.0002 gauss (16 bit)
⑦	Humidity	0 ~ 100%RH	0.01%RH (14bit)
⑧	Temperature	-40℃ ~ 70℃	0.0625℃ (12bit)
⑨	Barometer	300 ~ 1100 hPa	0.01hPa (16bit)

Features

● 9 sensors are embedded

You can use 9 sensors to do several kinds of experiments in Physics, Chemistry, Biology and Earth Science.

● Easy Wireless Connection

You can connect 'Smart Sensor Box' with any devices like PC, Laptop, Smart Phone, Tablet PC, etc. by Bluetooth. Therefore, you can do many kinds of experiment without cable and you manage the device easily.

● Extra 4 more sensors what you want

If you need other sensors, you can connect upto 4 sensors by cable, and then you can do more experiments.

● Provide FREE Data Analysis Program 'Science#' for Windows and Android

You can download 'Science#' for Android from Google Play Store and our website for Windows. It is FREE!

Science# (Data Analysis Program) is working on Windows and Android OS.
Windows OS (above Windows XP) -
All devices like PC, Laptop, Tablet PC except Windows Smart Phone
Android OS (above 4.0 version)
All devices like Smart Phone, Tablet PC
You can download "Science#" from Google Play Store.

User Guide

1. Press the power button more than 2 seconds and LED (Blue) will flash for the paring mode.
2. Connect Smart Linker 2 with Smart Devices by Bluetooth or USB cable.
3. Run the Data Logging program (Science#) and then proceed the experiment.
   If there is no activity or operation between Smart SensorBox and connecting device for 5 min, then it will turn-off automatically.

Specification

Input port	4 CH (Analog & Digital) ALL Korea Digital's sensors are compatible!
Sampling Rate	MAX. 1kHz (Bluetooth)
Network	Bluetooth (RF 2.4GHz), USB 2.0
Component	Sensor Cable 4 pcs Charing USB cable and manual

Battery	Li - polymer 2300Ah
Size	85 x 110 x 19 (mm), 125g
Charging Method	USB (500mA, 5V DC)

Data-Logger

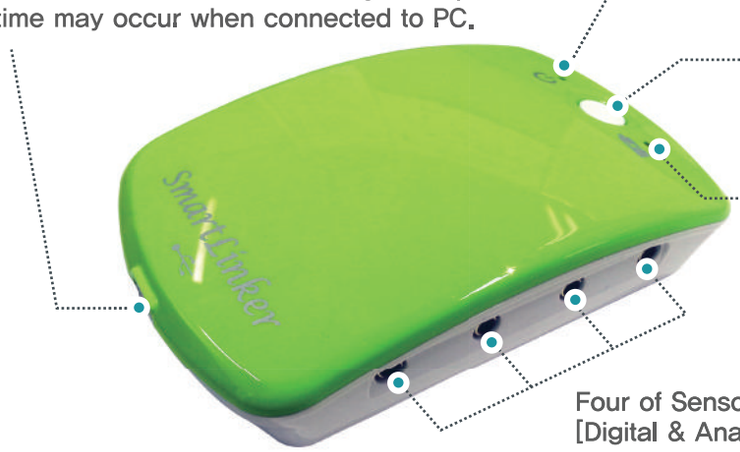
Smart Learning

Wireless Interface

USB mini port
Connect with USB Charger adaptor for charging and 4~5 hrs. are needed in order to charge fully for a complete dead battery. It is recommended to use the offered USB Charger adaptor as if longer charger time may occur when connected to PC.

Power LED (BLUE)
2 times/sec flash in case of Bluetooth fairing preparation mode Flash when measuring sensor data after Bluetooth connection

Power-On: Press longer than 2 sec.
Power-Off: Press longer than 3 sec.
Re-set: Press longer than 10 sec.

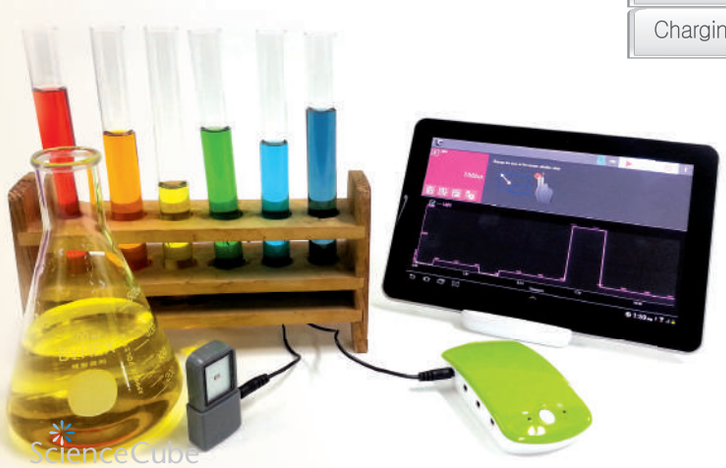


Charge LED (RED)
LED turns on when charging
LED turns off when charged fully

Four of Sensor Port
[Digital & Analogue]

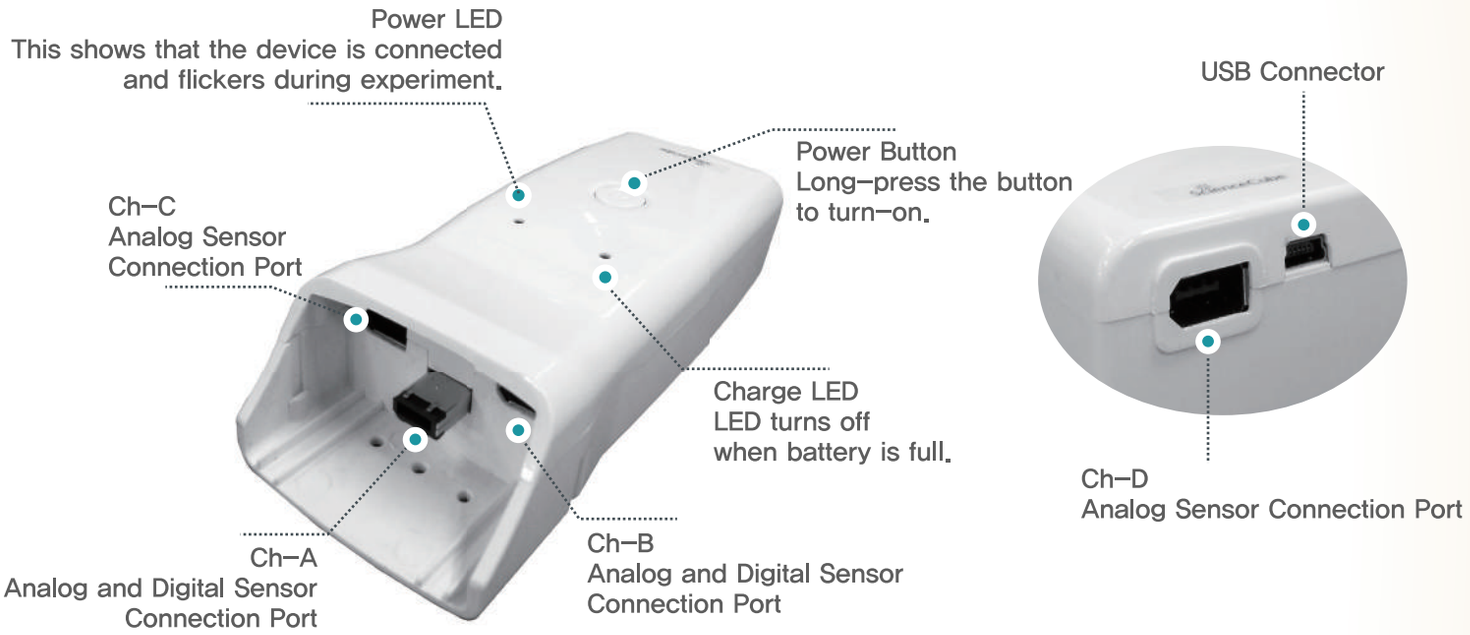
Smart Linker for SMBL

Sensor input port	4 FREE CH (Analog & Digital)
Connections	Wireless (RF 2.4 GHz) / USB 2.0
Sampling Rate	* Wireless - Up to 1,000 Hz (1 kHz) * Wire - Up to 10 kHz
Resolution	12 ~ 16 bit ADC
Battery	Li - polymer 2300mAh
Charging Requirements	USB port (MAX. 500mA @5VDC)



& Smart Education

Wireless Interface



Free Linker for MBL

Sensor input port	4 FREE CH (Analog & Digital)
Connections	Wireless (RF 2.4 GHz) / USB 2.0
Sampling Rate	MAX. 10 kHz / 1CH
Resolution	12 bit ADC
Battery	Li - polymer 1100mAh
Charging Requirements	USB port (MAX. 500mA @5VDC)

WIRELESS TEMPERATURE SENSOR WL 100T / -40 ~ +125℃

- Separation of the mixture
- Convection phenomenon
- Supercooling phenomenon
- Intermolecular gravitation
- Thermal equilibrium
- Thermal reaction
- Metal heat
- Radiant equilibrium
- The boiling point of pure matter and mixture

WIRELESS GAS PRESSURE SENSOR A WL 103P / -1,000 ~ +3,000 hPa

- Boyle's law/Charles's law
- The breathing of a yeast
- Cloud Creation Principles
- Response velocity by surface area
- The decomposition of hydrogen peroxide
- The solubility of a gas according to its temperature
- Response velocity according to the concentration of the acid

WIRELESS VOLTAGE SENSOR WL 101V / -15.0 ~ +15.0V

- Ohm's law (Relationship between voltage and current)
- Battery charge and discharge
- Series/Parallel connection of resistance
- The voltage of a solar cell

WIRELESS CURRENT SENSOR WL 102C / -3.0 ~ +3.0A

- Ohm's law (Relationship between voltage and current)
- Resistance according to length and width of technical pencil lead
- Creating an Electric Circuit
- Series/Parallel connection of resistance

SCIENCE CUBE

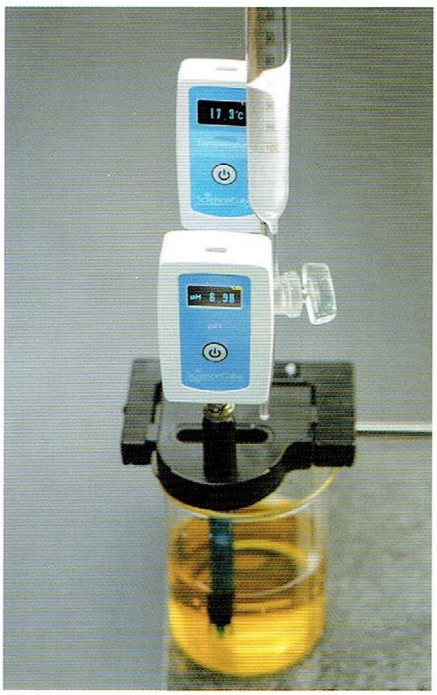
WIRELESS pH SENSOR — WL 104pH / 0 ~ 14pH

- The neutralization of acid and chlorine
- Acid rain research
- PH measurement of various solutions
- Variation of pH values during chemical reactions
- Measurement of changes in pH through photosynthesis
- Water Quality Research in the river

WIRELESS FORCE SENSOR — WL 105F / −80 ~ +80N

- Hook's Law
- The synthesis of two forces
- The law of inertia
- TImpact and momentum
- Frictional force
- Action and reaction
- The principle of a lever
- Weight in the water (Buoyant force)

Display: 0.96" (128*64)
Battery: Li-Polymer 700mAh
Wireless: BLE 4.2
Wired: USB-C



Please download <Science #> from Google Playstore. (FREE)

ANDROID APP ON Google play

Experiment List for MBL Sensor

CODE	MBL Sensor	Experiment List
KDS-1001	Stainless Steel Temperature Probe	Boiling Point Freezing Point Temperature Change with Water Level Water Temperature Change by Electric Current Chemical Reaction & Thermal Energy Crystal Observation Experiment
KDS-1002	Thermocouple Probe	Temperature Measurement from various materials (Liquid nitrogen, Dry ice, Soybean oil, etc.) Combustion Flames Measurement. (Flame temperature, etc.) Research of condition change on materials
KDS-1002W	Thermocouple Probe (Wire type)	Experiment on the change of Bunsen burner inner flame temperature by different location Comparative experiment with other flame temperature Measurement on a melting point
KDS-1005	pH Sensor	pH Measurement Acidity Measurement according to liquid Acid Rain
KDS-1007	Magnetic Field Sensor	Fleming Law Lorentz Law Magnetic Field Change by Distance Magnetic Field Change by Surrounding Objects Magnetic Force Measurement Experiment from Solenoid and Helmholtz Coil Magnetic Field Experiment on Growth and Activity of Various Organisms Physical Motion Experiment (Cycle, Velocity Detection) by Strobo Timing
KDS-1008	Relative Humidity Sensor	Increase Production Rate by Relative Humidity Observation with Plants in Sealed Room When to Observe the Optimum Growth Condition in Greenhouse or Terrarium To check Frequent Electrostatic Occurrence Day
KDS-1009	Different Voltage Probe	Ohms Law Brightness Connection of Lights between Voltage and Bulb Voltage Measurement of Volta Battery Coil Experiment Fruit Battery Experiment Electric Energy Series and Parallel Circuit Experiment
KDS-1010	Current Probe	Coil Experiment Ohm's Law Electric Energy Circuit Experiment on both Series and Parallel
KDS-1012	Microphone	Research on a wavy pattern of voice according to a pitch and amplitude Comparison on a wavy pattern of instrument Comparison on a wavy pattern of tuning fork Sound Speed Measurement from reflection of sound in tube Decision on cycle or pitch of sound by analyzing a sound wavy pattern Analysis by high FFT
KDS-1013	Sound Level Meter	Research about Noise block of Street Sound Measurement in Classroom Comparisons from Noise Units
KDS-1014	Accelerometer 5G	Acceleration Measurement in elevator Gravity Acceleration Measurement of the Earth Newton's Second Law Verification Acceleration Measurement effect on cart or certain material Spin Acceleration Measurement on spinning material Acceleration Measurement while bungee jumping
KDS-1016	Barometer	Change of air pressure during a day
KDS-1017	Turbidity Sensor	Turbidity Measurement for the lower and upper reaches of a river Turbidity change for sunny day and after rainy day
KDS-1020	CO_2 Gas Sensor	Carbon Dioxide Amount Measurement in Classroom Carbon Dioxide Change Observation during Photosynthesis of Plant Carbon Dioxide Change Observation during Cellular Respiration of Plant Carbon Dioxide Amount Measurement by Chemical Reaction with Hydrochloric Acid and Sodium Hydrogen Carbonate Increase rate of Carbon Dioxide Amount by Small Organisms like Insects or Bugs
KDS-1022	Dissolved Oxygen Prove	Comparisons of Dissolved Oxygen Amount on Drinking Waters Reduction Change Measurement of Oxygen Amount in Breathing

CODE	MBL Sensor	Experiment List
KDS-1023	Photogate	Speed & Acceleration Measurement with Straight-line Motion Object Cycle Measurement of Simple Pendulum Motion Calculation of Velocity, Acceleration, and more by measuring time intervals of moving objects among Photogates and connect by Daisy-Chain method with several photogates Gravity Acceleration Measurement from Motion of Free-Fall Movement Observation of Stopped Object Act on Drop Coefficient of Neutralization Titration by utilizing Event Experiment
KDS-1029	Dual Range Force Sensor II	Friction Simple Harmonic Motion Experiment of Force and Impact with collision Centripetal Force Hooke's Law Newton's Second Law Force Measurement for pick up objects by using a simple device
KDS-1031	Pt Stainless Steel Temperature Probe	Boiling Points from various materials Freezing Points from various materials Temperature Change with Water Level Water Temperature Change by Electric Current Chemical Reaction & Thermal Energy Crystal Observation Experiment
KDS-1032	Gas Pressure Sensor B	Yeast Breath Transpiration Gas Reaction
KDS-1033	Photometric Light Sensor	Relation between Voltage and Brightness of Light Light Role for Photosynthesis(by different levels of Light Intensity) and Transpiration Weather Research by Sunrise, Sunset Measurement Light Intensity from Distance Polarized Filter Experiment
KDS-1034	Gas Pressure Sensor A	Boyle's Law Charle's Law Breath Velocity Measurement of Germinated Bean Pattern Research of Human Breath by Using Breath Analyzer
KDS-1035	Galvanometer	Making Battery (Coin Battery, Fruit Battery) Electrolyte and Ions (Current Flowing Object) Current Reaction (Electricity)
KDS-1037	High Concentration CO_2 Sensor	Carbon Dioxide Amount Measurement of chemical reaction or combustion experiment Density change of carbon dioxide according to human respiration
KDS-1038	Conductivity probe	Conductivity Measurement on Different Concentrations of Electrolyte Solutions Conductivity Measurement on Surrounding Solutions like Acid Rain, Polluted Water
KDS-1039	ORP Sensor	Comparison on Oxidation-Reduction of Surrounded Environment like in Rainwater, Stream, Lake, etc. Optimal Potential Difference Comparison for the Oxidation-Reduction on Drinking Water Equilibrium Point Finding
KDS-1040	EKG Set	P, Q, R, S, T Wave Research Heartbeat Measurement after Exercise Heartbeat Check on Various Poses Abnormal Diagnosis of Coronary Sickness (Angina, Myocardial Infarction), Arrhythmia, Electrolyte
KDS-1041	Video Capture Camera	Motion Measurement of material and Research on exercise condition
KDS-1042	Motion Sensor II	Pendulum Movement Motion of Free Fall Distance Measurement from Straight-line Motion Object Movement of Cart on Track Simple Harmonic Oscillator on Spring as like Pendulum Motion of Bounce Ball
KDS-1044	Colorimeter II	Beer-lambert law Measurement for concentration of an unknown solution Photosynthetic experiment
KDS-1045	Blood Pressure sensor	Maximum and minimum of blood pressure, and heart beat Measurement Contraction Measurement and relaxation of pressure Relation with heart beat and pressure signal Measure blood pressure change and heart rate change Influence on pressure by the process of digestion compare pressure with smoker and non-smoker
KDS-1046	Heart Rate Monitor	Comparative experiment on heart rate among people. Heart rate Measurement during, after, and before exercise Time Measurement to recover heart rate after exercise Heart rate Measurement after or before eat (Coke or coffee)

CODE	MBL Sensor	Experiment List
KDS-1047	Oxygen Gas Sensor II	Oxygen Amount Measurement in Classroom Oxygen Amount Change Observation during Photosynthesis of Plant Oxygen Reduction Measurement in Small organisms like Insects, Bugs Oxygen Amount occurrence Measurement during Hydrogen Peroxide decomposition by Catalase Oxidation Measurement of metal and Iron
KDS-1048	Accelerometer 25G	Acceleration Measurement from collision Relation Research of Acceleration rate on acceleration measurement, cycle, radius and mass, etc. of horizontal spinning material. Acceleration Measurement of vertical spinning material Acceleration Measurement Research from knee bending and stretching during jump after connecting accelerometer sensor to human body.
KDS-1049	Spirometer	Breathing condition on positions Relations of airflow and capacity of lung Breathe Comparisons according to exercise in different condition
KDS-1051	Stethoscope	Comparisons on heart rate between human and animal. Comparisons on heart rate between stability and exercise condition.
KDS-1053	Balance 1	Mass measurement of Object
KDS-1054	Balance 2	Mass measurement of Object
KDS-1055	Salinity Sensor	Salinity Comparison from Freshwater to Sea Water Salinity Measurement on Salt Water Salinity Comparisons on Drinking Water, Beverages Salinity Comparisons on Surrounded Environment Water like Rain, River, etc.
KDS-1056	Respiration Monitor	Breath Comparisons before and after exercise Breath Comparisons with positions
KDS-1057	Radiation Monitor II	Radiation Measurement Half-life Measurement Intensity Measurement on Blackout Curtain Types
KDS-1059	Magnetic Field Meter	Magnetic field comparisons occurred from various electronics
KDS-1061	Absolute Pressure Sensor Ion Selective Electrode	Measurement of chemical reaction rate Ideal gas equation (Boyle's law, Charle's law) Research of Steam pressure according to temperature Measurement hard water (calcium ion): check amount of mineral on sample of fresh water
KDS-1063	Magnetic Field Sensor II	Magnetic field Comparisons by the number of times for a winded coil N-pole and S-pole finding Magnetic field by current Helmholtz Coil magnetic field Magnetic field Comparisons with distance
KDS-1064	Calcium Ise Probe	Measurement nitrate: sample of sewage or manure
KDS-1065	Ammonium Ise Probe	Measurement salinity and chloride of sea: measurement chloride concentration and salinity of sample of sea.
KDS-1066	Nitrate Ise Probe	Measurement ammonium: when water flows from manure of soil
KDS-1067	Chloride Ise Probe	Measurement milk in calcium: after skim off the film of the top, measure calcium in milk.
KDS-1068	Oscilloscope Probe	
KDS-1069	Heart Rate Monitor(hand-grip type)	Comparative experiment on heart rate among friends Comparison heart rate after or before exercise Comparison heart rate after eat
KDS-1070	Heart Rate Monitor (Ear-clip type)	Comparative experiment on heart rate among friends Comparison heart rate after or before exercise Comparison heart rate after eat
KDS-1071	Rotary Motion Sensor	Pendulum motion Rotary motion Angular speed measurement
KDS-1072	Drop Counter	Acid-base Experiment Electrical conductivity Experiment
KDS-1073	Rotary Motion (Digital Type)	Moment of inertia Torque
KDS-1076	Weather Sensor	Making power curve of Small wind turbine Solar hybrid system efficiency Comparisons from AC generator with wind generator turbine
KDS-1077	UV Sensor	UV Comparison with plastic and glass UV Comparison with sunny and rainy day UV Comparison with sunblock and effect
KDS-1078	Charge Sensor	Charging Measurement by friction, touch, motivation Electricity Measurement of (+) and (-) Faraday experiment

Experiment List for SMBL Sensor

Code	SMBL Sensor	Experiment List
C18C	Smart Temperature (length : 180mm)	Boiling Point Freezing Point Temperature Change with Water Level Water Temperature Change by Electric Current Chemical Reaction & Thermal Energy Crystal Observation Experiment
C23C	Light	Relation between Voltage and Brightness of Light Lights Role for both Photosynthesis(by Light Intensity) and Transpiration Weather Research by Detecting Sunrise, Sunset Light Intensity with Distance Polarized Filter Experiment
C38A	Triaxial Acceleration	Newton's Second Law Viking's Movement Parabola Movement Gravitational Acceleration
C39B	Color	Photosynthesis Quantity by Wavelength
C4DA	Air Temperature	Temperature Changes for a Day Temperature Changes of Atmosphere
C77A	Barometer / Temperature / Altitude	Change of Thermocouple metric pressure in a day
Z1DF	Force	Friction Simple Harmonic Motion Experiment for Force and Impact with Collision Centripetal Force Hooke's Law Newton's Second Law Force Measurement for Pick Up Objects by Using a Simple Device
K1EA	Photogate	Speed & Acceleration Measurement with Stright-line Motion Object Cycle Measurement of Simple Pendulum Motion Velocity, acceleration calculation by measuring time intervals of moving objects among photogates by connecting Daisy-Chain method with several photogates Gravity Acceleration Measurement at Motion of Free-Fall Movement Observation of Stopped Object Act on Drop Coefficient of Neutralization Titration by Utilizing Event Experiment
K1FB	Motion	Pendulum Movement Motion of Free Fall Distance Measurement of Straight-line Motion Object Movement of Cart on Track Simple Harmonic Oscillator on Spring as like Pendulum Motion of Bounce Ball
Z13A	Relative Gas Pressure [A]	Boyle's Law Charle's Law Breath Velocity Measurement of Germinated Bean
Z14A	Relative Gas Pressure [B]	Yeast Breath Transpiration Gas Reaction
K25A	Sound Spectrum / SPL	Research about Noise block of Street Sound Measurement in Classroom Comparison in Noise Units
K2AA	Stethoscope	Comparison of Heartbeat from Human and Animal Comparison of Heartbeat for Stability and Exercising State
K2BA	Chest Belt Heart Rate	Heart rate Measurement after Exercise Heart rate Measurement by Various Positions
Z28A	EKG	Wave Research about P, Q, R, S, T Hear beat Measurement afterward Exercise Heartbeat Check on Various Poses Diagnosis in the Stranges; Coronary Sickness (Angina, Myocardial Infarction), Arrhythmia, Electrolyte

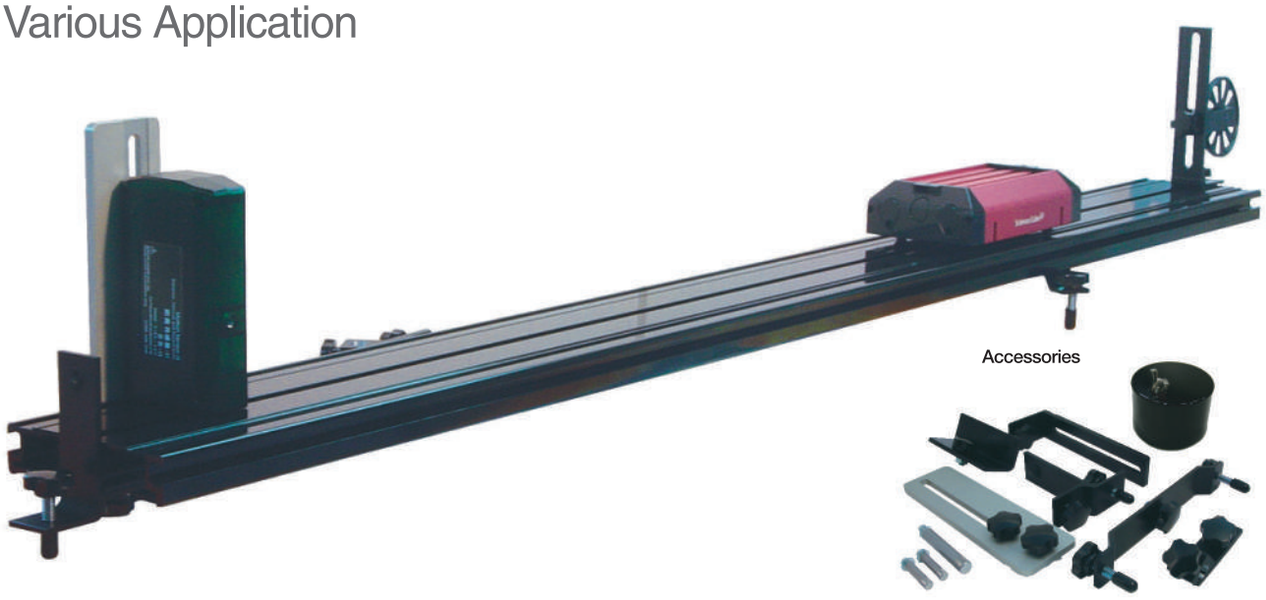
Experiment List for SMBL Sensor

Code	SMBL Sensor	Experiment List
K3BB	Oxygen (O2)	Oxygen Amount Measurement in Classroom Oxygen Amount Change Observation during Photosynthesis of Plant Oxygen Reduction Measurement in Small organisms like Insects, Bugs Oxygen Amount Occurrence Measurement during Hydrogen Peroxide decomposition by Catalase
K3CA	Radiation Monitor	Radiation Measurement Half-life Measurement Intensity Measurement on Blackout Curtain Types
K31A	pH	pH Optimal Acidity Measurement on Liquid Types Acidity Rain
K32A	Dissolved Oxygen	Comparison with Dissolved Oxygen Amount on Drinking Waters Reduction Change Measurement of Oxygen Amount in Breathing
K33A	Conductivity	Conductivity Measurement on Different Concentrations of Electrolyte Solutions Conductivity Measurement on Surrounding Solutions like in Acidity Rain, Polluted Water
K34A	ORP	Comparison on Oxidation-Reduction of Surrounded Environment like in Rainwater, Stream, Lake, etc. Potential Difference Optimal Comparison for the Oxidation-Reduction on Drinking Water Equilibrium Point Finding
K36A	Salinity	Salinity Comparison of Freshwater to Sea Water Salinity Measurement of Salt Water Salinity Comparison on Drinking Water, Beverages Salinity Comparison on Surrounded Environment Water like Rain, River, etc.
Z47A	K-Temperature	Surface Flame, Inner Flame Temperature Changes by Height
K50A	Humidity / Temperature / Dew Point	Increase Production Rate by Relative Humidity Observation with Plants in Sealed Room When to Observe the Optimum Growth Condition in Greenhouse or Terrarium To check Frequent Electrostatic Occurrence Day
Z60F	Voltage	Ohms Law Brightness Connection of Lights between Voltage and Bulb Voltage Measurement of Volta Battery Coil Experiment Fruit Battery Experiment Electric Power Circuit Experiment of both Series and Parallel
Z61F	Current	Coil Experiment Ohm's Law Electric Energy Circuit Experiment on both Series and Parallel
Z62F	Galvanometer	Battery Making (Coin Battery, Fruit Battery) Electrolyte and Ions (Make Current Flowing Object) Reaction of Current (Electricity)
Z64B	Magnetic Field [B]	Fleming Law Lorentz Law Magnetic Field Change by Distance Magnetic Field Change by Surrounding Objects Magnetic Force Measurement Experiment from Solenoid and Helmholtz Coil Magnetic Field Experiment on Growth and Activity of Various Organisms Physical Motion Experiment (Cycle, Velocity Detection) by Strabo Timing
K3AA	Carbon Dioxide (CO_2)	Carbon Dioxide Amount Measurement in Classroom Carbon Dioxide Change Observation during Photosynthesis of Plant Carbon Dioxide Change Observation during Cellular Respiration of Plant Carbon Dioxide Amount Measurement by Chemical Reaction with Hydrochloric Acid and Sodium Hydrogen Carbonate Increase rate of Carbon Dioxide Amount by Small Organisms like Insects or Bugs
K55A	Weather / Anemometer / Dew Point	Weather Change for a Day Wind Strengths between Buildings Wind Power Generator
Z65F	Oscilloscope	Voltage of Solar battery Capacitor
C42A	Smart GPS	Location Information of Experiment Place Moving Route of Bicycle

SCS-500

Multi-Functional Dynamics System

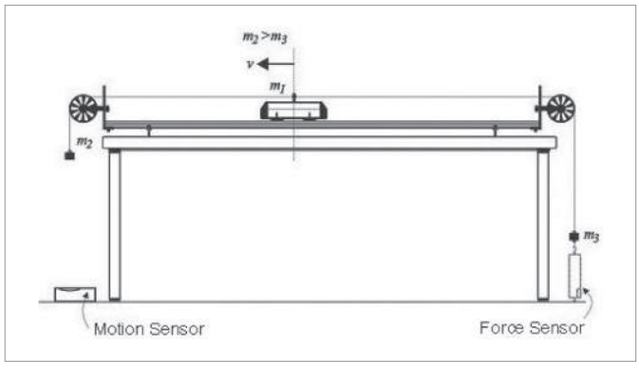
Low Friction, Diverse Accessories, Various Application



Accessories

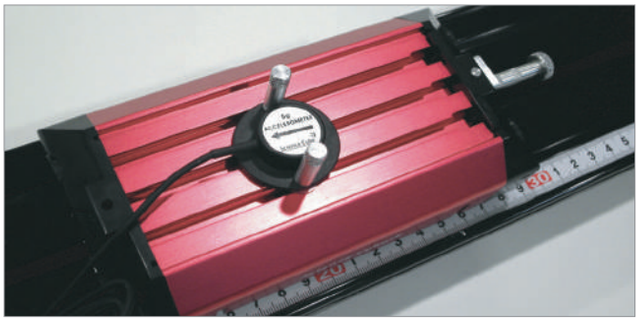
The Multi-Functional consists of a 1.2m track, two carts, and related accessories. The system is designed for use in physics and physical scientific experiments. Dynamics system enables more accurate and precise experiment by minimizing friction. Sensors like Motion sensor, Force sensor, Photogate, Accelerometer etc. can be adopted to measure exact data.
Some typical experiments done with the system and include

- Newton's law
- Conservation of Energy
- Uniform Motion
- Spring Constant
- Motion under constant acceleration
- Inelastic collisions and elastic collision

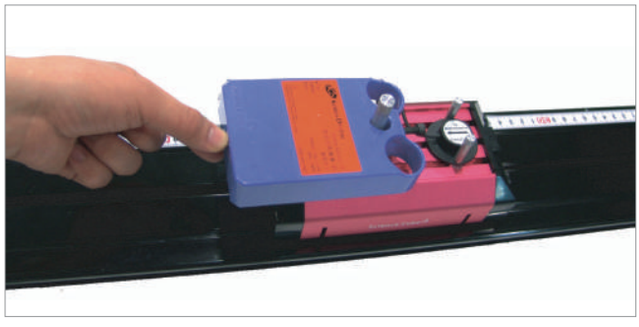


Determination of mass on an incline

APPLICATION



Accelerometer on Dynamics cart



Newton's Second Law

Lap Equipment

SCS-700

Gas Volume Package

1. Description

Gas volume Package (SCS-700) is designed to register gas temperature and measure gas volume. This package has to be connected to Data Logger and computer. Gas Volume Package can be used in elementary,middle,high school and also general physical, chemical laboratories.

2. Specification

- Range: 0ml (350ml) ~ 400ml (850ml)
- Error: under 63%
- Gas Temperature Range: 0˚C ~ +80˚C
- Error on measuring temperature : under 62%
- Dimension : length - 410 mm
  width - 90 mm
  height - 100 mm
- Length of cable : 120 mm
- Weight : 300gr

SCS-800

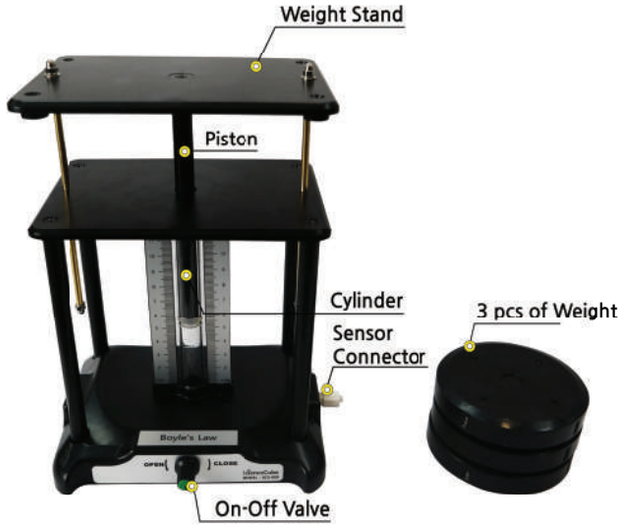
Boyle's Law Package

1. Description

Boyle's Law Package (SCS-800) is designed to explore the elastic properties and volume / pressure relationship how the pressure of a gas tends to decrease as the volume of a gas increases.
This package has to be connected to Data Logger and computer for the experiment.
Boyle's Law Package can be used in elementary, middle, high school and also general physical, chemical laboratories.

2. Composition

Dimension: 180 X 130 X 170 (mm)



SCS-600

Gate Timer Package

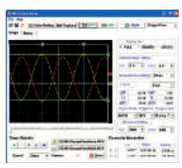
Gate Timer Package detects a period of reciprocation. This package shows the period directly without interface or computer. The photogate in this package adopts magnets so it can be attached on blackboards or rods.

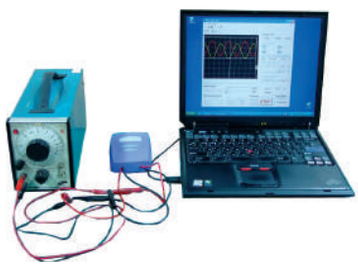
COMPOSITION

- Gate Timer
- 2 Photogates
- Sensor cable
- Manual

SCS-900

2CH Osciloscope



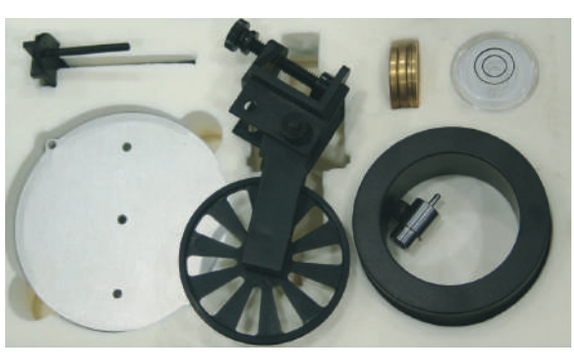


- 8 Bit ADC Resolution
- Simultaneous sampling on both channels.
- 200K S/s samplingrate (repetitive) 10K S/s native
- Analog Bandwidth 10KHz
- Maximum input voltage ±100V
- AC / DC Coupling
- Meter Displays - P.P / Frequency / Period
- Flexible Y-axis scaling (1mV~50V/ Div User Defined)
- Flexible X-axis scaling (10us~0.1s/ Div User Defined)
- Parameter Auto Save

The Oscilloscope is designed to observe waveform which is necessary in electrical experiment. The Oscilloscope measures voltage, phase difference of R-C or L-C circuit, AC voltage, period, frequency, the relationship between voltage and current, period and frequency, etc.

SCS-1200

Rotational Momentum Package



- Rotation Disk 1ea
- Mass 3ea
- Large Ring Mass 1ea
- Hanger 1ea
- Pulley with Clamp 1ea
- Level Meter 1ea

SCS-1000

Intelligent Timer Portable and Versatile stand alone type

The Intelligent Timer is an accurate, useful digital timer and measurement system for the student laboratory. The Intelligent Timer offers 0.1ms timing resolution and an easy to use memory function. The Intelligent Timer measures several types of events detected with sensors, including speed and acceleration using standard photogates. The Intelligent Timer features two input channels and a 2-line, liquid crystal display that indicates the operating mode and experimental results.

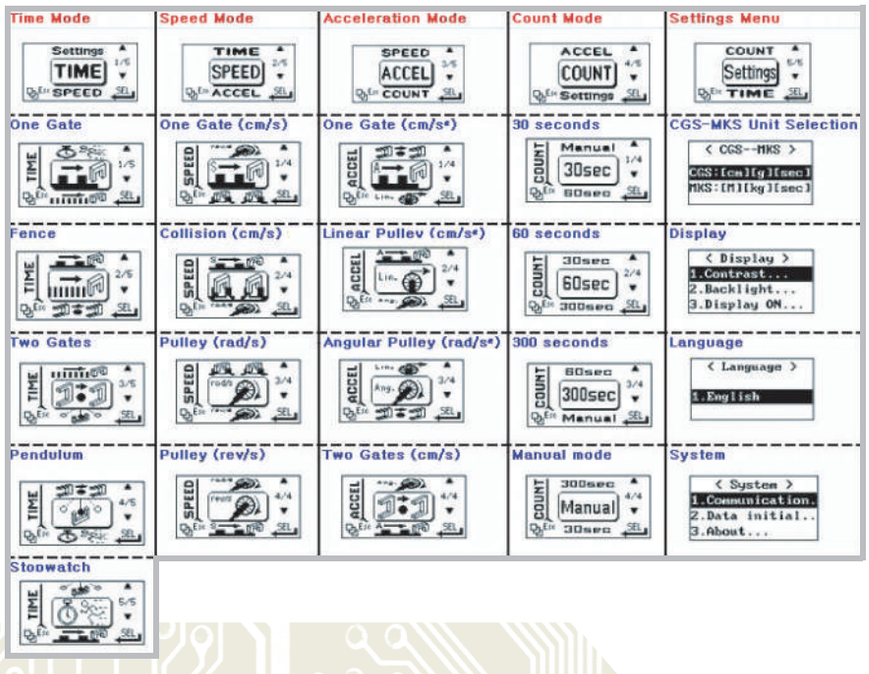
- Accurate & Useful Digital Timer for Laboratory
- Measures Time, Speed, Acceleration, Count with Photogates and Radiation Monitor
- Adopt wide LCD monitor to show the result instantly
- Easy & Simple operation

SCS-1000

EXPERIMENT LIST

- Gravity Acceleration
- Newton's 2nd Law
- Conservation of Momentum
- Counting Radiation
- Acceleration on an incline & decline
- Speed and Acceleration of an object

INTELLIGENT TIMER MODES



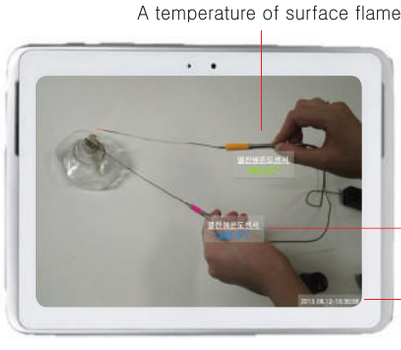
Data-Logging Program

Science# Program

ARCamera
(Augmented Reality)

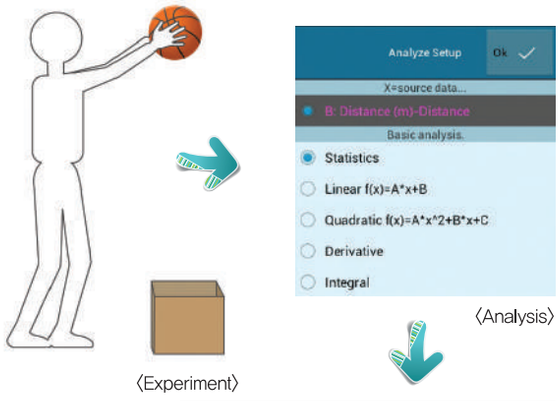
Recording Function

When you record the experiment by camera using by Science#, you can see the sensor's name and value on the screen of Tablet PC at the same time so that you are able to get the efficient data. In addition, you can check the result and experimental condition and expect a high quality education.



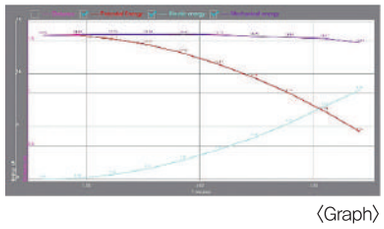
Science# shows results from sensors by detecting a color of Post-it.

Analysis based on contents



〈Analysis〉

〈Experiment〉



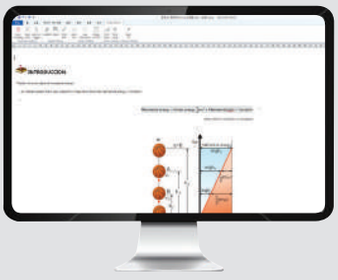
〈Graph〉

We have added physics formulas to a function of the formula menu. You will be able to do practically everything from calculating formulas to drawing graphs by touching the icon.

Contents Authoring TOOL

Apply to Science# &Making contents on MS-Word

MS-Word

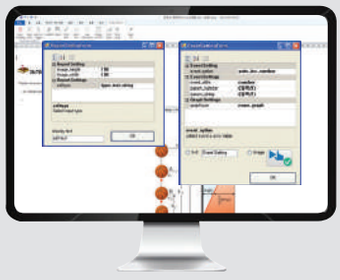


You are able to make contents by using Add-in function on MS-Word.

Science#

Students are able to share many contents that is made by other students or teachers through Science# contents Add-In function.

MS-Word



You are able to set up the experiment environment(Sensing gap, Measurement time, Data form) for data collecting in advance during contents making process.

NON-STOP

Science# (Data Analysis Program) is working on
Windows and Android OS.
Windows OS (above Windows XP)
All devices like PC, Laptop, Tablet PC except Windows Smart Phone
Android OS (above 4.0 version)
All devices like Smart Phone, Tablet PC
You can download "Science#"from Google Play Store.

An experiment based on contents in Science#

You can use both contents in Science# and contents from the internet.
Collecting and analyzing data in Logger.

Making report

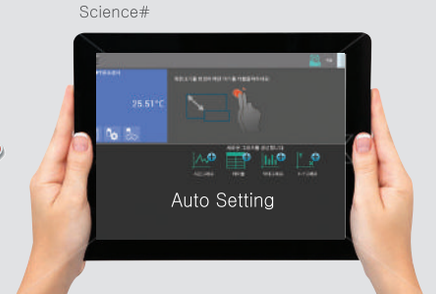
You can put the result of your experiment to a report by using the function of saving photographs and analysis data.

Teacher Evaluation

You can send a report to your teacher by using data sharing function. Then your teacher can evaluate your report promptly.

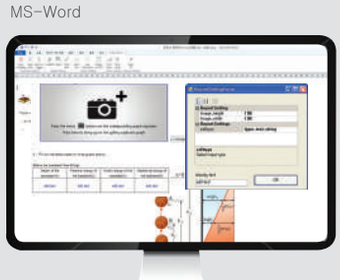
Science# for

Science#



Push auto-configuration button on Science# contents. Then your experiment environ-ment setting and data could be applied to Logger.

MS-Word



You can make a report for the result of an experiment. You can insert number-data input window or set up proper data form.

Science#

Students can write a report which is made for a subject of experiment. You can save a diversity type of experiment data as images. You also can write and register a learning concept by opening number or text input window.

Data-Logging Program

Science# for

Wireless Connection

You are able to connect Science# to an interface through wireless connection. Students are able to enhance their concentration level with Science# because they are free from cables.

Possible to use on any Android-based devices

You are able to use Science# by using an application which you are able to download on any Android-based devices.

Compatible with MBL, SMBL

Science# is a multi-functional Logger that can be used with all MBL and SMBL Sensors.

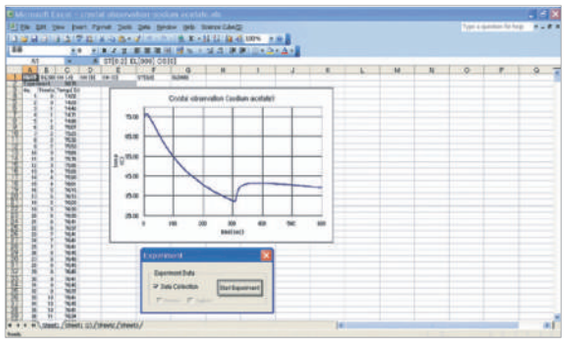
Contents Authoring TOOL is provided

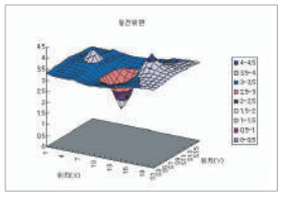
We provide the best optimized content experiments, where end-users can help use the logger with Add-In function in MS-Word.

- It is possible to connect ALL ScienceCube's interface and Data Logger for MBL and SMBL.
- It supports all Windows OS above Windows XP except Windows RT, Windows CE
- All data is compatible with Science# for Android 2.0 and it is easy and simple to share and transfer the data between Android and Windows.
- Multi-Functional wireless connection
- A variety of contents for Physics, Chemistry, Biology and Earth Science
- Experiment Environment Auto-configuration
- Automatic computing mathematical formula based on contents
- Easy GUI
- Non-stop system for the reporting
- Contents Authorizing tool based on MS-Words

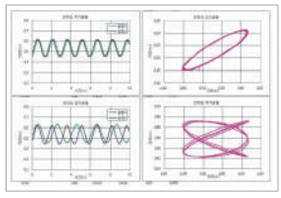
Excel Based Program MBL & SMBL

Now you can apply data-logging to excel program by installation ScienceCube® program in your computer simply. You can use Excel's powerful and easy function for making charts and graphs, controlling valuables, analyzing statistic. Also it's possible to work conversion, edition, sharing data. This program allows you make multi media report with Excel's original function.

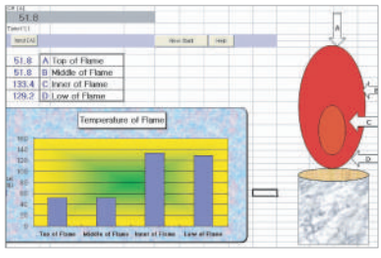




Free editing Excel Chart and graph



Easy data processing by using Excel's powerful function



Ready-made experiment sheet whth MACRO Function in Excel

Innovative Software
Advantage of Excel based program

- Simple operation :
  Beginner can learn how to operate the software without any trouble
- Powerful procession function :
  Can record and analyze data at the real-time
- Software's popularity :
  Can use to software as long as installing MS office program
- Software's utility :
  to attract student's attention, user could use a vivid color in on's table and it would help to improve student's interest

Application Softwares

Sound Wave Program Android device

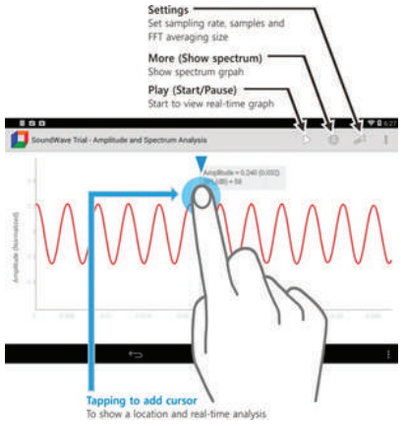
DESCRIPTION

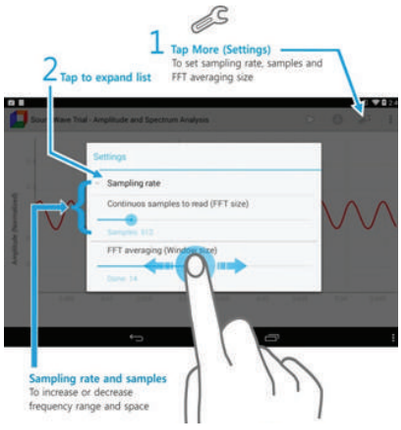
SoundWave Trial (Free) app brings real-time sound data visualization and analysis using just the built-in sound sensor for guided inquiry-based learning and teaching to your Android phone or tablet. This is a trial preview only for educational purposes that it may be used to help students to practice measuring and analyzing sound or learn about scientific methods with experimental investigation of acoustical phenomena in musical dynamics such as loudness, pitch and timbre, and harmonic tones.

FEATURES

Measuring and analyzing sound of musical instruments or the human voice:

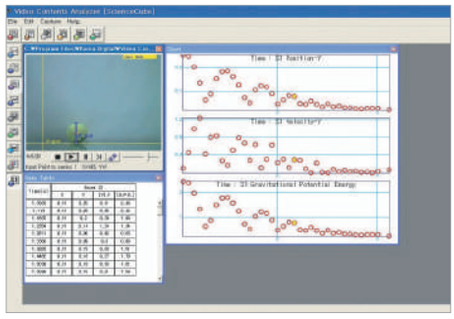
1. Measure sound data in real-time waveform and spectrum graph
2. Analyze audible sound data with fast and acc urate digital audio signal processing for Android
3. View amplitude resultant in dB scale, search peak frequency and more.





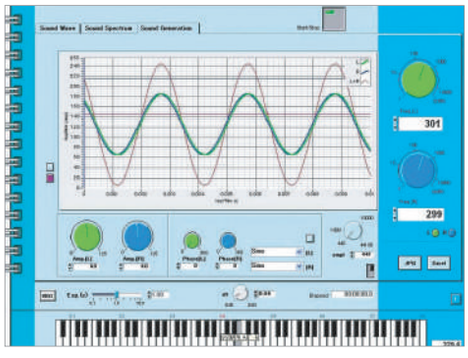
Video Contents Analyzer

Students can record movement of objects and analyze the data with VCA. This program makes it possible to chase and investigate the movement with tables and graphs. You can change any video files which you already recorded to our format file easily with this program. Input weight and dimension to calculate actual momentum, net force, kinetic energy, gravitational potential energy etc.



SOUND GENERATION - KEYBOARD INSTRUMENT

If you click Key board Instrument key, you can use the function. Click Start and experiment with keyboard. The red arrow shows the maximum frequency of peak frequency. This function is available in Sound Wave and Sound Spectrum. You can compare the frequency with other instruments. If Keyboard Instrument is used in Sound Generation, it shows sound wave according to the frequency of the key.



Download SoundWave Trial App from Google Play Store

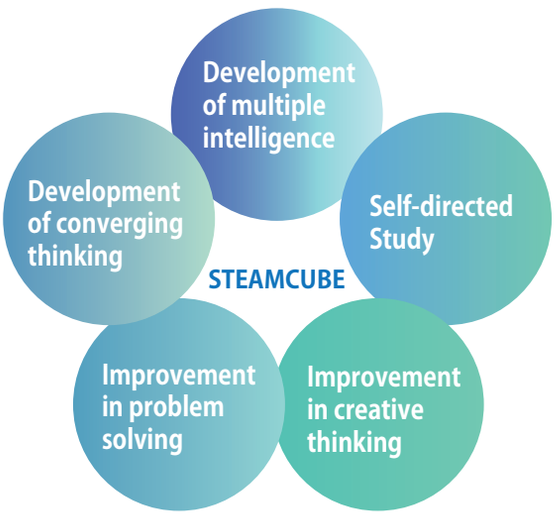
What is STEAMCUBE ?

It is a new kind of convergence science (STEAM) contents that allows students to produce models of engineering and mechanic products with assembling toys and then connect MBL (Microcomputer-based Laboratory) Sensor so they can find out physical quantity and understand science principles behind the products.

European Engineering Program + **Microcomputer-based Laboratory (MBL)**

- **Contents that combined block style models with MBL.**
- **Science experimental contents designed for STEAM, which converges science, engineering, technology and art.**
- **Generate motivation and interests in science education.**
- **Contents that can be used for special education with a broader and more intensive theme.**
- **Can be used as after-class program.**

Educational Effects of STEAMCUBE



Curriculum connection to STEAMCUBE (16 Models)

Principles of Solar Battery

Comparison of rotation speed according to intensity of light

- Wheel • Helicopter
- Bicycle's wheel.
- Ventilation Fan.
- Solar Battery Vehicle.

Electricity & Magnetism

- Ohm's Law. (Parallel resistance connection)
- Luminosity of light bulb according to resistance connection.
- Principle of micro-switch.
- ciple of electric motor.
- Principle of electric generator.

Wind Power Generator

- Comparison of voltage according to wind strength.
- Comparison of rotation speed according to number of wings.

Power & Motion

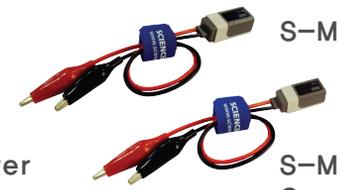
- Comparison of motion status according to slope angle.
- Change of centripetal force according to weight.

Work & Energy

- Kinetic & potential energy according to height.
- Mechanical energy according to friction.
- Fixed & Moveable Pulley.

Sensors for STEAMCUBE (Smart-MBL)

S–MBL Power

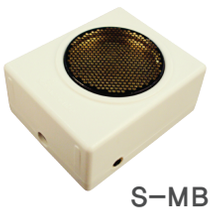


S–MBL Voltage

S–MBL Electric Current

S–MBL Magnetic Field

S–MBL Photogate



S–MBL Movement

S–MBL Illumination

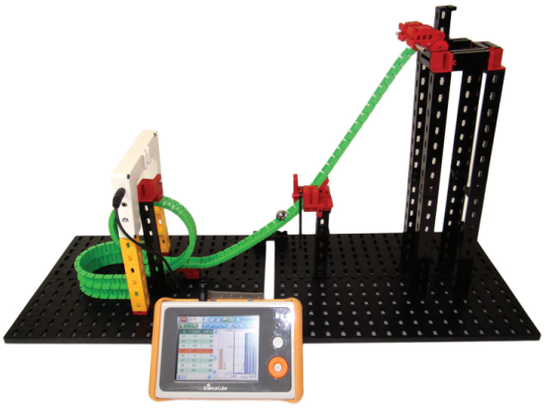
Above sensors can be used in various experiments other than STEAMCUBE

S-MBL Power	Strength of friction, measurement of buoyancy, combination of two powers, law of action & reaction, force according to tools and more.
S-MBL Movement	Motion of free fall, pendular movement, uniform motion, uniformly accelerated motion, motion of wheel on wet surface and more.
S-MBL Photogate	Measurement of simple pendulum, measurement of gravitational acceleration, neutralization titration experiments and more.
S-MBL Magnetic Feild	Magnetic field of magnet, magnetization, strength of magnetic field according to number of coil springs, magnetic field according to electric current and more.
S-MBL Illumination	Luminosity according to distance of stars, solar radiation energy according to elevation angle of the sun and more.
S-MBL Voltage & Electric Current	Ohm's Law, Serial & Parallel resistance connection, voltage according to length & area of resistance and more.

STEAMCUBE 16 Models

Wheel

How will voltage of solar batter and speed of wheel change according to intensity of light?

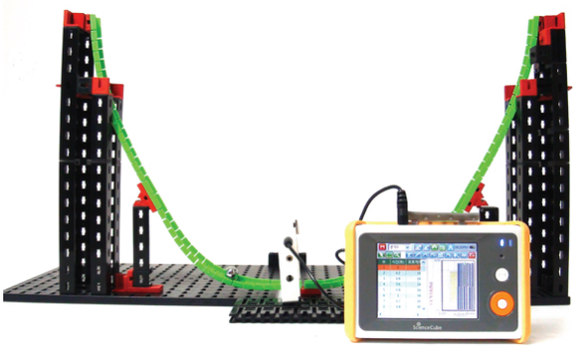


Roller Coaster I

How will kinetic & potential energy change according to place of steel ball?

Principle of electric motor

How will rotation speed of coil change according to strength of magnetic?

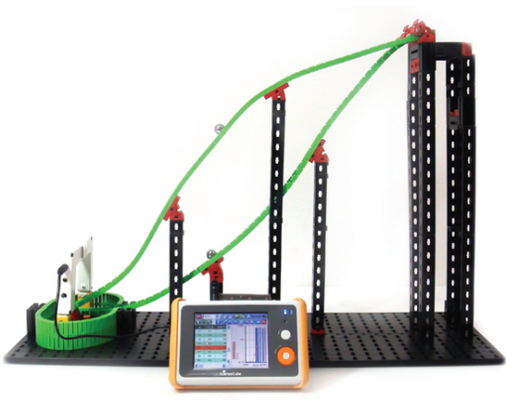


Roller Coaster II

How will the highest height of ball change according to friction surface?

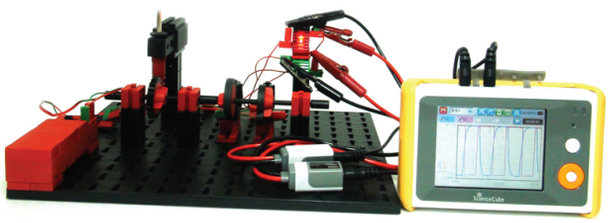
Helicopter

How will rotation speed of helicopter wings according to intensity of light?



Roller Coaster III

Race of two balls on different courses! Who will arrive first?

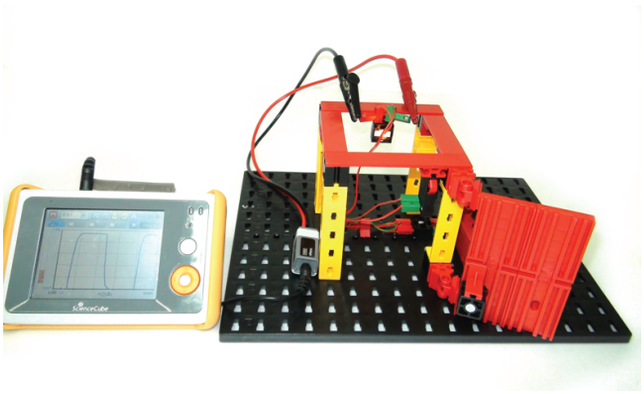


Traffic Light

Will Ohm's law realize in parallel resistance connection?

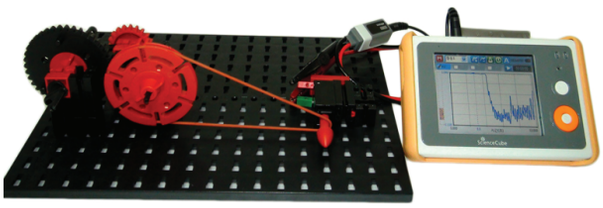
Giant Stride

Will height of giant stride change if weight changes?



Light of refrigerator

How will luminosity of electric bulb change according to serial resistance connection?

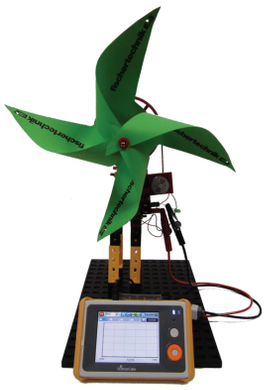


Principles of generator

Can I turn on light of bulb with electric energy that I made?

Solar battery vehicle

How will speed of solar battery vehicle change according to luminosity?



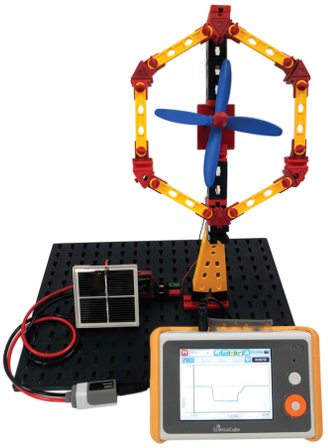
Wind Power Generator

What will be the differences in voltage according to wind strength?

STEAMCUBE 16 Models

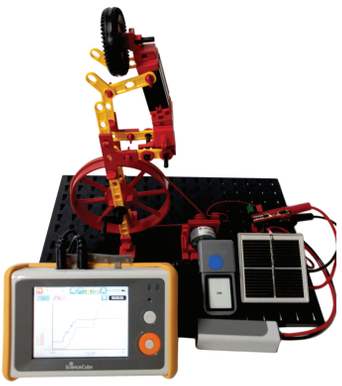
Pulley

What kind of effects will be produced by using fixed and moveable pulleys?



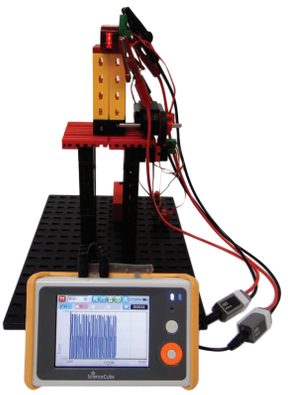
Ventilation Fan

How will the voltage of the solar battery and speed of ventilation fan change according to luminosity of light?



Person on bicycle

How will rotation speed of bicycle's wheel change according to luminosity of light?



Light on building

Let's learn about principles of micro–switch!

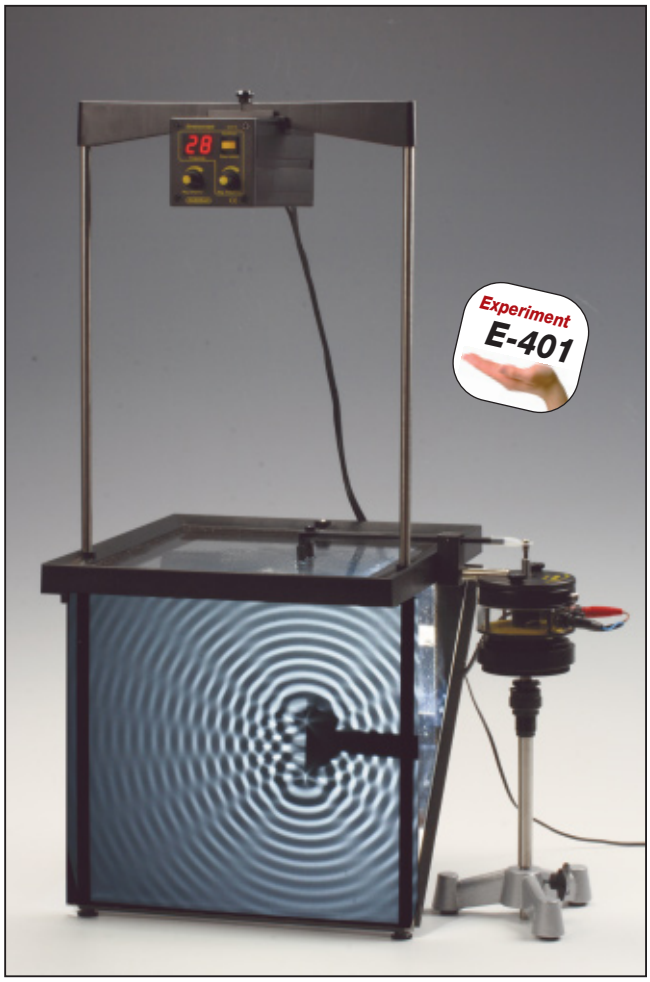
HOW to buy

- STEAMCUBE sets available for purchase(upto16 different sets)
- Each set is available for purchase separately.
- Each component can be purchased separately.
- Interface(mentor) and sensors can be sold separately.

STEAMCUBE Customer Line

02-2109-8880

www.koreadigital.com



Ripple tank

Whether you are dealing with the wave properties of light, electromagnetic waves, sound or other types of waves, their behavior is analogous to the behavior of waves on a water surface.

In a teaching situation water waves have the advantage of being visible and moving so slowly that students can observe wave phenomena directly.

By taking advantage of the optical properties of water waves, phenomena, can be enlarged and made visible on a screen.

The Ripple tank provides a dramatic demonstration of the general properties of waves and propagation phenomena.

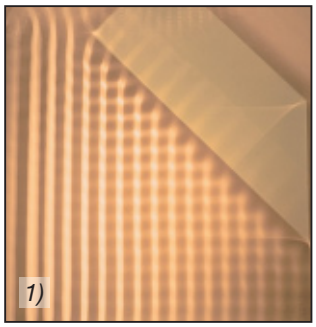
1) *Reflection and refraction. By using the linear dipper bar plane parallel waves can be produced. The waves exhibit reflection and refraction when appropriate barriers are used in the water tank.*

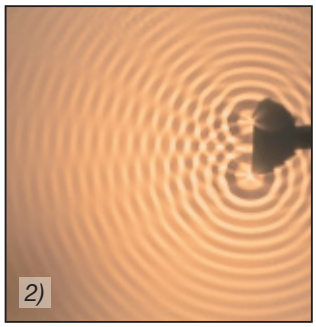
2) *Inteference phenomena occur when two point source dippers generate circular waves. The distance between the sources and their frequency can be regulated.*

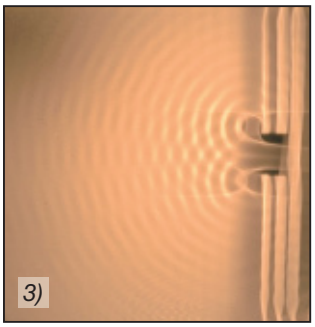
3) *Plane parallel waves form point wave sources when they encounter a double slit formed by three barriers.*

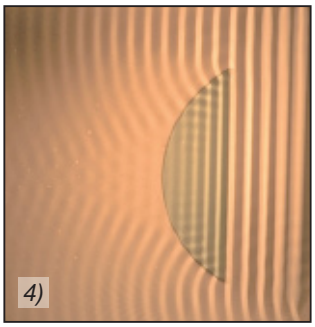
4) *The propagation velocity is dependent upon the depth of the water layer. The transparent lens cross section is covered by a shallow layer of water.*

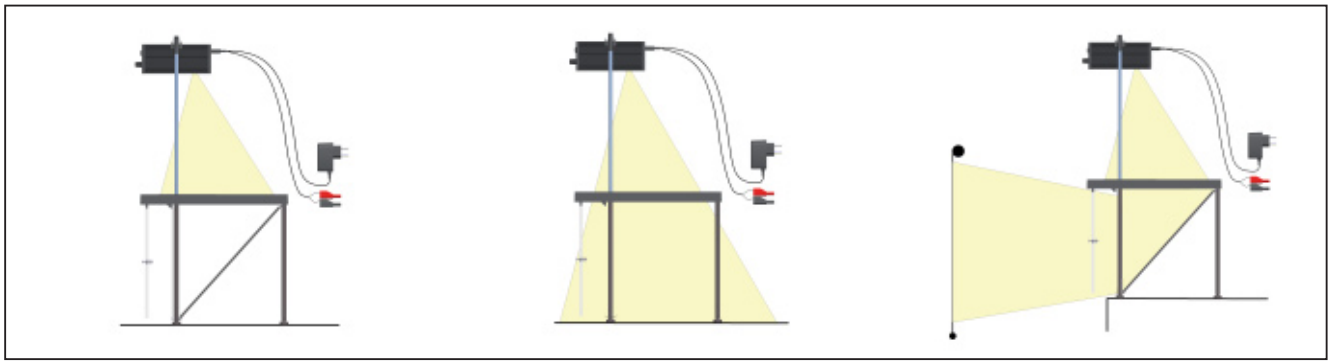
2211.00 Ripple Tank





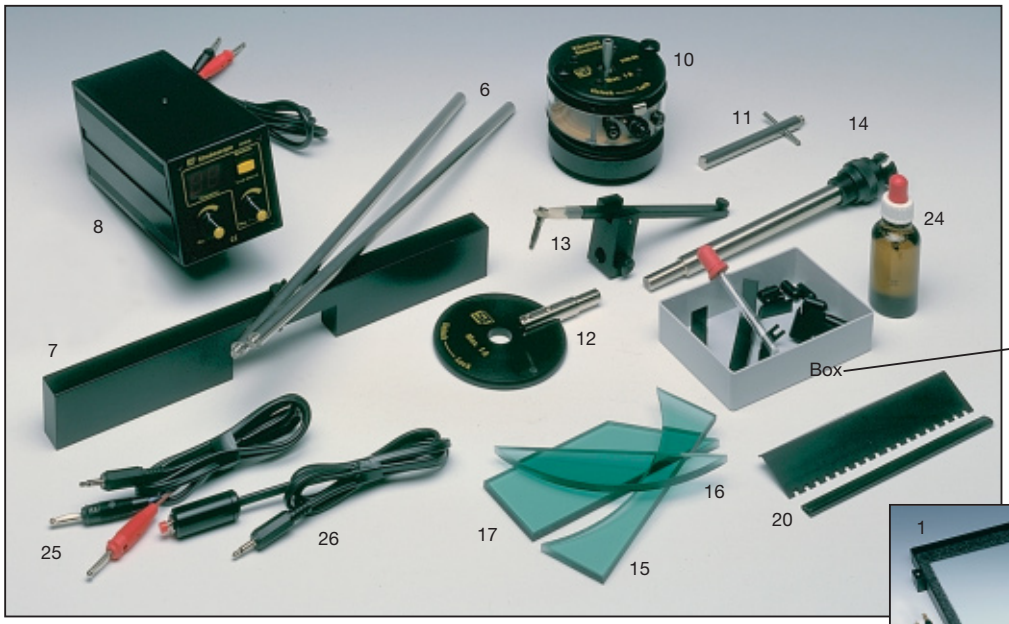




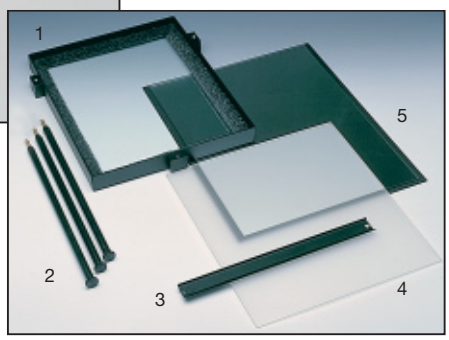


Projection

Intense illumination from the strobe light enables the images to be enlarged and projected using several techniques. On a table it is well-suited for group work e.g. in lab exercises. On a screen it is ideal for classroom demonstrations or lecture halls.



Content of box item no.:
18 – 19– 21 –22 – 23



The Ripple Tank comprises the following individual parts:

1) Ripple Tank (2210.33) . . . . . 1 pcs.
2) Detachable legs (2210,1013) . . 3 pcs.
3) Plate fitting (2210,1013) . . . . . 1 pcs.
4) Frosted glass plate (2210,5093) 1 pcs.
5) Mirror (2210,1011) . . . . . 1 pcs.
6) Fixing rods for Strobe-unit (2210.62) . . . . . 2 pcs.
7) Traverse f. Strobe-unit (2210.62) . . . . . 1 pcs.
8) Strobe-unit (2211.01) . . . . . 1 pcs.
9) Power Supply (3550.50) . . . . . 1 pcs.
10) Vibration Generator (2185.00) . 1 pcs.
11) Mounting pin 2185.06) . . . . . 1 pcs.
12) Holder for lever arm (2185.05) . 1 pcs.
13) Lever Arm w. pivot (2210.32) . . 1 pcs.
14) Height adjust unit (2185.07) . . .1 pcs.
15) Acrylic block, concave (2210.28) 1 pcs.
16) Acrylic block, convex (2210.29) 1 pcs.
17) Acrylic block, rectangular pcs. (2210.30) . . . . . 1 pcs.
18) Single dipper (2210.22) . . . . . 1 pcs.
19) Double dipper (2210.23) . . . . . 1 pcs.
20) Dipper for parallel waves w. plane wave attachment (2210.25) . . . 1 pcs.
21) Single dipper (unmounted) (2210,2202) . . . . . 5 pcs.
22) Barrier, long (2210.26) . . . . . 2 pcs.
23) Barrier, short (2210.27) . . . . . 1 pcs.
24) Pipette flask w. special solvent (2210.31) . . . . . 1 pcs.
25) Connection cable for Vibration Generator (1100.75) . . . . . 1 pcs.
26) Remote Control (1100.80) . . . . 1 pcs.

The ripple tank set is supplied complete in a fiber box segmented for storing the components and with complete user instructions.

2210.50 Ripple Tank, Complete

Electromechanical vibrator

The vibrator generates mechanical vibrations when used with a signal generator as e.g. catalog no. 2500.00 or 2501.50. The input signal is supplied to a coil which is mounted in a magnetic field from a cylindrical magnet. The unit is fuse-protected.
It is supplied with a lock which protects moving parts while changing accessories. It is supplied with mounting hardware, a string holder and extra fuses.
Max. input: 6 V/1A.
Dimensions: 100 mm diameter x 120 mm.
Mass: 1.26 kg

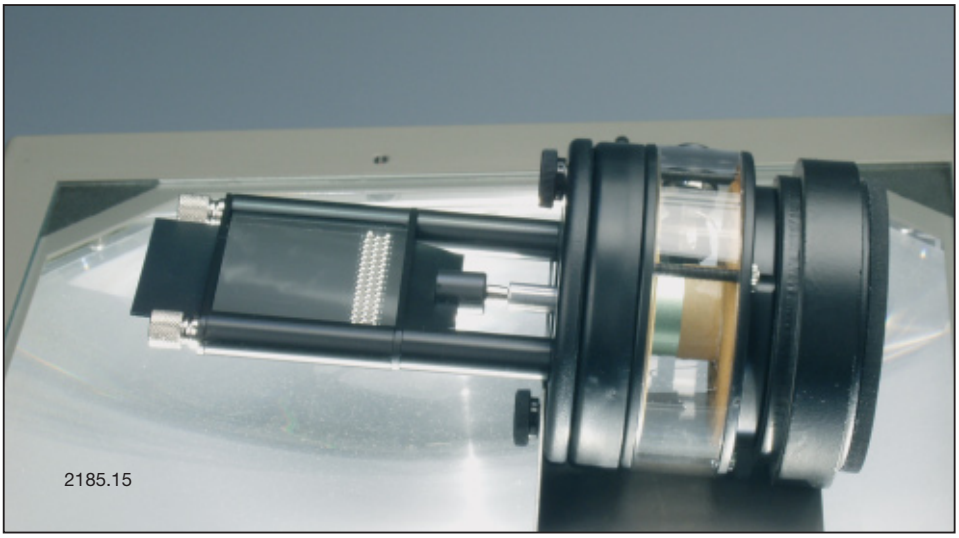
2185.00 Electromechanical Vibrator

RIPPLE TANK DELUXE

Item:	1050334
Name:	Deluxe ripple Tank
Remarks:	**Demonstrate wave theory to the college in the classic style.** CE approved ripple tank is a shallow glass tank of water used in school and colleges to demonstrate the basic properties of waves. Because it is illuminated from above, the light shines through the water. The water's ripples show up as shadows on the screen underneath the tank, providing a visual depiction of all the basic properties of waves. Light, electromagnetic waves, sound, reflection, refraction, interference and diffraction, come to vivid life.

Gas model with piston

For use with the 2185.00. Ball bearings in motion represent gas molecules which lift a plastic piston due to repeated collisions. The model is supplied with the piston, balls and a support for placing the apparatus on an overhead projector.



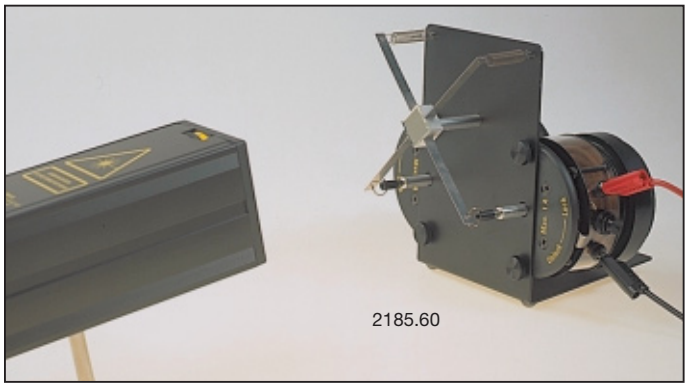
2185.55 Gas model with piston

Solids. Gas in piston. The gaseous state. Brownian motion. Boiling liquid.

Lissajous' apparatus

This apparatus is actually a simple oscilloscope. A mirror is mounted on a moveable steel ball held by two strips of spring steel. The two steel strips are spring loaded at one end and each controlled by a 2185.00 vibrator at the other. By regulating the oscillations with the two vibrators, one can control the motion of the mirror in two mutually perpendicular directions and thus control the laser beam reflected by the mirror. The light source can be a gas laser, a diode laser or similar light source. The vibrators, signal generators and light source are not included.

2185.60 Lissajous' apparatus



ADDITIONAL EQUIPMENT NEEDED

2 ea. Electromagnetic vibrators (2285.00)
2 ea. Signal generators (e.g. 2500.50)
1 ea. Laser (2885.00)

RADIOACTIVE SOURCE - Magic

Cat: AP2668-001

SUPPLIED WITH EXPERIMENT SHEETS:

DESCRIPTION:

The **'MAGIC'** RADIOACTIVE SOURCE has been specially designed for use in schools where policy prevents radioactive sources from being stored or used close to children.

This small instrument is very simple to operate, is very reliable and is microprocessor controlled. The program contains the mathematics to simulate a 'true to life' radioactive source behaviour. Apart from the very important safety aspect, to save a great deal of classroom time, this unique instrument was designed to assist in the performance of some experiments that are difficult to grasp when taught using conventional methods.

AP2668-001 electronic 'radioactive source'

Physical size: 175x100x37mm LxWxTh **Weight: 0.32 kg**

The fundamental operating instructions can never be mislaid because they are in the form of a label fixed to the rear face of the instrument. The instrument is programmed to behave like a Radioactive Source and two different types of source are simulated:

- **Very long half life type:** The source appears to be radiating particles and the display appears to be a Geiger Counter that indicates the same reading that would be found on a real Geiger Counter at a certain distance from a real source. These 'Geiger Counter' readings are actually random numbers within a window of maximum and minimum. This set of random numbers is useful to be used in mathematics and in theories of probabilities.
- **Very short half life type:** The display in this case shows the number of particles ***remaining in the source***. Initially the source contains 1.000×10^{20} particles. Eventually, after about 45 minutes, the number of particles remaining reaches one last particle. The time when that last particle will go is indeterminate. The elapsed decay time is also displayed in minutes and seconds for graphs to be plotted which demonstrate and explain the concept of half-life. When the source is exhausted, or at any other time, it can be 'replenished', ready for the next experiment, by a simple press on a button.
- **Audible monitoring:** The 'clicking' sound associated with the counting of a Geiger Counter can be turned ON or OFF as desired.
- **Fun to use:** The "Magic" concept makes the equipment fun to use and the results taken by the student actually work properly. This aspect improves the confidence level of the student.

INPUT: 12V.AC/DC 50/60Hz. Two 4mm sockets are provided on the end of the instrument for connection by banana plugs to a standard school power pack.

A socket is provided also for a 240/12V.AC. Plug Pak. Cat: PA4096-001

Designed and manufactured in Australia

GEIGER COUNTER / RATE - digital - hand held

Cat: AP1884-001 with internal GM tube

AP1884-002 for external GM tube.

DESCRIPTION:

This unique fully portable battery operated instrument is used:

- To detect and count Alpha (high energy), Beta and Gamma particles
- To count either continuously or over preset periods of 10 sec, 60 sec or 100 sec.
- To measure Rate of counts per second or Rate per minute.

Model AP1884-001 is complete with an internal Geiger Muller (GM) tube which makes it ideal for industry, the classroom or for outdoors. The thin mica window of the tube is protected against mechanical damage by a plastic grille.

Model AP 1884-002 is complete with a socket to accept a remote GM tube to be connected to the instrument by cable. The IEC Tube Holder and Leads as supplied on earlier models are fully compatible.

AP1884-001 internal GM tube

AP1884-002 external GM tube

Maximum geiger counting rate is 10kHz. and an audible 'click' for each particle count may be enabled or disabled by press button.

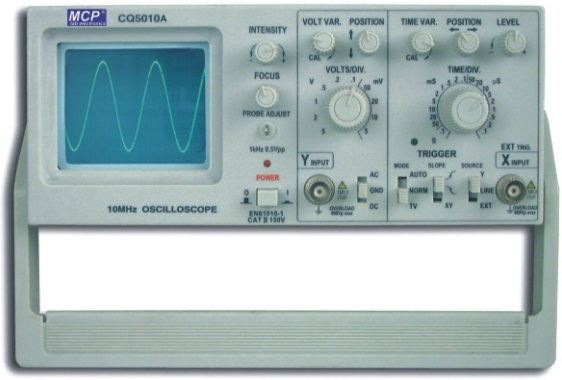
The IEC Geiger Counter & Rate meter will run on 3x standard 'AA' (penlight) batteries for a period of about 100 hours. Alkaline cells will give an even longer operating life. When batteries are approaching the flat condition, 'bAtt' displays momentarily without disturbing counting operations. If the batteries flatten, a socket is provided in the end of the instrument for a standard 240/12V.AC/DC Plug Pack.

CQ5010A / 5010B

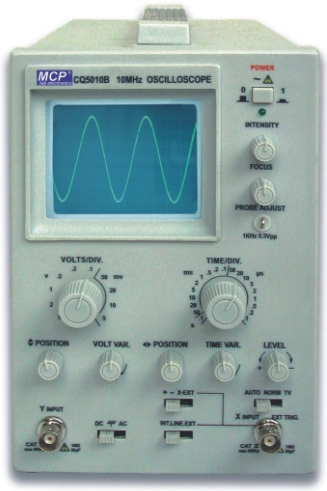
CE CLASSIC

Features

.10MHz single channel
.TV synchronizing, X-Y operating
.Easy to operate
.High performance, sensitive 5mV/DIV
.Ecnomical model,low cost



CQ5010A



CQ5010B

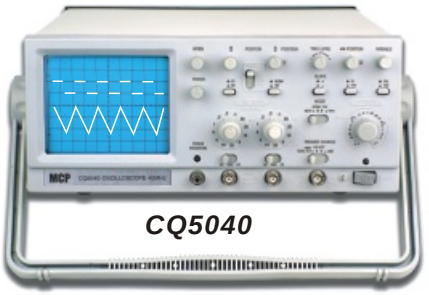
Technical Data		CQ5010A / CQ5010B
CRT	Type	3" round
	Display area	8 × 10DIV (1DIV=6mm)
	Potential	1.3kV
	Lightering color	Green
Vertical System	Sensitivity	5mV / DIV~5V /DIV ±3%
	Width of band (-3dB)	DC: 0~10MHz AC: 10Hz~10MHz
	Input impedance	1MΩ ±3% 30pF±5pF
	Input coupling	DC , GND, AC
	Max. input voltage	400V (DC +ACpeak)
	Trimming ratio	2.5 : 1
Horizontal system	Sweep time	0.1S / DIV ~0.1 μ s / DIV ±3%
	Trimming ratio	2.5 : 1
Trigger system	Mode	AUTO, NORM, TV
	Source	INT, LINE, EXT
	Polarity	"+" or "-"
	Trigger sensitivity	INT: 1DIV, EXT: 0.3V, TV: 2 DIV
	External trigger input	Input impedance: 1MΩ ±3% 25pF±5pF Max. input voltage: 160V (DC+ACpeak)
X -Y operation	Sensitivity	X: 0.5V / DIV Y: 5mV / DIV~ 5V / DIV
	Width of band (-3dB)	DC: 0-1MHz AC: 10Hz -1MHz
	Phase difference	≤3° (DC ~ 50kHz)
Calibration	Source	1kHz±2% 0.5Vp-p±2% square wave
Power source		110~127 VAC±10%, 220~240VAC±10% 50Hz±2Hz, 60Hz±2Hz
Dimensions (W × H × D)		220 × 90 ×270mm, 130 × 190 × 280mm
Weight		3kg
Other	Accessories	One operation manual, one fuse, one power cable,one probe

CQ50 SERIES DUAL CHANNEL OSCILLOSCOPE

CQ5020 / 5030/5040 CE

Features

.High sensitivity 1mV/DIV
.Wide vertical range 20V/DIV
.20MHz/30MHz/40MHz dual channel
.TV synchronization
.Z axis input
.Vertical mode triggering
.CH 1 output



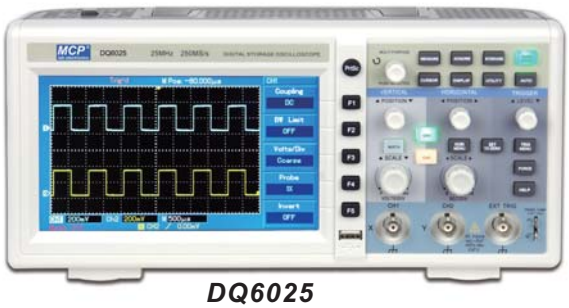
Technical Data		CQ5020 / CQ5030/CQ5040
CRT	Type	6" rectangle, internal graticule, 0%, 10%, 90% and100% marks
	Display area	8 ×10DIV (DIV=10mm)
	Accelerating voltage	1.9kV(CQ5020) 2kV (CQ5030)12kV(CQ5040)
	Intensity and focusing	Continuously adjustable at front panel
	Trace rotation	Adjusted at the front panel
Vertical System	Sensitivity and accuracy	5mV / DIV~20V / DIV ±3% 1mV / DIV~ 2mV / DIV, ±5% 12 calibration steps in 1-2-5 sequence, x5 MAG only CH1
	Trimming ratio	≥2.5:1
	Width of band (-3dB)	DC(AC 10Hz) ~20MHz (CQ5020)/30MHz (CQ5030)/40MHz (CQ5040)
	Rise time	≤ 17.5ns (CQ5020) ≤12ns (CQ5030) ≤8.75ns(CQ5040)
	Input impedance	Approx. 1MΩ ±3% 30pF±5pF
	Input coupling	DC , GND, AC
	Max. input voltage	400V (DC +ACpeak) at 1kHz or less
	Vertical mode	CH1, CH2, DUAL (CHOP, ALT), ADD, CH2inverse
	CH1 signal output	25mV / DIV 50Ω 20Hz~10MHz(-3dB)
Horizontal system	Sweep time	0.2 μ s~0.2s / DIV 19steps in 1-2-5 sequence
	Sweep accuracy	±3%, ±5% at ×10MAG
	Trimming ratio	≥2.5:1
	Sweep magnificaton	×10MAG
	Max sweep time	20ns/DIV
Trigger system	Mode	AUTO, NORM, TV
	Source	VERT-MODE, CH1, EXT, LINE
	Coupling	AC
	Polarity	"+" or "-"
	Trigger sensitivity	10Hz~10MHz / 10MHz~20MHz / 20MHz~30MHz / 30MHz~40MHz INT 0.5DIV / 1.5DIV / 1.5DIV / 1.5DIV EXT 0.2 / 0.8 / 0.2 / 0.8 TV sync pulse 1 DIVor 1V (EXT)
	External trigger input	Input impedance: 1MΩ ±3% 25pF±5pF Max. input voltage: 400V
X -Y operation	Input	X-axis: CH1, Y-axis:CH2
	Sensitivity & accuracy	5mV~20V/DIV, ±3% 1mV/DIV~2mV/DIV, ±5%
	Width of band (-3dB)	Axis X: CQ5020: DC ~500kHz CQ5030: DC ~ 1MHz CQ5040: DC ~1MHz
	Phase difference	≤3° or less from DCto 50kHz
Axis Z	Sensitivity	5V
	Polarity	Negative going input increase intensity
	Input impedance	20k Ω~30k Ω
	Usable frequency range	DC-2MHz
	Max input voltage	30V (DC +AC peak)
Calibration	Signal	1kHz 0.5Vp-p square wave
Power source		110~127 VAC±10%, 220~240VAC±10%, 50Hz±2Hz / 60Hz±2Hz
Dimensions (W × H × D)		316mm × 132mm × 410mm
Weight		7.8kg
Other	Accessories	One operation manual, one fuse, one powercable, two probes

DQ6000 SERIES

CE

Features

. 250MSa/s~1GSa/s sampling rate
. 7 inch wide rectangle colour LCD
. One key print screen
. 1mV/div~20V/div wide range
. FFT function
. Auto-setting for quick setup and waveform acquisition
. Advanced cursor modes: manual, auto and track
. Optional logic analyzer (DQ6052E, DQ6102E)



DQ6025

Technical Data		DQ6025	DQ6052	DQ6052E	DQ6102E
Display	Type	7" rectangle colour LCD			
	Backlight intensity	300nit (cd/m^2)			
	Display resolution	800 horizontal 480 vertical pixels			
	Display contrast	Adjustable			
Vertical system	Sensitivity	1mV / div~20V / div			
	Vertical resolution	8bit			
	Width of band (-3dB)	25MHz	50MHz	50MHz	100MHz
	Rise time	≤14ns	≤7ns	≤7ns	≤3.5ns
	Single-shot band width	25MHz	50MHz	50MHz	100MHz
	Input coupling	DC, GND, AC			
	DC gain accuracy	5% (1mV/div~2mV/div)	4% (5mV/div)	3% (10mV/div~20V/div)	
Horizontal system	SEC/DIV range	10ns~50s/div	5ns~50s/div	2ns~50s/div	2ns~50s/div
	Sampling rate range	250MSa/s	500MSa/s	1GSa/s	1GSa/s
	Waveform interpolation	(Sinx)/x			
	Record length	2 512k	2 512k	2 7.5M	2 7.5M
	memory depth	12.5k per channel		32k per channel	
	Sampling rate and delay time accuracy	50ppm over any ≥1ms time interval			
	Delta time measurement accuracy	Single (1 sampling interval time+50ppm rdg+0.6ns) Average (1 sampling interval time+50ppm rdg+0.4ns)			
Trigger system	Mode	Auto, Normal, Single			
	Type	Edge, Pulse Width, TV (only for DQ6025)			
	Hold off range	100ns ~ 1.5s		80ns ~ 1.5s	
Math		+, -, ,			
		FFT			
Acquire Input	Acquisition mode	Sampling、peak value sampling and smoothness sampling			
	Input coupling	DC, GND, AC			
	Input impedance	1MΩ 2% 20pF 3pF		1MΩ 2% 24pF 3pF	
	Probe attenuation factor	1 , 10 , 100 , 1000			
	Max. input voltage	400V (DC+AC peak, 1MΩ)			
	Channel CMR	Better than 40: 1			
	Interchannel time delay	150ps			
Measurement	Cursor	Voltage difference (△V) between cursors Time difference (△T) between cursors Reciprocal of △T in Hz (1/△T)			
	Auto-measure	Max, Min, High, Low, Middle, Pk-Pk, Ampl, Mean, CycMean, RMS, CycRMS, Area, CycArea, Overshoot, Pre-shoot, Period, Frequency, Rise, Fall, +Width, -Width, +Duty, -Duty, RiseDelay, FallDelay, Phase, FPP, FRF, FFR, FFF, LRF, LRR, LFR, LFF, total 34 types of parameter measurements (DQ6025, DQ6052 only 26 types of above)			
I/O	Standard	USB(OTG); Pass/Fail (except DQ6052); USB logic analyzer (optional for DQ6052E, DQ6102E)			
USB logic analyzer (optional)	Channels	16			
	Sample rate	250MSa/s			
	Memory depth	128k 2			
	Max. input voltage	40Vpp			
	Min. voltage swing	1.2Vpp			
	Logic level supported	TTL, CMOS, ECL			
Calibrator signal	Output voltage	3V (≥1MΩ load)			
	Output frequency	1kHz			
Power source		100~ 240VACrms, 45Hz~440Hz; 50VA Max; CAT Ⅱ			
Dimensions		306(W) 147(H) 122(D)mm			
Weight		2.2kg			
Accessories		Operation manual, power cord, USB cable, probe 2, software CD-ROM			

SG1634N & SG1638N

CE

Features

.Multi waveforms: Sine, Triangle, Square, Ramp, Pulse and etc.
.Separate TTL, 50Hz Sine and singel output
.DC offset and symmetry continuously adjustable
.VCF input
.Built-in 6 digits counter up to 15MHz equal accuracy(SG1638N)
.Economical type, low cost

SG1634N

SG1638N

Technical Data		SG1634N	SG1638N
Main output	Output frequency	0.2Hz ~ 2MHz	
	Output waveforms	Sine, Square, Triangle, Ramp, Pulse and etc.	
	Output impedance	50Ω ±10%	
	Output amplitude	≥20Vp - p (1MΩ Load); ≥10Vp - p (50Ω Load)	
	Output attenuation	0dB / 20dB /40dB / 60dB	
	DC offset	0~±10V (1MΩ Load); 0~±5V (50Ω Load)	
	Symmetry	10% ~ 90%	
Sine wave	Distortion factor	20Hz ~ 20kHz ≤ 1%	
	Frequency response	2Hz ~ 2MHz ≤ ±1dB	
Square wave	Rise or fall time	≤30ns	
TTL output	Rise or fall time	≤50ns	
	Low level	≤0.4V	
	High level	≥3.5V	
	Impedance	100Ω	
VCF	Input voltage	-5~0V	
	Input impedance	10kΩ ±10%	
50Hz output		2Vp-p, mains synchrony	
Counter	Display		6 digits
	Frequency range		0.5Hz ~ 15MHz
	Input impedance		10kΩ ±10%
	Sensitivity		200mVrms
	Resolution		0.1Hz/1Hz
	Accuracy		≤0.1%±1 digit
	Max. input voltage		50Vp-p
Power supply		110~127 VAC±10%, 220~240VAC±10%, 50Hz±2Hz / 60Hz±2Hz	
Dimensions		250(W) ×105(H)×280(D)mm	
Weight		2.5 kg	

NEW! Laboratory Power Supply

- **Weight reduction from 7.8 to 2.5 kg**
- **Simultaneously readout of voltage and current for AC and DC**
- **Improved sinus waveform for AC**
- **Higher efficiency – lower temperature**

Power supply 0-24 V AC/DC

This power supply features continuous regulation from 0-24 V AC and DC. It can be connected to separate loads to the DC and the AC connections, and the voltages can be set separately. It also permits simultaneous digital readout of both the AC and DC voltages and currents.
The supply has continuous regulation of DC current in the entire current range, and a fixed AC current limiter is provided. It is electronically protected against overloads. LED indicators in both the DC and AC ranges indicate whether or not the current supplied has reached the upper limit, in which case the built-in current regulation will reduce the output voltage.
This CE approved power supply with safey transformer fulfills the requirements of the EN 61558-1 standard. The power supply outputs are safety jack connectors and these live up to the safety requirements of the Danish Electricity Council.

Switch mode regulation (SMPS):

The combined requirements for high current levels, low operating temperature and compact size are best met by using switched mode regulation. This is the ultimate means of avoiding heating problems and wasted energy. The dependability and lifetime of the power supply is enhanced due to lower operating temperatures for all circuit components. The supply fulfills all requirements with respect to noise emission. The supply also boasts low weight compared with traditional power supply solutions. This is a user-friendly power supply with a large capacity. The simple and logically arranged control panel reduces the possibility of incorrect use. The unit is sturdy and compact. It can operate hour after hour at maximum rated current capacity without overheating. The unit fulfills EU's requrements for CE-marking and the low voltage directive.

DC Specifications:

- Voltage: 0-24 V DC smoothed, stabilized and continuously adjustable.
- Noise and ripple: Less than 25 mV.
- Current: Up to 10 A.

AC Specifications:

- Voltage: 0-24 V AC continuously adjustable.
- Current: Max. 6 amperes.
- Frequency: The same as the line voltage (50-60Hz)
- AC/DC: Electronically protected against overloading.
- Switched readout for AC/DC voltage and current.
- Line voltage: 230 V AC.
- Size: 297 x 225 x 118 mm.
- Mass 2.5 kg. (Net weight of power supply)

3630.00 Power supply 0-24 V AC/DC

Power supply 0-24 V AC/DC

Similar to 3630.00 but current limiter is operated through a hole in the front using a screw driver.

3630.10 Power supply 0-24 V AC/DC

POWER SUPPLY - general purpose

Cat: LB2631-001 (2, 4, 6, 8, 10, 12V. AC/DC at 10A AC, 8A DC)

LB2631-101 (as LB2631-001 but with LED overload indicator)

DESCRIPTION:

The IEC **Power Supply** is a robust and compact unit and is designed for general laboratory use. It is suitable for most laboratory experiments where close voltage regulation and DC ripple are not important. Output is up to 12V. AC or DC switched in 2V steps. Terminals are provided for both AC and DC outputs and they are 4mm socket head, spin free design.

NOTE: If the DC ripple must be reduced, a suitable electrolytic capacitor (perhaps 2500 microfarads x 40 volt) may be connected across the DC output terminals being sure to use the the correct polarity.

LB2631-001 general purpose, 10A.AC. 8A.DC.

Physical size: **205x180x110mm LxWxH** **Weight: 3.7 kg**

This power supply is similar to the famous LB2633-001 but has a larger current output. It is fitted with a larger transformer and rectifier and cannot be provided in the sloping panel format.

A very versatile, sturdy and economical power supply, for most of low-voltage experiments. Can also work as a Battery Eliminator Our CE certified power supply is a must for any laboratory. with overload protection and great durability

1050909

1050909 An extremely popular 2-12V AC/DC power supply with 8 A output

1030925

1030925 925B is a 1-25V AC/DC powe r supply with voltage display . Electrical adjustment with voltage lock. 5A in output . With an extra continuously variable 0.5-12V , regulated and smoothed 1A output.

1020925

1020925 925A is a 1-25V AC/DC power supply with voltage display . Electrical adjustment with voltage lock. 5A in output

1020909 909C is a popular AC/DC 2-12V power supply but included a display for actual voltage .8A in output

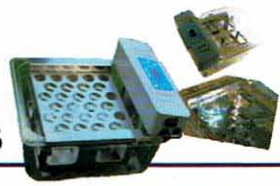
1020909

1020907

1020907 907B power supply is specially designed output 15.5A current at voltage from 2-12V AC/DC with 15.5A output

1020915

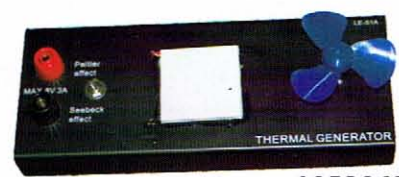
1020915 915A is a 1-15V AC/DC power supply with voltage display . Electrical adjustment with voltage lock. 8A in output



1057496

1057496 Water Bath 8 Litre with Stainless Steel racks, lid and bulid-in stirrer.
Water Bath 8L - CE Approved!
microprocessor control.
Supply voltage: 220(240)V/50(60)Hz or 110V 50/60Hz
Heating system: 1200W with Smart Energy Saving
control and Adjustable speed Stirrer.
Temperature Working range: up to 99.5 C
Temperature regulation: 0.1Deg.C

1052263



1052063

Thermoelectric Demonstrator Reversible Thermoelectric Demonstrator Reversible. To demonstrate
conversion of heat energy into electrical energy and vice-versa. which also call Peltier's effect and
Seeback Effect Amaze everyone with this apparatus, . advantage model with meter to measure the
votalge and current will great help

F8-1203E

AC & DC breadboard power supply

Specifications

.DC output voltage: 0~12V
.DC output current: 3A
.Load regulation: 10mV
.Line regulation:10mV
.Ripple: 1mV
.3 digits display for DC voltage

.AC output voltage: 3V, 6V, 9V, 12V
.AC output current: 3A
.AC overload protection

.Input voltage: 110~127VAC±10% 60Hz or 220~240VAC±10% 50Hz
.Weight: 2.5kg

M10-NY & M10-MX SERIES NEW

MINI SINGLE OUTPUT ADJUSTABLE DC POWER SUPPLY

Features

. Constant voltage and constant current
. 4 digits display, 10mV/1mA resolution (M10-MX series)
. Compact structure
. Low ripple and noise
. Plastic panel and new design

M10-NY304

Specifications

.Line Regulation: CV $1X10^{-4}$+3mV CC $2X10^{-3}$+3mA
.Load Regulation: CV $1X10^{-4}$+2mV CC $2X10^{-3}$+3mA
.Ripple & Noise: CV 0.5mVrms CC 5mA rms
Display Accuracy: Voltmeter±(0.2%Rdg+2digits)
- Ammeter±(1.0%Rdg+2digits)
Input Voltage: 110~127VAC±10%,
220~240VAC±10% Switchable

Model	Voltage	Current	Display	Resolution	Dimensions (WxHxD)	Weight (kg)
M10-NY183	0~18V	0~3A	3 digis LED	100mV/10mA	102x160x245mm	3.2
M10-NY185	0~18V	0~5A	3 digis LED	100mV/10mA		3.5
M10-NY302	0~30V	0~2A	3 digis LED	100mV/10mA		3.2
M10-NY304	0~30V	0~4A	3 digis LED	100mV/10mA		3.8
M10-MX302	0~30V	0~2A	4 digis LED	10mV/1mA		3.2
M10-MX304	0~30V	0~4A	4 digis LED	10mV/1mA		3.8

M10-AD360 SERIES

Features

.Both AC and DC output **(DC rectified)**
.AC and DC output voltage synchronization
.LED meters for both voltage and current
.DC smoothing function

Specifications

.Output Power: max.60VA(M10-AD360-2)
max.150VA(M10-AD360-5)
.Display Accuracy: Voltmeter ±(2.5%Rdg+2digits)
Ampmeter±(2.5%Rdg+2digits)
.Protection: Over current
.Input voltage: 110~127VAC±10%/220~240VAC±10%

M10-AD360-5

Model	Output Voltage	Output Current	Dimensions(W×D×H)	Weight (kg)
M10-AD360-2	0~30V	2A	260×160×260mm	5
M10-AD360-5	0~30V	5A	260×160×260mm	7

M10-AD370 CE NEW

Features

.AC and DC combined power supply
.DC constant voltage and constant current
.AC output current limited and continuous adjusting
.AC output over load electronic protection

Specifications

DC output

.Output Voltage: 0~30V
.Output Current: 0~6A
.Line Regulation: CV 1×10^{-4}+3mV CC 2×10^{-3}+3mA
.Load Regulation: CV 1×10^{-4}+5mV CC 2×10^{-3}+5mA
.Ripple & Noise: CV 1mVrms CC3mArms
.Display Accuracy: Voltmeter ±(0.2%Rdg+2digits)
Ampmeter ±(1.0%Rdg+2digits)

AC output

.Output Voltage: 0~30V
.Output Current: max.6A
.Display Accuracy: Voltmeter ±(1.0%Rdg+2digits)
Ampmeter ±(1.0%Rdg+2digits)
.Input Voltage: 220~240VAC±10%
.Dimensions: 380(W)×140(H)×300(D)mm
.Weight: 12kg

M10-AD370-6

AC & DC POWER SUPPLY

MCP® lab electronics

M10-SPL SERIES CE

Features

. Output off function
. New panel design
. Economical type with low cost

Specifications

. Line Regulation: CV ≤ 1×10^{-4} + 3mV CC ≤ 2×10^{-3} + 3mA
. Load Regulation: CV ≤ 1×10^{-4} + 2mV CC ≤ 2×10^{-3} + 3mA
. Ripple & Noise: CV ≤ 0.5mV rms CC ≤ 3mA rms
. Display Accuracy: Voltmeter ±(0.2%Rdg + 2 digits),±2.5% Full Scale
Ampmeter ±(1.0%Rdg + 2 digits),±2.5% Full Scale
. Input Voltage: 110 ~ 127VAC±10%/60Hz, 220 ~ 240VAC±10%/50Hz
Switchable

Model	Voltage	Current	Dimensions(W×H×D)	Weight(kg)
M10-SP3003L	0~30V	0~3A	130×160×310mm	5
M10-SP3005L	0~30V	0~5A	130×160×310mm	6.3
M10-SP6003L	0~60V	0~5A	130×160×310mm	6.5
M10-SP1820L	0~18V	0~20A	260×160×370mm	12
M10-SP3010L	0~30V	0~10A	260×160×370mm	10
M10-SP6005L	0~60V	0~5A	260×160×370mm	10

M10-SP3003L

M10-SPLX SERIES CE

Features

. Output off function
. New panel design
. 5V/1A fixed output

Specifications

. Line Regulation: CV ≤ 1×10^{-4} + 3mV CC ≤ 2×10^{-3} + 3mA
. Load Regulation: CV ≤ 1×10^{-4} + 2mV CC ≤ 2×10^{-3} + 3mA
. Ripple & Noise: CV ≤ 0.5mV rms CC ≤ 3mA rms
. Display Accuracy: Voltmeter ±(0.2%Rdg + 2 digits),±2.5% Full Scale
Ampmeter ±(1.0%Rdg + 2 digits),±2.5% Full Scale
. Input Voltage: 110 ~ 127VAC±10%/60Hz, 220 ~ 240VAC±10%/50Hz
Switchable

M10-SP3003LX

Model	Voltage	Current	Fixed output	Dimensions(W×H×D)	Weight(kg)
M10-SP3003LX	0~30V	0~3A	5V/1A	130×160×310mm	5
M10-SP3005LX	0~30V	0~5A	5V/1A	130×160×310mm	6.3
M10-SP6003LX	0~60V	0~3A	5V/1A	130×160×310mm	6.5

M10-AD350T SERIES

Features
.Both AC and DC output (DC regulated)
.Easy operation
.DC output over current , AC input fuse protection

M10-AD350T-5

Specifications

.AC output:	6V/5A, 12V/5A
.DC output voltage:	6V, 12V
.DC output current:	5A
.DC line regulation:	3%
.DC load regulation:	5%
.DC ripple voltage:	30mV
.Input voltage:	220~240VAC ±10%, 50Hz or 110~127VAC ±10%, 60Hz
.Dimensions(W×H×D):	150 × 110 × 215 mm
.Weight:	4.5kg

M10-AD350T-5

M10-AD350T-10

Specifications

.AC output:	6V/10A, 12V/10A, 24V/5A
.DC output voltage:	6V, 12V, 24V
.DC output current:	10A
.DC line regulation:	3%
.DC load regulation:	5%
.DC ripple voltage:	50mV
.Output accuracy:	2.5%
.Input voltage:	220~240VAC ±10%, 50Hz 110~127VAC ±10%, 60Hz
.Dimensions(W×H×D):	215 × 120 × 260mm
.Weight:	6kg

M10-AD350T-10

M10-AD350M SERIES

Features
.Both AC and DC output (DC regulated)
.Output 1~15V in 15steps
.Over current protection
.Transformer thermal protection

Specifications

.Output voltage:	1V, 2V, 3V, 4V, 5V, 6V, 7V, 8V, 9V, 10V, 11V, 12V, 13V,14V,15V
.DC line regulation:	1%
.DC load regulation:	1%
.DC ripple voltage:	3mV
.Input voltage:	220~240VAC ±10%, 50Hz or 110~127VAC ±10%, 60Hz
.Protection:	Over current, short-circuit protection

M10-AD350M-10

Model	Output current	Dimensions(W×D×H)	Weight(kg)
M10-AD350M-5	5A	170×160×250mm	5
M10-AD350M-10	10A	170×160×250mm	6.3

S303E

Features
.Constant voltage and constant current
.Plastic panel
.Low cost

S303E

Specifications

.Output voltage:	0~30V	
.Output current:	0~3A	
.Line regulation:	CV 1×10^{-4}+3mV	CC 2×10^{-3}+3mA
.Load regulation:	CV 1×10^{-4}+4mV	CC 2×10^{-3}+5mA
.Ripple & noise:	CV 1mVrms	CC 3mArms
.Display accuracy:	Voltmeter ± (0.2%Rdg+2digits)	
	Ammeter ± (1.0%Rdg+2digits)	
.Input voltage:	110~127VAC ± 10%,220~240 ± 10%	
	Switchable	
.Dimensions (W×H×D):	135×170×290 mm	
.Weight:	4kg	

T303E

Features
.Constant voltage and constant current
.Plastic panel
.Low cost

T303E

Specifications

.Output voltage:	0~30V×2/5V	
.Output current:	0~3A×2/3A	
.Line regulation:	CV 1×10^{-4}+3mV	CC 2×10^{-3}+3mA
	Fixed output 60mV	
.Load regulation:	CV 1×10^{-4}+4mV	CC 2×10^{-3}+5mA
	Fixed output 80mV	
.Ripple & noise:	CV 1mVrms	CC 3mArms
	Fixed output 10mV	
.Display accuracy:	Voltmeter ± (0.2%Rdg+2digits)	
	Ammeter ± (1.0%Rdg+2digits)	
.Fixed output accuracy:	2.5%	
.Input voltage:	110~127VAC ± 10%,220~240 ± 10%	
	Switchable	
.Dimensions (W×H×D):	265×155×295 mm	
.Weight:	7kg	

Digital Multimeter

Model:DT-830B

Features:

- 3 1/2 digits LCD,Max.reading of 1999
- 6 Functions,Most popular 19 ranges Digital Multimeter
- Voltage DC, Voltage AC, Current DC, Resistance, Diode Check and hFE
- Low battery indication
- Overload protection
- Low cost, pocket size ideal for hobby & DIY users
- Color available: Black
- Overload protection

Specifications:

- DCV: 200m-2000m-20-200-1000V
- ACV: 200-750V
- DCA: 200μ-2000μ-20m-200m-10A
- OHM: 200-2000-20K-200K-2000KΩ
- Diode Check: 3V/0.8mA
- hFE:Vce≈3V;Ib≈10μA
- Size / Weight:12.3×6.7×2.2cm/137g

Digital Multimeter
Model: DT9205A+

Features:

- Auto off function
- Full protection
- 3 digits LCD display 1999
- Applicable to electricians and qualified technicians

Specifications:

- A compact, battery operated, handheld with safety protector
- Best choice for technicians, service men, students and hobbyists who required an instrument that is accurate, reliable and always ready for use
- Auto ranging with good sensitivity, resolution and accuracy
- Overload indication and protection, low battery indication
- Packed with a pair of test leads (70cm)
- Test leads and 1*6F22 battery (included)
- Frequency: 200Khz
- Capacitance: 2nF to 200uF
- AC Volts: 200mV to 700V
- DC Volts: 200mV to 1,000V
- AC Current: 2mA to 10A
- DC Current: 200UA to 10A
- Resistance: 200 ohm to 200M ohm

MG300/MG302 CAT IV Insulation Tester/MultiMeter with Wireless PC Interface

WIRELESS Transmitter

Combines a 1000V Insulation Tester with a True RMS MultiMeter

- Wireless USB interface transmits measurement data to a PC
- Backlit large triple display and waterproof (IP67) rugged housing design
- Insulation Resistance from 0.001MΩ to 4000MΩ
- Auto discharge of capacitive voltage
- Lock Power On Function for hands-free operation
- Data Hold and Auto power off
- Min/Max and Relative mode
- 1 year warranty
- Complete with remote receiver with USB cable, Windows® compatible software, heavy duty 4-wire test leads, protective rubber holster, multimeter test leads, carrying case, and 6 x AA batteries
- **NOTE:** USA, Mexico, and Canada use 915MHz model MG300 and majority of other countries use 433MHz model MG302

SPECIFICATIONS	RANGE	RESOLUTION	BASIC ACCURACY
Insulation Resistance	4MΩ, 40MΩ, 400MΩ, 4000MΩ	0.001MΩ	±3%
Insulation Test Voltages	125V, 250V, 500V, 1000V		
AC Voltage	1000V	0.1mV	±1%
DC Voltage	1000V	0.01mV	±0.06%
AC Current	10A	0.1µA	±1.5%
DC Current	10A	0.01µA	±1.0%
Resistance	40MΩ	0.01Ω	±0.3%
Capacitance	40mF	0.001nF	±3.5%
Frequency	100MHZ	0.001HZ	±0.1%
Duty Cycle	0.1 to 99.9%	0.01	±1.2%
Temperature	-58 to 2192°F (-50 to 1200°C)	0.1°F (0.1°C)	±1% + 4.5°F (2.5°C)
4-20mA%	-25 to 125%	0.01%	
Continuity/Diode	Yes		
Dimensions/ Weight	7.8 x 3.6 x 1.9" (200 x 92 x 50mm)/ 20.5oz (582g)		

ORDERING	
MG300 N	CAT IV Insulation Tester/MultiMeter with Wireless PC Interface (915MHz)
MG302 N	CAT IV Insulation Tester/MultiMeter with Wireless PC Interface (433MHz)

True RMS multimeter gives accurate readings of distorted waveforms

Measure the insulation resistance of transformer windings

DT300 Laser Distance Meter (164ft/50m)

Laser measurement accurate to 0.06 inches with Historical Storage that recalls the previous 20 records (measured or calculated results)

- Automatically calculates Area and Volume
- Indirect measurement using Pythagorean theorem
- Continuous measurement function with Min/Max distance tracking updates every 0.5 seconds
- Addition/Subtraction, Front or rear edge reference, Low battery indicator, and Auto power off features
- Double molded housing (IP54)
- 1 year warranty
- Complete with carrying case and 2 AAA batteries

SPECIFICATIONS	
Measurement Range	2" to 164' (0.5 to 50m)
Accuracy (up to 32'/10m)	±0.06" (±1.5mm)
Resolution	0.001" (0.001m)
Length Add calculation	99'11" (99.99m)
Area calculation	999.99 sq. ft. (999.99m^2)
Volume calculation	999.99 cu. ft. (999.99m^3)
Laser Power Off / Auto Power Off	After 30 seconds / after 3 minutes
Dimensions/ Weight	4.5 x 1.9 x 1.1" (115 x 48 x 28mm)/ 5.3oz (150g)

ORDERING	
DT300	Laser Distance Meter (164ft/50m)

EXTECH INSTRUMENTS
A FLIR COMPANY

Experience the Extech Advantage

PRODUCT DATASHEET

Digital Mini MultiMeters

Compact Autoranging or Manual ranging multimeters
with Temperature function

Features:

- Large easy to read digital display
- Measure AC and DC Voltage to 600V
- DC Current function to 10A
- Thermocouple Temperature measurements to 1400°F (750°C)
- Resistance tests with Continuity and Diode functions
- Manual ranging model (MN35) with 9V and 1.5V Battery test
- Autoranging model (MN36) with AC Current, Capacitance and Frequency measurements
- Convenient mini size with protective rubber holster and tilt stand
- Data Hold locks reading in the display
- Includes protective rubber holster, battery, Test leads and Type K thermocouple probe

Specifications	Model MN35 Range	Max. Resolution	Basic Accuracy (%rdg+digits)	Model MN36 Range	Max. Resolution	Basic Accuracy (%rdg+digits)
DC Voltage	200mV, 2V, 20V, 200V, 600V	0.1mV	±0.5%	400mV, 4V, 40V, 400V, 600V	0.1mV	±0.5%
AC Voltage	200V, 600V	0.1V	±1.2%	4V, 40V, 400V, 600V	0.1V	±1.2%
DC Current	200mA, 10A	0.1mA	±1.5%	400µA, 4000µA, 40mA, 200mA, 10A	0.1µA	±1.2%
AC Current	—	—	—	400µA, 4000µA, 40mA, 200mA, 10A	0.1µA	±1.5%
Resistance	200Ω, 2kΩ, 20kΩ, 200kΩ, 20MΩ	0.1µΩ	±0.8%	400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ	0.1Ω	±1.2%
Capacitance	—	—	—	4nF, 40nF, 400nF, 40µF, 100µF	0.001nF	±3.0%
Frequency	—	—	—	10Hz, 100Hz, 1kHz, 10kHz, 100kHz, 1MHz, 5MHz	0.01Hz	±1.0%
Temperature	-4 to 1400°F (-20 to 750°C)	1°	±(1%+4°)	-4 to 1400°F (-20 to 750°C)	1	±(1%+4°)
Batttery Test	9V and 1.5V Batteries			—		
Power	one 9V battery			2 x AAA batteries		
Dimensions	5.43x2.83x1.5" (138x72x38mm)			5.43x2.83x1.5" (138x72x38mm)		
Weight	5.4oz (153g)			5.4oz (153g)		

Ordering Information:

MN35.....Manual Ranging Mini MultiMeter
MN36.....Autroranging Mini MultiMeter

CE* EN 61010-1 CAT II 600V 1 YEAR WARRANTY
*MN36 only

9/17/09 - R1

STUDENT METER

Feature
.Compact size
.Easy operation and stable work
.Binding post or safety socket connection
.Suitable for school experiment

Specifications

Current Meter

Model	Type	Range	Connector
DCA-1	Ampere meter DC	0-50mA-500mA-5A	Binding Post
DCA-1S	Ampere meter DC	0-50mA-500mA-5A	Safety Socket
ACA-1	Ampere meter AC	0-500mA-1A-5A	Binding Post
ACA-1S	Ampere meter AC	0-500mA-1A-5A	Safety Socket

DCA-1S

DCA-1

Voltage Meter

Model	Type	Range	Connector
DCV-1	Volt meter DC	0-3V-30V-300V	Binding Post
DCV-1S	Volt meter DC	0-3V-30V-300V	Safety Socket
DCV-2	Volt meter DC	0-300mV-3V-30V	Binding Post
DCV-2S	Volt meter DC	0-300mV-3V-30V	Safety Socket
ACV-1	Volt meter AC	0-15V-150V	Binding Post
ACV-1S	Volt meter AC	0-15V-150V	Safety Socket

DCV-1S

DCV-1

Galvano Meter

Model	Type	Range	Connector
DCG-1	Galvano meter	±35μA	Binding Post
DCG-1S	Galvano meter	±35μA	Safety Socket
DCG-2	Galvano meter	±30mA	Binding Post
DCG-2S	Galvano meter	±30mA	Safety Socket

DCG-1S

DCG-1

RM & RS SERIES

CE

Features:

.Portable meter
.Easy operation and stable work
.Safety socket connection
.Suitable for school experiment

Specifications

Current meter:

Model	Type	Range	Accuracy
RM3248	Analog DC current meter	1A/10A	2.5%
RM3250	Analog AC current meter	1A/10A	2.5%
RS3248	Digital DC current meter	0~1999mA	0.5%
RS3250	Digital AC current meter	0~19.99A	1%

Dimensions: 94×150×35 mm
Weight: 150g

RM 3250

RS 3248

Voltage meter:

Model	Type	Range	Accuracy
RM3249	Analog DC voltage meter	1.5V/15V 3V/30V 25V/250V	2.5%
RM3251	Analog AC voltage meter	25V/250V 100V/1000V	2.5%
RS3249	Digital DC voltage meter	0~199.9V	0.5%
RS3251	Digital AC voltage meter	0~1000V	1%

Dimensions: 94×150×35 mm
Weight: 150g

RM 3249

RS 3249

Galvanometer:

Model	Type	Range	Accuracy
RM3252	Analog galvanometer	±0~500μA	2.5%
RS3252	Digital galvanometer	±0~1999μA	0.5%

Dimensions: 94×150×35 mm
Weight: 150g

RM 3252

RS 3252

GM816 DIGITAL ANEMOMETER CE NEW

GM816

Features

.Both air velocity and air temperature measuring
.Different velocity indicating and temperature indicating

Technical Data		GM816
Air velocity	Range	0~30m/s, 0~90km/h, 0~5860ft/min, 0~55knots, 0~65mph
	Accuracy	±5%
	Resolution	0.2m/s
Air temperature	Range	-10℃~45℃, 14F~113F
	Accuracy	±2%
	Resolution	0.2℃
Wind chill		√
Beaufort scale indication		√
℃/F selection		√
Low battery indication		√
Auto power off		1 min. without any operation
Backlight		12 sec. active by press any key
Max./Avg./current reading		√
Power supply		2 × 1.5V AA
Weight		55g
Dimensions (W×H×D)		60 mm×105 mm×20 mm

GM1357 DIGITAL SOUND LEVER METER CE NEW

GM1357

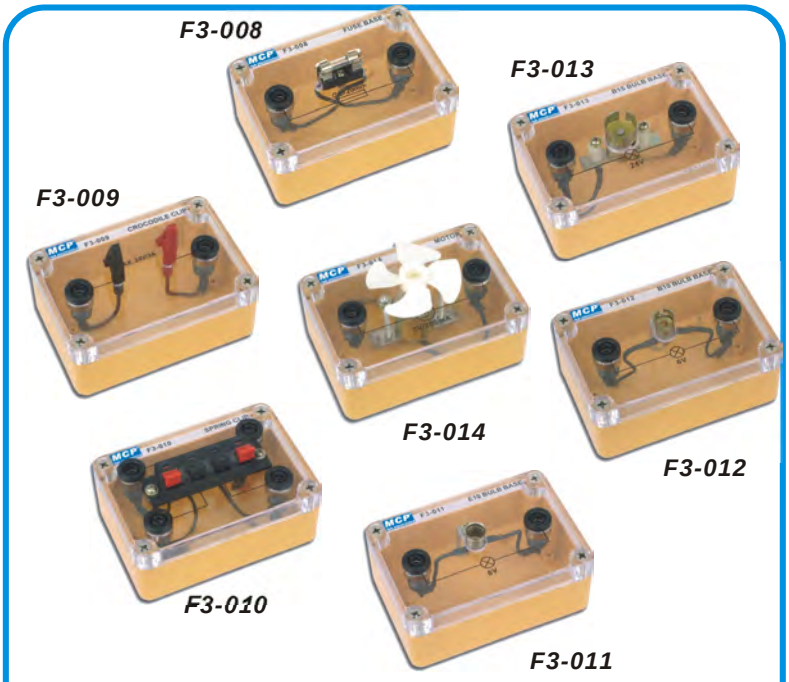
Features

.Both dBA and dBC frequency weighting characteristic

Technical Data	GM1357
Measuring range	30~130dBA; 35~130dBC
Accuracy	±1.5dB
Resolution	0.1dB (5 digits)
Frequency response	31.5Hz~8.5kHz
Measuring level range	30~130, 40~90, 50~100, 60~110, 80~130
Frequency weighting characteristic	A&C
Time weighting	Fast/Slow
Sampling rate	2 times/second
Microphone	1/2 inch polarization capacitance microphone
AC/DC output	√
Max. reading	√
Overload indication	Over/Under
Low battery indication	√
Power supply	4 × 1.5V AA or 6VDC/100mA adapter
Weight	310g
Dimensions (W×H×D)	70 mm×256 mm×35 mm

F3 SERIES CE NEW

Features
. Light and magnetic fixture
. Visible components
. Φ4mm safety socket connection
. Customization allows
. Dimensions (W × H × D):100 × 68 × 40mm



F3-001
Resistor

4.7Ω,12Ω,39Ω,2W

F3-002
Capacitor
470pF,4700pF
47000pF,63V

F3-003
Capacitor

0.5μF,1μF,2μF,400V

F3-004
Capacitor
220μF,470μF
2200μF,25V

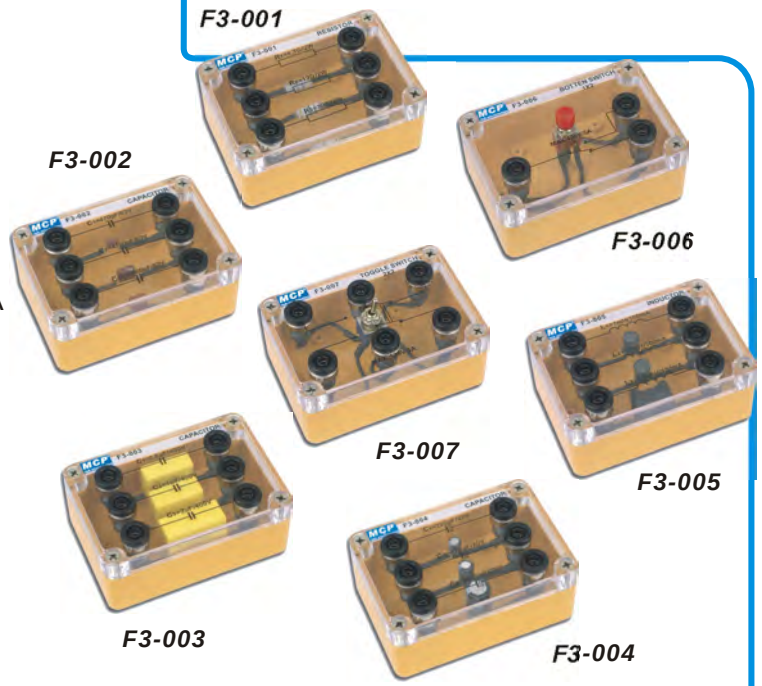
F3-005
Inductor
1mH,10mH
100mH,100mA

F3-006
Push switch

1×2,120V,5A

F3-007
Toggle switch

2×2,120V,5A



F3-008
Fuse

6×20,250V,3A

F3-009
Crocodile clip

24V,3A

F3-010
Spring clip

24V,3A

F3-011
E10 bulb base

6V

F3-012
B10 bulb base

6V

F3-013
B15 bulb base

24V

F3-014
DC Motor

3V,200mA


F3-015


F3-016


F3-017


F3-018


F3-019

F3-015
Buzzer

3~7V

F3-16
Speaker

8Ω,0.3W


F3-020


F3-021


F3-022


F3-023

F3-017
Potentiometer

1KΩ,0.5W

F3-018
Diode

1N4004

F3-019
Transistor

2SC1008

F3-020
Thyristor

97A6

F3-021
LED

6V

F3-022
Rectifier

400V,10A

F3-023
Transformer

220V,6V-0-6V,1A


F3-024


F3-027

F3-024
Toggle switch

2X2


F3-025


F3-028

F3-025
Toggle switch

1X2


F3-026


F3-029

F3-026
DC current meter

0~5A
Accuracy: 2.5%

F3-027
DC voltage meter

0~30V
Accuracy: 2.5%

F3-028
AC current meter

0~5A
Accuracy: 2.5%

F3-029
AC voltage meter

0~30V
Accuracy: 2.5%


F3-160


F3-162

F3-161
Amplifier modulation

Analog multiplier


F3-161

F3-160
Operational amplifier

Amplifier TL081

F3-162
Detector

The circuit for demodulation

F3-301

F3-302

F3-303

F3-304

F3-305

F3-306

Electromagnetism experiment boxes

F3-301
Circle Circuit

25 turns, I_{Max}=1A

F3-302
Solenoid Circuit

10 turns, I_{Max}=3A

F3-303
Straight ladder

I_{Max}=3A

F3-304
Head bow

I_{Max}=3A

F3-305
Straight Circuit

7 turns, I_{Max}=3A

F3-306
The Oersted Needle

I_{Max}=1A

M21-500

Features

.Low cost but ideal tool for breadboard
.With DC power supply for common use

M21-500

Technical Data		M21-500
DC Output Voltage		0~+15VDC/500mA
		0~-15VDC/500mA
		+5VDC/1A
Solderless Breadboard		2390 tie points
Dimensions(W×H×D)		200×80×250mm
Weight		4.5kg

M21-600

Features

.Low cost but ideal tool for breadboard
.With DC, AC power supply for common use

M21-600

Technical Data		M21-600
DC Output Voltage		0~+15VDC/500mA
		0~-15VDC/500mA
		+5VDC/1A
		-5VDC/500mA
AC Output Voltage		12V-6V-0-6V-12V, 300mA
Solderless Breadboard		2820 tie points
Dimensions(W×H×D)		334×95×258mm
Weight		4.5kg

M21-1000 SERIES CE

Features

.Provide available electrical components and interconnect in different configurations.
.Acquire the basic knowledge on electrical engineering, installations and electrical measurements.
.Study the means to check the main laws and principles.
.Component symbols and electrical diagrams are represented on the front panel.
.The symbols and electrical diagrams of each component are clearly represented on the front panel.
.The connections are eased by 4mm terminals and cables of different colors.
.The power supplies are included with extra low safety voltage.

Specifications

Main installed components:

General switch, fuse and signaling lamp
1 Safety single-phase transformer 115-230V / 6-12-24 VAC-1 A
2 Fuse-holder with fuse type 6x30-1A
1 Moving iron ammeter with range: 0.5-1A
1 Moving iron voltmeter with range: 25 V
10 Resistors of different values
(2Ω, 4Ω, 8Ω, 16Ω, 31.5Ω, 63Ω, 250Ω, 500Ω, 1000Ω, 2000Ω)
1 linear rheostat 100 Ω /25W
4 Diodes 6A-100V
2 Lamp-holder with 24-V signaling lamp
1 24-Vac buzzer
1 Electrolytic capacitor, 100 μF25Vdc
2 Electrolytic capacitors, 500 μF25Vdc
2 Inductances 60 mH 0.5 A
2 Pushbuttons for general use
2 Shunters for general use
1 Inverter for general use
1 Relay, 2 exchange contacts, 24 Vac coil
1 Step-by-step relay, 24-Vac coil (M21-1100)
1 Set of 25mm cables with 4-mm plug

Dimensions: 258×95×334 mm

Weight: 4.5kg

M21-1000

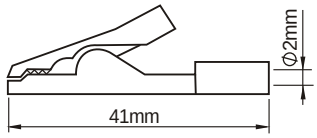
M21-1100

The main exercises which can be carried out are:

- AC voltage and current measurements
- Diode insertion with different configurations Half-wave rectifier, Full-wave rectifier, Bridge rectifier, Voltage doublers
- DC voltage and current measurements
- Insertion of resistances with different configurations Resistance measurements, Checking the Ohm's law, Series resistors, voltage divider, Parallel resistors, current divider, series and parallel resistors, max. power transfer, Kirchhoff's principle, superimposition principle, Thevenin's theorem
- Power measurements DC power measurement, Joule's law, AC power
- Insertion of capacitors with different configurations Charge and discharge of a DC capacitor, series DC capacitors, parallel DC capacitors
- Electromagnetic phenomena Inductance of a coil, coils in series, coils in parallel, Ohmic/inductive/capacitive circuits, RC circuit, RL circuit, series resonant circuit, parallel resonant circuit, Q-factor, coupled circuits, attenuators
- The transformer
- Leveling filters Inductive circuit, capacitive input, LC filter
- Lighting of a lamp with switch
- Lighting of more lamps with switch
- Lighting of a lamp with shunters
- Lighting of a lamp with shunters and inverter
- Lighting of a hotel room
- Lighting of a file room
- Lighting of one or more lamps with relay
- Lighting of one or more lamps with step-by-step relay (M21-1100)
- Acoustic signaling
- Light signaling
- Acoustic/light signaling
- Pulse remote control of a user with relay
- Remote control with self-holding circuit

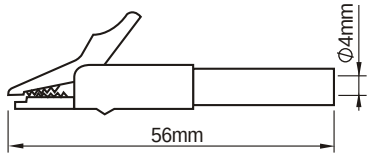
TEST CLIP (red, yellow, blue, green, black, green & yellow)

PTL909-1



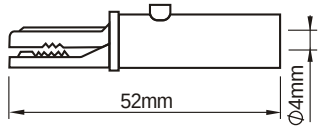
PTL909-1 Specification:
. Insulator: PA
. 30VAC, 60VDC
. Max. current: 10A

PTL909-2



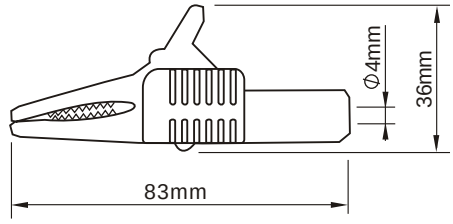
PTL909-2 Specification:
. Insulator: PA
. CATII 300V
. Max. current: 15A

PTL909-3



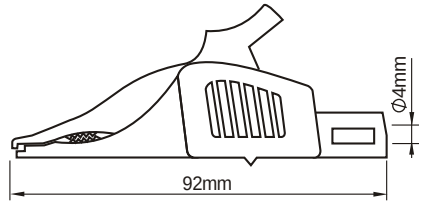
PTL909-3Specification:
. Insulator: ABS
. 30VAC, 60VDC
. Max. current: 10A

PTL909-5



PTL909-5 Specification:
. Insulator: PA
. CATIII 1000V
. Max. current: 32A

PTL909-6



PTL909-6 Specification:
. Insulator: PA
. CATIII 1000V
. Max. current: 32A

TEST CABLE

PTL921 Specification:
.Male BNC-2 crocdile clips
.3A
.100cm
.30VAC,60VDC

PTL921

PTL922 Specification:
.Male insulated BNC-2 crocdile clips
.3A
.100cm
.30VAC,60VDC

PTL922

PTL923 Specification:
.Male BNC-Male BNC
.3A
.100cm
.30VAC,60VDC

PTL923

PTL924 Specification:
.Male insulated BNC-Male insulated BNC
.3A
.100cm
.30VAC,60VDC
·□

PTL924

PTL 925 Specification:
.Male insulated BNC-2 crocdile clips
.3A
.100cm
.30VAC,60VDC

PTL925

PTL926 Specification:
.Male insulated BNC-2 clips
.3A
.100cm
.30VAC,60VDC

PTL926

PTL927 Specification:
.Male insulated BNC-2 safety stackable plugs
.3A
.100cm
.500V/CATI;150V/CATII
·□

PTL927

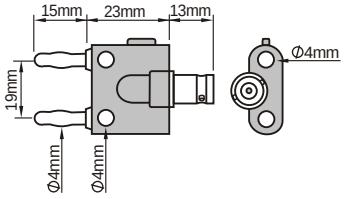
PTL928 Specification:
.Male insulated BNC-2 safety plugs
.3A
.100cm
.500V/CATI ;150V/ CATII
·□

PTL928

PTL929 Specification:
.Male insulated BNC-Male insulated BNC
.3A
.100cm
.500V/CATI;150V/ CATII
·□

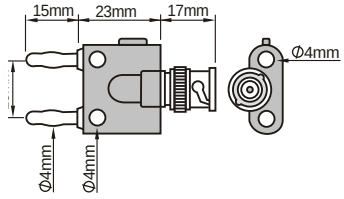
PTL929

ADAPTOR & VARIOUS



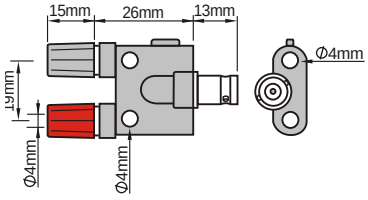
PTL-2156

2 Φ4mm plugs-female BNC
Max.Voltage: 500Vrms



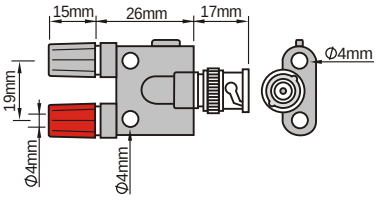
PTL-2157

2 Φ4mm plugs-male BNC
Max.Voltage: 500Vrms



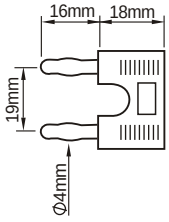
PTL-2158

2 Φ4mm binding post-female BNC
Max.Voltage: 500Vrms



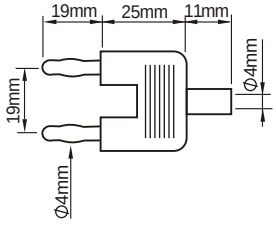
PTL-2159

2 Φ4mm binding post-male BNC
Max.Voltage: 500Vrms



PTL-2170

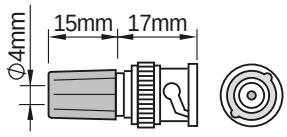
Φ4mm Short-circuit shunt
Max.Voltage: 500Vrms



PTL2172

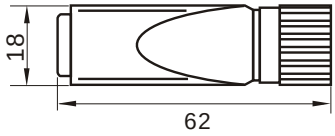
Φ4mm Short-circuit shunt
Max.Voltage: 500Vrms

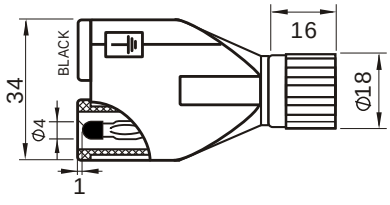
PTL-2403



PTL2403 Specification:
. BNC male to binding post
. 500Vrms

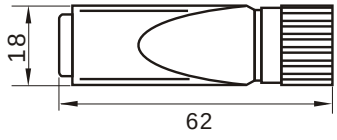
PTL-2161

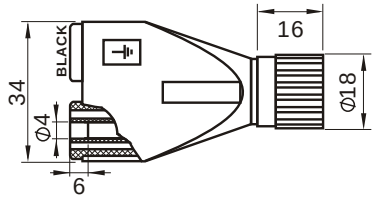




Insulated adapter □
male BNC-2 safety Φ4mm plugs for female safety leads
500V CATI/150V CATIII

PTL-2162





Insulated adapter □
male BNC-2 safety Φ4mm sockets for male safety leads
500V CATI/150V CATIII

New Products from Lionet Science

Gyroscope

120 mm in diameter and 250 mm high. Ideal for quantitative studies involving a variety of gyroscopic phenomena.
2111885

Battery Holder

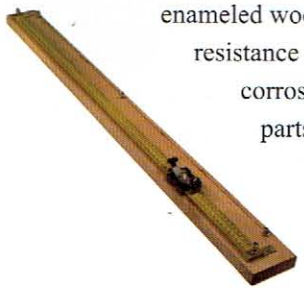
Build a 1-1/2 to 6 volt power source and use it to power our motors. Batteries can be connected from 0 to 6 voltsor -3 to 3 volts to experiment with different voltage levels. Includes: 5 terminals; plastic holder; rubber band; instructions. You need: 4 D batteries. #**2154110**

Optical Kits

Perform refraction experiments and study the behavior of light with this handy set of 6 prisms.
All are made of 15 mm thick acrylic with polished sides. Includes rectangular (75 x 50 x 15 mm); semicircular (90 mm base); equilateral (75mm sides); double convex lens (90mm, 23mm at center); two double concaves lenses (90mm, 10mm at center); wood box with storage compartments.
2140050

Wheastone Bridge

Slide-wire device is the classic way to measure resistance in a conductor by comparing a wire with known resistance to one with unknown resistance. Features 7.5 x 110 cm enameled wooden base; meter-long high resistance nichrome wire; terminals; corrosion-resistant nickel-plated parts; double-ended sliding knife edge contact; low resistance connectors; 1000mm scale.
2154540

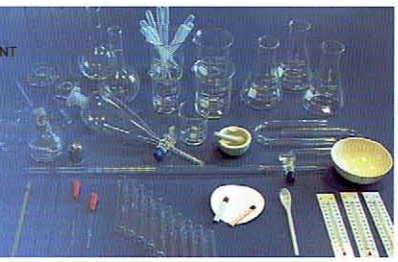


Dr. LASZLO'S COLLECTION
ELECTRICITY AND MAGNET FOR MIDDLE SCHOOL

1 pc BRAIN BOX 80 electronic kit (Ningbo product)
1 pc electroscope
1 pc ampermeter 50 mA , 500mA, with 5A measuring ranges
1 pc voltammeter 3V, 15V, with 30V measuring ranges
1 pc galvanometer ±50μA (+- 50 microamper)
1 pc stabilized Power Supply with safety socket (in 1.5 – 18V 1.5V step .2Amp)
1 pc model of bell
1 pc electromotor assembling kit b
1 pc induction coil with iron core
1 pc magnet needle on stand

Dr. LASZLO'S COLLECTION
GLASSWARE AND PORCELAIN FOR STUDENT

watch glass
watch glass
crystallizing disher
glass funnel
measuring cylinder borocilicate glass
measuring cylinder borocilicate glass
boiling flask
beaker
beaker
conical flask



Dr. LASZLO'S COLLECTION
ELECTRICITY AND MAGNET FOR HIGHER SCHOOL

1 pc electric current 1200 electronic kit (Ningbo product)
1 pc power supplier
1 pc ampermeter 50 mA , 500mA, with 5A measuring ranges
1 pc voltammeter 3V, 15V, with 30V measuring ranges
1 pc galvanometer ±50μA (+- 50 microamper)
1 pc digital multimeter
2 pcs of electrometer (point electroscope)
1 pair of conical conductor and 1 pairs of sphereical conductor
1 pc square electroscope + 1 set of electrostatic rod
1 set of perspex plate + electrostatic clothes
1 pair of condenser plate + 1 metal ball with handle

Dr. LASZLO'S COLLECTION
MECHANICS & SOUND FOR MIDDLE SCHOOL

musl purpose stand double clamp
lever balance spring sets
wooden inclinded plane slotted weight
table balance
dynamic cart
cylinder metal
digital stop watch
metal tape measure
tuning fork
millimeter square

Dr. LASZLO'S COLLECTION
MECHANICS OF THE LIQUID FOR MIDDLE SCHOOL

1 pc Stand base cast iron 5x8inch (base : with 60 cm rod (sorewy)
2 pcs multifunctional bosshead (can be assemble on a rod) $1.2 for set of 2
1 set Archimedes principle apparatus
1 pc Beaker, plastic, graduated, 1000ml
1 pc Mini Manometer, glass, scaled, with accessories
1 pc Hydraulic press model (50ml and 10ml plastic with iron weight 100gm+500gm
1 pc Measuring cylinder, glass, with feet, 250ml (without rubber bottle cap)borocilicate glass
U-shaped tube, length min: 150mm, min. diameter 15mm borocilicate glass
6 pcs student thermometers, 16cm: paper back gift

Distributor:

New Products from Lionet Science

Dual Sound / Wave Generator

1050228

This unit provides two sources of oscillating waves that are sourced from the one microprocessor.
They can be perfectly in phase or can be shifted in frequency and phase relative to one another over the range of 0.1Hz to 40kHz
The waveform can be sine,triangle or sawtooth and waveforms can be added or one wave modulated by the other.
The two outputs are very high power and can drive large speakers. Sockets are provided for headphones for private study.
A full entry keyboard permits the entry of any frequency or a shift of phase in degrees between the two signals.
#**1050228**

Conductivity Meter

10 Level readout

Visually compare conductivity between different solutions.
The green LED is numbered from 1-10 and will light up as the probes are dipped into solutions of salts or acids. Each light represents a unique level of conductivity from very low(1) to very high (10), providing quantitative and qualitative readings.
With brass probes.# **1050887**

1050887

1040115

Loop the Loop

With circular scale

Drop a ball on our circular track for a riveting display of the transformation between kinetic and potential energy. 110 cm metal track mounts on a sturdy base. High-resolution white-on-black 360° scale measures the angle at which the ball drops. Tow steel balls.
#**1040115**

1050336

Tangent Galvanometer

Selectable Air Core Solenoid

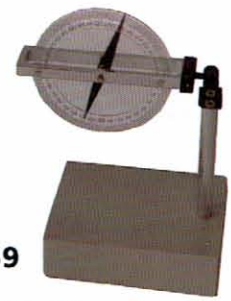
New! This features a liquid filled compass and runs over 25 hours on one battery. Multi turn coil, which changes the voltage from 5mV to 1.5V, offers precision resistance. 100/200/400 turn selectable air core solenoids change the magnetic field 4 times one AA battery included.# **1050336**

1050447

Vacuum Pump

Low cost, high quality

Transfer liquids in either direction with our two-way pump. Lightweight and practical, of sturdy PVC construction, it features a gauge in cm and inches Hg and displaces 725 mL of air. 16 long 1/4 clear plastic tubing included.
1050447



1050859

Dip Needle

New! Measure the vertical component of the earth,s field with this economical device. Our highly sensitive rotating compass is mounted on a horizontal rod between ruby bearings. Use as a normal compass or deploy vertically to measure the declination of the earth on our 360° circular scale. Sturdy base. #**1050859**

1052028

Dual Purpose Electroscope

New! This features an aluminum case with 4mm socket, a ground terminal and gold leaf support insulated by Teflon. The Malvern type electroscope is provided with a scale to measure the deflection of the gold leaf when static electricity is introduced.# **1052028**

Variable Plate Capacitor

New! Our capacitor permits an investigation of the Q = CV relationship. Capacitance increases when distance between plates decreases,# **1050872**

1050872

Air Source

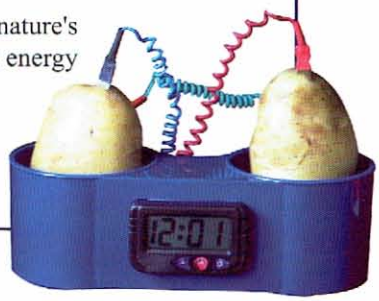
New! Quiet and dependable air source for air tracks and tables.
1040118 CE approved

1040118

New Products from Lionet Science

Lemon Clock

Make your own digital clock using nature's electricity. Learn about the galvanic energy in plants and liquids. #**1060700**



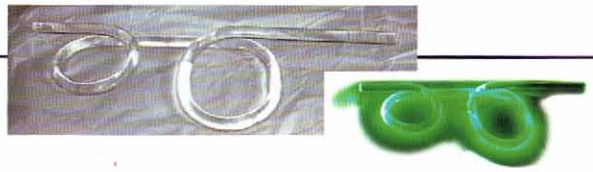
Demountable Transformer

Set of 5 coils with different turns can have relative voltage of output by plug a 6000 turn primary coil into main power.
#**1066850**

Electric Conductor

Robust design , higher resistance to earth, used for electrostatic experiments. #**1060710** **set of 4**

1060711	conical electric conductor	overall size	100x60x250mm
1060713	hollow electric conductor	overall size	80x80x250
1060715	sphere electric conductor	overall size	80x80x240
1060717	cylindrical electric conductor	overall size	170x60x250



Optical Rod

Precision machined Acylic Rod to demonstrate how information travels along a fiber optic line. # **1065500**

Expansion In Heating

A simple instruction to demo the expending rate different between two different liquid.
#**1068770**

Hot Glove

One size rubber mitten that fits most hands and protects hands when handling hot or cold labware. Features studded surfaces for good grip. #**1069010**

Stimulate Of Lumlung

Overall size 150x150x210.
#**2040338**

DISSECTIBLE TRANSFORMER

For demonstration of basic concepts associated with electromagnetic induction such as AC transformers, induced currents and their effects etc. Also call Demountable Transformer. Comprises a U-Core and I-Core of rectangular cross section, made from high grade laminations to minimize the induction losses, with size of the I-core suitable to sit completely over U-core to provide a continuous rectangular annular laminated block. Arms of the U-core takes various coils included for different experiments. All coils included are wound from enameled copper wire on insulated rectangular plastic bobbin and are totally covered to prevent any accidental direct contact with the winding. 4mm socket terminals provided at the front for electrical connections except for 600 turns coil that operates on AC mains and is provided with a two core flexible lead. With number of turns of coil clearly printed on front and direction of winding indicated on top. The bobbins have rectangular hole at their center matching the cross-section of U-core arms to sit on them with negligible air gap for minimizing induction losses. Also included is a pair of soft iron pole-pieces to sit on top of U-core arms. One end of each pole piece if flat so that the pole pieces in situ provide a narrow gap with full cross-sectional area, while the other end in form of truncated cone providing narrow concentrated field between the poles. Following components are included in the apparatus.

- Laminated U-Core - 1 No.
- Laminated I-Core - 1 No.
- Soft iron Pole Pieces - 2 Nos.
- One coil of 6000 turns, maximum current 0.2A with one intermediary output corresponding to 2000 turns
- One coil of 600 turns, maximum current 0.25A. Mainly to create the transformer primary. Provided with mains power supply
- One coil of 1200 turns, maximum current 1.25A, with intermediary outputs corresponding to 400 and 800 turns
- One coil of 72 turns maximum current 12A, with intermediary outputs corresponding to 6, 30, 54 and 66 turns

1090160/1 Dissectible Transformer with complete components

1090160/2 Stand for Dissectible Transformer: A cast metal stand consisting of a stable, non-skid heavy base with two removable clamping arms at the top. A channel, wide enough to accommodate U-core lengthwise, extends across its complete width. Integral support for arms, present toward the rear has level below the level of pole pieces. Arms pivoted on a spindle with adjustment of knobs at the rear, bringing cushioned pads beneath the front end of arms to bear on transformer core. Provided with 4mm hole for connecting earthing lead.

1090160/3 Coil for Transformer, 100 turns

1090160/4 Coil for Transformer, 300 turns

1090160/5 Coil for Transformer, 3600 turns

1090160/6 Coil for Transformer, 12000 turns

COILS FOR DISSECTIBLE TRANSFORMER, TRANSPARENT CASING

Coils for use with the Dissectible Transformer, Cat No. 1090160. These coils are of similar specifications as the ones supplied in Cat No. 1090160. All coils wound from enameled copper wire on insulated rectangular plastic bobbin enclosed on three sides by a transparent cover. Front of the bobbin is totally covered by a moulded plastic box on which 4mm shielded safety sockets are present for connecting coil in the circuit. With number of turns of coil clearly printed on front and direction of winding indicated on top. Rectangular bobbins have hole at their center matching the cross-section of U-core arms to sit on them with negligible air gap for minimizing induction losses.

1090180/1 Coil of 6000 turns, with one intermediary output corresponding to 2000 turns

1090180/2 Coil of 600 turns. Mainly to create the transformer primary. Provided with mains power cable

1090180/3 Coil of 1200 turns, with intermediary outputs corresponding to 400 and 800 turns

1090180/4 Coil of 72 turns maximum current 12A, with intermediary outputs corresponding to 6, 30, 54 and 66 turns

1090180/5 Coil for Transformer, 100 turns

1090180/6 Coil for Transformer, 300 turns

1090180/7 Coil for Transformer, 3600 turns

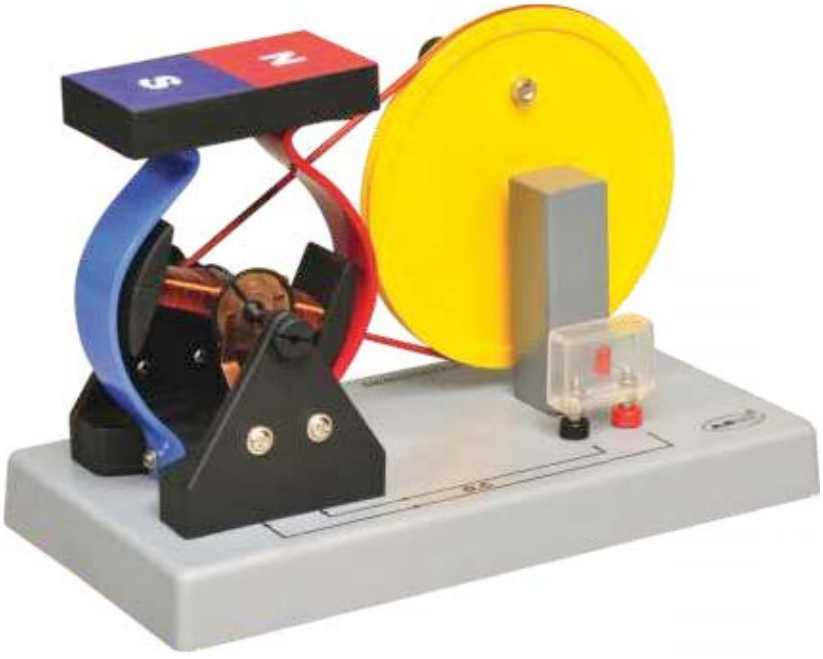
1090180/8 Coil for Transformer, 12000 turns

REMEMBER! We supply a comprehensive range of educational and school lab apparatus, covering more than 5000 items. If you are unable to find the product you are looking for in this catalog, please contact us with your query and we will be happy to assist you.

DEMONSTRATION DYNAMO, AC/DC

Shows the conversion of mechanical energy into electrical energy and principle of working of simple AC and DC dynamos. Complete assembly mounted on a base and capable of generating both AC and DC simultaneously as indicated by the glowing of bulb present on the base. A two-pole armature wound from enameled copper wire on insulated bobbin is mounted in shaft supported on moulded plastic legs on either side and is positioned between two curved iron strips. The shaft carries split ring commutator on one side for DC output and slip ring commutator on the other side for AC output, which is available through 4mm sockets mounted on respective sides and selectable through a sliding switch. Magnetic field provided by a permanent magnet on top of curved strips. The complete arrangement driven by a hand-cranked bigger driving wheel with handle through an endless rubber belt.

1090600 Demonstration Dynamo, AC/DC



DEMONSTRATION DYNAMO ECONOMICAL

A 6V DC motor fitted on a clamp driven by a big size pulley to generate electrical signals. A bulb will light up on drive the motor.

1090620/1 Demonstration Dynamo Economical

DEMONSTRATION DYNAMO, SIMPLE

Model mounted on a base, which also carries a hand-driven pulley coupled to the smaller dynamo pulley through an endless rubber belt to give a step-up ratio. Electrical output is via a pair of 4mm sockets and a light emitting diode is provided as simple output indicator. The model can also be used as a motor operating on a 6-8V DC supply.

1090620 Demonstration Dynamo, Simple

RESISTANCE BOX, PLUG TYPE

For accurate work. fitted in a plastic moulded box. Split brass contact blocks hold precision cut, interchangeable brass plugs having moulded black bakelite fluted tops. Coils of constantan wire, non-inductively wound, double silk covered; with resistances precisely adjusted and are mounted underneath the panel with double nut arrangement. Accuracy ±0.1%.

	Range (Ω)	*Total (Ω)*	*No. of Coils*
1090760/1	1-50	110	8
1090760/2	1-100	210	9
1090760/3	1-500	1110	12
1090760/4	1-1000	2110	13
1090760/5	1-5000	11110	16
1090760/6	1-10000	21110	17

Other ranges also available on specific request.

RESISTANCE BOX, PLUG TYPE

Same specifications as per Cat. No. 1090760 but with non-inductively wound coils of manganin wire, double silk covered with resistances adjusted to high precision. Accuracy ± 0.05%.

	Range (Ω)	*Total (Ω)*	*No. of Coils*
1090780/1	1-50	110	8
1090780/2	1-100	210	9
1090780/3	1-500	1110	12
1090780/4	1-1000	2110	13
1090780/5	1-5000	11110	16
1090780/6	1-10000	21110	17

Other ranges also available on specific request.

We specialize in product development as per customized requirements and designs meeting international quality standards with shortest delivery periods.

RESISTANCE BOX, DECADE, DIAL TYPE, METAL

Comprises circular dials mounted underneath a metal cover plate, inside sturdy aluminium extrusion case. Each dial has 10 resistances, with a knob at the top which rotates with positive click stop to select the desired value as indicated alongside index mark on the knob. Provided with a pair of 4mm sockets for connecting the resistances across a circuit and a yellow socket for earthing. Multiple dials are connected in series to add to the total resistances of each dial. Accuracy ±1%.

1090800/1 One Decade 1
0-100Ω × 10Ω

1090800/2 Two Decade 2
0-100Ω × 10Ω
0-10Ω × 1Ω
Total resistance is 110Ω.

1090800/3 Three Decades: 3
0-100Ω × 10Ω
0-1000Ω × 100Ω
0-10kΩ × 1kΩ
Total resistance is 11,100Ω (or 11.10kΩ)

1090800/4 Four Decades: 4
0-10Ω × 1Ω
0-100Ω × 10Ω
0-1000Ω × 100Ω
0-10kΩ × 1kΩ
Total resistance is 11,110Ω (or 11.11kΩ)

1090800/5 Five Decades:
0-10Ω × 1Ω
0-100Ω × 10Ω
0-1000Ω × 100Ω
0-10kΩ × 1kΩ
0-100kΩ × 10kΩ
Total resistance is 111, 110Ω (or 111.11kΩ)

Other ranges also available on specific request.

VARIABLE INDUCTOR

A set of five inductors housed in plastic moulded case. One can easily select any inductor out of five as indicated alongside index mark on the knob and can use in any circuit via. 4 mm sockets mounted on the plastic case (142x80x40) mm approx.

1090825 Variable Inductor

INDUCTANCE BOX, DECADE, DIAL TYPE, METAL

Designed with pot core stability for standard laboratory use. Useful as an oscillator element, wave shaping and resonance experiments, bridge experiments etc. Construction features similar to Cat No. 1090800. Accuracy ±3%.

1090820/1 One Decade
0-100mH × 10mH

1090820/2 Two Decades
0-10mH × 1mH
0-100mH × 10mH

1090820/3 Three Decades
0-1000µH (1mH) × 100µH
0-10mH × 1mH
0-100mH × 10mH

1090820/4 Four Decades
0-1000µH (1mH) × 100µH
0-10mH × 1mH
0-100mH × 10mH
0-1000mH (1H) × 100mH

1090820/5 Five Decades
0-100µH × 10µH
0-1000µH (1mH) × 100µH
0-10mH × 1mH
0-100mH × 10mH
0-1000mH (1H) × 100mH

Other ranges also available on specific request.

RESISTANCE COILS, PLASTIC CASE, ACCURATE 1

Non-inductively wound resistance coils of double silk covered constantan wire, mounted in moulded plastic round case. A pair of 4mm socket terminals at the top provide its connection in the circuit. Value clearly marked on each coil. Accuracy ±0.2%, rated 1W.

1090900/1	0.1 to 0.9Ω
1090900/2	1.0 to 10Ω
1090900/3	11 to 50Ω
1090900/4	51 to 100Ω
1090900/5	101 to 500Ω
1090900/6	500 to 1000Ω

RESISTANCE COILS 2

A range of resistance units based on a high stability metal film element (PCB). They offer improved accuracy and robustness, and are economical than traditional resistance coils. Accuracy ±1%.

	Resistance (Ω)	*Max. Volts (V) Max.*	*Current (A)*
1090920/1	2	1.0	500
1090920/2	20	3.0	150
1090920/3	5	1.6	320
1090920/4	50	5.0	100
1090920/5	1	0.7	700
1090920/6	10	2.2	220
1090920/7	100	7.0	70
1090920/8	500	16.0	32
1090920/9	1000	22.0	22
1090920/10	200	10.0	50

RESISTANCE SUBSTITUTION BOX

Eleven different resistances values fitted inside a plastic moulded box can be selected by just rotating the knob fitted on the box.

1090890 Resistance Substitution box

RESISTANCE COILS, TRANSPARENT PLASTIC CASE

Non-inductively wound with double silk covered constantan coils on plastic shaft enclosed in a transparent plastic tube with a connection terminal at each end. Values clearly marked on each coil. Accuracy ±0.2 %, Rated 1W.

1090940/1	0.1 to 0.9Ω
1090940/2	1.0 to 10Ω
1090940/3	11 to 50Ω
1090940/4	51 to 100Ω
1090940/5	101 to 500Ω
1090940/6	500 to 1000Ω

RESISTANCE COILS, IN CYLINDRICAL TRANSPARENT CASE

Non-inductively wound with double silk covered constantan coils on insulated plastic bobbins positioned in a transparent cylindrical plastic container by means of a plastic lid having 4mm socket terminal at its top. Values clearly marked on each coil.

A. Eureka / Constantan Wire
B. Magnin Wire

1090950/1	0.1 to 0.9Ω
1090950/2	1.0 to 10Ω
1090950/3	11 to 50Ω
1090950/4	51 to 100Ω
1090950/5	101 to 500Ω
1090950/6	500 to 1000Ω

MOUNTED RESISTANCE COILS

A useful apparatus for showing how resistance varies with the type of wire, length of wire and diameter of wire in coils. The apparatus can be used with wheatstone bridge or a suitable ohm-meter. Lengths and diameters of wires are in two to one ratios to simplify computations. A set of five collinear coils wound on identical bobbins and mounted on anodized aluminium sheet with six 4mm sockets to facilitate electrical connections. The coils are

Coil	Wire	Size	Length
No. 1	Copper	32SWG	10m
No. 2	Copper	38SWG	10m
No. 3	Copper	32SWG	20m
No. 4	Copper	38SWG	20m
No. 5	Nichrome	38SWG	10m

1091090 Mounted Resistance Coils

WHEATSTONE BRIDGE, FOUR GAPS

For determination of unknown resistances or comparison of resistances. This substantial FOUR-GAP bridge has broad, heavily plated brass strips mounted on a base. Terminals with 4mm sockets are provided to reduce unwanted resistance to a minimum and the gaps are closed by removable plated brass strips, which are held in position by the terminals. The 24SWG bare constantan wire is stretched along the top of a meter scale graduated in millimeters and figured every centimeter. The ends of the wire are securely clamped to the terminating strips to reduce end errors to the negligible level. Wire easily replaceable if damaged or broken. Supplied WITH JOCKEY.

1091100/1 On Polished Wooden Base
1091100/2 On Anodized Aluminium Channel Section Base

RESISTORS, SLIDING CONTACT (RHEOSTAT), OPEN TYPE, SINGLE TUBE 1

For use as series resistors or potentiometers. Comprises of eureka wire wound on a porcelain tube, supported at both ends on moulded plastic legs. Open type slide wire type with a variety of resistance and current carrying capacity. Copper-nickel alloy wire is oxidized to provide the desired insulation. Phosphorus bronze contact provided on metal chrome plated slider-rod to give rapid and smooth adjustment. Three 4mm socket terminals are provided – one at each end of the wound resistance wire and third one on one of the supporting legs and connected to the slider arrangement, enabling the use of rheostat as variable resistor or potential divider. Designed for continuous use without overheating. Total resistance in Ω and current carrying capacities are marked on each rheostat. Pipe diameter approx. 43mm.

		A	*B*	*C*	*D*	*E*	*F*
Length (mm)		150	200	250	300	400	500
	Current (A)			*Resistance (Ω)*			
1090960/1	8.0	1.5	2.5	3.5	4.5	6.5	8.5
1090960/2	6.5	3	4.4	6	7.5	10.5	13
1090960/3	5.0	4.5	6.5	9	11	15	20
1090960/4	4.2	8	12	16	20	28	36
1090960/5	3.3	11	16	22	27	37	50
1090960/6	2.8	15	22	29	36	50	64
1090960/7	2.3	23	34	45	56	80	100
1090960/8	1.8	36	55	74	92	128	165
1090960/9	1.6	50	75	100	125	175	225
1090960/10	1.4	64	96	128	160	220	290
1090960/11	1.2	89	135	180	225	315	395
1090960/12	1.0	115	175	235	290	405	515
1090960/13	0.8	160	240	320	400	560	720
1090960/14	0.6	270	400	540	670	930	1200
1090960/15	0.5	400	600	800	1000	1400	1800
1090960/16	0.4	660	975	1300	1625	2275	2950
1090960/17	0.3	1150	1700	2250	2850	3950	5150

Other ranges and rheostats on vitreous enameled pipe also available on specific request.

RESISTORS, SLIDING CONTACT (RHEOSTAT), OPEN TYPE, SINGLE TUBE

Similar to Cat. No. 1090960, but pipe diameter 56mm.

		A	*B*	*C*	*D*	*E*	*F*
Length (mm)		150	200	250	300	400	500
	Current (A)			*Resistance (Ω)*			
1090980/1	8.0	2	3	4.5	5.5	8	10
1090980/2	6.5	3.5	5.5	7.5	9.5	13	17
1090980/3	5.0	5.5	8	11	14	20	26
1090980/4	4.2	10	15	20	25	35	45
1090980/5	3.3	14	20	28	34	48	64
1090980/6	2.8	18	28	38	48	66	86
1090980/7	2.3	26	41	56	71	102	128
1090980/8	1.8	47	70	93	116	160	210
1090980/9	1.6	64	96	125	160	225	290
1090980/10	1.4	82	120	160	200	285	360
1090980/11	1.2	115	170	230	290	400	500
1090980/12	1.0	148	225	295	365	520	675
1090980/13	0.8	200	300	400	500	700	925
1090980/14	0.6	345	510	676	835	1165	1500
1090980/15	0.5	500	750	1000	1250	1800	2300
1090980/16	0.4	840	1250	1650	2270	2900	3750
1090980/17	0.3	1350	2100	2350	3600	5100	6750

Other ranges and rheostats on vitreous enameled pipe also available on specific request.

RESISTORS, SLIDING CONTACT (RHEOSTAT), OPEN TYPE, VITREOUS ENAMELED TUBE 2

Rheostats of excellent quality. Wound with heavily oxidized resistance wire on vitreous enameled steel tube. The winding is locked into place with ceramic cement. The tube is carried upon robust enameled die-cast end supports with heavy duty sliding contact consisting of multi leaf phosphor bronze strips, nickel plated for corrosion resistance. 4mm socket terminals are fitted, allowing for use as a variable resistor or potential divider.

	Resistance (Ω)	*Max. Current (A)*	*Tube Size (L × Dia.)*
1091060/1	1600	0.3	200×43mm
1091060/2	600	0.6	200×43mm
1091060/3	300	0.9	200×43mm
1091060/4	135	1.4	200×43mm
1091060/5	55	2.3	200×43mm
1091060/6	16	4	200×43mm
1091060/7	8.5	5	200×43mm
1091060/8	2.5	9	200×43mm
1091060/9	6.5	5.5	300×43mm
1091060/10	1325	0.5	300×43mm
1091060/11	280	1.2	300×43mm
1091060/12	125	1.8	300×43mm
1091060/13	37	3.2	300×43mm
1091060/14	20	4.5	300×43mm
1091060/15	4.5	9	300×43mm

Other ranges also available on specific request.

CAUTION:

- All the above Rheostats are of open design and are not protected, therefore, they should not be connected to electrical supplies exceeding 50V.
- While ordering Rheostats, please specify the Resistance (in Ω), Current capacity (in A) clearly.
- Current ratings indicated above are for intermittent use of rheostats in vertical position. For continuous, uninterrupted use, when Rheostats are being used horizontally, current should not exceed 75% of the marked value.

RESISTORS, SLIDING CONTACT (RHEOSTAT), WITH PERFORATED COVER

Heavy pattern, sturdy design, protected by perforated cover and designed to provide extra safety to the user. Other important design changes include spring loaded sliding contacts of solid brass in place of phosphor bronze strip contacts. Wound with heavily oxidized resistance wire on an insulated tube. Fitted with three 4mm socket terminals allowing for use as a variable resistor or potentiometer with a single slide operation. Resistance and current rating clearly marked on the slider. Resistance ±10% of the nominal value. Permits continuous use for longer periods without overheating. Pipe diameter available is about 56mm.

		A	*B*	*C*	*D*	*E*	*F*
Length (mm)		150	200	250	300	400	500
	Current (A)			*Resistance (Ω)*			
1091080/1	8.5	2	3	4.5	5.5	8	10
1091080/2	6.5	3.5	5.5	7.5	9.5	13	17
1091080/3	5.0	5.5	8	11	14	20	26
1091080/4	4.2	10	15	20	25	35	45
1091080/5	3.3	14	20	28	34	48	64
1091080/6	2.8	18	28	38	48	66	86
1091080/7	2.3	26	41	56	71	102	128
1091080/8	1.8	47	70	93	116	160	210
1091080/9	1.6	64	96	125	160	225	290
1091080/10	1.4	82	120	160	200	285	360
1091080/11	1.2	115	170	230	290	400	500
1091080/12	1.0	148	225	295	365	520	675
1091080/13	0.8	200	300	400	500	700	925
1091080/14	0.6	345	510	676	835	1165	1500
1091080/15	0.5	500	750	1000	1250	1800	2300
1091080/16	0.4	840	1250	1650	2270	2900	3750
1091080/17	0.3	1350	2100	2350	3600	5100	6750

Other ranges and rheostats on vitreous enameled pipe also available on specific request.

WHEATSTONE BRIDGE, TWO GAPS

Comprising 24SWG bare constantan wire stretched along a meter scale, subdivided in centimeters and millimeters, clamped to stout plated brass terminating plates designed to ensure that the connections are made exactly at the ends of the scale. A heavy plated brass strip with 4mm socket terminals is fastened along the back of the baseboard and provides a TWO-GAP system for normal Wheatstone bridge work. Supplied WITH JOCKEY.

1091120/1 On Polished Wooden Base
1091120/2 On sturdy Anodized Aluminium Channel Section Base 1

POTENTIOMETER

Useful as a potential divider for various electrical experiments such as in null point detection, works on the principle of variation of resistance of a conductor with length. Comprising a 24SWG bare constantan wire stretched along a meter rule, sub-divided in centimeters and millimeters and clamped to stout plated brass end plates. The clamping system is designed to make good electrical contact with the wire at the exact ends of the scale thus leaving virtually no margin for 'end errors'. The terminating strips are provided with heavy-duty 4mm socket terminals and the complete assembly is mounted on a long baseboard. Supplied WITH JOCKEY.

1091140/1 Single Wire (1m) on Polished Wooden Base 3
1091140/2 Double Wire (2m) on Polished Wooden Base
1091140/3 Single Wire (1m) on sturdy Anodized Aluminium Channel Section Base
1091140/4 Double Wire (2m) on sturdy Anodized Aluminium Channel Section Base 2

ELECTRICITY KIT

Activities those can be performed with this kit.
1. Characteristics of a complete circuits.
2. Materials used as a best conductor of electricity.
3. Working of a switch.
4. How do I control the brightness of the bulb?
5. Changing of circuits.
6. To draw a block diagram of a circuit.
7. How the wires of different materials affect the brightness of a bulb?

1091245 Electricity Kit

RESISTANCE BOARD

Three resistance wires are fitted on a wooden base with a cross sectional area ratio 1:2:4 to observe that how the resistance of same length wire is change on changing the cross sectional area.

1091170 Resistance Board

MANGNANIN WIRE, BARE

An alloy of manganese, nickel and copper, having a low temperature co-efficient. This wire is particularly suited for resistance coils etc., or any application where accuracy of resistance value is the important factor and electrical loading is low.

	Diameter (in mm)	*(SWG)*	*Mass (per reel)*
1091180/1	0.91	20	50g
1091180/2	0.71	22	50g
1091180/3	0.56	24	50g
1091180/4	0.45	26	50g
1091180/5	0.38	28	50g
1091180/6	0.31	30	50g

Mangnanin wire, Double Rayon covered is also available in above sizes.

Other sizes also available on specific request.

EUREKA/CONSTANTAN WIRE, BARE

A copper nickel alloy of low temperature co-efficient suitable for resistance coils etc.

	Diameter (in mm)	*(SWG)*	*Mass (per reel)*
1091200/1	1.62	16	125g
1091200/2	1.22	18	125g
1091200/3	0.91	20	125g
1091200/4	0.71	22	125g
1091200/5	0.56	24	125g
1091200/6	0.46	26	125g
1091200/7	0.38	28	125g
1091200/8	0.31	30	125g
1091200/9	0.27	32	125g
1091200/10	0.23	34	125g

Eureka/Constantan wire, Double Rayon covered is also available in above sizes.

Other sizes also available on specific request.

NICHROME WIRE, BARE

A nickel-chromium iron alloy especially suitable for high temperature applications such as heating elements, rheostats etc.

	Diameter (in mm)	*(SWG)*	*Mass (per reel)*
1091220/1	1.22	18	125g
1091220/2	0.91	20	125g
1091220/3	0.71	22	125g
1091220/4	0.56	24	125g
1091220/5	0.46	26	125g
1091220/6	0.38	28	125g
1091220/7	0.31	30	125g
1091220/8	0.27	32	125g

Other sizes also available on specific request.

WATER CIRCUIT BOARD

To demonstrate the principle of flow of electricity by analogy. Comprises an analogous circuit made of transparent plastic tubing connected to a low voltage electric pump operating on 6-12V DC for circulating water through the circuit, mounted on a large sheet metal board through spring clips. The circuit has two glass tubes of different bores, connected in parallel across the circuit and represents resistances. Across the resistances is connected a detachable manometer to show the pressure drop across the tubes indicating potential difference. Following the resistances, the tube discharges into a funnel for circulation through the circuit. 4mm sockets provided for power input to the pump. Rate of flow of water through the circuit represents current through the circuit and can be controlled by varying the input to the electric pump. Hoffman's Clips provided for disconnecting either of the two resistances or manometer, when needed.

1091240 Water Circuit Board

CARBON ARC LAMP

Mounted on wooden base to explain working of arc lamp operates on 12 volts AC/DC

1091280 Carbon Arc Lamp

MORSE KEY

To demonstrate the functioning of telegraphic communication. Tapping of the key sends signal to the sounder. On rectangular wooden base with two terminals, and pivoted contact arm with adjustable spring, all fittings are chrome plated. 4mm socket terminal provided for connections.

1091300 Morse Key 1

MORSE SOUNDER

Receives communication from Morse key and converts into audible signal for decoding. On rectangular wooden base with electromagnet and pivoted arm with adjustable screws, all fittings are chrome plated. 4mm socket terminal provided for connections.

1091320 Morse Sounder 2

PENCIL JOCKEY

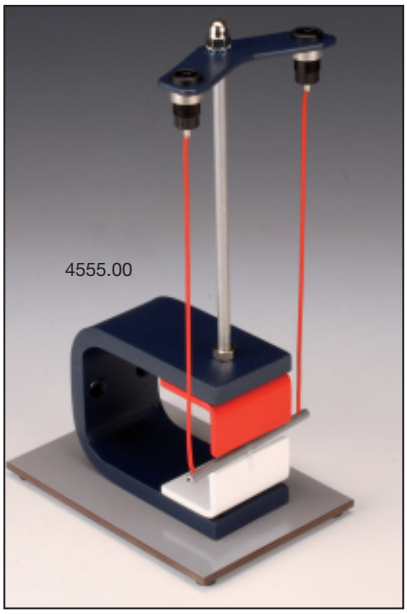
For Wheatstone bridge and potentiometer work, with insulated handle, plated brass contact, and a plated brass terminal with 4mm Socket.

1091160 Pencil Jockey

Pohl swing

For demonstration of the influence of a live wire in a magnetic field.
Dimensions:
Height 270, width 100, depth 160 mm.

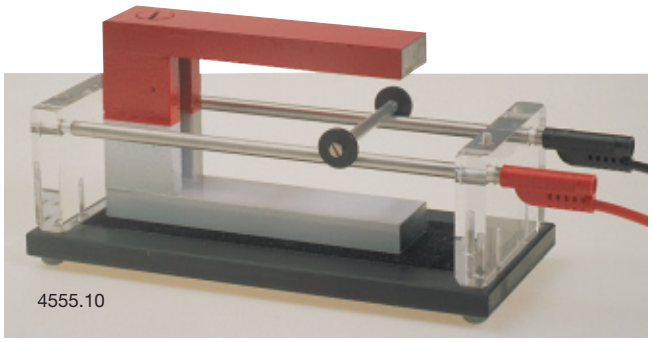
4555.00 Pohl swing



Apparatus for Laplace's law

This apparatus is the force on a conductor in a magnetic field. It consists of a pair of aluminium rails with 4 mm terminals. An aluminium axle with plastic discs can roll freely along the rails and thus completes the electrical contact between them. A strong U-shaped magnet is required to complete the app., use e.g. our no. 3315.00 (not included). When the axle is placed on the rails between the poles of the magnet and power is applied via the rails terminals, the axle is strongly repelled. I.e. it rolls along the rails away from the centre of the magnetic field.
Dimensions: 190 x 85 x 65 mm. Net weight: 445 g.

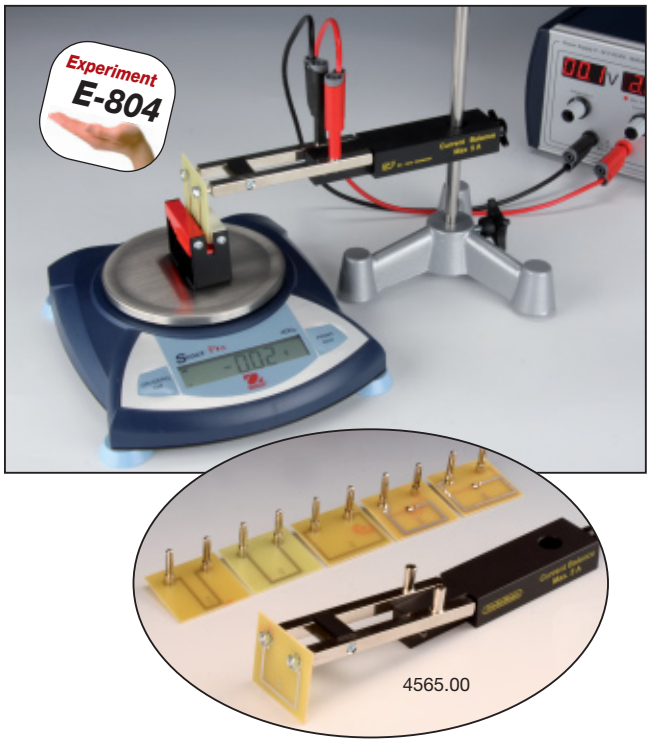
4555.10 Apparatus for Laplace's law



Current balance II

For demonstrating and measuring an electric conductor's influence on a magnetic field in relation to the angle between the conductor and the magnetic field. The equipment consists of a homogenous, permanent magnetic field built up by four magnets in a holder.

4565.10 Current balance II



Current balance I

For demonstration and measuring of an electric conductor's influence on a magnetic field.
The equipment consists of a magnet holder with interchangeable permanent magnets and a holder for wire frames which are mounted by means of 4 mm plugs.
For the experiment a top loading balance with 0.01 g accuracy and an 0-5 A, low voltage DC variable power supply are required.
The set consists of:
1 magnet holder with six permanent magnets.
1 holders for wire frames.
6 wire frames with wire lengths of 8 - 6 - 4 - 3 - 2 - 1 cm.

4565.00 Current balance I

DIDACTIC VARIABLE INDUCTOR RXI-1

Features

.Inductor equipped with 4mm safety socket and the whole unit is double insulated

RXI-1

Specifications

Variable inductance:	0.1~1.4H
No. of turns:	3500 in 16 layers
Resistance:	18Ω
Max. current:	2A
Wire diameter:	ϕ1.0mm
Core:	Soft iron ϕ40mm x 180mm
Graduation:	Henry and centimeter
Dimension:	290×160×105mm
Weight:	4.2kg

RXG250 SERIES SOLENOID CE

Features

.Simple application allows you to perform various manipulations
.Influence of L, I and the number of turns
.Axial guide for teslameter probes

RXG250

RXG250B

RXG250T

Specifications

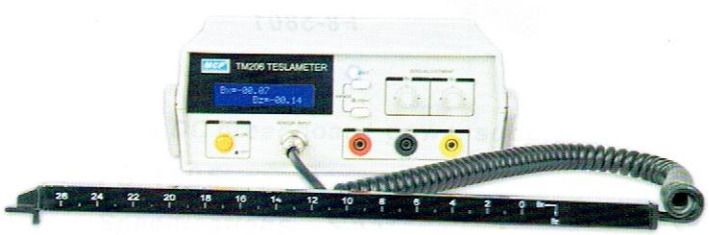
.Pipe length:	500mm
.Pipe material:	Ceramic
.Pipe diameter:	50mm
.Windings material:	Copper wires
.Dimensions:	620(W)×100(H)×120(D)mm
.Weight:	3kg

Model	Windings	Windings diameter	I_{max}	Intermediary terminals
RXG250	2×250T	0.92mm	7A(parallel)	×
RXG250B	500T	0.92mm	3.5A	×
RXG250T	250T+250T	1.0mm, 0.77mm	3.5A	√

TM206 TESLAMETER CE

Features

.Measuring BX and BZ at the same time
.Biaxial probe removable and graduation provided
.Double sensors protection
.2 ranges of measure:20 mT or 200mT
.Analog output



TM206

Specifications

.Range:	20mT	
	200mT	
.Display:	2000 digits LCD	
.Resolution:	10μT	
.Accuracy:	2%Rdg ± 3 digits (20mT)	
	2%Rdg ± 1 digit (100mT)	
.Analog:	Sensitivity:	10mV/mT(20mT)
		1mV/mT(100mT)
	Impendence:	4.7kΩ
	Connection:	safety socket Φ4mm
.Power supply:	110~127VAC±10% 60Hz, or 220~240VAC±10% 50Hz	
.Dimensions:	230(W)×85(H)×240(D)mm	
.Weight:	1kg	

THERMOPILE

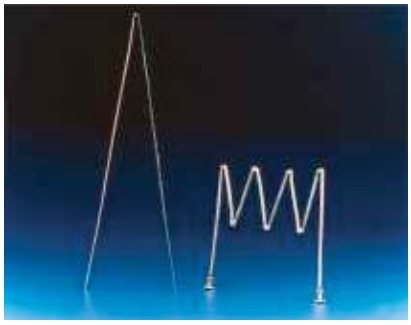
Demonstrates the generation of thermo emf in accordance to the Seebeck effect. Comprises a number of Bismuth (Bi) and Antimony (Sb) couples joined together in series and mounted in an annular metal ring with insulation between them. The Bi-Sb junctions in the metal ring are arranged in the rectangular fashion forming the sensitive area that comprises only of hot junctions, the cold junctions being the thick walled metal body. Terminals provided for electrical connection. A sheet metal conical funnel has a polished inner surface to facilitate the focusing of radiant heat on to the pile junctions and is fitted over the sensitive end of the metal ring to increase the directional sensitivity and to minimize cooling of the pile junctions by extraneous air currents. The complete apparatus mounted on a stable cast metal base through a plated metal rod. Configurations available are

1061160/1 12 pairs of Bismuth and Antimony Poles
10611602 24 pairs of Bismuth and Antimony Poles
1061160/3 48 pairs of Bismuth and Antimony Poles

ADJUSTABLE GAP MAGNET

Two Neodymium magnets fitted on two adjustable iron holders on metallic base. One can easily adjust the field strength in between the two magnets by just rotating knobs provided on the extreme ends.

1070010 Adjustable Gap Magnet



SIMPLE THERMOCOUPLE, COPPER-CONSTANTAN

Comprises of two wires about 300mm long, one each of copper and constantan joined together properly by twisting them and brazing the joint.

1061180 Simple Thermocouple, Copper Constantan

THERMOCOUPLE, COPPER-IRON

Copper and iron wires, four each joined alternately in V-shape by twisting and brazing together to form a total of seven junctions, four on the outer side and three on the inner side. With brass connectors for electrical connection.

1061200 Thermocouple, Copper-Iron

BAR MAGNETS, CHROME STEEL

Chrome Steel, supplied in pairs, red and blue painted with keepers. Available in sizes (L × W × H) (approximate).

1070020/1 37×12×5mm
1070020/2 50×12×5mm
1070020/3 75×12×5mm
1070020/4 100×12×5mm
1070020/5 150×12×5mm
Optional: Wooden case for above.
Other sizes also available on specific request.

BAR MAGNETS, ALNICO

ALNICO magnets supplied in pairs, with keepers. Strong lasting power. North pole clearly marked. In cardboard boxes.

1070040/1 37×13×10 (L × W × H)
1070040/2 50×13×10 (L × W × H)
1070040/3 75×13×10 (L × W × H)
1070040/4 100×13×10 (L × W × H)
1070040/5 150×13×10 (L × W × H)
1070040/6 37×15×10 (L × W × H)
1070040/7 50×15×10 (L × W × H)
1070040/8 75×15×10 (L × W × H)
1070040/9 100×15×10 (L × W × H)
1070040/10 150×15×10 (L × W × H)
1070040/11 50×12×8 (L × W × H)
1070040/12 75×12×8 (L × W × H)
1070040/13 100×12×8 (L × W × H)
1070040/14 150×12×8 (L × W × H)
1070040/15 50×15×5 (L × W × H)
1070040/16 75×15×5 (L × W × H)
1070040/17 100×15×5 (L × W × H)
1070040/18 100×20×10 (L × W × H)
1070040/19 150×25×15 (L × W × H)
Other sizes also available on specific request.

CYLINDRICAL BAR MAGNETS, CHROME STEEL

Chrome Steel magnets supplied in pair with keepers, painted red/blue, dia. about 12mm

1070060/1 50mm **1070060/2** 75mm
1070060/3 100mm **1070060/4** 150mm
Other sizes also available on specific request.

CYLINDRICAL MAGNETS, ALNICO

ALNICO, round edges, in pairs, with keepers. Strong lasting power. Supplied in cardboard boxes.

1070080/1 37×10mm
1070080/2 50×10mm
1070080/3 75×10mm
1070080/4 37×12mm
1070080/5 50×12mm
1070080/6 75×12mm
1070080/7 100×12mm
Other sizes also available on specific request.

BOXES FOR BAR MAGNET

Spare boxes for bar magnets, wooden. Lengths available are

1070100/1	50mm	**1070100/2**	75mm
1070100/3	100mm	**1070100/4**	150mm

HORSESHOE MAGNETS, CHROME STEEL

Chrome steel, with keepers, painted red. Approximate dimensions are

1070120/1 50×12×5mm
1070120/2 75×12×5mm
1070120/3 100×12×5mm
1070120/4 150×12×5mm
Optional: Wooden case for above.
Other sizes also available on specific request.

HORSESHOE MAGNETS, ALNICO

ALNICO, with keepers, painted red. Strong lasting power. Supplied in cardboard boxes. Approximate dimensions are

1070140/1 50×12×15mm
1070140/2 75×12×15mm
1070140/3 100×12×15mm
Other sizes also available on specific request.

U-SHAPED MAGNET, CHROME STEEL

Chrome Steel magnets, good lifting power, N-pole marked, with keeper. Supplied in cardboard boxes.

1070160/1 15×6×75mm
1070160/2 15×6×100mm
1070160/3 15×6×150mm
1070160/4 15×8×75mm
1070160/5 15×8×100mm
1070160/6 15×8×150mm
Other sizes also available on specific request.

U-SHAPED MAGNETS, ALNICO

ALNICO, strong lasting power, with keepers. Supplied in cardboard boxes.

	Size	*Centre Gap*	*Lifting Power*
1070180/1	37×13×10mm	18mm	350g
1070180/2	50×13×10mm	18mm	500g
1070180/3	75×13×10mm	18mm	500g

Whole assembly is fitted inside a plastic moulded case. A 9 Volt battery is used to operate it. Polarity will get reverse the direction on reversing the direction of sensor.

1070210 Hall Effect Probe

RING MAGNETS, CERAMIC

Annular shaped, strong magnets of ceramic, polarized along cylindrical axis, i.e., north / south poles along the flat surfaces.

1070200/1 32×16×8mm
1070200/2 36×18×6mm
1070200/3 36×18×8mm
1070200/4 45×22×8mm
1070200/5 45×22×11mm
1070200/6 53×24×10mm
1070200/7 72×32×10mm
Other sizes also available on specific request.

HALL EFFECT PROBE

Magnetic fields produced by permanent magnets and electromagnets can be measured with the help of Hall Effect probe. In the presence of magnetic fields the device will generate an output voltage in the range-4 to 4volts for field densities -70 to 70mT.

ELECTROMAGNETIC FIELD EXPERIMENT

Visibly demonstrates the magnetic field patterns associated with the different shapes of current carrying conductors. Comprises three conductors, each of different shape / configuration – straight rectangular, circular loop and solenoid – all mounted on a clear, transparent acrylic base. Each configuration has conductor wire consisting of 6 turns of 0.6mm diameter copper wire and is provided with a pair of 4mm sockets to connect them to a low voltage DC power source, with output current not exceeding 5A (maximum equivalent current through conductor being 30A). Using the included iron filings and 8 magnetic compasses (13mm diameter) lets you investigate the associated field and flux patterns. The transparent base allows the results to be shown on screen for entire class using overhead projector.

1070350 Electromagnetic Field Experiment

MAGNETIC FIELD DEMONSTRATOR

A set of two transparent plates of size (155x76x6)mm has a matrix of small (14x7) circular chambers, each chamber containing a piece of iron rod and functioning effectively as a plotting compass. We can arrange the plates in various ways e.g. as single large two-dimensional surface and as the faces of cube, so in this way it may be used to show the configuration of a magnetic field in one or two dimensions with the attraction and repulsion properties of magnets. The transparent nature of plates also makes them suitable for use on an overhead projector. A set of bar magnet is also provided with the kit.

1070370 Magnetic Field Demonstrator

MAGNETIC FIELD AROUND A STRAIGHT CURRENT CARRYING CONDUCTOR

Thick copper wire in the form of square loop for investigation of magnetic fields by the way of iron filling or plotting compass is mounted on a plastic moulded case. The ends of wire are internally connected with 4mm sockets. Maximum current rating is 10A DC.

1070375 Magnetic Field around a Straight Current Carrying Conductor

MAGNETIC FIELD DEMONSTRATION

For the study and demonstration of magnetic fields associated with different shapes of current carrying coils/conductors. Mounted on clear, transparent acrylic permits its use on OHP for classroom demonstration. Each accompanied with a pair of 4mm socket terminals for electrical supply. The magnetic effects in each can be visualized through the use of iron filings or plotting compasses. Comprises of following coils / conductors.

1070360/1 Long Solenoid: A solenoid coil about 52×125mm (diameter × length) of 16 SWG enameled copper wire. Each turn is sufficiently apart and well insulated from the adjacent ones.

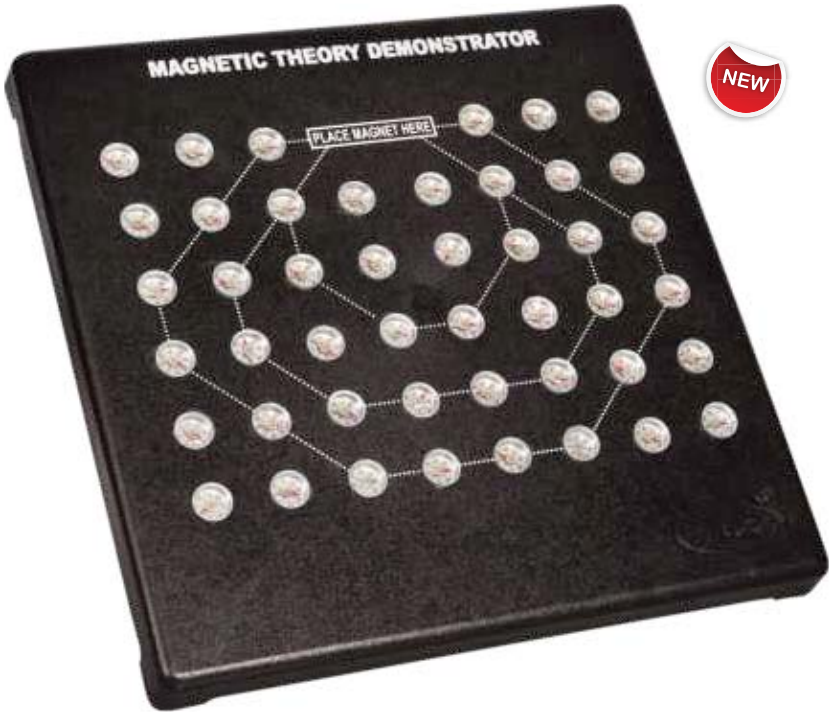
1070360/2 Vertical Wire: Copper wire 16 SWG, mounted in U shape, vertically on the base. Maximum current is 8A.

1070360/3 Vertical Coils: A set of 1 turn and 5 turn coils mounted side-by side on the base, each with separate pair of socket terminals for electrical connections. Maximum current for 1 turn coil is 8A and for 5 turn coil is 5A. By making the current flow through both of them, the cumulative effect of magnetic field of each can also be investigated.

1070360/4 Single, Circular Coil: Single turn circular coil of copper wire of 16 SWG mounted vertically on base. Coil diameter about 55mm. Maximum current is 8A.

1070360/5 Set of 4 Coils: Comprising one each of the above.

REMEMBER!
We supply a comprehensive range of educational and school lab apparatus, covering more than 5000 items. If you are unable to find the product you are looking for in this catalog, please contact us with your query and we will be happy to assist you.



MAGNETIC FIELD DEMONSTRATOR

To demonstrate the magnetic lines of forces, 46 magnetic compasses are fitted on a (302x302)mm approx. square plastic moulded base. Permanently fitted magnetic compasses provides a advantage to handle and store it easily.

1070415 Magnetic Field Demonstrator

MAGNETIC NEEDLES, BRASS CUP BEARING 1

Made of Carbon steel with brass cup bearing for pivoting.

1070420/1 50mm **1070420/2** 75mm
1070420/3 100mm

MAGNETIC NEEDLES, JEWELED BEARING 2

Made of Carbon steel with jeweled bearing for pivoting.

1070440/1 50mm **1070440/2** 75mm
1070440/3 100mm

PLOTTING COMPASS 3

With dial marked with principal points of the compass, top glass face, only in plastic / aluminium case.

1070480/1 12mm **1070480/2** 16mm
1070480/3 20mm **1070480/4** 25mm
1070480/5 38mm **1070480/6** 50mm
1070480/7 75mm

PLOTTING COMPASS, SMALL 4

With both the faces of clear glass having two orthogonal cross-lines, in aluminium frame. About 20mm diameter.

1070500 Plotting Compass, Small

PLOTTING COMPASS, BIG 5

Magnetic with metal dial body marked, aluminium body, jeweled needle upper plate of glass.

1070520/1 30mm
1070520/2 45mm

MAGNETIC COMPASS, WITH LOCK 6

Magnetic needle with metal dial having compass points marked, aluminium body, jewelled needle. Supplied with locking arrangement to prevent damage while transportation. With good quality, well finished cover.

1070540/1 30mm
1070540/2 45mm

PLOTTING COMPASS

Made of stainless steel with locking facility.

1070525 Plotting Compass

100% SATISFACTION GUARANTEED!

All our products carry unconditional guarantee for a period of 12 months. If for any reason, our product is not upto your satisfaction, we will send you a replacement as per your needs OR a refund / credit for the same.

TANGENT GALVANOMETER

Simplest way to measure the current passing through a coil with the help of compass and earth's magnetic field. No. of turns of coil can be selected on rotating the rotary switch fitted on the plastic moulded base. A D type battery is used to flow the current through the coil.

1070845 Tangent Galvanometer

TANGENT GALVANOMETER - ECONOMICAL

Simple and economical tangent galvanometer is specially designed to demonstrate that a current carrying coil produces a magnetic field perpendicular to the direction of the current. On placing a magnetic compass on transparent platform students can visualize that on changing the electric field the magnetic field will change.

1070845/1 Tangent Galvanometer - Economical

PRIMARY AND SECONDARY COILS

For exploring the concept of electromagnetic induction. Comprises two coils - primary coil wound from thicker gauge enameled copper wire with lesser number of turns; and secondary coil wound from thinner gauge, fine enameled copper wire with more number of turns. Both coils wound on a insulated plastic former and fitted with 4mm sockets. Primary slides into secondary for electromagnetic coupling. Includes soft iron cylindrical core that slides into primary.

1070860 Primary and Secondary Coils

DISSECTIBLE TRANSFORMER

It is a simplest way to demonstrate the electromagnetic induction and the working of a transformer as step up and step down. It comprises of two coils wound on plastic spools one of big size with thinner gauge, where as small size coil with thicker gauge, fine enameled copper wire and fitted with 4mm terminals. A soft iron cylindrical core is also provided with the coils.

1070885 Dissectible Transformer

MEASURE THE FORCE OF LAPLACE

Ideal for all work on Fleming's Left Hand Rule and associated investigation. Copper enameled wire sandwiched between two L shape plastic strips to form a coil that can easily stand on a digital balance to show the force on a current carrying conductor in a magnetic field with a current in the coil, the balance resistors the force by an apparent weight gain or loss. The end points of the coil are internally connected with colour coded flexible leads. No. of turns 100 with 2A DC maximum current rating.

1070890 Measure the Force of Laplace

BARLOW'S WHEEL

For demonstrating the conversion of electric energy into mechanical energy. Comprises a toothed copper disc about 9cm diameter, capable of rotating vertically on pair of adjustable bearings at its each side. The disc dips into mercury trough positioned between the two arms of a small horseshoe magnet. Disc holding clamp is adjustable vertically on metal support rod, which is connected to a terminal for electrical connections. Other terminal provided for connecting to the mercury trough. With the height of disc properly adjusted, the pointed teeth of disc dips just enough to make electrical contact with the mercury and experiences a force when current flows through it. The apparatus operates on 4-6volts. Supplied without battery.

1070900 Barlow's Wheel

FRICTION RODS FOR ELECTROSTATICS

Rods of different materials, useful in the study of electrostatics by charging through rubbing by a suitable material. Lengths of all rods about 30cm with their diameters about 12-13mm.

1080020 Nylon Rod
1080040 Polythene Rod
1080060 Ebonite Rod
1080080 Glass Rod
1080100 Perspex Rod
1080120 Compound Rod, Glass-Brass
1080140 Compound Rod, Ebonite-Brass

WESTMINSTER ELECTROMAGNETIC KIT

A comprehensive kit designed to contain all the necessary components for exploring concepts of electromagnetism, such as various types of magnets and their different arrangements and properties, working of motors, dynamos, vibrators and meters, principle of transformers, eddy current and damping etc. standard pack sufficient for 8 students. The complete kit includes

Anisotropic Alloy Magnets	8 Nos.	Anisotropic Ceramic Ferrite Magnets	8 Nos.
Steel Magnet Yokes	4 Nos.	Plotting Compasses	6 Nos.
Hardboard Formers for Compasses	4 Nos.	Iron Filing	1 Bottle
Iron Filing Dispensers	4 Nos.	Pair of C-Cores	4 Nos.
C-Cores Clips	4 Nos.	Aluminium Rings	4 Nos.
Aluminium Rings, Split	4 Nos.	Support Bases	4 Nos.
Armature with Axle Tubes	4 Nos.	Split Pins	8 Nos.
Rivets	16 Nos.	Axle Shafts	4 Nos.
Latex Rubber Tubing	1 length	Wooden Former for Coils	4 Nos.
Cello Tape Roles	4 Nos.	PVC Insulated Wire, 26SWG	4 Reels
White Paste Board Sheets	4 Nos.	Plain Postcard Sheets	4 Nos.
White Cotton Thread	1 Reel	MES Bulbs	10 Nos.
Neon Bulbs	5 Nos.	MES Lamp Holder	8 Nos.
Wooden Clamp and Wooden Block	1 each		
Carbon Resistances, 100Ω and 10Ω, 0.5W each	4 Nos. each		

1070940 Westminster Electromagnetic Kit

MAGNETS KIT

Help students understand the force of magnetism with these exciting experiments including classifying magnetic and non-magnetic materials, what attracts and repels, magnetic force through solids, how compasses react to a magnetic field and more! Includes a Teacher's Guide and material for five students.

4006 Magnets Kit

GOLD LEAF ELECTROSCOPE

Rectangular sheet metal case mounted in insulated base and provided with removable front and back sliding glass panels, one clear and other ground, respectively. Removable disc electrode mounted at the top through a moulded plastic bush insulating the disc electrode from the metal body to prevent charge leakage. The plastic bush has a plated metal blade on the underside for fixing the gold leaf. Case fitted with terminal at the side for earthing. Removable clear front slides up to allow insertion of ionizing material in chamber and fixing of leaves, when needed. A clear acrylic circular scale inside the chamber, graduated 0-90°, facilitates the comparison of charge by means of deflection. Supplied complete with one pair of leaves.

1080440 Gold Leaf Electroscope 1

ELECTROSCOPE, GOLD LEAF, FLASK TYPE

Comprises a glass conical flask, sealed at the top with holed rubber stopper. A metal rod supports a disc terminal at the top of rubber stopper and a pair of foil leaves suspended inside.

1080460 Electroscope, Gold Leaf, Flask Type 2

GOLD LEAVES

For use with electroscopes, available as spare, pack of 6

1080520 Gold Leaves

Our aim is to develop user friendly and affordable products to allow and facilitate the search for knowledge.

ELECTROSCOPE, METAL CASE, BIG

A bigger sized electroscope, similar to Cat No. 1080440, in appearance and construction. It has an insulating bush carrying a metal blade underneath it and inside the chamber to which a single metal leaf may be pivoted which deflects, when charged. The case provided with a terminal for earthing. The front window is clear and the rear window is of ground glass. An internal transparent scale graduated 0 to 90° is provided for measuring the deflection of the leaf. Includes two interchangeable electrodes that can be fitted on top of insulating bush - a disc electrode of diameter 50mm, mounted on a peg and a metal ball of 25mm diameter to study the charge capacities of both the electrodes. Overall dimensions 112×63×143mm (width × thickness × height).

1080480 Electroscope, Metal Case, Big

ELECTROSCOPE, IN CIRCULAR METAL CASE

An annular metal ring frame of diameter about 125mm, carries an insulating bush at the top, which has circular metal disc electrode above it and a conducting metal strip on the underside. The smaller, lightweight metal strip is pivoted at the center of bigger strip to provide deflection with the charging of electrode. The metal frame also has an earthing terminal at one side. Complete assembly mounted on base.

1080500 Electroscope, in Circular Metal Case

ELECTROSCOPE, GOLD LEAF, ALUMINIUM EXTRUSION

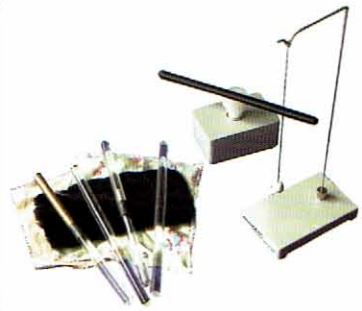
Comprises a pair of specially designed aluminium extrusion walls mounted parallel to each other and supported on top and bottom by moulded plastic plates. Provided with removable front and back sliding glass panels, one clear and other ground, respectively. The disc electrode is mounted through the upper lid connected to a metal blade at its underside, which in turn has a fine sheet metal leaf pivoted at its center to provide deflection with the charging of the electrode. Case fitted with terminal at the side for earthing. The upper lid also has a circular arc scale attached at its underside for noting the deflection of leaf

1080450 Electroscope, Gold Leaf, Aluminium Extrusion

New Products from Lionet Science

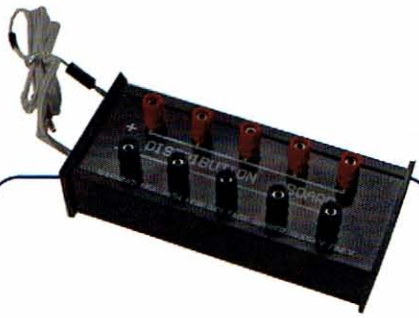
Vacuum Pump

150W, higher efficient, lower noise, CE approved. #**1014149**



Electrostatic Kits with Supports

This kit contains various friction rods and fabrics for electrostatic experiments a pith ball is suspended and will clearly demonstrate attraction and repulsion.
#**1025224**



Distribution Board

Suitable for student use in classroom for sharing one power supplier for up to 5 groups. #**1035412**

Power Supply

Robust 12A AC/DC power supply with overloading protection. 1V step from 1V to 27V selectable.
#**1050238**

Power Supply

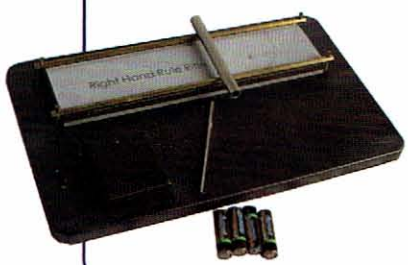
A new robust model with 8A AC/DC output, overloading protection, 1V step from 1V to 13V selectable by J link.
#**1050239**

Ring and Disc

Simple materials of the same mass and diameter - a Steel Ring and Wood Disc. #**1050234**

Air Core Solenoid

Air core solenoid with multi selectable turns, show student the magnet field tension changes when the turn of the coils differ. #**1050263**



Right Hand Rule

Investigate the magnetic field around a wire. Our heavy brass wire has terminals arranged on a transparent plastic base.
Also included are one 45 mm diameter compass, six smaller (16 mm diameter) compasses, and instructions. Arrange the compasses around the vertical rod and turn on a power supply.
#**1050259**

New Products from Lionet Science

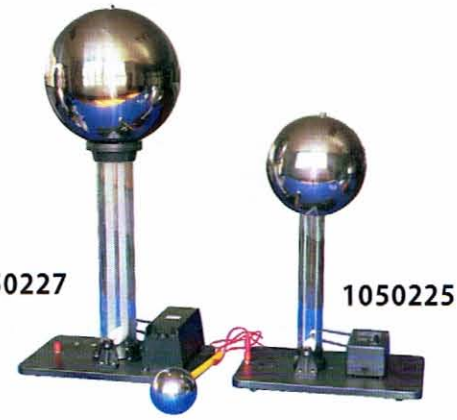
Variable High-output Air Source (cat. 1040118)
Mini Air Source (cat.1040120)

are designed with noise-reduce technology. It is powerful enough to float fully-loaded gliders or pucks,and is supplied with 1.5 meter long air hose suitable for all our air tables and air track

1040120

1040118

Van De Graff generator is an electrostatic generator which uses a moving belt to accumulate very high amounts of electrical potential on a hollow metal globe on the top of the stand.
In honor of the American physicist Robert J. Van de Graaff and his great innovation 85 years ago .Our Deluxe version (cat.105227) and Economic version (cat. 1050225) are designed with a variable speed control. Newly marketing in 2004



1050227

1050225

The Wimshurst influence machine is an electrostatic generator, It has a distinctive appearance with two large contra-rotating discs mounted in a vertical plane, two crossed bars with metallic brushes, and a spark gap formed by two metal spheres.
In 2012, Lionet Science and Education begun to produce a super size model (cat.1052339) in honor of British inventor James Wimshurst who (1832 - 1903) invented this great machine 130 years ago .

1052339

1052338

The induction coil (cat. 1050235)

An induction coil or "spark coil" (archaically known as an inductorium or Ruhmkorff coil after Heinrich Ruhmkorff) is a type of electrical transformer used to produce high-voltage pulses from a low-voltage direct current (DC) supply. To create the flux changes necessary to induce voltage in the secondary coil , the direct current in the primary coil is repeatedly interrupted by a vibrating mechanical contact called an interrupter. Developed in 1836 by Nicholas Callan and others, the induction coil was the first type of transformer. They were widely used in x-ray machines, spark gap radio transmitters, arc lighting and quack medical electrotherapy devices in early 20th century

1050235

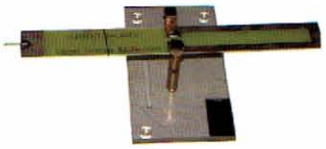
Our induction coil have special DC output to have rectified current at 3 mA 80KV

The ignition coil (cat. 1050237)

An ignition coil (also called a spark coil) is an induction coil in an automobile's ignition system which transforms the battery's low voltage to the thousands of volts needed to create an electric spark in the spark plugs and thus to ignite the fuel. Some coils have an internal resistor while others rely on a resistor wire or an external resistor to limit the current flowing into the coil from the car's 12-volt supply. The wire that goes from the ignition coil to the distributor and the high voltage wires that go from the distributor to each of the spark plugs are called spark plug wires or high tension leads.

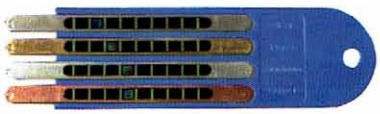
1050237

New Products from Lionet Science



Electrical Balance

Electrical balance, working together with lionet air core solenoid show student effect of the current in magnet field.
1050264

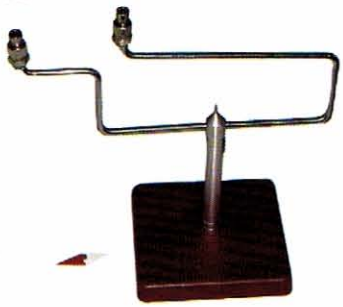


Thermal Conductivity Bar

Thermal conductivity meter, number scaled. # **1050310**

Oersted'S Law

Oersted'S Law Study the relationship between magnetism and the magnetic effect of electric current flowing in a wire with this classic device.
Our 15 cm long permanent magnetic needle rotates freely inside an aluminum frame that allows current to flow over or under the needle in either direction.
1050265



Lenz's Law

Teaches Faraday's Law of Induction as well as Lenz's Law. Show how passing a magnet through a complete loop causes the device to move.
1050266

Double Cone and Plane

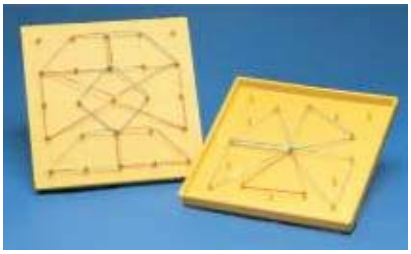
Double cone and plane: defy gravity as the cone appears to roll upwards.
1050270

Gaussian Gun

When you align powerful neodymium magnets on a linear rail and arrange steel balls in a sequence? A fun and intriguing demonstration of Newtonian physics. When properly arranged, a slow moving steel ball will be accelerated to 5-10 times its original speed by the pull of magnets and Newton's Third Law of Motion. # **1050283**

Inertial Balance

This is used to quantitatively determine the inertial mass of an object and is a simple way to demonstrate Newton's First Law. You can calculate the periodic motion of the balance when pushed sideways, showing that its motion is independent of the effects of gravity. Includes a frame with two platforms (one with holes) connected by two firm, horizontal spring blades. # **1050285**



YELLOW PLASTIC GEOBOARD

Supper sturdy pins make this 8" double-sided plastic board ideal for students of all ages. 5x5 pin array on one side, 12 pin circular pattern on the other.

SR-0600 Single Plastic Geoboard
SR-0658 Rubber bands

OVERHEAD GEOBOARD

Engineered to resist breakage, this transparent 7" geoboard is perfect for your overhead projector. 5x5 pin array.

SR-0615 Overhead Geoboard
SR-0658 Rubber bands

DISPLACEMENT VESSEL, COPPER

For experiments in density, specific gravity and Archimedes' principle etc., where volumetric displacement of liquids is involved. Seamless fabrication with flared top edge, complete nickel plated body and angled spout for convenient overflow and collection of liquids. Sizes (Height × Diameter) available are:

1020080/1 100 × 50mm
1020080/2 115 × 90mm

DISPLACEMENT VESSEL, TIN SHEET

Similar to Cat No. 1020080, but made of tin sheet, well painted, seamless. Sizes (Height × Diameter) available are:

1020100/1 100 × 50mm
1020100/2 115 × 90mm
1020100/3 225 × 125mm

DISPLACEMENT VESSEL, ALUMINIUM

Similar to Cat No. 1020080, but vessel spun from aluminium sheet. Sizes (Height × Diameter) available are:

1020120/1 100 × 50mm
1020120/2 115 × 90mm
1020120/3 225 × 125mm

DISPLACEMENT VESSEL

Similar to Cat No. 1020080,, but made of borosilicate glass, with angled spout. Capacities available are :

1020140/1 250ml, graduated
1020140/2 500ml, graduated
1020140/3 250ml, without graduation
1020140/4 500ml, without graduation

SPECIFIC GRAVITY BOTTLE, CALIBRATED, BOROSILICATE GLASS

Made of borosilicate glass, spherical pattern, flat bottom with perforated stopper. Volume of each bottle is accurately calibrated and adjusted at 20°C to the value indicated on it. Capacities available are:

1020160/1 10ml **1020160/2** 25ml
1020160/3 50ml

DISPLACEMENT VESSEL (OVERFLOW CAN), PLASTIC

Useful for experiments in density or specific gravity investigations by knowing the volume of the liquid displaced. Comprises a plastic vessel of about 500mL capacity with a spout.

1020150/1 250 mL **1020150/2** 500 mL
1020150/3 1000mL **1020150/4** 2000 mL

SPECIFIC GRAVITY BOTTLE, NOT CALIBRATED, BOROSILICATE GLASS

Made of borosilicate glass, spherical pattern, with perforated stopper. Not Calibrated Capacities available are:

1020180/1 10ml **1020180/2** 25ml
1020180/3 50ml

SPECIFIC GRAVITY BOTTLE, CALIBRATED, NEUTRAL GLASS

Similar to Cat No. 1020160, but made of neutral glass. Capacities available are:

1020200/1 10ml **1020200/2** 25ml
1020200/3 50ml

SPECIFIC GRAVITY BOTTLE, NOT CALIBRATED, NEUTRAL GLASS

Similar to Cat No. 1020180but made of neutral glass. Capacities available are:

1020220/1 10ml **1020220/2** 25ml
1020220/3 50ml

We specialize in product development as per customized requirements and designs meeting international quality standards with shortest delivery periods.

SPECIFIC GRAVITY BOTTLE

Calibrated, volume of each bottle is accurately calibrated and adjusted at 20°C to the value indicated on it. Made of borosilicate glass with wide top for solids. Capacities available are:

1020230/1 25ml **1020230/2** 50ml
1020230/3 100ml

SPECIFIC GRAVITY BOTTLE

Non-calibrated, made of borosilicate glass with wide top for solids. Capacities available are:

1020235 Non-calibrated

DENSITY SPHERE

Demonstrates the dependence of density of a liquid on the temperature. Comprises a hollow sphere, with a sealed mouth, carefully adjusted to float in cold water and sink in the hot water.

1020240 Density Sphere

SPOUTING CYLINDER, ECONOMICAL

For demonstrating the increase in pressure of liquid with the increase in depth or liquid column. Made of stout tin sheet, well painted, having three orifices of the same size but at different heights down one side.

1020260 Spouting Cylinder, Painted Blue Acrylic 1

SPOUTING CYLINDER

Similar to Cat No. 1020260 but with better quality. Sturdy sheet metal construction with heavy base having scratch-resistant epoxy coating. All orifices made of brass pipe fitted in the cylinder with leak-proof joints.

1020280 Spouting Cylinders 2

COMMUNICATING VESSEL ON STAND

Comprises four glass tubes, each of different cross-sectional size and shape, connected together at the bottom through a common horizontal glass tube, sealed to a manifold and mounted on stand. Demonstrates that the liquid level in communicating vessels remains same irrespective of the shapes and sizes of the vessels.

1020300/1 Communicating Vessel, on Wooden Stand 3
1020300/2 Communicating Vessel, on Painted Metal Stand 4
1020300/3 Communicating Vessel, Glass Part only

LIQUID LEVEL APPARATUS ON BASE

Economical version. Similar to Cat No. 1020300, but mounted vertically on a base.

1020320/1 Liquid Level Apparatus, on Plastic Base 5
1020320/2 Liquid Level Apparatus, Glass Part only

EQUALITY OF PRESSURE IN LIQUIDS (PASCAL'S LAW SYRINGE), GLASS

To demonstrate that the liquid transmits equal pressure in all directions. The apparatus comprising a glass cylinder provided with a piston plunger on one end and terminating in a spherical glass bulb on the other end. The bulb has small holes around its surface. Pushing the plunger inside with the apparatus filled with water, water is ejected with equal force from all the holes.

1020340 Equality of Pressure in Liquid (Pascal's Law Syringe), Glas

EQUALITY OF PRESSURE IN LIQUIDS (PASCAL'S LAW SYRINGE), ALL METAL

All metal construction provides rigidity, sturdiness and durability to the apparatus. Comprises a removable spherical metal bulb mounted at one end of the cylindrical barrel with piston plunger at the other end. The spherical bulb has a number of holes on its surface with small brass nozzles projecting out. All metal parts either well painted or plated. When filled with water, pushing in the plunger makes water to eject from all the nozzles with equal force.

1020360 Equality Of Pressure In Liquids (Pascal's Law Syringe), All Metal

PASCAL'S LAW APPARATUS

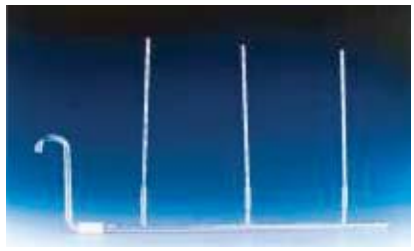
A simple apparatus to demonstrate the Pascal's Law that pressure exerted by a liquid in an enclosed space is equal in all directions. Comprises a spherical glass bulb with its neck supported horizontally and is connected to a vertically mounted 50mL plastic syringe through a flexible rubber tubing. The holes in the glass bulb allow liquid filled in the syringe to be ejected with equal force from each of them on pushing down the plunger of syringe. Complete apparatus mounted on a stable plastic base.

1020370 Pascal's Law Apparatus

PASCAL'S LAW APPARATUS (WEINHOLD'S)

Demonstrates that the pressure of liquids varies with the depth of liquid column and is independent of the shape or size of the vessel. Comprising a base with aperture on the underside and on top of which may be attached any one of the set of 4 glass vases having different shapes/sizes but identical bottom openings. A lever arm pivoted to the vertical support rod has a pressure disc on one end to close the aperture and a counterpoise pan. A vertically adjustable index pointer provided for adjusting liquid level in the vases. Complete apparatus mounted on a stable base.

1020380 Pascal's Law Apparatus (Weinhold's)



BERNOULLI'S TUBE APPARATUS

To demonstrate the effect of Bernoulli's theorem by studying variation in the pressure and speed of flow of an incompressible fluid through a tube with respect to the tube bore or cross-section. Comprises a Bernoulli's tube, with central constricted portion, a constant bore gradient tube, 6 lengths glass tubing, 2 swan necked outlets tubes and 8 small pieces of rubber connecting tubing for joining various glass tubings as and when needed. The two flow tubes, each 500×13mm (L×OD) have three sealed-in short side tubes of length 25mm each with interspacing of about 150mm for connection to glass tubing lengths for use as manometers. The middle short side tube in Bernoulli's tube stem out from the central constricted portion for studying the effect of constriction.

1020400 Bernoulli's Tubes Apparatus

VENTURI TUBE DEMONSTRATOR

A simple device for the demonstration of Bernoulli's Law. Similar devices fine extensive application in everything from carburetors of IC engines to aircraft airspeed indicators. Comprising of a horizontal glass tube having three cross sections along its length - wide, narrow and wide respectively, with wide cross-sections having same size. One short, side tube projects from each of the three cross-sections for connecting to the manometric tubes. Also included is a three-legged manometric tube joined to a common horizontal tube. When gas is flowing through the venturi tube with manometer filled with colored water, the relative pressure at the three points of the tube is evident from the water level in manometers.

1020420 Venturi Tube Demonstrator

MANOMETER TUBE

For use at moderate pressures, made from glass tubing of about 6mm bore, bend in the form of U. It is open at both ends and is supplied unfilled. Dimensions (approx): 250mm long, 32mm wide (75mm wide including side arm).

1020440 Manometer Tube

MANOMETER, GLASS, ON STAND

Glass manometer tube, U-shaped, with stopcock near the end of one arm, mounted on a stand with back plate. Scale having graduations 80-0-80 with 2mm subdivisions. Size of back plate about 40×8cm (Height × Width).

1020460/1 Manometer, Glass, on Wooden Stand

1020460/2 Manometer, Glass, on Acrylic Stand

MANOMETER, LARGE, GLASS

Large sized U-shaped glass manometer, mounted on a back-plate with provision for hanging on wall. Scale having graduations 260-0-260 with 2mm subdivisions. Size of back plate about 67×8cm (Height × Width).

1020480 Manometer Large, Glass

U TUBE MANOMETER

U-shaped glass tube mounted on wooden stand for use as a manometer, with a scale 0-50cm fixed between the two arms of tube for reading the level difference between both the arms.

1020500/1 U Tube Manometer 1
1020500/2 U-Tube, Glass, Unmounted

U-TUBE MANOMETER, DELUXE

Comprises a transparent flexible plastic tubing, bent in the form of U, mounted in a sturdy metal section with 20-0-20 scale, graduated in millimeters, at the front. A clear front cover provides safety to the apparatus. One end of the tubing has a rubber tube connected through an adapter for attaching it to a fluid circuit. Provided with a ring at the top for hanging.

1020560 U-Tube Manometer, Deluxe 2

CAPILLARY TUBE APPARATUS

For demonstrating the effect of capillary action, i.e., relationship between capillary pressure or level of liquid in capillary and the bore diameter of the capillary tube. The apparatus comprises a rectangular sheet-metal frame, the base of which takes the form of a trough for holding water. The upper part of the frame supports six capillary tubes, each of a different bore, in the holed rubber bung with their lower ends resting in the trough underneath. The difference in heights of the resulting columns of water in each capillary tube is readily apparent. Length of capillary tubes about 150mm.

1020580 Capillary Tube Apparatus

SIPHON BAROMETER

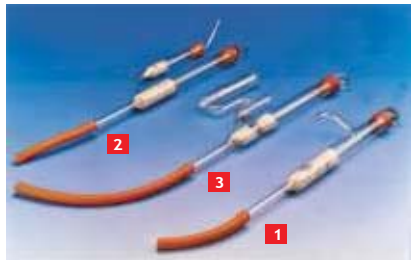
A low cost, simple barometer yet having sufficient accuracy. The whole column of mercury is clearly visible in the glass tube. Barometer scale is graduated in both English and Metric systems. Vertical sliding zero point adjustment is carried by a screw clamp attached to the glass tube. Complete apparatus mounted on a polished wooden board. Supplied without mercury.

1020600 Siphon Barometer

SIPHON BAROMETER (TORICELLI)

Wall model, barometer mounted on unbreakable, non-bendable plastic base-board of size 93×10cm (Height × Width). Consists of a clear glass Toricelli tube with a U-bend at the lower end leading to the mercury reservoir. Reservoir has a screw cap at the top, the thread's gap being sufficient to balance the atmospheric pressure by confining the mercury vapours. A mobile indicator allows the barometer to be regulated for altitude of the place of use. Also included is a red alcohol thermometer mounted alongside the barometer tube. Supplied without mercury.

1020620 Siphon Barometer (Toricelli)



LIFT PUMP

Working Model made of glass, to show the concepts involved in a lift pump. Both cylinder and piston provided with non-return float valves and a side tube for outlet.

1020640/1 Borosilicate Glass 1
1020640/2 Neutral Glass

FORCE PUMP

Working model made of glass. Demonstrates the working principle of the force pump, concept of double valve action of the pump and its ability to eject water at high pressure. Comprises a glass cylinder with a non-return float valve at its lower end, which also has an outlet side tube at its lower end, that in turn communicates the lower end of a secondary cylinder also equipped with a non-return float valve. The outlet tube from a secondary cylinder is drawn out into a jet.

1020680/1 Borosilicate Glass 2
1020680/2 Neutral Glass

HYDRAULIC PRESS, BRAMAH

Working model made of glass. To show the concepts involved in its functioning.

1020720/1 Borosilicate Glass 3
1020720/2 Neutral Glass

FLUID PRESSURE APPARATUS

Demonstrates the phenomenon of transmissibility of fluid pressure. For the same force exerted, pressure is inversely proportional to the surface area. The apparatus comprises of the plated brass cylindrical tubes of different diameters, each fitted with piston and connected to each other through a brass tube at their bottom. Pistons have circular disc at the top for loading masses (masses not included). Complete apparatus mounted on a wooden base.

1020800 Fluid Pressure Apparatus

LIFT PUMP, MOUNTED

Working Model made of glass, similar to Cat. No. 1020640 but mounted on wooden stand with trough for water. Provides convenient demonstration to a group of students.

1020660/1 Borosilicate Glass 4
1020660/2 Neutral Glass

FORCE PUMP, MOUNTED

Working Model made of glass, similar to Cat. No. 1020680 but mounted on wooden stand with trough for water. Provides convenient demonstration to a group of students.

1020700/1 Borosilicate Glass 5
1020700/2 Neutral Glass

HYDRAULIC PRESS, BRAMAH, MOUNTED

Working Model made of glass, similar to Cat. No. 1020720 but mounted on wooden stand with trough for water. Provides convenient demonstration to a group of students.

1020740/1 Borosilicate Glass 6
1020740/2 Neutral Glass

HYDRAULIC PRESS, SYRINGE TYPE, SMALL

A smaller and economical version of Cat No. 1020780 (Page 08), but smaller in size with syringes of 20ml and 5ml, with their nozzles joined through a 3-position valve and flexible rubbing. Both the pistons provided with limit-stop to prevent their complete ejection from the barrels and have loading platform at their top.

1020785 Hydraulic Press, Syringe Type, Small

HYDRAULIC PRESS, SYRINGE TYPE

Simple construction permits the use of water or even air for demonstration of the concepts involved. Comprises a pair of graduated glass syringes of capacities 50 and 20cm3, both having finely ground pistons and provide a cross-sectional area ratio of 3:1 respectively. Both the syringes mounted on a stable, non-skid sheet metal base with loading platform at their top and their nozzles linked to each other through a 3-position valve, by means of which they may be opened to the atmosphere, isolated or interconnected as desired. Both the pistons provided with limit-stop to prevent their complete ejection from the barrels. Thick wall of syringes makes it capable of withstanding pressures involved. The graduated syringe barrels also permit simple Boyle's Law experiments to be performed.

1020780 Hydraulic Press, Syringe Type

PASCAL'S DEMONSTRATOR

To demonstrate the principal used inside the power steering, shock absorbers, hydraulic jack etc. Two syringes fitted on a wooden stand and connected with a flexible tube. On applying the force to one syringe piston 10ml to make the liquid rise in the other 50ml syringe to demonstrate the Pascal's Law.

1020810 Pascal's Demonstrator

We usually keep stock of all the fast moving items (a range of more than 2000 items) in bulk to reduce the lead time to minimum.

As a manufacturer, Arihant Industries is always pleased to receive comments, suggestions and criticisms about its range of products.

HYDRAULIC BRAKE

For demonstration of the principle of hydraulic breaking system that operates on fluid pressure. It consists of a wheel with a handle for rotating it and hydraulically actuated breaking mechanism which is connected to cylindrical metal reservoir through a flexible pressure tubing. The plunger of the reservoir has a lever handle pivoted at its top for pushing it downward to apply pressure on the fluid inside, which is then forced through the connected tubing to actuate the braking mechanism. Complete apparatus mounted on a wooden base.

1020820 Hydraulic Brake

BOYLE'S LAW APPARATUS, LOW PRESSURE

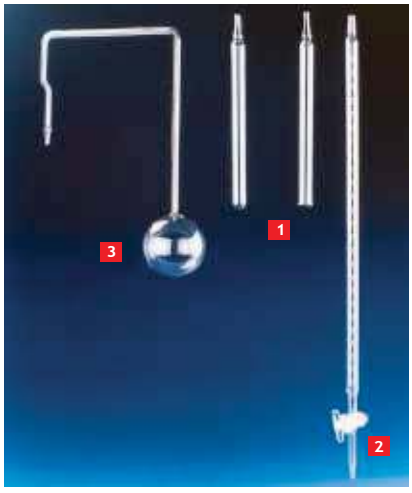
Demonstrates the relationship between pressure and volume of a given mass of gas at a fixed temperature, i.e., Boyle's Law. Consists of two glass tubes - one having both ends open and the other having one end closed. Both the tubes are mounted on vertical support rods with the help of sliding brackets that can be positioned anywhere along the length of the rod and are connected to each other through a flexible pressure rubber tubing. A meter rule graduated 0-100cm × 1mm, reading in both directions present between the two support-rods on a wooden back-plate and facilitates level reading in both the tubes. Complete apparatus mounted on a stable cast-metal base with leveling screws. Requires mercury for use, not included (available optionally).

1020900 Boyle's Law Apparatus, Low Pressure

BOYLE'S LAW APPARATUS, ALUMINIUM EXTRUSION

Similar to Cat No. 1020900 in operation, but having bottom zero scale fixed to a specially designed aluminium extrusion having rectangular cross-section in place of wooden back-plate. Sliding brackets with both the glass tubes sliding vertically on the slot on either side of extrusion instead of metal support rods. Requires mercury for use, not included (available optionally).

1020920 Boyle's Law Apparatus, Aluminium extrusion



BOYLE'S LAW GLASS TUBES 1

Spare set of 2 tubes, one having both ends open and the other having one end closed, made from borosilicate glass

1020940/1 Boyle's Law Glass Tubes
1020940/2 Boyle's Law Glass Tubes, with one tube having stopcock in place of closed end.

BOYLE'S LAW BURETTE 2

Graduated tube, with stopcock on one end and other end open for attaching rubber tubing. Made from borosilicate glass.

1020960 Boyle's Law Burette

JOLLY'S AIR BULB 3

A glass capillary bent at right angles to form 3 sides of a rectangle with spherical bulb blown at its one end and other end open for attaching the flexible rubber tubing.

1021020/1 Jolly's Air Bulb, Borosilicate Glass
1021020/2 Jolly's Air Bulb, Neutral Glass

BOYLE'S LAW-MARRIOT (Eco.)

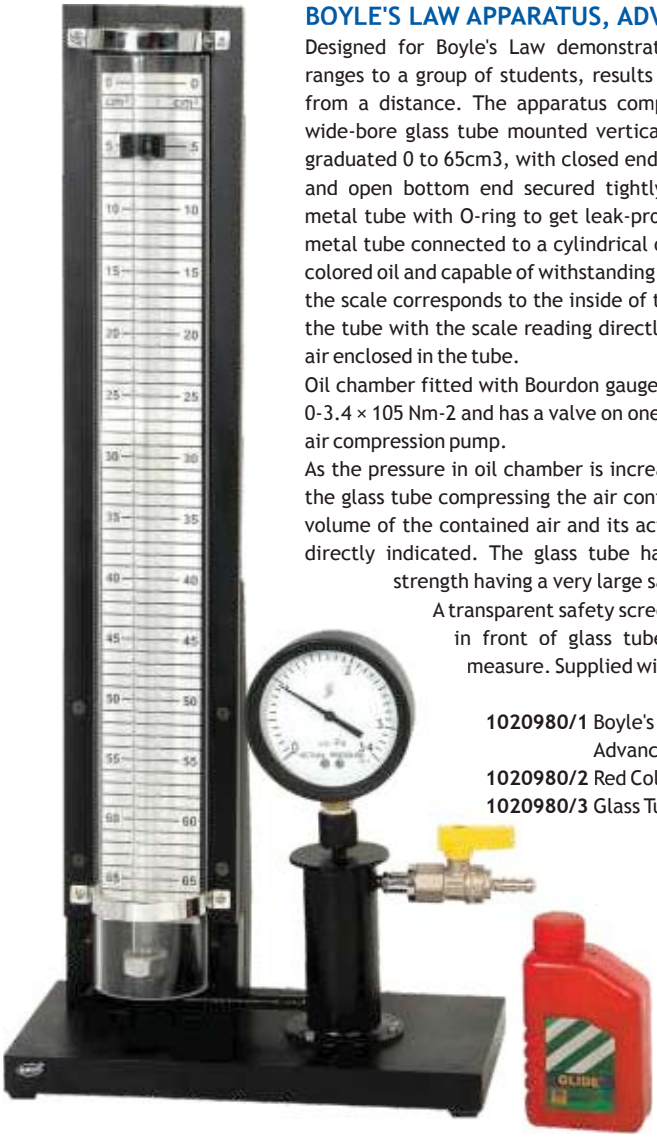
An economical (eco.) version gives the better and accurate quantitative results for the pressure and volume at a constant temperature. A 50ml plastic syringe is used for changing the volume and a pressure gauge is connected with syringe via. connecting tube to measure the pressure. Whole assembly is mounted on plastic moulded base.

1020975 Boyle's Law-marriot (Eco.)

BOYLE'S MARIOTTE LAW

A smaller more economical version gives the better and accurate quantitative results for the Pressure / Volume relationship of air at constant temperature. A graduated (0-300) cm3 cylinder with closely fitting piston is connected to a pressure gauge by a narrow tube to minimize the dead volume is fitted on two side supports. The cylinder is made of transparent material to see the working process inside it. We can adjust the pressure inside the cylinder by rotating the knob connected to the piston via threaded shaft. A gas tap allows the cylinder to communicate with the outside air to adjust the mass of air enclosed. The pressure can directly read out from a big size pressure gauge circular dial, graduated in (0-3.4) x 10^5 Pa.

1020970 Boyle's Mariotte Law



BOYLE'S LAW APPARATUS, ADVANCED

Designed for Boyle's Law demonstration in wide pressure ranges to a group of students, results can be observed even from a distance. The apparatus comprises a thick walled, wide-bore glass tube mounted vertically in front of a scale graduated 0 to 65cm3, with closed end of the tube at the top and open bottom end secured tightly on the thick-walled metal tube with O-ring to get leak-proof joint. Other end of metal tube connected to a cylindrical oil chamber filled with colored oil and capable of withstanding high pressures. Zero of the scale corresponds to the inside of the closed (top) end of the tube with the scale reading directly indicating volume of air enclosed in the tube.

Oil chamber fitted with Bourdon gauge at the top, calibrated 0-3.4 × 105 Nm-2 and has a valve on one side for connection to air compression pump.

As the pressure in oil chamber is increased, oil is forced into the glass tube compressing the air contained therein and the volume of the contained air and its actual (total) pressure is directly indicated. The glass tube has thick walls of high strength having a very large safety overload margin.

A transparent safety screen is mounted securely in front of glass tube as an added safety measure. Supplied without pump and oil.

1020980/1 Boyle's Law Apparatus Advanced
1020980/2 Red Coloured Oil, 500ml
1020980/3 Glass Tube, supplied as spare

BOYLES LAW APPARATUS

Alluminium extrusion support pillar with a scale (0-60)cm graduated at every .5 cm step to analise the oil level in the glass tube of length 60 cm fitted on support pillar. A pressure gauge with dual range dial (0-4 kg/cm2 /0-56 Psi) fitted on oil chamber and connected with glass tube via aluminium pipe. The oil chamber can be filled with oil by just removing the screw valve fitted on the chamber and two valves in side of chamber one to generate pressure and another to release the pressure from chamber. Whole assembly fitted on a well-painted CI casted rectangular base.

1020990 Boyles Law Apparatus

BOURDON GAUGE

For the measurement of actual gas pressure, and not gauge pressure. Comprises of a circular gauge about 100mm diameter. The dial has dual scale reading 0 to 50 Lbs/in2 and 0 to 3.5kg/cm2 pressure, and the case has a transparent perspex back to clearly observe the working of the gauge mechanism. A riffled tubule present at its one side provides gauge connection through rubber tubing. A thick black pointer needle against white dial provides easy reading of scale directly giving the actual pressure. Mounted on heavy cast-metal base for stability.

1021000 Bourdon Gauge

PRESSURE SENSOR

A fully sealed unit that can be used to monitor series and non corrosive liquid via. a tube attached to the inlet. On interfacing the pressure sensor with instrumentation amplifier pressure is obtained on a digital multimeter 0-350mv DC

1021010 Pressure Sensor

BOYLE'S LAW / CHARLE'S LAW APPARATUS, COMBINED

Also called Jolly's Apparatus. It demonstrates the relationship between pressure and temperature of a given mass of gas at fixed volume, i.e., Charle's Law. Comprising Jolly's Air bulb connected to a glass mercury reservoir through flexible rubber tubing. The complete apparatus mounted on a polished wooden stand with heavy cast metal base having leveling screws. A meter rule graduated 0-100cm × 1mm, reading in both directions is fixed on the stand for reading the levels directly. Mercury reservoir tube mounted on vertical support rod with the help of sliding bracket that can be positioned anywhere along the length of the rod. Can also be used as Boyle's law apparatus by using a glass tube with one closed mounted on a slider that slides vertically in slot provided alongside meter rule. Complete with pressure rubber tubing and set of 2 glass tubes. Supplied without mercury.

1021040 Boyle's Law / Charle's Law Apparatus, Combined

JOLLY'S BULB AND GAUGE

It consists of a glass bulb of dia. 60mm fitted with a bourdon gauge to investigate the relationship between temperature and pressure at a constant volume. Pressure with in the glass bulb can be directly readout from gauge on immerging the bulb in hot or cold water.

1021030 Jolly's Bulb and Gauge

BOYLE'S LAW / CHARLE'S LAW APPARATUS COMBINED, ON ALUMINIUM EXTRUSION

For demonstrating the relationship between pressure and temperature of a given mass of gas at fixed volume, i.e., Charle's Law. Comprising Jolly's Air bulb connected to a glass mercury reservoir through flexible rubber tubing. The complete apparatus mounted on aluminium extrusion section stand with stable rectangular base. The vertical aluminium section has a scale graduated 0-100cm × 1mm, reading in both directions for reading the levels directly. Mercury reservoir tube mounted on vertical support rod with the help of sliding bracket that can be positioned anywhere along the length of the rod. Can also be used as Boyle's law apparatus by using a glass tube with one closed mounted on a slider that slides vertically in slot provided alongside meter rule. Complete with pressure rubber tubing and set of 2 glass tubes. Supplied without mercury.

1021050 Boyle's Law / Charle's Law Apparatus Combined

BELL IN VACUUM (ACRYLIC)

Similar to cat. No. 1021200. Made of moulded acrylic bell jar for use on pump plates with diameter at least 200mm. Dimension of bell jar (9.5”x7.5”) (height x diameter).

1021210 Bell in Vacuum (Acrylic)

SPACE TUBE

No need of any pump plate and bell jar to demonstrate the “Bell in a Bell Jar” experiment. A buzzer with a battery fitted inside the jar to demonstrate that sound must required air as a medium to transmit. A rubber bung fitted with a nozzle and rubber tubing to evacuate the jar.

1021230 Space Tube

BELL IN VACUUM

Similar to Cat No. 1021200, but with bell fitted in clear acrylic bell jar of diameter about 18cm, instead of glass bell jar. Sizes (height × diameter) available are

1021240/1 Acrylic Bell Jar, Size 8”×4”
1021240/2 Acrylic Bell Jar, Size 12”×8”

BELL JAR WITH VACUUM PUMP, HAND OPERATED

A complete self-contained apparatus suitable for vacuum physics experiments and applications requiring evacuated space. Transparent jar and pump, both having unbreakable ABS body. Jar provides a robust chamber capable of withstanding full vacuum without danger of implosion or shattering and fitted with a vacuum gauge and vacuum release valve. A rubber gasket ring on the pump base ensures airtight seal with the jar. A manual exhaustion piston pump in the base provides quick and convenient evacuation of the jar.

Note: The exposure or contact of the apparatus to organic solvents or vapours, or to other aggressive chemicals is to be totally avoided. The apparatus is non-autoclavable.

1021220/1 Bell Jar with Vacuum Pump, Hand Operated 1
1021220/2 Bell Jar with Vacuum Pump, Hand Operated, fitted with electric bell 2

GUINEA AND FEATHER APPARATUS

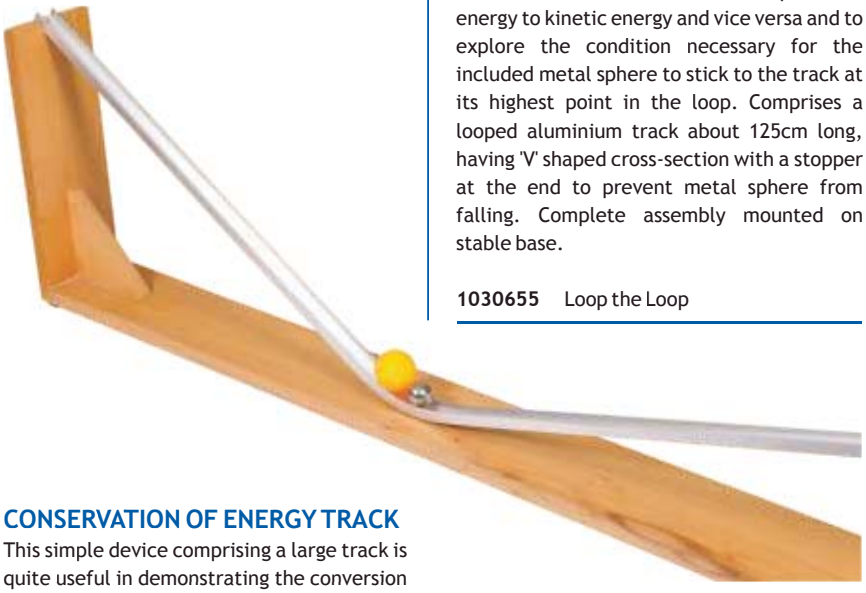
Demonstrates that the objects fall at the same rate of acceleration in vacuum under the effect of gravity irrespective of their relativ weights and sizes. Consists of a thick-walled glass tube fitted with rubber bungs at each end to seal the tube. One of the rubber bungs has a glass tube of about 8mm diameter fixed through hole in it that has rubber tubing with clip for connecting it to vacuum pump.

1021260/1 Guinea & Feather Apparatus, Glass Tube Size about 500×16mm (L×Dia.), with pinch Clip 3
1021260/2 Guinea & Feather Apparatus, Glass Tube Size about 600×50mm (L×Dia.), with Hoffman Clip 4

LOOP THE LOOP

An inclined track with a single loop to demonstrate the transformation of potential energy to kinetic energy and vice versa and to explore the condition necessary for the included metal sphere to stick to the track at its highest point in the loop. Comprises a looped aluminium track about 125cm long, having 'V' shaped cross-section with a stopper at the end to prevent metal sphere from falling. Complete assembly mounted on stable base.

1030655 Loop the Loop



CONSERVATION OF ENERGY TRACK

This simple device comprising a large track is quite useful in demonstrating the conversion of potential energy into linear and rotational kinetic energy and back again to potential energy. The V-shaped metal track has unequal arms, but their highest points at equal height, so as to form two adjacent inclined tracks of dissimilar lengths (hence unequal angle of inclinations) and is supported on 1.5m long wooden base. The concept is beautifully illustrated when balls of different material, two metal and one plastic (also included), are rolled down the track from either end.

1030645 Conservation of Energy Track

MARBLES

Solid glass spheres, in different colours. Available in sizes (diameters)

1030700/1 17mm **1030700/2** 25mm

STEEL SPHERES

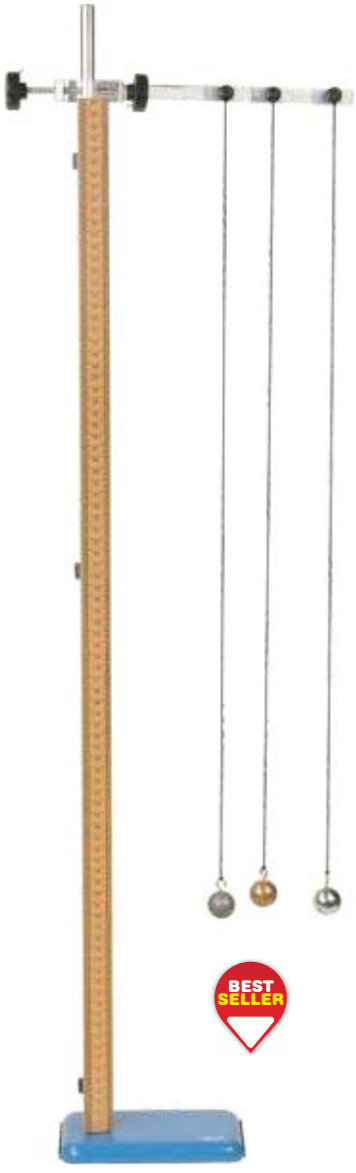
Solid steel spheres, hardened and chrome plated. Available in sizes (diameters)

1030720/1 3mm, Pack of 100
1030720/2 6mm, Pack of 100
1030720/3 12mm, Pack of 100
1030720/4 16mm, Pack of 100
1030720/5 19mm, Pack of 5
1030720/6 25mm, Pack of 5

INCLINED PLANE

Linear track with physics stand is used to perform accurate experiment on acceleration, Newton's laws, and friction. The cart with this inclined plane rides on bearing wheels down a grow in the track, so it will never fall off. Graduated scale is printed along the side allow for measurement to be taken during experiment or with the photo gate systems, which clamps easily to the side for greater accuracy. The attached protractor also allows for easy angle measurements. Includes inclined plane, mounting screw, instruction, and activity guide.

1030635 Inclined Plane



PENDULUM ON STAND

Designed for performing a number of pendulum related experiments quickly and accurately. Comprises a meter rule with zero at the bottom, graduated in millimeters and reading every centimeter, attached vertically on a support rod. Towards the upper end of the rod a hanger is fixed, from which 3 pendulum bobs, each of 25mm diameter and of different material - wood, steel and aluminium, are suspended. A sliding index mounted on the meter rule can be adjusted for vertical position and has a projection through which first pendulum cord passes thus controlling the effective length of suspension of first pendulum. Complete assembly mounted on a stable metal stand. The hanger has provision for controlling the length of suspension of each pendulum.

1030740 Pendulum on Stand

NEWTONIAN DEMONSTRATOR OR COLLISION BALLS

Dramatically illustrates Newton's third law of motion and works well on an overhead projector. Its graphical demonstration of elastic collisions qualitatively, is far superior to any other device on account of its size and total absence of friction. The unit is completely assembled and consists of a frame with six plated steel balls of 19mm diameter, suspended on the frame through lightweight cord. By pulling and releasing the different number of balls, collision results among the balls can be observed to draw many interpretations

1030820/1 Newtonian Demonstrator, Metal Frame
1030820/2 Newtonian Demonstrator, Wooden Frame

PENDULUM CLAMP

Connects to any vertical or horizontal rod support up to 18mm. L shaped plated metal strip has three knobs along its length with respective holes for mounting up to 3 pendulums on the same horizontal line and adjusting their height. The smaller arm of the metal strip has a boss attached to it for clamping securely on a rod support.

1030760 Pendulum Clamp

Documentation to offer 20008040

Pos.	No.	Description	Picture
	1000738 U8400830	**Free Fall Apparatus** Apparatus for measuring the time it takes for a ball to fall a certain distance using a digital timer. Very easy to set up and use but nevertheless highly accurate. Includes 3 steel balls. A micro-magnet holds the ball in its start position. Three contact pins under the release mechanism ensure that the start position of the ball can be reproduced and act as the contacts of a switch that opens when the ball is released, thus triggering the beginning of the timing measurement. When the ball strikes the contact plate at the bottom, the timer is stopped. The ball is also held firmly on the plate so that it does not bounce. The height through which the ball drops can be adjusted to a fraction of a millimetre and read off a scale on the column. Height scale 20 – 960 mm Scale divisions: 10 mm Scale precision: 0.2 mm Balls: Steel, 16 mm dia. Dimensions: 200 x 130 x 1000 mm³ approx. Weight: 1.6 kg approx.	
	1012832	**Millisecond Counter (230 V, 50/60Hz)** Inexpensive, compact counter for measuring milliseconds, e.g. in conjunction with the free-fall apparatus (9983-1000738). Each count is started and stopped by a signal at the input sockets. The device is automatically reset to zero each time it is restarted Includes plug-in power supply Time measurement: 1 ms – 9999 s Supply voltage: 5 V DC Connectors: 4-mm safety sockets Dimensions: 105x75x35 mm .approx .Weight: 400 g approx	

ROLLER BALL

The investigation between the impacts of spheres of different material and size spheres can be performed with the help of this apparatus. Wooden construction with a 'V' shaped grooved track for smooth movement of spheres and a detachable footboard used to place the track and make it easy to store. Supplied with pairs of brass and steel spheres and a pair of glass marbles.

1030905 Roller Ball

'g' BY FREE FALL APPARATUS

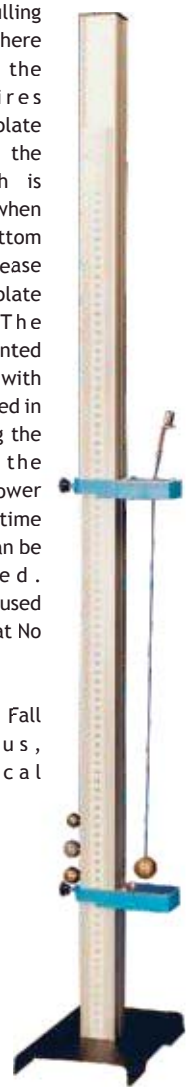
An electromagnet mounted in a plastic cabinet to release a metallic ball fitted on a square sectional rod. When the electromagnet is switched off metallic sphere gets released from the electromagnet and the timer will start. As the sphere hits the platform incorporated with the impact sensor, it stops the time. The time taken by the sphere from top to bottom will display on the segment display of digital timer to calculate the g by free fall. Digital timer is not included with this apparatus.

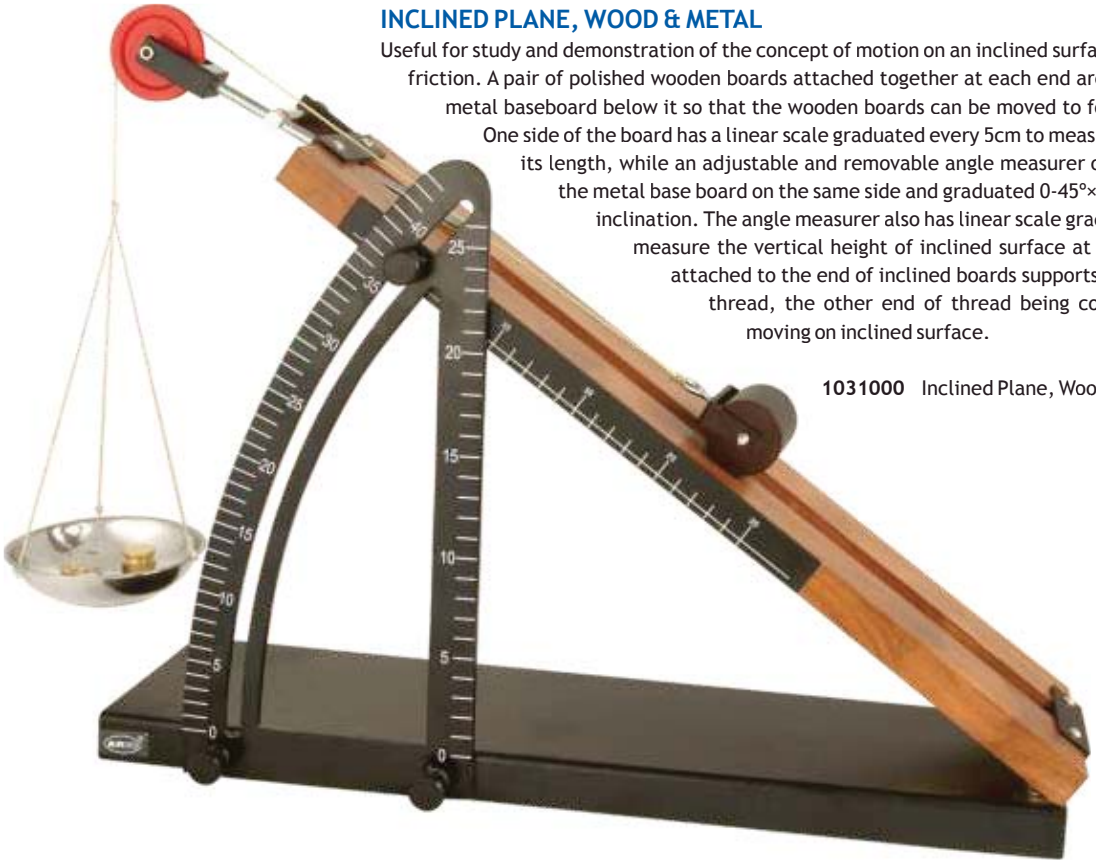
1030915 'G' By Free Fall Apparatus

'g' By FREE FALL APPARATUS, MECHANICAL RELEASE

An excellent apparatus for determining the value of acceleration due to gravity 'g' to a better accuracy. The specially designed release mechanism permits use of spheres of different material (magnetic or non-magnetic) and sizes. Pulling the release pin of the sphere at the top breaks the continuity of wires connecting the release plate to the timer, starting the timing process, which is stopped immediately when sphere strikes the bottom plate. Height of release plate and bottom strike plate are adjustable. The complete assembly mounted on aluminium extrusion with a scale 0-100cm graduated in millimeters. By knowing the distance between the release plate and lower striking plate, and the time of fall, the value of 'g' can be easily evaluated. Recommended to be used with our Event Timer, Cat No 1030940.

1030920 'g' by Free Fall Apparatus, Mechanical Release





INCLINED PLANE, WOOD & METAL

Useful for study and demonstration of the concept of motion on an inclined surface and its relation to the friction. A pair of polished wooden boards attached together at each end are hinged at one end to a metal baseboard below it so that the wooden boards can be moved to form an inclined surface. One side of the board has a linear scale graduated every 5cm to measure linear distance along its length, while an adjustable and removable angle measurer or arc scale, attached to the metal base board on the same side and graduated 0-45°×1° measures the angle of inclination. The angle measurer also has linear scale graduated in centimeters to measure the vertical height of inclined surface at a point. A plastic pulley attached to the end of inclined boards supports masses suspended from thread, the other end of thread being connected to the objects moving on inclined surface.

1031000 Inclined Plane, Wood & Metal

BEST SELLER

INCLINED PLANE, WOOD & METAL, ECONOMICAL

Similar to Cat No. 1031000 in construction. Comprises a two-piece wooden inclined board hinged at one end to a heavy cast metal base at one end and has a pulley in U-bracket mounted at other end. The inclined board has a glass surface mounted at its top with its one side plane and other ground to provide two different surfaces for friction experiments. The index pointer fixed to the inclined surface moves along the arc scale attached to the baseboard and gives its angle of inclination. Includes one metal roller in bracket with hook, one weight pan with lightweight cord for suspension.

1031020 Inclined Plane, Wood & Metal, Economical

AIR TABLE

REME02

AIR TABLE

AIR TABLE

By measuring the distance of dots produced by spark timer, motion and collision experiments can be performed accurately in a 2D environment with extremely low friction

Accessories

Angle Protractor

Height Block

Hooks

Additional Mass

Rotation Apparatus

Springs

Pulleys

Spring Holders

Launcher

Velcro for Inelastic Collision

REME02

AIR TABLE

The objective of this experiment is to analyse the motion of an object (puck) on an air table by investigating the dots produced by the puck on the data sheet. You will study :

- *The velocity and acceleration of an object (puck) moving in a straight line with constant velocity and acceleration,*
- *The motion of the puck projected horizontally with an initial velocity (projectile motion),*
- *Collisions in two dimension and conservation of momentum ,*
- *Newton's second law of motion (Atwood Machine),*
- *Rotational motion and conservation of the mechanical energy,*
- *Hooke's Law.*

Experiment Includes :

Air Table (ST-0003-00)
- *Material Type : Glass*
- *With aluminum frame*
- *LengthxWidth : 58cm x 58cm*
- *Adjustable level*

Compressor (EE-0004-01)
- *Flow rate : 120 l / min*

Hose for Compressor (ST-0034-00)
- *Length : 1.5 m*

Spark Timer (EE-0005-00)
- *Operating Frequencies : 10Hz , 20 Hz , 30Hz , 40Hz , 80Hz , 100Hz*

Air and Voltage Distributor (ST-0004-00)
- *With 2 hoses and 2 conductive chains*
- *2 banana sockets for current supply*

Support Rod (ST-0185-00)
- *Material Type : Aluminum*
- *Height : 75 cm*

Pedals for Spark Timer and Compressor (EE-0031-00)

Pucks (ST-0015-00)
- *2 pieces*
- *Material Type : Stainless Steel*
- *590 g*

Angle Protractor (ME-0014-00)
- *Graduated between 0°- 90 °*
- *Accuracy : 1 °*

Height Block (ST-0010-00)
- *Material Type : Hard Plastic*
- *Variable Height : 9 cm , 4 cm*

Hooks (ST-0011-00)
- *2 pieces*

Additional Mass (ST-0014-00)
- *2 pieces*
- *Material Type : Iron*
- *135 g*

Rotation Apparatus (ME-0015-00)
- *Material Type : Stainless Steel*
- *1000 g*
- *Radius : 3.5 cm*

Springs (ST-0012-00)
- *2 pieces*
- *Material Type : Stainless steel*
- *Spring constant : 2 N/m , 1 N/m*

Spring Holders (ST-0036-00)
- *2 pieces*

Pulleys (ME-0003-00)
- *2 pieces*

Launcher (ME-0016-00)
- *With angle scale*
  - *Graduated between -40 ° - + 40 °*
  - *Accuracy : 1 °*

Velcro for Inelastic Collision (ST-0035-00)
- *2 pieces*

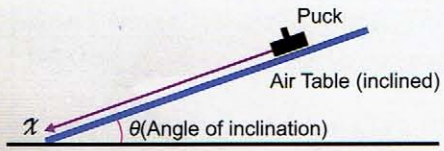
Conductive Carbon Papers (ST-0006-00)
- *2 pieces*
- *LengthxWidth : 50cm x 50cm*

Test Paper (ST-0005-00)
- *20 pieces*
- *LengthxWidth : 50cm x 50cm*

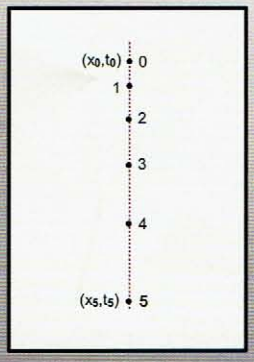
Experiment Manual (MA-0002-00)

Air table provides a flat frictionless surface in which the pucks can move in a frictionless environment. A spark times traces the motion of the pucks and the distance between dots created by timer allows for accurate calculations of motion. An experimental study of these dots enables us to measure the position *(x)* as a function of time for the moving pucks. As an example for the interval from $t=0$ to the later time t, the equitation for an object's motion with constant acceleration *(a)* in one dimension can be written as:

$$x = x_0 + v_0 t + \frac{1}{2} a t^2$$



The set-up for a puck moving down an inclined air table.



The dots produced by the puck on the data sheet for an inclined air table.

Ordering Information

Air Table.....REME02

Air Table..... ST-0003-00	*Additional Mass.....ST-0014-00*
Compressor.....EE-0004-01	*Rotational Apparatus..... ME-0015-00*
Hose for Compressor ST-0034-00	*Springs.....ST-0012-00*
Spark Timer.....EE-0005-00	*Spring Holders.....ST-0036-00*
Air and Voltage Distributor.....ST-0004-00	*Pulleys.....ME-0003-00*
Pedals for Spark Timer and Compressor EE-0031-00	*Launcher.....ME-0016-00*
Pucks..... ST-0015-00	*Velcro for Inelastic Collision.....ST-0035-00*
Angle Protractor.....ME-0014-00	*Conductive Carbon Papers.....ST-0006-00*
Height Block..... ST-0010-00	*Test Paper.....ST-0005-00*
Hooks.....ST-0011-00	

BALLISTICS CAR

Useful for studying the vector quantities associated with the projectile motion and demonstrates that the horizontal component of velocity of the object projected from another object moving horizontally is same as that of the horizontally moving object and is independent of the vertical component of velocity of projected object at any instant. Comprises a car made of heavy gauge aluminium with 4 low friction bearing wheels. The car has a heavy cylindrical barrel mounted vertically at its top which houses a spring loaded piston for shooting the ball vertically. The two locking position of the spring loaded piston arrangement provides two different but reproducible vertical projection velocities. Includes a steel sphere and a lock pin with cord. With the car moving with some horizontal velocity, if the steel sphere is projected upward, its trajectory will appear to be parabolic when viewed by a stationary observer and the sphere will return back to into the vertical barrel, irrespective of the velocity of projection or velocity of the moving car.

1031200 Ballistics Car

MINI DYNAMICS TROLLEY, METAL

Die-cast robust metal body incorporating new, compact design. The low friction wheels have individual spring suspension making them retract into the body to protect the trolley from damage due to fall or accidental skateboarding. Two metal locking pins provided at the top of trolley facilitates secure stacking of two or more trolleys to the effective mass 2-3 times its basic mass. The front end of the trolley incorporates a spring loaded exploder plunger with release trigger knob at the top, with the rear end features a clamping screw for attaching tape of ticker timer. Velcro fixed at the rear end for studying inelastic collisions.

1031260 Mini Dynamics Trolley, Metal

DYNAMICS CARTS SET, METAL

Comprises a pair of carts made of heavy gauge aluminium, with scratch-resistant epoxy coating, each incorporating 4 low-friction, ball bearing wheels. Both the carts are equipped with rubber bumpers with provision for attaching the spring steel bumpers to permit various momentum experiments in elastic and inelastic collisions. Supplied complete with one pair each of spring steel bumper in two different thicknesses and one large thin spring steel bumper.

1031280 Dynamics Carts Set, Metal

MINI DYNAMICS TROLLEY SET, PLASTIC

A pair of single piece moulded body made of unbreakable ABS having easily snap-in and removable wheels. Each trolley comes with provision for attaching spring steel bumpers, included with the set. The top of trolleys has recessed rectangular well for accommodating weights to increase the effective weight of the trolley.

1031300 Mini Dynamics Trolley Set, Plastic

CAR FOR MOTION EXPERIMENTS

Sturdy car of single piece moulded plastic body, with low friction plastic wheels provides manifold applications - for experiments on simple and accelerated motion, on friction impulse, conservations laws and on inclined planes. The rectangular cavity at the top enables masses to be placed for increasing the effective mass of the car. Can also be used on the surface of tables, independently of track.

1031320/1 Smaller Car, with hook on the front end for attaching cables, spring balances or joining two cars together

1031320/2 Bigger Car with sturdier body permits loading of larger magnitudes

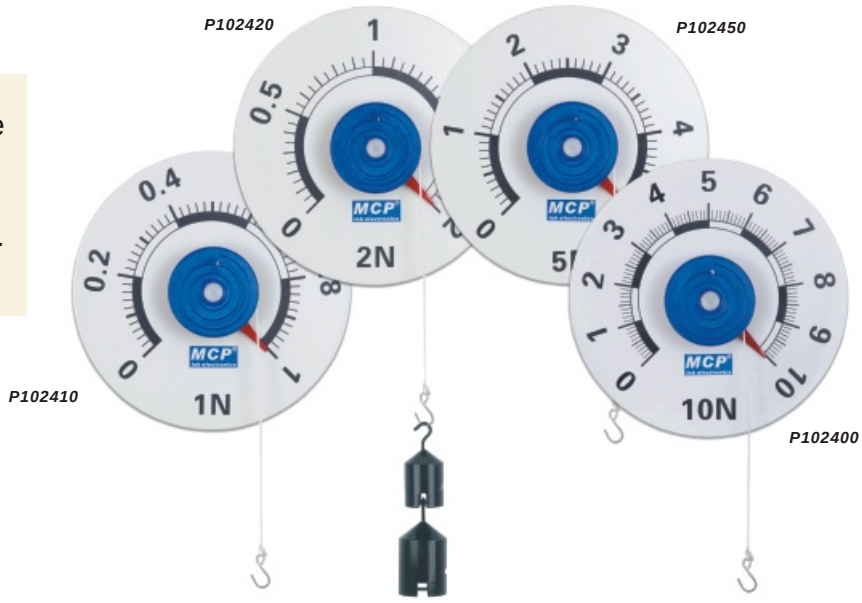
MINI DYNAMICS TROLLEY SET

Similar TO 1031300 but with a provision to hold the set of slotted masses

1031300/1 Mini Dynamics Trolley Set

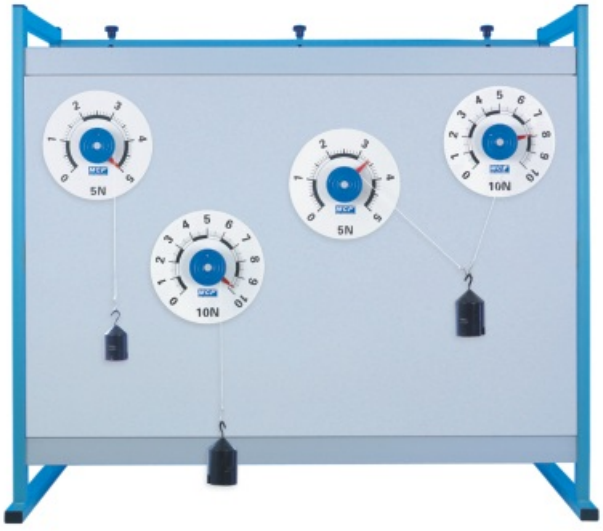
DYNAMOMETER NEW

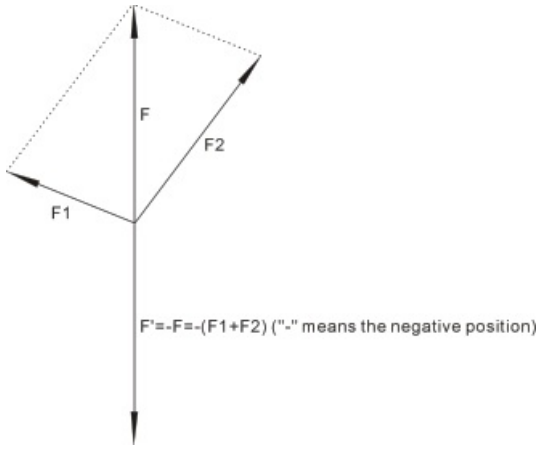
Features:
.The spring-type dynamometer can be mounted on a magnetized board for the purpose of demonstration.
.Includes pulley with ball bearing axles and cord groove, cord and hook.
.Large, easily visible round dial as well as zero-point adjustment.



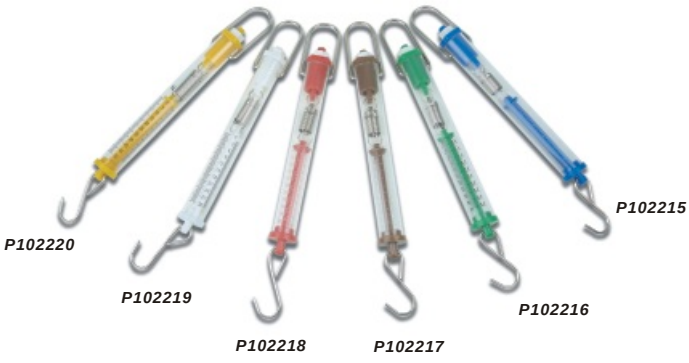
Specifications:

Force	No.	Scale division	Measuring precision	Diameter	Magnetic base
1N	P102410	0.02N	2.5%	200mm	Ferrite
2N	P102420	0.05N	2.5%	200mm	Ferrite
5N	P102450	0.1N	2.5%	200mm	NdFeB
10N	P102400	0.1N	2.5%	200mm	NdFeB





Composition of forces



TRANSPARENT DYNAMOMETER

Equipped with a scale on a transparent plastic sleeve. Lucid design, including a spring overstretch protection mechanism. Suitable for projection using the overhead projector

Force	color	No.
2.5N-250g	blue	P102215
5N-500g	green	P102216
10N-1000g	brown	P102217
20N-2000g	red	P102218
30N-3000g	White	P102219
50N-5000g	yellow	P102220

PRECISION DYNAMOMETER

In a strong aluminium alloy, with protection against overloading the spring. The scale is easily readable, as it consists of alternating red and yellow divisions

Force	No.
1N	P102221
2N	P102222
5N	P102223
10N	P102224
20N	P102225
30N	P102226
50N	P102227
100N	P102228

length 250mm,scale length 130mm, diameter 18mm, precision 1% of max. measurement

P102221

SIMPLE MECHANICS KIT

Challenging experiments with levers, wheel and axle mechanisms, pulleys and an inclined plane, help to teach students the principles behind motion and leverage. Kit includes a Teacher's Guide.

4004 Simple Mechanics Kit

HOOKE'S LAW APPARATUS, SS SCALE

For the demonstration of Hooke's Law that the elongation produced in a spring within elastic limits is proportional to the load applied to it. Also useful for investigating potential energy and investigating masses. Comprises of a metal rod carrying vertically a polished stainless steel scale 0 to 15cm, with provision for its height adjustment. An integrated mass hanger/pointer is connected to the lower end of the spring with the eye-shaped upper end for suspension through an adjustable collar with cross bar, which is positioned above the scale. Complete apparatus mounted on a stable base.

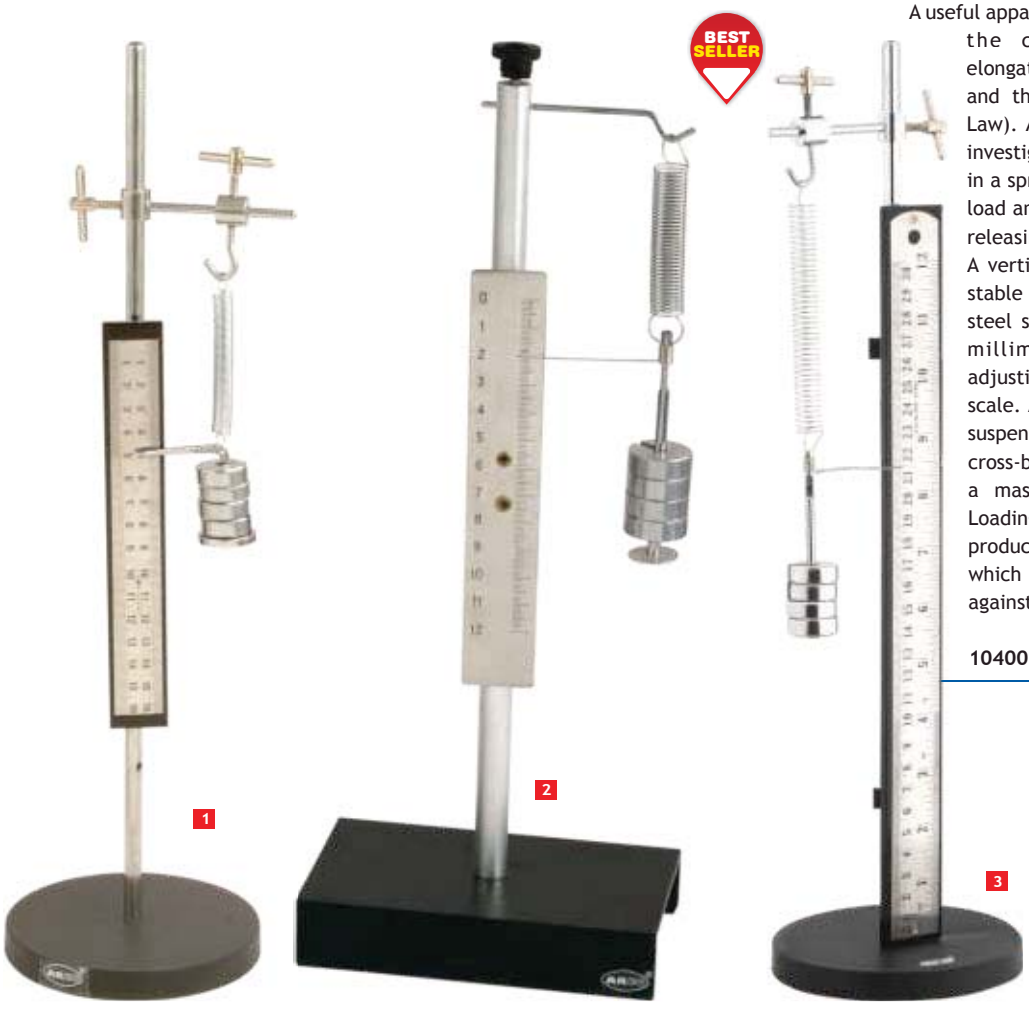
1040060/1 Hooke's Law Apparatus, SS Scale fixed on plastic back, etched scale 1

1040060/2 Hooke's Law Apparatus, complete scale off SS sheet, printed scale 2

HOOKE'S LAW

A useful apparatus capable of demonstrating the correlation between the elongation produced in a simple spring and the load applied (i.e., Hooke's Law). Also provides a useful tool for investigating potential energy stored in a spring as a function of suspended load and the oscillations produced on releasing the stretched loaded spring. A vertical metal rod supported on a stable round base, carries a stainless steel scale 0-30cm, graduated every millimeter, with provision for adjusting the vertical position of the scale. A close wound helical spring is suspended is suspended through a cross-bar by means of a collar and has a mass hanger at its lower end. Loading the mass hanger with masses produces extension in the spring, which is indicated by the pointer against the scale.

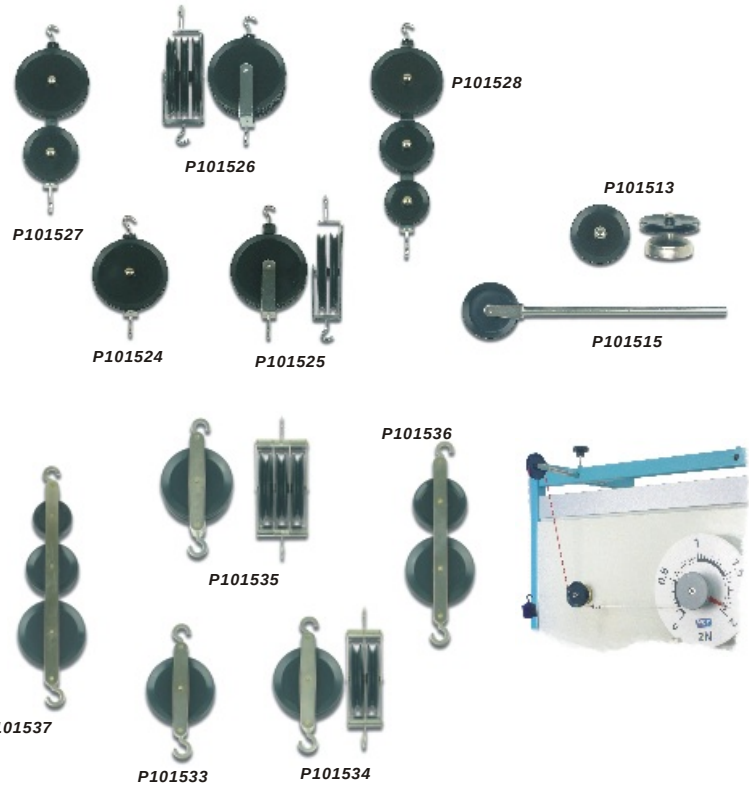
1040090 Hooke's Law 3



PULLEYS

Pulley, pulley block, pulley with holder

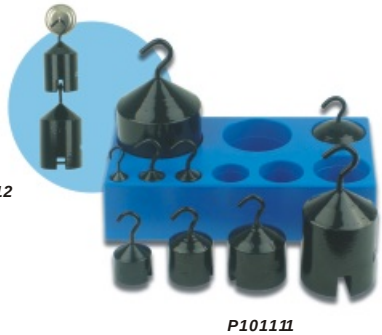
Diameter	No.
50mm (with magnetic base)	P101513
70mm (with magnetic base)	P101514
50mm (with stand rod)	P101515
70mm	P101524
2 x 70mm	P101525
3 x 70mm	P101526
50mm+70mm	P101527
40mm+50mm+70mm	P101528
50mm	P101533
2 x 50mm	P101534
3 x 50mm	P101535
40mm+50mm	P101536
30mm+40mm+50mm	P101537



WEIGHT SETS

Description	Sets	Weights	No.
Covering a wide range of application as loads or weight	slotted weight set 100g	hook 10g x 1, weight 10g x 9	P101211
	slotted weight set 200g	hook 20g x 1, weight 20g x 9	P101212
	slotted weight set 250g	hook 50g x 1, weight 20g x 9/10g x 1/5g x 2	P101213
	slotted weight set 500g	hook 50g x 1, weight 50g x 9	P101214
	slotted weight set 1000g	hook 100g x 1, weight 100g x 9	P101215
Equipped on one side with a hook and other side a dowel pin for mutual attachment. Weights on hanger for resolution of forces apparatus	hook weight set 10g~1000g	10g, 20g x 2, 50g, 100g, 200g x 2, 500g, 1000g	P101111
Equipped on both sides with a hook for mutual attachment. Covering a wide range of application as loads or weight	hook weight set 500g	50g x 10	P101112
Equipped on one side with a hook and other side a dowel pin for mutual attachment. Covering a wide range of application as small loads or weight	plastic hook weight set 55g	1g x 10, 2g x 10, 5g x 5	P101113

Experiment with pulley and pulley block



UNIVERSAL BOSSHEAD

For connecting two stand tubes or stand rods

Material: Steel
Dimensions: 42 mm long, 28mm dia.
Clamping width: 8 to12 mm

P101612

CLAMP WITH HOOK

For connecting two stand tubes or stand rods

Material: cast iron
Length: 15 cm
Clamping width: 8to 14 mm

P101632

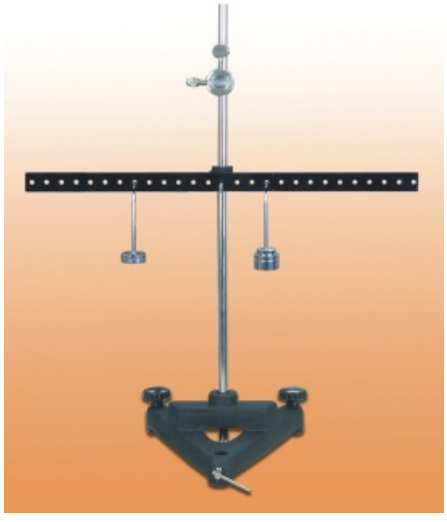
STAND BASE, V-SHAPE

For assemblies which require a high degree of stability, also when subjected to loads on one side.

Two holes with longitudinal slot and tommy screw on the bridge and the vertex. Two thread holes provided for levelling screws.

Jaw width for standrods: 8 to12 mm
Material: castiron
Length of sides: 22cm
Weight: 2.3 kgapprox.
Levelling screws: Adjustment range7 mm

P101413



Moment experiment

STAND ROD

Solid steel for suport any object

Dimensions	No.
Diameter 8mm, Length 25cm	P101013
Diameter 10mm, Length 50cm	P101026
Diameter 10mm, Length 50cm,M10	P101036

P101013

P101026

P101036

MAGNETIC BASE

For mounting experiment instruments and other equipment

	No.
4-mm axis	P101311
4-mm socket	P101312
Clamp	P101313
Hook	P101314
M6 inner screw thread	P101315

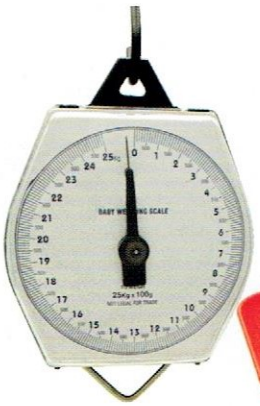
P101313

P101311

P101315

P101314

P101312



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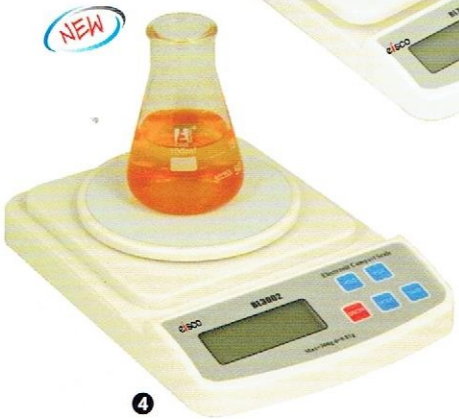

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Balance Spring – Dial Type

Dial type, circular scale, 6 inches with suspension and load hooks, with zero adjuster.

		Capacity	Resolution/Sub-division
PH0018A		10 kg	50 g
PH0018B	❶	25 kg	100 g
PH0018C		50 kg	200 g

Balance Compression

Useful for weighing chemicals and general purposes. Made of plastic body with wide view dial and easily readable scale. Most durable and provided with zero adjustment knob.

		Capacity	Resolution/Sub-division
PH0020A		500 g	5 g
PH0020B		1000 g	5 g
PH0020C	❷	2 kg	10 g
PH0020D		5 kg	25 g

Balance Electronic

Pan size 15x17 cm. Operates on 220V AC supply & battery. Supplied with adapter.

		Capacity	Resolution/Sub-division
PH0021	❸	2 kg	0.1 g
PH0021A		750 g	0.1 g
PH0021B		1 kg	0.1 g
PH0021C		3 kg	0.1 g
PH0021D		6 kg	0.5 g
PH0021E		~~10 kg~~ 7 Kg	1.0 g

Balance Electronic ❹

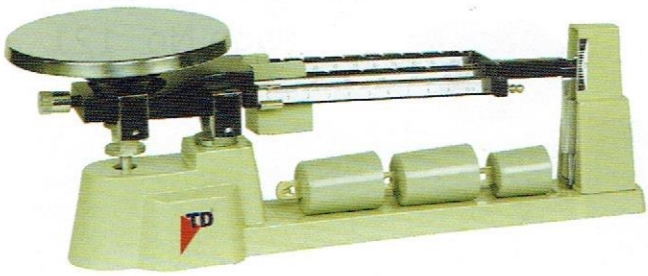
Pan Size 14.5 cm dia. Auto shut off & zero tracking. 5 digit Large LCD display.

	Capacity	Resolution/Sub-division
PH0021F	300 g	0.01 g
PH0021G	500 g	0.01 g

Balance Spring - Economy

Polystyrene body with large, easily read flat scales, zero adjustable devices having anodized metal scale is provided.

		Capacity	Resolution/Sub-division
PH0022A	❺	100 g / 1 N	2 g
PH0022B		250 g / 2.5 N	5 g
PH0022C	❻	500 g / 5 N	10 g
PH0022D		1000 g / 10 N	20 g
PH0022E		2000 g / 20 N	40 g



GP - 1133.1
BALANCE TRIPLE BEAM

A single pan low balance with three tired beams which can weigh upto 2610g when used with supplementary masses, the balances has three notched weighing beam with center indicating sliding masses giving total capacity of 610g. Additional masses are hung on the end of the beam increasing the capacity upto 2610g. And they can be stored in the recesed base when not required.

Magnetic Damping.

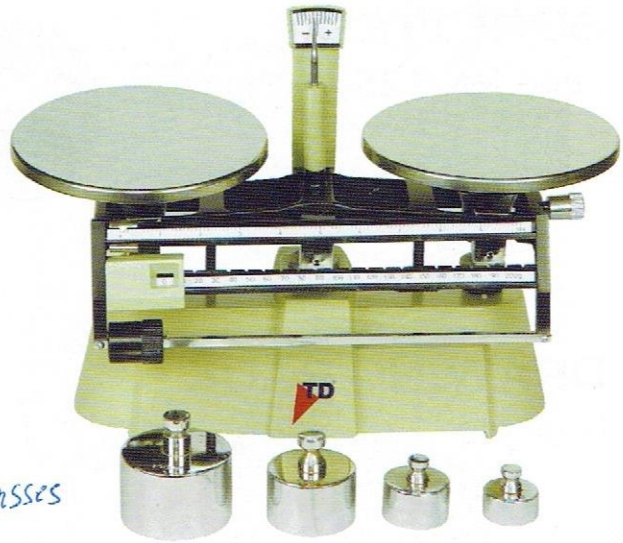
Beams	0 to 500g x 100g
	0 to 100g x 10g
	0 to 10g x 0.1g
Supplementary masses	2 x 1000g
Pan, stainless steel dia.	150 mm.

GP - 1132.1
BALANCE DOUBLE BEAM Roberval

Twin Pan Balance for accurate and rapid weighing of masses upto 2 kg when used with supplementary masses.

The Balance has a cast alloy base and feature angled beams with centre reading poises; undivided tare beam with a poise which slides and rotates for fine adjustment; spring loaded zero adjust compensator; precision ground knives and cross braced aluminium alloy box end beam.Equipped with facility for under balance weighing. Beams 0-200g X 10g, 0-10g X 0.1g Tare 224g Pan, stainless steel, 150mm diameter.

200g ; 500g ; 1Kg + masses



GP - 1127.3
COMPACT BALANCE

FEATURES

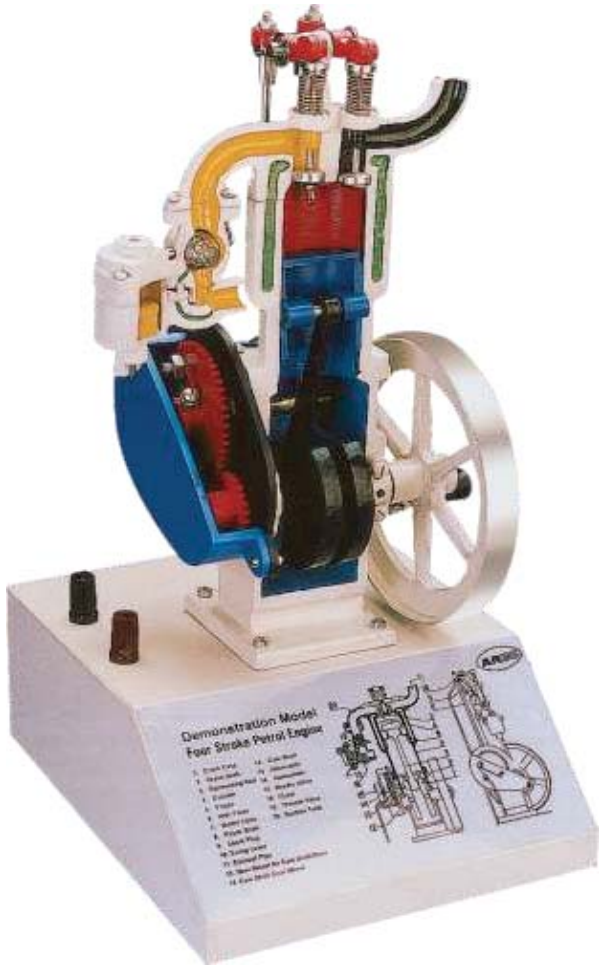
* Weighing Units like ct, gm, dwt.
* Simple Battery Operation.
* Precise and Accurate reading.
* High contrast LCD Display.

Model	Capacity	Readability
.01	200g	0.01g
.02	300g	0.01g
.03	500g	0.01g ✓
.04	1000g	0.1g
.05	1500g	0.1g
.06	2000g	1g
.07	5000g	2g

PETROL ENGINE, FOUR STROKE

Represents a typical air cooled, side-valve, four stroke petrol engine with the operation of the valves clearly evident. Cam operated inlet and exhaust valves being driven by a gear train from rear of the main crank. As with the two-stroke model, spark plug simulated through a small lamp to indicate the firing point. A pair of 4mm socket terminal for electrical supply. Cross-section of carburetor is shown. Mounted on a stable base, with printed diagram and key.

1050160/1 Mounted on metal base with printed diagram and key
1050160/2 Mounted on plastic base



DIESEL ENGINE, FOUR-STROKE

A model of four-stroke water-cooled diesel engine. Clearly demonstrates the functioning of all critical components such as fuel injection system, camshaft, rocker arms, tappets etc. Cam operated inlet and exhaust valves being driven by a gear train from rear of the main crank. Ignition simulated by means of a miniature bulb. Mounted on a stable base, with printed diagram and key.

1050200/1 Mounted on metal base with printed diagram and key
1050200/2 Mounted on plastic base

WANKEL ENGINE

This sectional model shows the internal structure in detail and demonstrates its basic principle operation. Unlike other engines, this engine incorporates rotary piston arrangements, completely eliminating reciprocating parts. The power piston is an arch shaped triangular rotor, which on rotating through a crank handle at the rear generates an epitrechoid. Ignition simulated by means of a miniature bulb. Mounted on base, with key and printed diagram showing working.

1050240/1 Mounted on metal base with printed diagram and key
1050240/2 Mounted on plastic base

HEAT KIT

All kits are assembly of discrete components to perform different activities. Each kit is especially designed to perform the experiments related to that particular field with each and every items in a single kit with a proper step by step instruction manual. Whole kit is packed in a well designed corrugated box. Activities those can be performed with this kit mentioned below..

1. Temperature characteristic.
2. Differentiate between hot and cold objects.
3. To keep an object either hot or cold.
4. Thermal insulator materials.
5. Melting points of different objects.
6. State changing of objects.

1060010 Heat Kit

RING & BALL

A simple and economical device for demonstrating the thermal expansion of solids. Comprises an annular brass ring mounted on an insulated handle and a captive brass ball secured to the ring handle through a chain and having diameter just smaller than the ID or the ring. When cold, the ball easily passes through the ring but does not pass on heating. When heated to the same extent, the ball still passes through the ring showing the “expansion of a hole” effect.

1060020/1 Ball diameter 13mm
1060020/2 Ball diameter 19mm
1060020/3 Ball diameter 25mm

RING AND BALL, GRAVESANDE'S

Similar to Cat No. 1060020, but both ball and ring mounted on separate insulated handles. Available in ball sizes (diameter).

1060040/1 13mm
1060040/2 19mm
1060040/3 25mm

RING AND BALL

Similar to Cat. No. 1060040, but ball is hanging with rod through a chain. Available in ball sizes (diameter).

1060050/1 13mm
1060050/2 19mm
1060050/3 25mm

You can search for the products in catalogue either by Catalogue Number or by the Name of the product.

RING AND BALL, GRAVESAND'S, ON STAND

Similar to Cat No. 1060020, but both ball and ring mounted on retort stand through a vertically adjustable collar, with ball suspended above the ring through a chain. Ball diameter 25mm.

1060060/1 Mounted on stand, with ball suspended from adjustable rod 1
1060060/2 Mounted on stand, with ball suspended from U-shaped bent rod, mounted on cast metal base 2

CONDUCTIVITY APPARATUS, INGEN-HAUSZ'S

For the comparison of conductivity of different metal rods. The apparatus consists of six metal rods, one each of copper, iron, lead, aluminium, steel and zinc of size about 150 × 3mm (length × diameter) fixed horizontally through holed rubber bungs inside a sheet metal trough of size about 150×90×100mm. (length × width × height) having six holes on one side. All metal rods have their one end deep inside the trough while other end projecting outside. In use, the rods are lightly coated with paraffin wax and water in the trough is heated. The rates of melting of respective rods can be compared to know their relative conductivities.

1060520/1 Conductivity Apparatus, Ingen Hausz's, with an insulated Plastic handle on each side for holding
1060520/2 Conductivity Apparatus, Ingen Hausz's, with an insulated wooden handle

DRINKING BIRD

A classic toy that is really a heat engine. A simple, inexpensive device that demonstrates the cooling effect caused due to evaporation. Simply duck the bird's head into a container filled of water to begin the bobbing motion. Subsequently, the thirsty bird will continue to drink so long as there is water in the container.

1060560 Drinking Bird

CONDUCTIVITY APPARATUS, INGEN HAUSZ'S, ON STAND

Comprises a sheet metal trough having seven holes at the top (six in one row and one at a side) and mounted on four detachable metal legs. Six holes facilitate vertical mounting of six metal rods, one each of copper, iron, lead, aluminium, steel and zinc through holed rubber bungs, while the seventh one provides for filling the trough with water or mounting of thermometer, if needed. All metal rods have their one end deep inside the through while other end projecting outside. The trough and stand painted with scratch-resistant epoxy coating.

1060540 Conductivity Apparatus, Ingen Hausz's, on Stand

THERMOSCOPE ETHER

For detecting thermal radiation. Two glass bulbs about 33mm diameter, attached to the ends of a U-shaped glass tube having one limb smaller than the other. Glass bulb attached to the smaller limb painted matt black. Apparatus partially evacuated.

1060600/1 Thermoscope Ether, mounted on wooden stand.
1060600/2 Thermoscope Ether, without wooden stand

CONVECTION TUBE

To show the convection currents in a heated liquid. Comprises a rectangular borosilicate glass tube of about 20mm outer diameter with funnel shaped outlet at its one side for filling it with water or any other liquid. It may be mounted vertically on a stand by means of a suitable retort clamp and gentle heating of either of its lower corner produces convection current which can be clearly observed by inserting small amount of dye or any other indicator in it.

1060580/1 380 × 300mm
1060580/2 200 × 150mm

MELTING POINT APPARATUS, SIMPLE 1

A very simple device for determination of melting point of amorphous solids. Comprises an aluminium cylinder with an obliquely drilled hole at its top for accommodating thermometers. When a very thin layer of the substance, whose melting point is to be determined, is sprinkled on top of the block and is gently heated, the temperature at which substance melts can be directly read from the thermometer.

1060620 Melting Point Apparatus, Simple

ICE MELTING KIT 2

Demonstrates the difference in conductivity of two different substances. Comprises two identical looking square blocks but of different materials, one of thermal conducting material and other of thermal insulating material. On placing ice on both of them, ice melts faster on one of them showing the difference in their conductivities.

1060640 Ice Melting Kit

CALORIMETER, COPPER 3

Single piece calorimeter, spun into cylindrical shaped vessel, seamless, with rolled rims at the top.

1060700/1 50×25mm (h × dia)
1060700/2 75×50mm (h × dia)
1060700/3 100×75mm (h × dia)

CALORIMETER, ALUMINIUM 4

Similar to Cat. No. 1060700.

1060720/1 50×25mm (h × dia)
1060720/2 75×50mm (h × dia)
1060720/3 100×75mm (h × dia)

METAL BLOCK CALORIMETER 5

A simple calorimeter facilitating quick experimental determination of the specific heat capacity of different metals. Comprises cylindrical metal blocks, each of equal mass adjusted to 1kg ±2%. Each metal block is drilled with two holes, a large central hole, about 12.5mm diameter to accept special immersion heater and a smaller hole about 7.5mm diameter, to accept thermometer or temperature sensor.

	Dia mm	*H mm*	*S. Heat (J/kg/K)*
1060660/1 Aluminium	76	84	878
1060660/2 Mild steel	44	89	480
1060660/3 Copper	44	79	381
1060660/4 Brass	44	85	368

IMMERSION HEATER 6

A special heater designed for use with metal block calorimeters. This fully sheathed miniature heater has a heating element enclosed in a stainless steel tube with two flying leads, having heat resistant insulation, coming out of the sealed tube body for electrical connections. Operates on 12 volts and rated 50 watts.

1060680 Immersion Heater

CALORIMETER, DOUBLE WALL, COPPER

Double vessel calorimeter with inner smaller vessel of size 75×50mm (height × diameter) positioned inside another copper vessel of size 100×75mm (height × diameter) and is surrounded completely with felt except on top to provide adequate thermal insulation. The vessels have a bakelite lid for thermal insulation at the top and a hole with slot for thermometer and stirrer respectively. Outer vessel fitted with detachable clip type thermometer support at its side. Supplied complete with stirrer but without thermometer.

1060760 Calorimeter, Double Wall, Copper

CALORIMETER, DOUBLE WALL, ALUMINIUM

Double vessel calorimeter with inner smaller vessel of about 300ml capacity positioned inside bigger aluminium vessel of about 900ml capacity with air insulation between them to minimize heat loss. The vessels have a insulated plastic lid for thermal insulation at the top and two holes - bigger one for holed rubber stopper to mount thermometer and smaller one for stirrer. Supplied complete with stirrer but without thermometer.

1060770 Calorimeter, Double Wall, Aluminium

CALORIMETER, JOULE'S, IN WOODEN BOX

Calorimeter vessel comprising of a nickel-plated copper calorimeter, placed inside a polished wooden box surrounded with felt to minimize the heat loss. The vessel is covered at the top with a bakelite cover which has a resistance coil mounted at the underside that terminates in binding posts on the upper side for electrical connections. The bakelite cover also has a slit for stirrer and a hole for suspending thermometer through a rod clamp arrangement on the wooden box. Supplied complete with stirrer but without thermometer.

1060940/1 75×50mm (h × dia)
1060940/2 100×75mm (h × dia)

METAL RIVETS / PELLETS

For specific heat Capacity experiments. Supplied in pack of 500g.

1061000/1 Aluminum Rivets
1061000/2 Brass Rivets
1061000/3 Copper Rivets
1061000/4 Iron Rivets
1061000/5 Lead Shots

JOULE AND WATT METER

Electrical energy consumed by a load with power is directly indicated on the front panel meter with a single selection switch. One can see either energy or power consumed by the applied load. Even we can use this instrument with data logger. A potential difference of 0-1V will generate on pulse output sockets. Max. input voltage for the meter is 24V D.C and 17V A.C with 10A max. current. Load current can be controlled by just rotating the knob fitted on the front panel indicated with load current.

1060950 Joule and Watt Meter

CALORIMETER, JOULE'S, DOUBLE WALL, COPPER

Provides more accurate results. Comprises a smaller inner nickel plated copper calorimeter vessel 75×50mm (height × diameter), enclosed in an outer vessel 100×75mm (height × diameter) with felt lagging in between them for minimizing heat loss. A close fitting bakelite lid is provided with a resistance coil mounted at the underside so as to be positioned sufficiently inside inner vessel and a pair of 4mm terminals at the top for electrical connections. The lid has provision for thermometer and stirrer. The resistance coil has recommended working current of 0.5A with a maximum of 1A to minimize the local boiling of liquid. Supplied complete with stirrer but without thermometer.

1060960 Calorimeter, Joule's, Double Wall, Copper

CALORIMETER, JOULE'S, DOUBLE WALL, ALUMINIUM

Similar to Cat No. 1060960 in construction and use, but with inner vessel of about 300ml and outer vessel of about 900ml, both of aluminium instead of copper, and upper lid of transparent acrylic cover. Supplied complete with stirrer but without thermometer.

1060980 Calorimeter, Joule's, Double Wall, Aluminium

ORGANIC CHEMISTRY SET

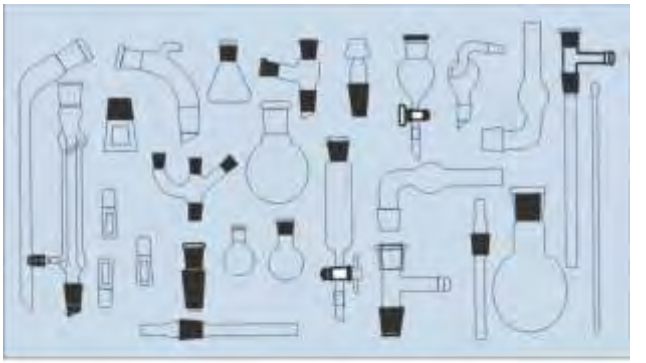
The multi-joint sets comprise following items.

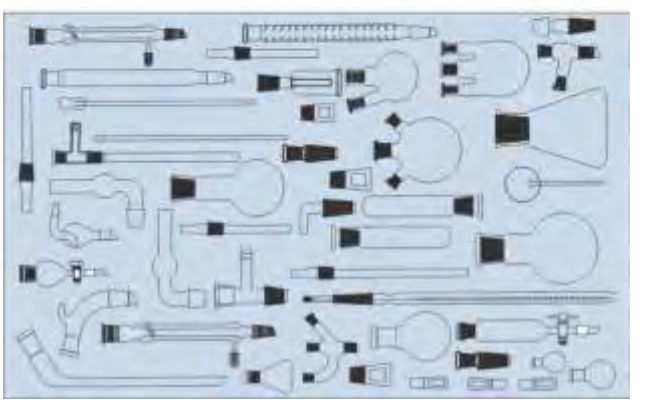
Components	2081080 (33BU)	2081120 (32BU)
Still head	1	1
Receiver adapter	1	1
Air leak / steam inlet tube	1	1
Liebig condenser	1	1
Dropping funnel, 100mL	1	1
Reduction adapter	1	1
Multiple adapter	1	1
Flask, RB, 50mL	1	1
Flask, Erlenmeyer, 250mL	1	1
Flask, RB, 250mL	1	1
Stopper	1	1
Stopper	1	1
Thermometer pocket	1	1
Receiver adapter	1	1
Flask, RB, 100mL	1	1
Stopper	1	1
Stirrer, link	1	1
Stirrer guide	1	1
Splash head	1	1
Pear shaped, funnel, 500mL	1	1
Adapter with 'T' connection	1	1
Drying tube	1	1
Drying tube	1	1
Flask, R.B., 500mL	1	1
Stirrer gland	1	1
Air leak / steam inlet tube	1	1
Stirrer, collapsible paddle		1
Air condenser		1
Double surface condenser		1
Air leak/steam inlet tube		1
Ground sleeve stirrer gland		1
Reduction adapter		1
Vigreux column		1
Thermometer-10° to 250°C		1
Thermometer pocket		1
Adapter, bent		1
Stopper		1
Stopper		1
Test Tube		1
Test Tube		1
Flask, RB, 1L, 3 necks		1
Flask, RB, 250mL, 2 neck		1
Flask, RB, 2L, 3 necks		1
Stirrer pulley		1
Flask, Erlenmeyer, 250m		1
Flask, RB, 1L.		1

2081080 33BU Organic Chemistry Set
2081120 32BU Organic Chemistry Set

Don't Taste or Sniff Chemicals

Safety precautions are always written on the chemical containers. For many chemicals, if you can smell them then you are exposing yourself to a dose that can harm you. It is advised to see the safety precaution on the chemical container to avoid any mishappening.





ELECTROLYSIS APPARATUS 1

For quick and simple electrolysis of solutions involving evolution of gases. Comprises a pair of Carbon electrodes, tapered at one end mounted at the base of clear transparent container through holed rubber stoppers, which are insulated from each other to prevent accidental short circuiting. The container has a pair of 4mm color coded sockets near the bottom for connections. Includes two graduated test tubes, 10ml each, held firmly in spring clips.

2090040 Electrolysis Apparatus

WATER VOLTAMETER 2

Glass cup form with two platinum electrodes sealed in stem with connecting wires connected them to two 4mm binding posts fitted on the base. Complete with two graduated test tubes, each of 15ml and a holder to support them in the voltameter.

2090080 Water Voltameter

GAS VOLTAMETER 1

Useful for electrolysis of small quantities, where gaseous evolutions accompany the process. Comprises a clear acrylic vessel mounted on an annular plastic ring and has a pair of platinum electrodes embedded at the bottom, which are connected to 4mm shielded sockets on the annular plastic ring. The gases evolved are collected in two miniature test tubes, included along with. The apparatus is fairly resistant to chemicals apart from organic solvents such as alcohols.

2090120 Gas Voltameter

COPPER VOLTAMETER 2

For experiments in electrochemistry. Consists of a plastic container with an insulated bakelite top lid having 3 rectangular copper electrodes mounted underneath. The middle copper electrode is removable and serves as cathode, while the other two copper electrodes serves as anode. The electrodes connected to terminals present on top of the bakelite lid for electrical connection.

2090160 Copper Voltameter

COPPER VOLTAMETER

A transparent acrylic vessel placed on a stand with circular base. A rubber stopper fixed in the centre of vessel with two copper electrodes internally connected with two colour-coded sockets fitted on the circular base. Copper voltameter is generally used in electrochemistry experiments with cupric sulfate. On applying a potential difference between two electrodes, the copper ions are deposited from anode to the cathode to verify the Faraday's Law Electrolysis. Iron, S.S, carbon electrodes fitted in rubber bung are also provided with it.

2090170 Copper Voltameter

HOFFMANN'S VOLTAMETER

Ideal for studying the electrolysis in which gaseous components are formed or gases are liberated at the electrodes. Demonstrates the composition of water by volume, and useful in determination of the electro-chemical equivalent of hydrogen. The apparatus consists of 'H' shaped glass tube having two connected eudiometers at its ends, graduated 50×0.2mL. A central bulb shaped reservoir is connected to the tube joining the two eudiometers. The eudiometer tubes provided with stop cock at the top and are open at the bottom to take suitable electrodes mounted in rubber bung. Complete made of borosilicate glass.

2090200/1 Hoffmann's Voltameter, with glass stop-cocks
2090200/2 Hoffmann's Voltameter, with stop-cocks made of PTFE key

ELECTRODES, SILVER FOIL

For use as electrode in electrochemistry. Foil thickness about 0.06mm, length 50mm and width 30mm. Pack of ten foils.

2090280 Electrodes, Silver Foil

ELECTRODES, CARBON

Comprises carbon electrodes mounted in holed rubber stopper. Can be used in beaker or boiling tube or with Cat No. 2090040. Supplied in pair. Approximate dimensions: 200×5mm (length × diameter)

2090320 Electrodes, Carbon

GAS TUBE, GRADUATED

Made of neutral glass, sealed at one end for collection and measurement of gases, capacity 50×0.2mL

2090400 Gas Tube, Graduated

ACCESSORIES AND SPARES FOR HOFFMANN'S VOLTAMETER

2090240/1 Stand for Hoffmann's Voltameter: Stable base with vertical metal rod and clamping arrangement to securely mount the Hoffmann's voltameter, by supporting the cross-limb and all the three vertical arms.

2090240/2 Carbon Electrodes, Simple: Carbon electrodes mounted in rubber bung with connecting wires with protective test tube housing and simple plastic connector. Useful for electrolysis of ammonia solutions or hydrochloric acid or any other chloride containing solution. Supplied in pair. 1

2090240/3 Carbon Electrodes, Superior: Similar to Cat No. 2090240/2, but superior quality carbon electrode mounted in extra soft rubber bung with brass connecting terminal. Supplied in pair. 2

2090240/4 Platinum Electrodes, Simple: Highly inert platinum electrodes fused in glass tube and mounted in rubber bung with connecting wires and protective test tube housing. Useful for electrolysis of acidified water. Supplied in pair. 3

2090240/5 Platinum Electrodes, Superior: Similar to Cat No. 2090240/4, but bigger platinum electrode mounted in extra soft rubber bung with brass connecting terminal. Supplied in pair. 4

SALT BRIDGE

For use in experiments involving the measurement of cell EMF under conditions of forward, zero, and reverse current flow. The bridge comprises an inverted 'U' tube with its ends closed by sintered discs. This apparatus provides a more effective method of making reversible cells than the wet filter paper or agar gel methods. Arm diameter 13mm, width 8cm and overall height 10cm

2090440 Salt Bridge

'U' TUBE

For the visual observation of the migration of coloured ions. Comprises central loading tube with funnel attached to a 'U' tube and two carbon electrodes mounted in holed rubber bungs closing the mouth of the U-tube. approximate sizes - 19.5cm height and 6.5cm width.

2090480 'U' Tube

Use of Bunsen Burner

- Turn the nozzle on the bottom of the burner.
- Lit the match stick in one hand and slowly turn on the gas at the spigot.
- Hold the match stick near the burner so that the air being pushed out by the propane does not blow it out.
- Lighting the burner using this method avoids explosion.

RAY TRACK APPARATUS

Comprises a wooden board with painted white, mounted on non-skid plastic feet, and a removable turntable about 170mm in diameter with two orthogonal lines along its diameter dividing it into four equal quadrants. Just beyond the rim of turntable, a circular scale graduated 90°-0-90°-0-90° × 1° is printed. Also includes a Ray Box with a 12V, 24W bulb. Supplied complete with a cylindrical convex lens of focal length about 75mm and two double slits, giving one wide beam slit and one each of single, triple and five slits.

1110800/1 Ray Track Apparatus
1110800/2 Optical Set for Ray Track Apparatus - one each of rectangular, semi-circular, right angled triangular - 90°×45°×45°, trapezoidal, biconvex and biconcave

CYLINDRICAL LENS FOR RAY BOX

Cylindrical lens for use with Ray Box, about 45mm wide. Focal length approx. 15cm (+6.67D).

1110780/1 Biconvex
1110780/2 Biconcave

Experiment

Aim

To calibrate an ammeter using a potentiometer.

Apparatus

A potentiometer, four accumulators, two rheostats, a Weston galvanometer, a standard cell or a Daniel cell, ammeter to be calibrated, two one-way keys, a two-way key, standard one ohm resistance, galvanometer.

Procedure

1. Arrange the apparatus as shown in the figure.
2. Put the plug between 1 and 2 in key K and find the balance point and note the corresponding length l1.
3. Pass the current through standard resistance by plugging key K2 and join 2 and 3 in K. Again locate the balance point and note the corresponding length l2. Take also the ammeter reading.
4. Gradually reduce R2 so as to increase the current through the ammeter in small suitable steps and measure the corresponding lengths for balance. Check also the reading of the balance point due to standard cell each time.
5. Compare the ammeter readings with the corresponding calculated values of the current. Graph: Plot a graph between the registered and the calculated values of the current. From this we can find the correct value of the current corresponding to any registered value.

LIGHT DEMONSTRATION DONUT

Optically clear frame polished acrylic for investigating internal replection and refraction.

1110725 Light Demonstration Donut

LENSES DOUBLE CONCAVE

Unmounted spherical lenses suitable for use with optical benches and for other studies in the optics. Spherical optically worked glass, with polished faces and ground edges.

Diameter 38mm

	Focal Length	*Power*
1110040/1	50mm	-20.00D
1110040/2	100mm	-10.00D
1110040/3	150mm	-6.67D
1110040/4	200mm	-5.00D
1110040/5	250mm	-4.00D
1110040/6	300mm	-3.33D
1110040/7	500mm	-2.00D
1110040/8	1000mm	-1.00D

Diameter 50mm

	Focal Length	*Power*
1110040/9	50mm	-20.00D
1110040/10	100mm	-10.00D
1110040/11	150mm	-6.67D
1110040/12	200mm	-5.00D
1110040/13	250mm	-4.00D
1110040/14	300mm	-3.33D
1110040/15	500mm	-2.00D
1110040/16	1000mm	-1.00D

Diameter 75mm

	Focal Length	*Power*
1110040/17	100mm	-10.00D
1110040/18	150mm	-6.67D
1110040/19	200mm	-5.00D
1110040/20	250mm	-4.00D
1110040/21	300mm	-3.33D
1110040/22	500mm	-2.00D
1110040/23	1000mm	-1.00D

Diameter 100mm

	Focal Length	*Power*
1110040/24	100mm	-10.00D
1110040/25	150mm	-6.67D
1110040/26	200mm	-5.00D
1110040/27	250mm	-4.00D
1110040/28	300mm	-3.33D
1110040/29	500mm	-2.00D
1110040/30	1000mm	-1.00D

Lenses of other diameters and focal lengths also available on specific request.

LENS, SET OF SIX IN WOODEN BOX

Set of 6 unmounted spherical lenses to explore the properties of different lenses, how they interact and affect light, concepts of reflection and refraction and combination of lenses. Made of optically worked plate glass with polished faces and ground edges. Includes one each of the following typical shapes - double convex, plano-convex, converging concave-convex (convexo-concave), diverging concave-convex (concavo-convex), double concave and plano-concave. Supplied in a velvet-lined box. Available in lens sizes (diameters)

1110060/1 38mm
1110060/2 50mm
1110060/3 75mm

LENS, SET OF SIX IN PLASTIC TRAY

Similar to cat no. 1110060 but supplied in plastic tray with cover. Lenses dia. is 50mm

1110065 50mm

CIRCULAR MIRROR, PLANE

Unmounted plane, circular, smooth ground edge, 50mm diameter. Silvered back with protective coating.

1110140 Circular Mirror, Plane 1

CYLINDRICAL MIRROR, GLASS

Optically worked faces, ground edges, white glass, well polished, size 50 × 45mm.

Plano-Convex

	Focal Length
1110080/1	6.0 cm
1110080/2	7.5 cm
1110080/3	10.0 cm
1110080/4	15.0 cm

Plano-Concave

	Focal Length
1110080/5	6.0 cm
1110080/6	15.0 cm
1110080/7	30.0 cm

Bi-Convex

	Focal Length
1110080/8	7.5 cm
1110080/9	15.0 cm
1110080/10	20.0 cm

Bi-Concave

	Focal Length
1110080/11	7.0 cm
1110080/12	15.0 cm
1110080/13	20.0 cm

SPHERICAL MIRRORS

Unmounted spherical mirrors, optically worked, silvered back with protective coating.

1110100 Concave Mirror 2
1110120 Convex Mirror 3

Diameter 50mm

	Focal Length
1	100mm
2	150mm
3	200mm
4	300mm

Diameter 60mm

	Focal Length
5	100mm
6	150mm
7	200mm
8	300mm

Diameter 75mm

	Focal Length
9	100mm
10	150mm
11	200mm
12	300mm

Mirrors of other diameters and focal lengths also available on specific request.

CYLINDRICAL MIRROR, GLASS

Unmounted, optically worked, glass cylindrical mirrors, Semi-circular, 75×25mm (diameter × height). Silvered back with protective coating.

1110160/1 Cylindrical Mirror, Glass, Concave
1110160/2 Cylindrical Mirror, Glass, Convex

CYLINDRICAL MIRROR, STAINLESS STEEL

Unmounted, Semi-circular mirror, 150×75mm (diameter × height). Made of Stainless Steel and respective surface highly polished.

1110180/1 Cylindrical Mirror, Stainless Steel, Concave
1110180/2 Cylindrical Mirror, Stainless Steel, Convex

CONVEX/CONCAVE MIRROR

Spherical convex/concave mirror, mounted in metal frame with base. Any focal length from 100mm to 300mm available. Sizes (Diameter) available are

1110200/1 75mm
1110200/2 100mm
1110200/3 150mm
Other Sizes also available on specific request.

PLANE MIRRORS, GLASS, UNMOUNTED

Unmounted rectangular plain glass mirrors with ground edges. Back silvered, with protective coating. Sizes (length × height) available are

1110220/1 75×25mm
1110220/2 75×50mm
1110220/3 100×75mm
1110220/4 150×25mm
1110220/5 150×50mm
Other Sizes also available on specific request.

MIRROR SUPPORT BLOCK, WOODEN

Simple wooden block of rectangular cross-section with slot at the center along its length to vertically mount plane rectangular mirrors. Specially designed for **Cat No. 1110220/5**, but equally suitable for the other similar mirrors in the range. Sizes (lengths) available are

1110240/1 25mm
1110240/2 50mm
1110240/3 75mm
1110240/4 100mm
Other Sizes also available on specific request.

LENS HOLDER

Useful tool in optical benches or other optical experiments for securely holding different sizes and types of lenses and mirrors.

1110260 Wooden, suitable for lenses or mirrors up to 75mm diameter. Comprising a wooden black, with a V-shaped groove to hold lenses or mirrors, mounted on a rectangular wooden base. With index mark engraved on either side of the base.

PRISMS, GLASS, RIGHT ANGLED

For studying diffraction, dispersion, deviation, refraction, total internal refraction, spectrum formation and other related optical phenomena. Right angled. Non-optically worked with polished faces, edges slightly beveled. Nominal angles of the face are 90°×45°×45°.

Size 25mm
1110280/1 Regular quality
1110280/2 Superior quality
1110280/3 Extra White Glass

Size 38mm
1110280/4 Regular quality
1110280/5 Superior quality
1110280/6 Extra White Glass

Size 50mm
1110280/7 Regular quality
1110280/8 Superior quality
1110280/9 Extra White Glass
Other Sizes also available on specific request.

PRISMS, GLASS, EQUILATERAL

Non-optically worked, with polished faces, edges slightly beveled. Nominal angles 60°×60°×60°.

Size 25mm
1110300/1 Regular quality
1110300/2 Superior quality
1110300/3 Extra White Glass

Size 38mm
1110300/4 Regular quality
1110300/5 Superior quality
1110300/6 Extra White Glass

Size 50mm
1110300/7 Regular quality
1110300/8 Superior quality
1110300/9 Extra White Glass
Other Sizes also available on specific request.

This catalogue is a hub for all science equipments which are in most demand at the labs.

PRISMS, ACRYLIC, EQUILATERAL

60°×60°×60°. Clear acrylic polished surfaces. Sizes available are

1110320/1	38mm
1110320/2	50mm

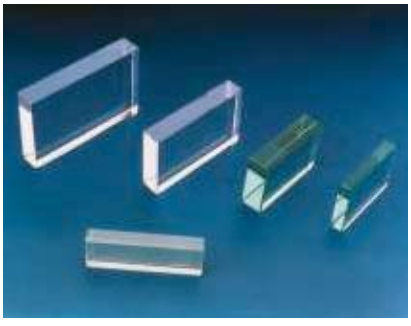
Other Sizes also available on specific request.

PRISMS, ACRYLIC, RIGHT ANGLED

90°×45°×45°, all faces fully polished. Sizes available are

1110340/1	38mm
1110340/2	50mm

Other Sizes also available on specific request.

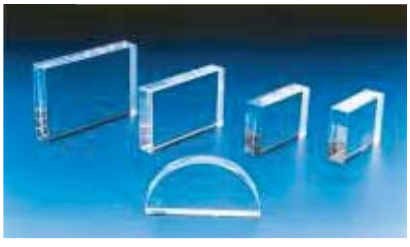


GLASS BLOCK, RECTANGULAR, ECONOMICAL

Made from moulded glass with polished surfaces. All angles accurately worked. For refraction experiments. Sizes (length × width × thickness) available are

1110360/1	75×50×18mm
1110360/2	100×60×25mm
1110360/3	110×65×18mm

Other Sizes also available on specific request.



GLASS BLOCK, RECTANGULAR, DELUXE

Made from high optical quality white glass with polished surfaces free from any defect. All angles accurately worked with edges slightly beveled and glass totally free from bubbles. Sizes available are

1110380/1	75×50×12mm
1110380/2	75×50×18mm
1110380/3	100×60×20mm
1110380/4	100×60×25mm
1110380/5	100×60×18mm
1110380/6	115×65×20mm
1110380/7	115×65×18mm
1110380/8	125×65×18mm
1110380/9	100×85×18mm

Other Sizes also available on specific request.

ACRYLIC BLOCK, RECTANGULAR

Made from clear acrylic, all faces fully polished and free from any defect. Sizes available are

1110400/1	75×50×12mm
1110400/2	75×50×18mm
1110400/3	100×60×20mm
1110400/4	100×60×25mm
1110400/5	100×60×18mm
1110400/6	115×65×20mm
1110400/7	115×65×18mm
1110400/8	125×65×18mm
1110400/9	100×85×18mm

Other Sizes also available on specific request.

SEMICIRCULAR BLOCKS

Clear, all faces polished. Sizes (diameter × thickness) available are

Glass

1110420/1	75×10mm
1110420/2	90×12mm
1110420/3	90×16mm
1110420/4	100×12mm
1110420/5	100×18mm
1110420/6	100×25mm

Acrylic

1110420/7	75×10mm
1110420/8	90×12mm
1110420/9	90×16mm
1110420/10	100×12mm
1110420/11	100×18mm
1110420/12	100×25mm

Other Sizes also available on specific request.

OPTICAL ACCESSORY BLOCKS, ACRYLIC IN PLASTIC TRAY

Similar to cat no. 1110440/8, but supplied in plastic tray with cover.

1110445 Optical Accessory Blocks, Acrylic

HOLLOW OPTICAL SHAPES, GLASS

For studying the optical properties of liquids and determination of their refractive index by filling them in the hollow optical shapes. Made from ordinary plate glass, properly cemented with optical cement. All shapes have opening at the top for pouring in liquid. Sizes and shapes available are

1110460/1	38×38mm, Hollow Prism
1110460/2	50×50mm, Hollow Prism
1110460/3	60×60mm, Hollow Trough
1110460/4	75×75mm, Hollow Trough

Other Sizes also available on specific request.

REFRACTIVE TANK SEMI CIRCULAR

Single moulded leakage proof semicircular acrylic tank to perform a variety of light experiments and to find out the refractive index of different liquids. A protractor for measuring the angle of refraction with a circular scale 180° in minimum graduation of 1° is printed in the base side of tank.

1110470 Refractive Tank Semi Circular

OPTICAL BENCH, ALUMINIUM EXTRUSION

Made from specially designed rugged aluminium extrusion and also permits the use of standard Light Box and Optical set for ray optics investigations. The accompanied prism table provides for the experiments in diffraction of light through prisms. The Light Box can itself be used as light source and the lens and blocks (prisms) in the optical set on the prism table. The extruded optical bench length has a 0-150cm × 1mm scale and has tilt-proof, easy sliding moulded plastic riders with index mark for mounting of various uprights and accessories. The optical Bench comes complete with following components.

- 1.5m long straight anodized aluminium extrusion optical bench with scale - 1 No.
- Special mounting platform with metal upright to support Light Box - 1 No.
- Convex lenses, 50mm diameter (of different focal lengths) - 8 Nos.
- Concave lenses, 50mm diameter (of different focal lengths) - 4 Nos.
- Object / Image screen
- Lens holders, plastic - 3 Nos.
- Rotary prism table - 1 No.

1110920 Optical Bench, Aluminium Extrusion

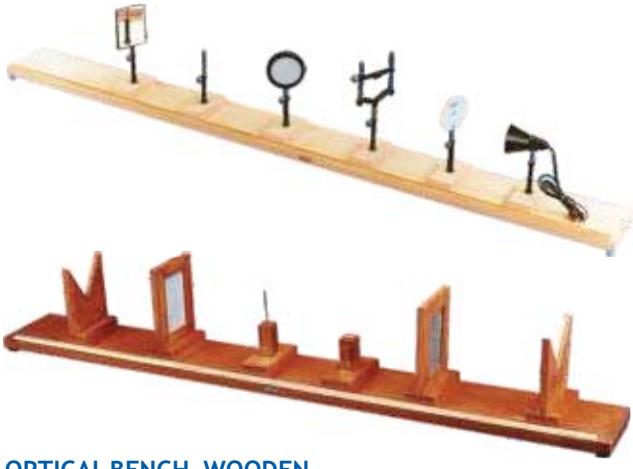
Other optional accessories from Cat Nos. 1111060 to 1111400 also available.

OPTICAL BENCH, METER RULE

A simple and economical set of components for setting up a complete optical bench with the help of a wooden meter rule. All components made of plated sheet metal. The standard set includes following components

- Meter Rule - thick, graduated 0-100cm × 1mm, with permanently engraved scale.
- Pair of Metal Supports - inverted W-shaped, for securely supporting the wooden meter rule as a base of the optical bench.
- Lens/Mirror Support, 50mm diameter - 2 Nos.
- Screen Support, for vertically supporting cardboard or light metal screens - 1 No.
- Candle Holder, Single Candle - 1 No.
- Object Marker, for use as an image in lens and mirrors experiments - 1 No.
- Screen, rectangular white cardboard, with a millimeter screen along one edge - 1 No.

1110980 Optical Bench, Meter Rule



OPTICAL BENCH, WOODEN

Comprising a long wooden baseboard about 14cm wide, with a scale graduated in millimeters. Also included are six riders mounted on free sliding bases, with index marks on one side of the base, for mounting accessories, with heights of the accessories adjustable. Supplied complete with following accessories.

- Lamp house with a 240V, 15W lamp - 1 No.
- Object screen of 75mm diameter with wire gauze at the center - 1 No.
- Holder for lenses 38mm diameter - 1 No.
- White metal receiving screen 100×75mm with a slot for square cardboard screen on the reverse - 1 No.
- Object needle - 1 No.
- Plane mirror mounted in a frame 100×75mm - 1 No

Sizes available are

1) With 0-100cm scale
2) With 0-150cm scale

1110960 With all accessories mounted on metal upright for fixing on top of the riders.

1110970 With all accessories on wooden stand

OPTICAL BENCH, ANGLE PROFILE

For exploring the fundamentals of optics, such as image formations, reflection / refraction through optical elements. Comprises a lightweight alloy extrusion having angular profile, about 1m long, with a scale on one side graduated in millimeters. Complete kit includes - 1 Light source, 3.5V with parabolic reflector; 5 multipurpose holders - 40mm diameter diaphragm holder, screen holder; 4 convex lenses, diameter 40mm and focal lengths 25, 12.5, 10 and 5cm; 1 concave lens, diameter 40mm and focal length 10cm; 5 metal clips for mounting lenses in the multipurpose holders; 1 diaphragm with 3 holes of diameters 3, 5 and 8mm; and one object letter. Specially designed multipurpose holders of light-weight, moulded plastic have bottom to sit exactly on top of the optical bench with free sliding motion and index mark for reading the position.

1111020 Optical Bench, Angle Profile

New Products from Lionet Science

Electrophoresis Power Supply

This new device lets you control electrical parameters to attain the band separation needed for electrophoresis. With clear, bright digital read-out. Supplies smooth, stabilized DC current at 110,75 and 25 V max. 500mA DC. # **1050232** CE approved

1050232

High Voltage Power Supply

New! This economical high voltage power supply will provide enough current for a wide range of experiments and practical applications. It provides an EHT output continuously variable from 0 to 6KV with a maximum of 3mA DC current. Features include overload protection. CE approved. # **1050854**

1050854

Magdeburg Hemisphere

Our plastic half-spheres withstand 180 pounds of force when pumped free of air. Includes 2 ABS plastic hemispheres (12cm diameter), plastic exhaust valve to fit pressure tubing; plastic . #**1010030**

1010030

Audio Generator

This economical device provides 0.1 to 200KHz, with 0.1Hz resolution. Features include sine wave and amplitude adjustment. With built-in amplification driver. 4 ohm, 5.8W. CE approved # **1050964**

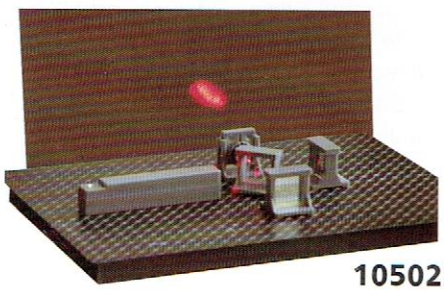
1050964

Digital Meter

Measure a wide range of current and voltage to get an accurate result. Uses two AA batteries. # **1250200**

1250200

1050235



1050226

Induction coil

This very higher voltage power source can be used in a variety of physics experiments involving spectrum tubes, cathode ray tubes, electric flasher, electric bomber between liquid/solid medium, and more...
With hammer interrupter and extinguishing capacitor.
Use build-in battery pack or power supply with input 6 to 12V DC.
Produces 10 to 50KV continuous voltage. # **1050235**

Michelson Interferometer

Magnetic optical components, gridded base

This new twist on the Michelson-Morley device measures the small differences in time needed for 2 separate light beams to travel 2 different paths. An interference pattern is produced by splitting a beam of light into two paths, bouncing the beams back and recombining them. The different paths may be of different lengths or composed of different materials to create alternating interference fringes on a screen. Positioning the magnetic optical components on our metal base is easy and accurate. The distance can be adjusted without a ruler as the base contains a permanent grid at a 45° angle. Unlike other models, we include all parts needed to measure the coefficient of linear expansion of a metal. *Contains* metal base with scale; optical components with magnets; 3 rods: brass, aluminum, steel. # **1050226**

1050511

Optical Bench

With Super LED and Laser Light Source

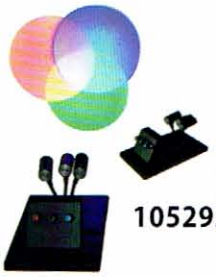
Observe and measure optical phenomena quickly and effectively with this 1 m long illuminated optical bench. Optical components can slide freely along the length of the extruded aluminum rail. Includes instructions; 1 m rail; 2 pedestal stands; 5 sliders; graduated scale plate; 40mm diameter convexo-convex lens; frosted lens; 36 mm diameter convexo-convex lens in front of light source with LED and laser; candle stick support; I-shaped screen; white screen; card holder and supports. Requires 6V DC power supply or battery pack. # **1050511**

New Products from Lionet Science

1057320

1057320 LCD light-up display and build in rechargeable Li battery .large internal memo . (Up to 20 data points can be recorded) come complete with 2 Photogates. can measure the time interval between two photogates, measure the time it takes to pass through one photogate, measure acceleration of a released ball, determine the acceleration due to gravity (with a picket fence), determine elastic and inelastic collision times, calculate cycles, determine the frequency of a rotating object, determine the period of a pendulum, and count time with great accuracy.

1052857



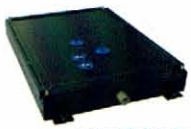
1052957

To learn and teach how different colors can be made by addition / mixing of the basic three primary colors Red, Blue and Green, like Yellow, Magenta, Cyan, White etc. Learn Color Mixing, Complementary Colors, Color Fatigue and Colored Shadows

1052757

1052757 Laser Ray Box 5 Beams. Side by diode lasers,1.6cm a part,650 nm wavelength.
Will easily demonstrate the following when used with appriate optics.Light bending by reflection,
Focusing effect,Reflection with mirrors,Fresnel reflection,
Monochromatic character of laser light,
Total Internal refection.rechargeable Li Battery operated.

1035095 our 700*500 mm air table facilitates the study of mechanics, both quantitatively and qualitatively, by providing an almost friction free system on which a large range of experiments may be performed. A long straight 90o triangular shaped tube is mounted on three adjustable feet so that the tube can be made level.
The sloping sides of this tube have small holes drilled and air is pumped into the tube from an air blower. Air passes out the small holes in the sloping sides. When 'Gliders' are placed on the air tube and they float on the air passing from the holes. They slide back and forth on the tube with almost zero friction.



1035095

1024140

1024140 Complete unit to demonstrate and study Refraction in Water, Refraction in Acrylic / Glass blocks and Reflection in Plane Mirror. Consists of a Laser Mounted graduated Plastic Disc 150m dia., which can lay flat on its surface and act as a table to demonstrate and study refraction in solid acrylic blocks or reflection in a plane mirror, or it can be mounted on the back of the tank which can hold liquids such as water to demonstrate and study refraction in water / liquids. Comes complete with four acrylic blocks one rectangular, one trapezoid, one triangular and one semi circular, one plane mirror, with instructions and storage box with thick foam cutouts to store all pieces in one box. Operates on 2 AAA Batteries not included

1050860

1050860 magnet probe:show the 3-D nature of magnetic field easily and conveniently

1057320

1057320 BRG light-up display for teacher use. large internal memo .(Up to 20 data points can be recorded) come complete with 2 Photogates. can measure the time interval between two photogates, measure the time it takes to pass through one photogate, measure acceleration of a released ball, determine the acceleration due to gravity (with a picket fence), determine elastic and inelastic collision times, calculate cycles, determine the frequency of a rotating object, determine the period of a pendulum, and count time with great accuracy.

1050957

A Rubens' tube, also known as a standing wave flame tube, or simply flame tube, is an antique physics apparatus for demonstrating acoustic standing waves in a tube. Invented by German physicist Heinrich Rubens in 1905, it graphically shows the relationship between sound waves and sound pressure, like a primitive oscilloscope. Today it is only used occasionally, as a demonstration in physics education.
this unit completed with signal generator and loadspeaker

2011011

2011011An excellent way to teach and demonstrate static friction on different textured surfaces and /or different surface size . hook on one side for pulling along an inclined plane or by attaching to a spring scale.

OPTICAL BENCH - simple type

Cat: HL2240-001 Complete with 'Hodson' Light Box.

Cat: HL2241-001 Not including 'Hodson' Light Box

DESCRIPTION:

The IEC **Optical Bench** system is designed to be used with the IEC 'Hodson' Light Box. The 'Hodson' Light Box can be used as the light source for the Optical Bench and the lens and prism blocks from the Light Box kit can be used on the Optical Bench. The study of colours and shadows is performed from the mirror end of the light box and the study of light rays and the creation of images is performed from the front end of the light box.

The 1.2m long aluminium rail with the 1m adjustable scale holds all the components in a straight line for accurate experiments. The kit contains lenses, prisms, screen, prism table, targets and holders for lenses, slits, plates and targets. These are all the components required for basic optical experiments of focal lengths, images, diffraction and much more.

The extensive kit is detailed on the following page.

HL2240-001 or HL2241-001 optical bench

Physical size: 1420x110x110mm LxWxH kit **Weight: 2.25 kg**

COMPONENTS:

The kit components are as follows:

- 1 pce Aluminium Bench, 1.2M long with 1M scale fitted.
- 1 pce Plastic pillar to clamp to bench to support light source.
- 1 pce Platform (tapered shape) to support 'Hodson' Light Box (presses tightly over plastic pillar clamped to bench).
- 3 pcs Tubular supports with circular clips for 50mm. Diam. lenses and mirrors. (accepts circular lens/mirrors)
- 1 set Prism table, circular, with tubular support.
- 4 pcs Grooved supports for square plates with centre hole.
- 4 pcs Square plates with centre hole (for lenses and devices). (these are pressed into the grooves of the supports).
- 1 pce White card screen. (this screen stands vertically held on any tubular support by slipping between the pins and the centre tube)
- 1 pce Photographic slide of a 3mm. diam. hole.
- 1 pce Photographic slide of a 5mm. diam. hole.
- 1 pce Photographic slide of an 8mm. diam. hole.
- 1 pce Photographic slide of the letter 'F'.
- 1 pce Photographic slide of a metric scale.
- 1 pce Photographic slide of circular targets (5 & 10mm. diam.).
- 2 pcs Convex lens, 50mm. diam. X 100mm focal length.
- 2 pcs Convex lens, 50mm. diam. X 200mm focal length.
- 2 pcs Convex lens, 50mm. diam. X 300mm focal length.
- 1 pce Concave lens, 50mm. diam. X 100mm focal length.
- 1 pce Concave lens, 50mm. diam. X 200mm focal length.
- 1 pce Concave lens, 50mm. diam. X 300mm focal length.
- 12 pc Rubber bands for holding lenses and devices to the square plates.
- 1 pce Triangular prism.
- 1 pce Light Box (HODSON type) - for **Cat: <u>HL2240-001 ONLY</u>**
- 1 pce Instruction sheet.

LIGHT BOX & OPTICAL SET - 'Hodson'

Cat: HL2060-001 Light Box & full kit of parts.

DESCRIPTION:

The Light Box & Optical set was designed back in 1971 and has undergone several improvements since that time. The excellent tooling for the shapes and the moulding technique ensure flat, accurate and water clear products.

An excellent experiment manual covering all basic experiments is provided with each kit.

For many years, several companies around the world have copied our product, but the original Australian product is still the best quality and the best value for money.

HL2060-001 'Hodson' light box & optical set

Physical size: 200x200x150mm LxWxD (outer pack) Weight: 0.83 kg

A spare lamp is provided with each kit and all replacement parts are individually available. Spare outer housings also available (see PA section of listing)

The light box is available also with set of 3x slits only (no kit of parts). See HL2060-020

IMPROVEMENTS FROM EARLIER MODELS:

- The sliding collimating lens no longer uses a screw knob and there is nothing for the students to undo. The friction slider is convenient and robust.
- The colour filters are now moulded from high temperature poly carbonate.
- The colour 'cards' are now moulded plates of colour.
- The new lamp is Quartz Halogen and the new socket cannot be twisted from the box by students.
- The new lamp is lower wattage and draws less current. Two Light Boxes can now be driven from one standard IEC power pack LB2633-001
- A new miniature transformer can be supplied inside the housing to permit the Light Box to be operated from 240V mains.
- The new lamp socket permits one Light Box to plug into another.
- The banana plugs on the cables are moulded on and are stackable. Cannot come loose or be removed.
- The sets of slits has been increased to a set of 3 to include a blank and a double slit.

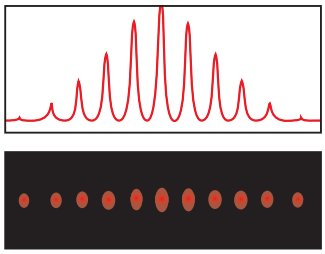
HL2060-001 'Hodson' light box & optical set

Designed and manufactured in Australia

HE-NE LASER FOR INTERFERENCE EXPERIMENTS

HE-NE LASER 1 MW

2885.00



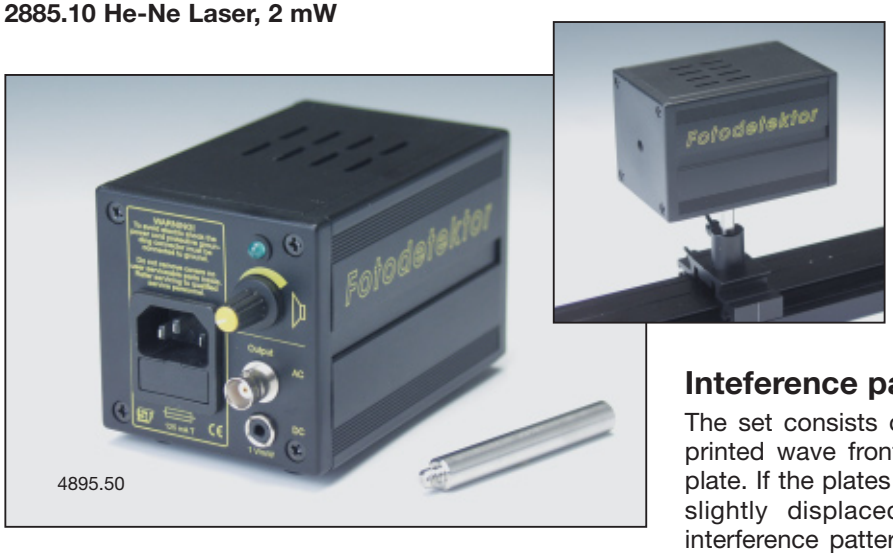
The laser emits light with a wavelength of 632.8 nanometers. The emitted light is coherent, i.e. wave fronts propagate in the same phase over a large distance compared with ordinary light sources. The emitted light is highly directional and the beam diameter at the laser is about 0.5 mm increasing very gradually at increasing distances from the laser. The light emitted is not uniformly polarized but changes its polarization at random around the direction of propagation. Light from the laser is well-suited to demonstrations of optical interference. If a line grating is placed in the laser beam, the interference pattern will be clearly visible on a projection screen. The laser can be used for a wide range of applications in geometrical optics, holography, communication etc.

2885.00 He-Ne Laser, 1 mW
2885.10 He-Ne Laser, 2 mW

He-Ne laser, modulated, 1 mW

Laser like the 2885.00 but with the option of modulating the light beam. The laser is provided with a BNC-connector for connection to a signal generator, CD-player or similar signal source. The light beam intensity will then vary with the applied signal. Well suited for demonstration of optical communication using photodetector no. 4895.50.
Maximum modulation frequency: 1 MHz.

2885.20 He-Ne laser, modulated, 1 mW



4895.50

Photodetector

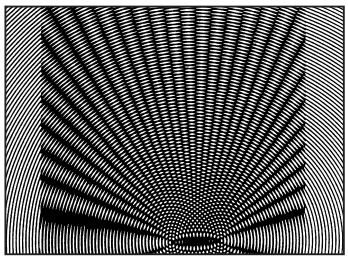
The photodetector is provided with a photo diode which can convert laser light intensity values to an electrical signal. The signal can be directed to the built in loudspeaker or be used for measurements via the analog and digital output connections. The photodetector can be used for demonstrating communication over a laser beam, fiber optic communication, plotting of interference patterns, etc. The maximum frequency is 1 MHz.

4895.50 Photodetector

Inteference pattern model for overhead projector

The set consists of two transparent plastic plates with printed wave front patterns for point sources on each plate. If the plates are placed on top of one another and slightly displaced, an interference pattern will appear. The pattern can readily be projected onto a large viewing screen using an overhead projector.

3235.00 Inteference pattern set



3235.00

TELESCOPE

Comprising a plano-convex lens of about 38mm diameter × 150mm FL, mounted in a tube about 400×50mm (length × diameter), and a double convex lens of 50mm diameter 500mm FL, mounted in a tube 400 × 55mm diameter. The small tube is located in the large tube by means of foam plastic rings, which provide an effective sliding. Equipped with rod for stand mounting. Useful for terrestrial as well as astronomical viewing. Supplied without stand.

1111420 Telescope

MODEL OF OPTICAL INSTRUMENTS

Demonstrates the working and optical arrangement of simple optical instruments. Complete with lenses, mounted vertically on the board with ray diagram printed to give an idea of their working. Different models available are

1111440/1 Galilean Telescope
1111440/2 Astronomical Telescope
1111440/3 Terrestrial Telescope
1111440/4 Compound Microscope

DIFFRACTION GRATING

Useful for studying the spectrum. Mounted in 50×50mm slide frame. Available in resolutions

1111620/1 80 lines/mm
1111620/2 100 lines/mm
1111620/3 300 lines/mm
1111620/4 600 lines/mm

GRATING SPECTROSCOPE

A diffraction grating spectroscope for viewing visible lines and absorption spectra. The spectrum is visible, superimposed on a scale, which gives the approximate wavelengths. The high resolution diffraction grating replica used, produces extremely bright spectrum. Complete body of unbreakable moulded plastic and can easily be held in the hand. The construction eliminates internal reflections to provide the sharpest, clearest spectrum possible.

1111450 Grating Spectroscope

DIRECT VISION SPECTROSCOPE IN WOODEN BOX

A simple device for the rapid qualitative examination of composition of emission and absorption spectra. It has the principle components - collimator, prism and telescope, all arranged along the same straight tube. Comprises a plated brass pipe with adjustable slit at one end for adjusting the inside amount of light entering inside, and a drawtube at the other end having eyepiece. The drawtube can be slid along its length for sharp focusing of the spectrum and is fitted with a multi-element prism causing appreciable dispersion of light without deviation. Supplied complete in velvet lined wooden case.

1111460 Direct Vision Spectroscope

GRATING HOLDER

A centered circular aperture square sheet fitted with two clips to hold the different sized gratings.

1111625 Grating Holder

DIRECT VISION SPECTROSCOPE IN PLASTIC TRAY

Similar to cat no. 1111460 but supplied in plastic tray with cover

1111465 Direct Vision Spectroscope

SPECTROMETER, KIRCHHOFF-BUNSEN TYPE

For qualitative observation and measurement of emission and absorption spectra. Table unit has fixed optical flint prism with removable cover. Includes swiveling observation telescope with movable ocular, scale tube with reference subdivision, slit tube with adjustable slit. Complete assembly supported on vertical pillar mounted on circular cast metal base.

1111480 Spectrometer, Kirchhoff-Bunsen Type

DIFFRACTION GRATING SLIDE

Demonstrates the basic principle of the diffraction grating and for exploring the dependence of its properties on its resolution (lines per unit length). Comprises a set of 3 gratings -100, 300 and 600 lines/mm, mounted on a single slide card mount with three apertures of 16×9mm, one for each resolution, which is clearly marked below each aperture. With protective coating.

1111640 Diffraction Grating Slide

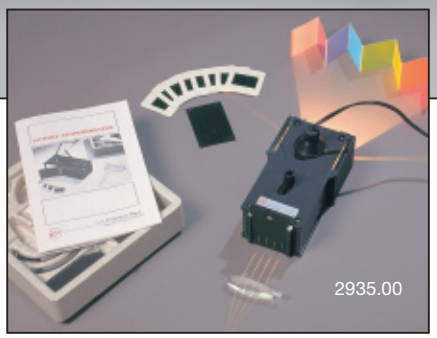
Bright spectral lamps

A low cost alternative to using the spectral lamps from Osram. These lamps should be used with a special spectral lamp holder (no. 2830.60) as well as a control transformer (no. 2840.50).

2836.50 Spectral lamp with E-27 tread socket, sodium
2836.60 Spectral lamp with E-27 tread socket, mercury
2830.50 Spectral lamp holder
2840.50 Control transformer

2830.60

2840.50



2935.00

2855.50

Optical set with lightbox excl. manual

Very comprehensive set for teaching geometrical optics and mixing of colours.
The set is consisting of a light box with a 12V halogen bulb, different lenses, slits, colour filters and mirrors. Al together 24 parts.

2935.00 Optical set with lightbox excl. manual

Spectral tube holder and power supply

This holder makes the use of spectral tubes easier and safer. The spectral tube is mounted from the front in the insulated holders with electrodes, where the lower holder is spring loaded parallel to the tube axis.
The holder is provided with a power supply which can deliver 6 kVDC at max. 2 mA to the electrodes built into the base of the insulated holder.
Can be used with spectral tubes 2850.00 – 2851.30 and with many other types of spectral tubes.
Dimensions: 78 x 78 x 290 mm. For 220 V AC.

2855.50 Spectral tube holder and power supply

Spectral tubes

Straight pattern, capillary length approximately 70 mm. Fitted with a 6.5 mm diameter contact caps at each end. For observing line and band spectra from various nobel and diatomic gasses.

For mounting inside spectral tube holder 2855.50 page 67.

2850.00 Spectral tube Ne
2850.10 Spectral tube Hg
2850.20 Spectral tube H_2
2850.30 Spectral tube He
2850.40 Spectral tube Ar
2850.50 Spectral tube O_2
2850.60 Spectral tube Kr
2850.70 Spectral tube N_2
2851.10 Spectral tube H_2O
2851.20 Spectral tube CO_2
2851.30 Spectral tube Xe

Halogen lamp, 150 W

Suitable for solar cell experiments. For 220V AC. Supplied with steel rod.

2801.00 Halogen lamp

2871.00

UVA lamp

This UVA lamp emits both spectral light (4 lines from the mercury spectrum) and a band of UV light in the range from 350 nm to 400 nm.
The UV lamp is supplied with an ordinary power plug (for direct connection to mains power).
Dimensions: 190 x 75 x 75 mm.

2871.00 UVA lamp

SPECTRUM TUBE POWER SUPPLY

A specially designed high quality spectrum tube power supply, designed keeping in view user's safety in mind. Complete assembly is housed in a sturdy and durable, pillar type sheet metal casing with indicator type ON/OFF switch and captive mains cable. All the connecting sockets are fully shielded to prevent electric shock. A pair of highly insulating, moulded plastic sockets are fitted - one near the top and other near the bottom to hold spectrum tubes firmly, while preventing the user from touching the electrodes. The bottom socket is spring loaded to enable quick and easy changing of spectrum tubes. Black metal panel behind the mounted tube eliminated distracting ambient light and protects tube from breakage. Operates on 220-240V AC, 50Hz.

1130090 Spectrum Tube Power Supply

REPULSION TUBE, GOLD STEIN'S 2

Vertical tube with two parallel wire cathode at two ends of tubes with third electrode to serve as anode. On base.

1130120 Repulsion Tube, Gold Stein's

RECTILINEAR PROPAGATION TUBE

V Shaped tube. To show cathode rays travel along a straight line path irrespective of the position of anode points.

1130100 Rectilinear Propagation, Tube 1

SHADOW EFFECT TUBE, ELECTROMAGNET 3

Demonstrates that cathode rays travel in straight line and cast shadows. An object obstructing cathode rays casts its shadow on the fluorescent wall facing it, and if the running cathode rays are subjected to magnetic effects, per an electromagnet, the shadow is affected by its slight rotation change. Complete with electromagnet.

1130140 Shadow Effect Tube, Electromagnet.

MECHANICAL EFFECT TUBE 4

To show the particle nature of cathode rays. Cathode Rays exert a pushing effect on object it falls on, is shown by the rotating of vanes caused by the impact of cathode rays striking the vanes.

1130160 Mechanical Effect Tube

MAGNETIC EFFECT DEFLECTION TUBE 5

To show that the cathode rays get deflected by magnetic fields. Running cathode rays are visible to naked eye by the glowing path on fluorescent screen. When a magnet is brought near, the deflecting path cathode rays are vividly visible. Supplied without magnet.

1130180 Magnetic Effect Deflection Tube

HEATING EFFECT TUBE, WAX COATED 6

When cathode rays are focused on wax coated on the outside of the upper round head of cathode ray tube, the wax melts quickly showing heat generated by cathode rays.

1130200 Heating Effect Tube, Wax Coated

SHADOW EFFECT MALTESE CROSS TUBE OR CROSS & SHADOW TUBE

A star shaped object obstructing the path of cathode rays casts its shadow on the fluorescent painted wall facing cathode rays.

1130220 Shadow Effect Maltese Cross Tube Or Cross & Shadow Tube 7

HEATING EFFECT PLATINUM FOIL

To show that cathode rays produce heat when they fall on matter. Upon focusing the rays at a point, cathode rays generate intense heat shown by the red heating of platinum foil.

1130240 Heating Effect Platinum Foil 8

EXTECH INSTRUMENTS

PRODUCT DATASHEET

Pocket Series
Environmental Meters

AN10 Air Velocity | LT10 Light | RH10 Humidity | SL10 Sound

Convenient pocket-sized meters are easy to use with one-button operation and can be stowed in a compact space such as a pocket. Models available for Air Velocity, Light, Humidity/Temperature, and Sound Level measurements. Keep one handy for whenever you need to take a quick environmental measurement.

Features

- Pocket-sized housing with easy one-button operation
- Large automatic backlit LCD display when meter is powered on
- Durable double molded side grip
- Tripod mount (Optional TR100 tripod)
- Complete with 9V battery and built-in sensor
- **Model AN10** - Anemometer
  - Measures air velocity: 80 to 3936ft/min, 1.1 to 20m/s, 0.8 to 72km/h, 0.9 to 45 MPH, and 0.8 to 39 knots
- **Model LT10** - Light Meter
  - Measures light intensity up to 4000Fc/40,000Lux with measuring rate of 1.5 times/second
- **Model RH10** - Humidity/Temperature Meter
  - Measures Relative Humidity from 0 to 100%RH and Temperature from -4 to 140°F (-20 to 60°F)
- **Model SL10** - Personal Sound Level Meter
  - Measures Sound Level from 40 to 130dB with A Frequency Weighting for human hearing and fast response time of 125mS

Ordering

AN10..... Pocket Anemometer
LT10..... Pocket Light Meter
RH10..... Pocket Humdity/Temperature Meter
SL10 ..... Pocket Personal Sound Level Meter
TR100 ..... Tripod

CE

INTERFERENCE MODEL

Two transparent acrylic plates (90x90)mm and (90x120)mm printed with pattern of concentric circles to represent wave fronts and to demonstrate the interference pattern of two waves on an overhead projector.

1110485 Interference Model

MICROSCOPE, COMPACT, NEWTON RINGS

Specially designed microscope for use in Newton's rings experiment. It is very compact in size and economically priced. It houses an inbuilt light-reflecting unit for the experiment and the lightweight cast aluminum body has provision for positioning the Newton's rings setup. The vertical motion of the microscope through a focusing knob. Horizontal motion along a cast metal carriage with a micrometer at one end for fine adjustment and reading the horizontal position of the microscope with a LC of 0.01mm. The microscope has 75mm working distance and comes with 8× eye piece, Ramsden type with cross line graticule.

1110520 Microscope Compact Newton Rings

LIGHT AND SHADOWS

Activities those can be performed with this kit.

1. Formation of shadows.
2. How do shadows change through out the day?
3. Does the sun shine from the same direction at the same time each day?
4. Earth spins on its axis.
5. Do the light pass through each materials?
6. Why we use a mirror?
7. Best light reflecting surfaces.
8. How can a shadow change?

1110550 Light and Shadows

NEWTON'S COLOUR DISC, ON STAND

For demonstrating that white light is composed of all the spectral colours through the additive mixing of the colours. Comprising a multi-coloured circular disc having sectors of various spectral color in proper proportions. On rotating the disc at sufficient speed, all the colours will be observed to disappear by merging into a single white colour. The disc has a friction pulley at the back touching the driving wheel with a handle. Complete assembly mounted on a stable base.

1110580/1 Newton's Colour Disc, smaller economical model, 150mm diameter

1110580/2 Newton's Colour Disc, bigger size, 200mm diameter

STROBOSCOPE DISC

A circular black colour disc with a white segment mounted on the axle of a low voltage motor fitted inside a plastic moulded case (142x80x40) mm approx. Operating voltage for the motor is 6V DC applied via. 4mm colour coded sockets. The speed of the motor may be varied with the help of the potentiometer fitted on outer side of the plastic case.

1110590 Stroboscope Disc

NEWTON'S COLOUR DISC, ON BENCH CLAMP

Similar to Cat No. 1110580, but 200mm Newton's colour disc assembly mounted on a bench clamp stand

1110600 Newton's Colour Disc, on Bench Clamp

KALEIDOSCOPE

A simple optical toy in a tube that produces beautiful symmetrical patterns due to reflection/refraction of light from numerous small colored glass pieces.

1110620/1 Kaleidoscope, in plastic tube
1110620/2 Kaleidoscope, in plated metal tube

NEWTON'S COLOUR DISC, MOUNTED ON MOTOR

For demonstrating that white light is composed of all the spectral colours through the additive mixing of the colours. Comprising a multi-coloured circular disc of about 80mm diameter, having sectors of various spectral color in proper proportions, mounted on a low voltage DC motor. On rotating the disc, all the colours are observed to disappear by merging into a single white colour. Provided with colour-coded wires terminating in 4mm banana plugs, connected to the motor for power input.

1110610 Newton's Colour Disc, Mounted on Motor

PERISCOPE

An optical instrument that permits the view of an otherwise obstructed field above or below the level of viewer. Comprising a Z-shaped square tube with both the projecting arms having plane mirrors mounted at 45° facing each other.

1110640/1 Periscope, plastic
1110640/2 Periscope, wooden

PIN HOLE CAMERA

To illustrate the principle of image formation due to light rays passing through small apertures. Comprising a polished wooden box with a ground glass screen at the rear end and an adjustable sliding front with a hole.

1110660 Pin Hole Camera

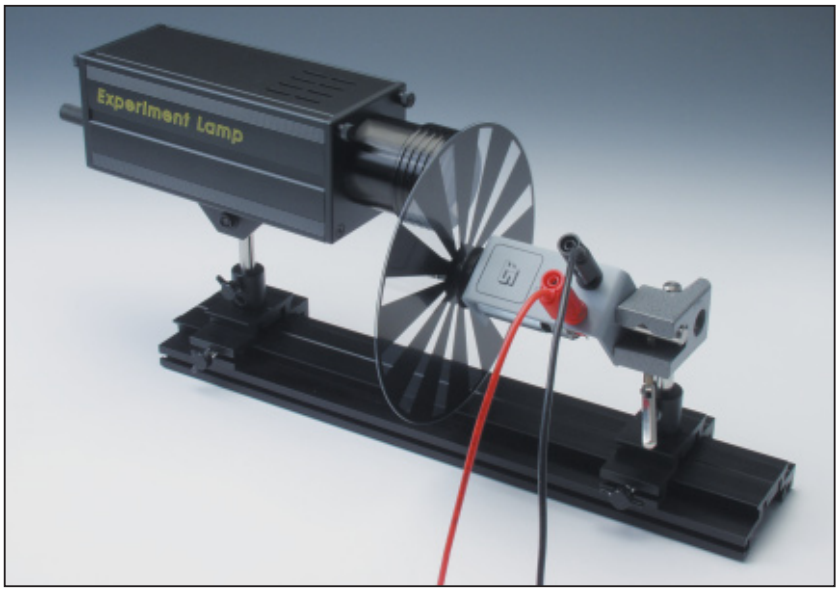
PIN HOLE CAMERA (SUPERIOR)

1110660/1 Pin Hole Camera Superior

Stroboscope disc

Made af black-lacquered plastic with 1 aperture.
For use with e.g. motor no. 2025.00 and illuminator.
Diameter 170 mm, hole diameter 8 mm.

2020.00 Stroboscope disc

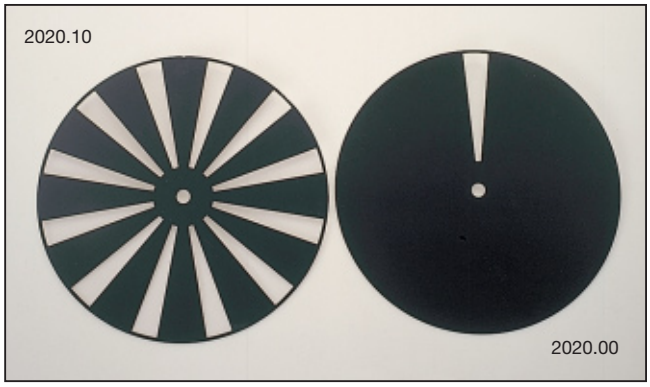


Stroboscope made of experiment lamp and stroboscope disc.

Stroboscope disc

As 2020.00 but with 12 apertures.

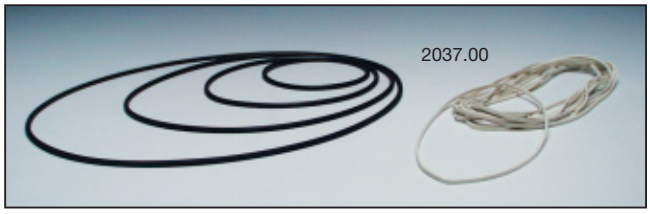
2020.10 Stroboscope disc



Motor with winding shaft

This universal motor is for operating units such as strobe discs, color discs, apparatus and models. Furthermore, the motor can be used as a generator in energy experiments, etc. The unit is provided with a sturdy DC motor with a permanent magnet stator.
A 2 step drive belt shaft is supplied along with a cylindrical winding axle with diameters of 8 and 12 mm. Supplied with a 35 mm 10 mm diameter mounting rod. Total length: 225 mm. Width: 40 mm. Height: 40 mm. Operating voltage range 0-12 V DC 0-4800 rpm, mass 0.35 kg.

2025.00 Motor with winding shaft



Drive belt set

Four different flexible, black synthetic rubber drive belts are supplied. Belt lengths: 240, 289 and 780 mm. The drive belts are oil resistant.

2037.00 Drive belt set, 4 different belts

461825 Combination Photo Tachometer/Stroboscope

Stroboscope to analyze rotating objects and Tachometer to measure rpms

- Course and fine flash rate adjustments to freeze and analyze rotating objects
- Unique display characters that reverse direction depending on function mode
- Large 0.4" (10mm) 5 digit LCD display and memory stores Last/MAX/MIN readings
- Complete with four 1.5V AA batteries, reflective tape, and case; 1 year warranty

SPECIFICATIONS	PHOTO TACHOMETER (RPM)	STROBOSCOPE (FPM/RPM)
Range	5 to 99,999	100 to 100,000
Accuracy	±0.1%rdg	±0.1%rdg
Sampling Time	1 Sec ≥ 60rpm;	1 Sec ≥ 60rpm;
Resolution	0.1rpm (<1,000rpm), 1rpm (≥1,000rpm)	0.1fpm (<1,000fpm), 1fpm (≥1,000fpm)
Dimensions/Weight	8.5x2.6x1.5" (215x65x38mm) / 10.6oz (300g)	±0.1%rdg

Ordering	
461825 N	Combination Photo Tachometer/Stroboscope
461937	Spare reflective tape (23" each strip), 10pk

461830/461831 Digital StroboTach

461834

Freeze motion and analyze rotating objects without contact

- Checks and analyzes motion and speed by simply aiming and synchronizing its flash rate (fpm) with a rotating object
- rpms on 4 digit LED display
- Flash/Speed Rate of 100 to 10,000fpm/rpm; Basic accuracy of ±0.05% rdg
- Duty Cycle of 5 to 30mins
- Tripod mount for stationary use
- Dimensions/Weight: 8.3x4.8x4.8" (211x122x122mm)/2.2lbs (1kg)
- Complete with 6ft (1.9m) power cord and handle; 1 year warranty

ORDERING	
461830 N	Digital StroboTach 115VAC, 60Hz
461831 N	Digital StroboTach 220VAC, 50Hz
461834	Spare Xenon Lamp (est life 300hrs), 2pk

461950 1/8 DIN Panel Tachometer

461957 Photoelectric

461955 Proximity

Continuous & accurate readings from 5 to 99,990rpm

- Large LED display updates 1/sec (rpm<60)
- Unique design permits rpm measurements of a one hole gear or disk eliminating the need for special gears
- A pulse is measured when a ferrous object (stud) passes by a proximity sensor
- Choice of two sensor pickup types (both include 6ft/1.8m cable): Proximity sensor: 0.1" (3mm) target distance, range up to 36,000rpm (600Hz); Photoelectric sensor: 0.4" (10mm) target distance, range up to 6000rpm (100Hz)
- 1 year warranty

SPECIFICATIONS	
rpm	5 to 99,990rpm
Basic accuracy	±0.05%
Resolution	0.1rpm (5 to 1000rpm), 1rpm (1000 to 9999rpm), 10rpm (10,000rpm to 99,990rpm)
Power	115V or 230V AC; 50/60Hz
Dimensions/Weight	Bezel 3.8x1.9x2.4" (96x48x60mm); Panel cutout 3.6x1.8" (92x45mm) Meter 3.6x3.5x1.7" (92x90x42mm)/ 14oz (397g)
Sampling Time	1sec>60rpm, >1sec>10 to 60rpm
Dimensions/ Weight	4.9x2x1.3" (124x50x33mm)/ 4oz (114g)

ORDERING	
461950 N	1/8 DIN Panel Mount Tachometer
461955	Proximity Sensor, max. 36,000rpm
461957	Photoelectric Sensor, max. 6000rpm

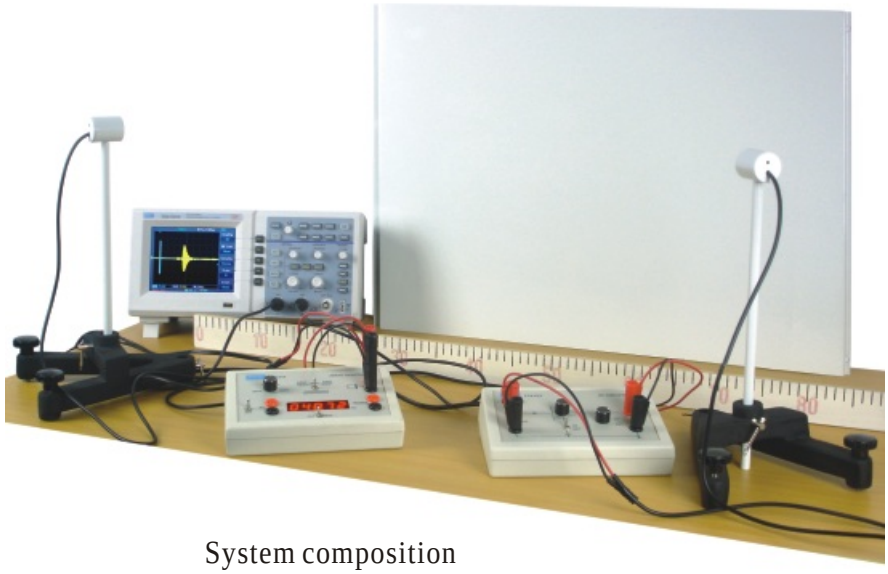
Ultrasonic waves experiment system of reflexion CE

Objects
Demonstrating the principle of an echo sounder.
Determining the velocity of sound in air from the transit time of a sound pulse and the distance to the reflecting object.
Determining distance by measuring the transit time of the sound pulse.

Principles
Ultrasonic waves are reflected at the boundary surfaces between media with differing resistances to sound waves. An echo sounder (or sonar) device emits pulsed ultrasonic signals and measures the time in which a signal is reflected from such a boundary surface to the receiver. To simplify the configuration, the transmitter and receiver are in the same location.

The time between transmission and reception can be used to determine the distance to the reflecting object (if the velocity of sound is known), or to determine the velocity of sound over a known distance. This method is commonly used e.g. to determine water depths at sea.
In the experiment, the echo-sounder principle is used to determine the velocity of sound in air, and to determine distances.

Two ultrasonic transducers serve as the transmitter and receiver, depending on their connection.
A piezoelectric body converts electrical to mechanical energy. When the AC voltage is applied to the piezoelectric body, the transducer configured as a transmitter supplies a sufficiently high sound amplitude at a resonance frequencies (approx. 40 kHz). Conversely, sound waves generate mechanical oscillations in the transducer when configured as a receiver. The amplitude of the resulting piezoelectric AC voltage is proportional to the sonic amplitude.



System composition

2 pcs	Ultrasonic transducers 40 kHz	P416000
1 pc	AC amplifier	F16-015
1 pc	Generator 40 kHz	F16-014
1 pc	Digital storage oscilloscope	DQ7202CA
2 pcs	Test leads	PTL927
2 pcs	Stand base, V-shape	P101413
1 pc	Metal scale, 1 m	
1 pc	Reflection plate	

F16-014 Generator 40 kHz

Features
With continuance and spacing square wave generator for operating source, for ultrasonic transducer 40 kHz (P416000) as an emitter. Inner and external frequency counter

Technical Data
Generator
Frequency range: 40 kHz, can be set from 35 kHz to 50 kHz
Pulse operation:
pulse duration approx. 0.2 ms
pulse spacing approx. 80 ms
Transducer output voltage: >18 Vpp
Trigger output voltage: >9 Vpp
Counter Frequency range: 1KHz~150kHz
Sensitivity: 100mV
Max. input voltage: 20V
Connection sockets: 4 mm dia.
Dimensions: 19 cm × 13.5 cm × 7 cm

F16-015 AC-amplifier

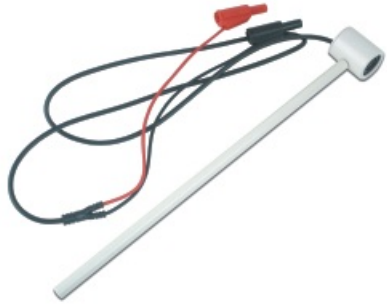
Features
Sensitive amplifier with microphone input for verifying ultrasonic waves in conjunction with an ultrasonic transducer (P416000) as a receiver, and sound amplification

Technical Data
Gain: 10× to 1000×, continuously adjustable
Frequency range: 10 kHz (100Hz microphone input) to 50 kHz
Outputs: signal, trigger and level, short-circuit proof
Max. signal output: 4 Vp-p
Trigger output: TTL compatible
Max. DC level output: 4 V
Connection sockets: 4 mm dia.
Dimensions: 19 cm × 13.5 cm × 7 cm
Weight: 0.5kg

P416000 Ultrasonic transducer 40 kHz

Features
Piezoelectric air ultrasonic transducer for experiments in the areas of geometric and wave-mechanical acoustics. The transducer is used as transmitter and receiver. In housing, on stand rod, with coax. connection cable.

Technical Data
Resonance frequency: 40 kHz
Bandwidth: approx. 6 kHz
Capacitance: 2000 pF
Connection: 1 m coax. cable with 4 mm sockets
Housing: 48 mm × 27 mm dia.
Stand rod: 20 cm × 10 mm dia.



Tuning fork set C-scale, physical

The set consists of eight tuning forks from C(256) to C(512) manufactured in nickel plated steel with frequency values engraved. Supplied in carrying case.

2235.00 Tuning fork set, C-scale

Tuning fork for demonstration experiments

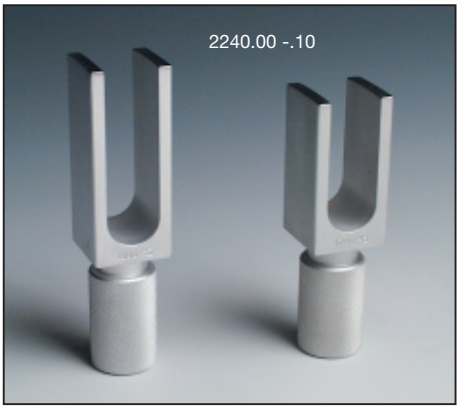
It is easy to hear an ordinary tuning fork but somewhat more difficult to show how it moves. The demonstration tuning fork oscillates at a frequency which is barely audible. On the other hand it is easy to observe its motion. Made of nickel plated steel. Length 75 cm.

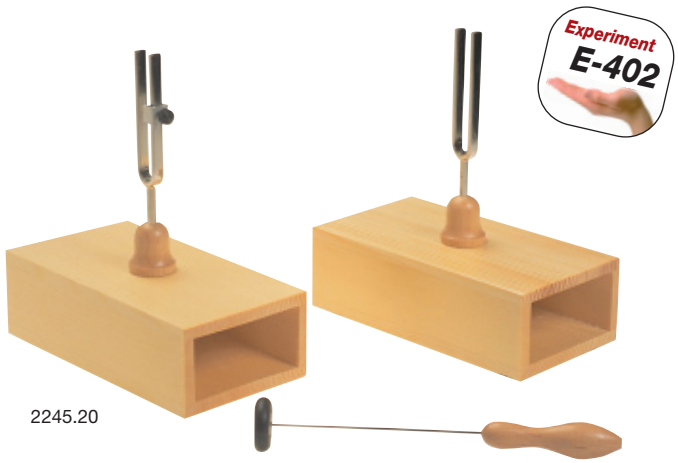
2220.00 Tuning fork for demonstration experiments

Tuning fork with writing tip

Frequency 128 Hz. One arm of the tuning fork is supplied with a pointed tip for marking the oscillations on e.g. a soot-covered glass plate. Supplied with wooden handle. Overall length: 335 mm. Weight: 300 g.

2450.00 Tuning fork with writing tip





Tuning fork, aluminum

The aluminum tuning fork is well-suited as a sound source for use with the resonance box due to its high sound power level. The lengths are 118 and 104 mm. Width: 30 mm. Mass: 97 and 87 g.

2240.00 Tuning fork, 1700 Hz

2240.10 Tuning fork, 1000 Hz

Tuning fork on resonance box

The tuning fork is manufactured in special nickel-plated steel. It is used for resonance and dissonance experiments. The resonance box is made of lacquered pine and supplied with thick felt pads on the bottom. It is supplied including a runner for mounting on one arm of the fork for changing the frequency. The standard frequency is 440 Hz. Set contains: Two tuning forks + boxes and a hammer.

2245.20 Tuning fork on resonance box

2225.00

Tuning forks, steel

These tuning forks are made of nickel plated steel with the tone and frequency engraved.

2225.00 Tuning fork 440 Hz. Length 120 mm

2230.01 Tuning fork 440 Hz. Length 145 mm

2230.05 Tuning fork 256 Hz. Length 170 mm

2230.10 Tuning fork 512 Hz. Length 140 mm

TUNING FORK, SET OF 13

Best quality plain shanks, with chromatic scale frequencies from C1(256Hz) to C2(512Hz). Complete set of THIRTEEN Tuning Forks supplied in a polished wooden case.

1120420/1 Nickel plated or blued steel, with frequencies clearly marked
1120420/2 Nickel plated or blued steel, with frequencies not marked. Printed frequency card included
1120420/3 Anodized aluminium, with frequencies clearly marked
1120420/4 In plastic tray with cover

TUNING FORK, ELECTRICALLY MAINTAINED

For producing vibrations in the stretched strings. Comprises a thick sturdy steel tuning fork with its stem held securely in cast metal clamp, which in turn is mounted on a sturdy, streamlined, heavy cast metal base with provision for horizontal or vertical use. An electromagnet operating on 6V is positioned between both the prongs and can slide along the prong's length for adjusting the amplitude of vibration of prongs. End of both the prongs have a stylus for frequency measurement and threaded arrangement for Melde's experiment.

1120500 Tuning Fork Electrically Maintained

DOPPLER BALL

Plastic moulded lightweight ball suitable for Doppler effect fitted with a 9V battery powered tone generator and a speaker inside. The ball can be whirled around on the attached cord to the demonstrate the change in pitch on a moving source.

1120510 Doppler Ball

PAIR OF TUNING FORKS ON RESONANCE BOXES

For exploring the concept of resonance through sympathetic and forced vibrations, and phenomenon of beats. Comprises two matched nickel plated tuning forks of frequency A(426.6), each mounted on top of hollow wooden box open at one end. One fork is provided with a sliding mass on one prong by means of which its frequency can be varied from the nominal 426.6Hz. When both forks are sounded a clearly audible 'beat' is produced, its rate depending upon the difference in frequency between the forks.

1120460/1 Pair of Tuning Forks on Resonance Boxes
1120460/2 Rubber Mounted Hammer for Tuning Forks, Disc Shaped

RESONANCE TUBE

A high power sound wave generator unit plugged into one and of a transparent approx. 1 meter long tube. A standard laboratory signal generator is used to drive sound wave generator and as the frequency is adjusted the various resonance modes are detected by increased loudness of the node. The distance between the transmitter and receiver can be changed by just inserting the rod inside the tube. On placing the cork or polystyrene dust is distributed throughout the tube and at resonance the power gather at the nodes and wavelength can be measured.

1120515 Resonance Tube

MELDE'S APPARATUS

For showing the effects of vibrations in a stretched cord and investigate the relationship between frequency, tension and density. In addition, the provision of electrical contacts, opened and closed by the vibrating armature, allow the apparatus to be used as high-speed changeover switch in. Comprises a thin steel rod armature mounted in a clamp formed by a pair of 4mm socket terminals, so that its free length may be adjusted as desired. An AC energizing coil surrounds the armature and a permanent magnet provides the necessary magnetic polarization. The free end of the armature equipped with a small boss and clamping screw for attachment of the cord and also serves as the moving contact when the apparatus is operating as a changeover switch. The complete apparatus is carried upon a box type base.

1120520 Melde's Apparatus

FORCED OSCILLATION DEMONSTRATOR

For the study of resultant vibratory motion (forced) produced on account of oscillations of two coupled springs. Two springs, each having different spring constants (hence different natural frequencies of vibration), are attached vertically to each other through a cylindrical mass and the assembly is supported at the top on an adjustable support. The lower spring also has a weight attached to its lower end, which is guided inside another adjustable support. The release mechanism on the base, when releases the lower mass, both the stretched springs show their independent oscillations, influencing the motion of one another. Complete assembly mounted on a stable base.

1120530 Forced Oscillation Demonstrator

SIREN WHEEL

A toothed wheel with a driven handle fitted on a metallic base engaged with a plastic strip. Rotation of the wheel gives a loud rattle sound. The frequency of sound generated by this instrument can be easily calculated by just multiplying No. of teeth on the wheel with the No. of rotation in one sec.

1120535 Siren Wheel

STETHOSCOPE

Good quality, with rubber tubing. Highly sensitive. Useful for observing faint sounds and vibrations after due amplification.

1120540 Stethoscope

ORGAN PIPE, SIMPLE

For demonstrating the relationship between length of air column and frequency of sound produced. A square pipe of polished wood, open, tuned to C1(256), overall length about 760mm.

1120560 Organ Pipe, Simple 1

SAVART'S TOOTHED WHEEL

Four toothed wheel each of diameter 7.5cm and spaced 6mm apart on a shaft with projecting spindle with slight taper at its end. For use with whirling table Cat. No. 1120640.

1120620 Savart's Toothed Wheel 4

SPEED OF SOUND

Two crystal mikes one is used to start the timing and another one is used to stop the timing when a sound frequency is generated by a hammer and a metallic plate. A 3*1/2 digit display with microsecond and millisecond provision to measure the time. Operating voltage for the instrument is 9V DC. Whole assembly is fitted inside a high grade metallic sheet with ABS side cover. Two crystal mikes with a set of hammer and plate is supplied with the instrument.

1120570 Speed of Sound

ORGAN PIPE, WITH GLASS FRONT

Similar to Cat No. 1120560, but with varnished wood pipe, having glass front and membrane suspended on cord for loading with sand to show positions of nodes and antinodes. Overall length about 760mm.

1120580 Organ Pipe, with Glass Front 2

ORGAN PIPE, WITH PISTON

Stoppered, varnished wood with movable piston marked with the chromatic scale from C (512) to (1024). Overall length when fully extended is about 840mm. Can also be used for investigating the phenomenon of beats in conjunction with a second pipe of the same type.

1120600 Organ Pipe, with Piston 3

WHIRLING TABLE

For demonstrating the various effects associated with the rotation of accessories mounted on it. Cast metal body, stands overall height about 43cm and can be used in both vertical as well as horizontal position. A cast metal adjustable driving wheel fitted towards the lower end of the stand drives a small pulley near the top through a belt. The driven pulley carries a spindle with socket for taking various accessories. Suitable for use with Savart's Toothed wheel and disc and an adapter to accommodate colour discs.

1120640 Whirling Table 5

Steel ball with eyelet

Well-suited for use as a pendulum bob. Manufactured from polished, hardened steel with an aluminum eyelet.

2160.00 Steel ball with eyelet, dia. 28 mm, 96 g

2160.10 Steel ball with eyelet, dia. 20 mm, 33 g

Pendulum bob

Weights for experiments with pendulum oscillations, determinations of periods and frequencies of oscillation, energy conservation experiments, etc. Dimensions: 18 mm diameter, overall length 43 mm. The weight can be supplied in brass or aluminum with the same physical dimensions but with different masses.

2165.00 Pendulum bob, brass

2165.10 Pendulum bob, aluminum

Slot weights with holder

These weights are used for loading of springs or as pendulum weights where mass changes are to be studied 25 grams at a time. The weights are manufactured of nickel plated brass with a slot and a centre hole which retains the weights so that they do not fall off the holder.
Supplied with three weights of 50 g and one weight of 25 g. Overall weight including holder: 200 g.

2177.00 Slot Weights with holder

Spiral springs for experiments with elastic oscillations

Product no.	Diameter	Length	Spring contant
2155.10	11 mm	32 mm	ca. 8.4 N/m
2155.20	11 mm	74 mm	ca. 3.2 N/m
2155.30	11 mm	115 mm	ca. 2.1 N/m
2155.40	31 mm	33 mm	ca. 5.0 N/m
2155.50	27 mm	155 mm	ca. 4.7 N/m

2155.10 – 2155.50 Spiral springs

Spiral spring "Slinky"

Is used for demonstration of longitudinal vibrations Length: 150 mm. Diameter: 75 mm.

2155.70 Spiral spring "Slinky"

Spiral spring, 2 meter

The spring is used for demonstrations of transverse oscillations and for producing standing waves.
Length, unloaded: 200 cm. Diameter: 10 mm.

2155.60 Spiral spring, 2 meters

Slot weights with holder

The weights are manufactured of brass with engraved mass and a centre hole which retains the weights so that they do not fall off the holder. The set contains 1 ea. 50 g, 9 ea. 20 g, 1 ea 10. g and 2 ea. 5 g

2177.10 Slot weights with holder

WAVE FORM HELIX, LONG

Steel wire close-wound helix of about 19mm diameter and closed length of about 3m extending to approx. 9m. With looped ends. Useful for demonstrating wave motion.

1120020 Wave Form Helix, Long

WAVE FORM, HELIX, SLINKY

For demonstrating wave motion. Helical coil of flat section, tempered steel wire.

1120040/1 Coil diameter 7.5cm, closed length 10cm
1120040/2 Coil diameter 5cm, closed length 7.5cm

PLASTIC SPRINGY

This large multi-coloured plastic coil is an excellent fiddle toy and can successfully perform that most essential of function; it really can walk down stairs! The rainbow of colours along its length make it extremely pretty, whilst its generous size and great play value insure a board appeal. The individual Plastic Springies are wrapped with an easily remove able label to discourage any tangles before purchase. 10.5cm

1120045 Plastic Springy

WAVE DEMONSTRATION

Acrylic sheet of length approx. 1.5m printed with a sinusoidal wave to demonstrate a group of students.

1120105 Wave Demonstration

ULTRASONIC SYSTEM

Ultrasonic transmitter and receiver operating in 40 KHz region enclosed in separate plastic enclosures (142x80x43) mm approximately, which contain the electronic circuit and 9V, DC batteries. 2 KHz modulating frequency is transmitted by ultrasonic transmitter and detected by receiver, which amplifies the signal and drives a internal loudspeaker. Output signal can also be visualized on a CRO for more quantitative measurements via. 4mm colour coded sockets fitted on the receiver. Transmitter is supplied with two ultrasonic transducer, both can be switch ON simultaneously when required to produce two coherent sources. Interference pattern can be dramatically demonstrate and simplifying the Young's Slits experiment by using waves rather than light on moving the receiver along a line parallel to the sources. The system uses the sound waves above the hearing threshold and demonstrating the reflection properties linked with 'SONAR' etc.

1120110 Ultrasonic System

RESONANCE JAR

Made of glass, mounted on circular base. Size approx 30×7.5cm (height × diameter).

1120160 Resonance Jar

BELL IN VACUUM

Demonstrates that sound waves need material medium for propagation and cannot travel through vacuum. For use on pump plates with diameter at least 15cm. it consists of an electric Bell operating on 4-6 volts AC/DC, suspended inside bell jar through a pair of thick metal wires from a rubber bung that seals the jar from the top. The wires terminating in 4mm socket terminals on the upper side of rubber bung for electrical connection to the bell. Sizes (height × diameter) of bell jars available are

1120120/1 Bell Jar, 9"×6"
1120120/2 Bell Jar, 8"×4"

RESONANCE APPARATUS

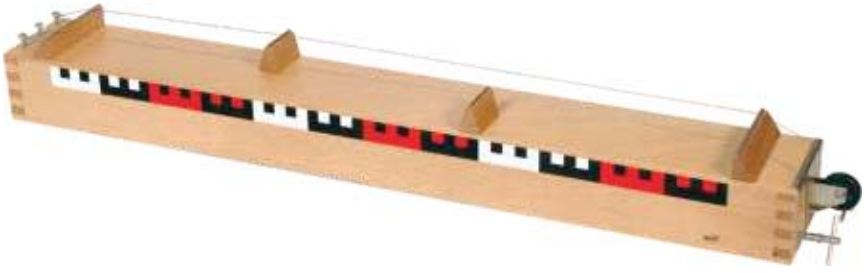
Useful for determining wavelength and velocity of sound in air by exploring the resonance of air column. Comprises of a pair of telescopically mounted metal tubes, one sliding inside other for varying the air column. Length of resonating air column helps in computing the velocity of sound. Mounted on stable base.

1120140/1 Resonance Apparatus, Aluminium Tubes
1120140/2 Resonance Apparatus, Brass Tubes

SONOMETER, THREE WIRE PATTERN, GEARED

A hollow wooden sounding box, about 1160×120×115mm (length × width × height) provided with 0-100cm scale at its top, with two wires stretched over fixed bridges, one at each end of the box. One wire passes over a horizontally mounted pulley and has a spring balance for directly reading the tension applied. The second wire is fixed at one end and attached to wrest pin for tension control and provides complete length of vibration. The third wire passes over a vertically pulley and for suspending masses through it for tensioning the wire. The wires supplied are of steel and are carefully selected to possess the exact determined density and radius uniformly throughout the length to avoid the need of repeated measurements. The wire tension mechanism is based on robust and mechanically sound thumb screw & gear system, which is accurate, more reliable and makes changing wires quick and easy. Complete with three moveable bridges, wrest-pin key and a set of four wires, length 1m, diameters 0.70, 0.40 and 0.40mm. Supplied without masses.

1120280/1 Sonometer, Three Wire Pattern, with 0-100cm scale 1
1120280/2 Sonometer, Three Wire Pattern, similar to Cat No 1120280/1, but smaller in size and with 0-60cm scale 2



SONOMETER, GRADUATED MONOCHORD

For investigating pitch of vibrating strings as a function of their tension, length and thickness. Comprises a hollow resonance box with three adjustable strings - two strings by means of wrest pin while third one at the center with loads or a spring balance. A 60cm scale fixed on one side between two fixed bridges has multi-coloured segments for easy reading, with each smallest block of 1cm. provided with two movable bridges to facilitate changing effective string length.

1120290 Sonometer, Graduated Monochord

SONOMETER PICK UP

The frequency and amplitude of a sonometer string can be directly displayed on the CRO with the help of this compact device known as magnetic pick up. On connecting it to a CRO via. 4mm sockets and placing it under a sonometer string. The height is so adjusted that we can place it under the sonometer string easily.

1120295 Sonometer Pick Up

SONOMETER WIRES SET

Set of six wires, 3 each of brass and steel of length 1.5m, and cross-section 22, 24 and 26SWG, with looped ends, ready for use.

1120300 Sonometer Wires Set

SLOTTED MASSES SET

For use with sonometers, cast iron, finished in synthetic hammer tone.

1120320/1 Set of 5 including hanger, each of 500g, Total 2.5kg
1120320/2 Set of 5 including hanger, each of 1kg, Total 5kg

CHLANDNI PLATES

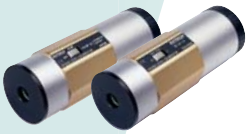
A thin layer of stand is spread over the plate. Which are either square of round, then resonance patterns can be observed. The plates resonances are audible.

1120330/1 Square Plate
1120330/2 Circular Plate

Unrivaled Selection

No one offers a better selection of sound level meters than Extech. With models for every application, capabilities include Type 2 compliance, calibration traceable to N.I.S.T., PC connectivity, datalogging, octave band analyzer, ultra compact and wall-mounted designs, and personal dosimeters.

ACCESSORIES	
TR100	Tripod (for meters with Tripod mount feature)
40705X	AC/DC Recorder Output Cable
407744 N	94dB Sound Calibrator (0.5", 1" microphones)
407766 N	94/114dB Sound Calibrator (0.5", 1" microphones)



Sound Level Calibrators

- Calibrate and verify Sound Meter operation
- 1kHz sine wave at 94dB/114dB (407766) or 94dB (407744) is generated to an accuracy of ±5% (frequency) and ±0.5dB (94dB); ±0.8dB (114dB)
- For use with both 0.5" to 1.0" microphones
- For use with all Extech Sound Level Meters
- Includes screwdriver, batteries, and case

407703A Analog Sound Level Meter

Check noise level economically

- Easy to read analog display
- MAX Hold
- Battery check
- Analog AC output for connection to chart recorders and dataloggers
- Tripod mount for field use (optional TR100 Tripod — sold separately)
- Complete with 9V battery

407730 Digital Sound Level Meter

Analog bargraph with 30dB range updates every 40ms

- ±2dB accuracy with 0.1dB resolution
- Analog AC output for connection to chart recorders and dataloggers
- Record MAX/MIN values over time
- Auto power off and MAX Hold functions
- Utilizes 0.5" (12.7mm) condenser microphone
- Tripod mount for field use (optional TR100 Tripod — sold separately)
- Complete with microphone wind screen and four AAA batteries

SPECIFICATIONS	407703A N	407730 N
Range	54 to 126dB	40 to 130dB
Basic Accuracy	±2dB	±2dB
Weighting (A&C)	Yes	Yes
Response Time (Fast/Slow)	Yes	Yes
Condenser Microphone	0.5" (12.7mm)	0.5" (12.7mm)
Analog Output	AC	AC
CE approved	Yes	Yes
Dimensions	7.1x2.7x1.4" (180x68x36mm)	9x2.2x1.7" (230x57x44mm)
Weight	5.1oz (145g)	5.6oz (160g)
Warranty	1 year	1 year

CALIBRATION TRACEABLE TO NIST

N *Indicates products that are available with optional calibration traceable to* **NIST.** *See page 144 for a complete listing.*

SPECKTRON

IDX Series

Interactive LED Display

High End Interactive Technology

CLASS ROOMS / TRAINING ROOMS / BOARD ROOMS

Wireless | Finger Touch | Pen Touch | Embedded PC | Tough Screen | Anti Glare Screen

SPECKTRON

XL 420 UST

Multimedia Projector

Business & Education

The Specktron XL420 UST is an ultra short throw projector designed with distinctive technology to display wide screen images in small spaces, without glare inhibiting the presenter. It features an impressive brightness of 2700 ANSI lumens and a contrast ratio of 2000:1 for vibrant, crisp imagery. The XL 420 UST is also equipped with a 10W speaker for brilliant sound quality and is ideal for any business or classroom environment.

KEY FEATURES	
Technology	LCD
Brightness	2700
Resolution	XGA (1024 x768)
Contrast Ratio	2000:1
Lamp Life	6000 hours (Eco)
Weight	5.5kg

SPECKTRON

XL 420 UST

Multimedia Projector

Business & Education

SPECIFICATIONS

Display Technology	LCD
Display Panel Type	LCX111AAJ/ABJ-6/7/8
Display Panel	3x0.63"
Brightness	2,700 ANSI lumens
Native Resolution	XGA (1024 x 768)
Contrast Ratio	2000:1
Lens	F=1.8, f=4.21
Uniformity	75%
Throw Ratio	80"@0.57m
Image Size / Throw Distance	60" to 100"/0.44m~0.7m
Aspect Ratio	4:3 Standard, 16:9 Compatible
Keystone	Manual Keystone : ±5°
Input	HDMI*2,VGA*2, YCbCr, Video (Share one with YCbCr), S-Video, Audio: 3.5 (Mini Jack), RCA*2
Output	VGA*1, Audio out (Mini-Jack)
Control	RJ45/RS232/USB-B
PC Compatibility	VGA, SVGA, XGA, SXGA, WXGA, UXGA, Mac
Video Compatibility	PAL, SECAM, NTSC 4.43, PAL-M, PAL-N, 480i, 480p, 576i, 576p, 720p, 1035i, 1080i
Lens Shift Horizontal	No
Lens Shift Vertical	No
Lamp	215W
Lamp Life	Normal 4000H, Eco 6000H
Remote Control	Yes
Horizontal Frequency	15 ~ 100 kHz
Vertical Frequency	48 ~ 85 Hz
Standby Power	<1W
Power Supply	100V ~240V @ 50~60 HZ
Power Consumption	280W
Operating Temp	5° to 35°
Store Temp	-10° to 60°
Speaker	1x10W
Dimensions	420 x 345 x 110 mm
Weight	5.5 kg.
OSD Languages	English / Arabic / Farsi / French / German / Italian / Spanish / Russian / Chinese / Portuguese / Afrikaans / Korean / Finnish / Dutch / Thai / Vietnamese / Japanese / Turkish / Indonesian
Features	• Change Lamp at the Top • Sponge Filter • Build in Test Image • Zoom in/out & Panning • Customized Power on Time • Auto signal Sourcing • Auto Power on/off • Auto Power off when no signal • Auto Power on when signal input in suspend mode
Accessories included	• Remote Control • Batteries • CD Manual • Power Adapter • VGA Cable • Power Cord • Lens Cover With String • Carry Case
Optional Accessories	N/A

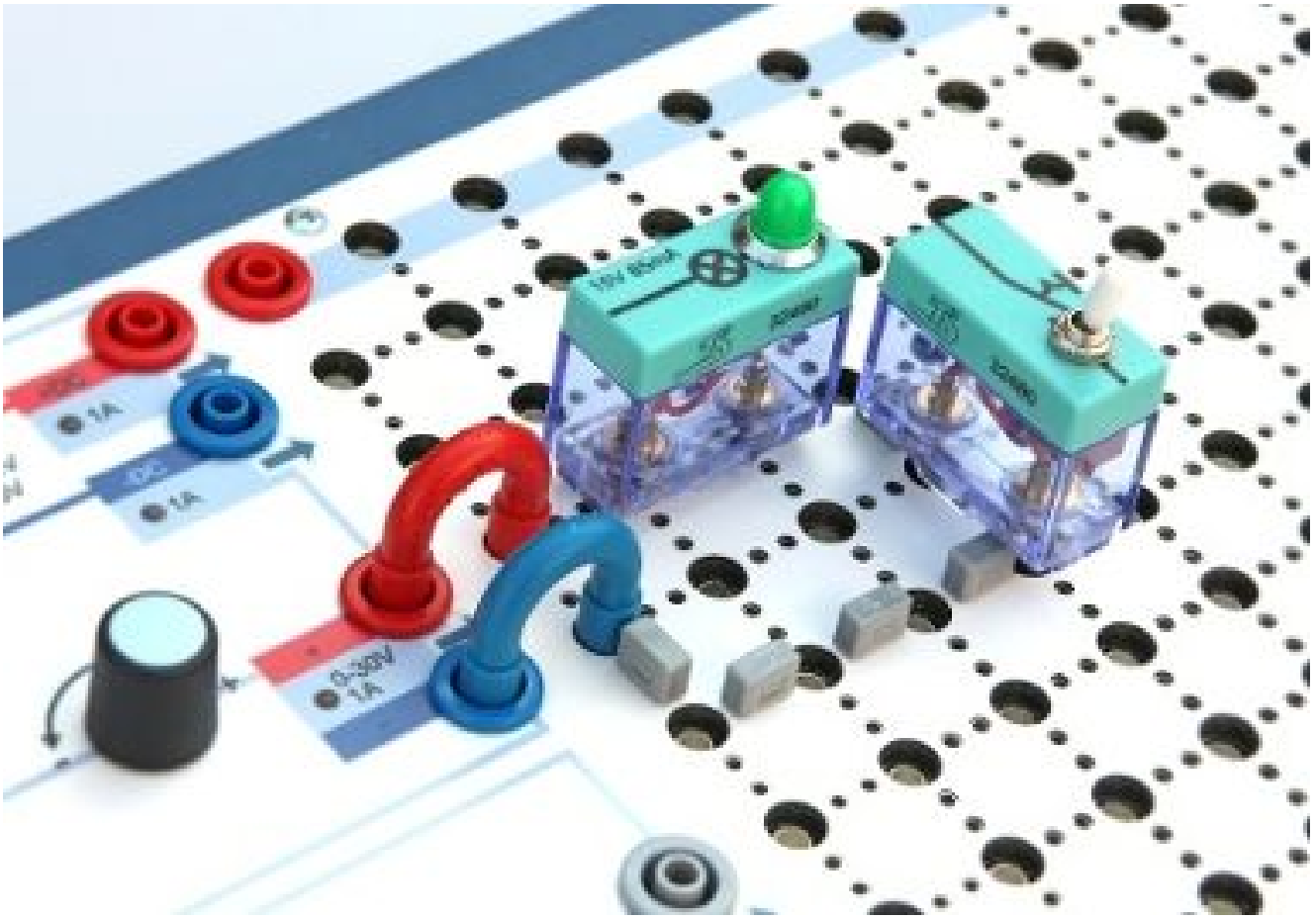
DIDACTIC GMBH
ELABO Training Systems

Products

Solutions for Electrical Trades and Professions

Since its foundation in1997, the ETS DIDACTIC GMBH has been developing didactic training system for die electrical engineering, electronics, automation and control technologies.

New and complex challenges as e.g. the industrial revolution – Internet of things - industry 4.0 have been taken up comprehensively by ETS.



ETS presents its flexibly expandable didactic training systems covering this topic in a state-of-the art manner with regard to both - technology and courseware.

ETS covers industrially relevant training topics for basic and further vocational trainings as well as studies. In addition to the fundamentals of electrical engineering/electronics this also includes power electronics, reactive power, compensation, electrical drives and motors, control engineering, control and automation technologies, robotics and IIoT.

The courseware for all our products will assist you in all matters of your occupational routine as teacher, trainer, or instructor. So, our courseware can be ordered as a three-piece package consisting of the Instructor’s and Student Manuals as well as presentations for medial support in class.

ETS DIDACTIC are sure they've got the right solution for you.