

MASSES AND WEIGHTS

PR-1 BALANCE WEIGHTS

Polished brass, supplied with wooden block, as illustrated.

A. Capacity 500 gm.

Comprising 1x200 gm, 2x100gm, 1x50gm, 1x20gm, 2x10gm, 1x5 gm, 2x2 gm, 1x1 gm

B. Capacity 1000 gm.

Comprising 1x500 gm, 1x200 gm, 2x100 gm, 1x50 gm, 1x20 gm, 2x10 gm, 1x5 gm, 2x2 gm, 1x1 gm.



A

C. Capacity 2000 gm.

Comprising 1x1000 gm, 1x500gm, 1x200gm, 2x100gm, 1x50gm, 1x20gm, 2x10gm, 1x5gm, 2x2gm, 2x1gm.



B

C

PR-2 BALANCE WEIGHTS

Polished brass, in hardwood case with hinged lid. Divided compartment with dust cover holds nickel-silver and aluminum fractions. With chrome plated brass forceps.

A Capacity 1 mg to 100gm.

B Capacity 1 mg to 200gm.

C Capacity 1 mg to 500gm.

D Capacity 1 mg to 1000gm.

E Capacity 1 mg to 2000gm.



A



B

PR-3 MASSES, SLOTTED

Solid brass, Accurate machined masses placed on a plastic and metal rack with handle.

Set of 8 1x10 gm, 2x20 gm, 1x50 gm, 1x100 gm, 2x200 gm, and 1x500 gm, Total 1100 gm.

Set of 10 1x10 gm, 2x20 gm, 1x50 gm, 5x100 gm, 1x500 gm, Total 1100 gm.

Set of 12 1x1 gm, 2x2 gm, 1x5 gm, 1x10 gm, 2x20 gm, 1x50 gm, 1x100 gm, 2x200 gm, 1x500 gm, Total 1110 gm.

Set of 14 1x1 gm, 2x2 gm, 1x5 gm, 1x10 gm, 2x20 gm, 1x50 gm, 5x100 gm, 1x500 gm, Total 1110 gm.



PR-4 SET OF MASSES, BRASS

Set comprises masses of brass with slots, brass hangers with hook. Fine finish, masses removable and replaceable on hanger.

A Set of 9 weights, one hanger each of 10 gm. Total weight 100 gm.

B Set of 9 weights, one hanger each of 25 gm. Total weight 250gm.

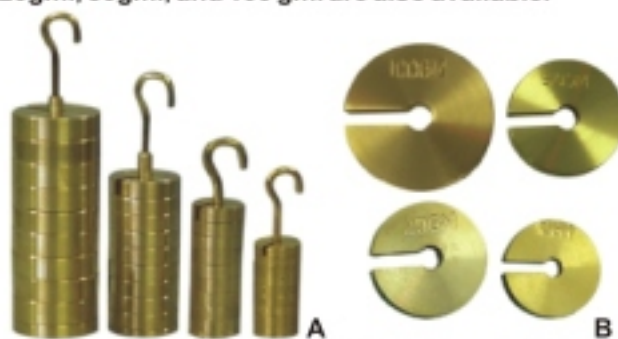
C Set of 4 weights, one hanger each of 50 gm. Total weight 250gm.

D Set of 9 weights, one hanger each of 100gm. Total weight 1000gm.

E Set of one hanger 20 gm. three weights 20 gm. Total weight 100gm.

F Set of one hanger 50 gm, nine weights 20 gm. One weight 10 gm. and two weights 5 gm. Total 250 gm.

Spare slotted weights and Hangers 5gm., 10gm., 20gm., 50gm., and 100 gm. are also available.



Above masses are also available in M.S. Chrome Plated.

WEIGHTS AND BALANCES



PR-5 MASSES ALUMINIUM

Set comprises masses of aluminium with slots, aluminium hanger with hook. Fine finish, masses removable and replaceable on hanger.

PR-6 SLOTTED MASS SET-CAST IRON

A set of slotted iron masses suitable for use with sono-meters or other applications where a large load is required. The masses and hanger are finished in black color.

- A Hanger and Mass each of 500 gm. Total weight 2.5kg.
- B Hanger and Mass each of 1 kg. Total weight 5 kg.



PR-7 SLOTTED MASS SET IRON



Made from iron shaft with slots painted in black color. Hanger and Mass each of 500 gm. Total weight 2.5 kg. Hanger and Mass each of 1 kg. Total weight 5 kg.

PR-8 MASSES, IRON

Hexagonal with lifting ring. Within international tolerance.

Weights are 50gm, 100gm, 200gm, 500gm, 1000gm, 2000gm, 5000gm.



PR-9 WEIGHTS

Weights of brass, Set of five, with hooks on both sides.



PR-10 ELECTRONIC SCALE 'DIGITAL'

- Strain Gauge Precision Technology
- Capacity x Readability : 5000g x 1g, 3000g x 1g., 2000g x 1g., 1000g x 0.5g, 500g x 0.1g, 200g x 0.1g
- Display Modes : g and oz (optional, upto four units)
 - Easy-View LCD Display
 - Low Battery Indication/Over-Load Indication
 - Auto / Manual Shut - Off
 - Powered By 4 x AAA Battery or DC 6V / 220V Adaptor



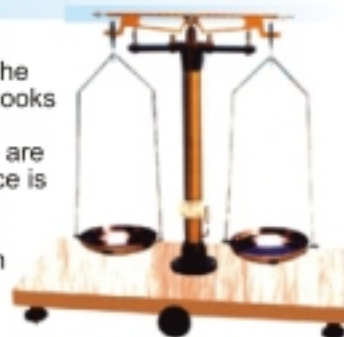
PR-11 BABY WEIGHING BALANCE

A single beam scale, robust steel body with epoxy powder coated parts. The beam carries a sliding weight to indicate the weight from 0 to 5kg in divisions of 20 grams each. One hanger and one slotted mass is provided to increase the capacity of the balance. When only the hanger is suspended from the end of the beam the capacity increases to 10 kg and the reading starts from 5 kg onwards on the scale up to 10 kg. On adding the slotted mass on to the hanger the capacity increases to 15 kg and the reading starts from 10 kg onwards on the scale up to 15 kg. The tray is detachable and can be easily replaced in position by sliding on to fixed plate. Second scale is provided which reads 0 to 1 kg in division of 10 gms. Making the total capacity of balance 16 kg in to 10 gms.



PR-12 BALANCE

Basic general purpose balance for students. The hangers have double hooks for specific gravity experiments, and pans are detachable. The balance is finished in black colour with chrome plated fittings and mounted on polished wooden base with leveling screws.



SPRING BALANCES, NEWTON & METRIC

PR-13 BALANCE LEVER

A direct reading, single pan balance with its scale in the form of a quadrant. The arc scale is graduated in dual ranges of 0-250x 1 gm and 0-1000x5gm which can be set using the weight arm provided. Cast aluminium frame with all steel parts chrome plated. Levelling screw for zero adjustment.

Balance Lever, Single range
Balance Lever, Dual range



PR-14 BALANCE SPRING

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

Capacity	Sub-division
10kg	50 gm.
25kg	100 gm.
50kg	200 gm.
100kg	500 gm.

Compression Balance
is also available



PR-15 BALANCE SPRING

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

	Capacity	Subdivision
A	100	1
B	200	2
C	250	2.5
D	500	5
E	1000	10
F	2000	20



PR-16 BALANCES SPRING

In graduated tubular aluminium, with zero adjustment, provided with top suspension loop and hook, with dual scale in Metric and Newton range.

	Capacity	Sub-division
A	100gm./1N	1 gm.
B	250gm./2.5N	5gm.
C	500gm./5N	10gm.
D	1000gm./10N	20gm.
E	2000gm./20N	40gm.
F	3000gm./30N	50gm.
G	5000gm./50N	100gm.
H	10kg./100N	200gm.



PR-17 NEWTON METERS

Plastic, tubular Newton spring balances. Each range is colour coded for convenience, and is graduated in both grams and Newtons. The spring mechanism is clearly visible and zero adjustment is incorporated.

	A	B	C	D	E	F
Range	250gm. 2.5 N	500gm. 5N	1 Kg. 10N	2 Kg. 20N	3 Kg. 30N	5 Kg. 50N



LAB MEASURING INSTRUMENTS

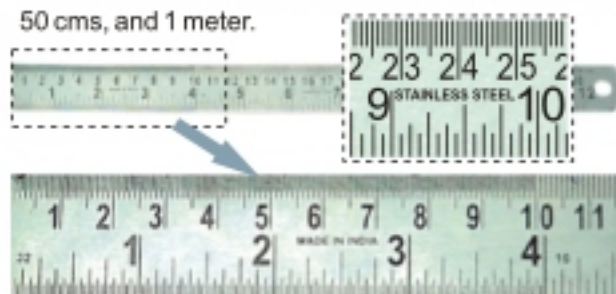
PR-18 METER SCALE, HARDWOOD

Horizontal reading, length one meter and width 25 mm. Double scale, one edge divided in inches and tenths and other in centimeters and millimeters also available graduated in vertical readings.



PR-19 RULES STEEL

Made of steel, graduated in centimeters and millimeters. Rule Steel is available in size 30 cms, 50 cms, and 1 meter.



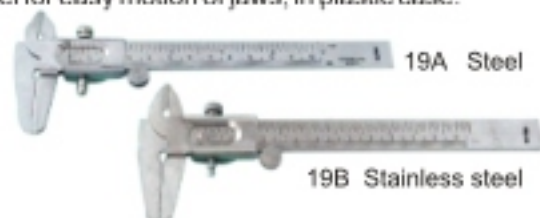
PR-20 TAPE MEASURES

Both sides metric, or one side metric and other in feet-inches. Fiber glass with PVC covering. Non-conducting, waterproof, washable, and water-resistant. Case made of zinc-coated steel sheet, covered with vinyl, & fitted with a flush winding handle. All metal fittings are chrome-plated. The Tape Measures are provided in size 5 meters, 10 meters, 15 meters, 20 meters, 25 meters, 30 meters.



PR-21 VERNIER CALLIPER

Plated steel, Columbus type calliper enabling the user to read either inside, outside or depth measurements. With dual scale 0-12.5 cm. x 0.1 mm. Imperial scale graduated to 5 x 1/128 inches provided with thumb wheel for easy motion of jaws, in plastic case.



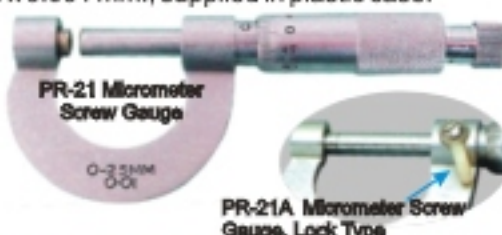
PR-22 VERNIER CALLIPER

IME type, Improved design plated steel with dual scale 0-15 cm. x 0.1mm and 6x1/128 inches, provided with thumb movement for easy motion of jaws, in velvet lined box / plastic case.



PR-23 MICROMETER (SCREW GAUGE)

Made of nickel plated brass, with ratchet top, accurately machined stainless steel rod, range 0-25 x 0.001 mm., supplied in plastic case.



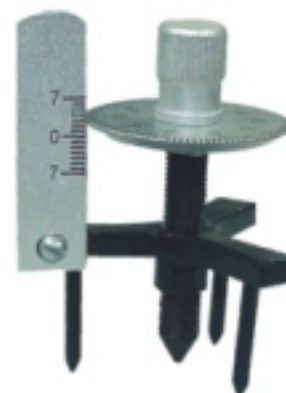
PR-24 MICROMETER (SCREW GAUGE)

All specifications same as per Model PR-21 but with a lock.

PR-25 SPHEROMETER

For accurate measurement of the radius of curvature of spherical lenses.

Three - pronged aluminium table with three pointed legs carries a vertical main scale from 10-0-10mm on one of the prongs, and a micrometer scale on an Aluminium disc with 100 divisions. The table has a screw at its center with a pitch of 1mm. Giving a least count of .01mm.



PROPERTIES OF MATERIAL

PR-26 SET OF GEOMETRICAL MODELS

Consists of 16 pieces, contains various geometrical models and figures. Made of hard wood and supplied in wooden box.



24/1 size 40mm x 25mm

24/2 size 50mm x 30mm

PR-27 GEOMETRICAL SHAPES

Set of geometrical shapes, each of circle, triangle, semi-circle, squares and rectangular. Available in Plastic or Wooden.



PR-28 CONE, DISSECTIBLE

Hardwood, polished, 24 H x 15 cm. base dia. Four different sections-circle, ellipse, parabola, and hyperbola held together by a pin and easily taken apart for demonstration. Can be dissected in 5 parts.



PR-29 SPECIFIC GRAVITY SPECIMEN CYLINDERS WITH HOOKS

For specific gravity determinations. Each cylinder is 5 cm. long and 13 mm. diameter. Metals included are of aluminium, steel, brass and copper. Available in set or individually.

Set of Four 13mm.

- A Aluminium
- B Copper
- C Brass
- D Steel



PR-30 SPECIFIC GRAVITY BLOCKS

Consisting one block each of brass, aluminium, steel and copper. Set of Four (A) Aluminium, (B) Copper, (C) Brass, (D) Steel. The sizes of the blocks are 50x13x13 mm.



PR-31 CUBES FOR DENSITY INVESTIGATION

Cubes for density investigation, 20mm. Brass, Lead, Steel, Copper, Aluminium, Iron, Tin. Set of 6.



PR-32 MATERIALS KIT SOLIDS

A variety of materials in the form of rectangular blocks, intended to familiarize the students with the appearance, 'feel', texture hardness and density of a range of common substances. Kit comprises two of each seventeen blocks as below. Blocks, 50x40x30mm.

Softwood, hardwood, paraffin wax, aluminium, Iron, foamed polystyrene Blocks, 20x20x100mm. Perspex, glass, slate, aluminium, softwood, Marble.

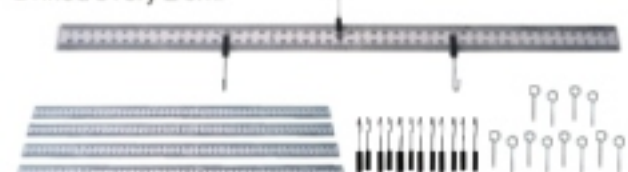
Blocks other sizes : Lead 50x50x20mm, Aluminium 50x50x80mm, Hardwood 50x50x200mm, Brass 20x20x50mm, Iron 40x40x20mm.



See also sets of Springs on Page No. 6. Useful for Properties of Materials.

PR-33 LEVER SIMPLE FORM

For introducing the concept of equilibrium leading to an appreciation of the principle of the beam balance. Consisting of a polished boxwood rule .5m in length, divided in centimetres and millimetres on both edges. Drilled every 2 cm.



PR-34 LEVER APPARATUS

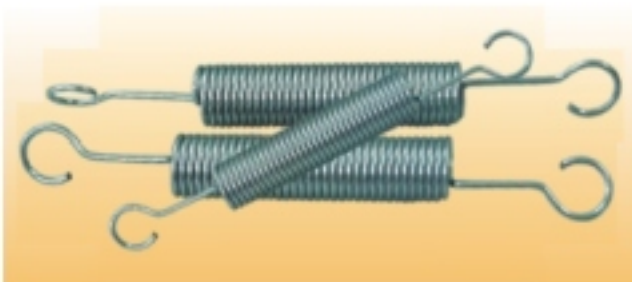
Consisting of a graduated meter, rule figured 50-0-50 fitted into a grooved stand with two hangers of 50 gms. each.



ARCHIMEDES APPARATUS

PR-35 SET OF SPRINGS

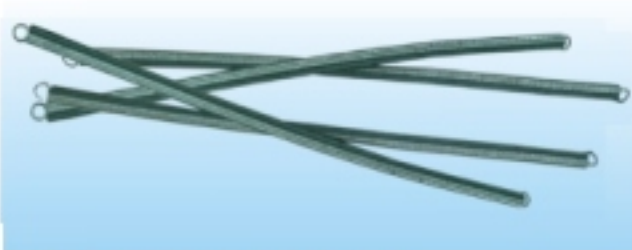
Set of springs are flexible with hooks on both sides.



PR-36 SPRING EXTENSION, STEEL

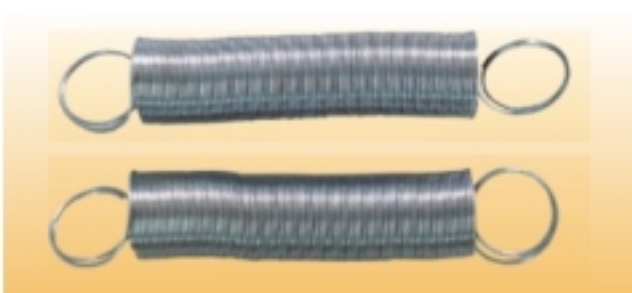


PR-37 SET OF SPRINGS



PR-38 SPRING EXTENSION, STEEL

For demonstrating Hook's Law.
Spring Extension 15x55 mm. length.



PR-39 DISPLACEMENT VESSEL

Metal, size 115mm x 90 mm (HxD) with spout for specific gravity experiments. Also available following two sizes : 100mm x 50mm 225mmx125mm



PR-40 DISPLACEMENT VESSEL



Made of glass, for class demonstration with spout for specific gravity experiment, available in following sizes :
A) 250ml B) 500ml.

PR-41 DISPLACEMENT VESSEL

Aluminium, seamless constructions. This is used for experiments involving volumetric displacement of liquids.



PR-42 CATCH BUCKET

Made of aluminium, with handle. Used for collecting the liquid overflow flowing from displacement vessel.

PR-43 BUCKET & CYLINDER

For demonstrating Archimedes principle, this is a simple form in brass, suitable for class demonstration or individual use. The bucket has suspension loop at the top and hook at the bottom. The cylinder has a suspension hook at one end. Size 6 cm long, overall length when extended 16 cm.

A Bucket and Cylinder
B Bucket and Cylinder Large



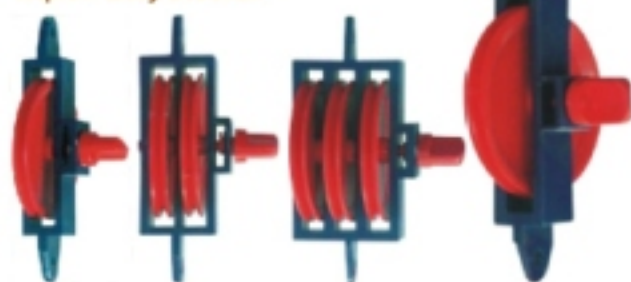
PR-44 PULLEY BLOCKS

50mm. diameter plastic pulleys are carried in tough plastic frames. Dearing pin is easily removable and has a simple locking arrangement which prevents the pin accidentally coming out. Blocks are provided with metal hooks.

Single Pulley Blocks.

Double Pulley Blocks.

Triple Pulley Blocks.



PR-45 PULLEY BENCH CLAMP FITTING

Pulley carried on a two part plastic frame, designed primarily for clamping to the edge of a bench, table etc. With the pulley overhanging the edge and in a vertical plane. The two different sizes are shown in the picture below.



PR-46 PULLEYS WITH UNIVERSAL CLAMP

A 5 cm. aluminium pulley has a universal frame and can be clamped in any position to a wall, bench, drawing board, corner / edge of a table, or fitted to a retort stand rod of diameter 12.5 mm. Its two clamping screws have bakelite knobs for easy working.

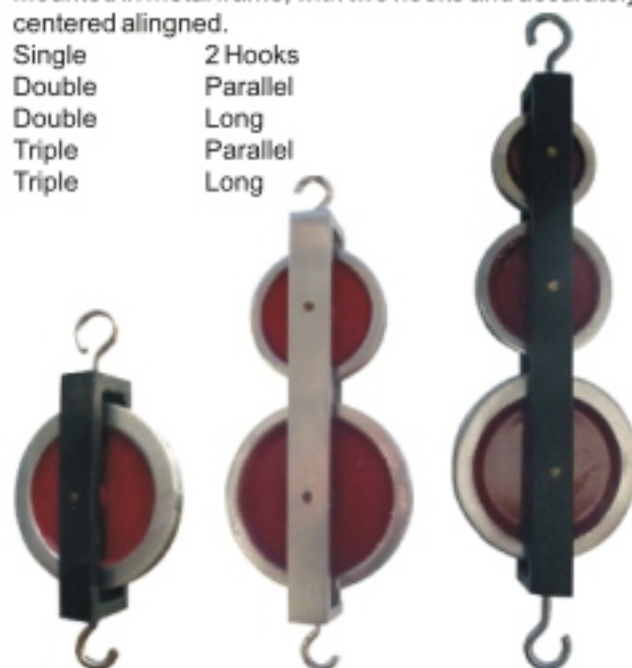


PULLEYS

PR-47 PULLEYS

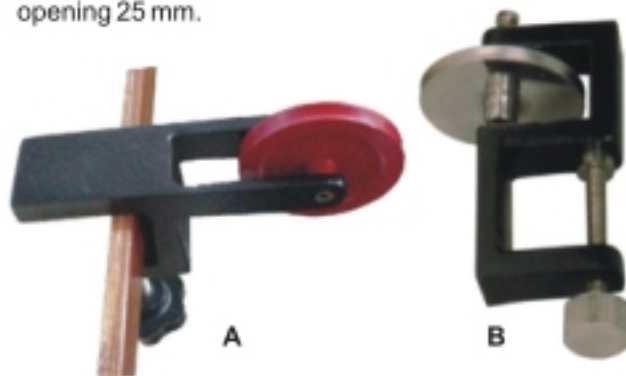
Mounted in metal frame, with two hooks and accurately centered aligned.

Single	2 Hooks
Double	Parallel
Double	Long
Triple	Parallel
Triple	Long



PR-48 PULLEYS BENCH CLAMP FITTING

Comprising a 50 mm. diameter pulley, carried on a two part aluminium frame, designed primarily for clamping to the edge of a bench, table etc. With the pulley overhanging the edge and in a vertical plane. Overall length of frame (pulley bar) 110 mm. Maximum clamp opening 25 mm.



PR-49 PULLEY ROD MOUNTED

50 mm. Plastic ball bearing pulley mounted on 150x10mm. dia rod.



PULLEYS, WHEEL, AXLE & PROPERTIES OF SOLIDS

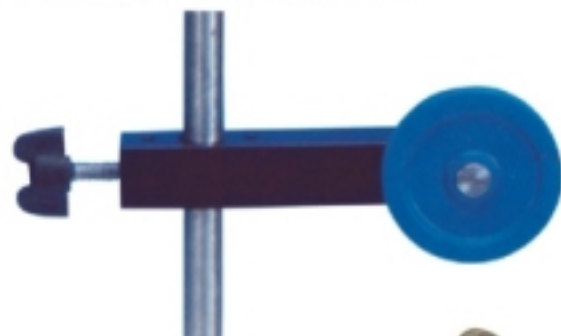
PR-50 PULLEY SINGLE

Bench mounting, aluminium, 50 mm. diameter, in metal frame for clamping to benches or boards up to 25 mm thick.



PR-51 PULLEY ROD MOUNTING

Comprising a 50 mm. diameter pulley carried on an aluminium boss, 20x20x110 mm. long provided with a hole and clamping screw to accommodate rods up to 13 mm. diameter. Tapped holes are provided so that the pulley may be fitted on to the boss with its axis of rotation in any one of the three planes.



PR-52 PULLEYS DIFFERENTIAL TRIPLE

One-piece aluminium of 38, 50 and 62 mm. mounted in metal frame with hook.



PR-53 WHEEL AND AXLE, SIMPLE FORM

Consisting of a wooden double wheel with flat bottomed grooves, 150 and 50 mm. diameter respectively. The wheel is pivoted on a spindle 10 mm. diameter which projects for a distance of 100 mm. so that the apparatus may be clamped to a normal retort stand. The apparatus is supplied complete with two hooks and 6 meters of whipcord, but WITHOUT masses and stand.



PR-54 FLY WHEEL

About 20 cm. in dia. and 45 mm. wide turned and carefully balanced, mounted on a horizontal shaft, held in ball bearings. The wheel is marked and pointer is fixed to the bracket. The bracket has four holes and can be fixed to the wall.



PR-55A HOOK'S LAW APPARATUS

Consists of a mirror scale 12 cm. long and supports spring, a weight holder and slotted weights of 250 gms. capacity.



PR-55B HOOK'S LAW STUDENT

This complete apparatus has a 15 cm. adjustable mirror scale, to prevent parallax error, and is graduated in millimeters and mounted on sturdy 30 cm. support rod. A hook supporting a coiled spring with a mass hanger and indicator is attached to the rod. Supplied with slotted weight of 250 gm. capacity.

PR-56 YOUNG'S MODULUS OF WIRE APPARATUS

Searle's Pattern. Spirit level mounted in two rectangular cast iron frame with one end resting on point of micrometer screw, fitted in one frame, the second end of spirit level pivoted in the second frame. The micrometer is provided with vertical scale 10 mm. on either sides of the zero and vernier reading 0.01 mm. Complete with ceiling bracket having two self-centering chucks and tension weight. Supplied in case.

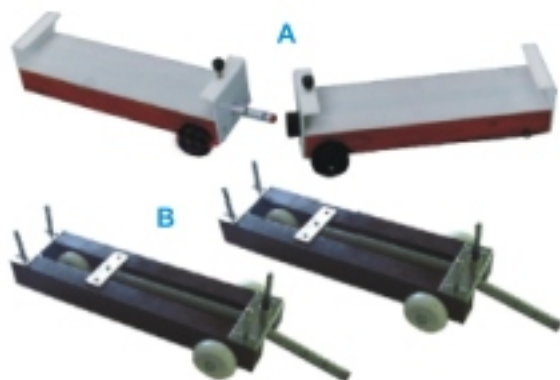


PR-57 GYROSCOPE

The brass wheel is 7.5 cm. in dia. 3 cm. at its rim, carefully balanced and all three pairs of pivots are adjustable. Complete fitted on stand.



DYNAMIC TROLLEY, WOODEN ARE ALSO AVAILABLE IN OTHER TWO MODELS AS SHOWN IN THE PICTURES (A & B) ARE GIVEN BELOW.



PR-58 DYNAMIC TROLLEY, WOODEN

A pair of identical wooden trolleys (300mm long), mounted on three wheels. A spring loaded rod is fitted to give impulse when released. It has a provision for stacking the trolleys on top of each other with removable pins. Supplied complete with 3 elastic rings, 3 springs, 8 pins (for stacking), 2 rubber corks 2 needles and 1 releasing pin.



DYNAMICS

PR-59 FALLING BODIES APPARATUS

L-Section launcher with holes for locating two 19mm. diameter steel balls which act as projectiles. Launcher is released by push button and projects one ball forward while allowing the other to fall freely. Launching mechanism mounted on wooden block, 180x60x30mm, which may be clamped by bench and has a convenient storage pocket for the balls. Complete with two steel balls.



PR-60 COLLISION IN TWO DIMENSIONS

For demonstrating the principle of conservation of momentum and showing that momentum is a vector quantity having direction as well as magnitude. The apparatus comprises the following items.

1. A curved wooden runway and its highest point, having a groove down which a steel ball may be rolled.
2. An object sphere support. This is an adjustable device which attaches to the mounting plate of the runway and will support a ball either exactly opposite the end of the runway for head-on collision or slightly offset for oblique impacts.
3. A plumb-bob for making the plumb line.
4. Two spheres (steel ball bearing 19 mm. diameter).



DYNAMICS

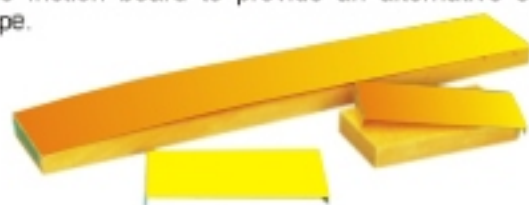
PR-61 INCLINED PLANE WITH ANGLE MEASURER

Hardwood comprising, cut-away base to allow cord to hang freely and hinged plane 60x7.5 cms. with aluminium pulley 28mm diameter, and stepped lower face to accommodate wood block for setting at angles between 24° & 45° approximately with cylindrical metal roller and scale pan.



PR-62 FRICTION BOARD APPARATUS

Wooden friction board 490 x 75 x 20 mm. a wooden slider with hook 140 x 70 x 20 mm. a plain aluminium slider and an aluminium slider with rubber backing. A further long aluminium slider is provided which fits over the friction board to provide an alternative surface type.



PR-63 INCLINED PLANE WITH ANGLE MEASURER

Wooden friction board a wooden slider with hook and plain glass slider A further long glass slider is provided which fits over the friction board to provide an alternative surface type.



PR-64 INCLINED PLANE WITH ANGLE MEASURER

Hardwood comprising, cut-away base to allow cord to hang freely and hinged plane 60x7.5 cms. with aluminium pulley 28mm diameter, and stepped lower face to accommodate wood block for setting at angles between 24° & 45° approximately with cylindrical metal roller and scale pan.



PR-65 PARALLELOGRAM OF FORCES APPARATUS

To verify the relationship between forces action at a point. Comprises board 65x50cm, with two aluminium pulleys 50mm dia., on clamp, for mounting in any position. Complete with three hangers iron nickel plated 50 gm. and 12 slotted weights of 50 gms. each.



PR-66 FORCE TABLE

To verify the law of composition and resolution of forces consisting of a aluminium table 40cm in dia. its raised rim has a engine divided scale, graduated in 360° mounted on heavy vertical support rod & tripod base provided with leveling screws. Body under study in a ring in center of the table fastened by cords passing over four pulleys attached with the table. Complete with four pulleys, four weights hangers twelve weights (2x10gm, 2x20gm, 4x50gm, 4x100gm.)



MECHANICAL INSTRUMENTS

PR-67 SURFACE TENSION BALANCE, SEARLE'S

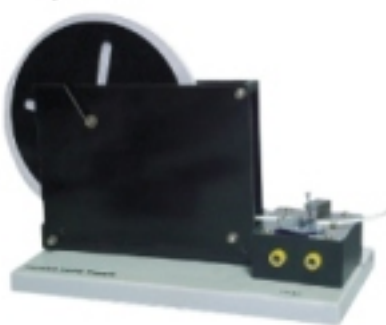
A horizontal frame is mounted on a rod fitted to a base & carries a steel wire stretched across it, the tension of which can be adjusted by a tightening screw. A light metal pointer with a counterpoise is attached to the centre of the wire clamp. A pan is hung from a notch in the pointer and has a hook at its underside from which can be suspended a light weight rectangular frame or a metal clip to hold a micro slide edge. The tip of the pointer moves over a graduated scale. With rectangular wire frame, slide clip, six micro slides & 3 meters of spare wire.



PR-68 TICKER TAPE TIMER

For the measurement of velocity and acceleration, using timing marks made on a moving paper tape by a vibrating striker. Designed to operate on a 12V A.C. supply and uses the mains frequency as its timing standard. The unit is housed in a moulded case including mounting flanges. The top of the case carries a tape guide which incorporates a carbon paper disc support and an adjustable anvil for the striker point. All moving parts are fully enclosed and a pair of 4mm sockets are provided on the side of the case for connection of the electrical supply. Supplied with a roll of self marking paper tape.

- A. Paper tape : 100m of paper tape, 9.5mm wide.
- B. Carbon Paper Discs : 40mm diameter, with 3mm hole, cut from long life plastic film type carbon paper.



PR-69 POWER PACK FOR TICKER TAPE TIMER



PR-70 STOP CLOCK, MECHANICAL

Two sweep hands, one indicating seconds, the other recording minutes. Start-stop lever on the left hand side, zero reset lever on right hand side.

Movement housed in metal case. Runs for 24 hours on one winding. Diameter of dial 100 mm. divided 0-60 x 1. In white powder coated metal case.



PR-71 DIGITAL STOP CLOCK

This sturdy, lightweight stopwatch has multiple functions you'll use every day, including time and date mode, stopwatch mode, and an alarm ! Digital Stop Clock has 1/100 Sec. (upto 10 Hrs.)* Big Digit, Time, Timer Alarm.



MECHANICAL LAB INSTRUMENTS

PR-72 DIGITAL STOP CLOCK

Timer, showing normal time, hours, minutes, seconds. Days, dates, months are displayed, 1/100th second. With alarm.



PR-73 STOP WATCHES

Chrome plated steel case, non-rusting, dust and damp-proof, 7- Jewelled lever movement bold figures, white dial and black steel hands. With start, stop and reset arrangement.

1/5th seconds 30 minutes

1/10th seconds 60 minutes

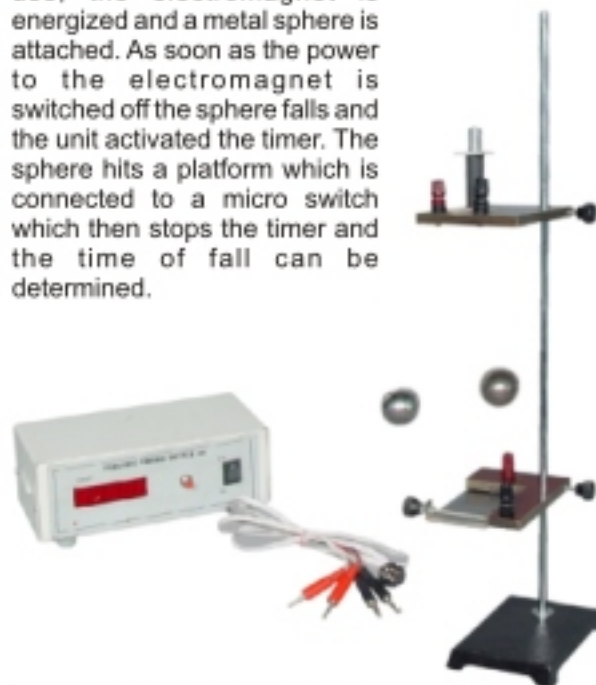


PR-74 CENTI SECOND METER



PR-75 'GRAVITY' BY FREE FALL APPARATUS

For determination of 'gravity' by free fall method. The apparatus consists of an electromagnet which is housed in a plastic moulded case, with socket connections provided to energize the magnet and another pair of sockets for connection to the timers. In use, the electromagnet is energized and a metal sphere is attached. As soon as the power to the electromagnet is switched off the sphere falls and the unit activated the timer. The sphere hits a platform which is connected to a micro switch which then stops the timer and the time of fall can be determined.



PR-76 LABORATORY TIMER

This is a versatile timer quartz crystal controlled for very high accuracy, which can be used for conducting experiments related to timing and motion with high accuracy. Can be used for G by free fall liner air tracks, dynamic trolleys etc. This timer has an in built power supply for the coil for G by free fall apparatus and lamps for photo gates.

Range : 0.001, 0.01, 0.1 Sec.

The above timer has a built in power source for photo gates and the coil for 'G' by free fall apparatus.



MECHANICAL LAB INSTRUMENTS

PR-77 LINEAR AIR TRACK

Angular section aluminium alloy track, length 255cms, with staggered air holes, supported on two light alloy castings positioned 45 cm from each end of the track. One support has a two-point contact and other one-point contact for lateral and horizontal adjustments for which a knurled screw is provided. Large catapult arms with slots for elastic bands are fitted to each end of the track. A fully fitted to one end of the track enables experiments involving acceleration under a constant force. Identical end caps enable air to be introduced from either end of the track, bung being supplied to close the end not being used. The vehicle buffer attachments and clamping screws are matt black to help interpretation of stroboscopic photographs.



PR-78 PHOTO GATES & LEADS

These pair of photo gates is housed in tough moulded cases giving them excellent durability. The lamps operate on 6 Volts with a special built in circuitry which prevents lamps from damage in case higher voltage is applied accidentally. The photo gates can be connected by 4 mm. sockets to a timer and power supplies.



PR-79 ELECTRIC BLOWER

The blower is supplied with the standard hose, length 2m, and the integral 2-core mains cable, length 5m. The cylinder has a completely insulated outer case rendering an earth connection unnecessary.



PR-80 BAR AND GAUGE

For illustrating expansion by heating and contraction by cooling comprising a mild steel bar 110x10mm (length), on rod with wooden handle, overall length approx. 280mm. with metal cast gauge, sliding fit over ends of bar and with hole 10mm bore in one arm.



PR-81 RING AND BALL

An apparatus for demonstrating thermal expansion, comprising a captive brass ball secured to a mounted brass ring by a chain. Ring mounted on rod with a wooden handle. The ball passes through the ring when cold but will not pass through after being heated. Ball dia. 25 mm.



HEAT AND ENERGY TRANSFER APPARATUS

PR-82 DRINKING BIRD

A classic toy that is really a heat engine. The bird operates because evaporation is a cooling process. After placing bird in motion, it will continue to drink as long as there is water in the cup and the room temperature is above 65°F.



PR-83 LINEAR EXPANSION APPARATUS

Consisting of a metal rod, 500mm in length and 4.5mm diameter, enclosed in a well lagged, nickel plated brass tube with three tubules for steam, inlet, outlet and thermometer. The metal rod to be studied is supported in the steam jacket by detachable conical cups situated at each end of the tube. The apparatus is carried on a heavy gauge channel base, at one end of which is an adjusting screw. At the opposite end is a micrometer screw reading to 0.01mm for measuring the expansion. Supplied complete with copper, brass & iron rods but without thermometer.



PR-84 COMPOUND BAR

To show the differential expansion of metals in a bimetallic strip. Comprising a length of bimetal strip 150x15mm mounted in a wooden handle. The strip is only 1mm thick so that very little heat is required to produce considerable bending. Length overall 270mm approx.



PR-85 BAR BREAKING APPARATUS

To show the forces which can be exerted during thermal expansion or contraction. Comprising a heavy cast iron frame 340x120x100mm with slotted end pillars to carry a stout iron bar. The bar is threaded at one end for a large tensioning nut and has holes at the other end to accommodate the cast iron breaking bars. Supplied complete with ten breaking bars.



PR-86 ENERGY TRANSFER APPARATUS

The Malvern energy transfer kit comprises a number of separately available units, which enable the user to show qualitatively energy conversion from one form of energy to another in a variety of different ways. All units are carried on a standard base and provided with socket terminals where appropriate.

PR-87 FLY-WHEEL UNIT

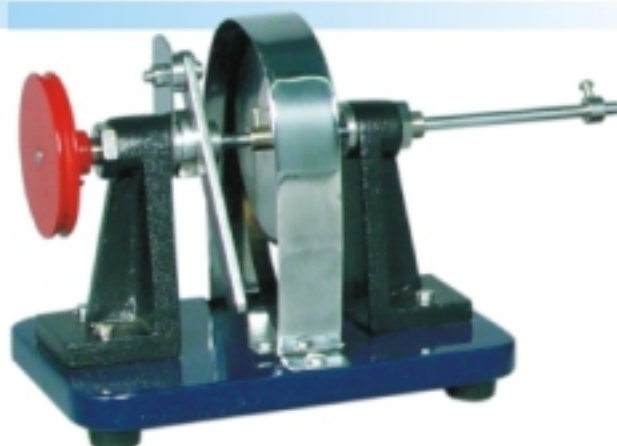
For use with a large motor/generator and a lamp unit to demonstrate the conversion of electrical energy to kinetic energy and then back again. Comprising an iron flywheel, mounted in cast brackets with bearings. The shaft has an aluminium "V" pulley for driving with the spring belt supplied.



ENERGY TRANSFER

PR-88 SPRING UNIT OF MECHANICAL MODEL

For showing potential energy in a wound-up spring and its conversion to electrical energy by driving a dynamo and lighting a lamp. May also be used to wind up a weight on a cord showing the change from potential energy to kinetic and back to potential in the raised weight. The steel shaft carries a clock spring with a free wheel device and winding ratchet, also an aluminium 'V' pulley 56 mm. diameter. One end of the shaft overhangs the base for use as line shaft when winding up a weight. Dimensions 220 x 100 x 100 mm. high. Supplied complete with driving belt.



PR-89 LAMP UNIT, TRIPLE

For use with motor/generator to give an indication of their output when used as dynamos. The lamp-holders are connected in parallel. Supplied with three lamps 3.5 V 0.25 A, M.E.S.



PR-90 TURBINE / PUMP UNIT

For use as a water turbine to drive a generator producing electricity or for use as a pump driven by a motor and raising a head of water to produce potential energy. The rotor has eight 'bucket' blades and is housed in a block turbine chamber with a clear Perspex front. Two inlet tubules (for turbine and pump operation respectively) and one outlet tubule are provided, and the shaft carries a 15 mm. diameter pulley. With driving belt.



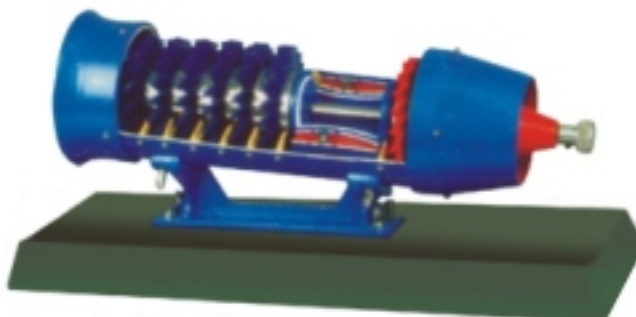
PR-91 LINE SHAFT UNIT

For showing the conversion from electrical energy via mechanical, to potential energy by winding up a weight on a cord. One end of the 6mm. steel shaft carries an aluminium 'V' pulley 56 mm. diameter, and the other end is fitted with a cord anchoring collar. Supplied complete with driving belt.



PR-92 GAS TURBINE / TURBOJET ENGINE

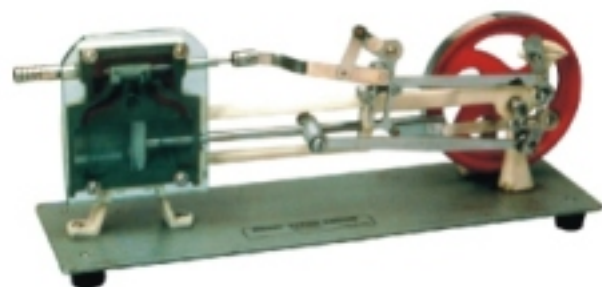
The cut section is constructed model is of light and strong metal showing air intake, axial flow, double stage compressor, fuel supply, combustion chamber, turbine rotor, jet thrust, exhaust etc. Complete on base.



MODEL ENGINE

PR-93 STEAM ENGINE MODEL

Operation of a commercial steam engine is well illustrated with this working model. The extra large size unit is provided with a horizontal boiler with a whistle, safety valve, steam gauge, on metal base. Operates on 220V A.C. 50 Hz.



PR-94 STEAM ENGINE MODEL WITH BOILER

Operation of a commercial steam engine is well illustrated with this working model. The extra large size unit is provided with a horizontal boiler with a whistle, safety valve, steam gauge, on metal base. Operates on 220V A.C. 50 Hz.



PR-95 FOUR-STROKE DIESEL ENGINE MODEL

A model of four stroke water-cooled diesel engine. This is of the chain-driven overhead camshaft type and all functional components like camshaft, rock-arms, tappets etc. are clearly demonstrated. The functioning of fuel injection system is also represented. Ignition is shown by means of a miniature bulb. Mounted on base.



PR-96 TWO STROKE DIESEL ENGINE MODEL

A model of two-stroke diesel engine made in aluminium alloy and gun metal. Ignition is shown by means of a miniature bulb. Fuel supply is also sectioned. With hand crank, provided for manual operation. Mounted on base.



PR-97 FOUR STROKE PETROL ENGINE MODEL

Represents internal structure and operating principles of an air cooled two-stroke engine. All parts in aluminium alloy. Ignition is shown by means of a miniature bulb. Carburettor and fuel supply also sectioned. Mounted on base, with printed diagram showing working.

Two-Stroke Petrol Engine
Four-Stroke Petrol Engine are also available.



PR-98 TWO STROKE PETROL ENGINE MODEL

Represents internal structure and operating principles of an air-cooled two-stroke engine. All parts in aluminium alloy. Ignition is shown by means of a miniature bulb. Carburettor and fuel supply also sectioned. Mounted on metal base.



MODEL ENGINE & DYNAMO DEMONSTRATION

PR-99 DEMONSTRATION ELECTRIC MOTOR

A model of the simplest form of D.C. electric motor, having 2-pole armature wound with enamelled copper wire, and a permanent magnetic field provided by a removable bar magnet. A disc-type commutator is incorporated and external connection to the phosphor-bronze bushes is by means of a pair of 4 mm. sockets. The motor will operate on 6-8 Volts D.C.



PR-100 DEMONSTRATION DYNAMO

This model uses the same basic assembly as the motor, but is mounted on a baseplate 230 x 90 mm. approx. which also carries a hand-drive pulley 120mm. diameter coupled to the smaller dynamo pulley by a rubber belt to give a step-up ratio. Electrical output is via a pair of 4mm. sockets. The model may also be used as a motor on a 6-8 V D.C. supply.



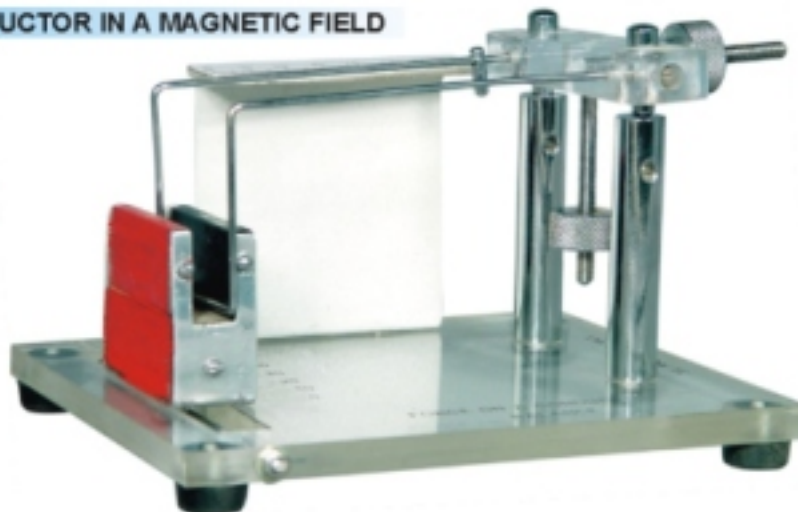
PR-101 MILLIKAN'S OIL DROP APPARATUS

Determination of charge on a electron by measuring a known distance on the basis of number of times of fall under gravity, and of rise in uniform vertical electrostatic field in a series of charged oil drops.



PR-102 APPARATUS TO SHOW ON CONDUCTOR IN A MAGNETIC FIELD

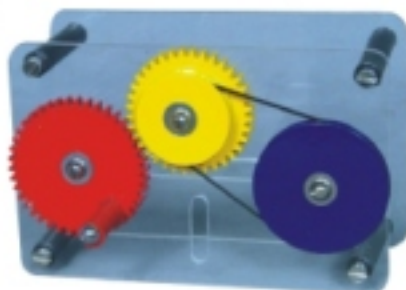
Comprising a strong U-shaped magnet and a pair of brass rails with 4 mm socket terminals. A brass axle with plastic discs is free to roll along the rails and completes the electrical contact between them. When the axle is placed on the rails between the poles of the magnets, and power supply unit is connected, the axle is repelled and rolls along the rails away from the center of magnetic field. Dimensions 175x60x58 mm.



GEAR AND GEAR ASSEMBLY

PR-103 MECHANICAL TRAINING MODEL

Highly useful for demonstrating the most fundamental and frequently used mechanism. Very useful for engineering students. All the components are made of high degree of precision. These modules are assembled on transparent perspex sheets to facilitate teaching. Easy to assemble or disassemble.

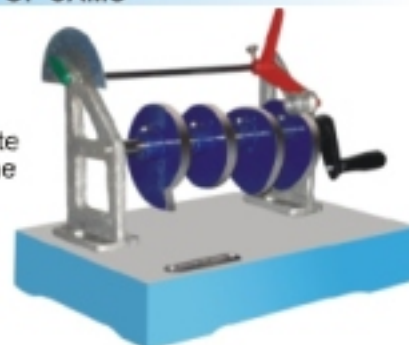


PR-104 SPUR GEAR AND SPIRAL GEAR



PR-105 ACTION OF CAMS

For the construction of a unit to demonstrate cam action and the effect of different cam profiles cut from card.



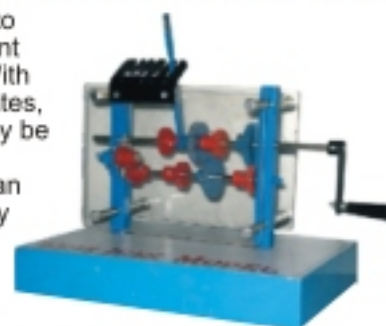
PR-106 EPICYCLIC GEAR (SUN & PLANET TYPE)



PR-107 DEMONSTRATION GEAR SYSTEM MODEL

A series of models to demonstrate different gearing systems. With transparent slideplates, the gears may easily be seen and where necessary there is an index on the primary and secondary shafts to show the change in the direction of rotation and the relative speed of rotation.

A simple three-speed and reverse-gear system using spur gears. Reverse gear is obtained by interposing a small lay-shaft mounted pinion between the two main shafts. Gear selection is by means of a short ball-ended lever.



PR-108 ACTUAL CUT MODEL GEAR BOX



ACTUAL CUT SECTION ENGINES

PR-109 ACTUAL DIFFERENTIAL GEAR



PR-110 WATER TURBINE WITH DYNAMO

To show conversion of mechanical energy into electrical energy. Turbine with transparent cover, inlet and outlet tubes, directly connected to a dynamo. Fitted on base.



PR-111 FRANCIS TURBINE



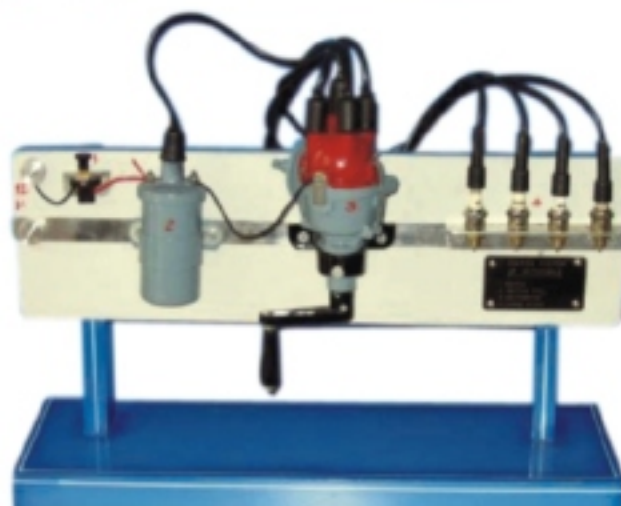
PR-112 DIFFERENT IMPELLERS OF PUMPS AND TURBINES



PR-113 HYDRAULIC BREAK UNIT



PR-114 IGNITION SYSTEM OF A CAR



PR-115 REAR WHEEL AXLE ASSEMBLY

