



stand and assembly systems

Experiments need to be set up in a way that everything is **SIMPLE – FAST – SAFE**

Experiments need to be set up in a SIMPLE - FAST - SAFE way.

When setting up experiments with the new NTL STAND SYSTEMS, there is almost no need for stand rods, boss heads or clamp holders.

With the basic elements, the large support base, L=500 mm, DS101-1G and the dismantlable support base DS104-1Z, made of a special aluminium profile, it is possible to set up experiments for all subject areas of

physics, both in horizontal and vertical arrangements, so that they are easy to follow and offer the most in stability.

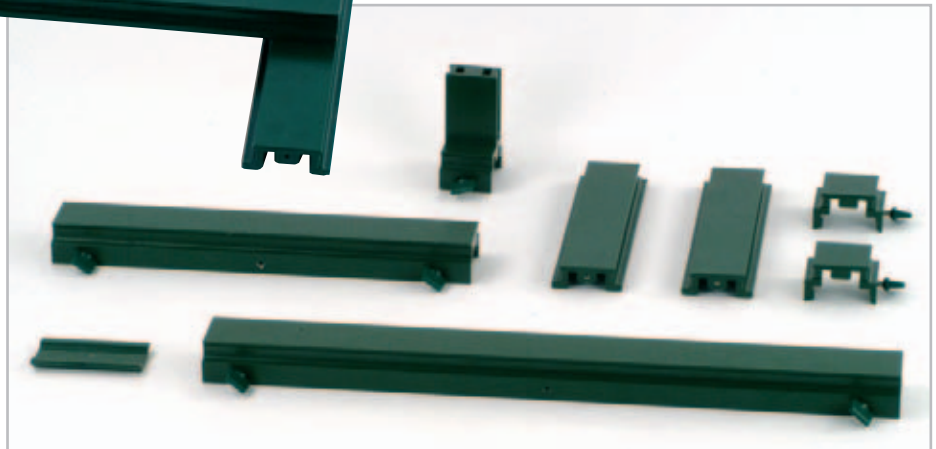
With the aid of the newly developed rail supports DS103ff, the stand rails DS104ff can be mounted either horizontally or vertically on the large support base or the dismantlable support base, offering support for sliding or clamp saddles so that equipment can be mounted on the assembly and fixed in

place. This ensures that the saddles as well as the equipment they hold can be adjusted to exactly the right position along the stand rails. Using the magnetic support bases DS102ff, any component of the NTL support material also be mounted on the magnetic panel or the new assembly panel DS602-2A for performing experiments in the vertical position.



DS101-1G Support base, large

Stable, h-shaped universal support base made of a special aluminium profile, green powder-coated, for attaching and fastening sliding saddles DS103-ff, rail supports DS103-ff or lab equipment mounted on saddles made of the special aluminium profile. Includes two levelling screws in order to compensate for surface unevenness. Dimensions: 500 x 325 mm



- DS104-1Z Support base, dismantlable**, consisting of:
- DS101-3G** Stand rail, L=325 mm
 - DS101-5G** Stand rail, L=500 mm
 - DS101-2G** Rail connector
 - DS102-2G** 2x Clamp saddle
 - DS102-4G** 2x Rail base, L=200 mm (non-magnetic)
 - DS103-1W** Rail support, horizontal, short

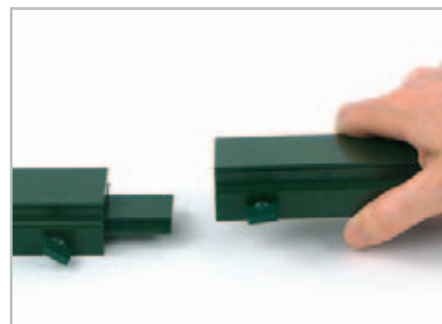
Experiment:

Working of the clamp saddle DS102-2G attached to the rail base DS102-4G and, tilted and above them, stand rail DS104-3G or DS104-5G



Experiment:

Use of the rail connector DS101-2G to join two stand rails DS104ff



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Experiment:

Support base, dismantlable, DS104-1Z, L=500 mm, attached to stand rail, L=325 mm, by means of short horizontal rail support DS103-1W



Experiment:

Support base, dismantlable, DS104-1Z, L=325 mm, attached to stand rail, L=500 mm, by means of short horizontal rail support DS103-1W



DS103-1G

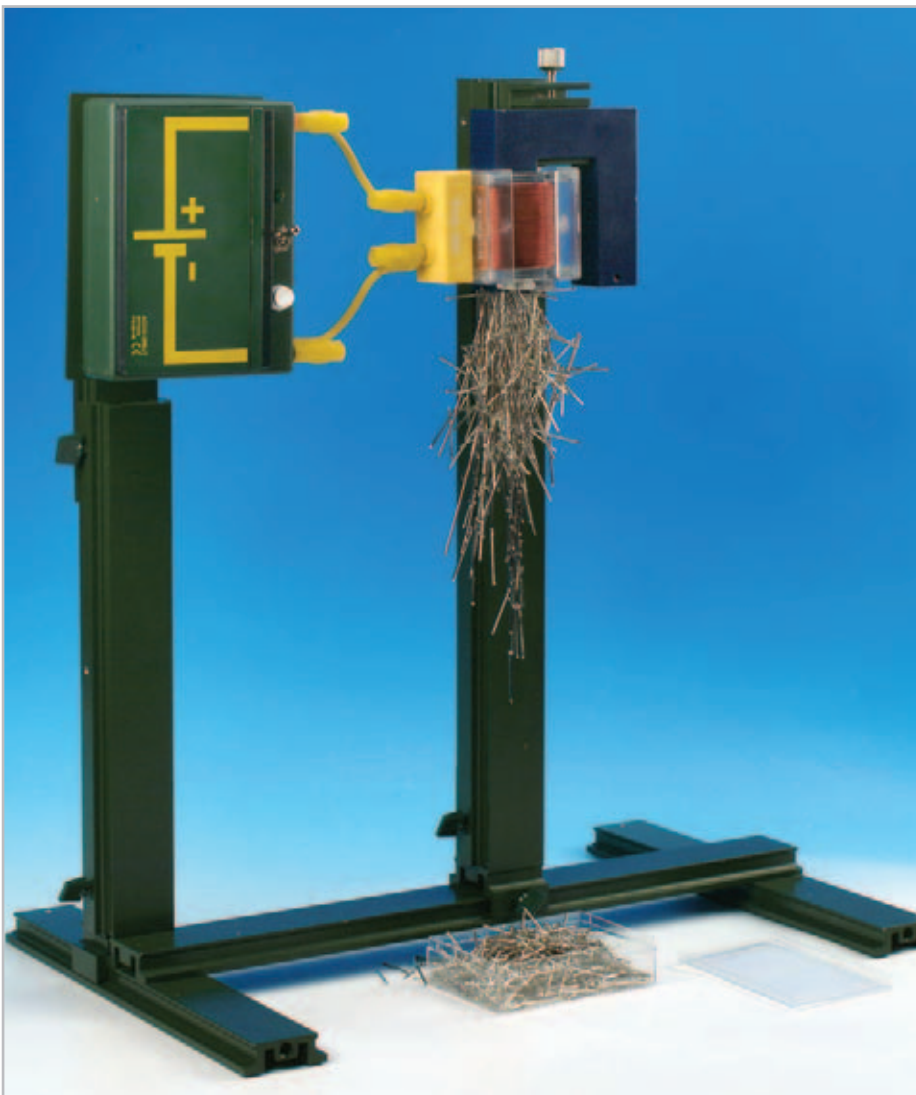
Rail support,
vertical, H=152 mm

DS103-4G

Rail holder,
vertical, H=101 mm

DS103-1S

Rail holder,
vertical, short



Experiment: Model of an electromagnet

Rail holders

Special aluminium profile mounted on saddle with clamping screw for fastening stand rails DS103-ff, other stand material or equipment mounted on saddles made of the special aluminium profile. The support column of the horizontal rail support may only be mounted parallel to the rail. The support column of the vertical rail support may only be mounted perpendicular to the rail.



DS103-2G

Rail support,
horizontal, H=152 mm

DS103-5G

Rail support,
horizontal, H=101 mm

DS103-1W

Rail support,
horizontal, short



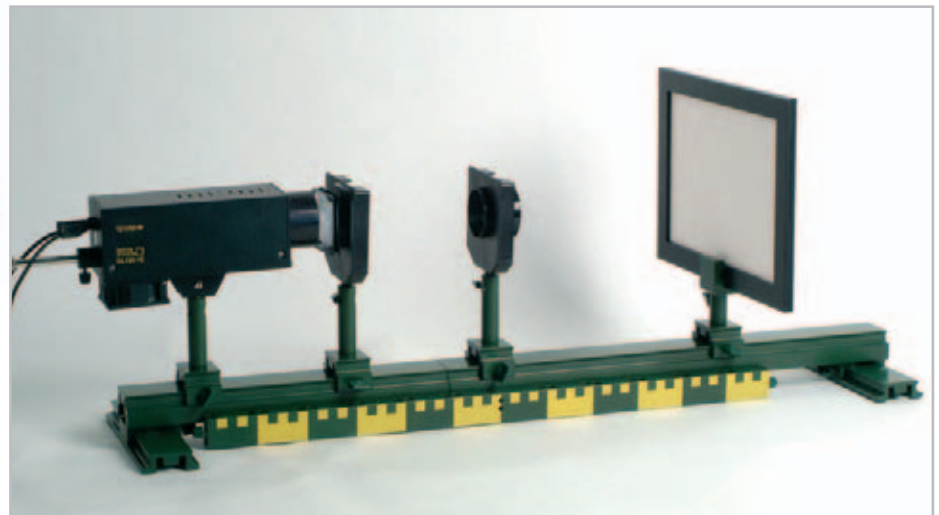
stand and assembly systems



Experiment: Lenz's Law



Example of an experiment: Support base DS104-1Z, dismantlable, with two support rails joined using the rail connector DS101-2G, L=825 mm



Experiment: Image of glass beads arranged to form the figure "F"

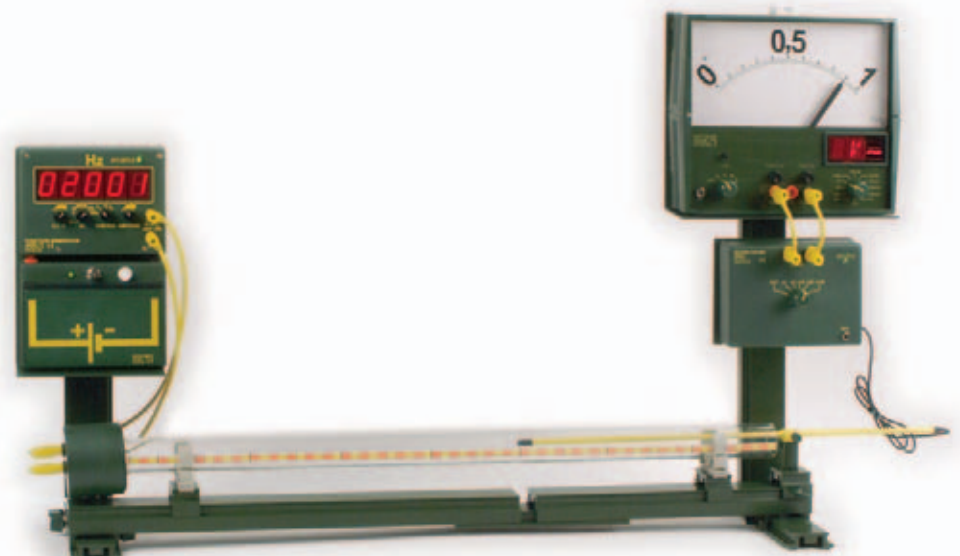


DS402-2G Clamp on support

Special aluminium profile on support, D=10 mm, with wing screw, for clamping onto round rods with a diameter of up to 18 mm or square rods with a cross-section of up to 12x12 mm, support length 40 mm

DS404-1G Plate clamp on support

Special aluminium profile on support, D=10 mm, with clamping jaws and wing screw, for clamping plates with a maximum thickness of 10 mm. Support length 40 mm



Experiment: Kundt's Tube

stand and assembly systems



DS102-2G Clamp saddle

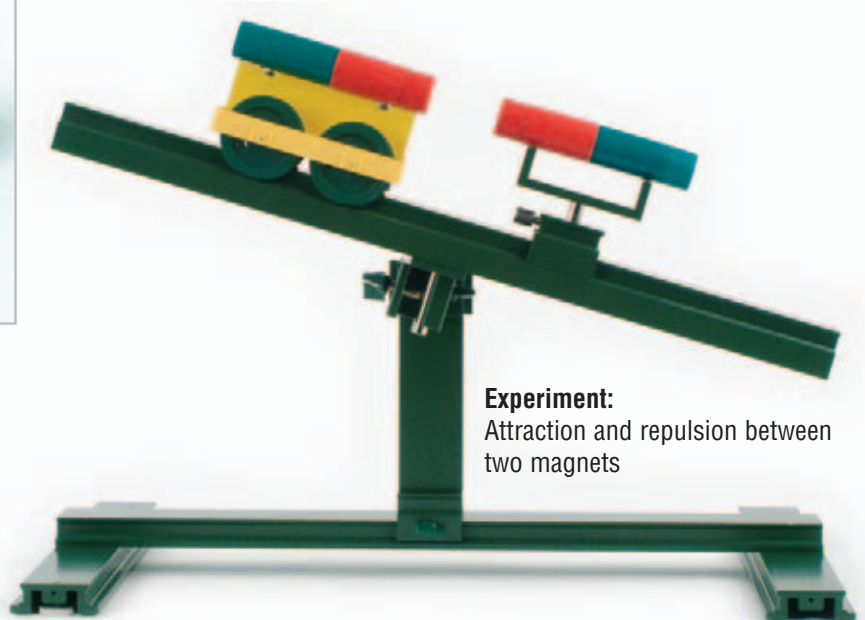
Special aluminium profile, green powder-coated, for attaching stand rails DS104-ff to rail bases DS102-ff. Length: 42 mm

DS102-3L Clamp saddle with hole

Special aluminium profile, green powder-coated, with hole for support rods 10 mm in diameter, with clamping screw for mounting and fastening onto stand rails DS104-ff; Length: 42 mm

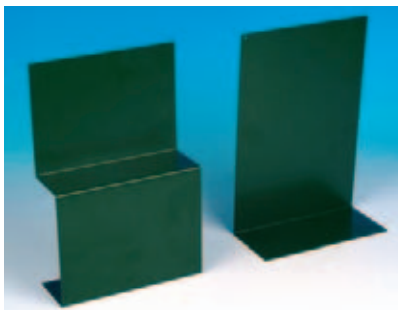
DS104-6G Stand rail, short

Special aluminium profile, green powder-coated, for fixing sliding saddles DS103ff or equipment mounted on saddles; Length: 200 mm



Experiment:

Attraction and repulsion between two magnets

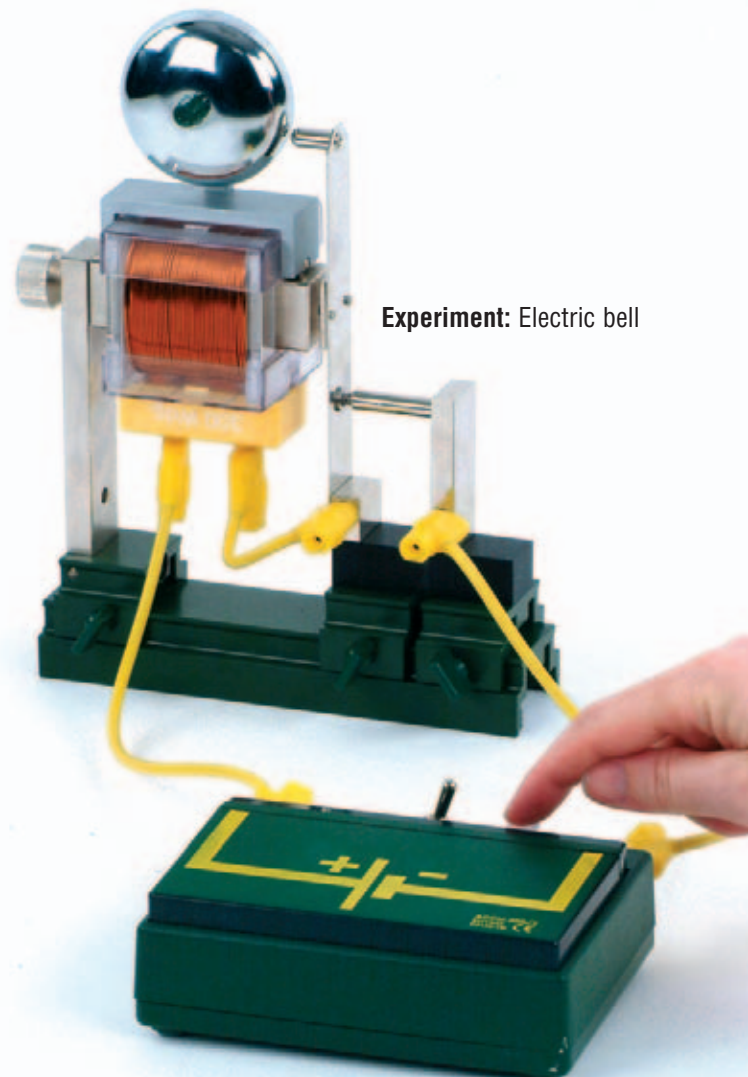


P3120-4A L-shaped assembly platform

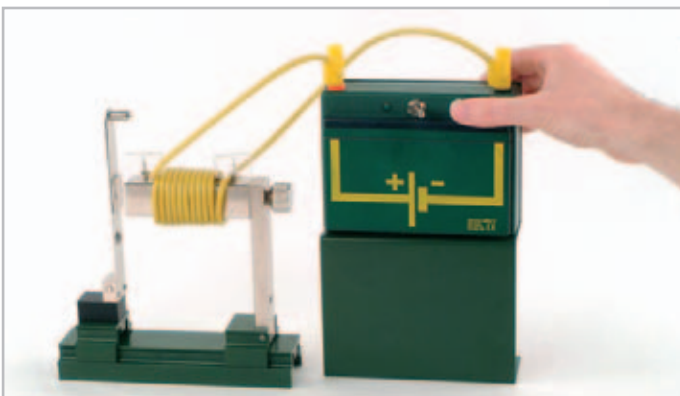
Metal platform, green powder-coated, for supporting up to two magnetic "inno" components, e.g. "inno" rechargeable battery P3120-1B in combination with "inno" DC converter P3120-1K, for mounting the equipment at an elevated position. Dimensions: 240x160 mm

P3120-5B S-shaped assembly platform

Metal platform, green powder-coated, for supporting a magnetic "inno" component, e.g. "inno" rechargeable battery P3120-1B or "inno" panelmeter DE722-1P, for mounting the equipment at an elevated position. Dimensions: 240x160 mm



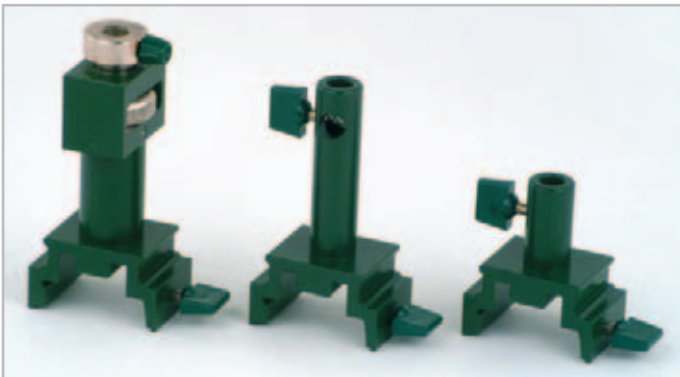
Experiment: Electric bell



Experiment: Principle of the electromagnet



stand and assembly systems



Sliding saddles

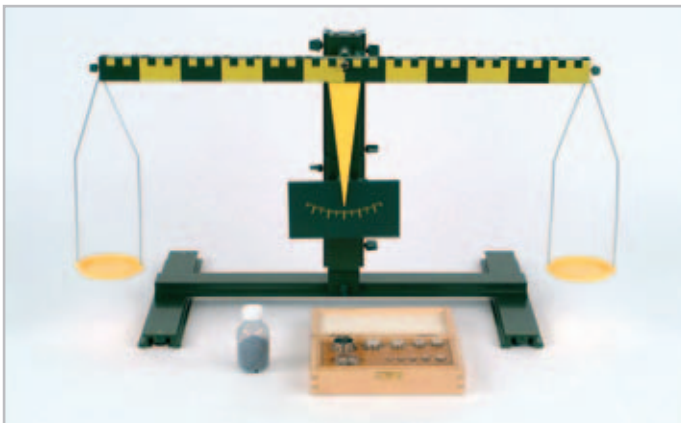
Special aluminium profile with clamp socket to be mounted onto stand rails DS101-ff and fixed by means of a wing screw; clamp socket includes a clamping screw for holding rods with a maximum diameter of 10 mm. Sliding saddle, H=70 mm, includes a transverse hole for holding rods with a maximum diameter of 10 mm

DS103-3G Sliding saddle, H=34 mm

DS103-7G Sliding saddle, H=70 mm

DS504-2K Sliding saddle, height adjustable

Clamp socket on a sliding saddle, for fine height adjustment by as much as 25 mm of equipment mounted on supports having a diameter of 10 mm; two clamping screws, one adjustment screw.



Experiment: Two-pan balance



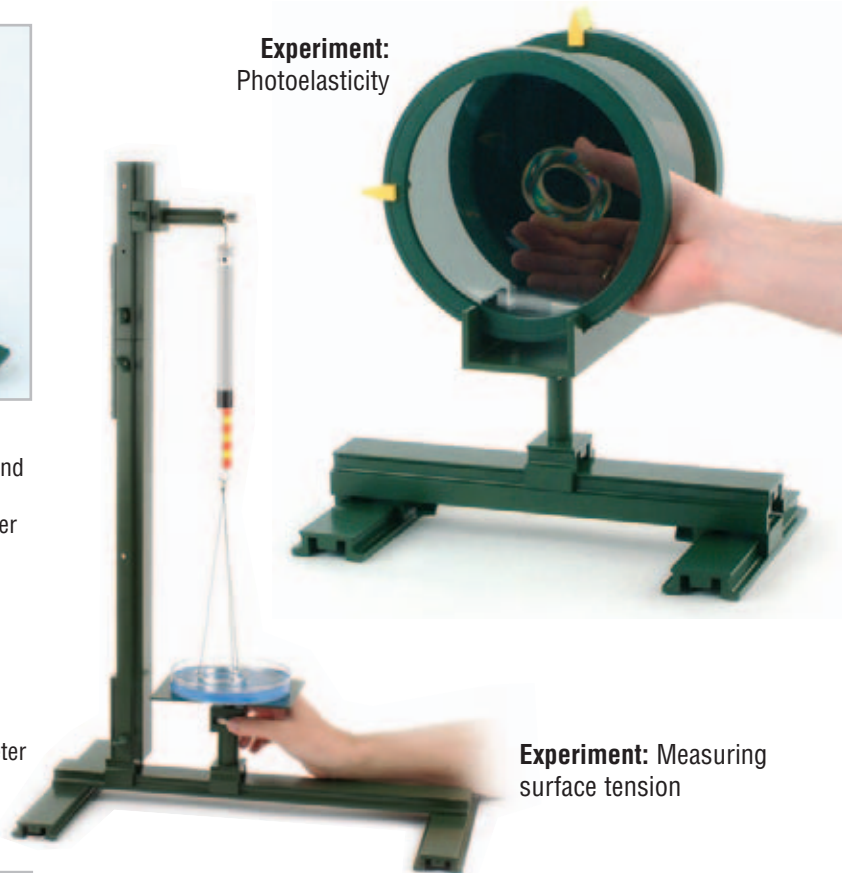
Sliding saddle with bearing pin

Special aluminium profile on support, Dia =18 mm, with wing screw; support includes hole and fastening screw for holding and fixing in place a bearing pin; pin includes transverse hole e.g. for inserting coil springs P1810-2A ff or rolls on pivots etc.; pin diameter: 3 mm

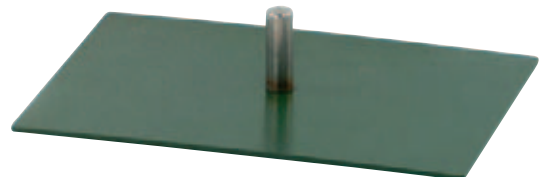
DS403-3R Sliding saddle with bearing pin, H=34 mm

DS403-7R Sliding saddle with bearing pin, H=70 mm

Experiment: Photoelasticity



Experiment: Measuring surface tension



DS103-1T Table on stand, small, metal, green powder-coated; dimensions: 160x120 mm

DS103-2T Table on stand, large, metal, green powder-coated; dimensions: 260x230 mm (not shown)



Experiment: One-sided lever

stand and assembly systems



Clamp sockets

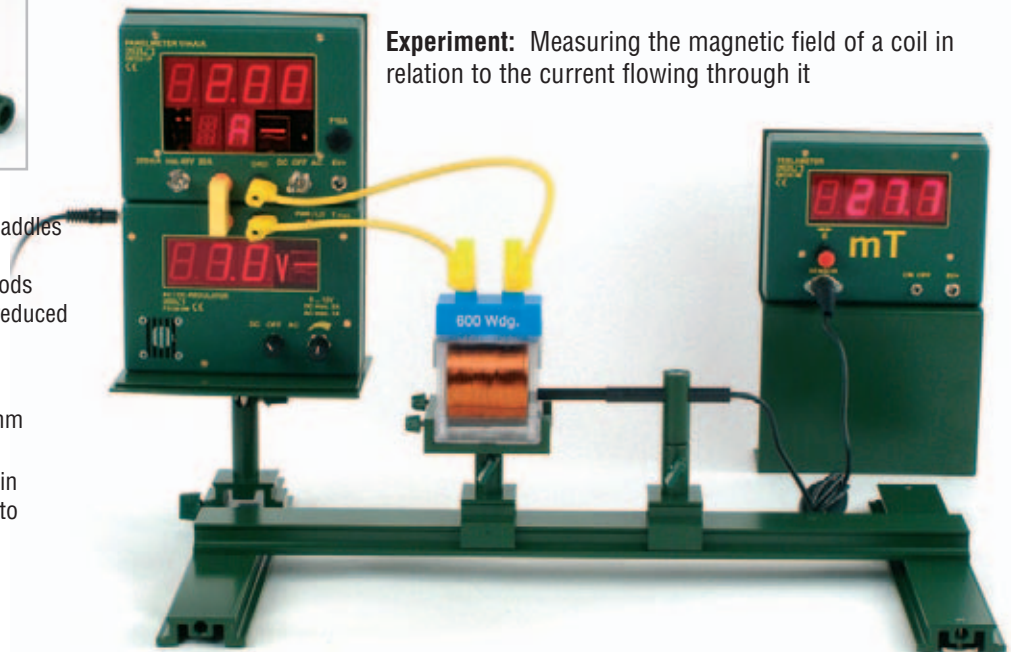
Including aluminium rod for extending sliding saddles DS103ff; 18 mm in diameter; hollow end with transverse hole and fastening screw for fixing rods with a maximum diameter of 10 mm; one end reduced to 10 mm in diameter.

DS200-2G Clamp socket, H=46 mm

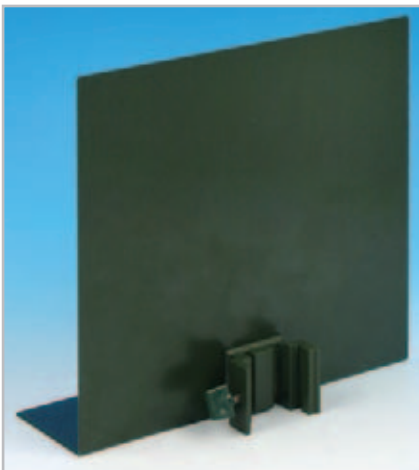
DS200-3G Clamp socket with slot, H=46 mm

DS103-2V Coupling sleeve

Aluminium tube, green powder-coated, 18 mm in diameter; two fastening screws; fits rods of up to 10 mm in diameter; length: 68 mm



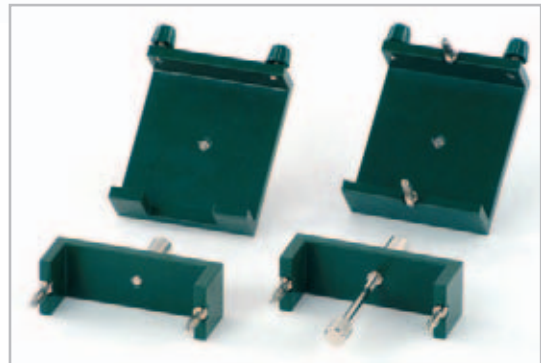
Experiment: Measuring the magnetic field of a coil in relation to the current flowing through it



P3120-4G

Assembly platform, small

Metal platform mounted on saddle, green powder-coated, for supporting magnetic equipment or instruments, e.g. universal multimeter I DE710-00 on special NTL profile
Dimensions: 240x160 mm



Coil holders:

DS407-2G Coil holder with plug pins

Aluminium u-bracket on support, D=10 mm, green powder-coated, two 4-mm plug pins for holding coils DE453ff with iron cores DE452ff inserted, two clamping screws for fixing the coils in place; dimensions: 80x80x25 mm

DS407-3G Coil holder with slot

Aluminium u-bracket on support, designed like DS407-2G except without plug pins, for holding a coil without an inserted iron core, additional gap in the lateral wall for holding a coil without iron core sideways; dimensions: 80x80x25 mm

DS407-1G Fork with plug

Small aluminium u-bracket on support, designed like DS407-2G except without fastening screws, may be used to allow coil with inserted iron core to rotate in pivot bearings DS402ff;
Dimensions: 80x28x25 mm

DS407-1M Fork with plug and screw

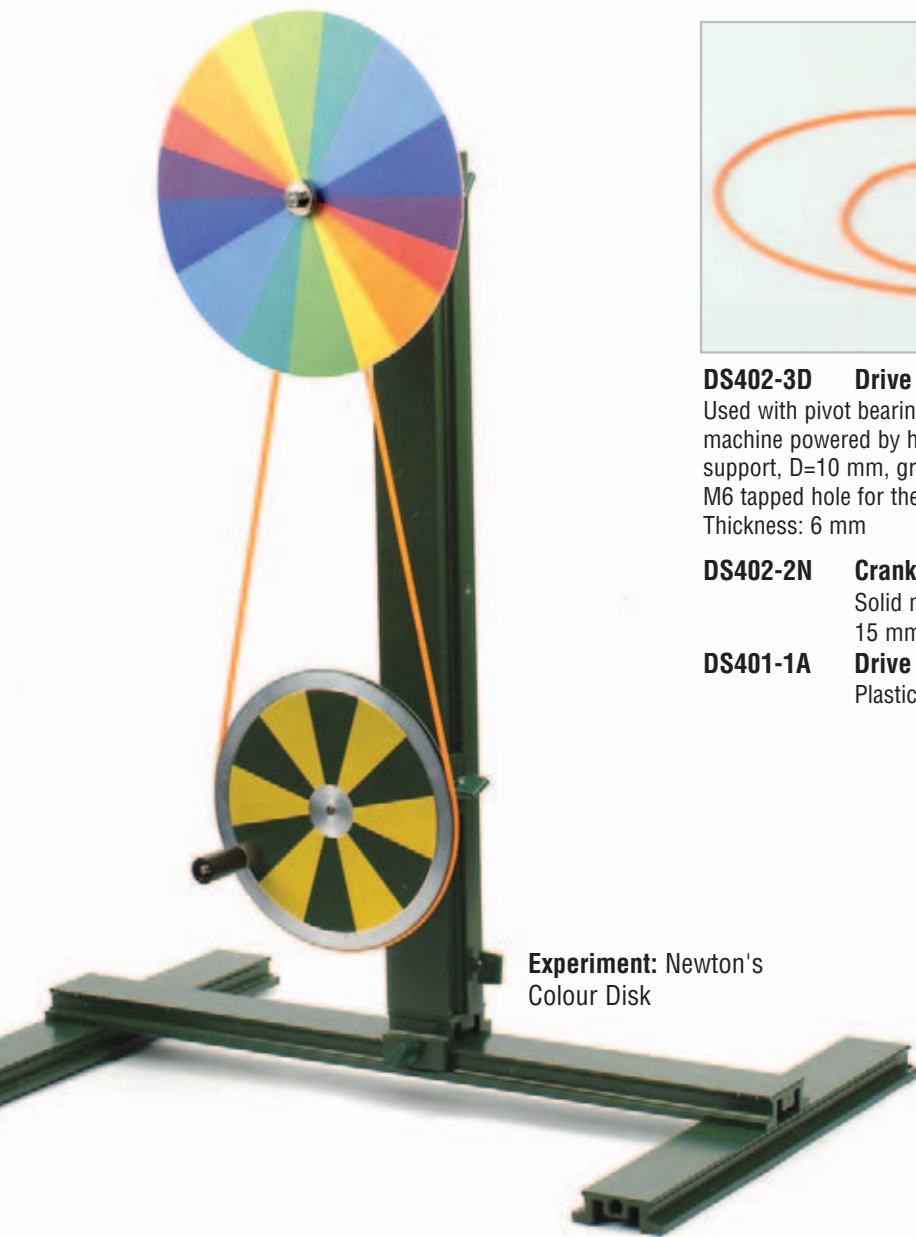
Designed like DS407-1G except with the addition of a clamping screw, e.g. for fixing the bar magnet DE411-1N when mounted onto it



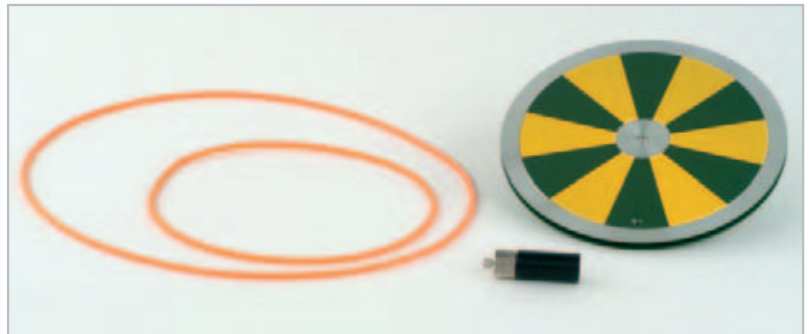
Experiment: Measuring heat radiation of a solid body



stand and assembly systems



Experiment: Newton's Colour Disk



DS402-3D Drive pulley

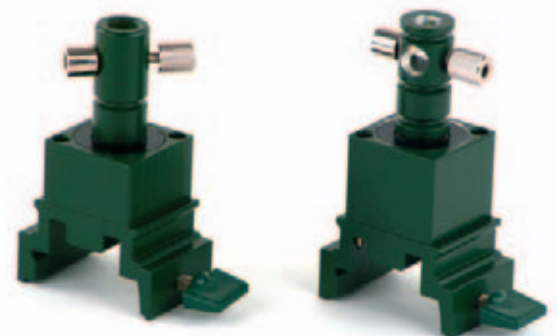
Used with pivot bearings DS402-3B and DS402-4B to assemble a momentum machine powered by hand. Aluminium disc with groove (for cord) mounted on support, D=10 mm, green powder-coated, printed with circle sectors in yellow; an M6 tapped hole for the hand-crank pin DS402-2N; disk diameter: 160mm; Thickness: 6 mm

DS402-2N Crank pin

Solid metal pin with M6 thread and plastic roller used as a handle, 15 mm in diameter; length: 50 mm

DS401-1A Drive belts, set of 2

Plastic belts 3 mm in diameter



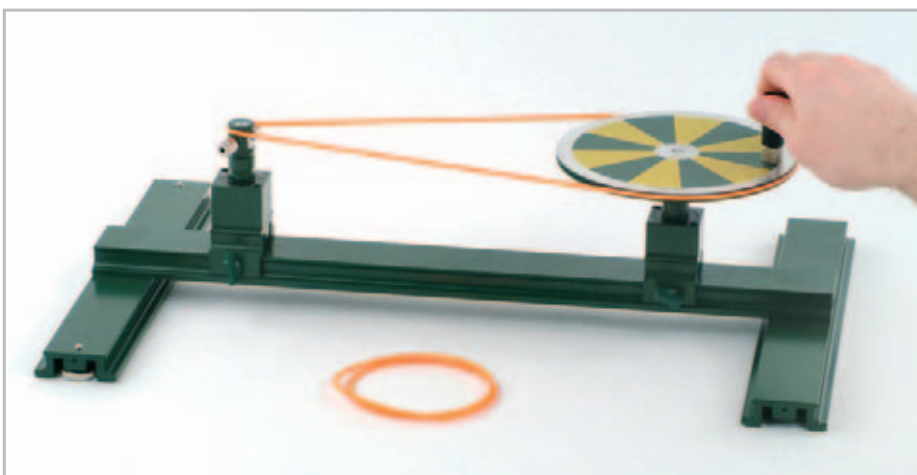
Pivot bearings:

DS402-3B Pivot bearing with transverse hole, on saddle

Pivoting clamp socket, mounted on double ball-bearings, with transverse hole; takes supports with a diameter of up to 10 mm; includes clamping screw and counterweight; mounted on sliding saddle made of special aluminium profile with a clamping screw to secure it on the large support base DS101-1G or stand rails DS104ff; green powder-coated; column height: 70 mm

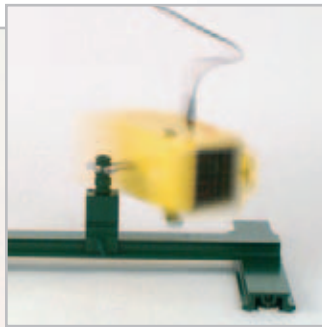
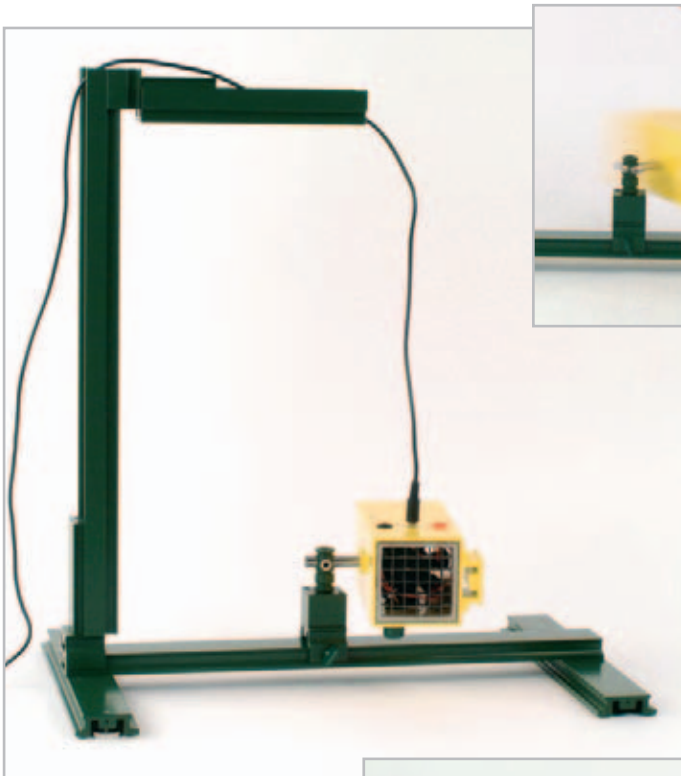
DS402-4B Pivot bearing, short, on saddle

Design as DS402-3B but without transverse hole in the clamp socket; Column height: 64 mm

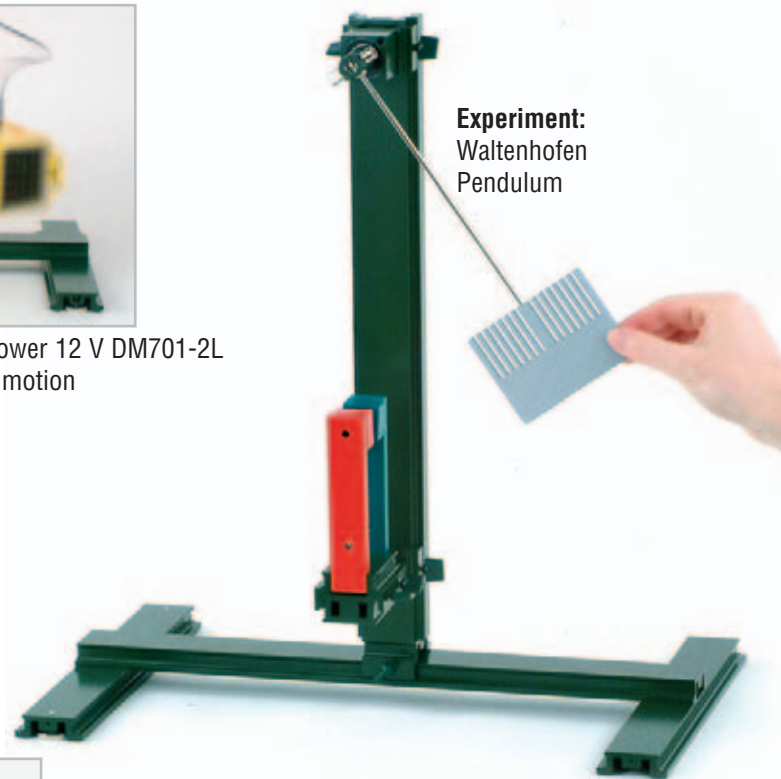


Experiment: Whirling table powered by hand, gear ratio approximate 1:9

stand and assembly systems



Blower 12 V DM701-2L
in motion

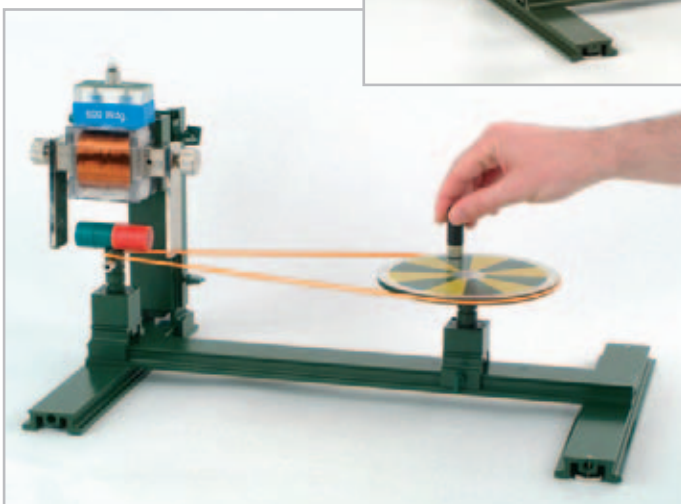


Experiment:
Waltenhofen
Pendulum

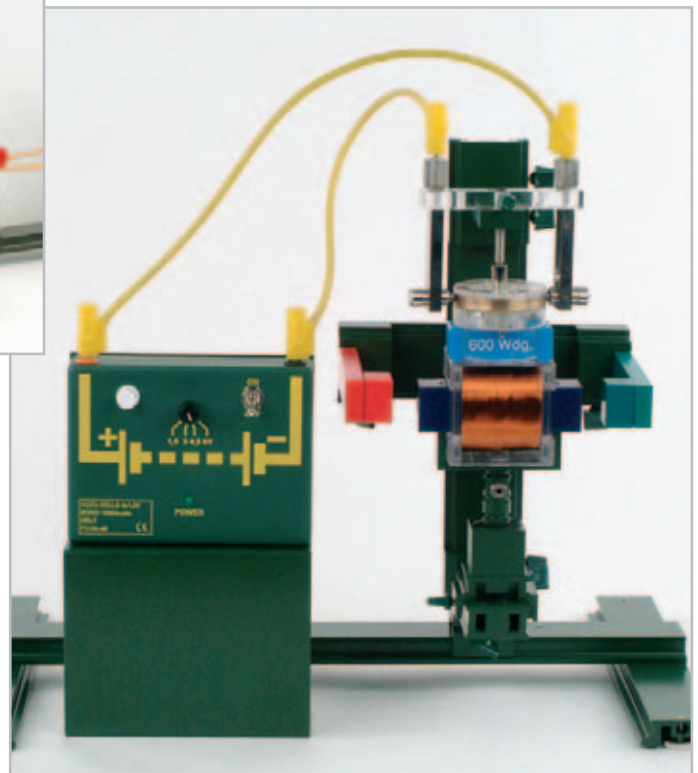
Experiment: Propulsion
(Blower 12 V DM701-2L,
mounted in pivot bearing)



Experiment:
Electromagnetic induction
- periodic change in the
magnetic field



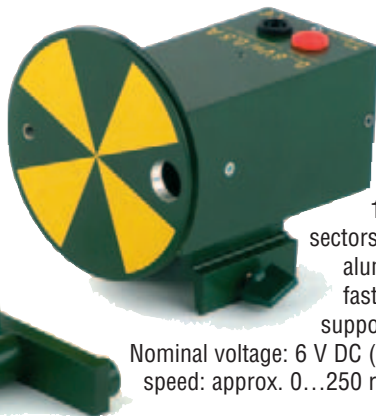
Experiment: Model of a bicycle dynamo



Experiment: Electric motor



stand and assembly systems



DS403-1G Geared motor

Electric motor with metal gears and high torque in aluminium case; drive shaft with permanently mounted aluminium pulley with groove and M6 tapping for attaching crank pin DS402-2N when used as a generator. Drive pulley diameter: 100 mm; green powder-coated printed with circle sectors in yellow; case mounted on sliding saddle of special aluminium profile with clamping screw for mounting and fastening onto large support base DS101-1G, rail support DS103ff or stand rails DS104ff

Nominal voltage: 6 V DC (3-12V); current consumption idling: 570 mA DC; speed: approx. 0...250 rpm; case dimensions: 128x60x60 mm



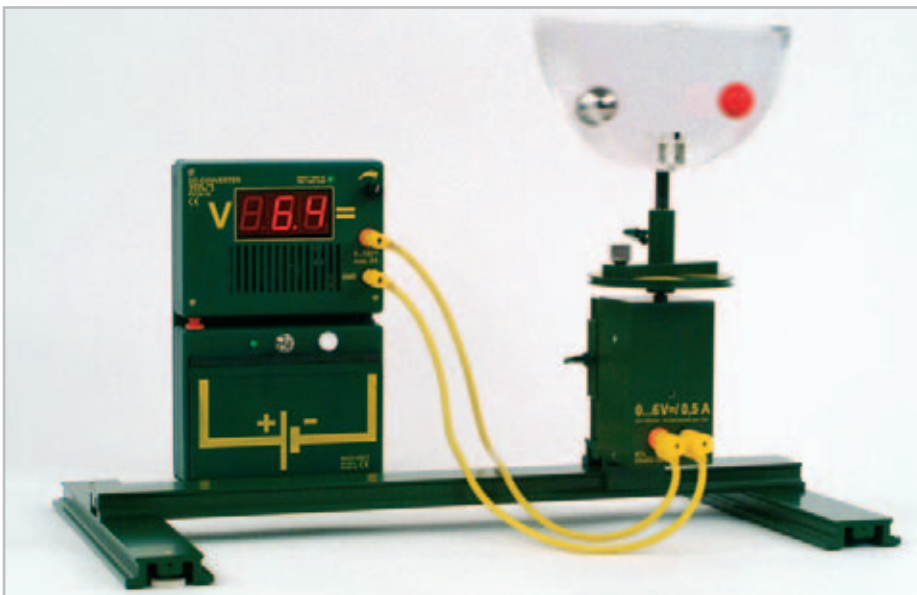
DS403-2K Clamp socket adapter

Clamp socket on support for mounting on drive pulley of geared motor DS403-1G. The clamp socket, green powder-coated, is used to attach and fix in place devices on supports 10 mm in diameter.

DS403-3F Fixing screw M6

DS403-2X Cam adapter

Used for generating linear, periodic motion as when producing standing waves in a cord or the motion required by the particle motion model. May be driven by geared motor DS403-1G or drive motor DS403-2S by means of drive belts DS401-1A (set of 2). The piston is self-lubricating at work and is equipped with an M6 tapping to accommodate the threaded c-hook DS102-3S or the threaded impact plate DS102-4P. Length of piston stroke may be varied. The drive pulley, running on double ball-bearings, is firmly mounted on a sliding saddle made of a special aluminium profile and includes a clamping screw for mounting and fastening onto the NTL track-profile



Experiment: Rotational dynamics paradox

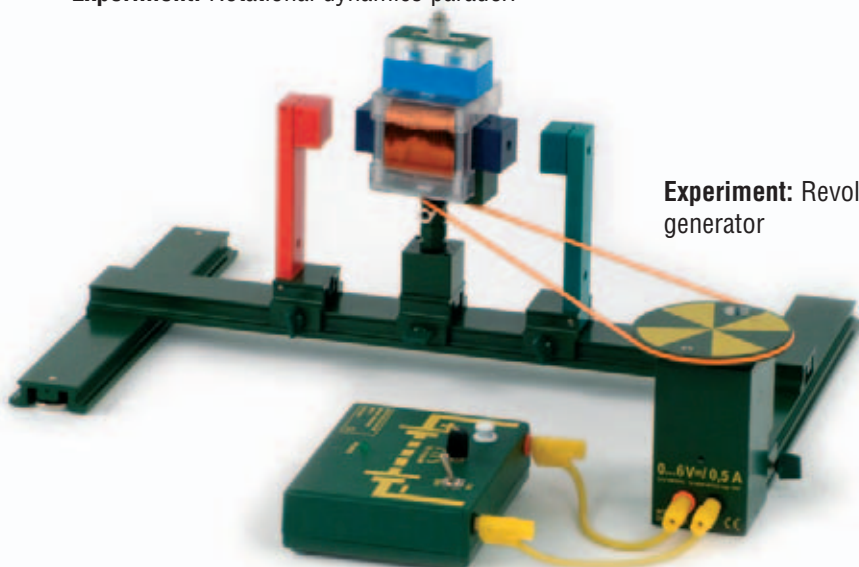


DS102-3S C-hook, threaded

Stable metal hook with M6 threading for attachment to cam adapter DS403-2X for holding a vibrating cord, may also be mounted on the threaded rod DS204-1S, 60 mm in length, for use as a rod with hook 10 mm in diameter

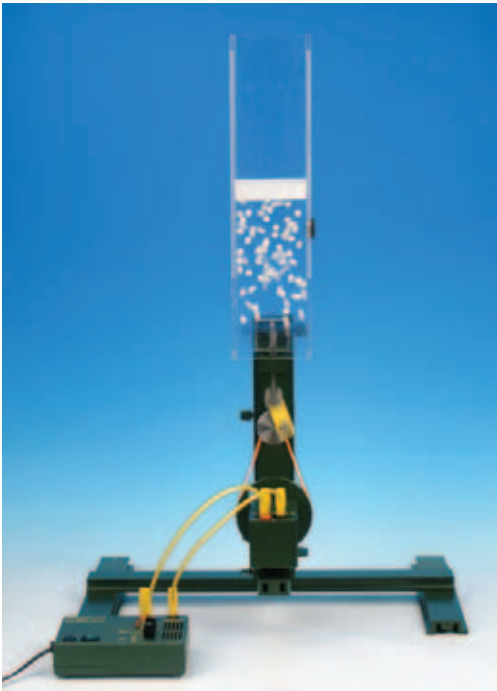
DS102-4P Impact plate

Metal plate with M6 tapping at centre, may be screwed onto the cam adapter when used as a plate for absorbing the impact of the balls used in the particle motion model. Dimensions: 84x52 mm



Experiment: Revolving-armature generator

stand and assembly systems



Experiment: Molecular motion demonstrator

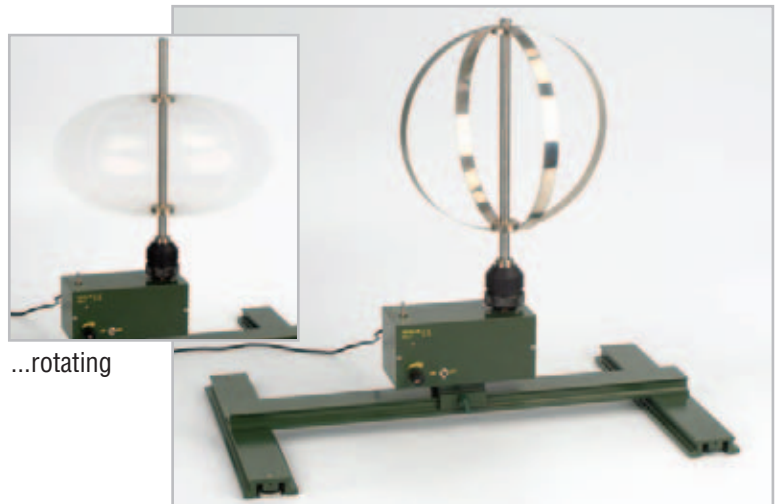


Experiment: Standing waves in cord



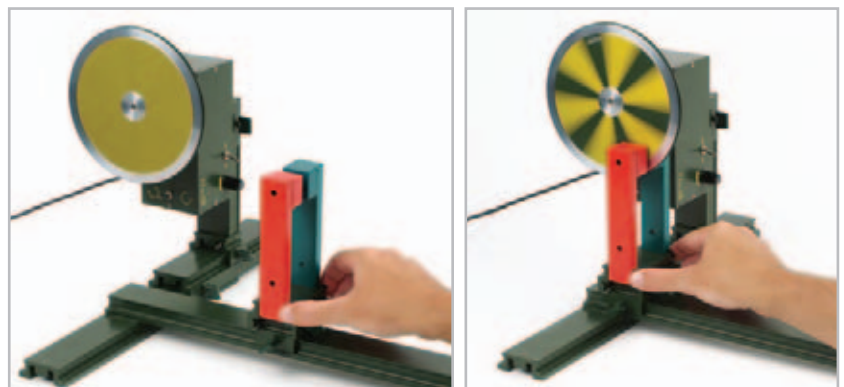
**DS403-2S
Drive motor,
demo**

Electric motor with gears at angle in aluminium case (70x70x150mm), green powder-coated, mounted on sliding saddle for setting directly on large support base DS101-1G and support rails DS104ff, may be mounted horizontally or vertically; keyless chuck for attaching rods with a diameter of up to 10 mm, switch for clockwise or counter-clockwise rotation, on/off switch, button for continuously varying speed; power supplied by way of two 4 mm safety jacks or hollow jack for connecting mains transformer 12 V/5.8 A P3130-2P
Speed: approx. 0...4000 rpm
Nominal torque: 20 N cm
Voltage source: 12V DC
Dimensions: 70x150x155 mm



...rotating

Experiment: Centrifugal hoops



Experiment: Eddy current brake...

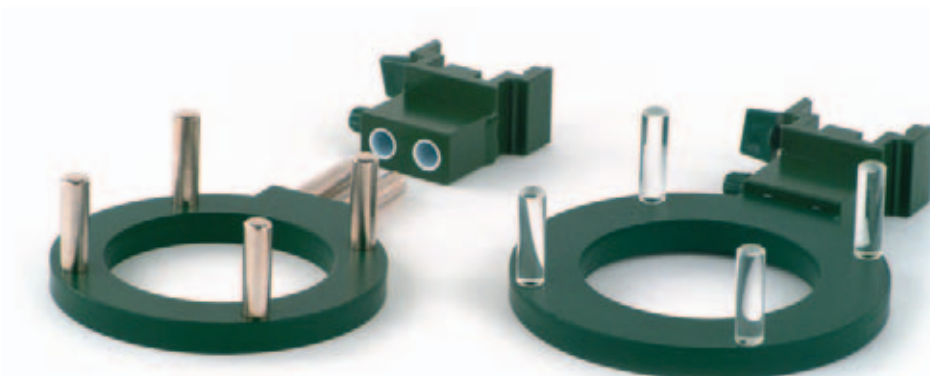
...braking



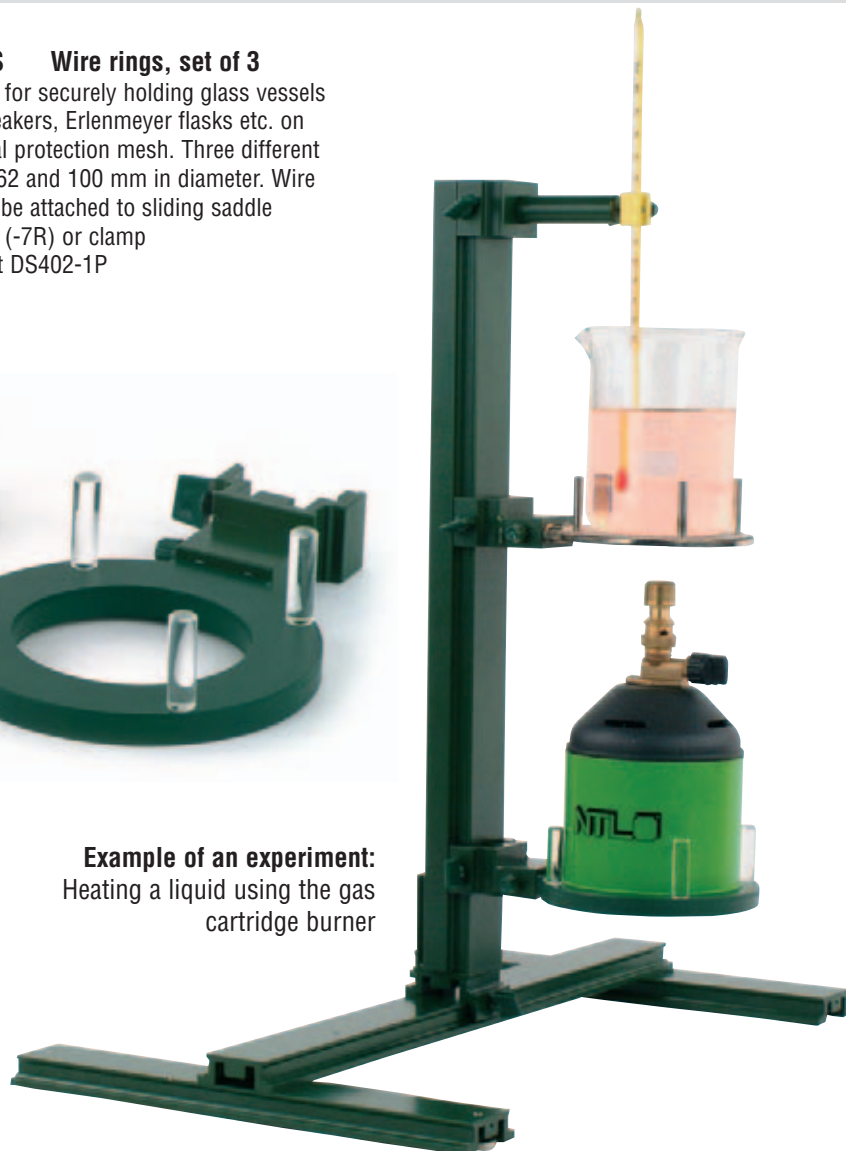
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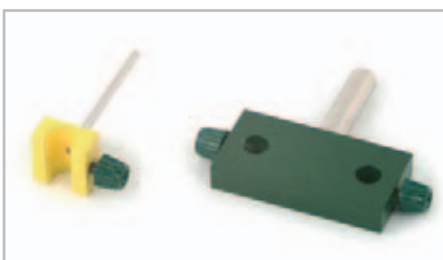
P7251-2S Wire rings, set of 3
 Wire rings for securely holding glass vessels such as beakers, Erlenmeyer flasks etc. on the thermal protection mesh. Three different sizes, 30, 62 and 100 mm in diameter. Wire rings may be attached to sliding saddle DS403-3R (-7R) or clamp on support DS402-1P



DS503-3B Holder for gas cartridge burner
DS503-3G Holder for vessels

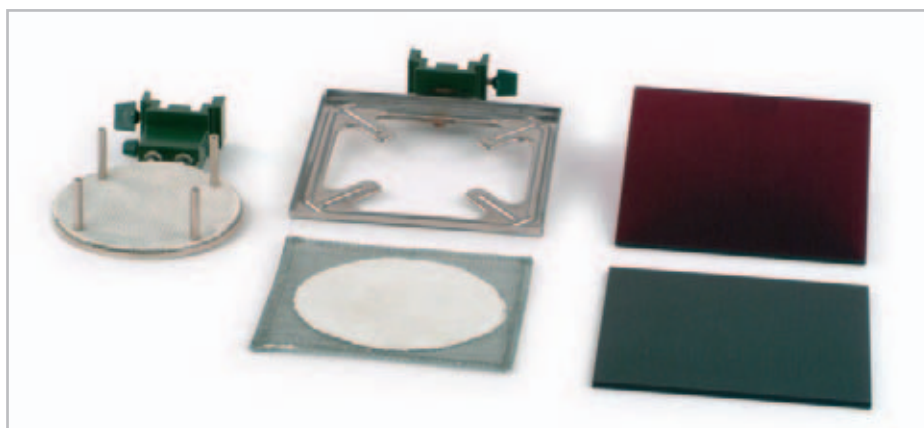


Example of an experiment:
 Heating a liquid using the gas cartridge burner



P7251-2T Tube holder
 Aluminium u-bracket on support, D=3 mm, yellow powder-coated, with fastening screw for clamping in a tube or thermometer with a diameter of up to 8 mm. The tube holder may be attached to and fixed in sliding saddle DS403-3R (-7R), clamp on support DS402-1P or magnetic base DS100-1L

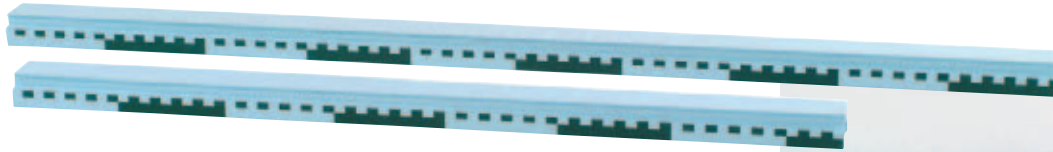
P7251-3T Double tube holder
 Aluminium plate on support, D=10 mm, green powder-coated, with two holes and fastening screws for clamping in parallel to each other two tubes or thermometers with diameters of up to 8 mm. The double tube holder may be attached to and fixed in sliding saddle DS103ff, clamp socket on support DS403-04 or magnetic base with clamp socket DS102-2K



Thermal protection holders

- DS503-2D** Wire gauze holder on saddle, D= 100 mm
- DS503-2P** Holder for plates on saddle, 158x158 mm
- DS503-2K** Plastic plate for holder DS503-2P
- C7226-1B** Ceran plate 155x155 mm
- P7125-1B** Wire gauze with ceramic 155x155 mm

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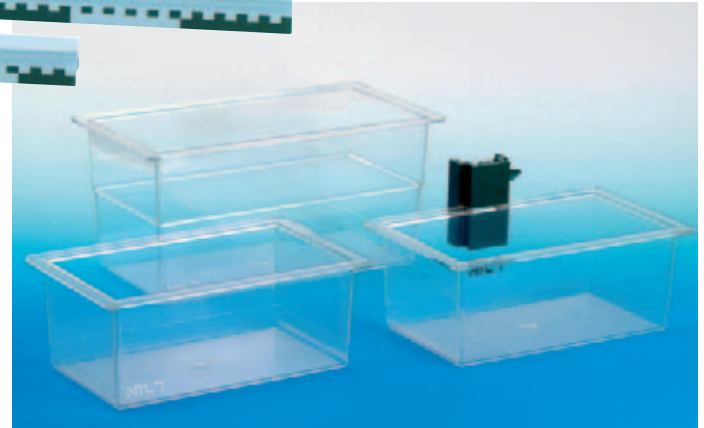


Stand rail with scale

Universal rail of special aluminium profile, light blue powder-coated, with green scale divided in blocks. For use together with the demo dynamics trolley, DM300-2A, or as a track for ball bearings 60 mm in diameter, DM360ff, or, together with a pair of saddles on rail bases, DS102-2F, as a long stand base

DS101-1B Stand rail with scale, L=750 mm

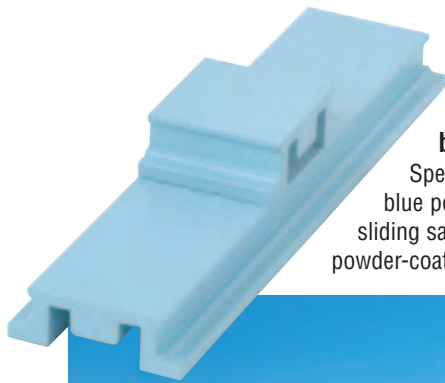
DS101-3B Stand rail with scale, L=1000 mm



C7447-1A Plastic pan
Dimensions: 300x150x150 mm

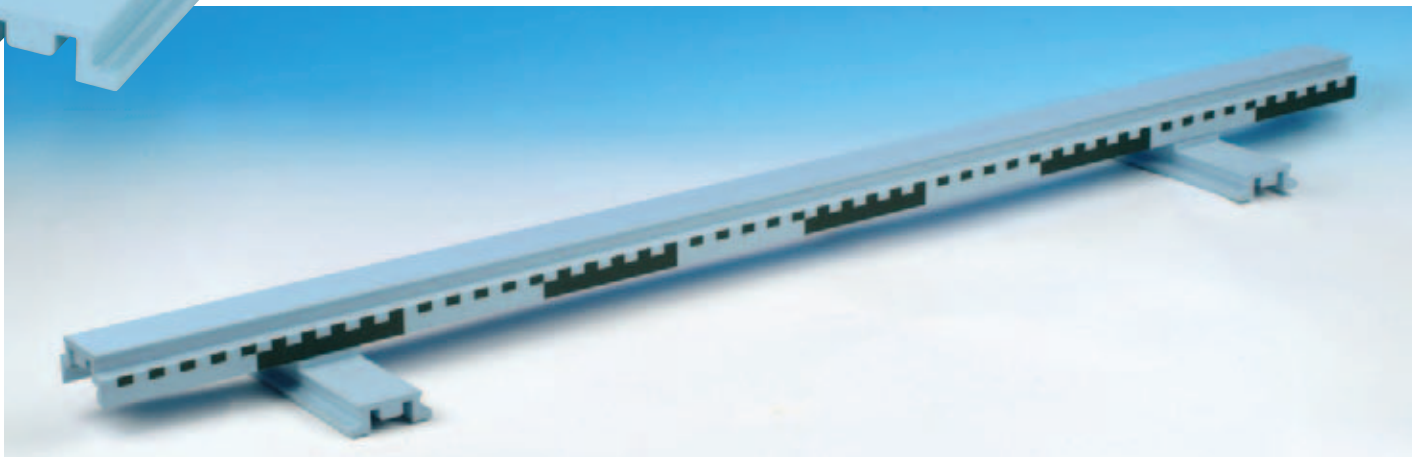
C7447-1B Plastic pan
Dimensions: 240x150x100 mm

C7447-2B Plastic pan on saddle
Dimensions: 240x150x100 mm

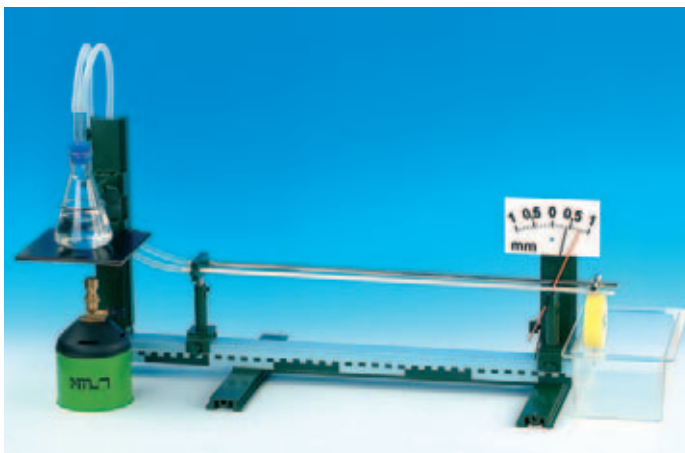


DS102-2F Sliding saddle on rail base

Special aluminium profile, light blue powder-coated, for fixing sliding saddles DS101ff, light blue powder-coated; length: 200 mm



Experiment: Long stand base, DS101ff with DS102-2F



Experiment: Longitudinal expansion metal tubes



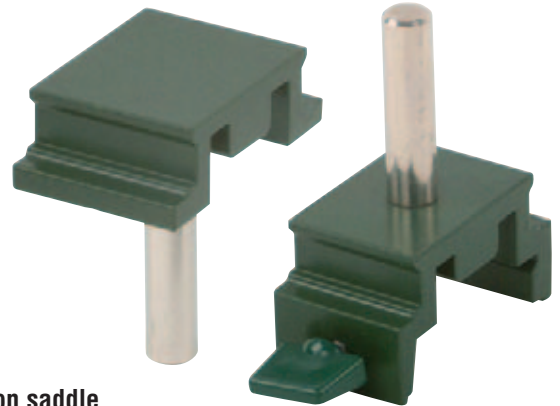
Experiment: Water propulsion



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Experiment:
Stability



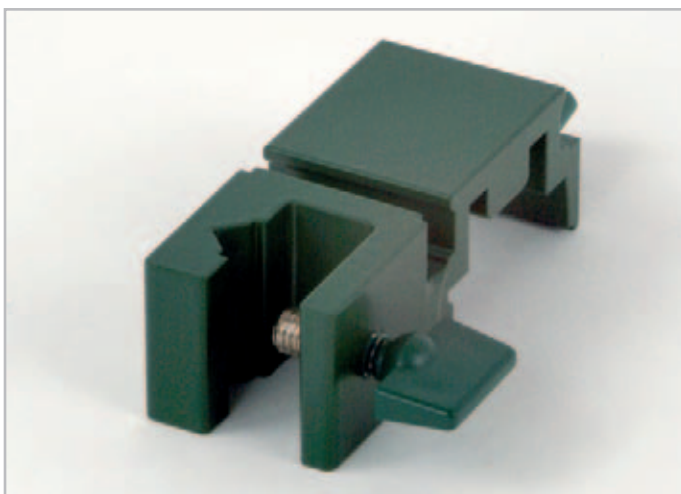
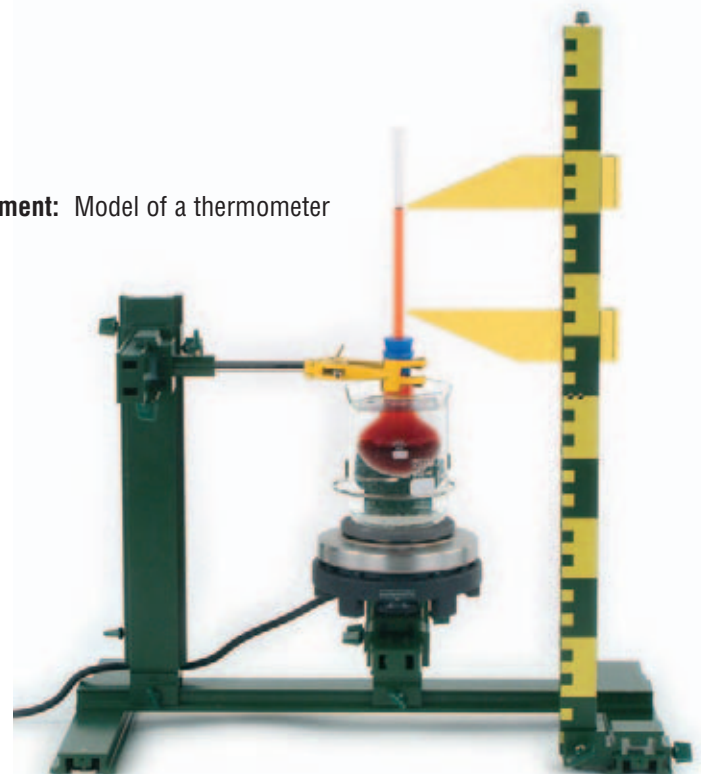
DS103-1H Support on saddle

Special aluminium profile with clamping screw on the side, may be set on and fixed to stand rails or used for holding stand rails on sliding saddles, DS103-ff, as a track; with a firmly attached support, D= 10mm; length: 40 mm

DS103-2H Rail holder on support

Special aluminium profile on support, 10 mm in diameter, for holding stand rails on saddles, DS103-ff, in an elevated position when used as a track or as an optics bench

Experiment: Model of a thermometer



DS400-2R Clamp on saddle

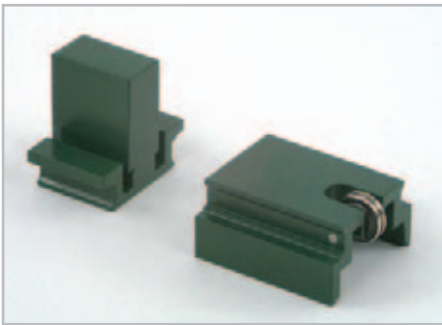
Special aluminium profile with clamping screw on the side for setting on and fixing to stand rails, an open clamp on the side with a clamping screw for holding rods up to 18 mm in diameter, square rods with a cross-section of up to 12x12 mm or plates with a maximum thickness of 15 mm in a vertical position.
Length: 35 mm



C7002-2A Universal clamp

Two adjustable, cork-lined clamping jaws on support; nickel-plated capstan-head screw. Maximum expansion: ca. approx. 80 mm; support 10 mm in diameter

stand and assembly systems

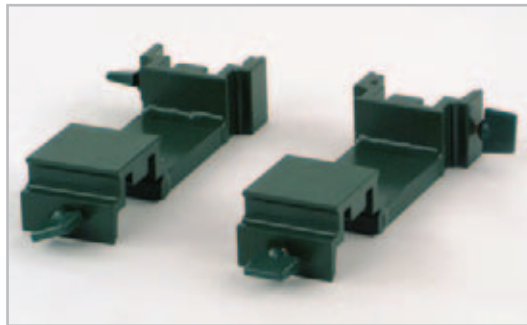


DS104-2G Sliding saddle with pulley

Special aluminium profile, pulley with groove on ball bearing, one clamping screw; for mounting at the end of a support rail or for extending support rails DS101ff in conjunction with rail connector DS101-2G when used as a track.

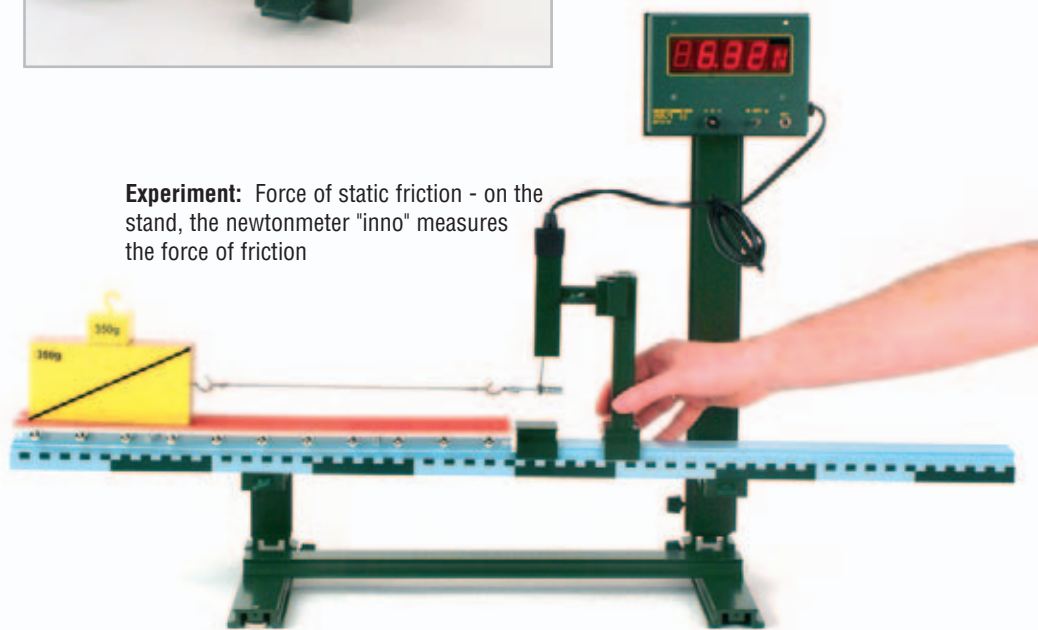
DM361-1K Ball stopper on base

Aluminium block with rubber pad mounted on rail base, made of special aluminium profile, used as stopper at end of track, mounted and fixed on support rail when used as a track.

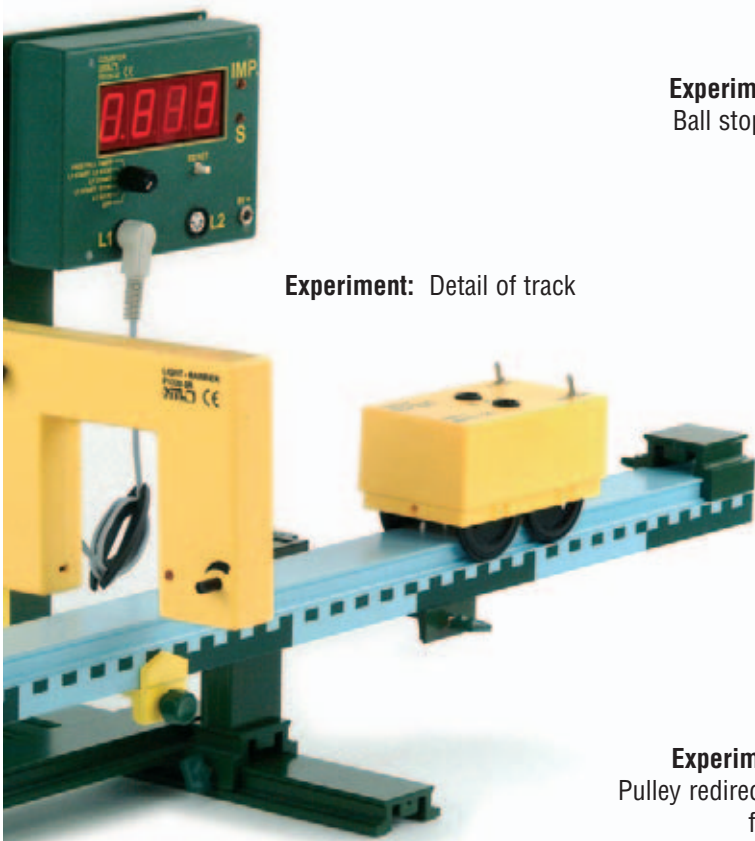


DS105-4G Rail holder, fixed

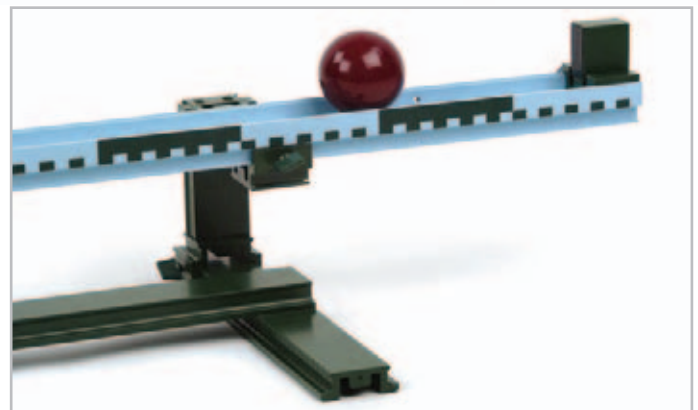
For holding stand rails at an adjustable height, e.g. with a track set on rail holders DS103ff and mounted on large support base DS101-1G or on assembly panel DS602-2A



Experiment: Force of static friction - on the stand, the newtonmeter "inno" measures the force of friction



Experiment: Detail of track



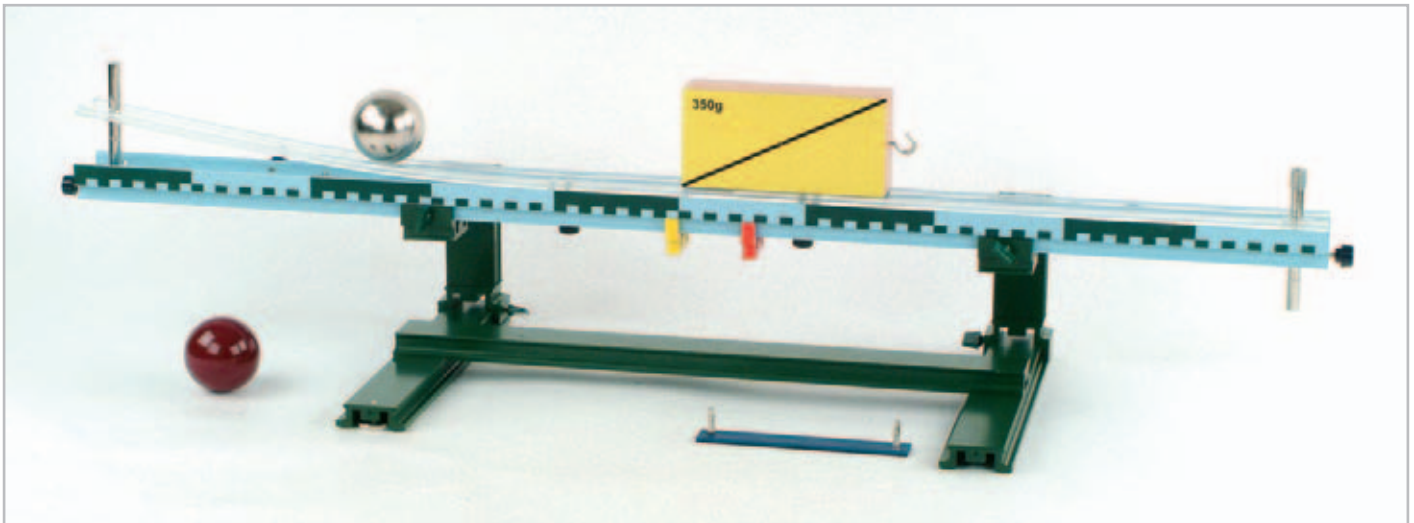
Experiment: Ball stopper



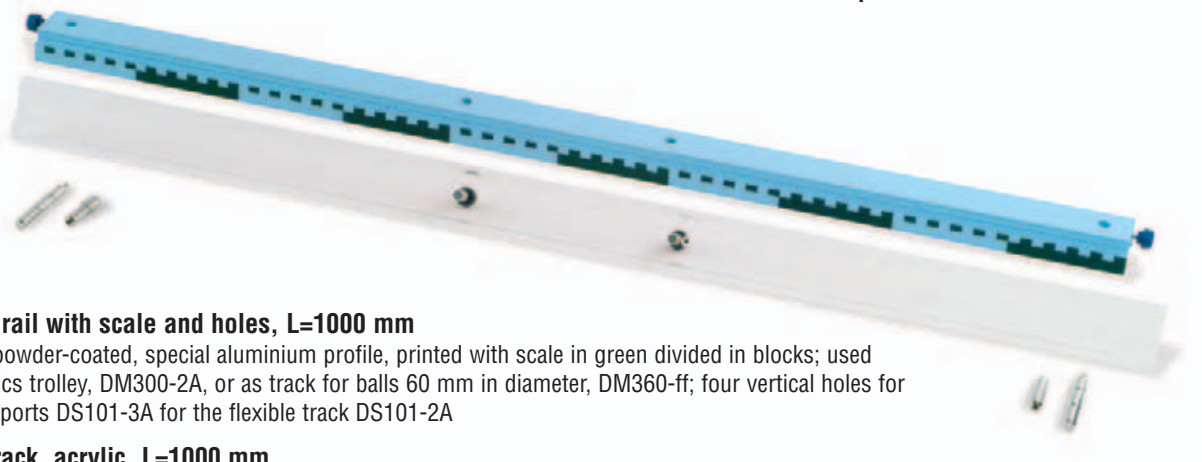
Experiment: Pulley redirecting force



stand and assembly systems



Experiment: Friction at work



DS101-4B Universal rail with scale and holes, L=1000 mm

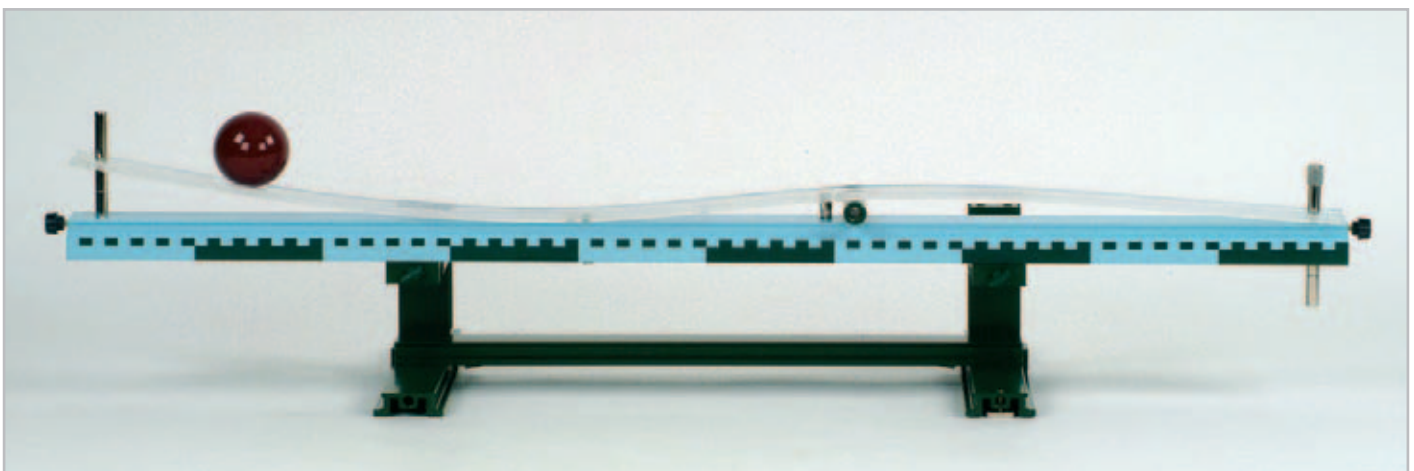
Universal rail of light-blue powder-coated, special aluminium profile, printed with scale in green divided in blocks; used together with demo dynamics trolley, DM300-2A, or as track for balls 60 mm in diameter, DM360-ff; four vertical holes for inserting and fixing the supports DS101-3A for the flexible track DS101-2A

DS101-2A Flexible track, acrylic, L=1000 mm

For use in experiments on non-uniform motion, conversion of "potential to kinetic energy" and "up- and downhill motion" of a trolley or ball bearing; flexible acrylic panel, 54 mm in width, with longitudinal grooves for demo dynamics trolley, DM300-2A, or ball bearings 60 mm in diameter, DM360-ff

DS101-3A Supports for fastening flexible track, set of 2

Two rods with engraved graduations for infinitely variable adjustment of the angle of inclination of the ends of the flexible acrylic track, DS101-1A, on the stand rail with scale and holes, DS101-4B



Experiment: Ball travelling "up- and downhill"

stand and assembly systems

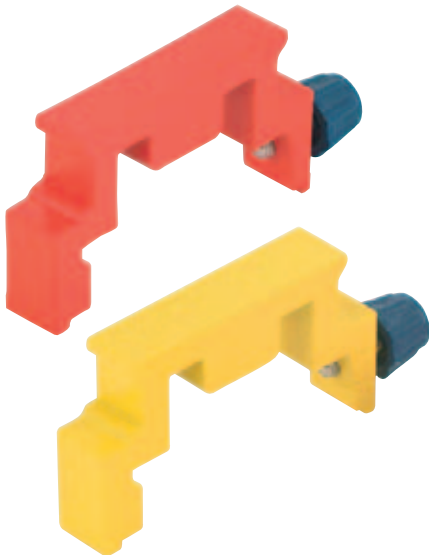


DS107-3D Track holder, rotatable, with degree scale

For holding and rotating stand rails by means of rail holders DS105-4G; aluminium disk attached to saddle made of special profile, with clamping screw for mounting on rail support stands DS103-ff using clamp saddle DS102-2G, on vertically arranged support rails or on the assembly panel DS602-2A; 160 mm in diameter, green powder-coated, printed with yellow degree scale; scale: 0° to 90°, left and right, in 5° graduations



Experiment: Inclined plane



Marking sliders

For marking positions along stand rails DS101ff when used as a track for balls; with a clamping screw; special aluminium profile 10 mm in width

DS105-1G Marking slider, yellow powder-coated

DS105-1R Marking slider, red powder-coated



Experiment: Inclined track