



electrical conductivity in liquids



P3710-1R MBC Junction box with 10 + 4 sockets

Magnetic "compact" module in yellow ABS; junction with ten 4-mm and four 2-mm sockets
Dimensions: 84x84x39 mm

P3325-2A Electrodes, set

Seven flat electrodes, each labelled with a chemical element sign; 2 x Zn, 2 x Pb, 1x Cu,

1 x Fe, 1 x Me;
Electrode size: 65x25 mm; 2 carbon rods (65x5 mm)

P3711-4K Clamping socket with plug

Clamping socket with a threaded pin for accepting 4-mm safety plugs; may be screwed onto a screw mounted on a 4-mm plug; 4-mm through hole; nickel-plated brass; D=12 mm Total length without plug: 48 mm

P3911-3D Crocodile clip, plain metal, with 4-mm plug



Experiment: Series of experiments on voltage ("compact" system)



C6115-2B Battery tank

Glass tank for electrolysis experiments; dimensions: 105x105x100 mm

C7118-1B Electrode plate holder

Slotted acrylic plate; for securing electrode plates C7122-ff and C7123-ff
Dimensions: approx. 106x85 mm

Electrode plates

Flat electrodes with a 4-mm device socket
Dimensions: 85x45 mm

- C7122-1A Electrode plate, lead
 - C7122-2A Electrode plate, iron
 - C7122-3A Electrode plate, zinc
 - C7122-4A Electrode plate, copper
 - C7122-5A Electrode plate, carbon
 - C7122-8A Electrode plate, aluminium
 - C7122-6A Electrode plate, nickel
- Dimensions: 85x25 mm



Experiment: Voltaic cell using two electrode plates (copper and zinc)

electrochemistry



C7118-2A Electrode rod holder

An insulated holder for connecting electrode rods up to 8 mm in diameter; acrylic block with two insulated metal cylinders mounted on a support; six 4-mm holes; three 8.2 mm holes with fixing screws on the side; support length: 120 mm

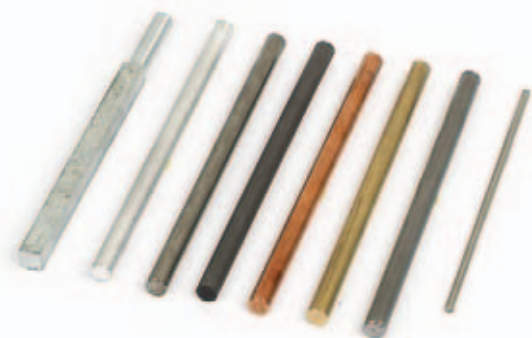
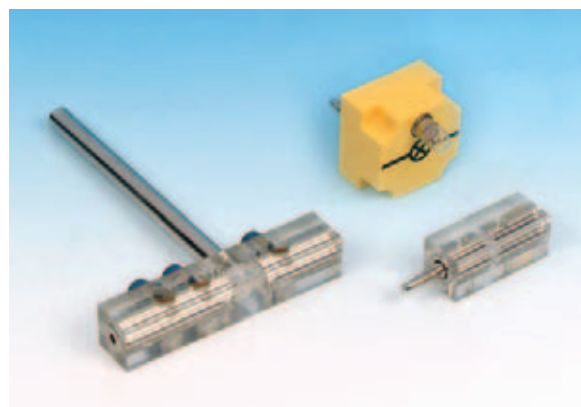
C7118-2B Electrode rod holder accessory

For expanding the uses of electrode rod holder C7118-2A, and particularly for mounting E10 light bulb socket plug-in component P3910-2B; acrylic block with two insulated metal cylinders; with a 4-mm plug and three 4-mm holes; block Dimensions: 40x20x20 mm

P3910-2B Lamp socket E 10 plug-in component

Plug-in component in an ABS plastic case; includes E10 light bulb socket and two 4-mm plugs 19 mm apart; suitable for electrode rod holder C7118-2A and electrode rod holder C7118-2B

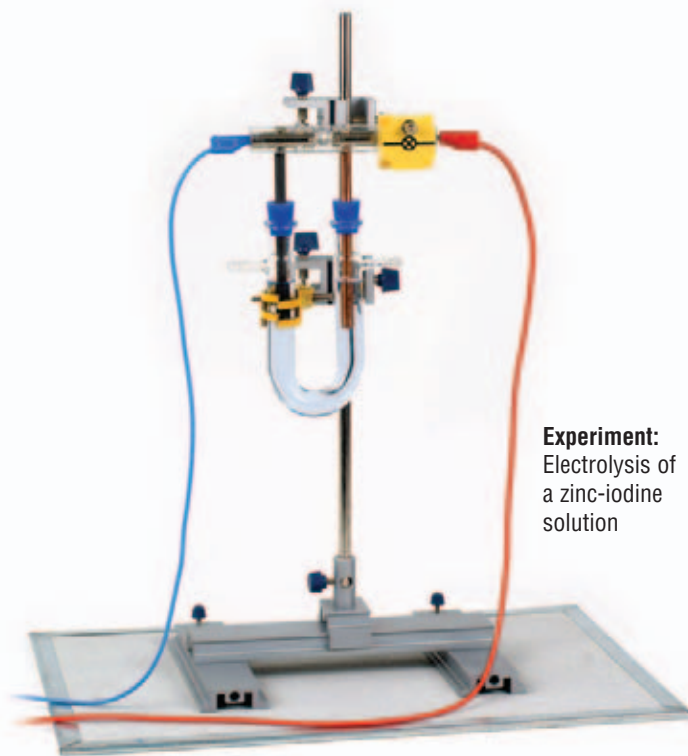
Case dimensions: 40x40x27 mm



Electrode rods

For experiments in the conductivity of liquids as well as for various other electrochemistry experiments; length: 150 mm, D=8 mm

- C7124-1A Electrode rod, lead
- C7124-2A Electrode rod, iron
- C7124-3A Electrode rod, zinc
- C7124-4A Electrode rod, copper
- C7124-5A Electrode rod, carbon
- C7124-7A Electrode rod, brass
- C7124-8A Electrode rod, aluminium
- C7124-6A Electrode rod, nickel, Length: 130 mm, diameter: 3,2 mm



Experiment:
Electrolysis of
a zinc-iodine
solution

C9900-4E SEK Electrochemistry

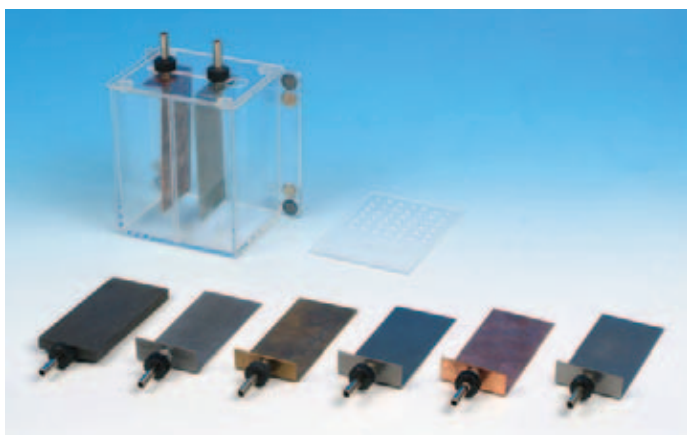
consisting of:

- C7118-2A 1x Electrode rod holder
- C7118-2B 1x Electrode rod holder accessory
- P3910-2B 1x Lamp socket E 10 plug-in component
- P3320-1I 1x Light bulb, 10 V/50 mA, E10
- C7124-6A 2x Electrode rod, nickel
- C7124-4A 1x Electrode rod, copper
- C7124-5A 2x Electrode rod, carbon
- DE921-3A 1x Holder with plug pin
- P3310-1A 1x Crocodile clip, plain metal
- C3082-4C 1x U-tube with adapter piece, SB 19/26
- C1000-1B 1x Glass beaker, 100 ml, short
- P7130-4B 2x Stopper silicone, 17/22/25 mm, 1 hole
- P3310-3B 2x Connecting lead, 50 cm, blue
- P3310-3A 1x Connecting lead, 50 cm, red
- P7806-1A 1x Storage box, small
- C7806-4E 1x Box insert SE - electrochemistry





electrochemistry



C6115-1E Electrolytic tank "inno"

Acrylic tank; two grooves on the inside surface for inserting a separating sieve; four strong neodymium magnets on the rear panel for mounting the tank on a metal panel
Dimensions: 130x120x85 mm

C6115-2T Separating sieve

Acrylic plate with holes; for insertion in electrolytic tank C6115-1E
Dimensions: 80x114 mm

C7118-1B Plate electrode holder

Slotted acrylic plate; for securing electrode plates C7122-ff and C7123-ff; dimensions: approx. 106x85 mm

Electrode plates "inno"

C7123-1A Electrode plate, lead, 100x45 mm
C7123-2A Electrode plate, iron, 100x45 mm
C7123-3A Electrode plate, zinc, 100x45 mm
C7123-4A Electrode plate, copper, 100x45 mm
C7123-5A Electrode plate, carbon, 100x45 mm
C7123-6A Electrode plate, brass, 100x45 mm



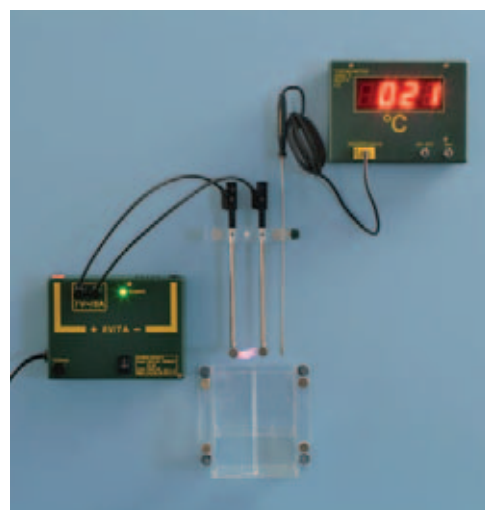
Experiment:

Conductors and non-conductors: liquids; ("inno" system) - magnetic panel assembly



Experiment:

Model of an immersion heater ("inno" system) - magnetic panel assembly



DE330-1H Heating element "inno"

Two I-shaped rods connected by a coil of resistance wire and 4-mm jacks mounted in an acrylic block; a hole in the side of the block and clamping screw allow the mounting of a thermo-sensor; two strong neodymium magnets on the back side for mounting the unit magnetically
Power: approx. 60 Watt
Length: approx. 160 mm

C7120-1A Hoffmann apparatus

For the electrolysis of water; two graduated glass tubes with a stopcock and one glass tube with a levelling tube; volume: 50 ml each; length: approx. 560 mm

Electrodes for electrolysis apparatus

Pair of electrode rods with SB 19 stoppers and 4-mm jacks

C7120-3A Carbon electrodes for C7120-1A, pair

C7120-3B Platinum electrodes for C7120-1A, pair

electrochemistry



DE715-4E Electricity set 4, electrochemistry "inno"

consisting of:

- C6115-1E 1x Electrolytic tank "inno", 130x120x85 mm
- C6115-2T 1x Separating sieve, 80x114 mm
- C7118-1B 1x Plate electrode holder
- C7123-1A 2x Electrode plate, lead, 100x45 mm
- C7123-2A 1x Electrode plate, iron, 100x45 mm
- C7123-3A 1x Electrode plate, zinc, 100x45 mm
- C7123-4A 1x Electrode plate, copper, 100x45 mm
- C7123-5A 2x Electrode plate, carbon, 100x45 mm
- C7123-6A 1x Electrode plate, brass, 100x45 mm
- DE330-1H 1x Heating element "inno"
- DE451-1F 1x Flat spring, short, L=160x20 mm
- DE451-2W 1x Bimetallic strip with wolfram contact, 153x12 mm
- DE451-3W 1x Contact pin with jack, L=140 mm
- DE453-2V 4x Screw post, magnetic
- DT202-1T 1x Thermocouple element, simple
- P7806-1B 1x Storage box, large
- P7810-4E 1x Box insert electricity set 4



Experiment: Charging and discharging a lead cell ("inno" system) - magnetic panel assembly



DE722-1L Conductivity meter "inno"

Demonstration instrument for measuring electrical conductivity of liquids; very easy to transport and magnetically mountable; the 26-mm LED display showing the measured value and the 20-mm LED display for the measurement unit allow precise readings to be taken even at a great distance

Technical data:

Display: 3 1/2-digit LED display; digit height 26 mm

External sensor for measurement (not included)

Measuring ranges: 20, 200 µs; 2, 20, 200, 2000 ms

Accuracy: approx. 1 %

4-mm safety jacks for connecting the conductivity electrode

"Slope" adjustment knob for setting the display to zero

Throw switch: ON/OFF

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 400 g

Required accessory:

C4100-1D Conductivity electrode

Recommended accessories:

P3120-6N Mains transformer 6V/500 mA

P3120-5B S-shaped assembly platform



Experiment: Measuring the conductivity of water, with and without table salt, and of an electrolyte beverage



pem fuel cells



DT771-1R Reversible fuel cell

Compact, yet powerful fuel cell coupled with an electrolyser unit; when supplied with energy the unit produces oxygen and hydrogen for powering the fuel cell; two 4-mm jacks for energy input and output; may be mounted directly on trolley with motor DM300-1A using bracket DT771-1B; working voltage: 1.4 ... 1.8 V
Current: 0 ... 500 mA; H₂ production: max. 3.5 ml/min;
Gas storage volume: 15 ml each; dimensions: 87x70x80 mm

DT771-1B Pair of brackets for reversible fuel cell

Two metal brackets, yellow powder-coated, with 4-mm pin plugs, for securing reversible fuel cell DT771-1R on trolley with motor DM300-1A



Detail: Reversible fuel cell with two brackets mounted on the trolley with motor



DT770-1B Fuel cell experiment set, small

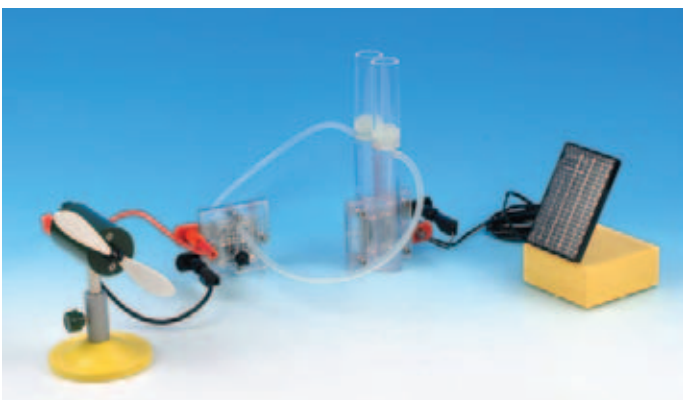
Apparatus set consisting of:

PEM fuel cell, small:

For generating electricity from oxygen and hydrogen, gases supplied by gas pressure cans C9010-ff or the PEM electrolyser
Voltage: 0.4 ... 0.9 V; current: max. 1000 mA
Dimensions: 90x50x65 mm

PEM electrolyser, small:

For producing oxygen and hydrogen from distilled water; gases can be fed directly to the fuel cells by means of silicone hoses
Storage capacity: 10 ml each of H₂ and O₂;
Working voltage: 1.4 ... 1.8 V
Current: 0 ... 500 mA; H₂ production: max. 3.5 ml/min;
Dimensions: 90x56x195 mm



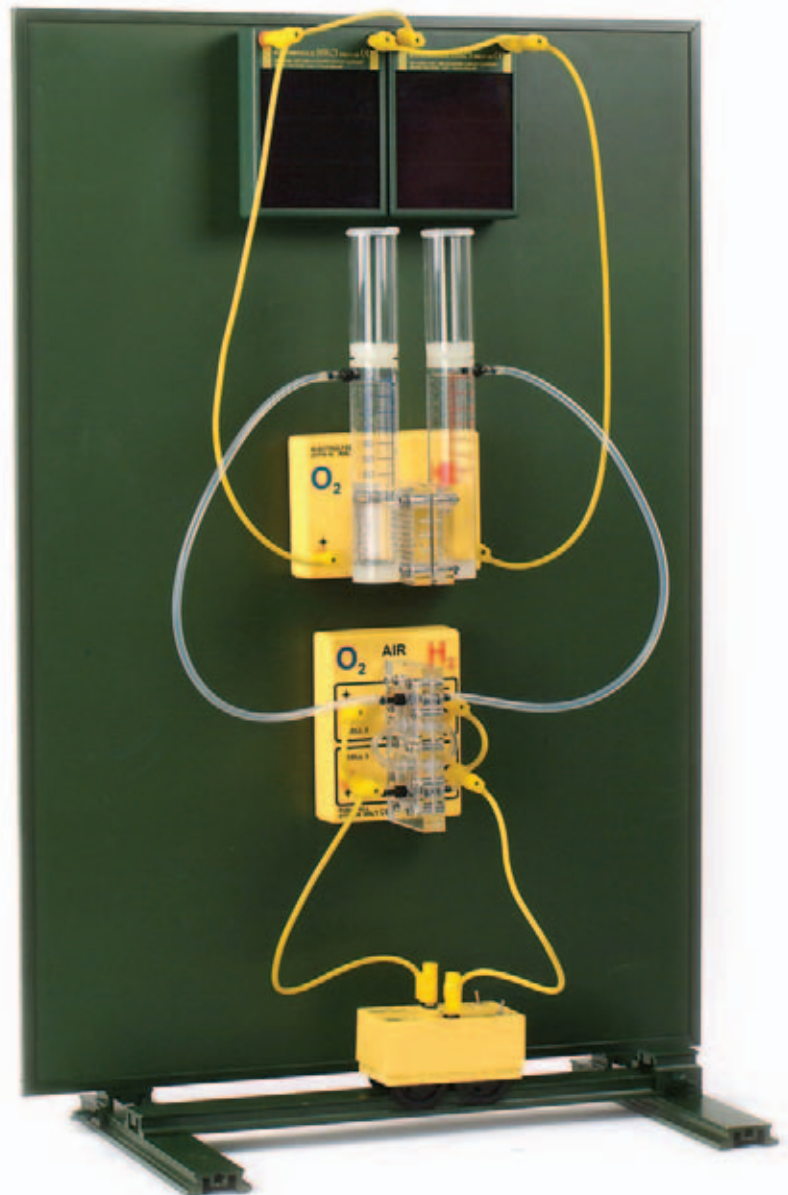
Combination of experiments: Radiation energy is converted into electrical energy - oxygen and hydrogen are produced in the electrolyser - electrical energy, generated using H₂ and O₂, powers wind generator on support DM311-2M

pem fuel cells



DT775-1B Fuel cell unit "inno"

Double PEM fuel cell for generating electrical energy from oxygen and hydrogen; gases supplied by gas pressure cans C9010-ff or electrolyser unit "inno" DT775-1E; cells may be operated parallel or in series; unit mounted on a magnetic "inno" component base; two safety jacks for energy output
 Membrane surface: 2x 10 cm², parallel voltage: 0.4 ... 0.9 V
 Series voltage: 0.8 ... 1.8 V; parallel current: max. 4000 mA
 Dimensions: 120x125x160 mm



DT775-1E Electrolyser unit "inno"

Powerful PEM electrolyser for generating oxygen and hydrogen from distilled water; gases can be fed directly to fuel cell unit "inno" DT775-1B by means of small silicone hoses; mounted on magnetic "inno" component base; two safety jacks for energy input
 Membrane surface: 25 cm²; working voltage: 1.4 ... 1.8 V
 Current: 0 ... 4000 mA; H₂ production: approx. 28 ml/min;
 Gas storage volume: 65 ml each; dimensions: 160x135x285 mm

Experiment:

Deriving electrical energy from hydrogen for powering trolley with motor
 DM300-1A - magnetic panel assembly
 For information on solar modules see page 246



electrical conductivity in gases



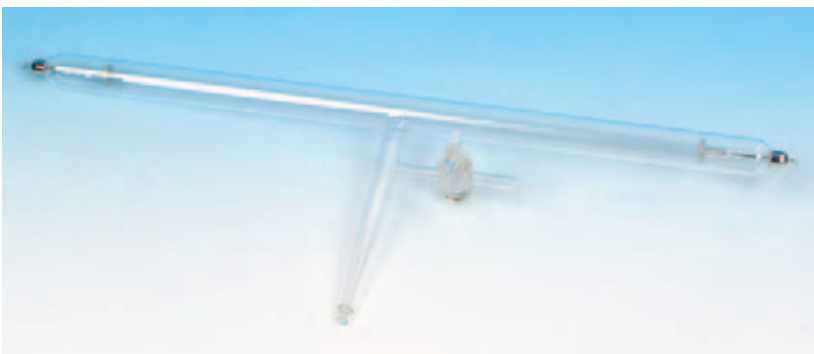
DE798-1B Funny ball

Intriguing fun: as soon as you touch the contact plates on the back of the ball with your fingers, the ball blinks and buzzes - the human body as a conductor!
Plastic ball with two contact plates and a smiley face; D=40mm.



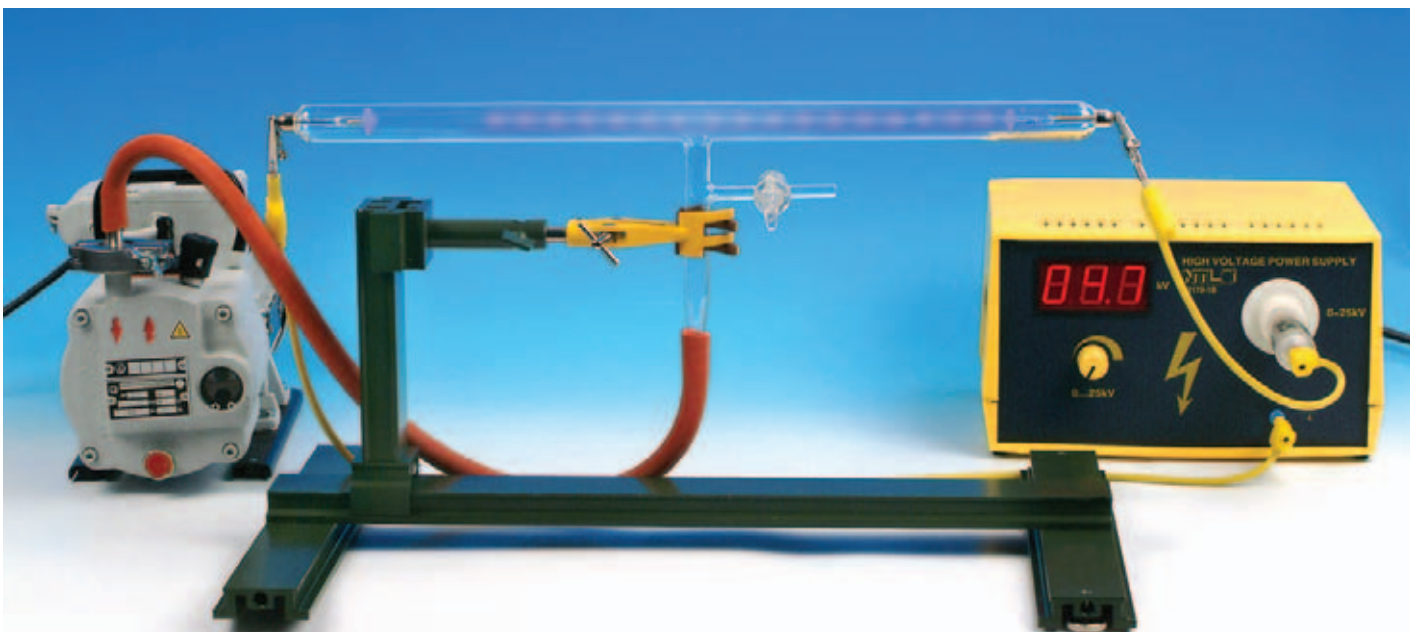
DE798-1L Energy-saving lamp

Intriguing fun: the bulb lights up as soon as you touch the base and contact plate with your fingers - the human body as a conductor!
Plastic body and metal base; H=100 mm, D=55 mm



DE453-3P Vacuum discharge tube (Pohl type)

For demonstrating how pressure affects the glow in a gas discharge tube; Glass tube with two electrode discs mounted on metal caps, hose fitting and vacuum valve on the side
Tube length: approx. 500 mm;
Tube diameter: approx. 25 mm



Experiment: Glow during gas discharge is dependent on pressure

electrical conductivity in gases



DE798-1E Plasma globe
Glass bulb filled with gas under low pressure; the glow is caused by the strong electrical field generated by the high-voltage transformer in the plastic base; diameter of the globe approx. 100 mm
Power supply: 12 V DC (transformer included)



Experiment: Deflecting the flashes resulting from the gas discharge by influencing the external field



Experiment: Demonstrating the presence of an electrical field using a neon lamp

DE453-3S Cathode ray tube with slit
For demonstrating deflection of cathode rays in a magnetic field; electrodes mounted on metal caps, plastic base
Length: approx. 300 mm; diameter: approx. 50 mm

Recommended power supply
for cathode ray tubes
(see page 264 for technical details)

P3171-1A High-voltage power supply, 10 kV, with digital display, "demo"

or:

P3127-1V High-voltage power supply, 18 kV, "inno"

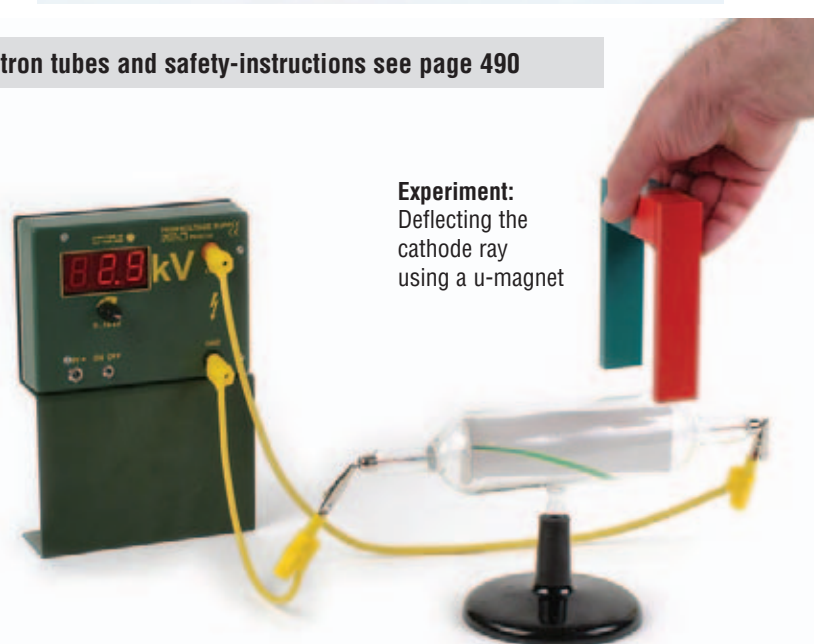


Further electron tubes and safety-instructions see page 490



DE453-3K Cathode ray tube with Maltese cross
For demonstrating the linear propagation of

cathode rays; tube with electrodes mounted on metal caps, metal cross may be folded down, plastic base
Length: approx. 200 mm; diameter: approx. 80 mm



Experiment: Deflecting the cathode ray using a u-magnet



electrical conductivity in gases



DM851-1Z Tube accessory on saddle, rectangular

Acrylic tube mounted on a slider; used as a protective cover for the electrodes of the Jacob's ladder or as an accessory for particle motion model DM851-1T (see page 163)

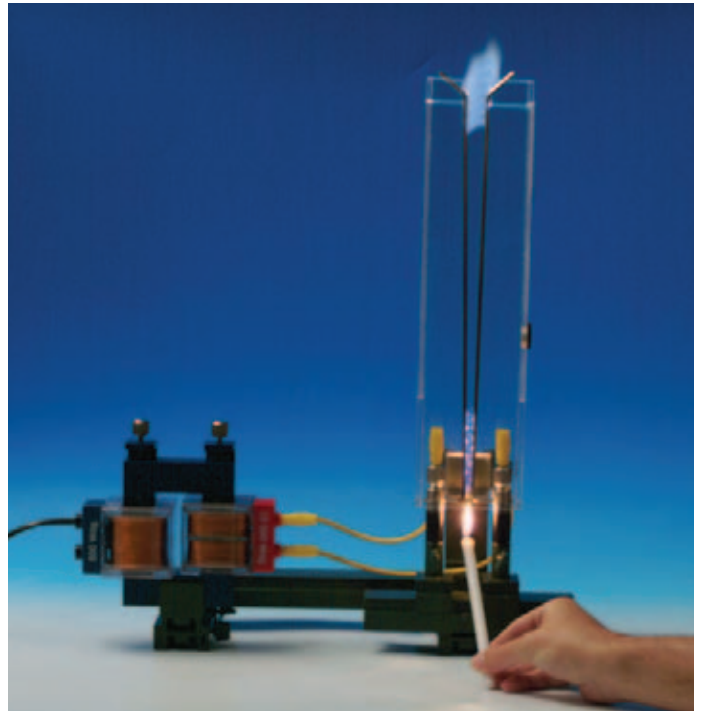
Dimensions (inside): 90x60x400 mm

DE453-2K Carbon electrodes, set

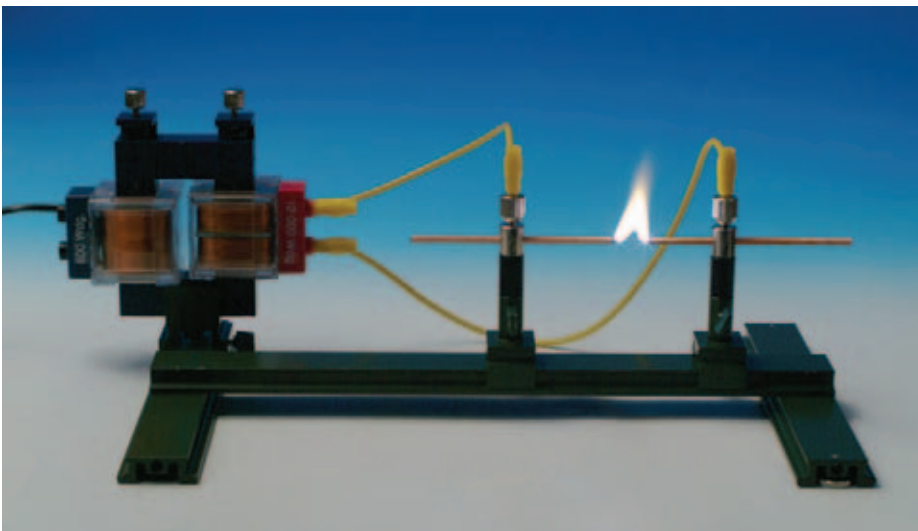
Carbon electrodes for the "arc discharge" experiment; set of 10, L=200 mm, D=5 mm

DE453-2E Electrodes for Jacob's ladder, pair

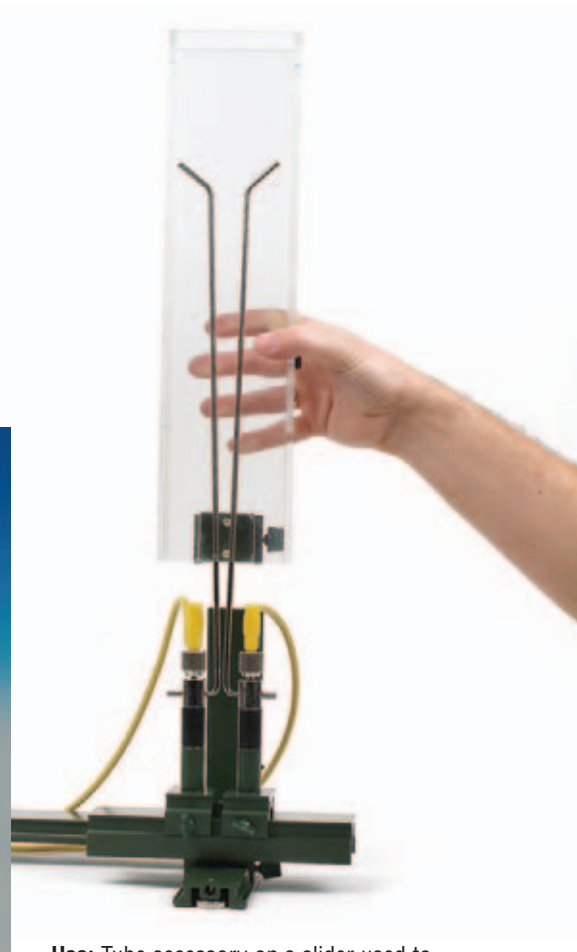
For demonstrating how an arc travels upward along electrodes; may be mounted in screw posts DS406-2N; Length: 400 mm



Experiment: An arc travelling upward between two electrodes



Experiment: Model of an arc lamp (arc discharge)



Use: Tube accessory on a slider used to cover the electrodes of the Jacob's ladder