

High Voltage Power Supply 10 kV (230 V, 50/60 Hz)	1019234
High Voltage Power Supply 10 kV (115 V, 50/60 Hz)	1020138

Instruction sheet

03/16 SD



1. Safety instructions

The high voltage power supply 10 kV conforms to all safety regulations for electrical measuring, control, monitoring and laboratory equipment, as specified under DIN EN 61010, Section 1, and the equipment has been designed to meet protection class II. It is intended for operation in a dry environment, suitable for the operation of electrical equipment and systems.

Safe operation of the equipment is guaranteed, provided it is used correctly. However, there is no guarantee of safety if the equipment is used in an improper or careless manner.

If it may be assumed for any reason that non-hazardous operation will not be possible (e.g. visible damage), the equipment should be switched off immediately and secured against any unintended use.

In schools and other educational institutions, the operation of the power supply unit must be supervised by qualified personnel.

- Before using the power supply unit for the first time, confirm that the specifications printed on the rear side of the housing are compatible with the local mains voltage.
- Before using the power supply unit for the first time, check the housing and the mains lead for any damage. In the event of any malfunction/operational defect or visible damage, switch off the unit immediately and secure it against unintended use.
- The instrument may only be connected to the mains via a socket that has an earth connection.
- Before making any connections, check the experiment leads for damaged insulation and exposed wires.
- Replace a faulty fuse only with one matching the specifications stated at the rear of the housing.
- Disconnect the equipment from the mains before replacing a fuse.
- Never short the fuse or the fuse holder.
- Never cover the air vents in the housing. This is necessary in order to ensure sufficient circulation of air required for cooling the internal components of the equipment.
- The equipment may only be opened/repared by qualified and trained personnel.

2. Description

The high voltage power supply 10 kV is a universally usable non-earthed high voltage source for experiments on electrostatics or for operating electron tubes.

It provides a continuously variable stabilized high voltage with passive current limitation, that is safe to handle. It also incorporates a transformer, insulated against high voltage, to supply the cathode

heater voltage for an electron tube. A temperature-controlled fan protects the equipment from overheating.

The 1020138 high voltage power supply is for operation with a mains voltage of 115 V ($\pm 10\%$), and the 1019234 unit is for operation with a mains voltage of 230 V ($\pm 10\%$).

3. Operating elements



Fig. 1 Operating elements

- 1 High voltage regulator
- 2 Voltage display
- 3 Heater voltage output
- 4 Earthing socket

5 Changeover switch display

With the changeover switch the display can be switched between high voltage outputs:

0 ... +5 kV: for display of the high voltage between the "0" and "+" sockets

-5 ... +5 kV: for display of high voltage between the sockets "-" and "+"

0 ... - 5 kV: for display of high voltage between the sockets "0" and "-"

6 High voltage output

7 Mains on/off switch

8 Fuses

9 Voltage selector switch

10 Fan

4. Technical data

Mains voltage:	115 / 230 V AC \pm 10%, see rear of housing
Mains frequency:	50 / 60 Hz
Fuses:	115 V: 2x 1 A slow-blow, 230 V: 2x 0.5 A slow-blow
High voltage output:	0 – 10 kV DC, max. 2 mA
Heater voltage output:	6.3 V AC, max. 3 A, high voltage resistant up to 10 kV
Overload protection:	Primary fuse: see rear of housing Secondary protection: current-limiting resistors
Terminals:	4 mm safety sockets
Display:	digital
Display precision:	1% + 2 digits
Ambient temperature:	5°C to 40°C
Max. relative humidity:	80 %
Dimensions:	240x220x90 mm ³ approx.
Weight:	2.1 kg approx.

Electromagnetic compatibility:

Interference emission: EN 55011:2009

Interference resistance: EN 61326-1:2013

Electrical safety:

Safety specifications: EN 61010-1:2010

Transformer: Safety isolating transformer according to DIN EN 61558-2-6

Protection class: 2

Contamination level: 2

Protection type: IP20

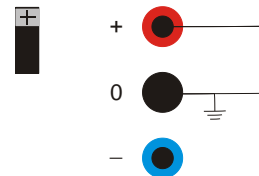
5. Operation

5.1 General information

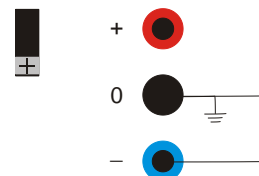
- Before switching on the power supply, set the high voltage regulator to zero (turn fully to the left).
- Connect the power supply to the experimental setup.
- Do not switch the power supply on until the experiment has been fully assembled.
- Changes to the experimental setup must only be made with the power supply switched off.
- Set the high voltage regulator to give the required voltage.
- Before switching off the power supply, set the high voltage regulator to zero again (turn fully to the left).

5.2 Voltage tap

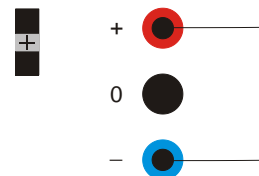
- To tap a high voltage of +5 kV, connect the positive pole to the red socket "+" and the negative pole to the black socket "0". Connect the black socket to the ground.



- To tap a high voltage of +5 kV, connect the positive pole to the black socket "0" and the negative pole to the blue socket "-". Connect the black socket to the ground.



- To tap a high voltage of 10 kV, connect the positive pole to the red socket "+" and the negative pole to the blue socket "-".



- To tap heating voltage for experiments with electron tubes, connect the heating filaments to the sockets of the heating voltage output.

5.3 Changing the fuse

- Turn off the power switch and unplug the mains plug.
- Pry out the fuse holder on the rear of the power supply using a flat-head screwdriver (see Fig. 2).
- Use the screwdriver from the side of the mains euro socket.
- Replace the fuse and reinsert the holder in its socket.

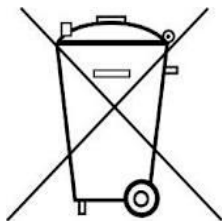


Fig. 2 Changing the fuse

6. Storage, cleaning and disposal

- Keep the power supply unit in a clean, dry and dust free place.
- Always unplug the mains plug before cleaning.
- Do not clean the unit with volatile solvents or abrasive cleaners.
- Use a soft, damp cloth to clean it.
- The packaging should be disposed of at local recycling points.

Should you need to dispose of the equipment itself, never throw it away in normal domestic waste. If being used in private households it can be disposed of at the local public waste disposal authority.



- Comply with the applicable regulations for the disposal of electrical equipment.

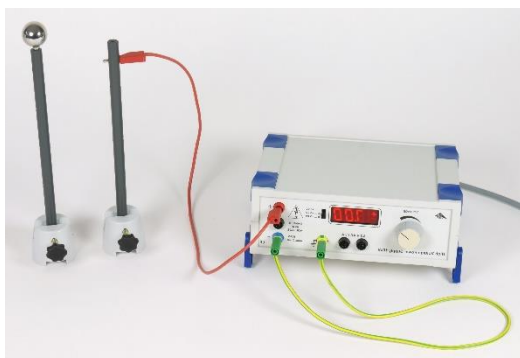


Fig. 3 Set-up for charging up the sphere

7. Example applications

7.1 Determining the capacitance of a sphere in free space

Additionally required:

1 Electrometer @ 230 V	1001025
or	
1 Electrometer @ 115 V	1001024
1 Electrometer Accessories	1006813
1 Analogue Multimeter Escola 30	1013526
1 Drilled Rod	1002710
2 Barrel Foot, 1 kg	1002834
Experiment Leads	

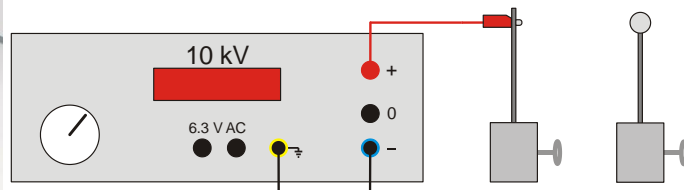
The experiment set-up for this experiment comprises 2 parts. Fig. 2 is the set-up for electrically charging up a sphere, Fig. 3 shows how the electrometer is connected to measure the charge.

7.2. Set-up for investigating how electrons are deflected in an electrical field using the electron deflection tube D

Additionally required:

1 Electron Deflection Tube D	1000651
1 Tube Holder D	1008507
1 High Voltage Power Supply E 5 kV @ 230 V	1013412
or	
1 High Voltage Power Supply E 5 kV @ 115 V	1017725
1 Set of Experiment Leads for Electron Tube Experiments	1002847

The high voltage power supply unit 10 kV is used to power the plate capacitors in the tube.



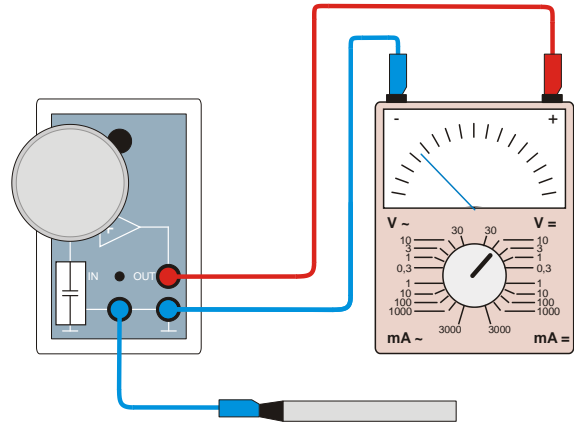
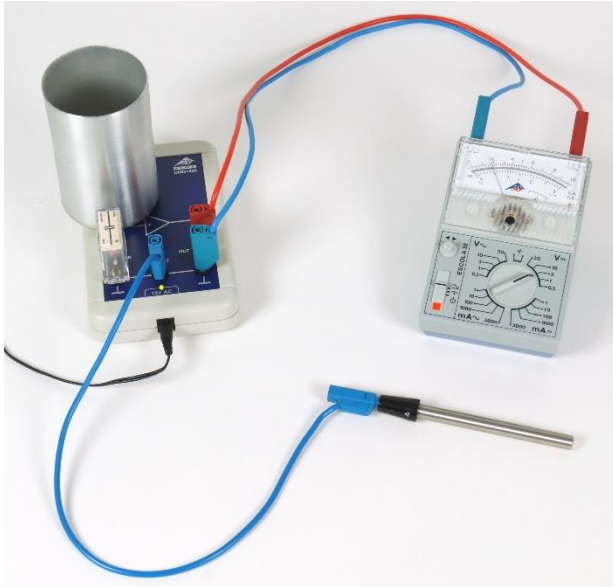


Fig. 4 Set-up for measuring electrical charge

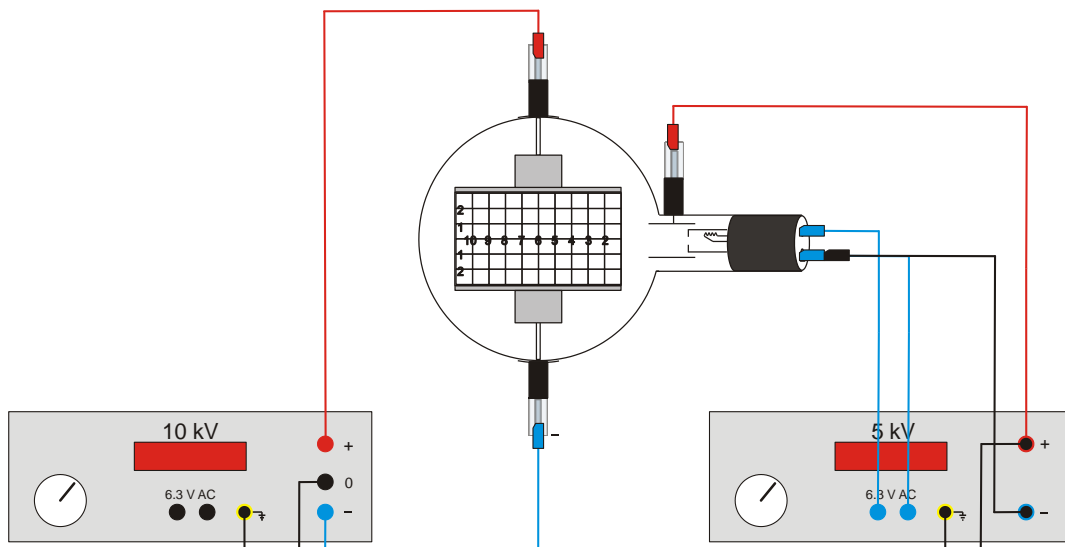
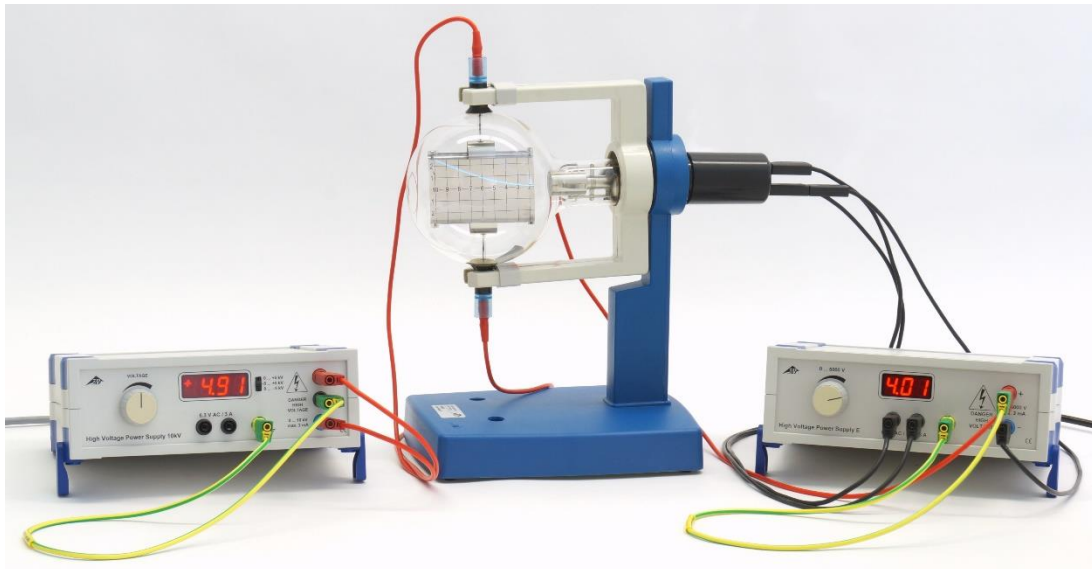


Fig. 5 Set-up for investigating the deflection of electrons in an electric field using the electron deflection tube D

