



Kit for Equipotential Lines

13029.88

Operating Instructions



1 SUPPLIED ITEMS

The kit for equipotential lines consists of the following parts:

1 Grid Plate 16cm x 21cm	13002.00
2 Universal Holder	13024.13
1 Polycarbonate Plate	13027.05
1 electrode Kit with Holder	13027.24
consisting of:	
1 electrode holder	
1 straight electrode	
1 ring electrode	
2 round electrodes	
2 Knitting Needles	06342.00
3 Crocodile Clips	07274.03
1 Special Carbon Paper (enough for 30 times)	13027.29
1 Storage Box	13029.05

2 PURPOSE AND PROPERTIES

This kit enables the investigation of various electric fields using only a low electrode voltage (10V). The position of the equipotential lines and their separation relative to one another enables conclusions to be drawn about the properties of electric fields. The smaller the separation between the equipotential lines, the higher the electric field strength. The field lines always run perpendicular to the equipotential lines.

No electrolyte is required for the experiments. Special carbon paper is used as a flat resistive surface and it is placed on a firm, insulating polycarbonate plate. The points having the same voltage are found using a special probe (knitting needle) and are marked on the carbon paper with pencil or printed on a sheet of white paper using carbon copy paper. The voltage measurement must be made with a high resistance measurement instrument ($R_i = 10 \text{ M}\Omega$).

3 OPERATION

Fig. 2 shows the experimental arrangement.

- Place the two universal holders onto the perforated plate so that the polycarbonate plate (upright format) is located in the intervening space.
- Completely unscrew the screws from both holders and screw the electrode holder tight using the screws.
- Place a piece of carbon paper 130mm x 100mm on the polycarbonate plate.
- Place two electrodes on the carbon paper and press down uniformly and firmly with the knurled screws.
- Draw the outlines of the electrodes on the carbon paper, loosen the knurled screws slightly and withdraw the carbon paper again.
- Carefully fill in the marked fields with a soft pencil. The graphite gives an improved contact between the electrodes and the carbon paper.
- Push the carbon paper into its original position underneath the electrodes again and tighten the knurled screws uniformly.
- Apply a DC voltage of 10V to the electrodes using the crocodile clips.
- Measure the voltage between the measuring probe (knitting needle) and the reference electrode with a high resistance digital multimeter ($R_i = 10 \text{ M}\Omega$).
- Mark the points with the same potential (equal voltage) on the carbon paper with a sharp pencil.

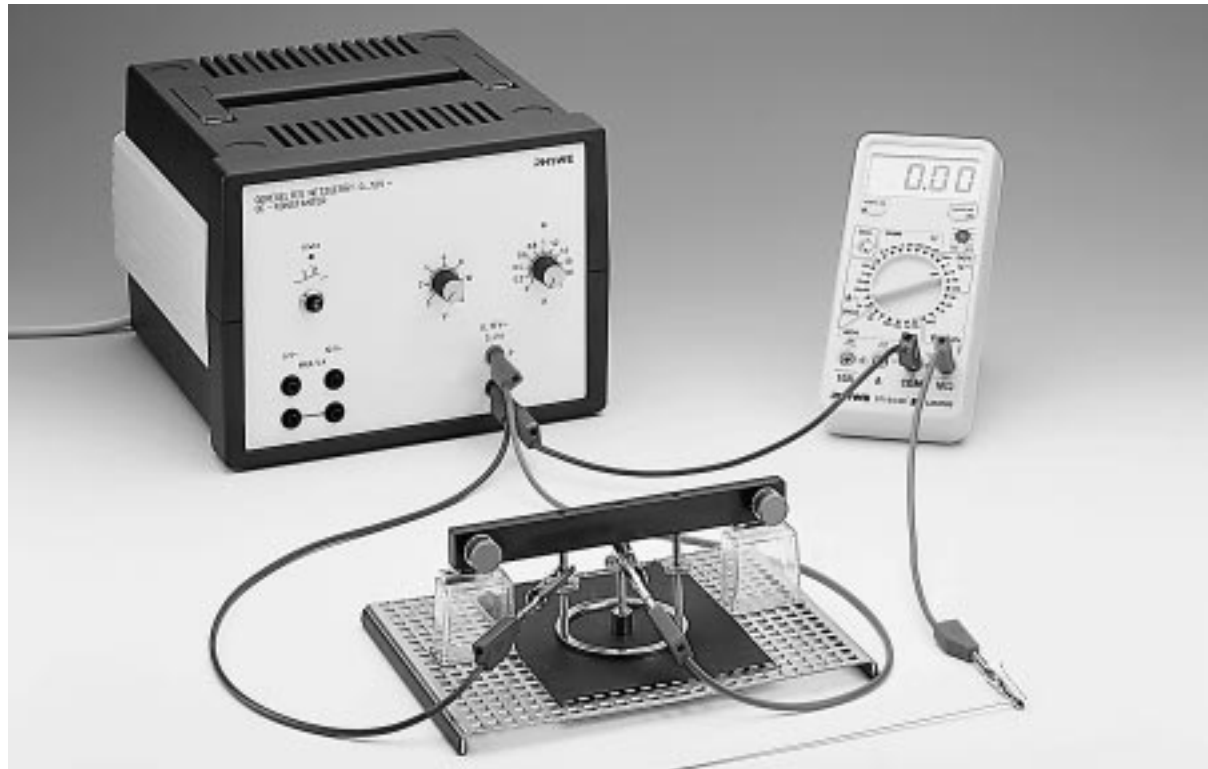


Fig. 2: Experimental arrangement for the measurement of equipotential lines

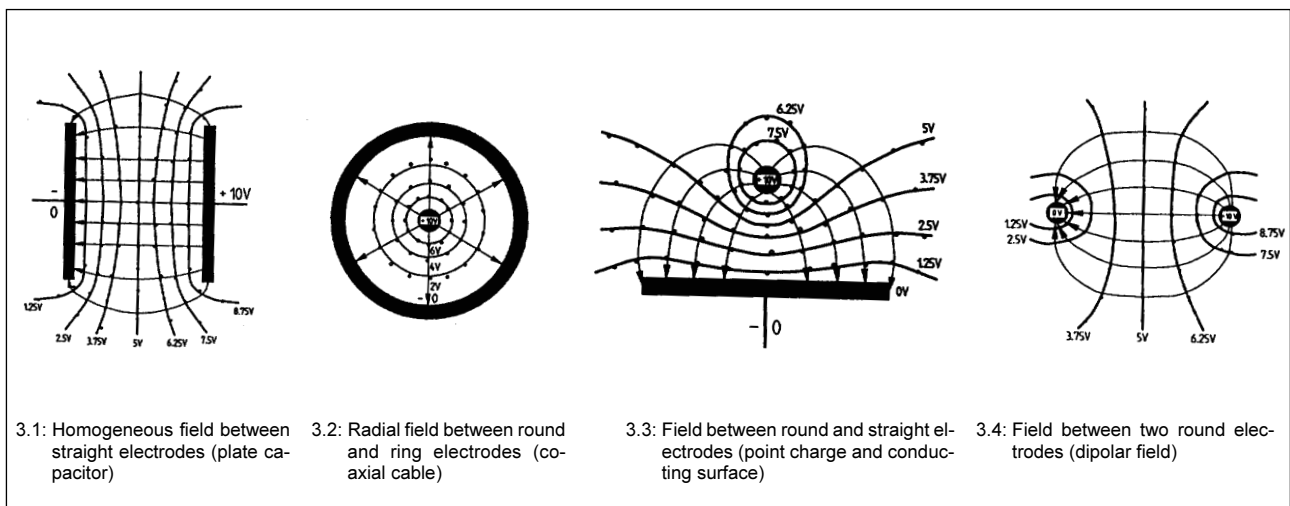


Fig. 3: Equipotential lines and field lines of various field

- Loosen the electrodes and withdraw the carbon paper.
- Join the points having the same potential with lines (equipotential lines).
- Draw lines at a uniform distance, perpendicular to all equipotential lines (field lines).

4 MATERIAL LIST

Kit for Equipotential Lines	13029.88
Power Supply 0...12VDC/2A, 6VAC, 12VAC/5A	13505.93
Digital Multimeter	07134.00
Connecting leads (4x)	

Consumable material:
Special Carbon Paper

13027.29

Note:

1. If the fields that have been measured are unsymmetrical, then the contact between the electrodes and the carbon paper should be checked. Press the electrodes down more firmly or use a softer pencil for the contact surfaces.
2. If carbon copy paper and white paper are placed between the carbon paper and the polycarbonate plate, the measuring points can be pressed onto the white paper with the knitting needle. The carbon paper can be reused a number of times.