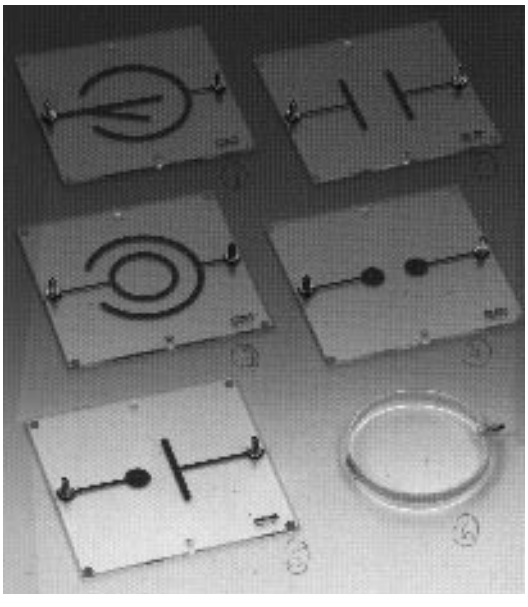
Field line unit

06251.88

Operating Instructions



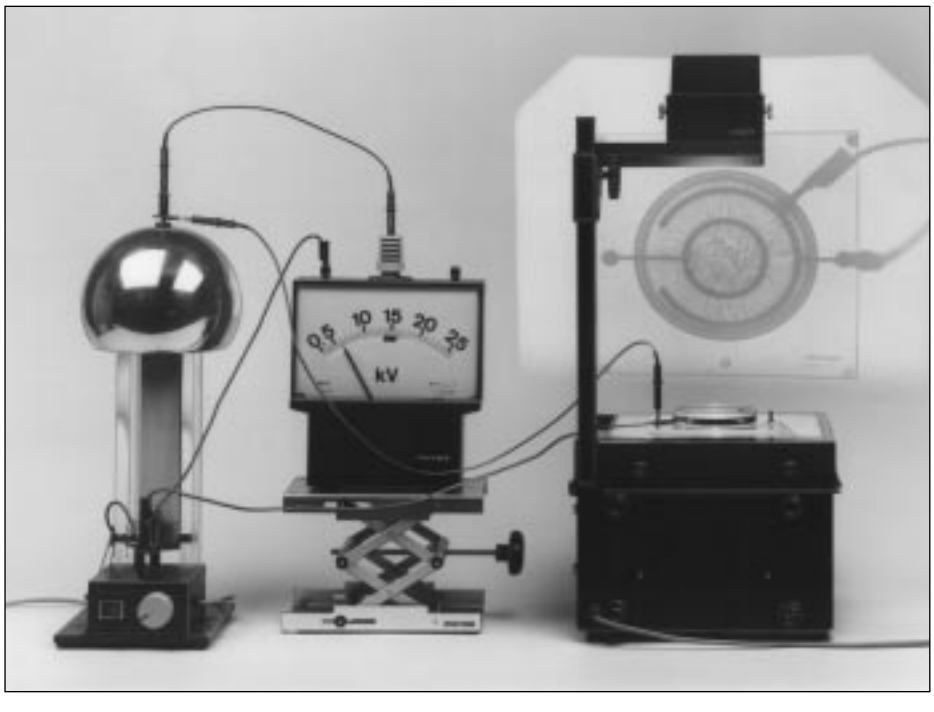
1 PURPOSE AND DESCRIPTION

A spatial electric situation can be described as a model by means of field lines. The field line unit allows to show the course of such electric field lines for different kinds of electrodes and to display them with an overhead projector. The list of accessories delivered with field line unit 06251.88 is found in section 5.1.

The electrodes are impressed as thin, wear resistant conducting layers onto Plexiglas plates and are fitted with 4 mm connecting sockets. The round flat cuvette which is placed on the used electrode plate is filled with castor oil in which grains of semolina are regularly distributed. When a voltage is applied to the electrodes, these grains shift to form chains along the field lines. The cuvette has a ring shaped electrode which can be earthed if necessary. The fact that the electrodes themselves are not submerged in the castor oil assures a fast and clean exchange of electrodes.

2 HANDLING

The Plexiglas plate with the electrode configuration which is to be used is laid on the working pad of the overhead projector. The cuvette with castor oil is placed onto the electrode plate (fill to about 0,5 cm) and a certain amount - not too many - grains of semolina are strewn on the castor oil and distributed uniformly through stirring. High voltage of 25 kV is required to operate the field line unit. This is obtained from high voltage power supply 13671.93. It is recommended to use 30 kV connecting cables (cf. list of accessories). Van de Graaff generator 07643.93 can also be used as a high voltage power supply; in this case, it is absolutely necessary to install a static 26 kV voltmeter 11151.00 in parallel, as this contains a sphere spark-gap, which surely avoids higher voltages than 30 kV. Fig. 2 shows an experimental set-up with a Van de Graaff generator.



Indication:
The connecting socket of the cuvette may not be placed immediately above conducting paths on the underlying Plexiglas plate (danger of flashover!).

3 SERVICING

After the experiments, the cuvette must be emptied and washed with a normal detergent; a dried mixture of castor oil and semolina is difficult to remove. If necessary, the Plexiglas plates may also be carefully cleaned. In this case, strong rubbing of the electrodes must be avoided.

Caution: high voltage of more than 30 kV destroy the electrodes.

4 EXPERIMENTING LITERATURE

Physik in Demonstrationsversuchen,	
7.-10. Schuljahr, Ausgabe A/B, Band Elektrik	01141.31
Versuchseinheiten Physik,	
Das elektrische Feld 1	16100.01

5 ACCESSORIES

5.1 List of accessories provided with 06251.88

Electroscope, model	06251.01
Plate capacitor, model	06251.02
Cylindrical capacitor, model	06251.03
Two spheres, model	06251.04
Sphere before a capacitor plate, model	06251.05
Cuvette	06251.06

5.2 To carry out experiments

Semolina, 250 g	06255.00
or grass seeds	
Castor oil, 250 ml	31799.27
or sanflower oil	
High voltage unit 0 ... 25 kV-	13671.93
or	
High voltage unit 0...10kV	13670.93
or	
Van de Graaff generator	07643.93
Static voltmeter 26 kV	11151.00
Connecting cable 30 kV, 500 mm	07366.00
Connecting cable 30 kV, 1000 mm	07367.00
Overhead projector	