

Wimshurst Machine

Instruction Manual

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Introduction:

The prime purpose of this product is to demonstrate the production of static charge by moving insulators. The principal components are two counter-rotating plastic plates with metal foils and a manual drive. Also provided are conducting brushes, metal supports, discharge spheres and two Leyden jars. Turning the handle provided causes the plates to rotate and the apparatus to act as an electrostatic generator. High voltages are produced, accompanied by small currents.

Preparation of apparatus (before use):

The apparatus will not work if damp. Ten minutes at a safe distance from an electric fire is sufficient to remove all condensation and to ensure perfect working.

Method of use:

The two Leyden jars (which act as capacitors) can be connected or disconnected from the main generator by depressing or raising the two outermost insulated levers. Also their outer

foils can be connected to earth (if required) via the two 4 mm sockets on the base board.

With the jars disconnected, the generator will produce a continuous spark between the smaller spheres. This spark can be lengthened by moving the spheres apart. On bringing the jars into circuit, this spark becomes intermittent and small lightning flashes are formed.

Investigations and safety:

The breakdown voltage for air is of the order of kilovolts per centimetre. Hence touching the apparatus even inadvertently can cause an unpleasant (but usually non-dangerous) shock.

However anybody using heart pacemakers are advised not to approach the apparatus.

The maximum voltage generated can be estimated by moving the discharge knobs apart until a spark is no longer produced. As a rough guide, and dependent on atmospheric and other conditions, voltages in the high kilovolt range are produced. However, a student attempting to produce very high voltages might find that the static charge will “wander” elsewhere and give a shock.

Remember that the Leyden jars act as capacitors (charge stores). Thus charge might still be present on the apparatus after use and can still give an annoying shock.

The use of conventional voltmeters and ammeters with this apparatus is generally to be discouraged as the voltages generated will be sufficient to cause insulation breakdown.