

What is going on ?

1. AC generator (Step 2) : As the armature rotates in the magnetic field the two continuous rings also rotate with the armature. The two brushes (brass strips) which are in turn connected to the galvanometer through aluminum sockets, keep contact with rotating rings. When the armature starts rotating, it cuts magnetic field lines and according to Fleming's right hand rule the induced currents are set up in the armature. In the first half rotation the effective induced current flows in one direction. In the next half rotation, the faces of the armature are reversed in the magnetic field, as a result current the current induces in opposite direction. Thus after every half rotation, the polarity of the current changes. Such a current is called an alternating current. This type of device is called an AC generator.

2. DC generator (Step 3) : In this arrangement the split ring act as a commutator. As the armature moves, one brush is at all times in contact with the wire moving up in the field, while the other is in contact with the wire moving down in the field. Therefore we get unidirectional current. Such a current is called direct current and the device is called DC generator.



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In the years of 1831–1832, Michael Faraday discovered the operating principle of electromagnetic generators. The principle, later called Faraday's law.

Hippolyte Pixii (1808–1835) was an instrument maker from Paris, France. In 1832 he built an early form of alternating current electrical generator, based on the principle of magnetic induction discovered by Michael Faraday.



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AC/DC GENERATOR

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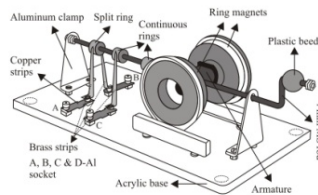
AC/DC GENERATOR

Conversion of mechanical energy in to electrical energy.

Assembly : Consists of an armature made from cast iron piece with MS rod fixed at its centre. One end of this 4mm rod is bent in 'U' shape and a small plastic bead is fixed to it. An insulated copper wire of 26 G is wound on the cast iron piece. The wire is wound to have 160 turns. The starting and end points of this copper wire are first soldered to the two continuous rings and then to the split ring fixed on the 4 mm rod (rings are made from brass and are fixed over a plastic bush). This coil with rings assembly is fixed on a 6 mm clear acrylic base using two aluminum clamps. Two strong ring magnets (Red and Blue coloured) which are fixed to the acrylic plates are mounted in line with each other on opposite sides of the coil and close to the coil. The magnets are mounted ensuring that opposite poles are facing each other. This provides magnetic fields. Four brass strips are fixed on the acrylic plate such that two are in line with each other on the opposite sides of the split ring and the other two are on the opposite sides of the two continuous rings. The top edges of the brass strips touch the rings. The lower ends of these brass strips are connected to the aluminum sockets (A,B,C&D) using copper strips as shown in the diagram. These brass strips act as carbon brushes and aluminum sockets are used to draw the current from the armature. Two banana pins with wire soldered are part of the kit.

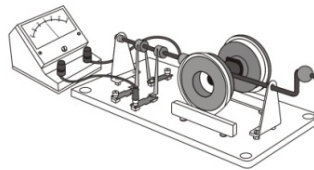


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To do and observe :

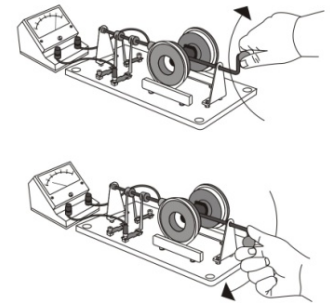
Step 1 : Put the banana pins with wire soldered in to the aluminium sockets C & D respectively as shown below and connect the free ends of the wire to the table galvanometer.



Step 2 : Now rotate the armature holding the plastic bead in clockwise direction as shown below. As you rotate the armature, you will notice that the galvanometer shows deflection on one side during first half rotation and in opposite direction during next half rotation. That is as armature completes one rotation, the galvanometer shows deflection on both sides from center zero.



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Step 3 : Now put the two banana pins into the aluminum sockets A and B respectively without removing galvanometer connections. As you rotate the armature you will notice that the galvanometer shows the deflection on only one side during both the half cycles.



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