MOTOR / GENERATOR SET – hand driven

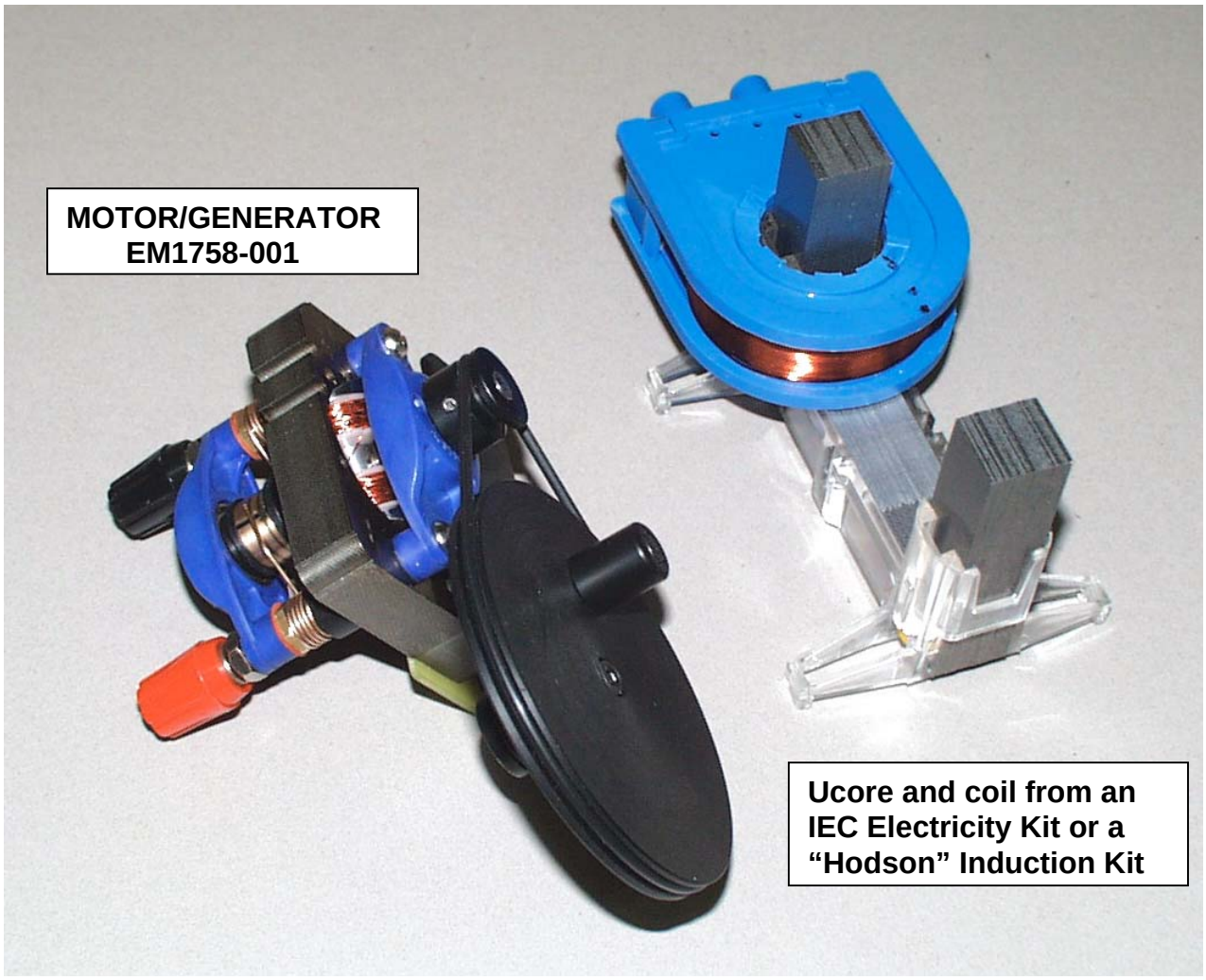
Cat: EM1758-001 hand driven motor/generator

DESCRIPTION:

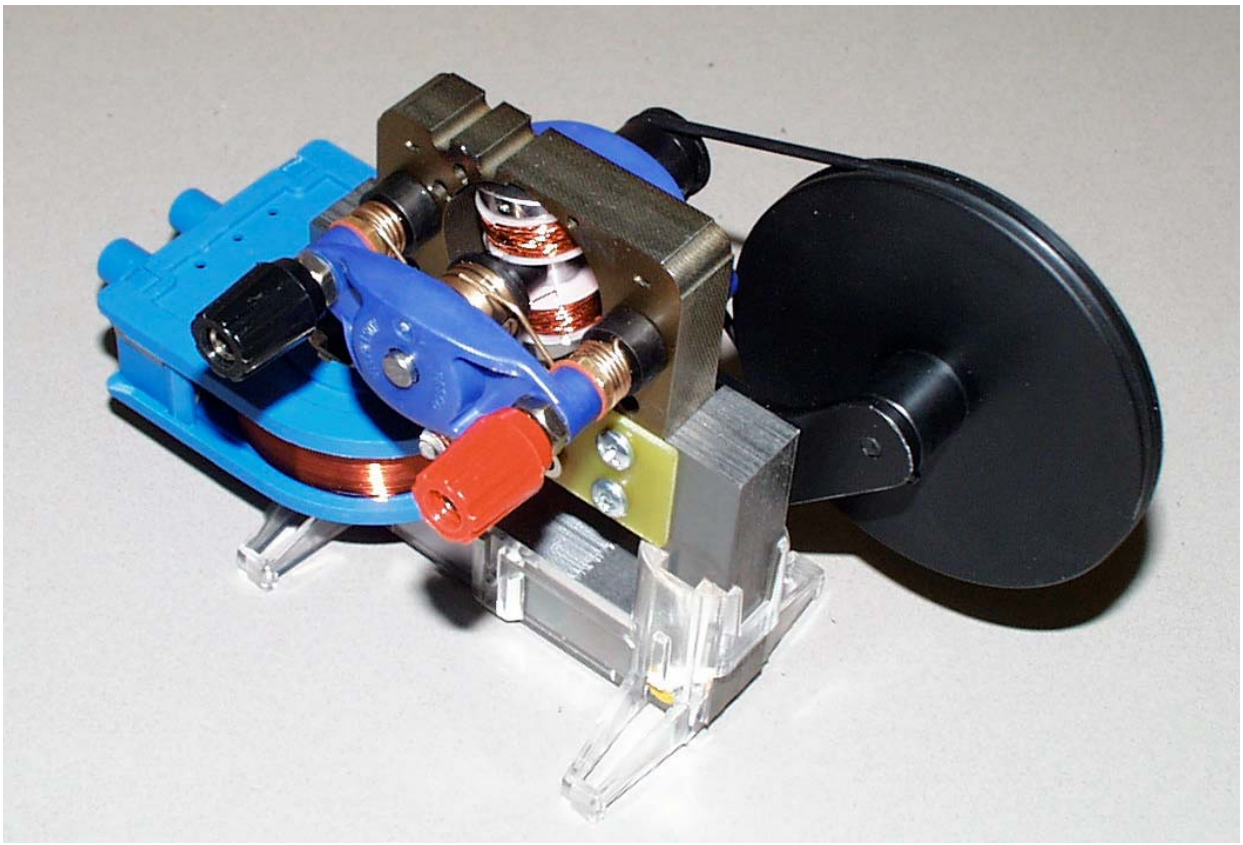
The IEC hand driven Motor / Generator is a precision, ball bearing motor with a 2 pole rotor and a 2 bar commutator. It can be run as a DC motor or it can be hand driven to be a DC generator. All parts of the motor are easily visible and the operation of the commutator and brushes can be studied. The commutator is self-lubricating to avoid squeaking and wear. It is strong and is designed to have a long life in the hands of students. When connected as a generator, an MES lamp is provided to illuminate as power is created.

To create the magnetic field through the motor, use the Ucore that forms part of the IEC Electricity Kit EM1763-001, the IEC 'Hodson" Induction Kit EM1973-001 or the IEC Small Dissectible Transformer EM4089-001. The motor/generator can be used also with permanent magnets.

EM1758-001 HAND DRIVEN MOTOR/GENERATOR

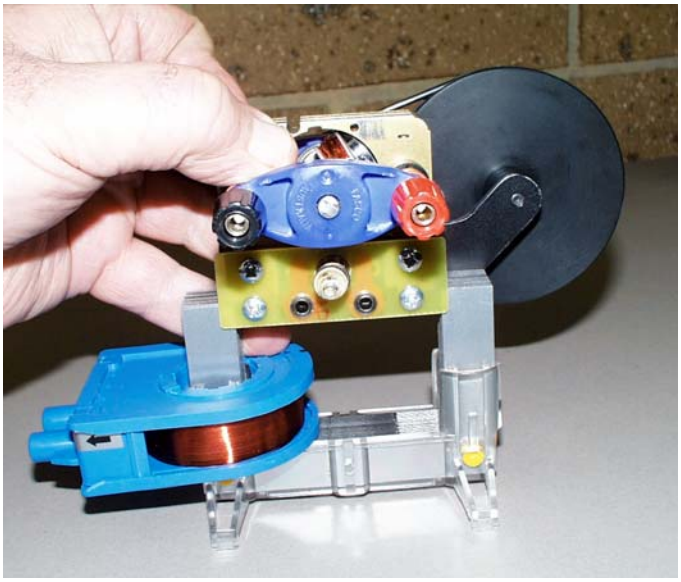


Physical size: 18x10x10mm LxWxH **Weight: 0.5 kg.**



MOUNTING THE MOTOR/GENERATOR::

The motor/generator is designed to slide between the legs of the standard IEC 'Hodson' Induction Kit iron Ucore fitted with a single 600 turn coil. This Coil and Ucore creates the field for the motor. When the motor is slid into place, it locates to sit firmly. 6V.DC. applied to the 600 turn coil produces enough DC magnetic field to run the motor or to generate electricity. See image below.



When being used as a generator, the lamp can be run by connecting the sockets beside the lamp socket to the output terminals of the generator.

If about 6V.DC. is applied to the field coil on the Ucore, and the handwheel turned briskly, the lamp will illuminate.

A voltmeter and ammeter can be used to measure the volts and amps coming from the generator.

When being used as a motor, apply about 6V.DC. to both the field and the armature in parallel. See below for notes on other possible connections.

CONNECTED AS A MOTOR:

As described above, the motor is slid between the legs of the IEC Ucore found in the IEC Electricity Kit, the IEC "Hodson Induction Kit or the IEC Small Dissectible Transformer.

6V.DC. is connected to the 600 turn coil on the Ucore and also connected to the terminals on the motor. The iron rotor is magnetised by the current flowing through the rotor coils from the brushes and commutator which reverses the direction of the current as the rotor turns so that the rotor continues to rotate. This is because the magnetic field in the rotor is repelled from one side of the motor and attracted to the opposite side of the motor upon each reversal of current direction through the rotor.

SHUNT CONNECTION: If the motor armature is connected in parallel with the field coil, it is called a 'shunt connection'. The currents passing through each device is independent of one another.

SERIES CONNECTION: The motor armature can be connected in series with the field coil and this is called a 'series connection'. In this case, the same current is passed through the field and the armature and, because the ohms resistance is now higher, a higher voltage (say up to 12V.DC.) can be applied to the system.

PERMANENT MAGNET: Alternatively, instead of using the Ucore, a few strong alnico magnets or super magnets can be placed on the edge of the motor's laminated iron core with north poles one side and south poles the other so that a DC magnetic field appears across the diameter of the motor. Using permanent magnets, the motor can be either mounted or held in the hand.

CONNECTED AS A GENERATOR::

The hand wheel and belt can run the rotor at a speed that will generate about 6V.DC. if about 6V to 8V.DC.is applied to the 600 turn field coil. If the lamp socket mounted on the generator is connected to the output of the generator, a lamp will glow as the handle is rotated briskly and about 4 to 6 V.DC. can be generated.

If permanent magnets are used, the output voltage when running as a generator will be about 2 volts.

CARE AND MAINTENANCE:

The bronze wire brushes that rub on the commutator can be adjusted for pressure. They are designed so that they are not easily bent or damaged by students, but if they should become bent out of shape they can be re-bent but the following points are important:

- The points of contact where the brushes touch the commutator should be EXACTLY opposite one another.
- By loosening the terminal and slightly loosening the screw through the motor, the plastic collar can be rotated slightly to alter the pressure of the brush to the commutator. Both brushes should be gently pressing on the commutator.

Designed and manufactured in Australia