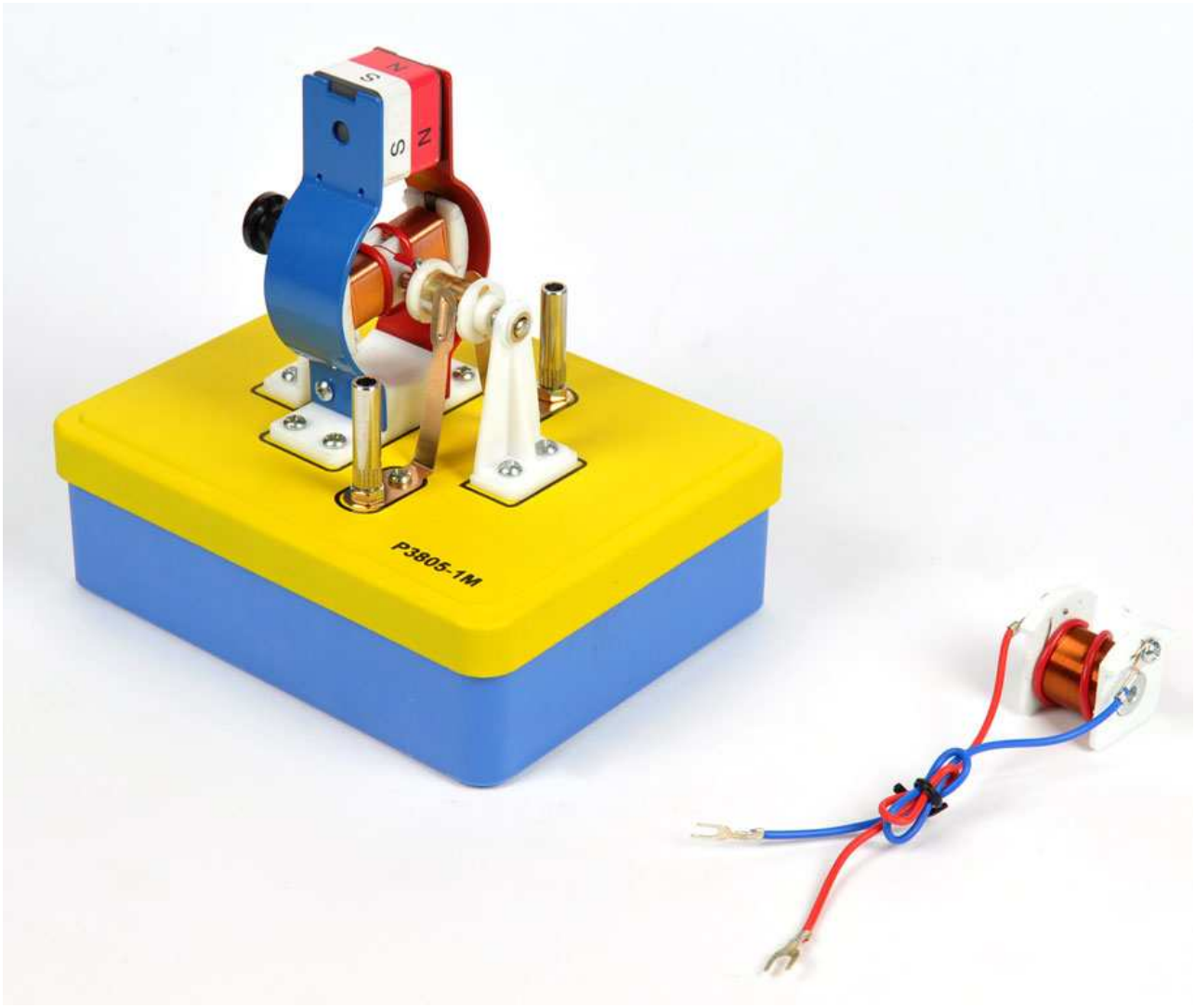
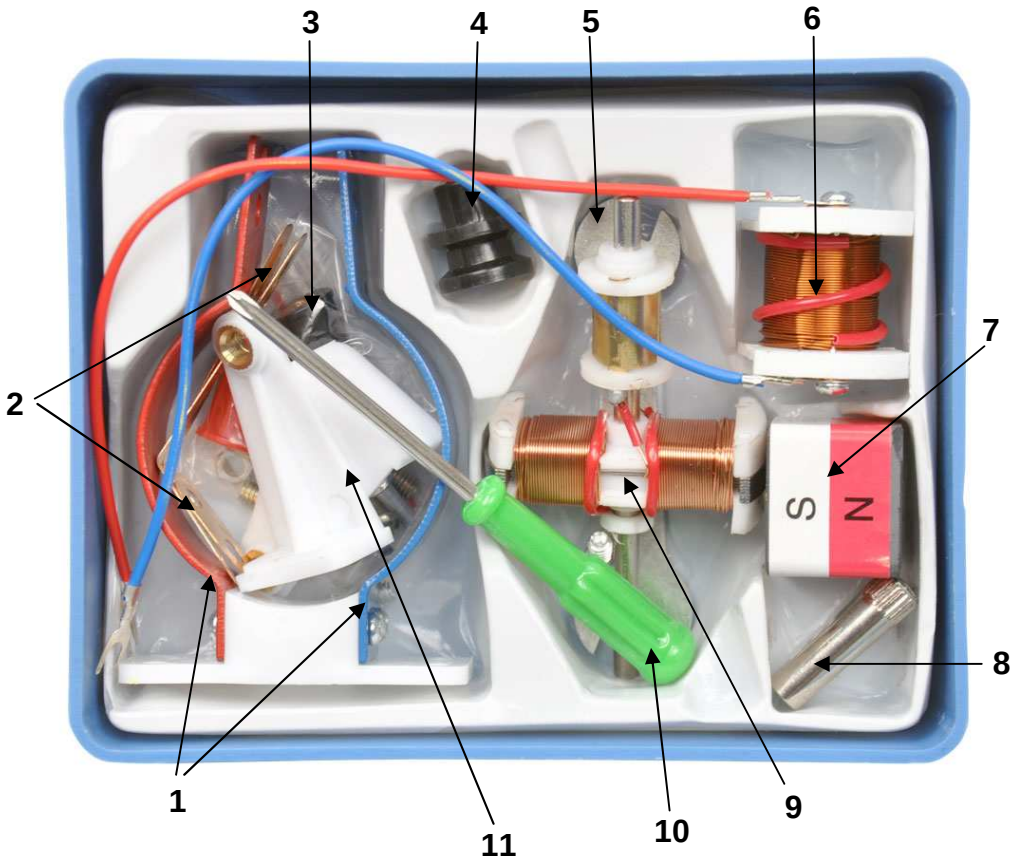
P3805-1M
DC and AC Motor Model
Experiment Kit



This is a working model of an electric motor, ideal for student experiments.
By assembling the model, students become familiar with the parts and structure of a motor.
Due to the simple design of the model, motor functioning is clear and easy to understand. The permanent magnet can be replaced by an electromagnet. Doing this allows the motor to be operated using both DC and AC voltage. It is, of course, also possible to run the model either as a series or as a shunt motor.
The drive shaft of the motor is equipped with a pulley to allow it to be used as a generator.



Components:

1 - Pole plates
2 - Commutator brushes
3 - 10x M3 screws and nuts
2x M4 screws and nuts
4 - Pulley
5 - Wrench
6 - Electromagnet (coil)
7 - Permanent magnet
8 - 2x Connector terminals
9 - Rotor
10 - Screwdriver
11 - Pivot bearing
Storage box and assembly board

Set-up:

In the following steps, use M3 screws and nuts. The screws are always inserted from the outside and fastened on the inside of the assembly board using nuts, unless another procedure is explicitly mentioned.

First, mount the pole plates (1) on the assembly board using 4 screws and the assembly material supplied. It makes no difference how the pole plate colours are arranged.

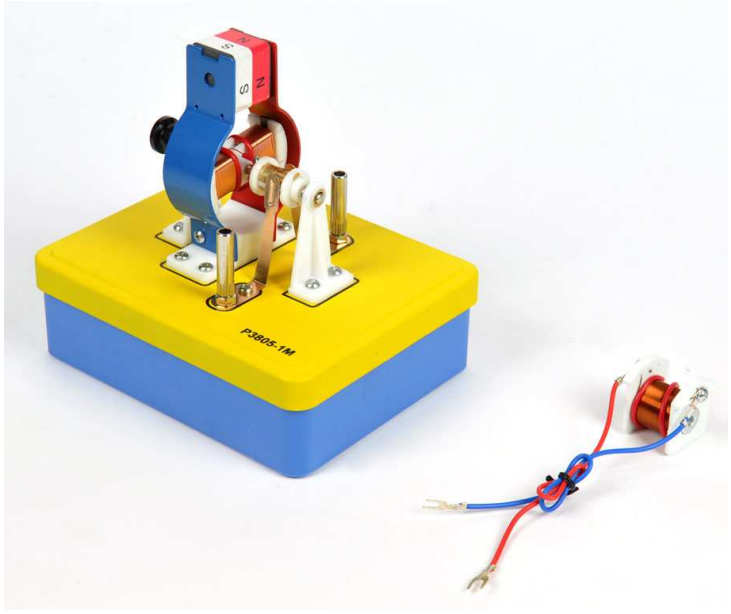
The first pivot bearing (7) is mounted on the side with only 2 mounting holes, and the rotor (6) is inserted through the pivot bearing. When doing this, make sure that the pivot bearing is aligned with the pole plates and the commutator of the rotor is visible from the opposite side of the first pivot bearing, i.e. that the motor winding is directly below the pole plates.

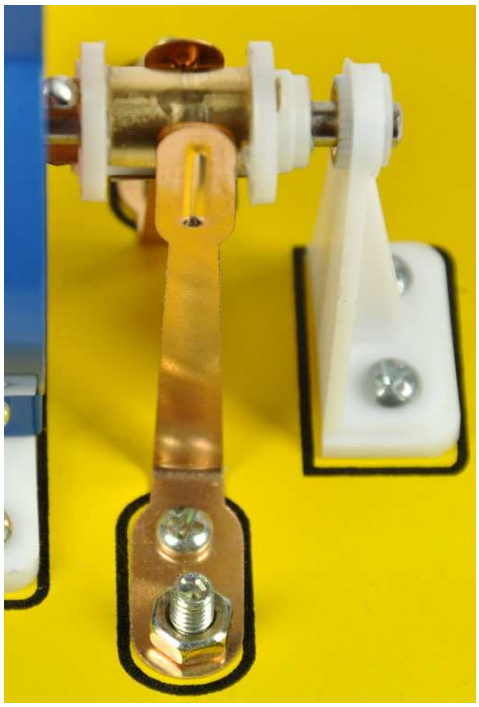
Next, mount the second pivot bearing on the opposite side of the rotor. Then, mount the pulley (11) on the rotor.

Next, fasten the commutator brushes (2) using the 4 remaining mounting holes. The brushes should firmly contact the commutator of the rotor. Note how the commutator brushes are mounted (detailed image). The assembly is also fastened on the inside using an M3 screw inserted through the assembly board fastened on the inside with a nut. On the outside of the assembly board, however, M4 screws are used, which are inserted from the inside of the board and fastened on the outside using M4 nuts.

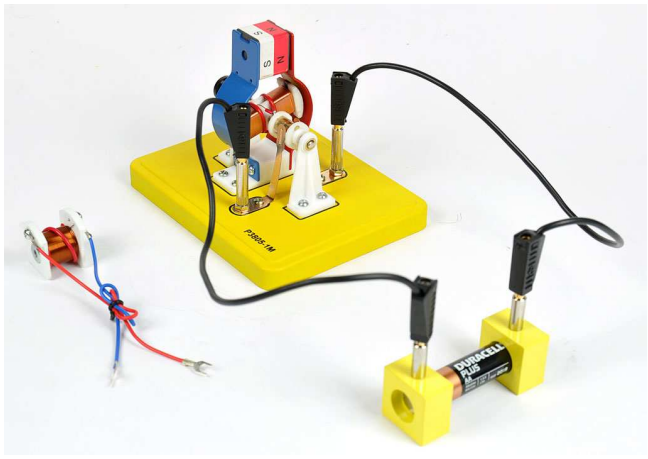
Then, screw two connector terminals onto the protruding M4 screws. The assembly is now complete.

The permanent magnet between the pole plates can be easily removed and replaced with the electromagnet.

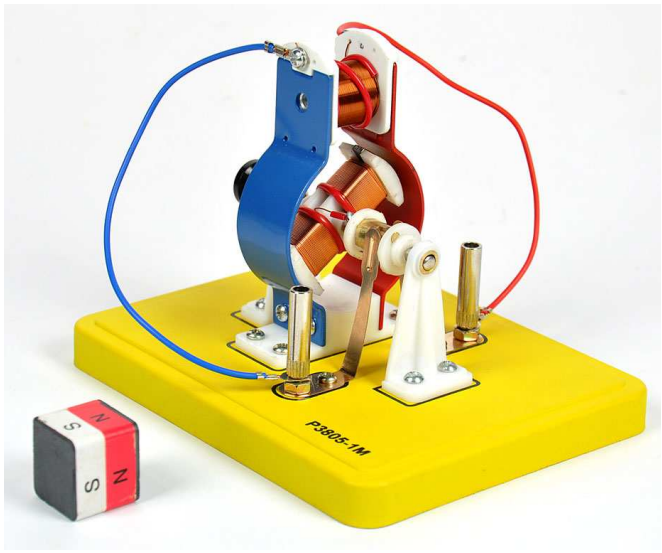




Examples of experiments:



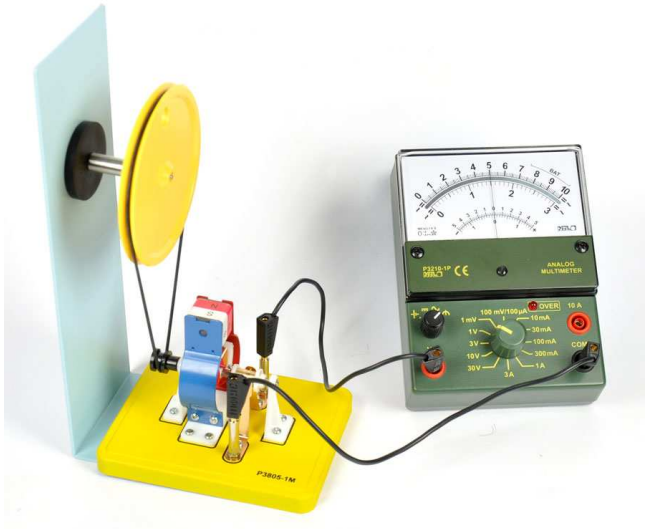
1) Motor with permanent magnet
Connect a DC power supply of between 1.5 and 5 volts to the connector terminals. The motor model should begin to turn. Give the rotor a turn to start if necessary.
Reverse the poles of the DC power supply. What happens?



2) Shunt motor
Replace the permanent magnet with the electromagnet and connect each of the leads to the connector terminal of the same colour on the power supply. When supplied with DC voltage (1.5...5V) or AC voltage (6...9V), the rotor begins to turn. Give the rotor a turn to start if necessary.
Reverse the poles of the DC power supply. What happens?

3) Series motor
With a series motor, the electromagnet is connected in series with the power supply. Please note the arrangement of the leads in the image.
The positive terminal of the power supply is connected to the green connecting lead of the electromagnet using a crocodile clip, while the red lead is connected to the connector terminal of the motor model. The second connecting terminal is connected directly to the negative terminal of the power supply (no direct connection to the electromagnet).
For this experiment the use of a power supply with more than 6V DC is recommended. When connected in series, the electromotor causes an additional voltage drop, so that the motor requires higher start-up voltage than in the shunt motor experiment.
The experiment may be performed with both DC and AC voltage.

4) Generator
Using an additional belt and pulley, the motor model can be used to explain the principle underlying a generator.
To do this, it is preferable to connect an analogue multimeter (set to AC voltage in a low range e.g. 1V) to the motor model terminals. Then turn the rotor.
The multimeter indicates voltage.



Size:
Dimensions (in plastic box): 140 x 90 x 30 mm
Dimensions (assembled model): 140 x 90 x 100 mm