

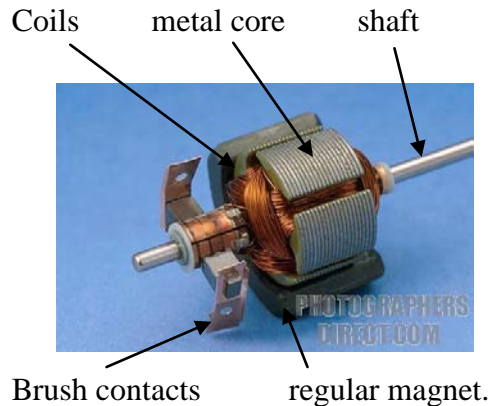
DC Motors

These are your bog-standard motors. There are thousands or varieties available, from dead cheap to dead expensive. DC stands for direct current and this means that these motors need a constant supply of electricity in one direction.

Uses: used where constant rotation is needed without needing to know how often it is turning.

Number of wires: 2, non-polarised, sending electricity through it in the other direction simply reverses the direction of rotation. Approx price for the cheapest: £1.50.

DC motors contain several coils of wire (electromagnets) mounted to the motor's shaft with brush connections to the power terminals. Two oppositely charged curved magnets are attached to the case. As the shaft spins, different electromagnets are charged as they come into contact with the power terminals, pushing the shaft round a short distance and connecting the next electromagnet in line with the power.

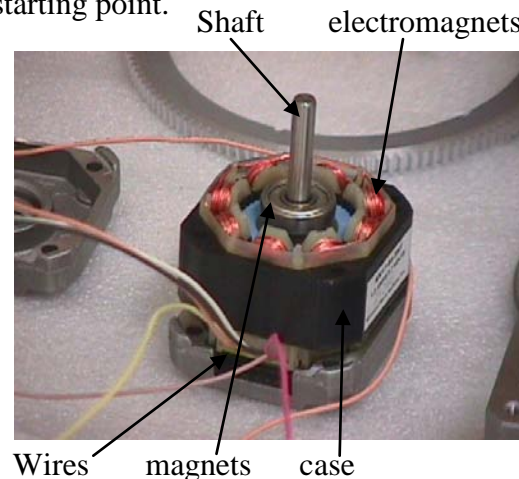


Stepper motors

Stepper motors are the next step up from the simple DC motor. The motor turns using pulses sent through different wires, the speed of the pulses determines the speed of rotation. A circuit board is required to make the stepper motor rotate successfully.

Uses: used where counting the rotation, controlling the speed without losing any torque or more torque is needed than a regular DC motor can supply is important. Number of wires: usually 4... can depend on the type and quality. Approx price for the cheapest: £7.00

This time, the magnets are on the shaft and the electromagnets are mounted to the case. There are several electromagnets and they are each controlled individually by sending pulses down one of the wires. Each pulse moves the motor 1 step, so if the circuit turning the motor has sent 7 pulses, it knows exactly how far the motor has turned. This is often used in robotics as the wheels because the robot can "count" the pulses and use that information to find its way back to the starting point.



Servo motors

Servo motors are the least used of the three types. This is because they are the most expensive, do not rotate continuously and require programming to work. Unlike stepper motors – which need pulses sent through different wires at a the right speed, Servos take all their pulses through one wire.

Uses: robotics limbs, places where constant rotation is not required and accurate positioning is required. Number of wires: 3, positive power, pulse wire and common ground. Approx price for cheapest: £10.00

Servos have about 180° of rotation and pulses (ranging from 0.75ms to 2.25ms pulses per 20ms) determine which position the servo turns to. The servos position is constantly measured by a potentiometer connected directly to the shaft. If the servo's position is not equal to the pulses, the potentiometer notices and tells the servo to correct the error. The fact it is constantly doing this gives the servo an amazingly high torque, even when it is not turning, and should something manage to overcome the torque, the servo will return to it's correct position as soon as the opposing force is gone.

