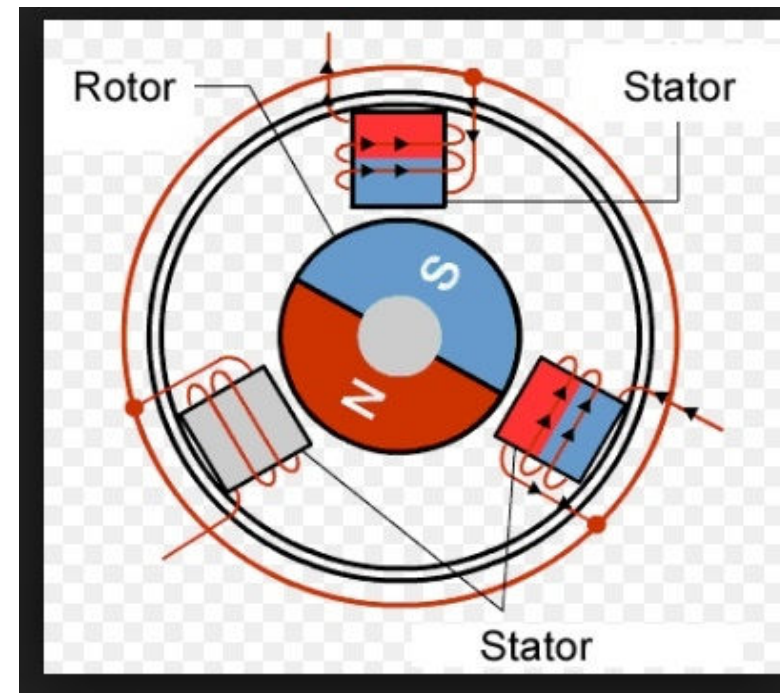# Stepper Motor

- Stepper motors are used to translate electrical pulses into mechanical movements.

- In some disk drives, dot matrix printers, and some other different places the stepper motors are used.

- The main advantage of using the stepper motor is the position control.

- Stepper motors generally have a permanent magnet shaft (rotor), and it is surrounded by a stator.

Stepper Motor

- **Step Angle** – The step angle is the angle in which the rotor moves when one pulse is applied as an input of the stator.
- This parameter is used to determine the positioning of a stepper motor.
- **Steps per Revolution** – This is the number of step angles required for a complete revolution. So the formula is 360° /Step Angle.
- **Steps per Second** – This parameter is used to measure a number of steps covered in each second.
- **RPM** – The RPM is the Revolution Per Minute. It measures the frequency of rotation. By this parameter, we can measure the number of rotations in one minute.

Wave Drive Mode

- In this mode, one coil is energized at a time.

- All four coils are energized one after another.

- This mode produces less torque than full step drive mode.

Steps	Winding A	Winding B	Winding C	Winding D
1	1	0	0	0
2	0	1	0	0
3	0	0	1	0
4	0	0	0	1

Full Drive Mode

- In this mode, two coils are energized at the same time.

- This mode produces more torque. Here the power consumption is also high

Steps	Winding A	Winding B	Winding C	Winding D
1	1	1	0	0
2	0	1	1	0
3	0	0	1	1
4	1	0	0	1

Half Drive Mode

- In this mode, one and two coils are energized alternately.
- At first, one coil is energized then two coils are energized.
- This is basically a combination of wave and full drive mode.
- It increases the angular rotation of the motor

Steps	Winding A	Winding B	Winding C	Winding D
1	1	0	0	0
2	1	1	0	0
3	0	1	0	0
4	0	1	1	0
5	0	0	1	0
6	0	0	1	1
7	0	0	0	1
8	1	0	0	1

Stepper Motor