Tecnológico Nacional de México
Instituto Tecnológico de Tijuana
Departamento de Sistemas y Computación
Carrera: Ingeniería en Sistemas Computacionales
Semestre: Febrero 2021 - Junio 2021
Materia: Sistemas Programables scc-1023sc7B
Maestro(a): Jaime Leonardo Enriquez Alvarez
Integrantes:

Gasca Olvera Michelle Iván - 16212007
Quino Hernández Nelly Jazmín - 17212175
Villarreal Felix Francisco Javier - 16212090

Martes, 04 de Mayo de 2021

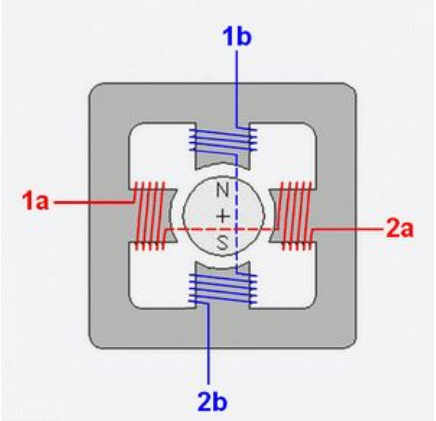
INTRODUCTION

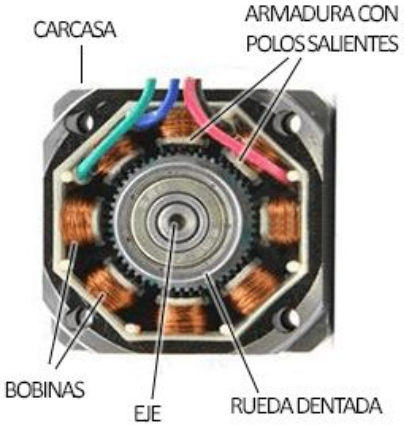
In the following presentation we will see quickly and simply what bipolar stepper motors are for easy understanding and understanding, we'll see how it works, technical specifications as well as electrical ones.

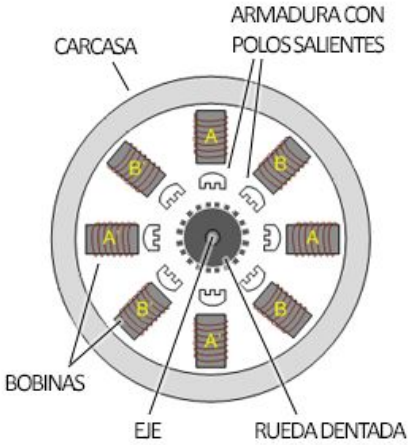
You will also see what the engine looks like to get a little idea of what is going on inside and some of its applications.

DEFINITION

Bipolar motors require more complex power and control circuits. But at present this is not a problem, since these circuits are usually implemented in an integrated, which solves this complexity in a single component. At most some power components must be added, such as transistors and diodes for countercurrents, although this is not necessary in small and medium motors.




CARCASA
ARMADURA CON
POLOS SALIENTES
BOBINAS
EJE
RUEDA DENTADA


CARCASA
ARMADURA CON
POLOS SALIENTES
A
B
A
B
B
B
A
A
BOBINAS
EJE
RUEDA DENTADA

PHYSICAL CHARACTERISTICS

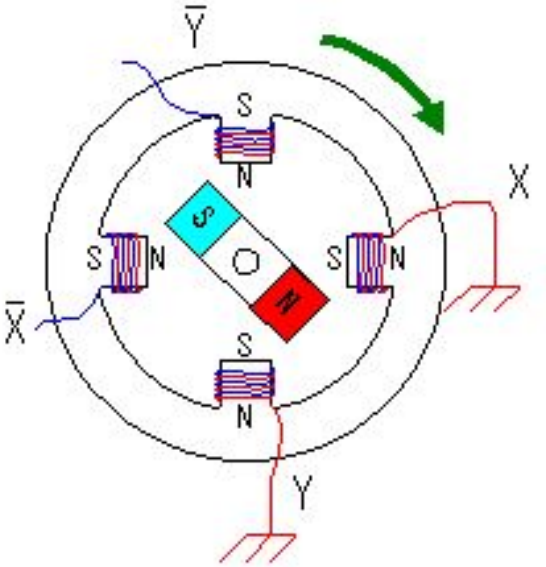
- Construction: Bipolar (4 Wire).
- Torque: 13 kg-cm (180oz-in)
- Pitch angle: 1.8°
- Power dissipated by motor: 29W
- Dimensions: 56 x 56 x 56 mm.
- Shaft diameter: 8mm.
- Weight: 650g
- Smaller

ELECTRICAL CHARACTERISTICS

- Current: 2.1 A
- Operating voltage: 9-32
- Minimum Recommended Input Voltage - Maximum Recommended Input Voltage: 12V - 24V
- You need a driver IC with an internal H bridge circuit
- Connection:
  - Coil B= pins 4 and 6.
  - Coil A= pins 1 and 3.

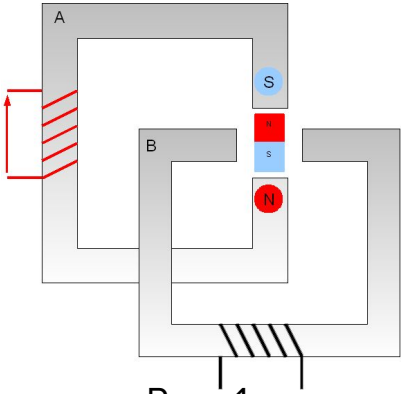
OPERATING PRINCIPLE

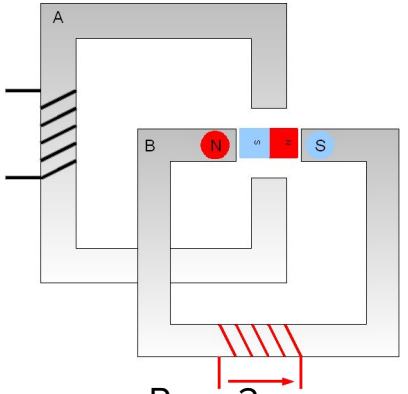
A typical driving pattern for a two coil bipolar stepper motor would be: A+ B+ A− B−. I.e. drive coil A with positive current, then remove current from coil A; then drive coil B with positive current, then remove current from coil B; then drive coil A with negative current (flipping polarity by switching the wires e.g. with an H bridge), then remove current from coil A; then drive coil B with negative current (again flipping polarity same as coil A); the cycle is complete and begins anew.

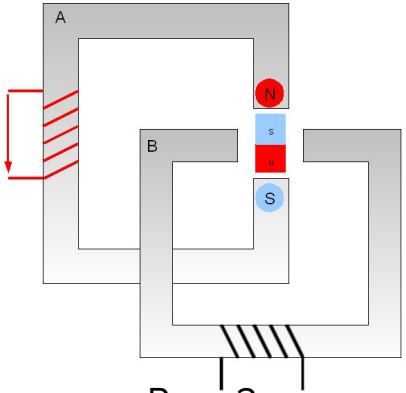


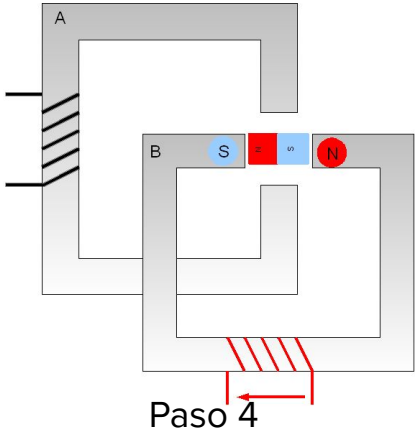
X	$\overline{X}$	Y	$\overline{Y}$
0	1	0	1
1	0	0	1
1	0	1	0
0	1	1	0

Paso	Terminal 1 Bobina A	Terminal 2 Bobina A	Terminal 1 Bobina A	Terminal 2 Bobina B
Paso 1	+Vcc	-Vcc		
Paso 2			+Vcc	-Vcc
Paso 3	-Vcc	+Vcc		
Paso 4			-Vcc	+Vcc









APPLICABLE USES

- Security cameras
- Computer Numerical Control (CNC)
- Printing and scanning
- 3D printers
- Precision positioning equipment

CONCLUSIONS

N: Bipolar Stepper Motors are composed of a rotor that has 4 coils around it, which are connected in pairs, with the number we can identify each pair and with the letter we can identify pole of each coil. It works through pulses which makes it rotate a certain number of degrees but it's necessary to use a driver which helps to keep it fixed and allows it to rotate in both directions thus offering greater torque. This type of motors are employed in rotary tables, pointing systems and robotics.

F: The bipolar stepper motor is a motor to a certain extent more efficient to use, but at the same time more complex since it has more control in its movement and more torque which makes it more reliable when it comes to loading and moving things. It is a fairly used motor, the only thing that could be considered a problem is that a microcontroller is used to program its movement.

M: The bipolar stepper motor is very useful for tasks where precision is required when using motors, and above all, considerable torque.

BIBLIOGRAPHY

https://hackaday.com/2014/07/29/changing-unipolar-steppers-to-bipolar/

https://blog.330ohms.com/2016/02/09/motores-a-pasos-unipolares-o-bipolares/

http://galia.fc.uaslp.mx/~cantocar/microcontroladores/SLIDES_8051_PDF/21_MOTOR.PDF

http://robots-argentina.com.ar/MotorPP_basico.htm