

## Stepper Motors

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Stepper Motors come in two types.

The Unipolar has **five wires**. It has four different coils (or combinations thereof). Four of the wires are connected to the positive of the coils and there is a common negative.

The Bipolar has **four wires**. It has two different coils (or combinations thereof). The wires are connected to the positive and negative of each coil.

The four “steps” in a unipolar motor are achieved by cycling through the individual coils. In a “wave drive” situation, only one coil is activated at any one time. In a “full drive” situation, two coils are activated at any one time. Both examples are shown below.

“wave drive”	Coil 1	Coil 2	Coil 3	Coil 4
Step one	■			
Step two		■		
Step three			■	
Step four				■

“full drive”	Coil 1	Coil 2	Coil 3	Coil 4
Step one	■	■		
Step two		■	■	
Step three			■	■
Step four	■			■

The four “steps” in a bipolar motor are achieved by reversing the current to the coils in sequence. Normally we do not use “wave drive” on bipolar motors, we use “full drive” as both coils are activated all the time, as shown in the example below.

“full drive”	Coil 1 +ve	Coil 2 +ve	Coil 1 -ve	Coil 2 -ve
Step one	■	■		
Step two		■	■	
Step three			■	■
Step four	■			■

In theory, the bipolar motors are more powerful for their size due to the fact that all coils are working all the time (either normal or reversed polarity).

Bipolar motors work well with any common dual-motor driver boards, of which there are many types available.