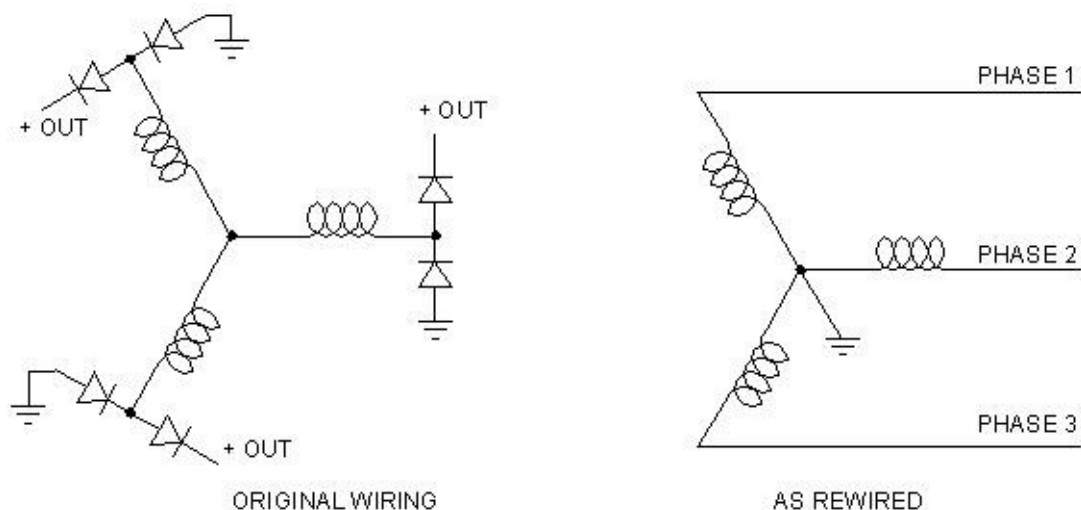


## Stepper Motor From Alternator

If you don't know what a stepper motor is, then you probably don't need one. These motors can be made to turn a few degrees at a time, and are used under computer control to position various objects.

I had an application where I wanted to move short pieces of 6" pipe under a cutting torch for the automated cutting of various features. I was able to get it to work from a couple small stepper motors I had lying around, but I really wanted a better margin of power and speed. I then begin to consider the possibilities of an automotive alternator.

The 3-phase stator windings of the alternator are wound and connected as shown on the left here.



By throwing away a half-dozen diodes and rewiring the stator as shown on the right, you have a stepper motor.

By applying a voltage sequentially to each of the phases, and energizing the rotor by another voltage source, you can get this modified alternator to step in either direction.

The alternator I got a hold of gave me 21 steps per revolution, but by applying voltage to two phases at a time, I was able to get half-steps, for a total of 42 steps.

The stator windings have extremely low resistance, and at even 6 volts you may find yourself burning your alternator.

The simplest way I have found to regulate the current is to put an automotive lamp in series with your windings; you may need a head lamp to find one large enough. Begin by selecting one of about 4 to 6 amps, and go up or down from there according to your needs.

Another method, which I did not try, would be to use pulses at a frequency that would allow the inductive reactance to keep the current to acceptable levels.

Beyond these two suggestions, you should keep your voltage down.



In their intended automotive application, alternators are constantly cooled by a strong blast of air – not so in this application, so you may need a fan.