How To Wire An Armature To Make the Field Rotate In the Opposite Direction as the Shaft

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If a magnetic field rotates opposite to the armature's rotation, Lenz Drag is placed into a paradox. If Lenz opposes the magnetic rotation, it inadvertently pushes the armature in the same direction it is rotating. Resulting in the output coils becoming the field coils.

The Prerequisites:

For the magnetic field to rotate in the opposite direction as the physical armature, the field must be rotating quicker than the armature. The formula is, Actual RPM from the viewpoint of the output stator is RPM of the field Minus RPM of the shaft. To understand this, if you take 1 step forward followed by 1 step back, you won't move in space-time from an outside perspective. But if you take 2 steps forward, followed by 1 step back, you do move forward in time-space. So if the field is rotating 2X for every one shaft rotation, the field ends up moving 1 rotation for every 1 rotation of the shaft when the field is rotated opposite of the shaft.

Normal Armature Winding:

In stock wound armatures and motors, the field in the armature takes one step forward, then one step back in a repeating fashion. This allows the field magnets or field coils to create a constant rotational torque on the armature. Every time the armature moves a little but to align with the stationary field, the commutator steps the field back to the beginning to start over. So the armature is always trying to align with the stationary field but never can. From the vantage point of the field coils (or stator) the field does not rotate but keeps getting pulled forward but the commutator and brushes keep stepping it back to the start, even thought the physical armature is rotating.

How To Wire The Armature

There are almost certainly other ways to do this, but this is the way I did it and it is proven to work. My aim is using 2 brushes to create 2 pole rotation that is 2X the RPM compared to the shaft. This means spinning the armature 1 way creates a rotating field that is 2X that of the shaft, but spinning the shaft in the opposite direction creates magnetic rotation equal to the shaft RPM, but in reverse direction.

My actual build used a 16 slot armature with 16 contacts, but my explanation will assume a 12 slot armature with 12 contact commutator for simplicity. The more slots and contacts, the smoother the field will rotate.

12 slots in the armature allows the armature to host 6 full-pitch coils. So the amount of coils is half that of contacts on the commutator. This is essential because the field needs to rotate twice per commutator rotation, so it must complete 1 revolution with half the commutator contacts so it can repeat with the remaining contacts.

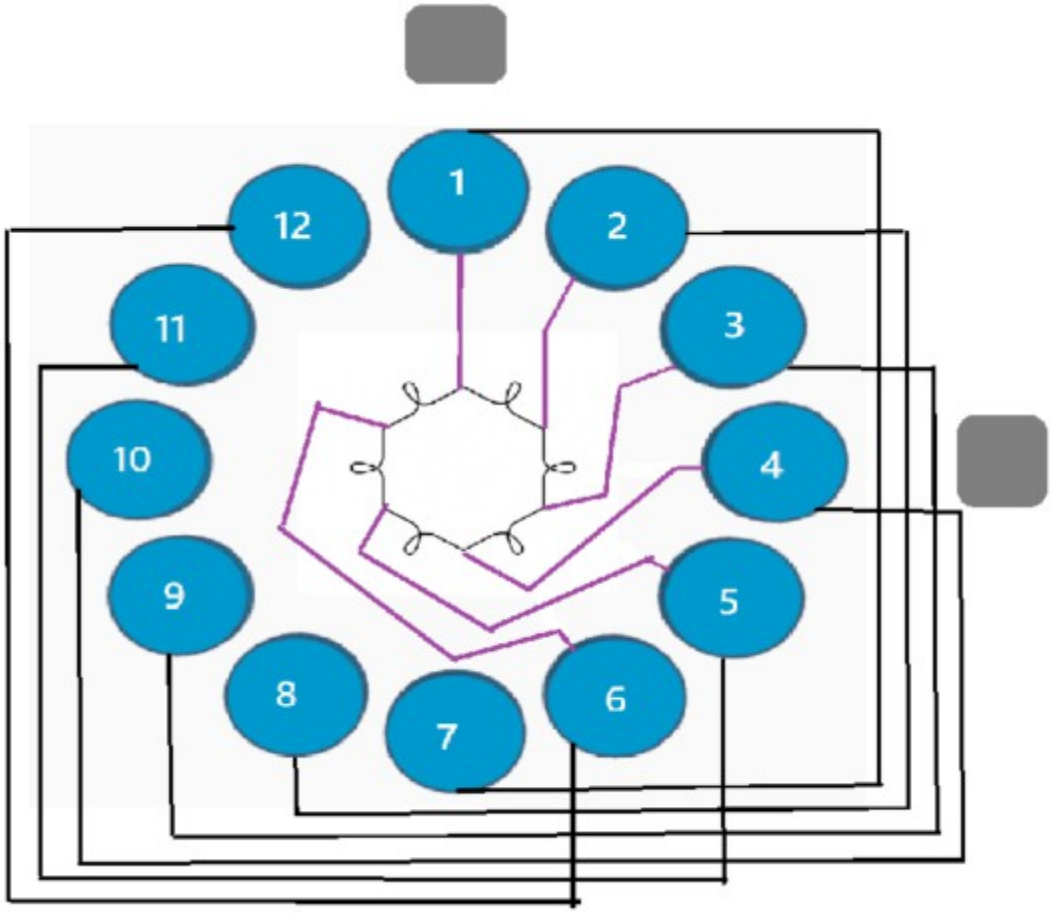
We are winding 6 full pitch armature coils, series connected in a closed loop as is standard in armature-driven motors, and connecting the 6 junction points to the first 6 contacts of the commutator. This will cause 1 complete rotation for every half commutator revolution if the brushes and remaining contacts are configured properly.

The two brushes now must be placed at 90 degrees from each other, instead of the usual 180 degrees. A standard wound armature / commutator uses this equation; 180 degree brushes X2 Brushes =360 degrees. But in this setup, 90 degrees X2 brushes is 180 Degrees X 2 times the magnetic revolutions is 360.

Now only 6 of the contacts of the commutator are used, which leaves 6 open to complete the 2nd magnetic revolution with the last half of the commutator rotation. So commutator contact 1 must connect to contact 7. Contact 2 to 8, etc. Now we basically made a 12 contact commutator into two 6 contact commutators, which the brushes positioned at 90 activate in succession.

The Wiring Diagram

This is a basic wiring diagram. Remember tho, my demo was wound full-pitch, which is not easy to show on an image.



If the armature is wired correctly and the output stator is a multi-phase stator, the output stator creates a magnetic field when powering a load that is now oriented in the correct way to act as the field coils and the initial motor that got the machine spinning can be removed. The rotation of the machine will continue until the load is removed, then the rotation will cease.

Success depends on quality and accuracy of your build.