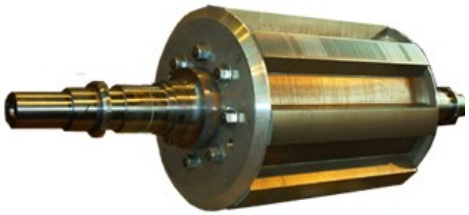
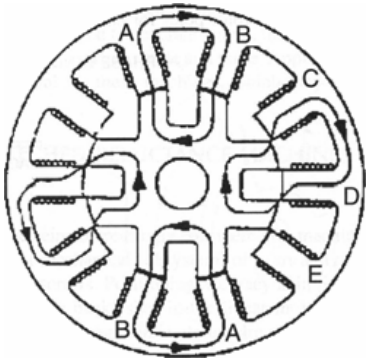
Special Electrical Machines

Configuration-cont.

Radial field SRM:

The magnetic field path is perpendicular to the shaft or along the radius of the cylindrical stator and rotor.

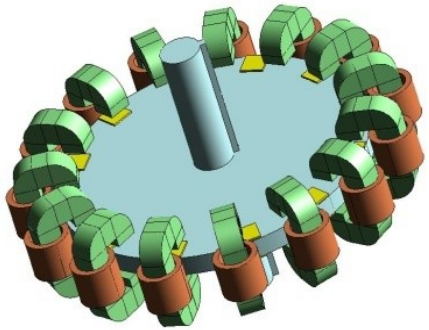




Short flux path in a five-phase radial field SRM with 10/8 pole

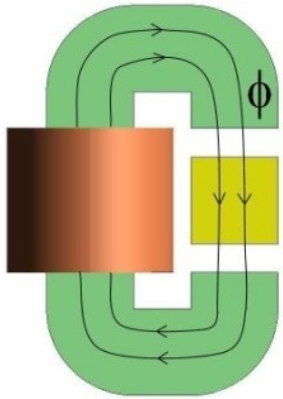
Configuration-cont.

Axial field SRM: The magnetic field path is along the axial direction.



Whole motor

Rotor



The short magnetic flux path

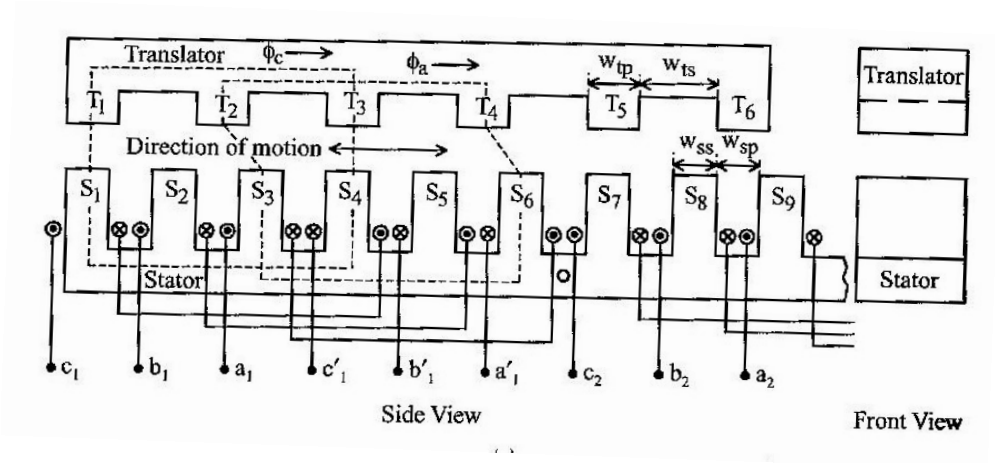
Configuration-cont.

LSRM: The motion of the motor is linear.

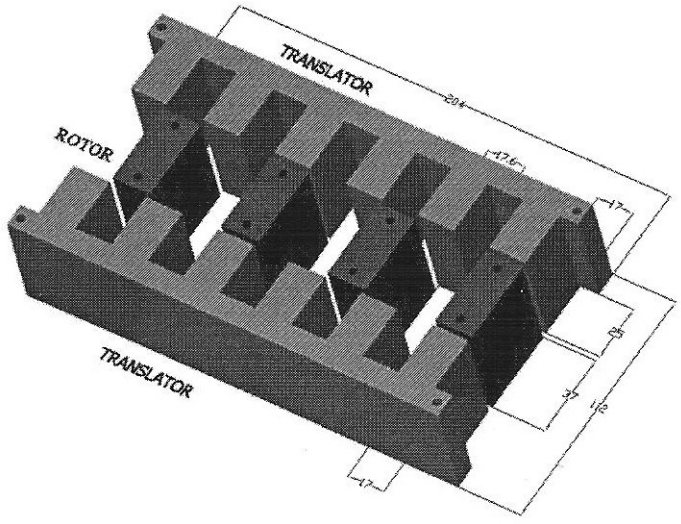
Structure:

A LSRM may have windings either on the stator or translator (the moving part). Fixed part is called track. Moving part is called translator.

Applications: Ideal for machine tool drives

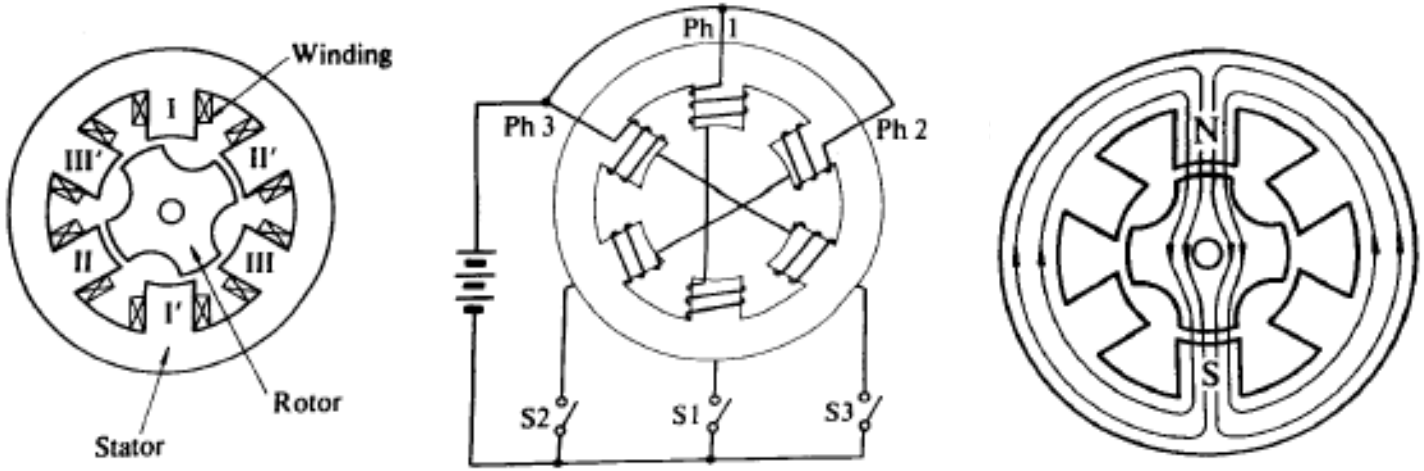


One side LSRM



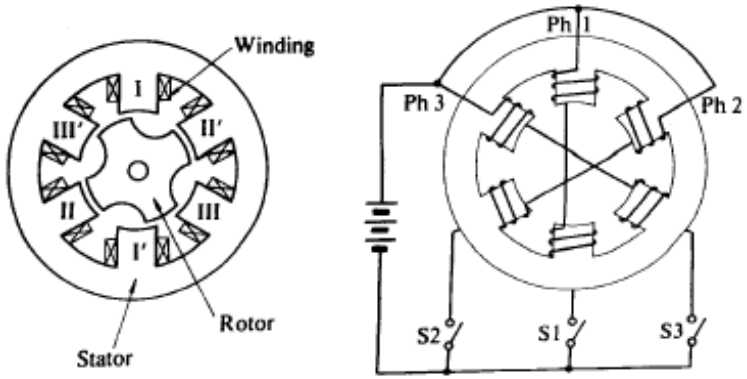
Two sided LSRM with winding on the translator

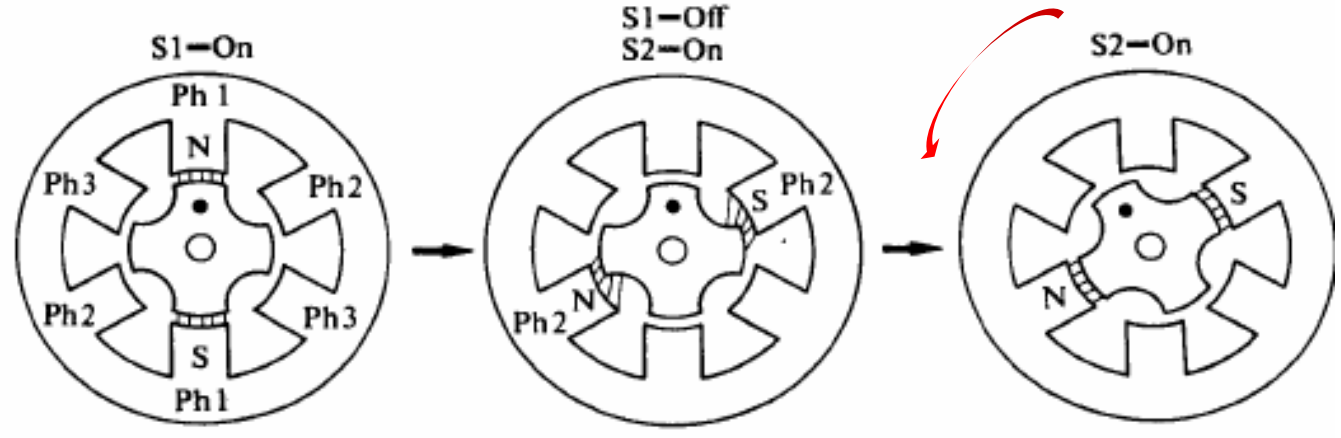
Principle of Operation



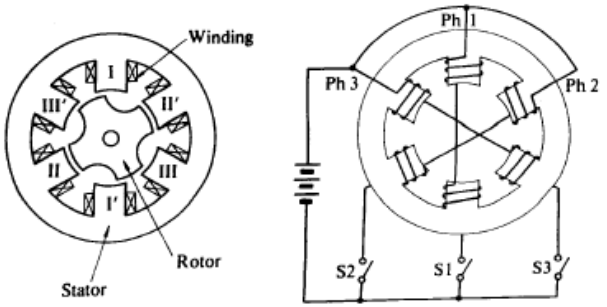
Cross sectional model of a three phase SRM, winding arrangement, and equilibrium position with phase 1 excited

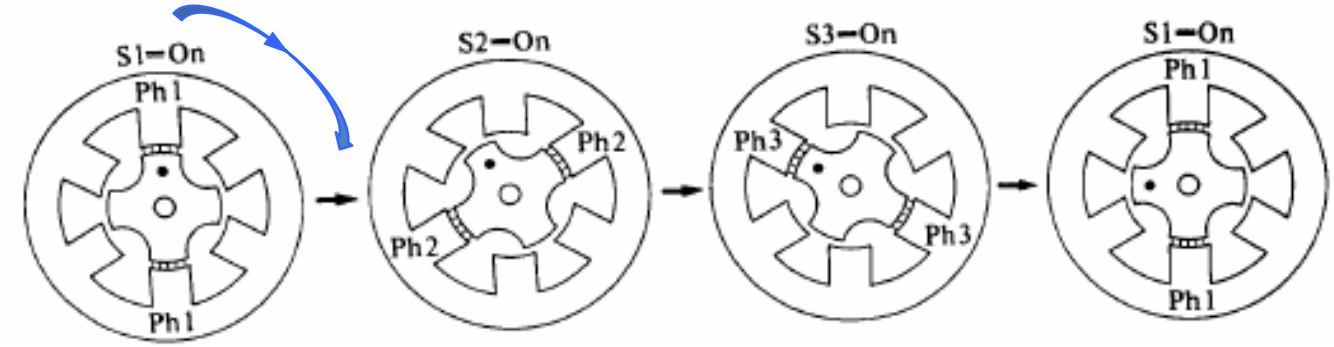
Principle of Operation-cont.





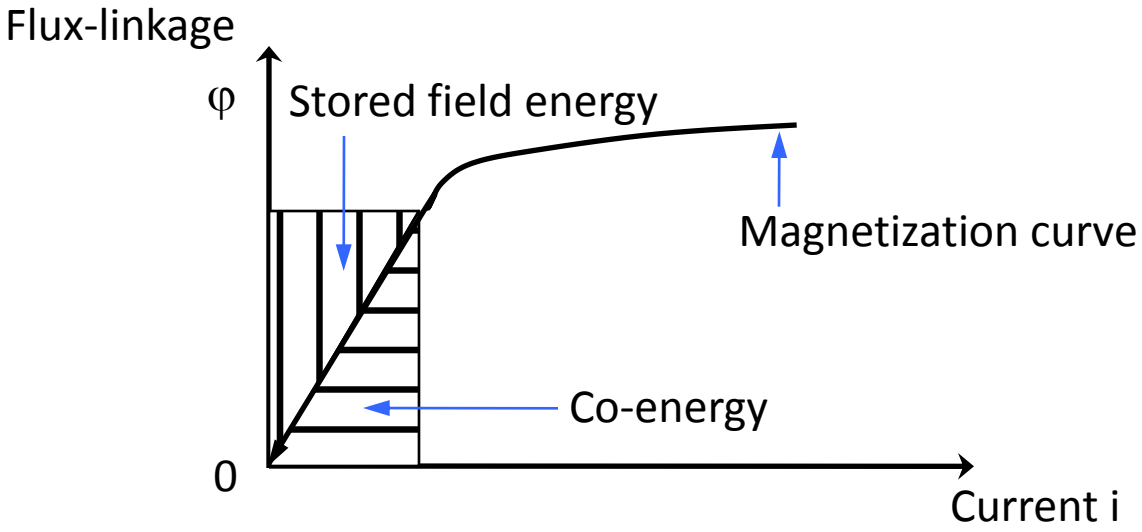
Principle of Operation-cont.





- Rotor rotation as switching sequence proceeds in a three phase SRM, the rotation direction is opposite to the direction of the excited phase.
- The switching angle for the phase current is controlled and synchronized with the rotor position, usually by means of a shaft position sensor.

Torque Production



Definition of co-energy and stored field energy

THANKS….

Queries Please…