

DUAL - ROTOR SINGLE STATOR ELECTRIC MOTOR

Vishnu Kumar Patel
 Asst. Prof. Department of Electrical Engineering
 Shri Krishna University, Chhatarpur (MP)

ABSTRACT

In this Type electric motors is to help the adoption of new technologies that have greater engineering benefits and reduce environmental damage. Taking as a base the innovation in axial flux electric motor in future stages of the project in this application. The development presented in this article is a till in progress and is Susceptible to improvements. Most permanent magnet motors these days work with a radial flux topology. Here, the magnetic flux loop starts at a permanent magnet on the rotor, passes through the first tooth on the stator, then flows radially along the stator. It then passes through a second tooth to arrive at the second magnet on the rotor.

INTRODUCTION

The principal of axial flux motor – dual-rotor single stator, the flux loop starts at the first magnet, passes axially through a stator tooth, and immediately arrives at the second magnet. Dual-rotor axial machines also have thermal issues, as the winding are located deep within the stator and between the two rotor discs. That makes it difficult to dissipate the heat. Overcome some of the problems while avoiding the need to scale the machine’s diameter and magnets.

CONSTRUCTION

Axial flux motor construction consists of a stator with winding, and a rotor with permanent magnets, positioned in a flat, disc-like arrangement. The various parts of the Axial Flux Motor are :

- I. Disk-shaped Stator and Rotor
- II. Radial Magnets
- III. Winding Coils

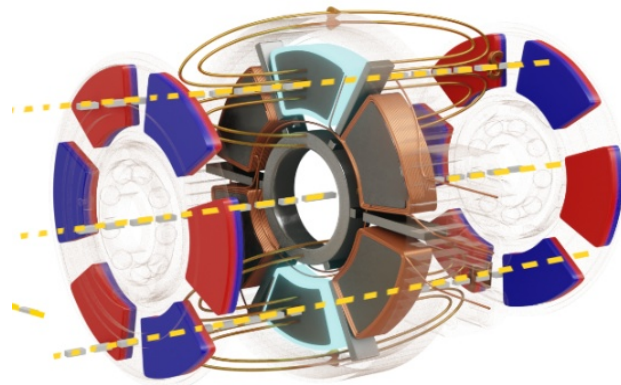


Fig.-1 Axial flux motor construction

A comparison table of this type of motor and radial flux motor is presented -

Motor	Weight	Torque density
<i>Radial flux motor</i>	50kg	400Nm
<i>Axial flux motor</i>	24-25 kg	800Nm



Fig.-2 Axial flux motor

Characteristic	Axial Flux Motor	Radial Flux Motor
Magnetic Flux Path	Parallel to the Axis of Rotation	Radial, from Center to Edge
Motor Thickness	Thin and Flat (Pancake Shape)	Thicker, Cylindrical
Rotor-Stator Configuration	Coaxial Discs (Parallel)	Cylinders
Efficiency	Typically Higher	Variable, Depending on Design
Cooling	More Effective Due to Flat Design	Cooling More Challenging
Size and Weight	Compact and Lightweight	Bulkier and Heavier
Applications	Robotics, Some Wind Turbines	Generators, Industrial Drives, Appliances
Noise Level	Generally Lower Noise Emission	Variable, Dependent on Design

Axial Flux Motor Advantages -

- 1) The advantages of Axial Flow Motor are.
- 2) Compact and lightweight design.
- 3) High power-to-weight ratio.
- 4) Effective cooling due to flat structure.
- 5) Suitable for electric vehicles and robotics.
- 6) Greater torque density in some cases.

Axial Flux Motor Disadvantages -

- 1) The limitations include:
- 2) Lower torque capacity compared to radial flux motors.

- 3) Limited use in high-torque industrial applications.
- 4) More complex manufacturing in certain designs.
- 5) Heat dissipation challenges may arise.
- 6) Noise levels can vary depending on design.

Applications of Axial Flux Motor -

- ❖ Following are the applications of Axial Flux Motor:
- ❖ Electric vehicles (EVs) propulsion.
- ❖ Robotics and automation systems.
- ❖ Electric fans and blowers.
- ❖ Small-scale hydroelectric generators.
- ❖ Electric bicycles (e-bikes).
- ❖ Aircraft propulsion systems.
- ❖ Industrial machinery and conveyors.
- ❖ Water pumps for irrigation.

CONCLUSION

In this case, the flux is generated parallel to the axis of rotation because of the way it's wound. This carries the advantage of simplifying fabrication of the motor. Although this type of electric motor geometry is far from new, it was rarely used in commercial applications due to manufacture ability and costs when using lamination. Soft magnetic composite (SMC) materials exclusive to powder metal are allowing designers to exploit the axial typology's advantages, driving the future of axial flux motors.

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