

INDUCTION MOTOR

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What is induction motor

- An **induction motor** is an AC electric motor in which the electric current in the rotor needed to produce torque is obtained by electromagnetic induction from the magnetic field of the stator winding.

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Working principle of induction motor

- When ac supply is given to the stator winding of induction motor, the alternating current starts flowing through the stator or main winding. This alternating current produces an alternating flux called main flux. This main flux also links with the rotor conductors and hence cut the rotor conductor.

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FARADAY'S LAW OF ELECTROMAGNETIC

INDUCTION

According to the Faraday's law of electromagnetic induction, emf gets induced in the rotor. As the rotor circuit is closed one so, the current starts flowing in the rotor. This currents called the rotor current. This rotor current produces its own flux called rotor flux. Since this flux is produced due to induction principle so, the motor working on this principle got its name as induction motor. Now there are two fluxes one is main flux and another is called rotor flux. These two fluxes produce the

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- Induction motors are used worldwide in many residential, commercial, industrial, and utility applications.
- Induction Motors transform electrical energy into mechanical energy.
- It can be part of a pump or fan, or connected to some other form of mechanical equipment such as a winder, conveyor, or mixer.

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Effect of 3 Phase Current Passing Through Stator Winding:

When a 3 phase AC current passes through the winding It produces a rotating magnetic field (*RMF*). As shown in the figure below a magnetic field is produced which is rotating in nature. We will see how this is produced in the next section.

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The Concept of a Rotating Magnetic Field

- To understand a rotating magnetic field, we consider a simplified 3 phase winding with just 3 coils.
- A wire carrying current produces a magnetic field around it. Now for this special arrangement, the magnetic field produced by 3 phase A.C current will be as shown at a particular instant.

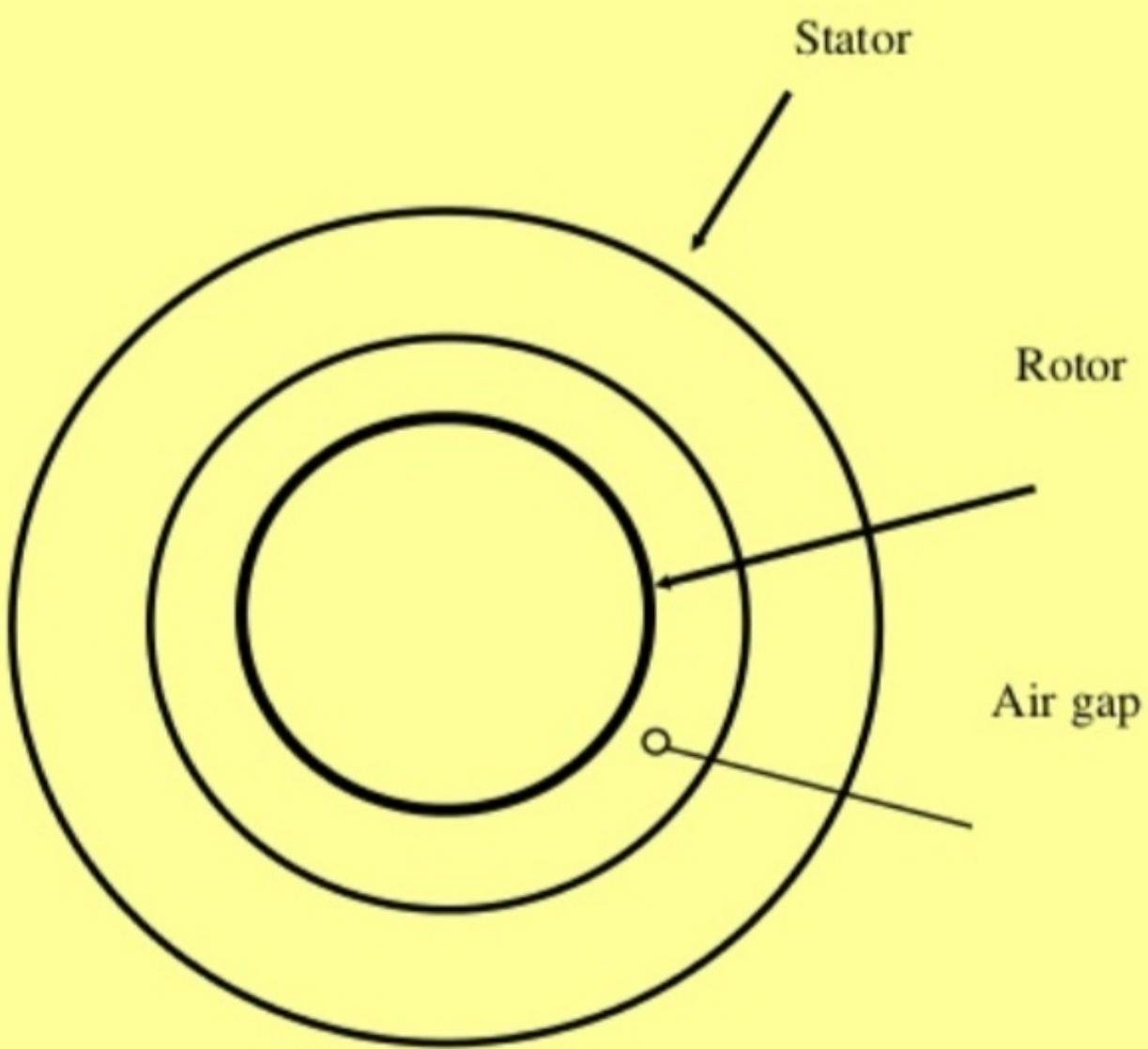
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- The components of A.C current will vary with time.
- Due to the variation in the A.C current, the magnetic field also varies in orientation and its magnitude remains the same.
- The speed of rotation of the magnetic field is known as *synchronous speed*.

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The Working of an Induction Motor

- A 3-phase AC current passing through a Stator winding produces a rotating magnetic field.
- current will be induced in the bars of the squirrel cage and it will start to rotate.
- We can note variation of the induced current in squirrel cage bars.
- This is due to the rate of change of magnetic flux in one squirrel bar pair which is different from another, due to its different orientation. This variation of current in the bar will change over time.

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