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RESEARCH ARTICLE OPEN ACCESS

Design and Development of Re-Generative Electro Motor

Ajay B. Lathiya, Dhaval R. Dhakecha
(Scholar, Department of Automobile Engineering, Dr. S. & S. S. Ghandhy College of Engineering & Technology, Surat

ABSTRACT
The main purpose of our project is to provide electricity without any specific work like mechanical movement. We are trying to introduce basic design with parameters which will one kind of free and renewable energy and nevertheless no pollution and less maintenance as well as service is required. The design of the project is very simple. As the construction being simple and easy. This project can be implemented where ac motors are use and specifically where it run by battery or other power sources.
Keywords– Stator, Rotor, Secondary Stator, VSI, Voltage Regulator

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I. INTRODUCTION

1.1 CONCEPT

In this technological era the world is facing energy crisis. Here we present the use of waste energy. In this project we are going to catch waste magnetic energy and convert it into electricity with the help of special arrangement. The energy will generate due to rotating magnetic field which is be able to rotate rotor and cross the conductor. Rotor is surrounded by primary stator furthermore secondary stator also used which is located around primary stator. When primary stator generate magnetic field for rotating rotor, some magnetic field is also used by secondary stator which leads to generate electricity.

Our tentative design is introduce over here by basic drawing as shown in figure with their elements name. Now onwards we are going to start physical model. Our concept generate electricity with help of waste magnetic field, this model impact is created which is the benefit leave for the social health and importantly economic situation.

1.2 COMPONENTS OF THE MODEL

1 Stator (ΔABC)
2 Secondary stator (ΔαβƔ)
3 Rotor (squirrel cage) (O)
4 Voltage Source Inverter (VSI)
5 Voltage Regulator
*() Identity in figure

1.3 FULL CYCLE

For easy understanding we have to divide this device in two separate parts one is induction motor and another is alternator

In relevant to induction motor,

A three-phase power supply provides a rotating magnetic field in an induction motor. In both induction and synchronous motors, the AC power supplied to the motor's stator (O) creates a magnetic field that rotates in synchronism with the AC oscillations. Whereas a synchronous motor's rotor turns at the same rate as the stator field, an induction motor's rotor rotates at a somewhat slower speed than the stator field. The induction motor stator's(ΔABC) magnetic field is therefore changing or rotating relative to the rotor. This induces an opposing current in the induction motor's rotor, in effect the motor's secondary winding (rotor's winding), when the latter is short-circuited or closed through an external impedance. The rotating magnetic flux induces currents in the windings of the rotor, in a manner similar to currents induced in a transformer's secondary winding(s).

The induced currents in the rotor windings in turn create magnetic fields in the rotor that react against the stator field. The direction of the magnetic field created will be such as to oppose the change in current through the rotor windings, in agreement with Lenz's Law. The cause of induced current in the rotor windings is the rotating stator magnetic field, so to oppose the change in rotor-winding currents the rotor will start to rotate in the direction of the rotating stator magnetic field. The rotor accelerates until the magnitude of induced rotor current and torque balances the applied mechanical load on the rotation of the rotor. Since rotation at synchronous speed would result in no induced rotor current, an induction motor always operates slightly slower than synchronous speed. The difference, or "slip," between actual and synchronous speed varies from about 0.5% to 5.0% for standard Design torque curve induction motors. The induction motor's essential character is that it is created solely by induction instead of being separately excited as in synchronous or DC machines or being self-magnetized as in permanent magnet motors.

For rotor currents to be induced, the speed of the physical rotor must be lower than that of the stator's rotating magnetic field otherwise the magnetic field would not be moving relative to the rotor conductors and no currents would be induced. As the speed of the rotor drops below synchronous speed, the rotation rate of the magnetic field in the rotor increases, inducing more current in the windings and creating more torque. The ratio between the rotation rate of the magnetic field induced in the rotor and the rotation rate of the stator's rotating field is called "slip". Under load, the speed drops and the slip increases enough to create sufficient torque to turn the load. For this reason, induction motors are sometimes referred to as "asynchronous motors".

In relevant to alternator,

A conductor moving relative to a magnetic field develops an electromotive force (EMF) in it (Faraday's Law). This EMF reverses its polarity when it moves under magnetic poles of opposite polarity. Typically, a rotating magnet, called the stator(ΔABC) turns within a stationary set of conductors wound in coils on an iron core, called the secondary stator(ΔαβƔ). The field cuts across the conductors, generating an induced EMF (electromotive force), as the ac supply causes the magnetic field to turn.

The rotating magnetic field induces an AC voltage in the secondary stator windings. Which found at point α, β & Ɣ. Since the currents in the secondary stator windings vary in step with the speed and strength of the rotating magnetic field produce by stator.

We have to regulate induced current as per our requirement.

EQUACTION

Synchronous speed,

An AC motor's synchronous speed s, is the rotation rate of the stator's magnetic field,

$$Ns = \frac{2f}{P},$$

Where f is the frequency of the power supply, P is the number of magnetic poles, and Ns is the synchronous speed of the machine. For f in hertz and Ns in RPM, the formula becomes:

$$Ns = \frac{2f}{P}\left(\frac{60\ seconds}{minute}\right) = \frac{120f}{P}\left(\frac{seconds}{minute}\right)$$

For example, for a four-pole, three-phase motor, $P = 4$ and $Ns = \frac{120f}{P} = 1500$ RPM (for f =50Hz) and 1800 RPM (for f =60Hz) Synchronous speed.

II. FIGURE

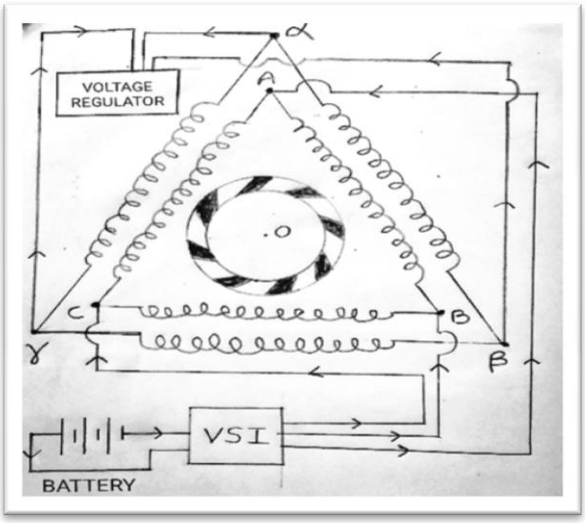

Figure. Re-Generative Electro Motor Model

III. CONCLUTION

By advantage this project uses waste magnetic energy which is waste. It provide us AC current. No requirement of any external sources and no mechanical energy to run it.as there are no extra moving parts, hence there are no possibilities of accidents during application.

So that it can be used in Electrical vehicle(car,bus,train,truck etc.) where limited energy. We can also obtain more electricity by doing some modification in the model.

However it has no limitation but sometimes it require cooling system to run in great efficiency.

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