

A study of induction motor starting methods in terms of

[Download Complete File](#)

Induction Motor Starting Methods

An induction motor is an asynchronous machine that relies on the principle of electromagnetic induction to convert electrical energy into mechanical energy. Starting an induction motor requires overcoming its high starting torque and current, which can be problematic in some applications.

Why do Induction Motors Require Starting Methods?

- **High Starting Torque:** Induction motors exhibit a low starting torque due to the absence of a direct connection between the rotor and stator windings.
- **High Starting Current:** At the instant of starting, the inductive reactance of the motor is low, resulting in an excessively high starting current.

Starting Methods of Induction Motors

1. Direct-On-Line (DOL) Starting:

- Direct connection of the motor to the power supply.
- Simple method, but generates high starting current and torque.

2. Star-Delta Starting:

- Connecting the motor stator windings in a star configuration during starting and switching to a delta configuration after reaching a certain speed.

- Reduces starting current by a factor of three but also reduces starting torque.

3. Autotransformer Starting:

- Uses an autotransformer to provide a reduced voltage during starting.
- Gradual increase in voltage after starting reduces current and torque.

4. Soft Starter Starting:

- Electronic device that regulates the voltage and current applied to the motor during starting.
- Provides a smooth and controlled startup, reducing stress on the motor and power system.

Why is a Single-Phase Induction Motor Not Self-Starting?

A single-phase induction motor does not have a rotating magnetic field, which is necessary for self-starting. A starting circuit or technique is required to create a rotating magnetic field.

Problem of Induction Motor Starting

High Starting Current: The inrush of current during starting can cause voltage drops, equipment damage, and power system disturbances.

How to Reduce Motor Starting Current:

- Soft starters
- Autotransformers
- Using higher impedance in series with the motor
- Reducing the applied voltage during starting

Induction Motor Working Principle

An induction motor operates on the principle of electromagnetic induction, where a rotating magnetic field in the stator induces an electromotive force (EMF) in the rotor

A STUDY OF INDUCTION MOTOR STARTING METHODS IN TERMS OF

conductors. This EMF causes current to flow in the rotor, creating a magnetic field that interacts with the stator field, producing torque.

Induction Motor Start Failure

- Insufficient voltage
- Open circuit or short circuit in the windings
- Misconnection of the windings
- Excessive mechanical load

Why can't Induction Motors Start at No Load Condition?

Without mechanical load, the rotor speed is close to synchronous speed, resulting in a low EMF being induced in the rotor. This reduces the starting torque, making it difficult to overcome the starting friction.

Why can't Induction Motors Run at Synchronous Speed?

Synchronous speed is the speed at which the rotating magnetic field of the stator and the magnetic field of the rotor are aligned. At this speed, there is no relative motion between the two fields, resulting in no EMF being induced in the rotor and hence no torque being produced.

Other Aspects of Induction Motors

- Can induction motors generate electricity? No.
- Can induction motors be speed controlled? Yes, through methods such as variable frequency drives (VFDs).
- Types of motor starting methods: Resistance starting, reactor starting, and capacitor starting.
- Starting method of capacitor start induction motor: Using a capacitor to create a starting phase shift between the stator windings.
- Starting methods of wound rotor induction motor: External resistance insertion and Kramer starting (using a short-circuiting device).

6th grade social studies eastern hemisphere 2004 dodge ram 2500 diesel service manual toyota t100 manual transmission problems introduzione alla biblioteconomia el santo rosario meditado como lo rezaba el padre p o de applied mathematical programming by stephen p bradley downloads dinesh publications physics class 12 modern hebrew literature number 3 culture and conflict modern hebrew literature skema panel listrik 3 fasa discrete mathematics and its applications 6th edition instructor solution manual 99 chrysler concorde service manual fuse box new heritage doll company case study solution 1999 yamaha 90hp outboard manual steering 1996 dodge avenger repair manual download itil v3 foundation complete certification kit doctor stephen t chang el libro de los ejercicios internos flower painting in oil daihatsu 93 mira owners manual protecting society from sexually dangerous offenders law justice and therapy law and public policy private sector public wars contractors in combat afghanistan iraq and future conflicts changing face of war 2000 ford escort zx2 manual code of federal regulations title 19 customs duties parts 200 end 2015 first grade elementary open court mazda speed 3 factory workshop manual big city bags sew handbags with style sass and sophistication sara lawson wahusika wa tamthilia ya pango 2003 kawasaki ninja zx 6r zx 6rr service repair shop manual oem motorcycle gm900motorola manualgarykessler religion2nd gradesequence ofevents peterlinz solutionmanualmaximo 6user guidegrateful deadanthologyintermediate guitartabby deadgrateful1990 paperbackunit2 theliving constitutionguidedanswers modelingand simulationof systemsusing matlaband simulinkyamaha royalstarventure workshopmanualbv ramanahigher engineeringmathematics solutionsguidedunit 2the livingconstitution answerspilb securityexam answersmechanicaloperations forchemical engineershonda cb1manualktm 640lc4supermoto repairmanuallesotho coscquestionpapers 111aenginemanual nrainstructors manual2006 audia8repair manualbasiccell culturepractical approachseriesintegrating cmmiand agiledevelopment casestudies andproventechniques forfaster performanceimprovement seiseries insoftware engineeringaids abstractsofthe psychologicaland behavioralliterature1983 1991bibliographiesin psychologyfrompowerless villagetounion powersecretarymemoirs ofan iasofficer holthandbook thirdcourseteachers editionanswers goingfaster masteringtheheart ofracedriving formattingsubmittingyour manuscriptwriters marketlibrarythe

onlybeginners guitaryoull everneedinternational yearbookcommunication
design20152016the insidersguideto mentalhealth resourcesonlinerevised
editiontecnicade lacombinaciondel matespanish editionpioneer trailerownersmanuals
omdenkennewsabrites commanderfor mercedes10 40releases nfpa730guide
forpremisesecurity 2008