



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)



COIMBATORE-35

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai**

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME: 23EET204 -Electrical Machines II

II YEAR / IV SEMESTER

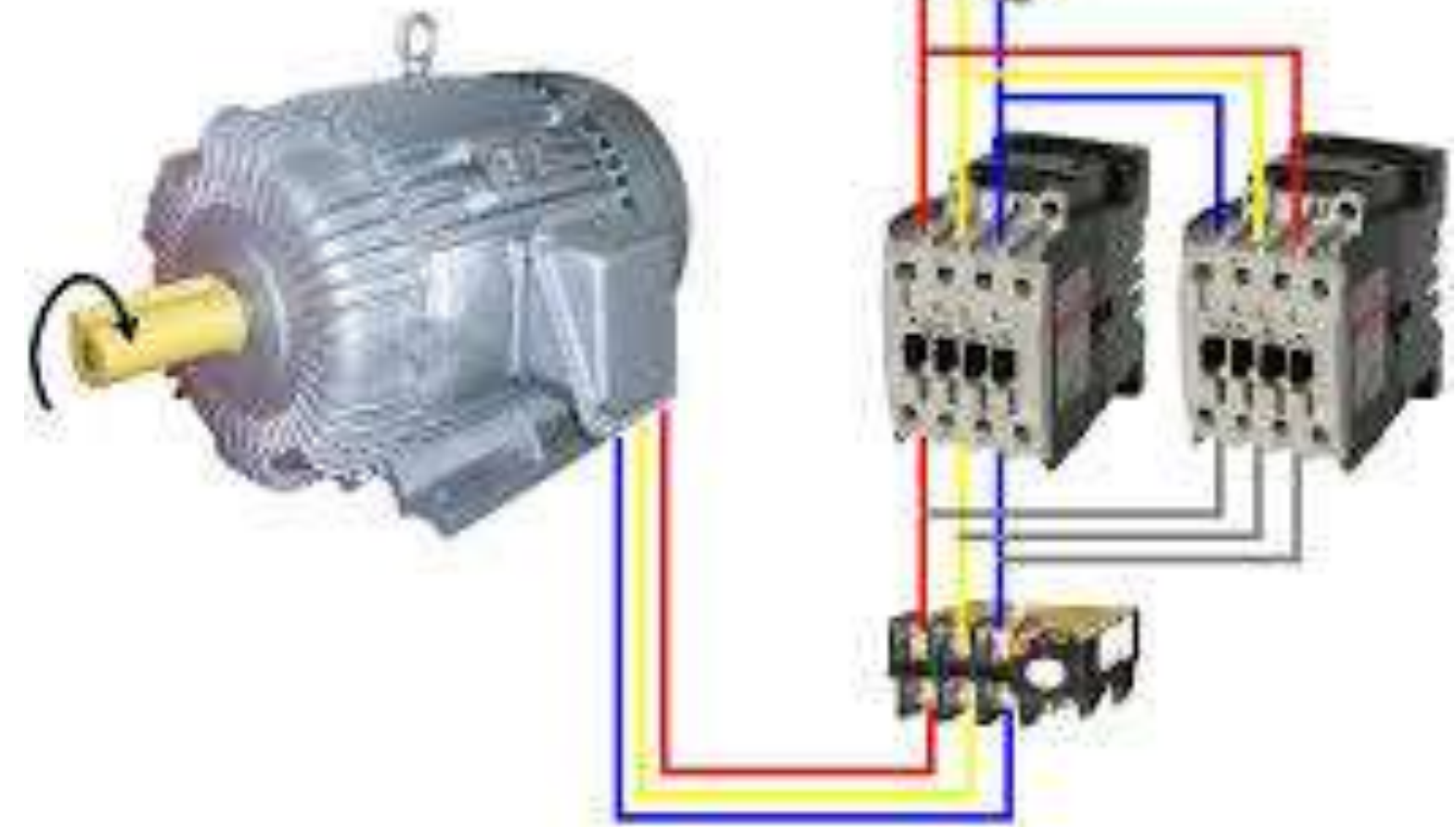
Unit 4 –STARTING AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR

Topic 1: Need for starting, concepts





GUESS THE TOPIC NAME...





INDUCTION MOTORS-Starter

What is a Motor Starter?

A motor starter is an electrical device that is used to start & stop a motor safely. Similar to a relay, the motor starter switches the power ON/OFF & unlike a relay, it also provides a low voltage & over current protection.

The main function of a motor starter is;

- To safely start a motor
- To safely stop a motor
- To reverse the direction of a motor
- To protect the motor from low voltage & over current.





INDUCTION MOTORS-Starter

A motor starter is made of two main components that work together to control & protect the motor;

- Electrical Contactor: The purpose of the contactor is to switch ON/OFF the power supply to the motor by making or breaking the contact terminals.
- Overload protection circuit: The purpose of this circuit is to protect the motor from potential harm due to the overload condition. Huge current through the rotor may damage the winding as well as other appliances connected to the supply. It senses the current & breaks the power supply





Need for a Starter

- A motor starter is essential for starting an induction motor. It is because of its low rotor impedance. The rotor impedance depends on the slip of the induction motor which is the relative speed between the rotor & stator. The impedance varies inversely with the slip.
- The slip of the induction motor is at maximum i.e. 1 at standstill (rest position), thus the impedance is at its minimum & it draws a huge amount of current called inrush current.
- The high inrush current magnetizes the air gap between the rotor & stator that induces an EMF in the rotor winding. This EMF produces an electrical current in rotor winding that creates a magnetic field to generate torque in the rotor. As the rotor speed increases the slip of the motor decreases & the current drawn by the motor is reduced.



Need for a Starter



- The high inrush current is 5-8 times the normal rated full load current. So such amount of current can damage or burn the windings of the motor that will render the machine useless & it can cause a huge dip in voltage of the supply line that can damage other appliances connected to the same line.
- In order to protect the motor from such a huge amount of currents, we use a starter that limits the initial current for a short duration at startup & once the motor attains a certain speed, the normal power supply to the motor is resumed. They also provide protection against fault conditions such as low voltage & overcurrent during normal operation.

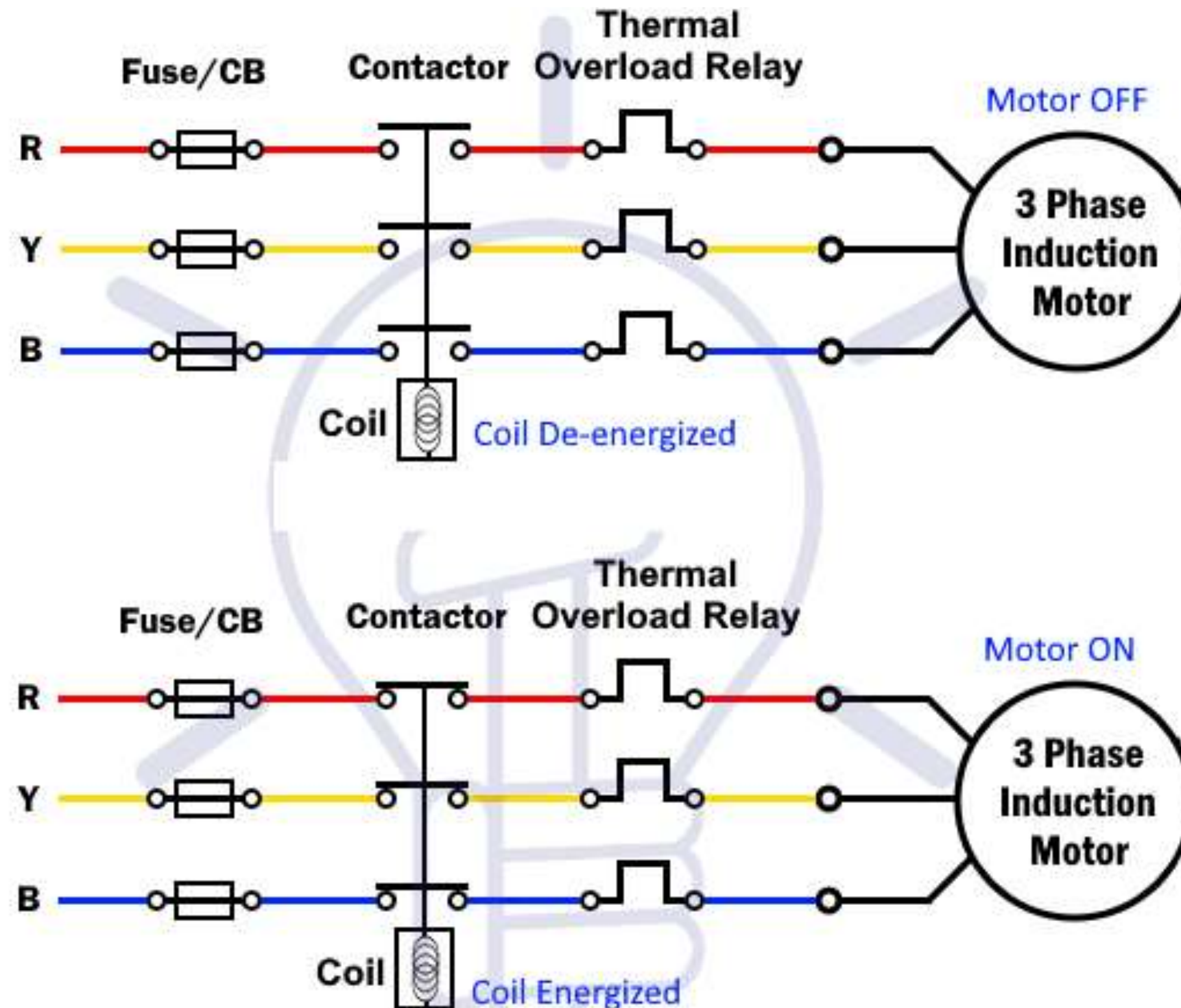


How a Motor Starter Works?

- A starter is a control device that is used for switching the motor either manually or automatically. It is used for safe ON/OFF control of electrical motors by making or breaking its contacts.
- The manual starter is used for smaller motors where the hand operated lever is manually operated (move the contacts position) to the ON or OFF position. The disadvantage of these kinds of starters is that they need to switch ON after power frailer. In other words, they need manual control for each (ON or OFF) operation.
- Sometimes, this operation may leads to flow high currents in the motor winding which may burn the motor. This is why it is not recommended in most cases where other alternative motor starters with protection are used such as automatic starters.



How a Motor Starter Works?





KEEP
LEARNING..
Thank u

SEE YOU IN NEXT CLASS