SNS College of Technology, Coimbatore-35

19MEE402 Hybrid Technology

UNIT 3-REQUIREMENTS IN HYBRID AND ELECTRIC VEHICLES

Induction Motor drives

Electric propulsion units in hybrid vehicles consist of electric motors, power electronics, and a battery. Here's a brief overview of how they work and their types:

Parallel Hybrid System:

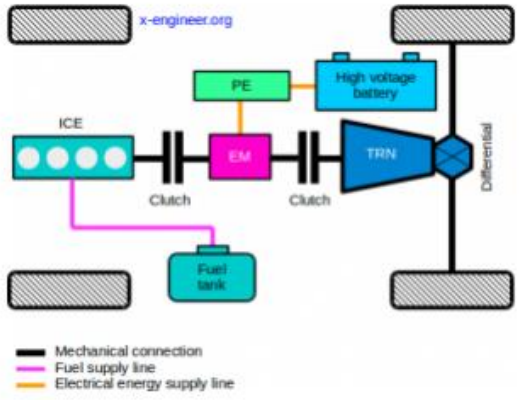


Image: Parallel hybrid powertrain with two clutches

where:

ICE – internal combustion engine

EM – electric machine

TRN – transmission

PE – power electronics

In this type, both the internal combustion engine (ICE) and electric motor can independently propel the vehicle.

The vehicle can operate on either the gasoline engine, electric motor, or a combination of both.

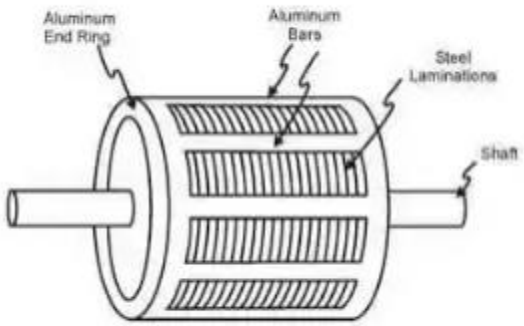
Series Hybrid System:

The internal combustion engine (ICE) is used solely to generate electricity.

The electric motor drives the wheels, and the generator charges the battery or directly powers the electric motor.

Induction motors

An **induction motor** (also known as an **asynchronous motor**) is a commonly used AC electric motor. In an induction motor, the electric current in the rotor needed to produce torque is obtained via electromagnetic induction from the rotating magnetic field of the stator winding. The rotor of an induction motor can be a squirrel cage rotor or wound type rotor. Induction motors are referred to as 'asynchronous motors' because they operate at a speed less than their synchronous speed



Induction motors work based on electromagnetic induction, where a changing magnetic field induces a current in a nearby conductor. They consist of a stator and a rotor, with the stator producing a rotating magnetic field that induces currents in the rotor, causing it to turn.

Advantages:

Simple Design: Induction motors have a straightforward design, making them robust and reliable.

Low Maintenance: They have fewer moving parts, reducing the need for maintenance.

Durability: Induction motors are known for their durability and long operational life.

Self-Starting: They are inherently self-starting and do not require additional starting devices.

Disadvantages:

Limited Speed Control: Induction motors have limited speed control compared to other motor types.

Lower Efficiency at Low Loads: Efficiency can decrease at low loads, affecting performance.

Size and Weight: In some cases, induction motors may be larger and heavier than alternative motor types.

Applications:

Industrial Machinery: Used in various industrial applications for tasks like pumping, compressing, and conveying.

HVAC Systems: Commonly employed in heating, ventilation, and air conditioning systems.

Household Appliances: Found in household items like washing machines and fans.

Transportation: Used in electric vehicles and railway propulsion systems.

These motors are versatile and widely used due to their reliability and cost-effectiveness across various applications.