RECENT TRENDS ON ELECTRIC VEHICLES

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ABSTRACT

This paper presents current developments and offers an overview of recent work on electric vehicles in the area. The development and comparison of several component parts are discussed in the study. We look at the key elements of battery tech, charger design, motor, steering, and brakes. Finally, a prototype electric vehicle is described in the paper as a recent development in electric automobiles.

***Keywords**: Electric vehicle, AFS, steering system, braking system, ABS, battery management systems, BMS, Inverter*

I. INTRODUCTION

A vehicle that uses one or more electric motors for locomotion is referred to as an electric vehicle (EV). It can be driven remotely by a battery, a collector system, or electricity from extravehicular sources (sometimes charged by solar panels, or by converting fuel to electricity using fuel cells or a generator).

[1] Railroad and road vehicles, surface and underwater watercraft, electric airplanes, and electric spacecraft are all examples of EVs. Electric vehicles (EVs) originally appeared in the late 19th century when electricity was one of the preferred forms of automobile power, offering a level of comfort and ease of use that gasoline cars of the day were unable to match. The primary propulsion system used was internal combustion motors. for about 100 years, in other vehicle types, such as railways and heavy vehicles of all kinds, electric power remained the trend.

Due to technology breakthroughs, a greater emphasis on renewable energy, and the possibility to lessen the impact of transportation on climate change, air pollution, and other environmental issues, EVs have had a comeback in the 21st century. Electric vehicles are listed in the top 100 modern options to combating climate change by Project Drawdown.

[2] Incentives from the government to spur adoption were first offered in the late 2000s, especially in the US and the EU. This resulted in a booming market for the cars in the 2010s.
[3] Increasing public awareness and interest, as well as systemic incentives such those It is anticipated that the market for electric vehicles would rise substantially as part of the green recovery from the COVID-19 pandemic. Lockdowns have decreased the amount of greenhouse gases produced by gasoline or diesel cars during the COVID-19 outbreak.
[4] In 2021, the Global Energy Agency urged nations to take more measures to achieve climate change goals, including regulations for large electric cars.

2.EV AND HEV:

Over the recent ten years, HEV has received significant promotion. There is at least one HEV available since almost every manufacturer. At that time, it is expected to solve the battery storage of energy issue. By using a hybrid car, it is possible to use the engine to generate electric power. Series hybrid and series hybrid are the two main categories of HEV. The battery and engine of a series hybrid are completely intertwined. The battery provides all of the motor's power. Both the engine and the motor provide propulsion power for the parallel hybrid. Both the engine and the motor contribute to the torque. In order to absorb the power from the engine through the transmission, the motor also serves as a generator. However, HEVs still produce some pollutants. the arrival of plug-in HEVs, which somewhat addresses the issue. It accepts electrical power from the mains through a socket to charge the batteries. Therefore, clients can use AC from the mains to charge the battery whenever it becomes conventional.

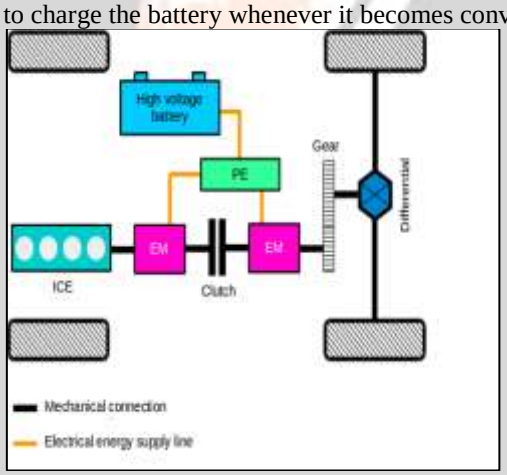

Fig -1: The series or parallel path of an HEV

3.THE KEY COMPONENTS IN EV:

The electric vehicle is rather simple in structure. The key components are the propulsion parts. Fig-2 shows the configuration.

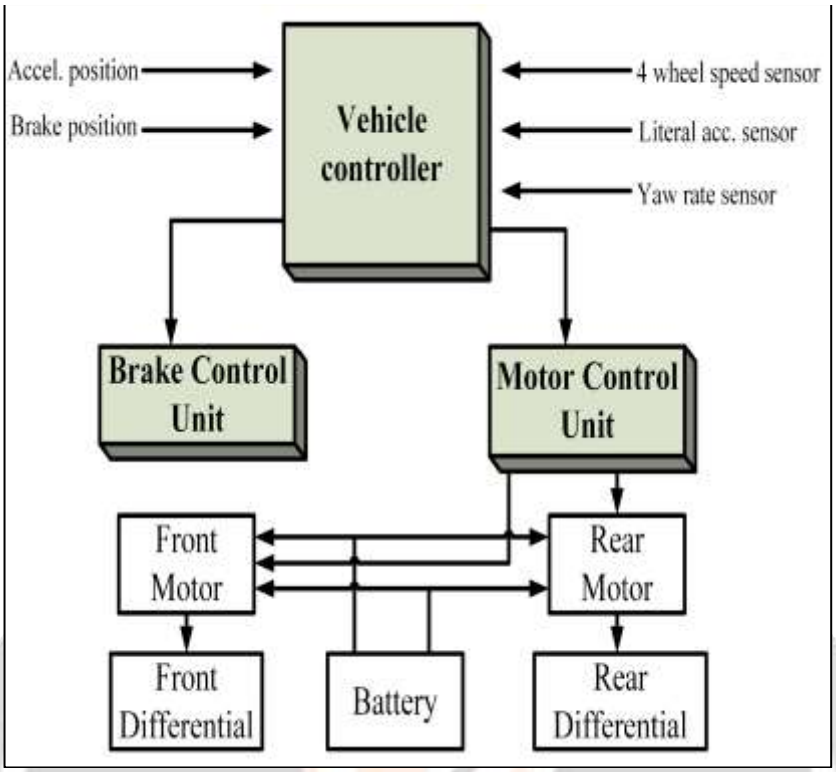

Fig-2: The key components of an Electric Vehicle

The main energy storage is the battery. The purpose of the charging station is to modify mains power so that it can charge the battery. To run the motor, the battery voltage, which is DC, is inverted into a switched-mode signal using a power electronic inverter. Through a DC-DC converter, which steps down transformer from the battery pack to a lower voltage in order for other electrical components in a vehicle may be charged, the battery can as 5V-20V.

4.THE MOTOR:

There are a number of motors available for electric vehicle: DC motors, Induction motor, DC brushless motor, Permanent magnetic synchronous motor and Switched reluctance motor.

4.1 DC motors:

It is a classical motor and has been used in motor control for a long time. All the power involved in electromechanical conversion is transferred to the rotor through stationary brushes which are in rubbing contact with the copper segments of the commutator. It requires certain maintenance and has a shorter life time. However, it is suitable for low power application. It has found applications in electric wheel-chair, transporter and micro-car. Today, most of the golf-carts are using DC motors. The power level is less than 4kW.

4.2 Induction motor:

It is a very well-liked AC motor. Moreover, it has a substantial market share in applications requiring variable speed drivers, like air conditioning, escalators, and escalators. Many electric vehicles having higher outputs than 5 kW employ induction motors. Typically, speed and torque control are supplied via a vector drive.

4.3 DC brush less motor:

Because the primary, high power coil rotates while the low power winding, or the field, is motionless, the ordinary DC motor has poor mechanical performance. Turning the DC brushless motor inside out. A permanent magnet is used to excite the field on the rotor while the increased power winding is mounted on the motor's stationary side. The motor costs a few times more but has a longer lifespan than a DC motor. The majority of DC motors can be replaced with brushless motors and the necessary driver. Currently, low power electric vehicles (EV) use it.

4.4 Permanent magnetic synchronous motor:

A stator used in an induction motor is analogous. Magnets installed continuously hold the rotor in place. It functions similarly to an induction motor, except a permanent magnet creates the air-gap field. Pulse-width modulation creates the sinewave that acts as the driving voltage (PWM).

4.5. Switched reluctance motor:

It is a variable reluctance device that has recently gained notoriety for its fault tolerance due to the fact that each phase is autonomous of the others. The power stage is distinct from the other units covered in paragraphs. A flyback circuit-style connection is made between each phase winding.

5.Charging network:

Because of the ambiguity concerning the amount of power required, the charging location, and the charging duration, EV charging techniques are debatable. In current revelations, it has been stated that battery charging times have decreased. The technology of lead-acid batteries has limitations. Less than 0.2C is the charging rate, and faster charging rates significantly reduce product life. The suggested charging rate for other batteries, including Li-ion, is 0.5C. The majority of electric cars generally include an on-board rechargeable battery. The vehicle is connected to a charging port by a power wire. A power source ought to offer several power outlets as well as an appropriate transaction software to figure out the rate. The total power required by the battery pack is unimportant. A typical charging power for a private vehicle is less than 2.8kW. It uses a single-phase power line. A vehicle needs to be charged on average every three days. Using Hong Kong as an example, even if all black cabs are charged to EVs, it will only have a minor impact on power consumption of less than 2%.

5.1 FAST CHARING STATION:

High current for quick charging, hence three-phase electricity is frequently employed. As not all civilians are adept of using a 3-phase socket system, the charging station should take into account how to connect the 3-phase socket to consumers. The following topics have been raised:

a. Magnetic contactless paying: Magnetic induction is used for complete power transfer; there isn't metal contact. This lessens the worry when a civilian handles a high-power cable since the conductors won't be in connection.

b. High voltage electrical transfer: By attaching at a higher voltage, the size of the bulky, heavy 3-phase adapter and cable can be decreased. The wire is shortened and the power source increased to high voltage of several kV. A second step-down converter in the car reduced the high voltage to a suitable lower level so that the battery could be charged.

c. Battery rental has been advocated since the first day of the campaign for electric vehicles. All of the batteries are rent rather than owned by the consumers. Users switch out the batteries for fully charged ones at the charging station. Just a few moments are required. The Vehicle should be designed to allow for such adjustments. charging of the vehicle's battery Energy storage within the station is another way to reduce peak demand through project components for the valleys.

6.CONCLUSION:

This paper discusses the most recent advancements in electric vehicle technology. The paper begins by describing the general structure and then moves on to discuss energy storage. It then progresses to future vehicle components. The paper provides an overview of the recent EV work.

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