

HYBRID VEHICLE- ELECTRIC GENERATOR WITH CHAIN DRIVE

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ABSTRACT

A Gasoline and Electric Powered Two Wheeler Hybrid Vehicle is an automobile which relies not only on batteries but also on an internal combustion engine which drives a generator to provide the electricity and also drive a wheel. It has great advantages over the previously used gasoline engine that drives the power from gasoline only. It also is a major source of air pollution. The objective is to design and fabricate a two wheeler hybrid electric vehicle powered by both battery and gasoline and contains a hub motor, generator drives with chain drive, controller, and batteries. In this source of drive we assemble the generator with sprocket and attached with chain drive. When the chain is drive then generator is also drive, it is produce electric current and this electric current we store in battery for drive the vehicle. The combination of both the power makes the vehicle dynamic in nature. It provides its owner with advantages in fuel economy and environmental impact over conventional automobiles. Hybrid electric vehicles combine an electric motor, battery and power system with an internal combustion engine to achieve better fuel economy and reduce toxic emissions.

Keywords—Hub motor, Generator, controller, Battery, switch, etc

1. INTRODUCTION :

With the invention of Internal Combustion Engine by NicolasOtto, there was revolution in Automobile field. Later on, Petrol and Diesel became the main source of fuel for these vehicles. This technology made Human Efforts very easy through commercializing in the market. As, the world went through 20th Century, there happened many advancements forming this technology efficient and cost-effective. Due, to which it became the commercial success and its use in the day to day period increased. People could reach thousands of kilometres/miles in hours with the help of this technology. As we know everything has its own positive and negative side. The rate of Carbon Monoxide (CO) and Carbon Dioxide (CO₂) suddenly increased at the dangerous level in the beginning of 21st Century which made a negative impact on Ecosystem, reason for Global Warming, Health related issues, etc. This forced Scientist, Researchers and Policymakers to focus or made them start thinking for Green Technology or the technology which can stop the adverse effect happening on Nature. Hence, the 21st Century will become the Century for Evolution in various technologies with the main focus in Automobile Sector.

“Toyota Prius Series” is an example of Hybrid Electric Vehicle technology, “Astrolab” is an example of Hybrid Solar Vehicle and “Chevrolet Volt” is an example of Plug-In Hybrid Electric Vehicle.

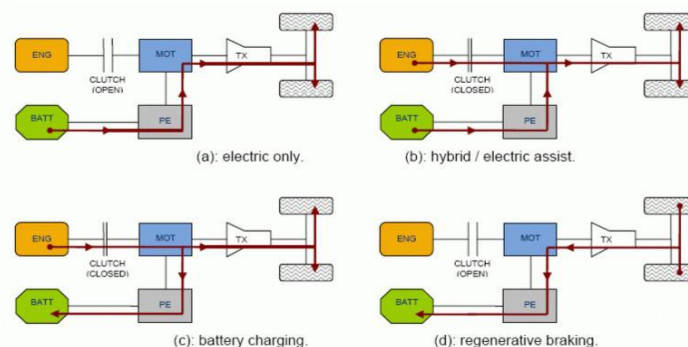


Fig. 1: Working Principle of Hybrid Vehicle

Regenerative braking is an energy recovery mechanism which slows down a vehicle by converting its kinetic energy into another form, normally into electrical energy, which can be used immediately or stored until needed in high voltage batteries. The electric motor is operated in reverse during braking or coasting, acting as generator. The rotors of electric traction motor are coupled with wheels, they experience opposing torque as current is induced in the motor coils. [12] The wheels transfer kinetic energy via drivetrain to generator. At the same time, generator resistance produced from the electricity created, slows the vehicle. When more braking torque is required than the generator alone can provide, additional braking is accomplished by friction brakes.

2. EASE OF USE

In this system for electrical output we are going to use lithium iron battery. And for power output hub motor will be assemble on real wheel of bike. When we are taking drive from the engine at the same time our hub motor will work as generator and charges the battery.

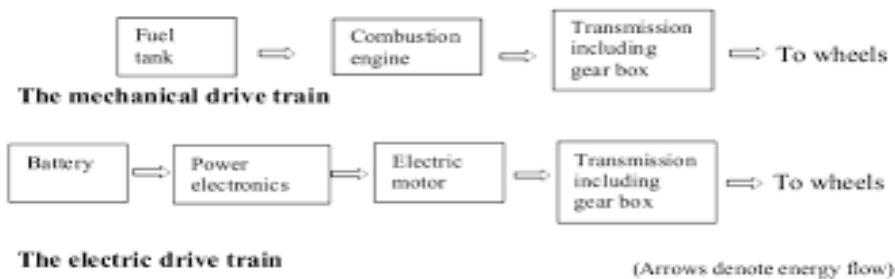


Fig. 2: Flow of energy within Mechanical & a electric drive train

BACKGROUND OF THE INVENTION

In the modern developing world, automobiles play a vital important role in the human need as its usage is increasing day by day. It has many highlighting benefits but it’s also a major contributor towards the air pollution.

Researchers are developing methodologies to solve these issues to make it smoother in our day to usage. In spite of recent efforts to improve fuel efficiency and minimize poisonous emissions in cars, levels of automotive emissions have increased consistently in the past two decades. For conservation of fossil fuels for future and enhancing the efficiency of vehicle an electric vehicle can be a major breakthrough.

A hybrid vehicle tackles these issues by combining the advantages of both the frameworks and uses both the control power sources at their efficient conditions. It has greatadvantages over the previously used conventional internal combustion engine that drives the power from fossil fuels only which is one of the major sources of air pollution.

However, there is a need to overcome these issues and our present invention overcomes the above said drawbacks eventually.

DESIGN DISCRIPTION.

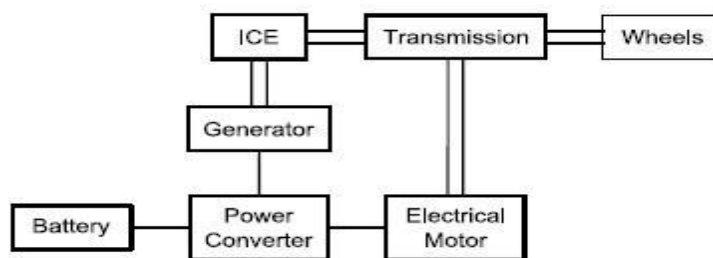


Fig. 3: Series-Parallel Hybrid Structure

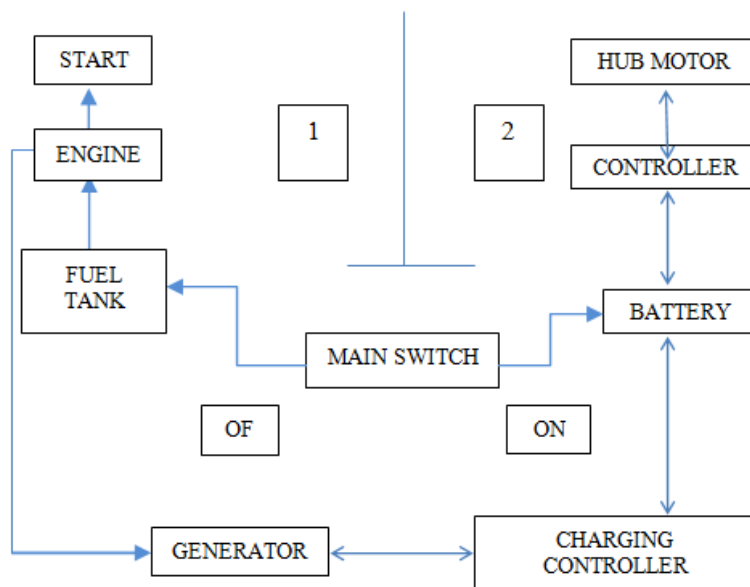


Fig. 4: On & Off Vehicle With Main Switch

Other features and advantages of the present invention will become apparent from the detailed description of the invention which follows, when considered in light of the accompanying drawings in which:

Fig 3 and Fig 4 is a block diagram showing the working mechanism between petrol engine and battery with the main switch on/off as intermediate. Referring to the Fig 5 wherein the engine is connected with petrol/fuel tank and the main switch. Then main switch controls the power on and off button of the battery. When the engine is in running condition, during that time the main switch power supply will be in off condition mode and during that time generator converts

the mechanical power to electrical power and it will be stored in our battery.

When we switch OFF the engine then we can switch ON the main switch for electrical operation after switching the system then that time battery pass the electric current to controller and then it passes to hub motor then vehicle runs on battery, hub motor, and controller.

DETAILED DESCRIPTION OF THE INVENTION

The principles of operation, design configurations and evaluation values in these non-limiting examples can be varied and are merely cited to illustrate at least one embodiment of the invention, without limiting the scope thereof.

The embodiments will be described in detail with corresponding marked references to the drawings, in which the illustrative components of the invention are outlined. The embodiments disclosed herein can be expressed in different forms and should not be considered as limited to the listed embodiments in the disclosed invention. The various embodiments outlined in the subsequent sections are construed such that it provides a complete and a thorough understanding of the disclosed invention, by clearly describing the scope of the invention, for those skilled in the art.

The hub motor electromagnetic fields are supplied to the stationary windings of the motor. The outer part of the motor follows, or tries to follow, those fields, turning the attached wheel. In a brushed motor, energy is transferred by brushes contacting the rotating shaft of the motor. Energy is transferred in a brushless motor electronically, eliminating physical contact between stationary and moving parts.

A hub motor typically is designed in one of three configurations. Considered least practical is an axial-flux motor, where the stator windings are typically sandwiched between sets of magnets. The other two configurations are both radial designs with the motormagnets bonded to the rotor; in one, the inner rotation motor, the rotor sits inside the stator, as in a conventional motor. In the other, the outer-rotation motor, the rotor sits outside the stator and rotates around it. The application of hub motors in vehicular uses is still evolving, and neither configuration has become standard.

Electric motors have their greatest torque at startup, making them ideal for vehicles as they need the most torque at startup too. The PLDC GENERATOR HUBMOTOR's Voltage is 72v, Watt- 2000w and its carrying capacity is 300kgs.

The Generator is a 13 tooth 5mm belt sprocket with base. The mounting bracket is a 4-bolt bracket (threaded M6) on the base of the motor. This motor is capable of rotation in either the clockwise or counter clockwise direction by just reversing the battery polarity to the motor and it can be speed controlled

The Voltage is 72VDC, and the motor type is brush, whereas the Output is 1000 Watts

Sprocket is 11 tooth (when it is applied to a T8F chain), 72 V & 1000W, and the Torque is 2.56n.m with No of load speed is 3350 rpm.

The battery used for the inventions is lithium batteries. The lithium batteries should be charged in three stages, which are constant-current charge, topping charge and float charge. The constant-current charge applies the bulk of the charge and takes up roughly half of the required charge time; the topping charge continues at a lower charge current and provides saturation, and the float charge compensates for the loss caused by self-discharge. The ratings are 72V-30AH Batteries which are Sealed and maintenance free lithium battery with nominal voltage of 72 Volts complete Bank.

The brushless motor controller rated voltage is 72 volts rated power of 1500 watts phase angle: self-study throttle voltage: 1.1-4.2v brake level: high/low under voltage protection of 42 volts \pm 0.5v 3 phase 60 or 120brushless motor. The Operating conditions are -40~80 c size: 24.5x8.7x4.3cm fitment which is suitable for electric bicycle & scooter, mechanical or electric forklift etc.

The Rated power is 250-4000w during the brushless motor controller the vehicle will automatically stop during the release of the accelerator handle. The Power assistant is needed during when starting on the hill stations.

The Switch & Throttle is made up of Aluminium Alloy and Rubber, it Weights approx. 170g and Wire Length of approx. 2m / 78.7". The key switch type is Compatible with Suitable for 12V-99V Electric Bicycle Fitment for 22.2mm diameter handle. The Working Voltage is Throttle DC0.8-4.2V, battery level indicator, 12-84V automatically identifies. The Application for any battery such as lithium battery, lead-acid battery can be used. It is Compatible with Universal throttle for electric bike, scooter, tricycle, and other electric vehicle etc.

As per all components for this hybrid vehicle;

- i. bldchubmotor;
- ii. generator;
- iii. battery;
- iv. controller;
- v. switch & throttle;

➤ DESIGN SPECIFICATION

1. BLDC HUBMOTOR

Voltage-72v

Watt-2000w

Carring capacity- 300kgs

2. GENERATOR

Voltage: 72VDC

Type: Brush

Output: 1000 Watts

Sprocket: 11 tooth (apply to a T8F chain)

It's have a 72 V & 1000W

Torque 2.56n.m

No load speed: 3350 rpm.

Sprocket: 11 tooth

3. BATTERY

RATINGS: 72V-30AH Batteries

BATTERY: 72 Volts

TYPE: Sealed and maintenance free Lead Acid battery.

NOMINAL VOLTAGE: 72 Volts complete Bank

4. CONTROLLER

Controller 72 v

Rated power: 250-4000w

It is brushless motor controller

5. SWITCH& THROTTLE

Material: Aluminium Alloy + Rubber

Weight: approx. 170g

Wire Length: approx. 2m / 78.7"

Type: key switch

Compatible With: Suitable for 12V-99V Electric Bicycle

Fitment: Fit for 22.2mm diameter handle

Working Voltage: Throttle DC0.8-4.2V, battery level indicator, 12-84V automatically identify. Application for any battery such as lithium battery , lead-acid battery

Compatible With: Universal throttle for electric bike, scooter, tricycle, and other electric vehicle

RESULT

- Source of power will be increased.
- Pollution will be decreased.
- It is eco friendly
- Maintenance will be minimized.
- Easy to operate
- Save fuel

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