ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 11, March 2017

ELECTRIC VEHICLE USING BLDC MOTOR WITH DYNAMO CHARGING

P.VINOTH KUMAR
(Student): EEE Department
K. Ramakrishnan College of Engineering
Trichy, India
e-mail:vinothkumar27296@gmail.com

S.MANOJKUMAR
(Student): EEE Department
K. Ramakrishnan College of Engineering
Trichy, India
e-mail:smartsoju31@gmail.com

P.SUBAS
(Student): EEE Department
K. Ramakrishnan College of Engineering
Trichy, India
e-mail:subas32895@gmail.com

M.VEERAPRAKASH
(Student): EEE Department
K. Ramakrishnan College of Engineering
Trichy, India
e-mail:pveera50@gmail.com

***Abstract*— Electric vehicle (EV) are gaining increasing attention for having unique features such as low emission, high efficiency, quiet operation etc. However, the chemical batteries have many short comings such as limited cycle life, limited power density as well as high cost. In the present rendition electric vehicle is not self-charging and endures with more batteries. In this project, in addition with the electric vehicle technology we are adding up dynamos with the vehicle. Conventionally, dynamos are used for lighting purpose in bicycle. Here we are using dynamos for running the vehicle as well as charging the vehicle. The rate of electric vehicle is controlled by controller, which guarantee the electric vehicle security, which is done by ATMEGA08 Controller. In order to provide an efficient acceleration of an electric vehicle, we use BLDC motor. The results confirm that petrol and diesel can be exists for current scenario, so future scope depends only on electric bike.**

Keywords—dynamo; bldc motor; atmega08; self-charging;

I. INTRODUCTION

This course will deal primarily with electric vehicles used for personal transportation where internal combustion engine is replaced by a battery and electric motor drive. This course is devoted to providing you with information on how to convert a conventional automobile to an electric vehicle. The principles of alternating current, direct current, motors, speed controls, batteries, relays, battery chargers and provided to you. Components including chassis, transmissions, wheel and brakes are presented. Information will be basics for design of the conversion electrical hazards of batteries, and high ampere and high voltage wiring will be presented. These electric vehicle are differing from a type of battery used and the electric vehicle are designed based on the power of the motor and weight motor power rating. Electric vehicle use 3-4 no's of 12v battery for different power of motors. These batteries are connected in series, so voltage build up to 3 batteries in 36v and 4 batteries in 48v main weight of vehicle is battery. Then battery recharged by separate EB AC supply. This recharged time approximately 6-8 hours/per charge. The market available electric vehicle use BLDC motor for drive purpose. Our paper will improve the performance of vehicle by using dynamo and speed regulation of motor. Present rendition electric vehicle is not self-charging and endures with more weight batteries. The drawback of electric vehicle requires frequent charging of battery. The electric vehicle running cost is very low, when compare to other sources of energy. In order to provide a efficient acceleration of electric vehicle, we use BLDC motor. This motor is directly connected to the dynamo which produces electric energy. This energy stored into battery the battery is recharging simultaneously with the help of dynamo rotation. .

A. DYNAMO

A dynamo is an electrical generator that produces direct current with the use of the commutator. Dynamos were the first electrical generators capable of delivering power for industry, and the foundation upon which many other later electric power

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 11, March 2017

conversion device were based, including the electric motor, the alternating-current alternator, and the rotary converter. Today, the simpler alternator dominates large scale power generation, for efficiency, reliability and cost reasons. A dynamo has the disadvantages of a mechanical commutator. Also, converting alternating to direct current using power rectification devices(vacuum tube are more recently solid state) is effective and usually economical.

II. HOW DYNAMO WORKS

Before A Bicycle dynamo is a type of generator attached to a bicycle to produce electricity for the bicycle's lights . the top of the dynamo touches the tire's rim, which spins when the bicycle starts moving currently, the term dynamo refers to mechanisms that are capable of producing direct current, such as the small devices fitted to bicycles to generate power for the lights.

Typically, a bicycle dynamo has one or more permanent magnets with coils of wire spinning inside there poles. The device consists of stationary part called a stator and a rotating part called an armature. When the coil spins in the magnetic field created by the magnets, the magnetic flux begins to change trough the coils, resulting in an electric field that generates the charge carriers through the wire. This process produces an electric current. Small bicycle dynamos attain a low efficiency in converting mechanical motion into electricity. However there are large machines such as water wheels that attain high efficiency under ideal conditions. .[2] discussed about principles of Semiconductors which forms the basis of Electronic Devices and Components.

A. Ab Brushless Direct Current Motor

D picking an engine was the initial phase in making a suitable framework for the electric bicycle. At first, the task was to be driven by dc miniaturized scale engines that were arranged to turn a sprocket. The sprocket is utilized to transmit revolving movement between two shafts. To change riggings and rates of the bike, the breadth of the sprocket should be changed. Rather than having various estimated sprockets in parallel, the underlying thought was to put numerous miniaturized scale engines in parallel to expand the measure of current supply to the sprocket for more yield force. This framework appeared to be over confused and the smaller scale engines would not supply enough power and torque to bolster a bike at the high speeds it was settled that the best arrangement in driving the bicycle is with an electric dc engine; along these lines, making an electric bicycle. In the dc engine, a static field flux is impelled utilizing lasting magnets or a stator field winding situated on the rotor of the dc engine is the armature winding. The armature winding is the arrangement of leading loops, each associated in fragments of a commutator that are twisted around the iron center in which voltage is incited. This causes it to pivot inside an attractive field; with the wires are broken are harmed, the armature won't turn appropriately. For the dc engine to create any torque, the curls of the armature must be associated with an outside dc circuit with a considerably number of brush heads. Figure demonstrates a circuit model of a dc engine. e.

B. The main advantages and characteristics of a BLDC motor compare to conventional DC motor include.

- Longer life and higher reliability
- Higher efficiency
- Ability to operate at various speeds, including high speed applications
- Can reach peak torque from stand still
- Construction of motor rigid
- Operational in vacuum or in explosive or hazardous environments
- Eliminates radio frequency interference due to brush commutation
- Heat is generated in the stator: Easier to remove and maintain.
- Rotor has permanent magnets vs. coils thus lighter less inertia: Easier to start and stop
- Linear torque/current relationship smooth acceleration or constant torque
- Higher torque ripple due to lack of information between sectors

C. BOOST CONVERTERS

Switched mode supplies can be used for many purposes including DC to DC converters. Often, although a dc supply, such as a battery may be available, its available voltage is not suitable for the system being supplied. For example, the motors used in driving electric automobiles require much higher voltages, in the region of 500V, than could be supplied by a battery alone. Even if bank of batteries where used, the extra weight and space taken up would be too great to be practical. The answer to this problem is to use fewer batteries and to boost the available dc voltage to the required level by using the boost converter. Another problem with the batteries, large or small, is that their output voltage varies as the available charge is used up, and at some point the battery voltage becomes too low to power the circuit being supplied. However, if this low output level can be boosted back up to a useful level again, by using a

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 11, March 2017

boost converter, the life of the battery can be extended.

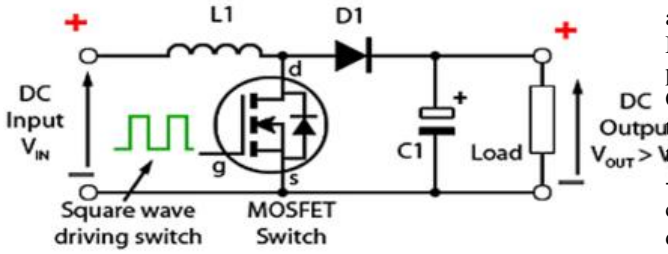

Figure 1: Diagram of boost converter

- *MODE:1*

The circuit action during the initial high period of the high frequency square wave applied to the MOSFET gate at start up. During this time MOSFET conducts, placing a short circuit from the right had side of L1 to the negative input supply terminal therefore a current flows between the positive and negative terminals through L1, which stores energy in its magnetic field. There is virtually no current flowing in the remainder of the circuit as the combination of D1, C1 And the load represent much higher impedance than the path directly through the heavily conducting MOSFET.

The current path during a low period of the switching square wave cycle. As the MOSFET is rapidly turned off the sudden drop in current causes L1 to produce a back emf. In there opposite polarity to the voltage across L1 during the ON period to keep current flowing. This results in two voltages, the supply voltage Vin and the back emf (V1) across L1 in series with each other.

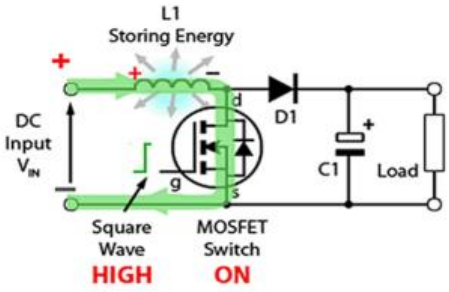

Figure 2: Diagram for Mode1 operation

This higher voltage (Vin +V1), now there is no current path through the MOSFET, forward biases D1. The resulting current through D1 charges up C1 to Vin +V1 minus the small forward voltage drop across D1 and also supplies the load.

- MODE: 2

The circuit action during MOSFET on periods after the initial starter. Each time the MOSFET conducts, the cathode of D1 is more positive then its anode, due to the charge of C1. D1 is therefore turned off so the output of the circuit is isolated from the input; however the load continues to be supplied with Vin +V1 from the charge of C1. Although the charge C1 drains away through the load during this period, C1 is recharged each time the MOSFET switches off, so maintain an almost study output voltage across the load.

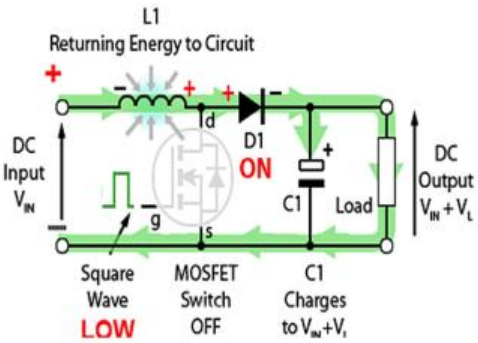

Figure 3: Diagram for Mode2 operation

III. OPERATION MODE OF ELECTRIC VEHICLE.

A. Vehicle normal mode:

Whenever the motor power Pmotor is equal or less than the battery rated power PBattrated, the vehicle normal mode is activated. In this mode, the battery voltage is higher than the generaateed voltage,D1 is revers biased. This type of energy flow happens in the normal mode. Moreover, the buck converter is turned off and the capactior module is idle. The battery pack solely supplies the DC motor inn this condition.

B.During the vehicle acceleration .

The motor power Pmotor exceeds the battery rated power PBattrated which here is refer to vehicle acceleration mode. In this mode, the battery pack could undergo frequent deep discharge cycless and the performance of the vehicle could also be degraded. In such conditions, if the generated voltage is greater than the minimum threshold (Vsc>=VSCin), thhe regenerator starts to assist the battery pack through the dc-dc converter .

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 11, March 2017

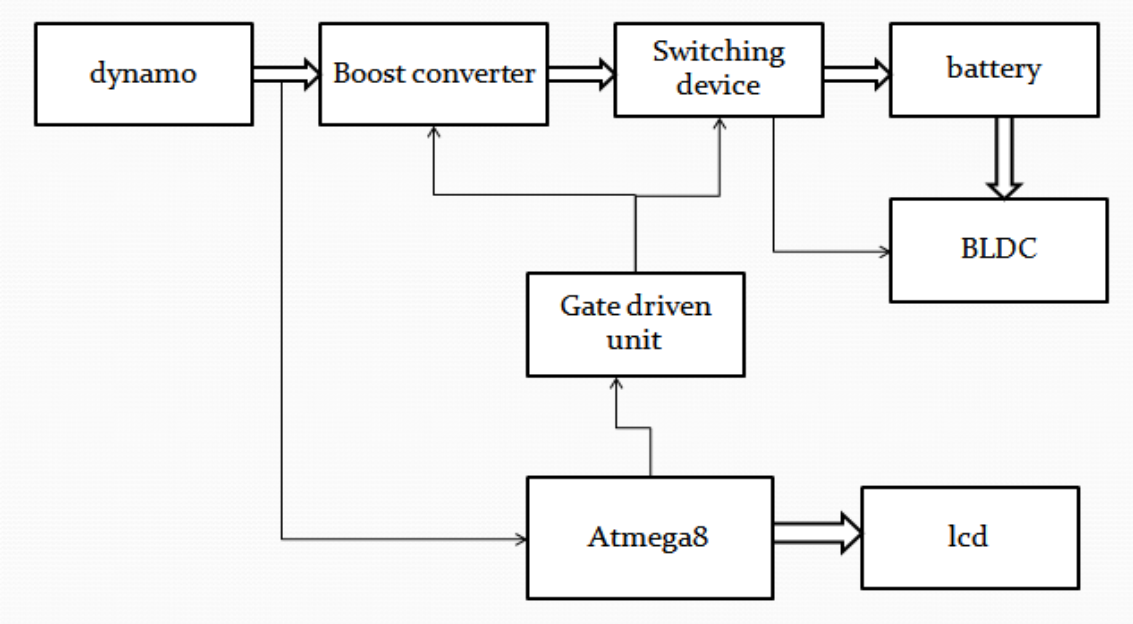

Fig 4: Block diagram of electric vehicle using dynamo charging

B. F LCD INTERFACING es

1) P LCD(liquid crystal display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly useed in various devices and circuits. These module are preferred over seven segments and other multi segments LEDs. The reasons being : LCDs are economical; easily programmable; have no limitation of displaying special& even custom characters (unlike in seven segments), animations and so on.

2) A 16x2 LCD means it can display 16 characters perr line and there are 2 such lines. In tese LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, command and data.

3) The command register stores the command instructions given to the LCDs. A command is an instructon given to the LCD to do a predefined task ;ike initializing it, clearing its screen, setting the cursor position, controlling display etc. the data register stores the data to be displayed on the LCD. The data iis the ASC2 value of the character to be displayed on the LCDe.

PROTEUS

Proteus PCB design electronic circuits can computer –aided design and circuit boards are designed. The intelligent schematic input system is the environment for the design and simulation and electronic circuits.

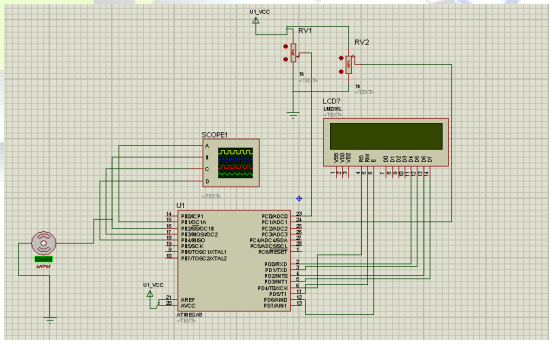

Figure 4: Proteus diagram for electric vehicle

Atmega08

The ATMEGA08 is a low power, high - performance CMOS 8bit microcontroller with 8k bytes of in system programmable flash memory. The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 11, March 2017

with the industry standard 80C51 instruction set and pin out. The on-chip flash allows the program memory to be reprogrammed in system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in – system programmable Flash on a monolithic chip, the Atmel's is a powerful microcontroller which provides a high flexible and cost effective function solution to many embedded applications.

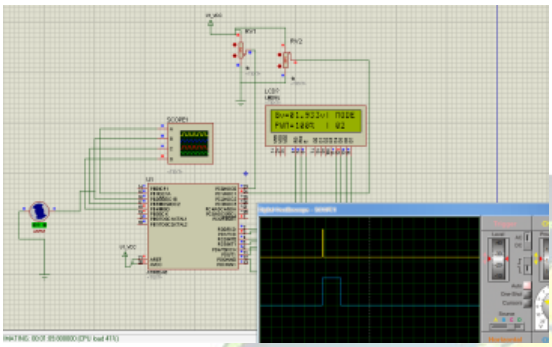

Figure 5: Battery charging and discharging using dynamo

Acknowledgment

Author would like to thank Mr. Subramaniya siva for their encouragement in carrying out this work. We also thank our colleagues for their technical support and in documentation of this paper.

Reference

[1] G.Robert cong, rodney martinez,mark casilkng, peter vong electric bicycle system. (*references*)

[2] Christo Ananth, S.Esakki Rajavel, S.Allwin Devaraj, P.Kannan. "Electronic Devices.", ACES Publishers, Tirunelveli, India, ISBN: 978-81-910-747-6-5, Volume 2,December 2014, pp:1-300.

[3] I Vicroads website. Vicroads "power assisted power bicycles " 0.

[4] K yogesh jadhav, self chargig electric bicycle in volume: four space issue: four, 2015.

[5] Farshid naseri an efficient regenerative breaking system based on battery/super capacitor for electric, hybrid and plugf in hybrid electric vehicle with BLDC motor bol.9, no. 4, tp. 18 – 29, 2016.

[6] R Dr. k.v subba reddy, operation and deesigning of bidiractional DC-DC converterr for hybrid electric vehicle, vol.04, issue.03, march-2016.