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PORTABLE INVERTER CHARGING BY USING MOTOR CYCLE DYNAMO

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Abstract

Now days, every person has their own electronic gadgets. Facing a problem of charging of the gadgets, lots of new technologies are invented for that as back source but every time needs to carry during travelling. So there is an option for generation of electricity during travelling. This paper presents generation of electricity during travelling with their own motion. Motion can get converted into electricity with the help of dynamo as this simple principle power is generated over the motorcycle. Number of peoples use motorcycle in day to day life with the help of this motorcycle system generates electricity for their own purpose during transformation. The variable DC power regulated and stored in battery. This store power will ne used as DC supply or AC supply with the help of inverter so that any appliances can get powered.

Index Terms: *Dynamo, Battery, Inverter Circuit, Motor Cycle Wheel, etc.*

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1. INTRODUCTION

1.1 Problem Statement:

Our primary goal was to run the practical DC motor as generator (to keep cost low) by using generator. The battery will be charge and gives output of 6 V to 12 V. As the output of the battery is not regulated and filter it cannot be given directly to load like mobile, laptop, light load, etc.

1.2 Problem formulation:-

In order to design and construct our electrical power generation by using motor cycle wheel, we took the very systematic approach.

This system is based on the capability of the generator we have to use. By calculating the required gear ratio needed to achieve the required output voltage. In this system we have to build a structure by the supporting of the generator (DC dynamo), motor cycle wheel and extra gear (small wheel). Due to rotation of the small wheel, the shaft of the dynamo is rotated and the mechanical energy is converted into electrical energy. The system charge or discharge the controller, inverter and the charge indicator where they assemble parallel. The invertor circuit is feated and connected to a secure box.

The output of the DC dynamo is given to the battery and due to this the battery will charge. The terminals (negative and positive) are connected to the input of the inverter circuit. By using the SMPS step-up transformer inside the inverter circuit, the output of the inverter is single phase 230 Volts, 50 Hz. This output supply is given to the mobiles, laptops, light load, etc. or single phase appliances.

2. BLOCK DIAGRAM

In this paper, portable inverter charging set by using motorcycle (bike), with the help of following block diagram.

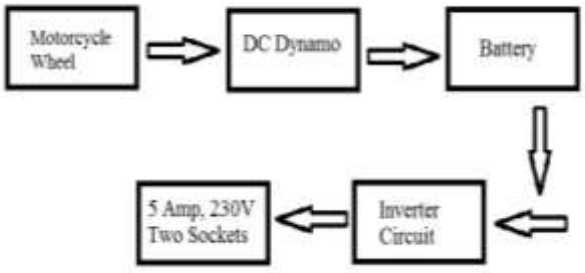

Fig.1. Block Diagram.

The main function of this system is simply to charge the battery array which generate the 12 Volts DC by using motorcycle wheel. The given design system is considered successfully, primary and secondary objectives are as follows:

1. Primary Objective:-

- The running cost of this system is less.
- The initial cost of the system is less.
- It can be provide highly safety.

2. Secondary Objective:-

- This system is provided by high energy efficiency.
- This system has long life.

3. WORKING PRINCIPLE

With the help of motor cycle wheel, the rotating energy converted into mechanical energy as the motor cycle wheel is mechanically coupled with the shaft of the DC machine. The mechanical energy is converted into electrical energy by using DC machine. The speed of the motor cycle wheel is not constant due to this output electrical energy is also be variable. The small DC machine gives 6 Volts to 12 Volts according to the velocity of motor cycle wheel.

According to the variation of the wheel speed, the output current also varies. Then constant 4.7 Volts output supply is given by Zener Diode. This voltage is used to charge our mobile phone, laptop, etc. Where the mobile phone battery has rating 3.6 Volts,900 mA or 2000 mA. So 1 hrs 45 mins time will requires to fully charging the battery . This system idea is very suitable for common people, as the output of dynamo is being given to input of the full wave rectifier. The full wave rectifier has DC output which is given to BUCK-BOOST convertor. The main function of BUCK-BOOST convertor is to decrease or increase pulsating DC output for required load. With the help of BUCK-BOOST convertor, we increase the voltage in this system.

4. ACTUAL CONCEPT

In given system, by using motor cycle and DC dynamo the power will be generated by using dynamo which is fixed at the front wheel .The motor cycle speed will be increases in this case by using the front wheel to produce the mechanical energy , this mechanical energy is converted into electrical energy which is DC voltage. This DC voltage can be directly used to store the battery array by using the inverter circuit. The 6 Volts to 12 Volts DC is converted into 230 Volts AC series supply with the help of motor cycle wheel. The electricity is generated by using DC dynamo. In this system, the permanent magnet motor or dynamo can be use as a generator for charging of the battery. By using motor cycle, Due to the small wheel connected into D.C dynamo is rotated over a motorcycle wheel than the shaft of the DC dynamo can be rotated. As the more number of coil turns is used inside the dynamo due to this more voltage will be produce. The DC dynamo will generate the alternating emf output.

5. CHARGING CIRCUIT

The dynamo attach to the motor cycle wheel for electrical power generation. As the dynamo is connected to motor cycle wheel, this results dynamo shaft is rotate and electrical energy produce. The dynamo output is given to the rectifier circuit then to the voltage regulator. This DC regulated output is use for charging the lead acid battery.

6. MECHANICAL COUPLING

Fig 2. Dynamo fixed in Coupling.

Fig 3. Mechanical Coupling.

The fig.2 shows the two iron sheet which is welded. Between two iron sheet dynamo is fixed and shaft of the dynamo is mechanically coupled with small wheel. This small wheel is rotated over a motor cycle which shows fig.3 The mechanical coupling is used in system. The too simple mechanical structure mounted on a front shock-up of the motor cycle. This coupling holds the dynamo which can rolls on the motor cycle wheel. As the wheel rotates with the speed then the dynamo connected to wheel also rotates with the speed of motor cycle and then this

dynamo gets mechanical input and it convert mechanical energy into electrical energy.

This mechanical coupling is made in work shop by using simple iron sheets and angles. This can be welded with proper design, nuts and bolts.

7. DYNAMO

Fig.4. DC Dynamo

This fig shows the DC dynamo. By using the solid stand in place, there are more option for the motor setup in this system. In this system, it includes the DC motor as a generator alternator. The DC motor is to connect with the spinning back wheel directly to shaft of motor. The two options are to either have a direct coupled between the back wheel and motor shaft by using more grip between the wheel and shaft. The DC output of dynamo is given to battery.

When the small wheel is connected to shaft of dynamo rotates. When the rotor rotates in magnetic field it cuts the magnetic flux. Then according to the Faraday's law of Electromagnetic Induction, whenever conductor cuts the magnetic flux, emf is induced in the conductor. Therefore current flows to the armature winding with the help of commutator and brushes, DC power is collected.

7. BATTERY

Fig.5. Battery

Battery is a device which stores the electrical energy in the form of chemical energy and whenever there is need, it provides energy in electrical form. We use 6 Volts to 12 Volts lead acid battery. The charging current of battery is 2.25 Amps. Where the battery capacity is always measures in Amp-Hour and it has capacity 5 Amp-hr.

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8. INVERTOR CIRCUIT

With the help of SMPS(Switch Mode Power Supply) transformer, the voltage is step-up in 230 Volts AC. This 230 Volts AC can be used for charging laptop, mobile, etc. and it is specially use for light load application. The input of the inverter is 12 Volts by using battery. The output of the inverter is 115 to 230 Volts AC. This is the great solution for having easy to use as portable power supply. It is important to the discriminating in the purchasing process. In this system, by small inverter circuit with an automotive battery, this will make work suitable. Most of battery power supply will last for 25 to 55 minutes before they need to recharge. The output of the inverter circuit is single phase 230 Volts, 5 Amps, 50 Hz.

8.1 SMPS Circuit:

By using SMPS (Switch Mode Power Supply) transformer, off time and on time of the switches will control and also control the power delivered to the load (load circuit). The transformer voltage pulse is a portion of an overall cycle time (ton and toff). The operating system is inversely proportional to the total cycle time. The control of switching on and off time increase with duty cycle and pulse width modulation. In this system, we required small power supply which convert the power from conventional low frequency AC wall socket (eg. 230 Volts, 50 Hz) is necessary current voltage. The need well regulated DC voltage. The AC will be change by changing the DC input voltage. Due to this, the good regulation voltage cannot be assure. The SMPS (Switch Mode Power Supply) transformer provides more regulated output voltage. In the SMPS transformer, the AC rectification is not compulsory. The SMPS transformer pulse width modulation is used to control regulation.

9. ADVANTAGE

- Low initial Cost.
- It helps, preserve and protect the environment for future generation.
- In this system, the use of energy efficiency will be high.
- It requires small place.
- It is very safe to use.
- As it is portable and provide flexibility so it can carry anywhere you want and provide the availability of supply.
- Maintenance cost is less.
- Size of inverter circuit is small.
- Life of system is very long.
- No regular maintenance is required.
- Extra cost of the generator maintenance is avoided.
- This system helps to generate electrical energy without using any fossil fuels.

10. APPLICATION

- In any moving system, there is no charging facility so this very useful while travelling.
- It can be use for long distance travelling.
- This electrical energy generating mechanism may be use to light load.
- It can be used for the agricultural purpose like fencing sprayers.
- It can use for charging of mobile, laptop, etc.
- The area in which the load shading is occurs, this system can be use.

11. RESULT

Vehicle Speed (KM/Hr)	Machine Speed (RPM)	Induced O/p Voltage (Volt)
20	382	1.9
30	685	3.4
40	906	4.5
50	1286	6.4

The rotational energy of the dynamo is used to operate small devices. The motor cycle with dynamo is a power generator that we have design and constructed. Our system is capable for an output 60 watts total. But our wheel speed is able to achieve half of this power output.

The cost is kept in a budget. This system include over charging prevention in the charge controller. When the fly wheel is connect before the generator to smooth out torque sparkes. The more powerful generator and larger battery among any number of other improvements. The overall design of this system is depend on the need of the user by varying load much more efficiently but the above are the most significant charger.

12. FUTURE SCOPE

- The efficiency of the system can be improved by increasing battery capacity.
- It can be use for electrifying the vehicle.
- It can be use for charging of laptop.
- Size can be reduce to make it compact.
- This can be suitable for long distance travelling.

13. CONCLUSION

The basic concept of portable inverter charging by using motor cycle dynamo is given in this paper. Working of dynamo and inverter for this system is explain by us. Also the working principle actual concept, how mechanical energy can be done, which dynamo and battery can be used and also about inverter circuit and SMPS (Switch Mode Power Supply) transformer is explained in detailed.

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