

AN ECO FRIENDLY(SOLAR) FOUR WHEELER BLDC MOTOR

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ABSTRACT

Solar car can be characterized as a green means of transport which is powered by renewable energy with zero carbon emission. Various numbers of solar race events structured around the world has propelled the continue improvement of solar cars by different research teams. These events have become the proposal for universities and private companies to platform their latest technologies and has been observed to boost significance over the producing a realistic solar car suitable for recently developed a solar car using off-the-shelf components in order to diminish the development cost. It offered a big challenge in order to reduce the development cost. It presented a big confront to the team in combining those apparatus while aspiring to achieve optimum functional conditions. This project describes the design concept of this 'alternative' solar car with the concepts of the mechanical, electrical and systems.

KEYWORDS: Solar vehicle ,BLDC motor, Charger controller, PWM converter

I. INTRODUCTION

Solar energy is kind of simply the energy made directly by the sun and chosen up somewhere else, unremarkably the world. Solely a really tiny fraction of the complete radiation made reaches the Earth. a lot of the world's needed energy will be equipped directly by star power. In today's climate of growing energy wants and growing environmental concern, alternatives to the utilization of non-renewable and polluting fossil fuels have to be compelled to be investigated. One such various is solar power. Solar automobile depend upon electrical phenomenon cells to convert daylight in to electricity. in contrast to star thermal energy that converts star energy to heat for either family functions, industrial functions or to be regenerate to electricity. Solar automobile mix technology usually employed in the region, bicycle, energy automotive industries. the planning of a star vehicle is strictly limited by the quantity of energy input to the automobile. Most star automobile have been calculated for the purpose of the star vehicle races. Some prototypes are designed for public use, though no cars primarily high-powered by the sun square measure on the market commercially. Solar cars depends on star array that uses electrical phenomenon cells (PV cells) to convert daylight in ton electricity in contrast to star thermal energy that converts star energy to heat, PV cells directly convert daylight into electricity. once daylight (photons) strikes PV cells, they excite electrons and permit them to flow, making an electrical current. PV cells square measure created from semiconductor materials such as chemical element and permits of metallic element, atomic number 31 and N. Crystalline chemical element is that the majority typical material used and has an potency rate of 15-20%. The quests for a constant, safe, clean, environmental friendly fuel is never-ending. Carbon-based fuels, such as fossil fuels square measure indefensible and adventurous to the environment. a number of the alternatives square measure renewable energy sources that symbolize all fuel sorts and energy carriers, totally different from the fossil ones, like the sun, wind, tides, hydropower and a biomass. Due to its inestimable edges environmental, financial and social aspects PV system have becomes the world's quickest growing energy technology. It will arguably be same that the sole limitations to alternative energy as energy supply is our understanding of developing economical a value effective technology which might implement it. rides. Nothing on the world is freed from value, however what if we tend to might realize some way to implement free Indeed it would be amazing if our cars might keep on to run while not U.S. having to pay billions on fossil fuels every year and to deal natural hazard that their combustion leave behind. If we tend to might drive a solar-powered automobile, that motor vehicle dream would return true. Star cars would bind energy from the star panels. A star panel is packaged , connected assembly of star cells, additionally referred to

as PV cells that square measure solid state devices that square assess converts solar power into electricity through quantum mechanical transitions. They're settle down and pollution-free with no rotating components and wish minimum maintenance the electricity so generated would then fuel the battery that might be the car's motors. Thus we might get AN electrically driven vehicle that to travel on "free" energy with no destructive emissions, which will utilize and full power in the least speeds and would have little or no protection value.

II. METHODOLOGY

The series of batteries that produce 48v as output is associated across the charge controller which help to charge the batteries from both the solar panel and plug-in charging; the power from the batteries is given to motor controller from beginning to end fuse and circuit breaker which help to protect the equipment. The controller provide stepped amount produced signal to the motor according to the given acceleration. The gear changers are use to for changing forward and reverse direction.

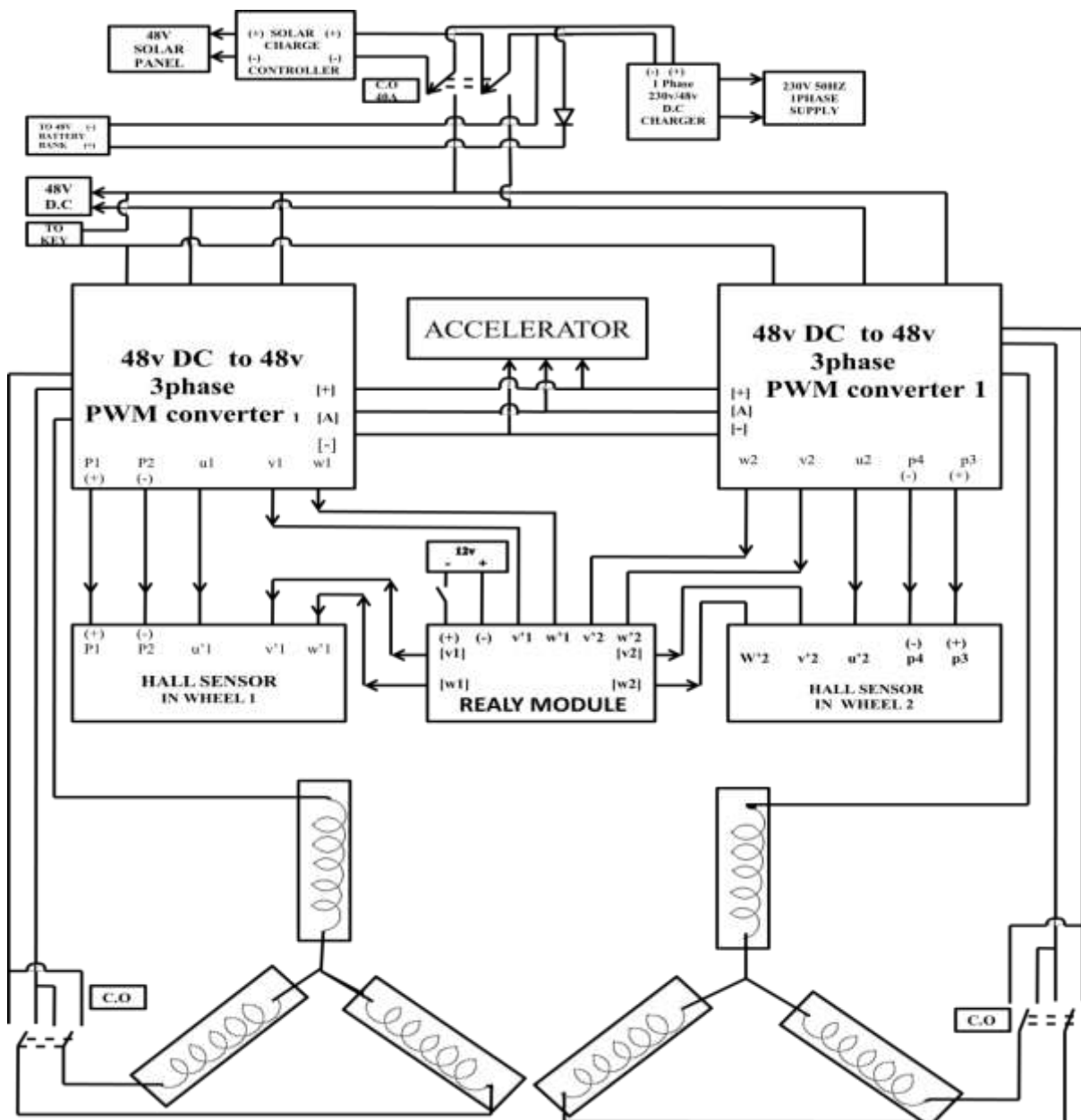


Fig-1: Internal wiring diagram of solar car

III. MODELING AND ANALYSIS

a) Charge control circuit:

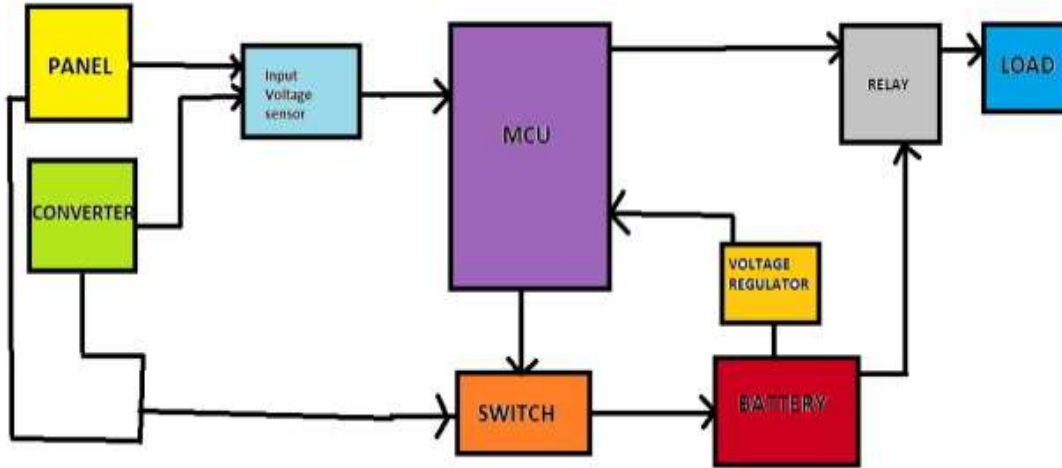


Fig-2: Block diagram of charge controller

The most necessary charge controller fundamentally controls the device voltage and opens the circuit, tentative the charging, when the battery voltage ascents to a firm level. More charge controllers utilized a mechanical relay to open or push the circuit, halting or establishment power heading off to the electrical charge devices.

Usually solar power systems make utilize of 12v of batteries. Solar panels can convey much more voltage than is indebted to charge the battery. The charge voltage could be reserved at a finest level whereas the system desirable to totally charge the electric storage devices is fewer required. This permit the solar systems to work optimally regularly. By management higher voltage in the wires from the solar panels to the charge controller, power dissipation in the wires is fundamentally.

The solar charge controllers can be also control the reverse power flow. The charge controllers can differentiate when no power is originate from the solar panels and open the circuit unraveling the solar panels from the battery devices and stumbling the reverse current flow.

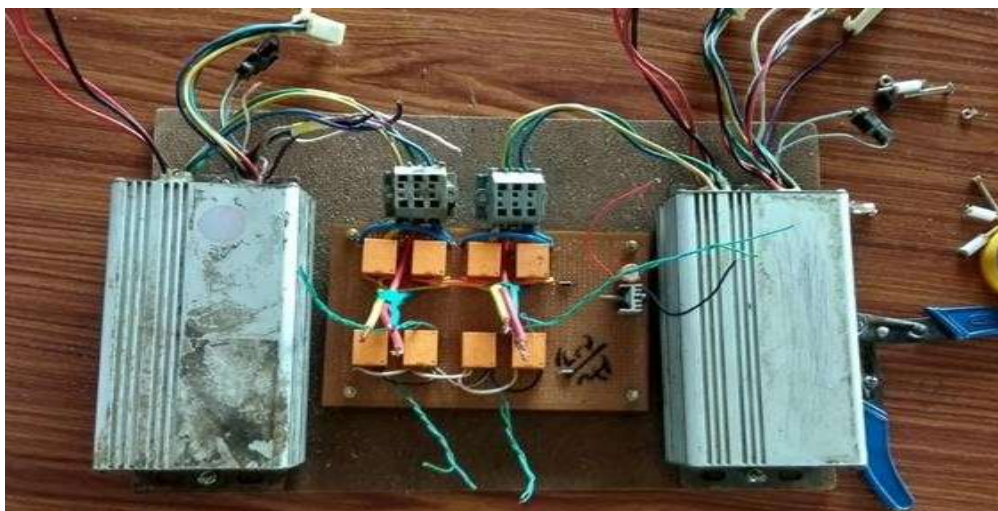


Fig-3: Charge controllers of solar vehicle

Operation:

The motor controller allow the motor to rotate at different speed; it takes the input from the battery and gives output for motor. The controller used in the solar car has an input and output rating of 48 to 60 volts and has a current rating of max 30 ampere. There are two outputs from the motor controller, one for the acceleration pedal and other for the motor. The internal circuitry for acceleration control further convert the input voltages into low current system. The motor controller adjusts the amount of energy that flows to motor to keep up a correspondence to the throttle. The motor use that energy to drive the wheels.

Present are two modes of battery charging in this circuit. At first, the solar panel collects the energy from sun and charges the battery using PWM charge controller. Here charge controller is used to regulate current and voltage using preset and it prevents the panel from overcharging. When there is no accessibility of closed manually, the stored energy in battery is fed to the motor controllers, the accelerates regulates the flow of current from controller to the motor. Then this energy is connected to motors and vehicle moves. With the help of direction regulator we n can obtain the forward and reverse directions. The brakes drum is provided which are used to control and stop the vehicle.

IV. RESULTS AND DISCUSSION

In order to deal with the growing demands for fuel and the devastating environment pollution due to driving carbon-based vehicles, it is reasonably necessary to switch to recent source of energy, i.e. the solar power which would be a low-cost, well-organized, limitless and of course an eco-friendly alternative. Solar-powered electric vehicles are safe no volatile fuel or hot exhaust systems. They are zero emission vehicles, odourless, smokeless and noiseless. They require least maintenance, are more trustworthy with little or no moving parts and can be efficiently charged nearly anywhere. Needless to say it is very much cost efficient. Since solar cars can easily add in future technology, we expect that it would not be long before the popular of the worlds people would control to driving this modern vehicle and thereby bring about a positive change in their lives and the surroundings. This is just the inauguration of a new technology and it is definite that future developments will make solar cars the largest mode of transportation over vehicles with internal ignition engines.



Fig-4: An eco-friendly BLDC solar car

Like solar-powered homes, star cars harness energy from the sun ever-changing it into electricity. This electricity fuels the battery that runs the car's motor instead of using a battery, some star cars direct the power straight to associate degree electrical motor. Nice example of the foremost recent star automotives are the university of Michigan star automotive, the Massachusetts Institute of Technology star automotive, and thus the Berkeley star automotive. Solar cars use physical phenomenon cells to convert daylight into energy. Physical phenomenon cells are the weather in star panels that convert the sun's energy to electricity. They created from semiconductors, usually Si, that absorbs the sunshine. The sun's energy frees electrons inside the semiconductors, creating a flow of electrons. That flow generates electricity that powers the battery and therefore the specialised a flow of electrons. That flow generates electricity that powers the battery and specialised motor in star cars.

V. CONCLUSION

In order to deal with the growing demands for fuel and the devastating environment pollution due to driving carbon-based vehicles, it is reasonably necessary to switch to recent source of energy, i.e. the solar power which would be a low-cost, well-organized, limitless and of course an eco-friendly alternative. Solar-powered electric vehicles are safe no volatile fuel or hot exhaust systems. They are zero emission vehicles, odourless, smokeless and noiseless. They require least maintenance, are more trustworthy with little or no moving parts and can be efficiently charged nearly anywhere. Needless to say it is very much cost efficient. Since solar cars can easily add in future technology, we expect that it would not be long before the popular of the worlds people would control to driving this modern vehicle and thereby bring about a positive change in their lives and the surroundings. This is just the inauguration of a new technology and it is definite that future developments will make solar cars the largest mode of transportation over vehicles with internal ignition engines.

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