

## Two Way Charging E-Bike

Mr. Anand Chopade<sup>1</sup>, Mr. Bhushan Dehankar<sup>2</sup>, Prof. P.V. Raut<sup>3</sup>

<sup>1,2</sup>UG Scholar Electrical Engineering DESCOET Dhamangaon (Rly.), Dhamangaon, Maharashtra.

<sup>3</sup>Prof. Priyanka Raut, Electrical Engineering Department DESCOET Dhamangaon (Rly) Engineering DESCOET Dhamangaon (Rly), Maharashtra, India

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**Abstract** - This paper introduces the improvement of a *partner degree, Electric Bicycle System* "with an imaginative methodology. The point of this paper is to demonstrate that the ordinary bi-cycle can be moved up to electric one by some means- that including the advancement of a regenerative stopping mechanism and imaginative BLDC engine control - yet in addition utilizes ongoing detecting and the forces of publicly supporting to enhance the cycling background; get more individuals riding bicycles; and to help in the structure and improvement of urban communities. Electric bicycles have at the same time picked up fame in numerous locales of the world and some have recommended that it could give a significantly more elevated amount of administration contrasted with existing frameworks.

There are a few difficulties that are connected electric bicycle plan: electric helped extend, energizing convention, and bicycle and battery checkout systems. This paper traces framework necessities to effectively create and send an electric bicycle, concentrating on framework design, operational ideas, and battery the board. In spite of the fact that there is minimal observational proof, electric bicycle could be achievable, contingent upon interest and battery the board, and can conceivably enhance the utility of existing bicycle frameworks.

**Key Words:** Cycle, lithium ion Battery, Charger, Head lights

### 1. INTRODUCTION

The current electric bikes are outfitted with rectifier for charging the battery that takes a shot at the principle supply. At the point when the battery is charging from the primary supply then the bike can't be utilized and it needs fundamental power supply at record-breaking amid charging. Our endeavor in this venture is to include other reviving instrument which can be utilized for decreasing the reliance over the fundamental supply for energizing the battery. The energizing component utilizes a sun based board or a DC generator. The sun based board utilized for charging the battery when the bike is very still and appropriate daylight is accessible. This aides in decreasing mains control utilization.

The utilization of DC generator is for reviving the battery while riding is conceivable just when bike isn't worked by engine. The DC generator structured and put with the end goal that it doesn't produce perceptible weight on pedal of the bike while riding the bike. The yield from these sources isn't consistent at unsurpassed thus it can't be utilized for

reviving the battery. Consistent yield voltage can be acquired by utilizing a DC-DC converter. A rectifier is additionally accommodated energizing the battery by utilizing primary supply when the other two sources are not turned out to be equipped for reviving the battery.

A 250W BLDC center point engine is utilized for running the bike it is fueled by utilizing 36V 12Ah battery. Rider can settle on decision that the bike is totally determined by the engine or not. Bike speed is fluctuated by utilizing throttle the most extreme speed of 20km/hour. For putting the BLDC center point engine with wheel in the bike we have done some modification in the bike. The BLDC center point engine is fitted with wheel that put in the front side. Front side is decided for setting Motor driven wheel is for associating the DC generator to the back wheel of the bike. The assurance of battery is another critical factor for guaranteeing the wellbeing for rider from battery blast and for enhancing the battery life.

### 1.1 Theory 1

The rate of electric bike is controlled by controller, which guarantee the electric bike security and it is additionally the center part. Fulfilled capacity of limit discovery, under-voltage insurance etc. Present rendition of Electric bike accessible in business sector is not self charging and this bike endures with more weight. Such bicycles utilized for short separation. The expression "SOLAR" (Self charging electric bike) is utilized to depict "electric-engine controlled bikes," including both completely and incompletely engine fueled bikes. This anticipate is comprise six separate parts: The Battery, Dynamo as a wind generator, the BLDC engine, controller, charging framework and sun oriented board. Utilization of disentangled Mechanical outline and less weighted dry cell batteries to defeat the above issues. Wind-sunlight based blend is utilized for self charging. Because of that bike get to be brilliant and pace is expanded. Charging time required for battery of this bike is less and releasing time is more. A few parts, for example, engine, controller, battery, senator were introduced in like manner bike, it is called electric bike.

As a result of PIC16F72 was taken as the principle control chip, make present day electric bike progressively more have a tendency to be wise. The main thrust of customary electric bike totally originate from engine, it diminish battery life extraordinarily as well as waste more power vitality.

The arrangement is outstandingly beneficial, sharp, and one day mass-made, especially in making countries where vehicle transportation is an unbelievable. Here, oneself charging electric bicycle business area would benefit by further research both on the battery and on the drive development and their usage with electric bicycles. A self-charging electric bicycle in light of a brushless dc motor drive which has high adequacy, zero defilement, perfect and accommodating, is then arranged and executed in this foresee.

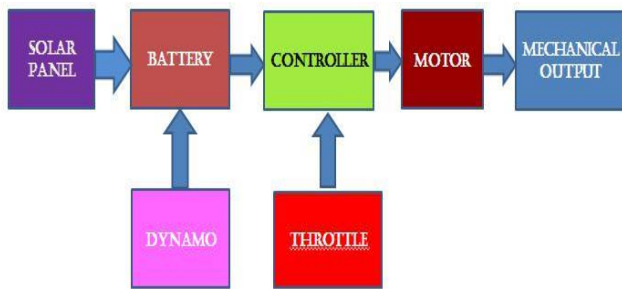


Fig -1: Block diagram

### 1.2 Description 2

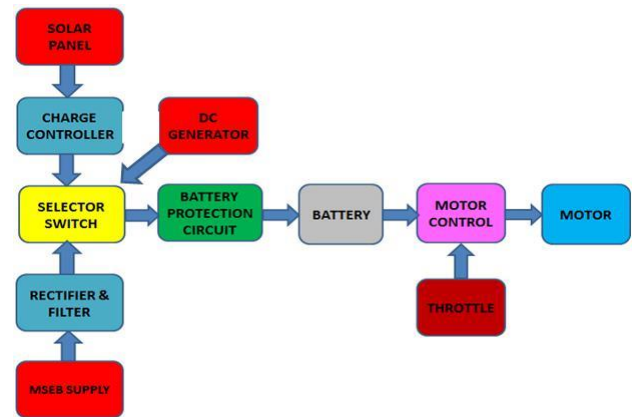
As we as a whole realize the fuel costs particularly the petroleum is rising consistently step by step. Again the contamination because of vehicles in metro urban areas and urban zones is expanding consistently. To defeat these issues, an exertion is being made to look through some other elective wellsprings of vitality for the vehicles. Once more, it is likewise not reasonable to buy vehicles (mopeds, bikes or cruisers) for all the class of society.

Remembering this, a look for some approach to cook these monetarily needy individuals and to give an answer for the natural contamination was in advancement. The sunlight based helped bike created is driven by DC engine fitted in front or back pivot lodging and worked by sun oriented vitality. The sun based boards mounted on the carriage will charge the battery and which thus drive the center engine. At the point when the bike is inert, the sun powered board will charge the battery.

This plan will supplant the petroleum motor, the apparatus confine and the fuel tank instance of a bike or a chain sprocket, chain and rigging moving course of action of a regular bike being utilized by most normal man. As a piece of thesis work, the sunlight based helped bike is fitted with a dc center point engine on front pivot of a bike with power rating of 250W and with a voyaging rate of around 25-30 kmph. It is furnished with a couple of lead corrosive batteries of 35 Ah each, a photovoltaic sun based board with limit of 20 watt, a voltage controller of 24v 10 Amp, quickening agent and engine controller of 24v 25Amp. There is additionally an arrangement for accusing of the battery of

220-240V, AC divider outlet supply, in the event of poor sun oriented supply because of shady climate.

### 2. Block diagram 2



In this task there are three charging hotspots for charging the battery of bike which are recorded underneath.

Sun oriented board

Dc generator

MSEB supply

Sun oriented board is associated with the charge controller on the grounds that the sun based board yield isn't steady it changes agreement to the sun powered radiation, henceforth charge controller give consistent voltage. The yield of the charge controller is associated with the selector switch. Dc generator which deliver electrical vitality whose yield is associated with the selector switch. Next supply is the MSEB supply which is in air conditioning is changed over into dc with the assistance of rectifier and channel unit whose yield is likewise associated with the area switch.

Presently the selector change select the out of three sources, this determination is absolutely rely on the client. Client select the any one supply out of three for charging the battery according to his necessity.

The yield of part change is associated with the battery insurance circuit where the battery is shielded from the cheating. The yield of battery is associated with the engine controller .

The throttle is associated with the engine controller for modifying the speed of engine. The yield of the controller is associated with the engine for controlling the engine.

### 3. Circuit Diagram 3

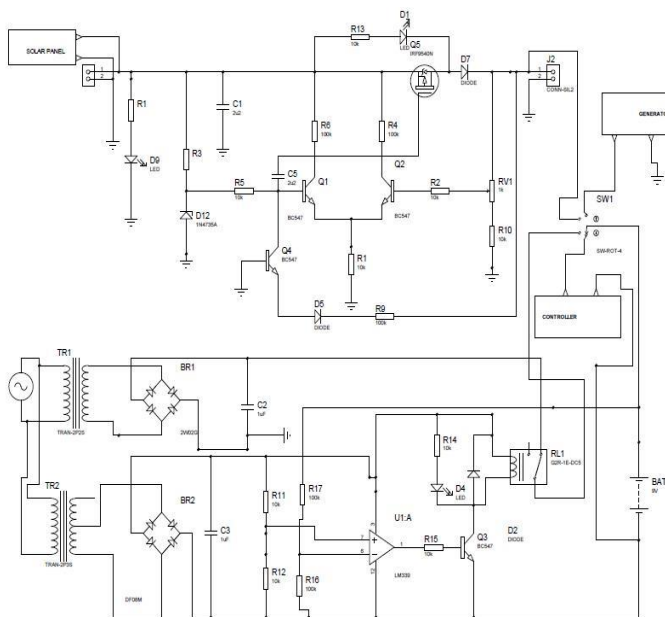


Fig - 2: Circuit diagram

#### Charging Mechanism:-

This is a bike with three way charging source. There are diverse charging component which are recorded underneath.

1. Solar vitality
2. Dc generator
3. MSEB supply

At the point when the sun oriented radiation fall on the sunlight based board the electrical vitality is gotten this producing voltage isn't steady isn't is changes agreement to the sun powered radiation subsequently the charge controller is associated with the sun based board to give consistent voltage.

Second wellspring of battery charging is the dc generator which convert the mechanical vitality into electrical vitality. This generator is put on the front/raise wheel of bike.

Presently the third wellspring of charging is the MSEB supply this air conditioner source is changed over into the dc utilizing the rectifier and the channel unit to charge the battery.

Presently all the yield of the charging sources is associated with the selector switch which will choose any one charging source out of three to charge the battery.

Battery insurance circuit is utilized to stay away from the cheating of the battery. At the point when battery will full charge then the auto cut off circuit cut the charging supply of battery.

#### Engine task:-

In this venture we utilize the BLDC center point engine for controlling this engine we required controller which control the engine based on lobby sensor position. Contingent on the lobby sensor result controller actuate two eliminates of three this eliminate changing of three ceaselessly continue after 60°.

The speed of engine controlled by utilizing throttle which alter the speed of engine as indicated by the our prerequisite. Throttle change the voltage of engine thus the speed of engine is changed.

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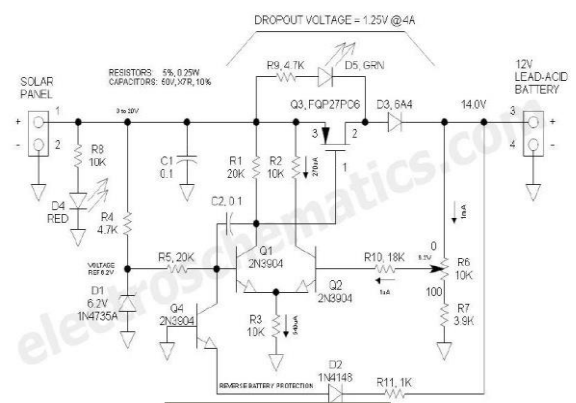


Fig - 3: charge circuit

#### Dropout Voltage

The information voltage surpasses the info voltage by 1.25V while charging at the most extreme rate – the lower, the better. Low Dropout Voltage (LDO) is the catchphrase for anything under roughly 2V. This could conceivably be diminished to underneath 1V by making D3 a schottky rectifier.

#### Current Limiting

Current constraining is given by the sun powered board – it's anything but a normally comprehended truth that the sunlight based board will in general be a consistent current gadget. Hence, a sun based board can withstand a short out. Along these lines, the control does not require current constraining. Buoy Charge of Lead-Acid Batteries This control charges the battery at a consistent voltage and furthermore keeps up a charged battery. The buoy charge voltage detail is a little lower than the charge voltage, so to oblige the two voltages, a trade off is come to by just diminishing the voltage marginally – that is the means by which ALL car frameworks work. To acquire most extreme

charge in a 12V battery, set the control to 14 to 14.6V. Car frameworks further lessen voltage to 13 to 13.5V so as to oblige high temperature set the control to 14 to 14.6V. Car frameworks further decrease voltage to 13 to 13.5V so as to oblige high temperature task as the battery is typically situated in the hot motor compartment – battery has a negative warm coefficient of voltage.

#### Voltage Adjustment

To set the voltage, separate the battery and associate a 1K sham load resistor to the yield. The resistor is important to shunt potential MOSFET spillage current and the green LED current.

#### LDO Solar Charge Control Circuit Operation

R4 and D1 shape a 6V shunt zenner voltage reference. Q1 and Q2 make up the exemplary differential speaker that intensifiers the contrast between the reference voltage and the input voltage from the arm of potentiometer R6. The yield is taken from the authority of Q1 and drives the entryway of P Channel MOSFET Q3. Differential voltage gain is most likely in the request of 100 to 200. For best execution, I chose Q1 and Q2 for coordinated hFE. As the criticism voltage increments at the arm of R6, Q2 turns on harder and takes a portion of the producer current far from Q1. The gatherer current of Q1 pursues the producer current and drops less voltage crosswise over R1 subsequently decreasing Vgs of Q3 and turning it off. C2 gives recurrence pay to keep the intensifier from swaying. Q3 is torpid except if the battery is associated invert – should this occur, Q3 turns on and diminishes the reference voltage contribution to zero hence turning Q1 and Q3 and counteracting harming battery current. D3 keeps the battery voltage from showing up over an idle sun based board.

#### Warm Management

This is a straight arrangement controller that disperses huge power when the pass transistor is both directing present and dropping voltage all the while – amid most extreme charge rate when the voltage drop is low, the heatsink runs warm – when the battery is completely charged and there is low charge current, the heatsink is chilly – however when the battery begins to best of at greatest voltage, the heatsink runs exceptionally hot – such is the idea of a straight controller. At 4A, Q3 drops 3.3V (accepting sun powered board voltage is 18V)(the staying 0.7V is the D3 voltage drop.  $P = 4A * 3.3V = 13.2W$ . The heatsink is appraised at  $3.9\text{C}/W$ , so heatsink temperature rise =  $13.2W * 3.9\text{C}/W = 51.5\text{C}$ . Including the  $25\text{C}$  surrounding temperature results in a heatsink temperature of  $76.5\text{C}$ . While this may appear to be exceptionally HOT to the touch, it is as yet cool to the transistor that is appraised for an intersection temperature of  $175\text{C}$ .

#### 4. CONCLUSIONS

Self-charging Electric bike is adjustment of existing electric bike. It is appropriate for both city and nation streets, that are made of bond, black-top, or mud. This bike is less expensive, less difficult in development and can be generally utilized for short separation voyaging particularly by school youngsters, undergrads, office goers, villagers, postmen and so forth. It is particularly reasonable for youthful, matured people groups. It very well may be worked free of expense. This bike is that it doesn't expend significant non-renewable energy sources along these lines sparing crores of outside monetary standards. It is eco-accommodating, conservative and contamination free, as it doesn't have any discharges. Additionally it is silent and can be revived with the AC connector in the event of crisis or overcast climate. It very well may be driven by manual paddling in the event of any issue with the electric driving framework.

On the off chance that we contrast the electric bike and our ordinary bicycle whose normal is 50km/ltr. The petroleum rate is 76Rs./liter, implies 76 Rs. required for venturing to every part of the 50km. In any case, MSEB rate of per unit is 7Rs. also, we required just half unit for charging the battery implies we require just 3.5Rs. for charging the battery and bike keep running up to 34 km for this battery.

Subsequently the electric bike is progressively temperate as contrast with typical vehicle.

#### ACKNOWLEDGEMENT

The authors can acknowledge any person/authorities in this section. This is not mandatory.

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