

SOLAR POWERED WIRELESS CHARGING STATION FOR ELECTRIC CYCLE

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Abstract – A widespread application on industrial and household has been found in wireless technology. the key objective is to attain Wireless power transfer via resonant inductive coupling between the transmitting and receiving coils within the near field. Hence we design a solar powered wireless charging station for electric bicycle. to confirm optimal charging the efficiency needs to be high therefore reducing the energy losses. The RFID tag system reads the respective bicycles and allows for charging where the unwanted users are been blocked or alerted. this is often been monitored and controlled by a mobile application. so as to realize a wireless power transfer through inductive coupling a versatile wireless charging station for electric cycles is more required. To be more portable and mobility with lack of wires and fewer infrastructure cost a charging station is mandatory. Hence a budget friendly charging station for electric cycle is been designed.

Those conductive reasonably recharging causes several problems as physical plugging of the wire, high stating current, insulation damage and related safety concerns. Manual charging is undesirable with caution of shock or hazard. So, there's an inclining requirement for convenient, safe and still effective because of recharging vehicles. during this paper author describes Embodiments of this invention include direct three-phase ac-ac matrix converters for inductive power transfer (IPT) systems with soft-switching operation. Embodiments of this invention also include methods of operation for three-phase ac-ac matrix converters. Embodiments of this invention can operate employing a variable frequency control strategy supported an energy injection and free oscillation technique that's accustomed regulate the resonant current, the resonant voltage, and so the output power. during this paper author describes An OLEV-based ETB system is actually composed of buses and a charging infrastructure that comprises multiple power transmitters installed along the route. The bus contains the pickup device, battery, and motor. The charging unit is that the facility transmitter, which consists of an inverter and an inductive structure

1. INTRODUCTION

Wireless transfer technology is distinct popular in modern days that offers numerous of application that creates everything uncomplicated and simple. In nowadays, wireless technology may well be accessed by internet which will make people life easier. Here we design an optimal solar powered wireless charging station for electric bicycle. This work explains the enhancement of recent wireless transfer technology where the charging level, users record are been maintained within the charging station employing a mobile application called Blynk. It may also monitor the directions of the vehicle as left ,right , backward and forward. The charging rate of the vehicle also can be notified to the user while charging thus being as an user friendly charging station.

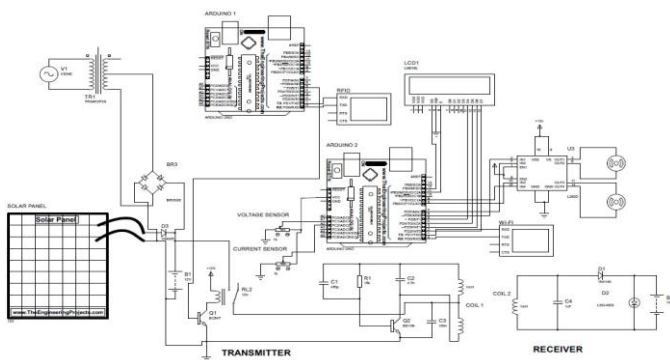
2.LITERATURE SURVEY

In this paper author describes the Distribution networks will face style of challenges because of the rapid increase within the amount of EVs and so the increasing load demand to charge these EVs. due to the uncertainty of these loads, many technical issues will arise, like congestion on the distribution side and voltage drops. The technology of storage systems has gained significant attention and has been the most focus of rigorous study. during this paper the author describes Presently most commercially available EVs are powered by plugging them to the charging station.

3.METHODOLOGY

Charging station has grid and solar power supply. Whenever the cycle enters the charging station, RFID verify the cycle details. Wireless power transfer (WPT) is the technology that Forces to transmit power in an electromagnetic field to an Electrical load through an air gap without interconnecting Wires. In the dynamic charging a track is present inside the road, consisting of multiple transmitting coils, thus allowing the Transfer of power towards the receiving coil that is inside the Cycle, whenever the receiving coil is aligned, during the Motion, to any of the road coils. Web services can also provide information about EV charging to consumers and help them to plan their journey. All sensing, controlling and indicating task are taken by microcontroller. All data are dumped to the blynk application for indication purpose. RFID tag reads only the respective users and excludes the unwanted users. The directions of the vehicle can also be changed into the station. The charging rate will also be alerted to the user thereby mentioning the current user in the station to the next user.

4.CIRCUIT DIAGRAM



SRAM	2KB(ATmega328p)
EEPROM	1KB(ATmega328P)
Clock Speed	16MHZ
Length	101.52mm
Width	68.6mm
Weight	25g

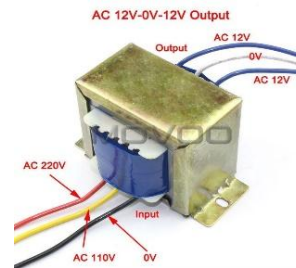
5.2 BATTERY



FEATURES

Voltage	12v
Battery Capacity	1.3Ah
External Height	53mm
External Width	45mm
External Depth	96.5mm
Technology	Lead Acid

5.3 STEP DOWN TRANSFORMER



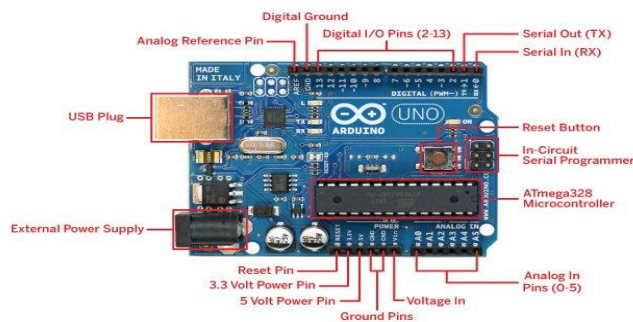
The transformer is a static electrical device that transfers energy by inductive coupling between its winding circuits. The Transformer act as step down transformer reducing AC - 230V to AC - 12V.

FEATURES

Input Voltage	230v AC
Output Voltage	12v or 0v
Output Current	1 Amp
Mounting	Vertical mount type

5.HARDWARE

5.1 ARDUINO UNO BOARD



The Arduino Uno a microcontroller board supports the ATmega328. Being a 32k Byte in system programmable flash, 14 digital I/O pins (of which 6 may be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, consist of an influence jack and a button. To construct and program electronics Arduino is an open source platform. It can receive and send information to most devices, and command even through the net to the precise device. It uses a hardware called Arduino Uno card. It supports the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter. "Uno" refers the reference versions of Arduino, moving forward. The Uno is the latest series of USB Arduino boards.

FEATURES

Input Voltage(recommended)	7-12v
Input Voltage(limit)	6-20v
Digital I/O Pins	54
Operating Voltage	5v
Analog Input Pins	16
DC Current per I/O Pin	20mA
DC Current for 3.3v Pin	50mA
Flash Memory	32KB(ATmega328p)

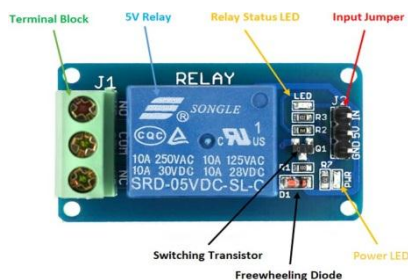
5.4 SOLAR PANEL



FEATURES

DC Output Voltage	12v
Max. Output Current	1.03-1.04Amps
Max Power Output	20W
Weight	2880gm
Material	Polycrystalline Silicon.

5.5 RELAY MODULE



A relay is an electrically operated switch. Relays may operate Mechanically called as electromagnetic relay and a few are Solid-state relays. Where ever it's necessary to manage a tool gate by a small-power signal, relays are Implemented which they also provides electrical isolation Between sensing circuit and actuating circuits, or where Multiple circuits are to be controlled by one signal. we've used here the electromagnetic relay which has the Moving part called because the COM (Common) connection of a Relay. The ON and OFF condition for this relay is as follows:

- a. When a relay is OFF, NO (Normally Open) Connection of the relay isn't connected and also the COMMON is connected to the terminal NC (Normally Closed).
- b. When the relay activates or get energized, the plunger (COMMON) terminal move from NC to NO. Mechanical relays creates a sound of Clicking that Shows the transition of the plunger.

FEATURES

UL, CUR & TUV safety approval
 15 Amps current capability, Epoxy seal type and flux free.
 Satisfies all requirements for use in car and household electric appliances.

5.6 LIQUID CRYSTAL DISPLAY UNIT



LCD (Liquid Crystal Display) screen is an electronic display Module and it find a wide range of applications in automation Systems. In a 16x2 LCD display there are 2 lines to display 16 Characters per line. In this LCD the pixel matrix size is of 5x7 which is used to Display each character. There are two different types of Registers are available in LCD for storage that is, Command Register and Data register. The command instructions are Stored in the command register which are given to the LCD and the data register stores the data to be displayed on the LCD. The data format is the ASCII value of the character Which is to be displayed.

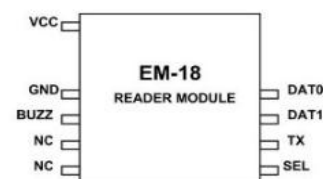
5.7 VOLTAGE SENSOR



Needs no external components, Easy to use with Microcontrollers, Small, cheap and easily available.

FEATURES

Input Voltage	0 to 25V
Voltage Detection Range	0.02445 to 25 v
Analog Voltage Resolution	0.00489V
Dimensions	4 × 3 × 2 cm



5.8 EM-18 RFID READER MODULE

FEATURES

Define Operating voltage of EM-18	+4.5V to +5.5V
Current consumption	50mA
Power operation	LOW power
Operating temperature	0°C to +80°C
Operating frequency	125KHz
Communication parameter	9600bps

5.9 ESP 8266 WIFI MODULE



32-bit Ten silica LX106 CPU running 80MHz,3.3V supply (current can spike 300mA+, depending on mode), PCB-trace antenna, 2 x 4 dual-in-line pinout

FEATURES

8Mbit external QSPI flash memory	1MByte
Dimension	14.3 x 24.8mm
Weight	1.5g.

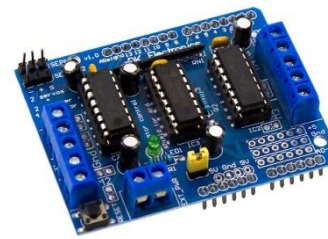
5.10 DC GEAR MOTOR

FEATURES



Motor Type	DC with Gear Box & Metal Gears
Base Motor	DC 3000 RPM
Shaft Type	Circular 6mm dia with Internal
Hole for coupling	23 mm shaft Length
Maximum Torque	~3 Kg-cm at 12V
RPM	45 RPM at 12V
Weight	130 Gm
Max Load Current	~330mA at 12V

5.11 L293 MOTOR DRIVER

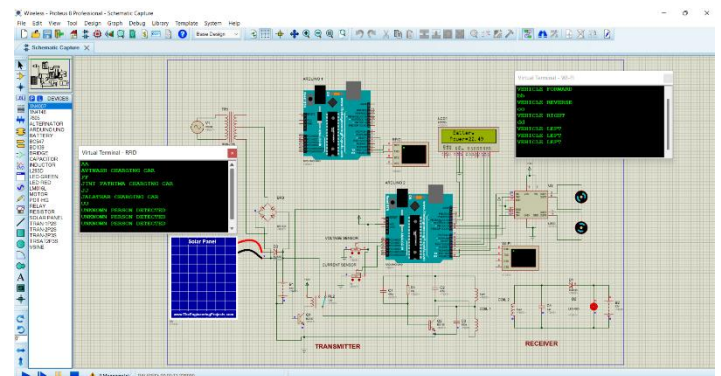


It can drive small DC-g geared motors, bipolar stepper motor, Thermal Shutdown, High-Noise-Immunity Inputs

FEATURES

Supply Voltage Range	12V.
Output current capability per driver	36V
Input-logic supply	Seperate
Pulsed Current Per Driver	1.2-A

6.OUTPUT



7.SCOPE AND APPLICTIONS

- [1] Our Wireless EV charging system use inductive power transfer technology to transfer power over the air from a pad embedded in the ground to a pad attached to the underbelly of an EV to charge its battery.
- [2] This charging system help avoid plug-in problems usually faced with wired EV charging systems.
- [3] Reduced battery size and range anxiety issue associated to electric vehicles.
- [4] Only known user can charge their vehicle.
- [5] The usage of Wireless charging EV is simple, convenient, and user-friendly.

8. CONCLUSION

The technology of wireless power transmission system eliminates the use of the wires and batteries, thus increasing the mobility, convenience, and safety of an electronic device for all users. Our system is very simple and automatic. This may also avoid electrocution risk typically arising from power cords. This system would be user friendly because all the details are been updated to the user once the cycle enters for charging

REFERENCES

- [1] R. R. Deshmukh and M. S. Ballal, "An energy management scheme for grid Connected EVs charging stations," in Proc. Int. Conf. Power Instrum. Control Comput., 2018, pp. 1–6.
- [2] J. P. K. Joseph and D. Elangovan, "A review on renewable energy powered Wireless power transmission techniques for light electric vehicle charging Applications," Elsevier J. Energy Storage, vol. 16, pp. 145–155, 2018.
- [3] Y. J. Jang, E. S. Suh, and J.W. Kim, "System architecture and mathematical Models of electric transit bus system utilizing wireless power transfer Technology," IEEE Syst. J., vol. 10, no. 2, pp. 495–506, Jun. 2016
- [4] A.Kurs, A. Karalis, R. Moffatt, J. D. Joannopoulos, P. Fisher, and M. Soljacic, "Wireless power transfer via strongly coupled magnetic resonances," Science, Vol. 5, pp. 83–86, 2007.
- [5] S. Byeong-Mun, R. Kratz, and S. Gurol, "Contactless inductive power pickup System for Maglev applications," in Proc. Industry Appl. Conf., 2002, pp. 1586–1591.