

FABRICATION OF SOLAR POWERED WHEEL CHAIR

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ABSTRACT:

Personal mobility means freedom for the physically challenged. One of the best inventions in the medical field that helped both elderly and handicapped is the mobility wheel chair. The fact that they are no longer depending on someone else to perform daily duties is big step forward.

Wheel chairs are designed based on the usage i.e. either indoors or out door. They make use of conventional energy for recharging. The cost of the vehicle may not be affordable for common man. In this Present work an attempt is made to fabricate a solar powered wheel chair at an optimal cost which can be utilized in both indoor and outdoor environments.

I. INTRODUCTION

The present work involves in fabrication of solar powered wheel chair. The direction of the wheel chair can be changed depending on commands given by the pushbuttons. Depending upon commands, wheel chair movement can be controlled in Forward, Backward, Left and Right direction.

II: HARDWARE DESCRIPTION

The block diagram of the present work and design aspect of independent modules are considered. Block diagram is shown.

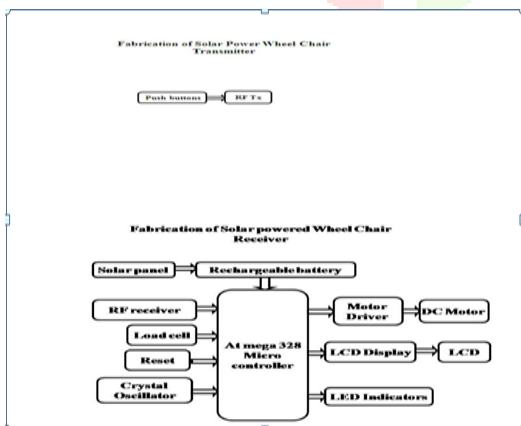


Fig 2.1 Block Diagram

REGULATED POWER SUPPLY

Power supply is a supply of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called

a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

D.C. Motor:

A dc motor uses electrical energy to produce mechanical energy, very typically through the interaction of magnetic fields and current-carrying conductors.

Producing electrical energy from mechanical energy is accomplished by an alternator, generator or dynamo. Many types of electric motors can be run as generators, and vice versa. The input of a DC motor is current/voltage and its output is torque (speed).



Fig 2.2 D.C Motor

COMPONENTS OF WHEELCHAIR

The structure of wheel chair consists of Main frame, Steering mechanism, Power source, Wheels, Casters, Indicators and other accessories

Mainframe

This is the skeleton of the wheel chair. This carries entire load of the person using the chair. This is made up of hollow cast iron rods of 35mm diameter. The rods are cut into different lengths, and are arc welded so that it gains the strength to withstand the load as well as the capacity to resist the vibrations during the travel. The height of the frame is 105cm, width is 57cm, and seating area is 41X41 cm²

Wheels

These are called wheel hub motor, (also called wheel motor, wheel hub drive, hub motor or in-wheel motor) an electric motor that is incorporated into a hub of a wheel and drives directly. Hub motor electromagnetic fields are supplied to the stationary windings of the motor. The outer part of the motor follows, or tries to follow, those fields,

turning the attached wheel. A purported advantage of this design is that no additional transmission system is needed, increasing the efficiency of the drive system. The wheels used are alloy wheels with a diameter of 50 cm and a thickness of 7.5 cm. The capacity of the motor is 240 W and speed 500 rpm at no load.

Caster

A caster (or castor) is an un-driven, single, double, or compound wheel that is designed to be mounted at the bottom of a larger object (the "vehicle") to enable the object to be easily moved. They are available in various sizes, and are commonly made of rubber, plastic, nylon, aluminium, or stainless steel. Casters are found in numerous applications, including shopping carts, office chairs, and material handling equipment. High capacity, heavy duty casters are used in many industrial applications, such as platform trucks, carts, assemblies, and towlines in plants. Generally, casters operate well on smooth and flat surfaces. The diameter of the caster used is 15cm and thickness is 3.5 cm

Power Source

The Power required to run the motor is supplied through a rechargeable battery. Rechargeable batteries are available in many different shapes and sizes.

Design Considerations

The main factors that are considered for the fabrication of the wheel chair are weight or load, speed, width and height of the wheel chair. The body of the wheel chair is constructed to withstand a load of 80-100kg, including itself-weight and the speed is limited to 3-5km/hr for safety. The height and width of the chair are slightly modified from that of a conventional model. The solar frame is provided with an adjustable slot so that the height can be adjusted as required.

Solar Panels

A solar panel (photovoltaic module or photovoltaic panel) is a packaged interconnected assembly of solar cells, also known as photovoltaic cells. The solar panel can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. A photovoltaic installation typically includes an array of solar panels, an inverter, batteries and interconnection wiring. Photovoltaic systems are used for either on- or off-grid applications, and on spacecraft. The capacity of each solar panel used is 18W and 4 such panels are connected in series to support a battery of 48 volts. The size of the panel is 500X340 mm

III: PRESENT WORKING MODEL

The schematic diagram of solar powered wheel chair is shown below.



Fig 3.1 Solar Powered Wheel Chair

The above schematic diagrams of **Fabrication of solar power wheel chair** explain the interfacing section of each component which moves by using the solar energy.

IV: ADVANTAGES AND DISADVANTAGES

Advantages:

- Wireless controlling of wheel chair
- Fast response
- Efficient and low cost design
- Low power consumption
- Alerts on phone.

Disadvantages

- Limited distance

Applications:

The user can transport this chair to any movable part and with the simple gestures he can control the wheel chair using pushbuttons. The temperature, heartbeat sensor senses the same and sends the same to the concerned person as an SMS or transmits the data through Bluetooth.

V: RESULTS

The Present work "**fabrication of solar power wheel chair**" was designed such that the wheel chair can be moved by using solar energy. The direction of the wheel chair can be changed depending on commands given by the keypad. Depending upon commands, wheel chair movement can be controlled in forward, backward, left and right direction.

Conclusion:

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly

advanced IC's with the help of growing technology, the present work has been successfully implemented. Thus the present work has been successfully designed and tested.

Future Scope

The Present work “**Fabrication of solar power wheel chair**” is mainly intended to operate Wheel chair using solar energy. The micro controller is programmed in such a way that the wheel chair can be operated.

The different health parameters are determined by the sensors present and sent to the concerned person through an SMS or through Bluetooth.

References

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