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Smart solar powered pesticide sprayer

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ABSTRACT

Farmer is the heart of Indian Economy and our new invention gives support by making farmer friendly solar operated spray pump. Use of other pesticide pumps causes fatigues, pollution which is harmful for green society. Considering all energy crisis, solar energy would be one of the best solutions. Here we prepared low cost farmer friendly solar operated pesticide pump with devices such as emergency LED and dc mobile charger

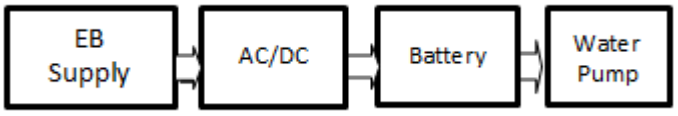
INTRODUCTION

Here we prepared a low cost solar operated pesticide pump with devices such as emergency LED, dc mobile charger, which can work without any fuel. This pesticide pump can be use at various places such as farm, garden also in municipality to kill mosquitoes. We hope our new invention make the farmer modern and smarter. In this project, we emphasized on the spraying of pesticides using solar power as energy.

EXISTING SYSTEM

This series of 16M electric sprayer has new design and unique structure, comfortable, safe and efficient when you use it. It can be used for kinds of crops and flowers, and also for the environmental sanitation of public places like parts, and for the eqidemic prevention and sanitation of livestock poultry sheds. It is the ideal substitute of the manual one. This product uses plumbic acid no-service battery as power. It uses miniature motor to drive liquid pump and get pressure mist. Its atomization effect is good, and the working efficiency is 3-4 times better than that of manual sprayer. Every time it can be used for 5-7 hours continually after fully recharged, and spray medicine 300-600kg, but use electricity less than 0.3degree, reducing the work labor intensity and create high benefits.

▲



PROPOSED SYSTEM MODEL

Sprayer is mechanical device that are specifically designed to spray liquid quickly and easily. They have number of different varieties. In this project we prepared solar operated spray pump and which can be used for many purposes. Our solar based pesticide spray pump is one of the most improved and modern version spray pump. it can be most often used at various locations such as farms, gardens although it can become more popular in rural areas as well. It is found more reliable to use. It uses solar power to run so it is maintenance free and pollution free pesticide pump

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as compare to two stroke engine pumps. The additional advantage of this model is that, it can be useful for appliances like emergency led and unique dc mobile charger; also it can be used as home lighting system as its battery can be used at night too.

BLOCK DIAGRAM OF PROPOSED SYSTEM

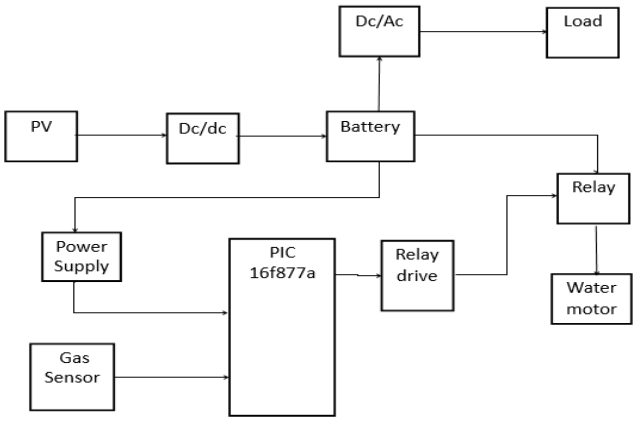

Fig1. Block diagram of proposed model

The basic block diagram and circuit diagram are as shown in figure. The solar pump system consist of solar panel, DC motor, Battery, pic16f877a control sensor, emergency LED, DC mobile charger, spray nozzle, pesticide tank etc. It uses solar energy to operate. First the solar (photovoltaic cell) panel collects solar radiation and converts it into electrical energy by photovoltaic conversion process. Battery consumes this electricity to charge itself. The stored electricity used to run the motor and other portable devices. When the switch is turn ON the electricity is provided to motor to suck pesticide from tank and deliver it. But the ON and OFF state of motor is control by spray gun trigger. When trigger is pulled, the motor is made ON and pressure is maintained by micro control sensor. As trigger is released, the motor is made OFF. For portable devices, the adaptors are fixed on the body of tank. This adaptor provide plug-in and out connection for emergency LED, DC mobile charger. Which can be used for emergency uses in disaster period like cyclone, heavy rain etc.

A gas sensor which is used to turn ON and OFF the sprayer. When we wear the mask the device will turn ON or otherwise the device doesn't turn ON.

GAS SENSOR

Description

Sensitive material of MQ-2 gas sensor is SnO2, which with lower conductivity in clean air. When the target combustible gas exist, The sensor's conductivity is more higher along with the gas concentration rising. Please use simple electrocircuit, Convert change of conductivity to correspond output signal of gas concentration. MQ-2 gas sensor has high sensitity to LPG, Propane and Hydrogen, also could be used to Methane and other combustible steam, it is with low cost and suitable for different application.

Features

- Good sensitivity to Combustible gas in wide range
- High sensitivity to LPG, Propane and Hydrogen
- Long life and low cost
- Simple drive circuit

Application

- Domestic gas leakage detector
- Industrial Combustible gas detector
- Portable gas detector

MICROCONTROLLER (PIC 16F877A)

Peripheral features

- Timer0: 8-bit timer/counter with 8-bit prescaler.
- Timer1: 16-bit timer/counter with prescaler.
- Timer2: 8-bit timer/counter with 8-bit period register, prescalar and postscalar.
- It has a Capture, Compare, PWM (CCP) module. Capture is of 16-bit and it has a maximum resolution of 12.5 ns. Compare is of 16-bit and it has a maximum resolution of 200ns.Pulse Width Modulation has a maximum resolution of 10-bit.8-bit.
- 8 channel analog-to-digital converter with 10 bit each.
- It has a Synchronous Serial Port (SSP) with SPI (Master/Slave) and I2C, USART with 9 bit detection. It also has a Brown-out detection circuitry for Brown-out Reset (BOR).

RESULT

Fig 2: Proposed System Output Kit Image

We have used solar energy it can be either used for sprayer or inverter for emergency use. It is an effective safety system for human by protecting from poisonous gas.

Application

- Emergency Lamp
- DC Mobile Charger
- Domestic & Industrial

Features

The total model weight is 21 kg with fully pesticide tank. The weight can be reduced 2-3 kg by using plastic molding for mechanical structure. Further energy can be saved by using PWM Scheme for driving pump.

CONCLUSION

Thus solar operated spray pump will help the farmers of those remote areas of country where fuel is not available easily. They can perform their regular work as well as saves fuel up to large extent. At the same time they can do their pesticide spraying work with very less environment pollution. Thus, indirectly saving revenue of government and also most demanded fuel.

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