



DESIGN AND FABRICATION OF WATER PUMPING SYSTEM WITH SOLAR PANEL USING SENSOR

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Abstract:

The largest difficulty in agriculture is energy sources. Demonstrates the proper design of a sensor-equipped solar water pumping system. In the agricultural industry, energy such as petrol or electricity is always required. A factor could be the groundwater's depth. The cost of fuel is more expensive than the cost of electricity, which has also increased recently. The following technique uses solar energy and might only cost one thing. This energy cannot possibly be contaminated. Solar energy is one of the universe's most potent sources of renewable energy. The DC water pump can be powered by the DC current produced by the solar panel. Current can be controlled by the supply's controller. Then, the water level sensor is used. The sensor may notice when the water tank is full and shut off power to the water pump. The water level in the tank is controlled by this sensor. The water pump can be powered by solar energy to pump water and fill the tank when a sensor detects a drop in the level of the tank's water. It can only be used to irrigate crops when the sun is visible from morning until evening. During the rainy season, irrigation is not necessary because of the rainfall and because it is impossible to irrigate fields at night. The solar panel may produce its best output in the afternoon, when solar radiation is at its highest. The water pump can then provide the best results currently available.

1. Introduction

1.1 About solar panel

Solar energy is a cheap, abundant, and renewable source of power. It may be used to make energy, heat water, and cook meals. [1] In a solar power system, the sun produces the DC supply, which a DC pump then uses. [2] In this study, solar photovoltaic cells are used to harvest solar energy from the solar array. It once harnessed the sun's rays to produce power. [3] The majority of farmers do not have access to energy for their agricultural areas. They therefore use the solar system.

1.2 Needs of solar energy in agriculture

When you generate power with solar panels, no greenhouse gas emissions are put into the atmosphere. Solar energy is a key energy source in the transition to the creation of clean energy since the sun produces more energy than humans could ever require. [4] It is difficult to supply this demand using solar energy that is renewable. The technique for pumping water in agriculture is built on solar energy. [5] This article's main objective is to use solar energy for irrigation while requiring as little assistance from farmers as possible. [6] The amount of solar radiation that is present at particular times determines how photovoltaic cells. [7] The best solar panels were chosen based on the motors' estimated

maximum power usage. Solar panels and batteries have provided the energy required by DC motors.

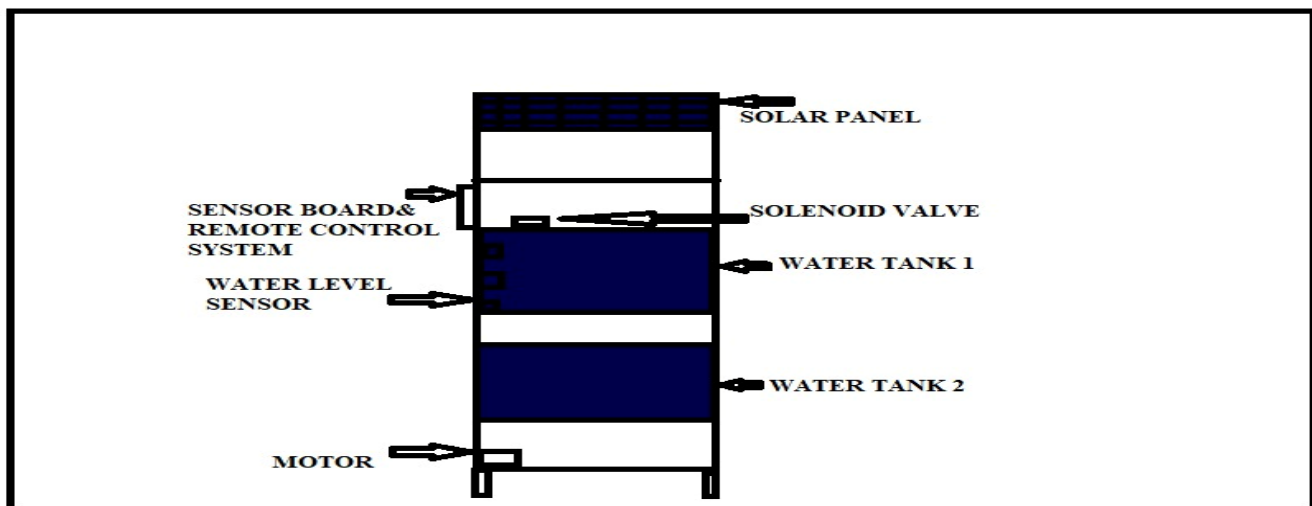
1.3 Advance in solar-based agriculture

One of the innovations in solar is the automated. [8] We demonstrate a moisture sensor-based autonomous water flow control system with a solar-powered vehicle tracker. [9] The system may help farmers and employees by giving them access to water, time, and electricity as a result of technological developments. [10] Water use may be cut by 80% with an intelligent watering system. An automatic irrigation system might be helpful depending on the water requirements of the plants.

1.4 Influences of the solar system on agriculture

Several conventional agricultural applications, such as solar-powered crop drying systems, solar-powered desalination technologies, solar-powered greenhouse cultivation systems, solar-powered heating and cooling systems, and solar-powered water, can all be powered by solar energy. These greenhouses help farmers grow fruits and vegetables out of season by keeping a comfortable temperature. To maintain a pleasant temperature for the animals, farmers use space heaters and water heaters. In these heaters, solar energy transforms solar energy into heat energy.

2. Diagram



3. Working

The solar panel provides us with the electricity we need to power our project. In our project, remote control is powered by solar energy. We provide the input for remote control, and we take the output to determine the solenoid value. Two tanks make up our idea, and the water pump will be fixed in the

lower tank. The solenoid valve will receive the water pump. The solenoid valve will open and let water flow to the storage tank when it is controlled by a remote control system.

We will then install the water level controller for an automatic cut-off system in the storage tank. There are three sensor wires for the

bottom, middle, and top of the tank in that water level controller. This procedure will be fixed in the tank: after running the motor pump to fill the tank, the water will enter. The

SI NO	NAME OF THE COMPONENTS	MATERIAL	NO OF COMPONENTS
1.	Solar panel	Cast iron	1
2.	Channel	Mild steel	1
3.	Water pump	Plastic	1
4.	Tank	Plastic	2
5.	Gate valve	Plastic	2
6.	Solenoid valve	Plastic	1
7.	Water level sensor	Electronic	1
8.	Wireless remote control	Plastic	1
9.	Water pipe	Pvc	2

4.1 Wireless remote controller



A remote control, commonly referred to as a remote or clicker, is an electrical gadget used to wirelessly and remotely control another device. A remote control can be used to operate consumer electronics, including television sets, DVD players, and other home appliances. You can control the equipment or device with an industrial remote control without tampering with the cords.

As a result, you have more mobility and are not constrained by a cable's maximum length. Because cables in

bottom sensor has on the most pump, the middle sensor has on the signal, and the higher sensor will turn off the motor.

4. Material selection

industrial settings typically wear out more quickly, cable controllers typically require more maintenance. Infrared (IR) and radio frequency (RF) remote controls are the two main categories. Infrared light pulses are sent to a gadget through infrared remote controls to operate it.

4.2 Solenoid valve



Solenoids play a crucial role since they can generate precise magnetic fields and function as electromagnets. The word "solenoid" specifically refers to a magnet made to create a consistent magnetic field within a volume of space (where an experiment might be conducted). Direct current (DC) and alternating current (AC)

variants of 12 volt solenoid valves are both available. Most 12-volt DC solenoid valves are of the 2-way variety and are used to turn on and turn off water, air, and other fuels or gases like butane or propane. In less than a second, a 12 volt DC coil can open and close the valve. It draws 2.50 amps, which equates to a nominal power usage of 40 watts, and is rated for continuous use.

4.3 Solar panel



A solar panel is a machine that uses photovoltaic (PV) cells to transform sunlight into electricity. Materials used in PV cells produce electrons when exposed to light. Direct current (DC) electricity is created by the passage of electrons via a circuit and can be used to power a variety of electronic devices and materials that produce electrons when exposed to light.

Direct current (DC) electricity is created when electrons go through a circuit and can be utilized to power a variety of appliances. PV modules, solar electric panels, and solar cell panels are other names for solar panels. Solar panels have a number of benefits, including using a clean, renewable energy source, lowering greenhouse gas emissions, and lowering electricity costs

o regulate the water pump in accordance with the tank's water level. Relay at the time the water pump was on activates when the tank

water level drops. The relay shuts off as the water level in the tank rises.

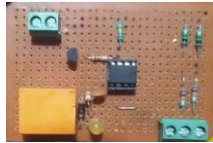
4.4 Water pump



An electric water pump motor that runs on 12 volt direct current is known as a 12 volt water pump. It boosts, transfers, lifts, or circulates liquids like water, oil, and coolant for sprayers, autos, fountains, showers, gardens, etc. using centrifugal force produced by a high-speed revolving impeller.

A 12V water pump is a popular choice for users and the market since it is inexpensive, compact, and has a long lifespan. A 12 volt pump is therefore frequently used as an automotive electric water pump, submersible water pump, booster water pump, or circulation water pump for agriculture, tabletop fountains, garden solar fountains, PC cooling systems, aquariums, fish tanks, and hot water systems.

4.5 Water level sensor



This circuit is utilized to regulate the water pump in accordance with the tank's water level. Relay at the time the water pump was on activates when the tank water level drops. The relay shuts off as the water level in the tank rises.



A water storage tank's primary function is to hold water until it is needed for drinking, washing, cleaning, and other purposes, but many storage tanks are trickier than they appear. Water is gathered and stored in a water storage tank for later usage and quick access. Water is sent from the tank to your tap when you turn on the kitchen tap, giving you access to fresh water whenever you need it. Systems for reverse osmosis cleanse water one drop at a time while operating slowly.

4.6 Water tank

5. CONCLUSION

The majority of the system for pumping water can be run on electricity. Also more expensive now is electricity. On fuels that are similarly more expensive than electricity, other water pumping systems can run. A solar panel, which can run on the light from the sun, is the alternative. A single

investment was made in the solar panel. When the sun is out until dusk, the water pump can run. A solar panel can also be used to power the pump. When the tank is full, the power supply can be switched off by the sensor when it detects the water level in the tank. For water pumping systems, it is therefore useful.

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