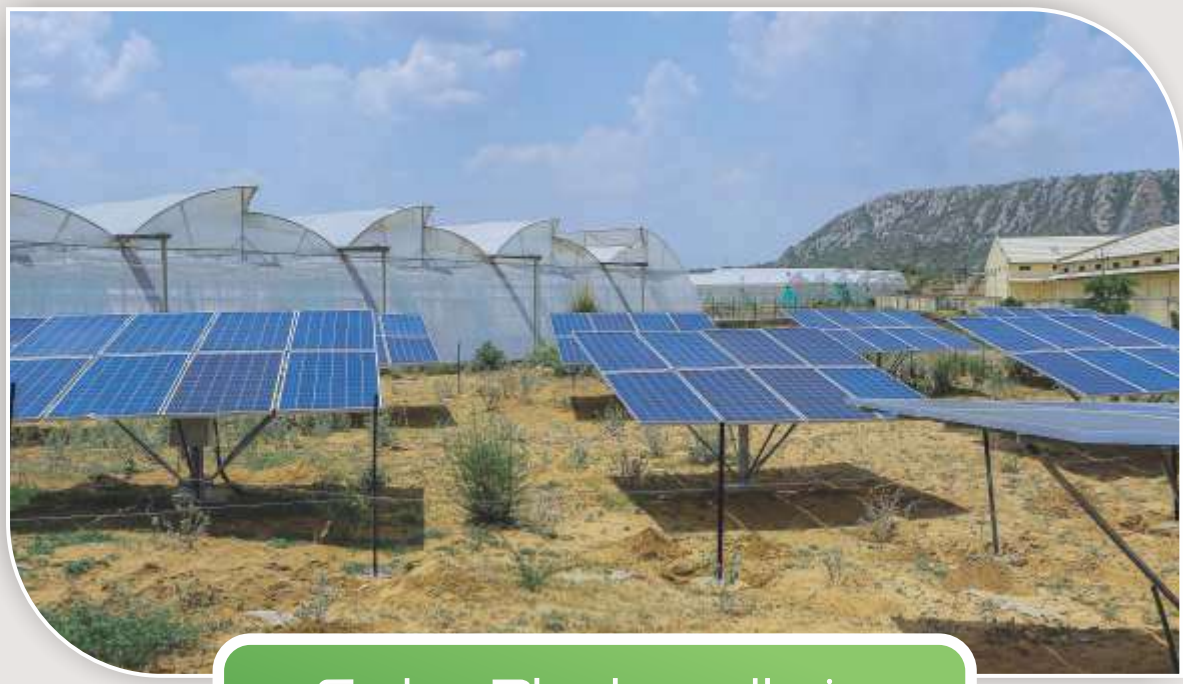
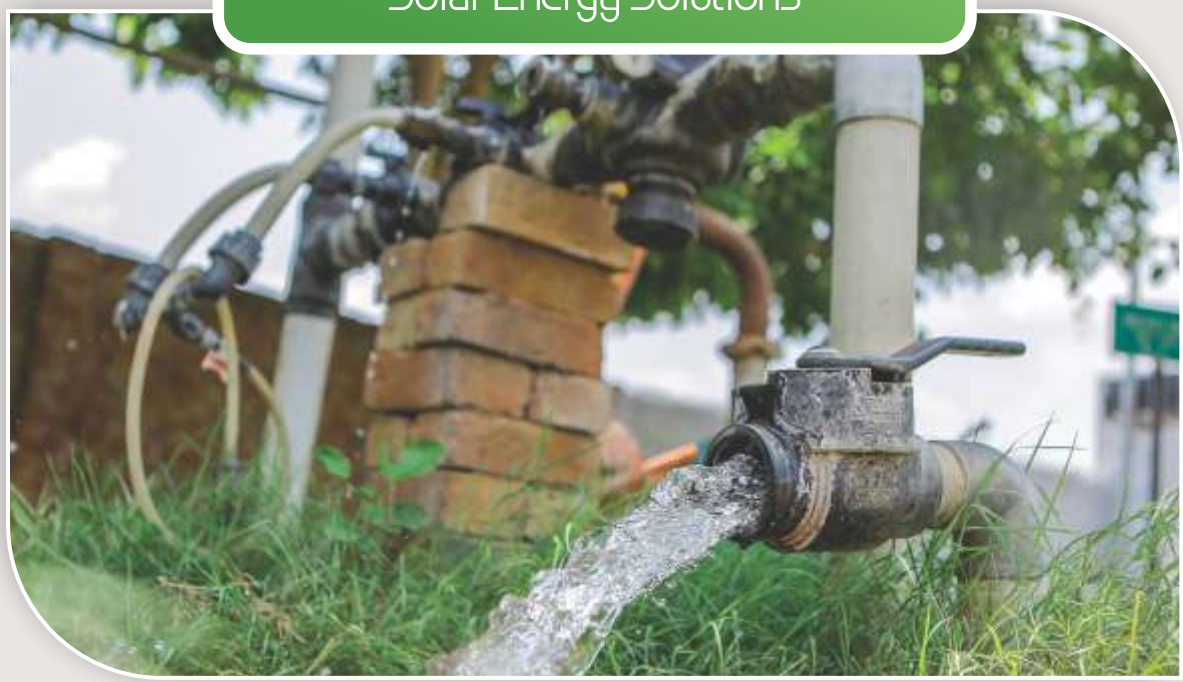
RS Power

Power+



Solar Photovoltaic Water Pumping System

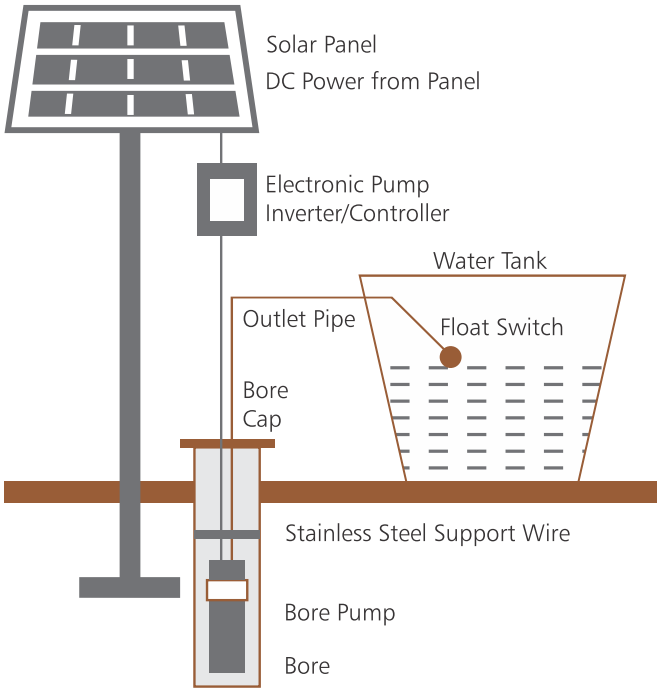
Solar Energy Solutions



Introduction

Solar Water Pumps can supply water to locations which are beyond the reach of power lines. Commonly, such places rely on human or animal power or on diesel engines for their water supply. Solar Water Pumps can replace the current pump systems and result in both socio-economic benefits as well as climate related benefits. The water supplied by the solar water pump can be used to irrigate crops, water livestock or provide potable drinking water.

A solar water pump system is essentially an electrical pump system in which the electricity is provided by one or several Solar Photo Voltaic (SPV) panels. A typical solar powered pumping system consists of a solar panel array that powers an electric AC/DC motor, which in turn powers a bore or surface pump. The water is often pumped from the ground or stream into a storage tank that provides a gravity feed, so energy storage is not needed for these systems. A typical installation is illustrated here.



Working Principle

An array of solar panels generates the power and voltage required to drive the pump. The Solar Drive (Controller) converts the DC voltage into a 1-Phase/3-Phase AC output with variable voltage and frequency. The MPPT algorithm of solar drive extracts maximum power available from the solar panels during the day and operates the motor at variable speed based on the power input to the drive. The frequency range in which the drive operates depends upon the motor speed, hydraulic system and the power available from the solar panel. As the sunshine varies during the day, power input to the drive varies and the solar drive generates variable V/F ratio thus controlling the speed of the motor, which in turn regulates the pump impeller speed. Water Level Sensor is used only when the water is pumped to overhead tank.

Features

- Inbuilt MPPT (Maximum Power Point Tracker)
- SVPWM 3-Phase output with maximum conversion efficiency of 98%, complies with requirements of international standards like IEC 61683 and IEC 60068-2 as well as MNRE guidelines
- Variable frequency and variable voltage operation as per the variation in the intensity of sunlight
- Sensor-less dry run protection
- Under voltage and over voltage protection
- Reverse polarity protection
- Soft start for the AC induction motors
- Output short circuit protection
- Provided with certified IP 54 enclosure having DC switch and surge suppressor
- Auto-start and stop as per solar intensity
- LED & LCD display indicating system health and enables parameters monitoring
- Provision for remote monitoring (optional)

Advantages

- These pumps run off a clean, plentiful and free renewable energy source.
- The maintenance cost of solar panels, that have a service life of at least twenty years, is practically nil.
- Solar PV water pumping systems are used for irrigation and drinking water in off-grid areas.
- Farmer can cultivate multiple crops throughout the year in off-grid areas.
- Women can save their time spent in collecting and transporting water.
- Lower operation expenses compared to diesel pumps.
- Zero emission of green house gases.
- Reduced load on national grid.

Components/Structure of Solar Photovoltaic (SPV) Water Pumping System

- PV Array (Solar Panels)
- Motor Pumps Set (Surface or Submersible)
- Electronic Pump Controller - MPPT (Maximum Power Point Tracker)
- Solar Panel Mounting Structure
- Pipes and Interconnecting Cables
- "On-Off" Switch
- Foundation Set (consisting of foundation bolts, structure base and civil construction material - cement, sand and stones)
- Earthing Kit

Applications

Solar pumps are used principally for the following applications

- Village Water Supply
- Livestock Watering
- Irrigation
- Solar Powered Fountain

TECHNICAL SPECIFICATIONS

S.N.	Description	Technical Specification					
1	Item Name	Solar Photovoltaic (SPV) Water Pumping System					
2	PV Array Capacity	5000 Wp	7500 Wp	10000 Wp	125000 Wp	150000 Wp	200000 Wp
3	Motor Capacity	5 HP	7.5 HP	10 HP	2.50 HP	15 HP	20 HP
4	Motor Pump Set (Surface or Submersible)	D.C. Motor Pump Set (With Brushes or Brush less D.C.) or A.C. Induction Motor Pump Set with a suitable Inverter					
5	Module Mounting Structure & Tracking System	MS hot dipped galvanized, at least three times manual tracking facilities					
6	Water Output	As per MNRE standards. Water output figures are on a clear sunny day with three times tracking of SPV panel under the "Average Daily Solar Radiation" condition of 7.15 KWh/Sq.m on the surface of PV array (i.e. Coplanar with the PV Modules).					
7	Electronics	• Maximum Power Point Tracker (MPPT). • Inverter for A.C. Motors.					
8	Protections	• Dry operation of Motor Pump Set • Lightning • Hailstorm • Open Circuit • Accidental Short Circuit and • Reverse Polarity Protection					
9	Accessories	• The suction/delivery pipe (ISI: GI/HDPE) • Electric Cables (ISI Mark) • "ON/OFF" Switch provided with the motor pump set for DC/AC use with sufficient length of cable provided for interconnection between the PV array & the Motor Pump Set. • Floating Assembly (HDPE in case of surface/ open water bodies) • Civil Work (As per civil design against wind load protection)					

We, **RS Power Systems** *are glad to introduce ourselves as a leading player in providing Solar Energy solutions. We provide wide range of Solar Photovoltaic Water Pumping System.*

RS Power Systems Pvt. Ltd.

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