# Zytech Solar Pump System Introduction

Photovoltaic modules generate electricity directly from the sun light, with no moving parts. The solar array or solar modules may be mounted some distance away from the water source. Most systems are designed to pump only during the daytime to fill a storage tank or pond. This is usually more economical and reliable than using batteries. Small solar pumping systems use a controller (electronics device) to connect the photovoltaic modules directly with the pump motor, eliminating the need for inverters and/or batter y storage.

Any combination of photovoltaic panels with a nominal power of up to 400Wp placed in series or in parallel can be used with the Solar Pumping System. Voltage can be anywhere between 24V and 80V. Direct current is fed directly from the photovoltaic modules to the pump motor. Neither inverters nor batteries are necessary.

The system is completed by a flexible polyethylene drop-pipe supplied in one continuous length to enable installation by hand within a few minutes; by good quality submersible resin packed leak-proof electric cable; and by an appropriate length of good quality sa fety cord. Tracking systems for the photovoltaic modules are optional. Suppor ts for photovoltaic panels can be ground, pole, or lattice type according to requirements imposed by prevailing climatic conditions.

Solar module
Solar pump controller
Water tank
Solar pump
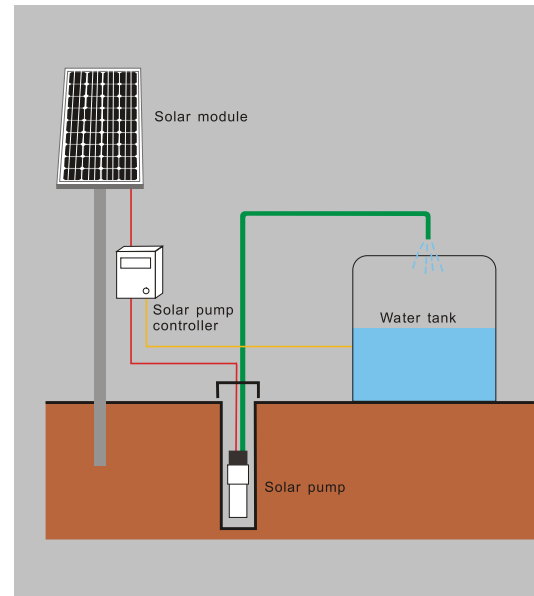
What are Solar Pump Systems used for?

Livestock Watering

Cattle ranchers in the Americas, Australia and Souther n Africa are enthusiastic solar pump users. Their water sources are scattered over vast range lands where power lines are few and costs of transport and maintenance are high. Some ranchers use solar pumps to distribute water through several miles (over 5 km) of pipelines. Others use portable systems, moving them from one water source to another.

Irrigation

Solar pumps are used on small farms, orchards, vineyards and gardens. It is most economical to pump PV array-direct (without batter y), store water in a tank, and distribute it by gravity flow. Where pressurizing is required, storage batteries stabilize the voltage for consistent flow and distribution, and may eliminatethe need for a large storage tank.

Domestic Water

Solar pumps are used for private homes, villages, medical clinics, etc. A water pump can be powered by its own PV array, or by a main system that powers lights and appliances. An elevated storage tank may be used, or a second pump called a booster pump can provide water pressure. Or, instead of using a large storage tank, a battery powered system with a small pressure tank can be used to provide water on demand. Rain catch basins can supplement solar pumping when sunshine is scarce. When designing a system, it helps to view the whole picture and consider all the resources.

There are virtually no limits to how large solar pumps can be built. But, they tend to be most competitive in small installations where they replace windmills and mecha nical pump jacks powered by combustion engines.

Some small solar pumps require less than 150 watts, and can lift water from depths exceeding 200 Feet. You may be surprised by the per formance of such a small system. On a sunny day a 1.5 gallon per minute system with a tracker can lift 900 gallons of water. That's enough to supply several families, up to 60 head of cattle, or 40 fruit trees!

Slow solar pumping lets us utilize low-yield water sources. It also reduces the cost of long pipelines, since small-sized pipe may be used. The length of piping has little bearing on the energy required to pump if the piping is sized correctly.

The most attractive advantage of solar pump systems over windmills and pump jacks is that they are easily installed and maintained without the use of expensive well ser vice equipment.

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Here is a general configuration table for Zytech Solar Pump System without inverter

Description	Unit	ZT308	ZT208	ZT108
Maxim. voltage	V	35,00(+/-1,0)	35,00(+/-1,0)	17,50(+/-0,5)
Minim. voltage	V	32,00 (+/-0,2)	32,00 (+/-0,2)	16,20 (+/-0,1)
Max. power	W	36,00 (+3,0)	24,00 (+2,0)	12,00 (+1,0)
Working current	A	0,05-1,10	0,05-0,75	0,05-0,75
Safe for "dry run"		yes	yes	yes
Safe for overload		yes	yes	yes
Safe for reverse poling		yes	yes	yes
LED operating indication		yes	yes	yes
Water deep at the minimum	cm	36,00	36,00	36,00
Length of cabel	m	30,50 (+/-0,2)	20,50 (+/-0,2)	10,50 (+/-0,2)
Length of water pipe	m	30,50 (+/-0,2)	20,50 (+/-0,2)	10,50 (+/-0,2)

Water depth (meter)	Water pumping output (liter) delivering amount at 6 sunshine hours		
	Sunny	Less cloudy	Cloudy
ZT308			
15 m	422	327	242
25 m	345	266	201
25 m	282	210	155
30 m	221	167	112
ZT208			
7 m	438	335	244
10 m	374	283	208
15 m	306	225	164
20 m	249	187	129
ZT108			
3 m	678	479	365
5 m	521	385	285
7 m	411	304	227
10 m	270	180	129

Here is a general configuration table for Zytech Solar Pump System with inverter

Pump power (KW)	Solar panel (Kwp)	Inverter (KVA)	Voltage	Pumping height (m)	Water flow rate m³/h
0.37	0.5-0.6	0.75	220/380	46	1
0.55	0.7-0.8	1.1	220/380	67	1
0.75	1-1.2	1.1	220/380	87	1
1.1	1.5-1.8	1.5	220/380	129	1
1.5	2-2.5	2.2	220/380	186	1
2.2	3-3.5	3	220/380	260	1
3	4-4.5	4	380	120	5
4	5-6	6	380	161	5
5.5	7-8	8	380	147	8
7.5	9.5-10.5	11	380	198	8
9.2	11.5-13.5	13	380	141	17
11	13.5-16	15	380	165	17

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