

SOLAROPIA

INNOVATIONS IN SOLAR PUMPING TECHNOLOGY

DEEP WELLS SOLAR PUMPING SYSTEMS



SOLAR DC



3 Phase-AC to Pump



SPI-W

WORLD'S FIRST SOLAR TECHNOLOGY TO OPERATE DEEP-WELLS PUMPS UP TO 500 HP

The Technology of the 21 Century Operates Industrial Pumps with Solar

ABOUT SPI-W SOLAR PUMPS

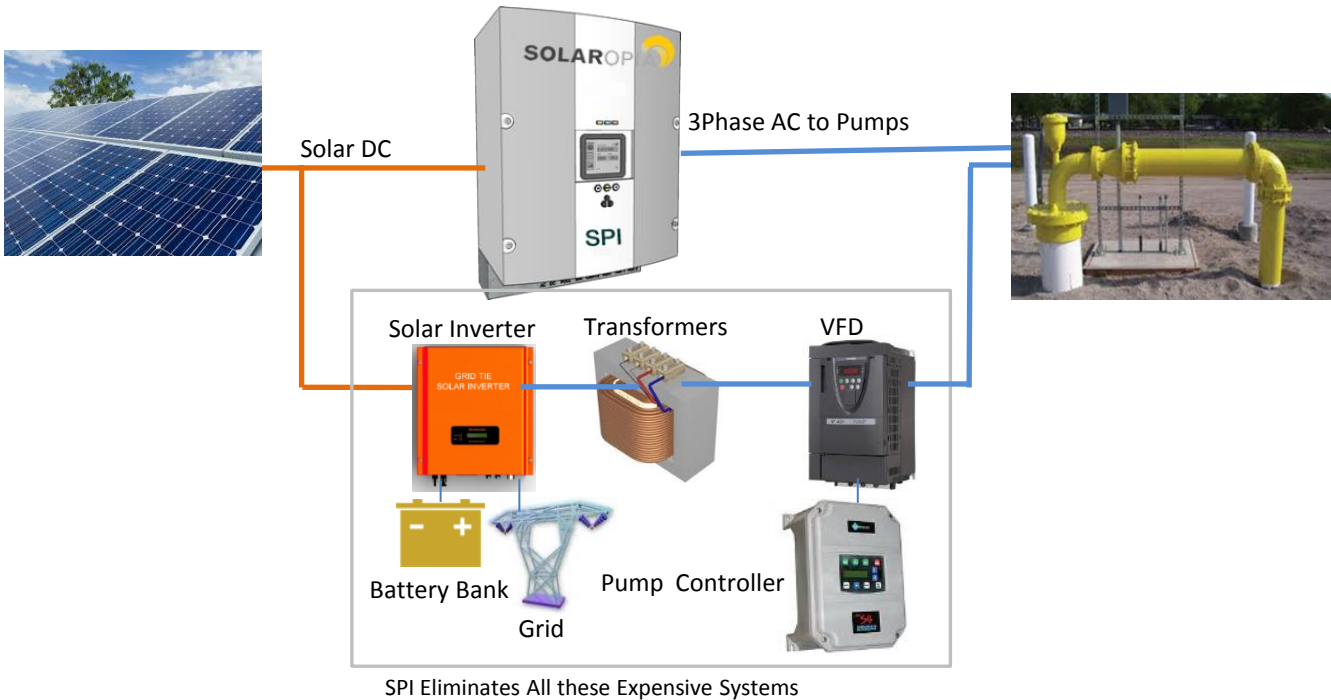
SOLAROPIA SPI-W represents a new generation of solar pumping systems that uses solar VFD technology to directly operate pumps up to 500 HP from Solar PV arrays. These systems can handle city scale plant to supply potable water from aquifers and deep wells, to irrigate large hundreds Acres farms, or to supply a million GPD for rural oil field using one pump.

- Operate pumps Off-Grid (in Rural Areas)
- Operate 24 hours pumping in hybrid Solar-AC mode (in Urban Areas)
- Pump type independent (no need to change existing pumps to use SPI solar power)
- Extremely efficient (about 40% higher efficiency than conventional solar systems)



HIGH EFFICIENCY-LOWER PUMPING COST

Conventional solar inverters (Off and On Grid) are not suited to operate pumps – they would need four systems (Solar Inverter, Transformer, VFD, and Pump Controller) which translates into 20% of solar power losses. SPI eliminates all these systems (see the diagram below) and reduces solar system cost by average 40%-50%



SOLAR PUMPING ECONOMY

Pumps consumes lot of power and represents 95% of plants operating cost. SPI-W tremendously reduces this cost by 50%-to-70%. The cost and saving data for 50 HP pump, for example, is provided below to compare SPI cost (average \$8 per KWh), with diesel power plant (average \$22 KWh), and Utility power (average \$18KWh). SPI saves about 75% of diesel plant operating cost, and 55% of grid power cost to operate the same pump.

Pump Power Source (50 HP Pump)	Operating Cost (15 years)*	Saving of Operating Cost (15 years)
Diesel Power Plant	\$440,000	\$0
Utility Power	\$315,000	\$125,000
SPI Solar Plant	\$140,000	\$300,000

*SPI solar systems operate 15 years as minimum -25 years average.

INDUSTRIAL- HEAVY DUTY SOLAR PUMPING SYSTEM

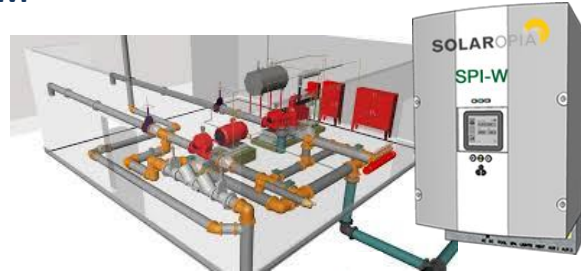
BUILT-IN PUMP PROTECTION CONTROLLER

PUMP OPERATION PROTECTION

- Soft-start and Soft-shutdown.
- Dry-Run Protection
- High Pressure Protection
- Pipe Breaks-leakage Protection
- Flow Compensation .
- Pipe fill Protection

PUMP ELECTRICAL PROTECTION

- High Voltage Protection
- Power Surge protection
- Phase loss Protection
- GFC protection
- Emergency stop
- Main turbulence protection



BUILT-IN SMART PUMPS CONTROLLER

- Auto start in Solar mode (No need to turn pump ON / OFF)
- Auto-switching between power modes
- Boost –decrease Flow Rate (Manual-Time Set- Remote)
- Built in meters for distant transmission (Flow Rate , Daily Pumped Volume , Solar Power (KW)

BUILT-IN PUMP COM-CONTROLLER

- Communicate remotely using standard Protocols (Modbus, Profibus) with other pumps , data servers, PLCs, control rooms



SPI-W APPLICATIONS

SPI-W enables to power and operate large water plants, oil fields , RO plants , farms and utility projects



City Supply Ground Water Plant

SPI-W -500 model can pump 1-to-3 million GPD (4000-12000 m3/day) of fresh ground water using one solar pump at 500 KW PV



Brackish Water RO Plants

SPI-W500 model can feed RO plants to supply 1 million GPD (4000m3) per day using one deep well solar pump at 500 KW PV



Farming

SPI-W offers models to operate from 5 hp to 500 hp pumps to irrigate small farms from 10 Acres to large farms up to 1000 Acres with one solar pump



Industrial

Power plants and Oil & Gas industry can benefit from SPI-W. 1million gallon ground water per a day can operate :

- 200 MW power plant (1MWh requires about 500 gallon)
- 20,000 barrel oil per day (1 oil bbl requires 2-4 bbl water).

SPI –W MODELS FOR DEEP WELLS PUMPING

SPI models are referenced following pumps horse power (HP) .
 SPI is operated by PV array in KW equal to the HP of pumps .
 SPI-W models up to 500 HP are listed here for required pumping head (H) and flow rate(Q). Models are referenced with the required pumping HP (KW PV).



Q FLOW RATE		H: PUMPING HEAD Feet'-Meter (m)						
GPM	m3/h	150'-50m	250'-75m	350'-100m	500'-150m	700'-200m	1000'-300m	1200'-400m
100	25	SPI-6	SPI-9	SPI-12	SPI-18	SPI-24	SPI-36	SPI-48
200	50	SPI-12	SPI-18	SPI-24	SPI-36	SPI-48	SPI-75	SPI-120
300	75	SPI-18	SPI-24	SPI-36	SPI-60	SPI-75	SPI-120	SPI-150
400	100	SPI-24	SPI-36	SPI-48	SPI-90	SPI-120	SPI-150	SPI-180
600	150	SPI-36	SPI-48	SPI-75	SPI-120	SPI-150	SPI-240	SPI-300
800	200	SPI-48	SPI-75	SPI-90	SPI-150	SPI-180	SPI-330	SPI-420
1000	250	SPI-60	SPI-90	SPI-120	SPI-180	SPI-240	SPI-480	SPI-540

SOLAROPIA is the only world's company that warrants its solar pumping performance data

Complete Solar Pumping Systems

SOLAROPIA offers three packages of ready-to-install solar pumping systems

PAC1: Package with SPI only (Installers supply PV and mounts).

PAC2: Package to operate existing Pumps with solar power (SPI with PVs , Mounts , and AC-DC cables included).

PAC3: Package for New Pumping projects (PAC2 with new pump from SOLAROPIA Partners Pump manufacturers)

PAC1	PAC2	PAC3
SPI system only (Solar PV and Mounts are not included)	Complete solar System for Existing Pumps (SPI, Solar PV , mounts, Combiner Boxes with DC and AC Cables –are included)	PAC2 with new pump supplied by SOLAROPIA pump manufacturers partners in USA , or in the country of installation



SPI SYSTEM ORDERING REFERENCE

SPI-W	HP	V	P
	Pump HP	Pump Voltage	PAC:1,2,3

