

SOLAROPIA

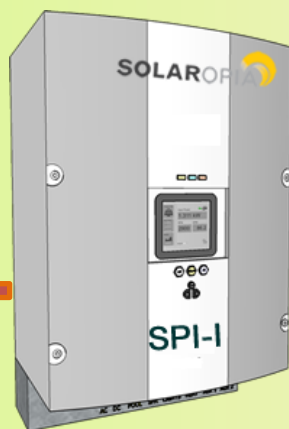
INNOVATIONS IN SOLAR PUMPING TECHNOLOGIES

SOLAR IRRIGATION PUMPS

COMPLETE SOLAR SYSTEM TO OPERATE ALL AC PUMPS WITH SOLAR POWER



Solar DC



3Phase AC to pump



SPI-I DIRECT SOLAR TO PUMP VFD TECHNOLOGY

LOWERS SOLAR PUMPING COST BY 40%

(40% LESS PVs COST AND 40% LESS MOUNTING AREA)

Built-in Pumping Flow-Rate and Volume control

Data logging and Remote Data Transmission/ pump Operation

ABOUT SPI SOLAR IRRIGATION PUMPS

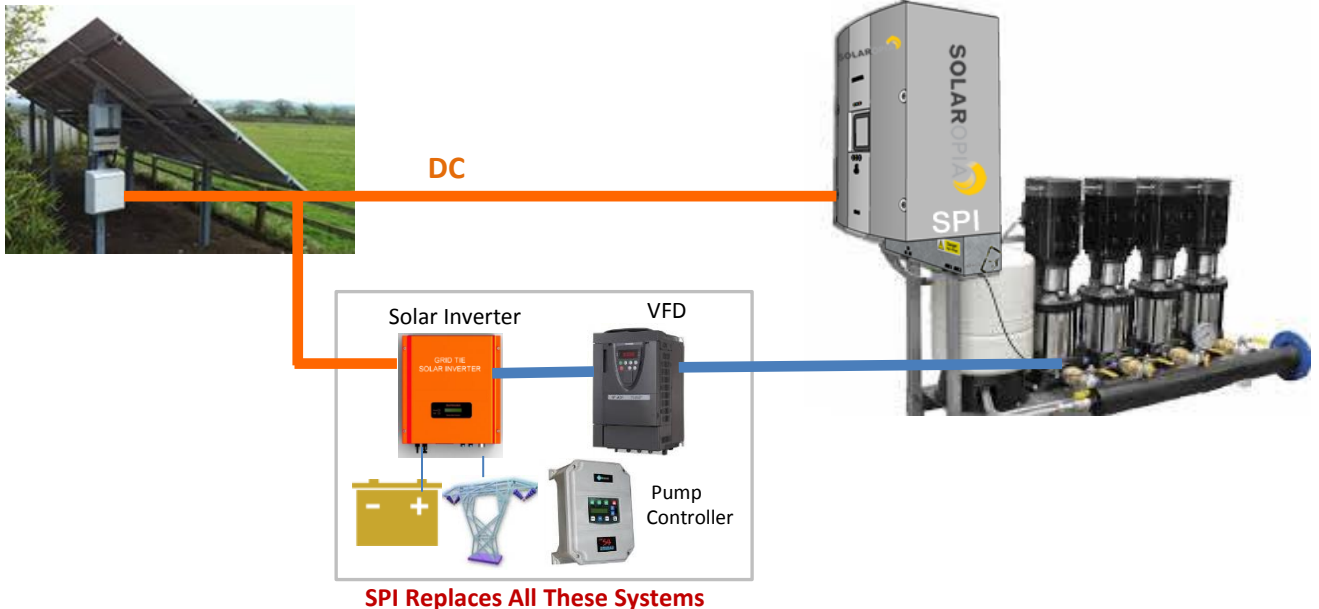
SOLAROPIA SPI-I represents a new generation of solar pumping systems that employs solar VFD technology to directly operate pumps from Solar PV arrays. These pumps can handle large farms up to 1000 Acres, and small farms down to 10 Acres. SPI-I can operate with solar deep-wells pumps, surface pumps and sprinklers booster pumps. Additionally, it has the following distinguishing features



- Operate pumps Off-Grid (in Rural Farms)
- Operate 24 hours pumping in hybrid Solar-AC mode (in Grid-connected Farms)
- Pump type independent (no need to change existing pumps to use SPI solar power)
- Operate Ground water and surface Pumps, boosters for sprinklers Central Pivots
- Embeds smart irrigation tools that advise farmers on required flow and volume per crops
- Advanced Industrial pump protection functions
- 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%



THE SOLAR PUMPING ECONOMY

Pumps consume a lot of power and represent 60% of FARMING operating cost. SPI-i tremendously reduces this cost by 50%-to-70%. The cost and saving data for a 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

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
- GFIC protection
- Emergency stop
- Main turbulence protection



BUILT-IN SMART IRRIGATION 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 volume advisory set per crops type-farm area and daily solar pumping volume

APPLICATIONS

Ground Water Pumping



SPI-IW 300 operates pump to lift water 1500' (500m) and deliver 150,000 GPD (500 m3) to irrigate up to 200 Acres with 300 KW PV

Surface Water Pumping



SPI-IS 100 operates large surface pumps at 100 KW PV to deliver 1million GPD (6,000m3) to irrigate 500 Acres

Boosters for Sprinklers and Central Pivots



SPI-IB 200 operates booster pumps of pivots to irrigate large farms up to 500 Acres with only 200 KW PV

MODELS AND CAPACITIES

SPI models are referenced with pumps horse power (HP) which is equal to the required PV array power in KW. Please refer to the listed models below referenced with the HP (KW PV) per SPI-Pumping class.

MODELS REFERENCE: SPI-IW XX

(XX= the PV power in KW from the Ref. table below)

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	6	9	12	18	24	36	48
200	50	12	18	24	36	48	75	120
300	75	18	24	36	60	75	120	150
400	100	24	36	48	90	120	150	180
600	150	36	48	75	120	150	240	300
800	200	48	60	90	150	180	330	420
1,000	250	60	90	120	180	240	480	540

SPI LOWERS SOLAR PUMPING COST BY 40% (40% LESS PVs COST AND MOUNTING AREA)

SOLAR SURFACE PUMPS (SPI-IS Class)

SPI –IS Provides complete solar system to operate any surface pump to irrigate farms.

Q: FLOW RATE		H: SURFACE PUMPING HEAD (feet', bars, meters)	
GPM	m3/h	30'-1 bar-10m	75'-2.5 bar-25m
400	100	6	9
800	200	12	24
1,000	300	18	36
1,500	400	24	48
2,000	500	30	60
2,250	750	60	90
4,000	1,000	90	120
6,000	1,500	150	210
8,000	2,000	210	270
12,000	3,000	270	350
16,000	4,000	330	420
20,000	5,000	400	480

SOLAR BOOSTING PUMPS (SPI-IB Class)

SPI –I-B Provides complete solar system to operate any pressure boosting pump in farms.

Q: FLOW RATE		H: Total RO Pump Pressure (bar-psi)		
GPM	m3/h	3bar 50 psi	5bar 75 psi	7 bar 100 psi
100	25	6	7.5	12
200	50	9	15	18
300	75	15	21	30
400	100	18	30	36
500	125	24	36	48
600	150	36	40	60
800	200	40	48	75
1,200	300	60	75	150
2,000	500	75	120	210
4,000	1,000	150	210	300

MODELS REFERENCE: SPI-IW-XX AND SPI-IB- XX (XX= the PV power in KW from the Ref. table)

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 "Grundfos" in USA , or in the country of installation.



SPI SYSTEM ORDERING REFERENCE

SPI- I	T	HP/KW	V	P
Pump Type: W, S, B		Pump HP/KW PV	Voltage:2, 4	PAC:1,2,3

