

# SOLAROPIA

INNOVATIONS IN SOLAR PUMPING TECHNOLOGY

## SOLAR RO PUMPS



3 Phase AC to RO Pumps

The Pumping Technology of the 21 Century Operates with Solar

## SPI-RO

WORLD'S FIRST SYSTEM TO OPERATE UP TO 500 HP RO PUMPS WITH SOLAR POWER

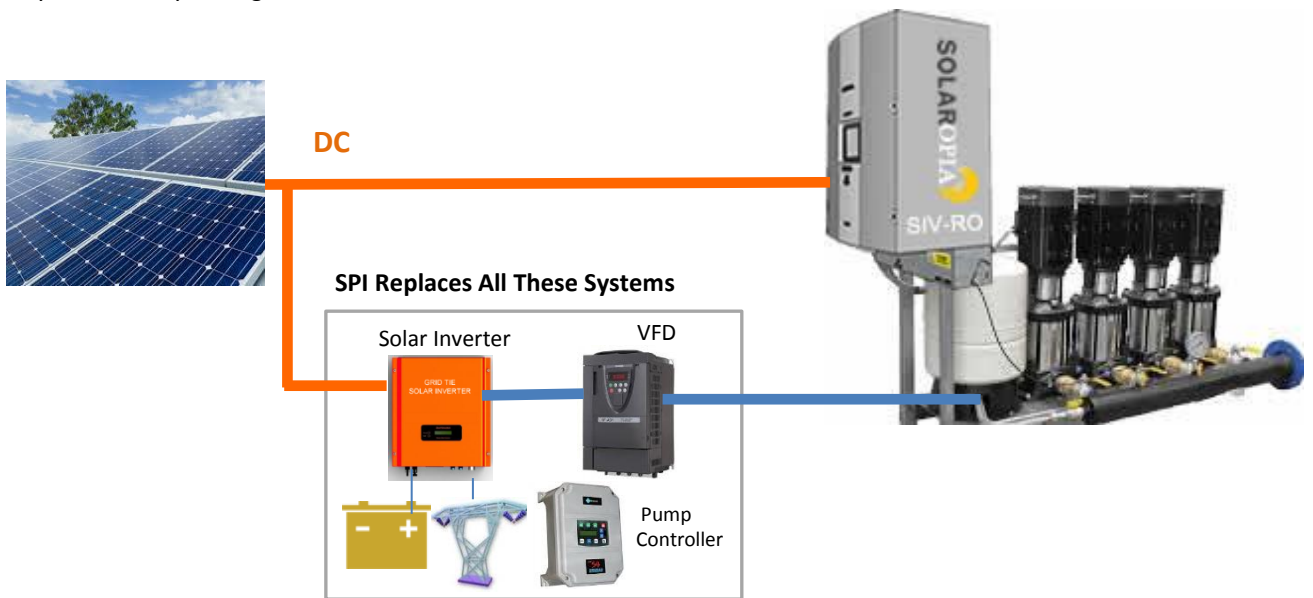
## SPI-RO SOLAR PUMPING SYSTEMS

SOLAROPIA SPI-RO Class represents a new generation of high-pressure solar pumping systems that uses solar VFD technology to directly operate RO pumps up to 500 HP from Solar PV arrays. Its most distinguished features include:

- Pump Brand and Type independent
- All Pumps from 1 to 400 HP
- All Standard Pumps operating Voltages (200v, 400v, 600V)
- 3 Power operating modes: Solar, AC, and Hybrid (Solar and AC)
- Reduces RO plant Operation cost by 50%

## 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 RO SOLAR PUMPING ECONOMY

Pumps consumes lot of power and represents 95% of plants operating cost. SPI-B 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

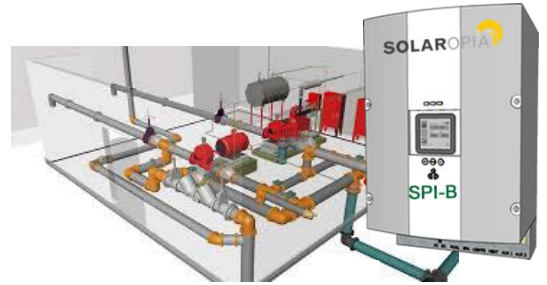
## BUILT-IN PUMP PROTECTION CONTROLLER

### 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
- GFI 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



## APPLICATIONS

### RO Plant Manufacturers



SPI-RO enables RO manufacturers to offer Hybrid Solar-AC powered RO plants for wide range of commercial applications

### RO Brackish Ground Water Plants



SPI-RO 300 model can operate RO pump to deliver 1 million GPD (4,000 m3/day) from 5000 TDS brackish water using one solar pump at 300 KW-PV

### Water-Reuse RO Plants



SPI-RO 400 can operate water recycle plant up to 1 million GPD (4000m3/day) Using 400 KW PV

### Seawater Desalination RO Plants



SPI-RO 500 operate RO desalination pumps to produce 300,000 GPD (1200 m3) from seawater at 45000 TDS.

## SPI-RO MODELS

SPI models are referenced following pumps horse power (HP) and requires equal power PV array in KW. SPI models are listed below for given pumping head (H), flow rate(Q), and referenced with the required PV (KW).

Q FLOW RATE		H: Total RO Pump Pressure (bar-psi)						
GPM	m3/h	7 bar 100psi	15 bar- 200 psi	20bar 300 PSI	30bar 450 PSI	40bar 600 PSI	50bar 750 PSI	60 bar 900 PSI
20	5	SPI-RO -3	SPI-RO -6	SPI-RO -9	SPI-RO -12	SPI-RO-18	SPI-RO-24	SPI-RO-30
40	10	SPI-RO -6	SPI-RO -9	SPI-RO -12	SPI-RO-18	SPI-RO-24	SPI-RO-36	SPI-RO-48
100	25	SPI-RO -9	SPI-RO-18	SPI-RO-24	SPI-RO-36	SPI-RO-48	SPI-RO-60	SPI-RO-96
200	50	SPI-RO-18	SPI-RO- 36	SPI-RO-42	SPI-RO-48	SPI-RO-60	SPI-RO-72	SPI-RO-180
400	100	SPI-RO-36	SPI-RO-72	SPI-RO-90	SPI-RO-120	SPI-RO-150	SPI-RO-180	SPI-RO-330
<b>500</b>	125	SPI-RO-48	SPI-RO-90	SPI-120	SPI-RO-150	SPI-RO-180	SPI-RO-330	SPI-RO-400
600	150	SPI-RO-60	SPI-RO-120	SPI-RO-150	SPI-RO-180	SPI-RO-330	SPI-RO-400	SPI-RO-480
<b>800</b>	<b>200</b>	SPI-RO-90	SPI-RO-150	SPI-RO-180	SPI-RO-330	SPI-RO-300	SPI-RO-420	SPI-RO-660
<b>1000</b>	<b>250</b>	SPI-RO- 120	SPI-RO-180	SPI-RO-210	SPI-RO-300	SPI-RO-420	SPI-RO-660	SPI-RO-800

## SPI-RO Systems Referencing

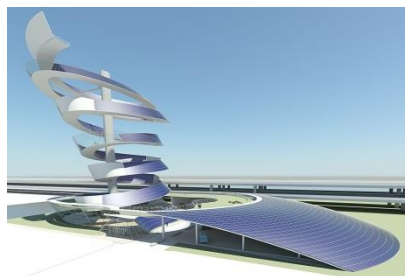
SPI systems are offered in three solution packages:

PAC1: Package contains SPI only- Installers Supply Solar PVs and Mounts

PAC2: Ready to install Solar system Package ( SPI, PVs, Mounts, cables, accessories)

PAC4: PAC2 with installation and commissioning

PAC1	PAC2	PAC4
SPI-RO 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 installation by SOLAROPIA or its certified partner in the country of installation for Existing RO plants



SPI -RO	HP	V	N
PUMP HP		VOLTAGE TYPE: 1 to 6	
PACKAGE TYPE: 1, 2,4			

