

# SOLAROPIA



INNOVATIONS IN SOLAR PUMPING TECHNOLOGY

## SOLAR PUMPS FOR CONTAINERIZED RO PLANTS

Complete Solar Pumping System Operated by Solar VFD Technology



## SPI-RO-C

COMPLETE SOLAR PUMPING SYSTEMS FOR RO PLANTS

OPERATES WITH SOLAR ANY RO PLANT FOR ANY APPLICATION

### WHAT IS THE SPI-RO-C

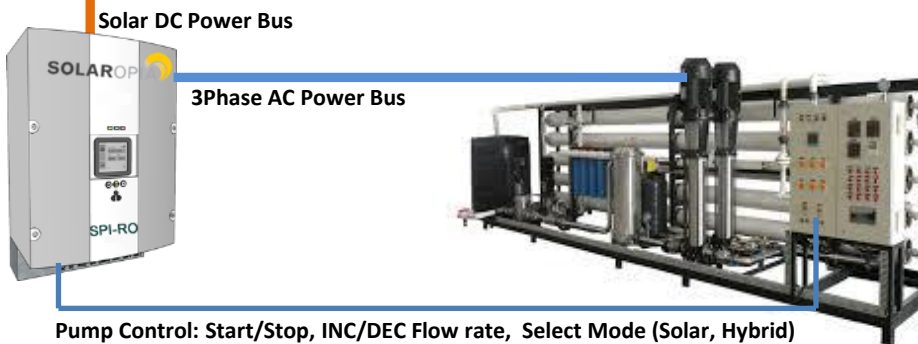
SOLAROPIA offers SPI-RO-C containerized solar systems to operate pumps up to 50 hp in RO plants for various applications. The SPI-RO-C is all in one system with built-in Solar VFD that directly operates pumps from solar power only/ or hybrid solar and AC power. It occupies less than 2% of the container volume where the RO plant can be mounted. The PV is mounted on the container roof with special racking structure that stands wind up to 100 miles/h (170 km/h). It is ready-to-integrate solar system with RO plants enabling RO systems manufacturers to offer Solar operated RO plants for wide applications in rural and urban areas for brackish deep-wells, industrial recycling, to seawater desalination. SPI-RO-C operates both the feed and the RO pumps with solar power.



### MAIN FEATURES

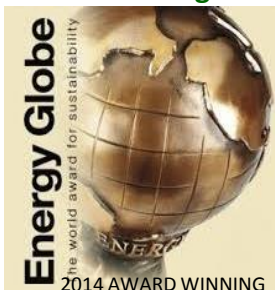
- All-in-one Solar complete system solution for RO plants
- Employs advanced new Solar-VFD technology that is 30% more efficient than solar inverters and powered directly from solar PVs (Battery-less technology)
- PV are Mounted on standard 20', and 40' containers with special mounting structure that resist winds up to 100 miles/h (170 km/h).
- Operates off-grid in rural areas and in hybrid mode with AC in urban areas
- Easy to deploy and to operate; practically installs in one day
- Heavy-Duty designed for harsh and high-temperature environments
- Built-in pump protection both operational and electrical
- Easy to operate with TFT touch screen or set automatic mode to start/stop.
- Built-in GPRS for wireless remote operation and data monitoring

### EASY TO OPERATE AND TO INTEGRATE WITH RO PLANTS



RO OEMs can easily integrate SPI-RO-C to operate their plants with solar power – it is just replacing the conventional VFD in their designs by Solar VFD. SPI-RO-C provides 3phase AC power to pumps and standard digital/analog interface to RO plant's PLC to control pumps operation. SPI-RO-C is also user friendly to operate – it offers touch-to-operate TFT Touch screen on the SPI-RO-C. Pumping Monitoring data is also available on TFT screen and can be transmitted for remote monitoring.

### Award winning Solar VFD Technology for RO Pumps



SPI-RO-C has been awarded in 2014 the prestigious Globe Energy Organization's award - Solar Water Pumping technology of the year. More than 800 compact RO plants deployed world-wide SPI-RO system in various applications in villages, small towns, and for industrial water. It reduces RO operating cost by 50% compared to grid power and about 70% compared to diesel generators.

### Applications and Capacities

OEM can select the complete SPI-RO-C solar system power model that suites their RO plant designs. The tables below serves as a guide for required solar power in PV KW to operate RO pumps for various Source water TDS/RO pump pressure up to 50 hp.

### Solar Power Guide for RO Pumps (PV KW= Pump HP)

Q: FLOW RATE		TDS (PPM)/ RO Pump Pressure (bar-psi)							
		TDS 1500	TDS 3000	TDS 5000	TDS 10000	TDS 15000	TD 25000	TDS 35000	TDS 45000
GPM	m <sup>3</sup> /h	7 bar 100psi	10bar 150psi	15 bar 200 psi	20bar 300 PSI	25bar 375 PSI	30 bar 450 PSI	50 bar 750 PSI	65 bar 1000 PSI
20	5	6 KW	9 KW	12KW	18KW	24 KW	24 KW	48 KW	60 KW
40	10	12KW	15KW	18 KW	24KW	36KW	36 KW	60 KW	80KW
80	20	24 KW	30KW	36 KW	60KW	Special orders			
200	50	36 KW	48KW	60KW	Special Orders				

### Solar Power Guide for Feed Pumps (PV KW= PUMP HP)

#### DEEP-WELLS SOLAR FEED PUMPS



Q: FLOW RATE		H: PUMPING HEAD feet'-meter (m)					
GPM	m <sup>3</sup> /h	150' (50m)	350' (100m)	500' (150m)	750' (250m)	1000' (350m)	1500' (500m)
40	10	1.5 KW	3KW	4.5 KW	6KW	9KW	15KW
100	25	6 KW	12 KW	18 KW	24 KW	36 KW	48 KW
200	50	12 KW	24 KW	36KW	48 KW	60 KW	80 KW
300	75	18 KW	36 KW	60 KW	Special orders		
400	100	24 KW	48 KW	Special Orders			

#### SURFACE WATER SOLAR FEED PUMPS



Q: FLOW RATE		H: SURFACE PUMPING HEAD feet', meter (m)		
GPM	m <sup>3</sup> /h	75'-25m	150'- 50 m	350' (100m)
40	10	1KW	1.5 KW	3KW
100	25	3KW	6 KW	12 KW
200	50	6KW	12 KW	24 KW
300	75	9KW	18 KW	36 KW
400	100	12KW	24 KW	48 KW

### Ordering Reference

RO OEM can order SPI-RO-C Solar System without containers (System Ref. PAC1) or with Containers (System Ref. PAC2). The Ordering format is simple: Just indicate the Feed and RO Pumps HP, the Pump Voltage, and the System Package (1 or 2)

SPI-RO-C	RO HP	FEED HP	VOLT	PAC
	RO Pump HP	Feed Pump HP	Pump Voltage: 200V / 400V	Package 1, 2



Specifications Features	Description			
SPI-RO-C Dimensions (H x W x D)	Up to 10 KW 29 x 24 x 12 in 735 x 610x 305 mm	Up to 20 KW 29 x 24 x 16 in 735x 610 x407 mm	Up to 40 KW 36x 31 x 16 in 915x 788 x 407 mm	Up to 60 KW 50 x 40 x 16 in 1270 x1016 x407 mm
No of Containers to Hold PVs	20'/1	40'/1	40'/2	40'/3
Pumping Power Rating (HP) 3-Phase-AC power in both modes	Up to 10 HP (up 7.5 KW AC)	Up to 20 HP (up to 15KW AC)	Up to 40 HP (up to 30 KW AC)	Up to 60 HP (up to 45 KW AC)
Operating Power Modes	1.Solar Mode (S): Solar DC Input Only 2.Hybrid Mode(H): Solar and AC input (AC Complementary to Solar-No switching needed)			
<b>3-Pahse-AC Voltage to RO Pumps</b>				
Input AC Voltage (Hybrid Mode )	Class2: 3-Phase-AC 200-240 V @ 50/60 Hz		Class 4 : 3-Phase-AC 380-480 V @ 50/60 Hz	
Solar VFD Voltage Range to Pumps	200-240V 3-Phase-AC 50/60 Hz ~ Frequency		380-480V 3-Phase-AC 50/60 Hz ~ Frequency	
<b>DC Input Voltage</b>				
Input Voltage (DC) in Serial PV Array	335 VDC min-400 VDC max		600VDC min-800 VDC max	
MPPT Operating Voltage (DC)	290 VDC--400 VDC		550--800 VDC	
<b>Integration With RO Plants</b>				
Digital /Analog Interface	4 D/In Command from RO PLC: Start/Stop , Select Mode (Solar, Hybrid) , INC/DEC RPM 1 D/Out Pump Status 2 A/Out to Export data to RO PLC ( Pump RPM, Pump Power)			
ModBus Communications	Optional. All Command to Pump and Pump Monitoring Data			
<b>Solar Pump Operation (Local &amp;Remote)</b>				
HMI	<b>Local:</b> TFT Touch screen 4" (8" Option) for system parameters setting and Monitoring <b>Local:</b> LCP 3" menu driven with key pad for pump parameters setting /Pump data Monitoring <b>Remote:</b> Built-In Modbus/Profibus (RTU, TCP) Option: add GPRS GSM/CDMA			
Monitoring Data	Power mode (S, H) RPM, Operating Frequency, Pump Operating Power (KW) Flow Rate, Daily Pumping Volume (in Solar Mode), Solar Operating Hours , Daily Solar mode Power(KW), Total Solar Power since Installation.			
Data Logging / Data Transmission	Data logging for 12 Months with 5 minutes intervals. <b>Remote:</b> 5 seconds Intervals			
<b>Built-In Automatic Pump Protection</b>				
Pump Electrical Protection	Overvoltage, Power surge, Overload, Mains turbulence, phase lose, short-circuit			
Pump Operation Protection	Dry run, High Pressure, Pipes leakage detection, emergency stop, end of curve operation			
<b>Environmental Protection</b>				
PV mounted structure	Wind Resistant up to 100 miles/h ( 170km/h)			
Solar -VFD	NEMA 3 R, Indoor/outdoor installation/UV Resistant Enclosure Ambient Temperature: (15-130F, -10-55C°), Humidity : 5%-95%			
System Electrical Protection	Lightening protection, GFCI, Ground protection, Kill-Switch disconnect			
<b>Additional Power Sources (options)</b>				
External DC Power option	24VDC output to operate external devices (such as RO PLC)			
External AC Power Option	0.5KW-up to 2KW 3pahse-AC for operator and plant use			
<b>Service Life /Warranty /Origin</b>	10 years /3 years / USA			

