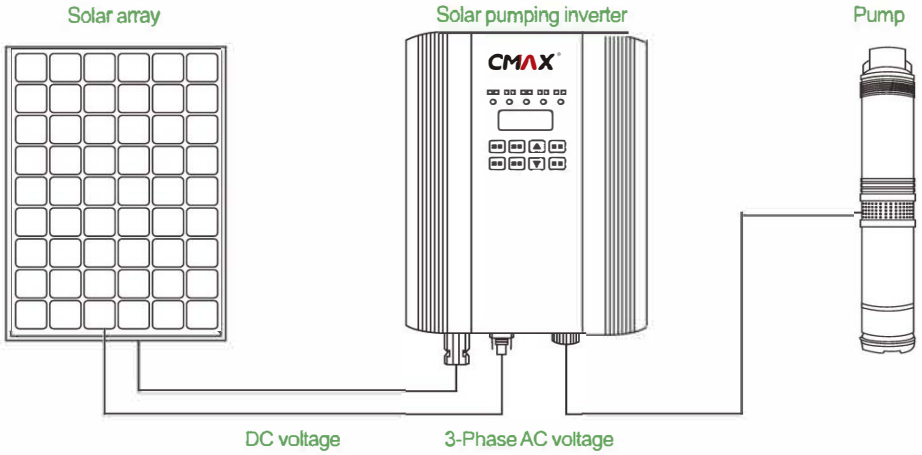
Solar Pumping System Introduction

Our AC solar pumping system consists of solar pumping inverter, pump and PV array. Consider that storing water is more efficient than storing electricity, the system is designed to directly drive the pump without battery which can reduce the construction and operating cost and routine maintenance effectively.

The PV array consists of multiple solar panels connected in series/parallel, which can supply the whole system as power source by converting the absorbed solar radiation energy to the electrical energy.

Solar pumping inverter can implement the control of the whole system operation, which drives the pump by converting DC power produced by the PV array to AC power. This inverter can adjust the output frequency according to the solar irradiation intensity in real time to implement the MPPT (maximum power point tracking).

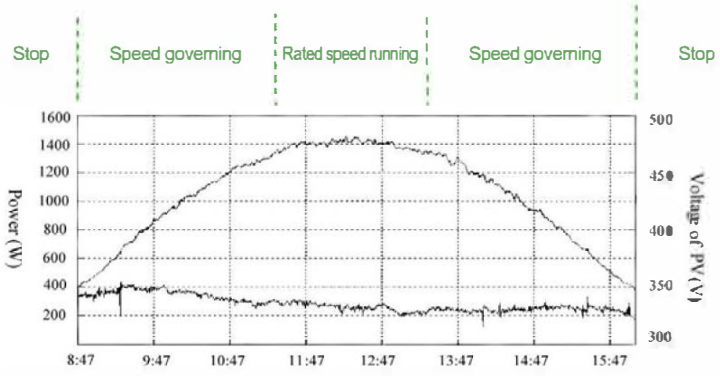
The pump driven by a 3-phase AC motor draws water from deep-well or river. The pumped water is then fed into reservoir or water tank, or connected to the irrigation system or fountain system directly. All of centrifugal pump, axial-flow pump, mixed-flow pump, and deep-well pump can be utilized.



Solar Pumping System Optimization—Single Pump System Optimization

A single pump system denotes that only a pump and the matched PV array and a solar pumping inverter are configured in the system. The goal of system optimization is to reduce the number of PV modules to be utilized as could as possible while meeting the requirements of water head and consumption. The pump rotational speed can be regulated according to the variation of solar irradiation: When the solar radiation intensity reaches the peak, the pump runs at its rated speed, and the output power is close to the maximum power of PV array; when the solar radiation intensity is relatively weak, the pump runs with the low speed based on the MPPT algorithm; when the pump speed is so low that no water flow can be available, the system stops working. Therefore, the solar pumping system is actually different from traditional pumping system, for which the system configuration needs to be optimized according to the requirements of water head, daily water consumption, and the local solar radiation levels.

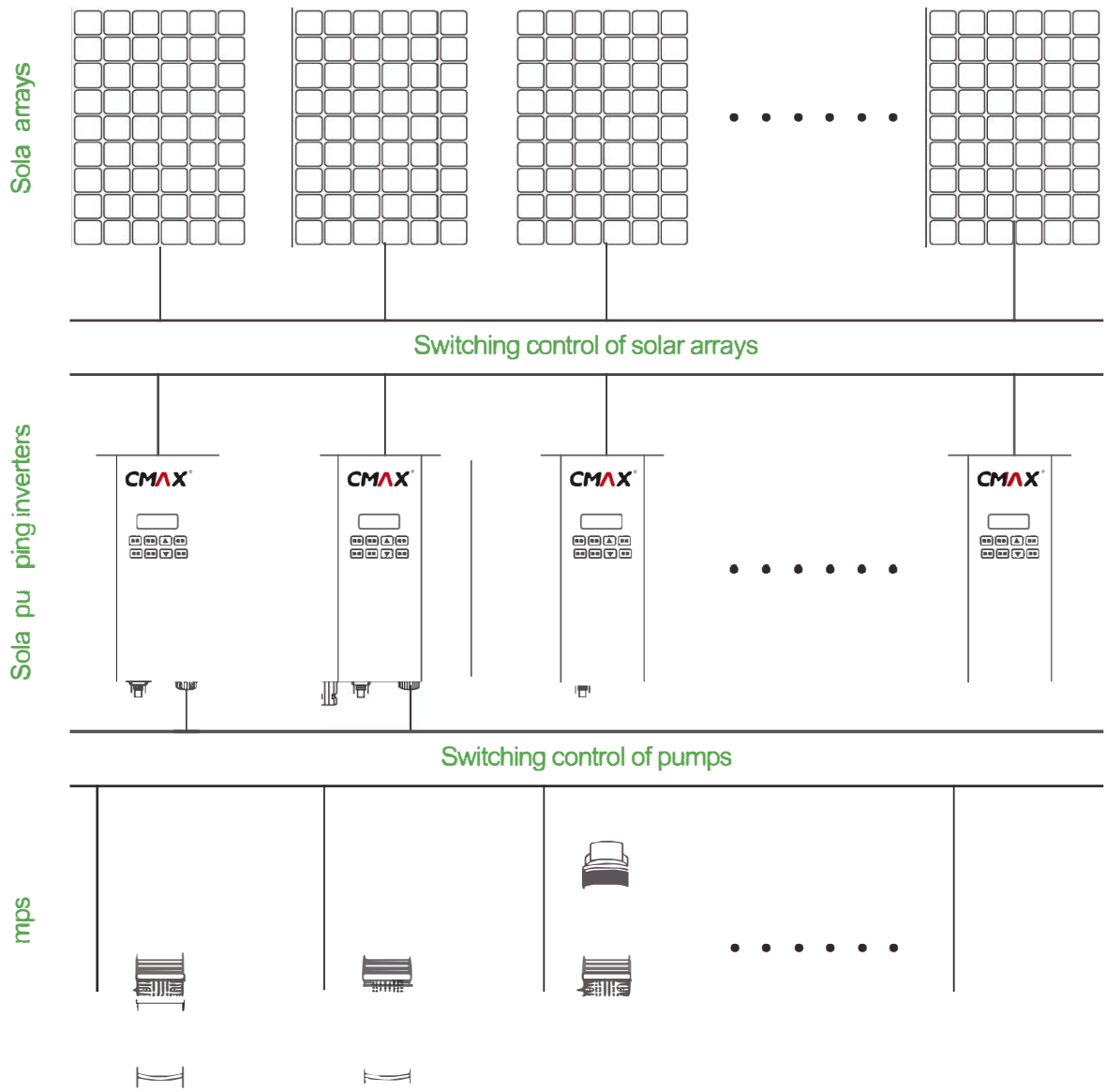
- Determine the optimal average daily working time and the range of pump speed;
- Select the optimal water head and rated power of the pump;
- Determine the maximum power of PV array, the recommended operating voltage and the connection mode.



Daily operation curve on a sunny day

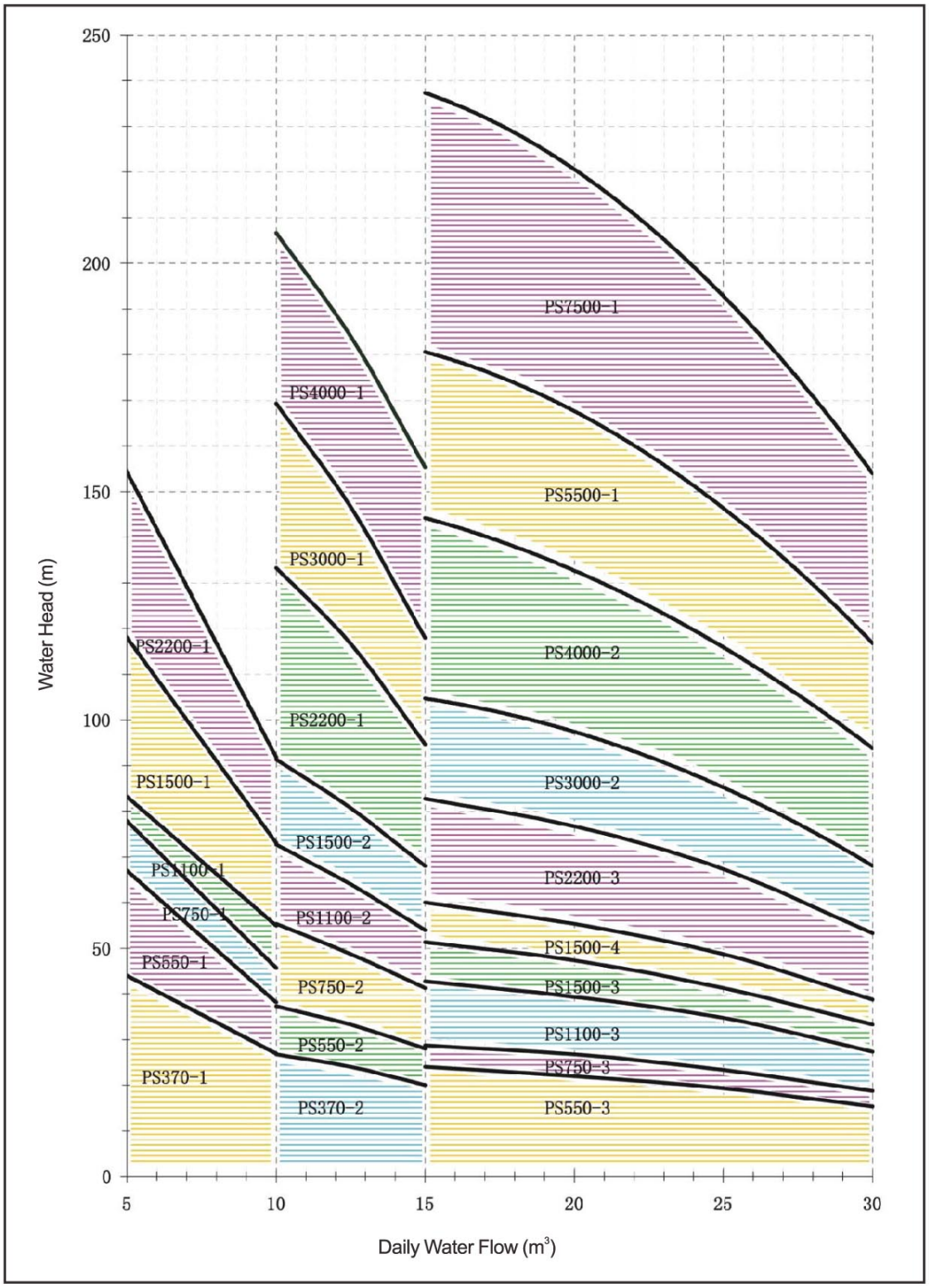
Multi-pump System Optimization

A multi-pump system denotes that there exist several pumps in the system. These pumps can be driven by either one high-power inverter or several low-power inverters. In general, the operation of multi-pump system bears more flexibility under the situation of high requirements of water consumption by controlling switches of solar array and pumps. When the solar radiation intensity is relatively sufficient, all pumps run in MPPT mode; when the solar radiation intensity is relatively weak, some pumps shut down, and the remaining running pumps can be intently supplied by the PV array. On the basis of single pump system optimization, the range of pump speed can be further optimized, in which the system can always work with high efficiency.



Solar Pumping System Selection 1

Head/Lift Range: 10-250m Daily Water Supply Range: 5-30m^3/day

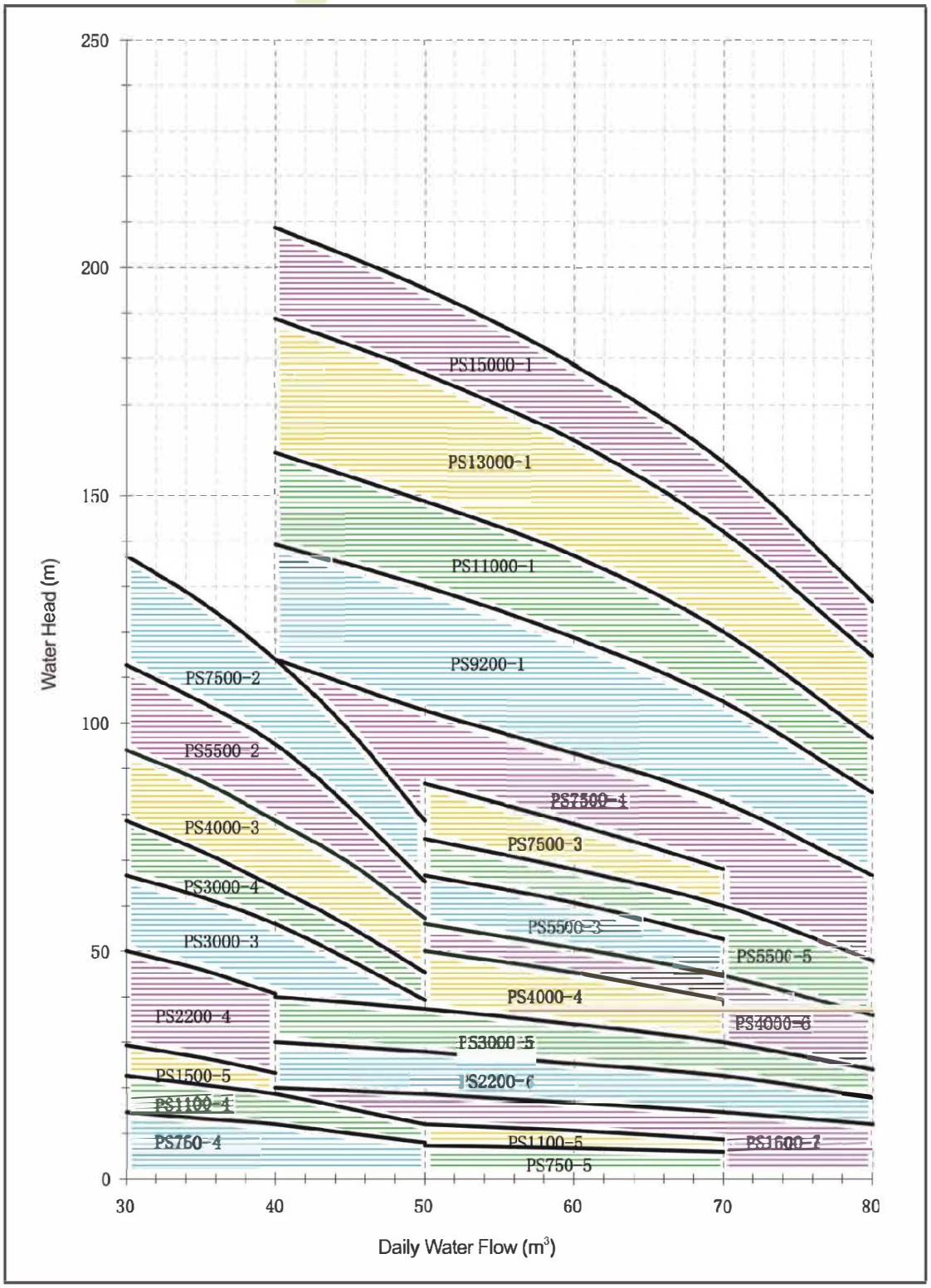


Steps for System Design

- To confirm the basic requirements of water consumption: Head and Daily water consumption;
- Y axis corresponds to Head; X axis corresponds to Daily water supply;
- To adjust the system configuration in accordance with the local solar radiation condition.

Solar Pumping System Selection 2

Head/Lift Range: 10-210m Daily Water Supply Range:30-80m³/day

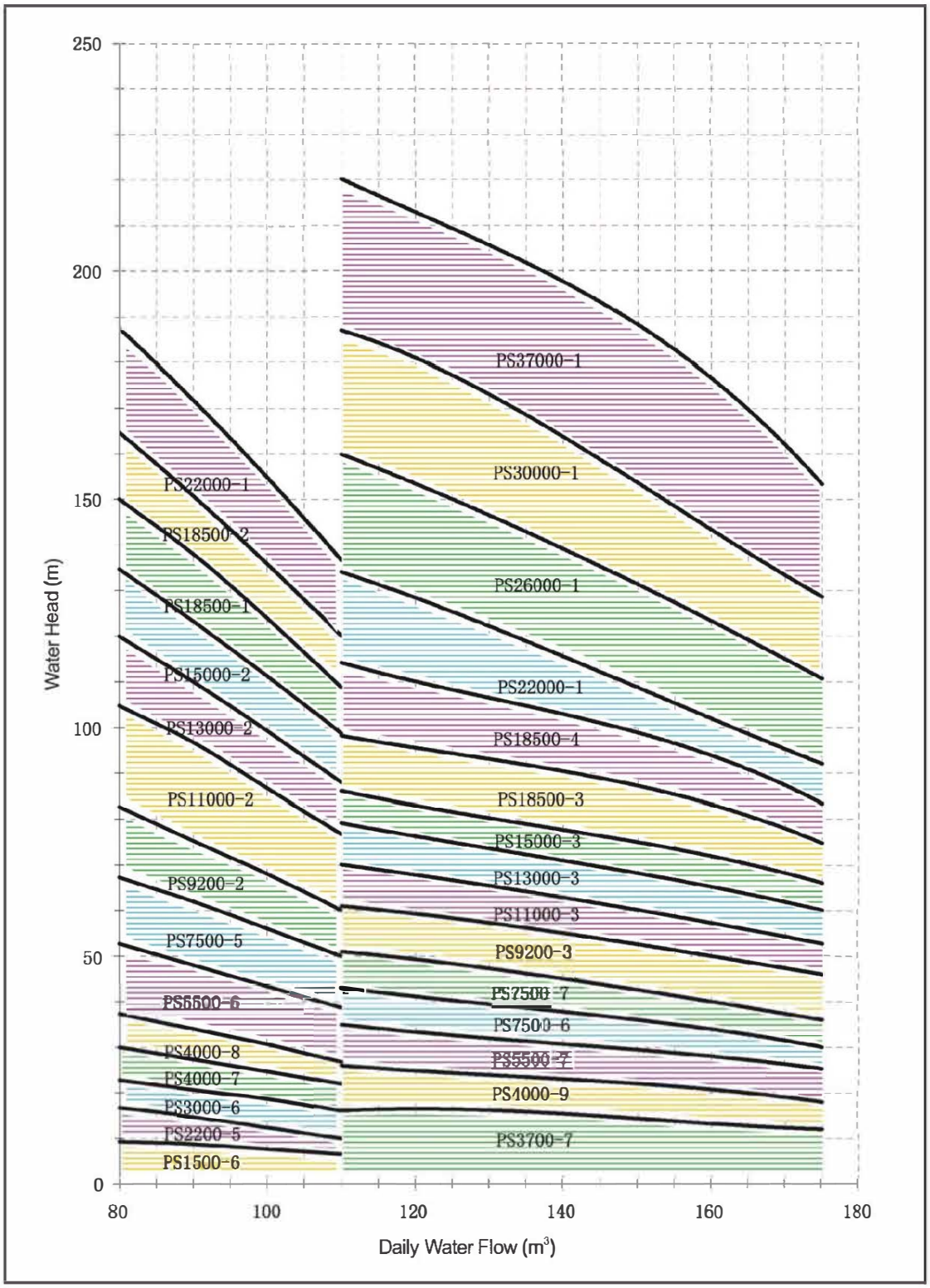


Steps for System Design

To confirm the basic requirements of water consumption: Head and Daily water consumption;
Y axis corresponds to Head; X axis corresponds to Daily water supply;
To adjust the system configuration in accordance with the local solar radiation condition.

Solar Pumping System Selection 3

Head/Lift Range: 10-220m Daily Water Supply Range: 80-180m³/day

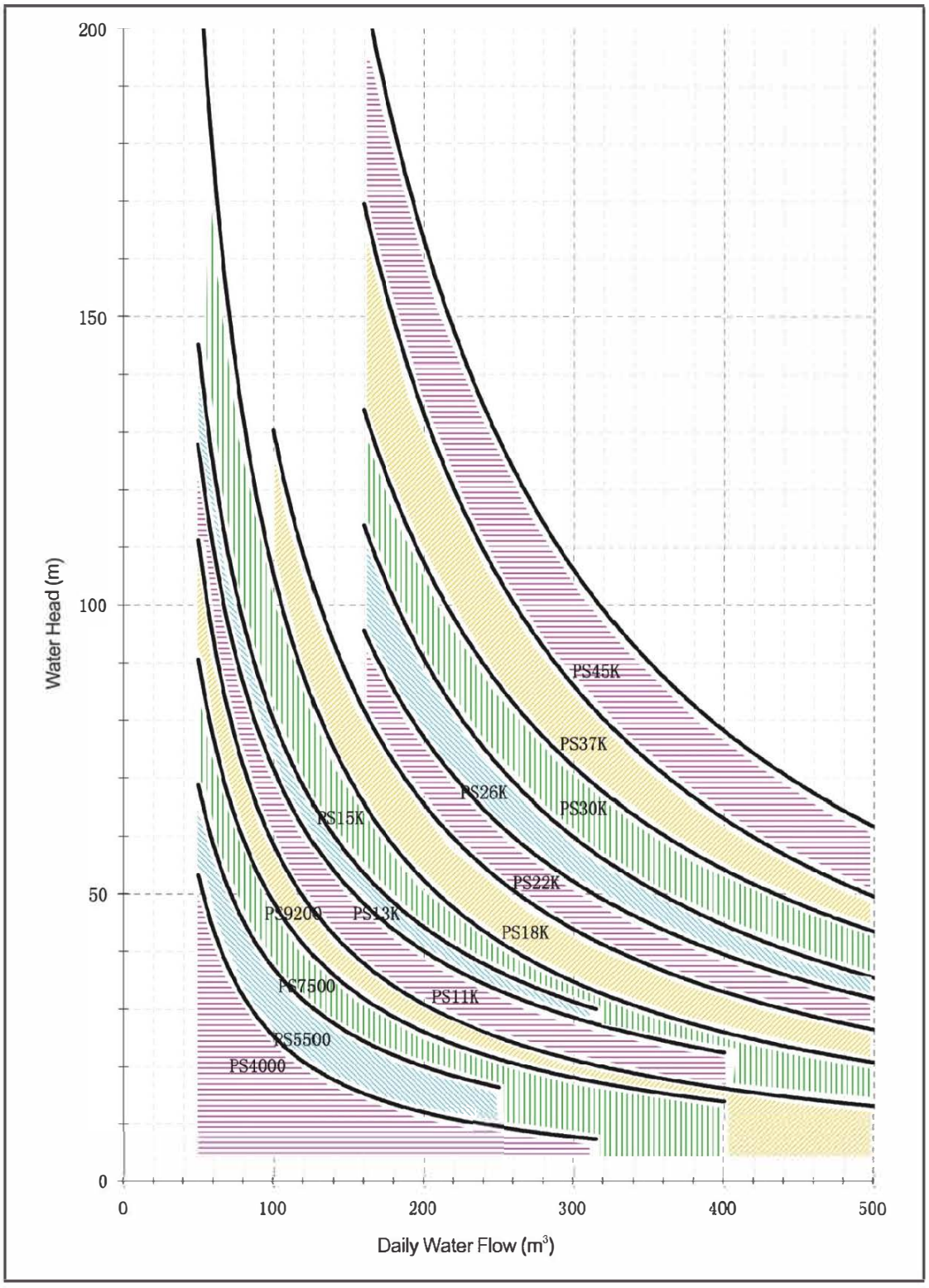


Steps for System Design

- To confirm the basic requirements of water consumption: Head and Daily water consumption;
- Y axis corresponds to Head; X axis corresponds to Daily water supply;
- To adjust the system configuration in accordance with the local solar radiation condition.

Solar Pumping System Selection 4

Head/Lift Range: 10-200m Daily Water Supply Range: 50-500m³/day



Steps for System Design

- To confirm the basic requirements of water consumption: Head and Daily water consumption;
- Y axis corresponds to Head; X axis corresponds to Daily water supply;
- To adjust the system configuration in accordance with the local solar radiation condition.

Solar Pump

Solar pump is a pumping device powered by solar energy, which consists of solar pumping inverter and pump, and is mainly applied for agriculture irrigation, desert control, pasture animal husbandry, city waterscape, seawater desalination and living water supply etc.

- Powered by solar energy, no need power grid support;
- Automatic operation, maintenance free;
- Easy to install and move, high universality;
- Clean and green, high economic benefits.

Definition of Solar Pump Model:

SP 4 370 010

- 010 — Daily Water Supply (m^3/day)
- 370 — Nominal Power (W)
- 4 — Outer Diameter of Pump (inch)
- SP — Solar Pump Code

AC SOLAR WATER PUMP SELECTION TABLE

Model	Input	Adapting Water Head	Daily Water Supply	Outlet Internal Dia.	Adapting Well Dia.	Recommended Open Circuit Voltage	Recommended MPP Voltage
SP4370010	3PH 220V 50Hz	27m–35m	10m^3–7.5m^3	30mm 1"1/4G	100mm	350-430VDC	280-350VDC
SP4370015	3PH 220V 50Hz	20m–27m	15m^3–10m^3	30mm 1"1/4G	100mm	350-430VDC	280-350VDC
SP4550010	3PH 220V 50Hz	37m–52m	10m^3–7.5m^3	30mm 1"1/4G	100mm	350-430VDC	280-350VDC
SP4550015	3PH 220V 50Hz	28m–37m	15m^3–10m^3	30mm 1"1/4G	100mm	350-430VDC	280-350VDC
SP4550030	3PH 220V 50Hz	15m–24m	30m^3–15m^3	40mm 1"1/2G	100mm	350-430VDC	280-350VDC
SP4750010	3PH 220V 50Hz	45m–61m	10m^3–7.5m^3	30mm 1"1/4G	100mm	350-430VDC	280-350VDC
SP4750015	3PH 220V 50Hz	41m–55m	15m^3–10m^3	30mm 1"1/4G	100mm	350-430VDC	280-350VDC
SP4750030	3PH 220V 50Hz	19m–29m	30m^3–15m^3	40mm 1"1/2G	100mm	350-430VDC	280-350VDC
SP4750050	3PH 220V 50Hz	8m–15m	50m^3–30m^3	50mm2"G	100mm	350-430VDC	280-350VDC
SP4750070	3PH 380V 50Hz	6m–7m	70m^3–50m^3	50mm2"G	100mm	625-750VDC	500-600VDC
SP41K1010	3PH 220V 50Hz	55m–69m	10m^3–7.5m^3	30mm 1"1/4G	100mm	350-430VDC	280-350VDC
SP41K1015	3PH 220V 50Hz	54m–73m	15m^3–10m^3	30mm 1"1/4G	100mm	350-430VDC	280-350VDC
SP41K1030	3PH 220V 50Hz	27m–43m	30m^3–15m^3	40mm 1"1/2G	100mm	350-430VDC	280-350VDC
SP41K1050	3PH 220V 50Hz	12m–23m	50m^3–30m^3	50mm2"G	100mm	350-430VDC	280-350VDC
SP41K1070	3PH 220V 50Hz	8m–12m	70m^3–50m^3	50mm2"G	100mm	350-430VDC	280-350VDC
SP41K5010	3PH 220V 50Hz	73m–95m	10m^3–7.5m^3	30mm 1"1/4G	100mm	350-430VDC	280-350VDC

AC SOLAR WATER PUMP SELECTION TABLE

Model	Input	Adapting Water Head	Daily Water Supply	Outlet Internal Dia.	Adapting Well Dia.	Recommended Open Circuit Voltage	Recommended MPP Voltage
SP41K5015	3PH 220V 50Hz	68m–91m	15m³–10m³	30mm 1"1/4G	100mm	350-430VDC	280-350VDC
SP41K5030	3PH 220V 50Hz	33m–51m	30m³–15m³	40mm 1"1/2G	100mm	350-430VDC	280-350VDC
SP41K5031	3PH 220V 50Hz	39m–60m	30m³–15m³	40mm 1"1/2G	100mm	350-430VDC	280-350VDC
SP41K5040	3PH 220V 50Hz	23m–29m	40m³–30m³	50mm2"G	100mm	350-430VDC	280-350VDC
SP41K5100	3PH 380V 50Hz	7m–9m	100m³–80m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP61K5080	3PH 380V 50Hz	12m–20m	80m³–40m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP42K2010	3PH 380V 50Hz	91m–123m	10m³–7.5m³	30mm 1"1/4G	100mm	625-750VDC	500-600VDC
SP42K2015	3PH 380V 50Hz	95m–133m	15m³–10m³	30mm 1"1/4G	100mm	625-750VDC	500-600VDC
SP42K2030	3PH 380V 50Hz	54m–83m	30m³–15m³	40mm 1"1/2G	100mm	625-750VDC	500-600VDC
SP42K2040	3PH 380V 50Hz	41m–50m	40m³–30m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP42K2100	3PH 380V 50Hz	12m–16m	100m³–80m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP62K2080	3PH 380V 50Hz	18m–30m	80m³–40m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP62K2300	3PH 380V 50Hz	6m–8m	300m³–70m³	76mm3"G	150mm	625-750VDC	500-600VDC
SP43K0015	3PH 380V 50Hz	118m–169m	15m³–10m³	30mm 1"1/4G	100mm	625-750VDC	500-600VDC
SP43K0030	3PH 380V 50Hz	68m–105m	30m³–15m³	40mm 1"1/2G	100mm	625-750VDC	500-600VDC
SP43K0050	3PH 380V 50Hz	39m–67m	50m³–30m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP43K0051	3PH 380V 50Hz	45m–79m	50m³–30m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP63K0080	3PH 380V 50Hz	24m–40m	80m³–40m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP63K0110	3PH 380V 50Hz	16m–22m	110m³–80m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP63K0175	3PH 380V 50Hz	12m–17m	175m³–110m³	76mm3"G	150mm	625-750VDC	500-600VDC
SP63K0350	3PH 380V 50Hz	6m–15m	350m³–150m³	76mm3"G	150mm	625-750VDC	500-600VDC
SP44K0015	3PH 380V 50Hz	155m–207m	15m³–10m³	30mm 1"1/4G	100mm	625-750VDC	500-600VDC
SP44K0030	3PH 380V 50Hz	93m–145m	30m³–15m³	40mm 1"1/2G	100mm	625-750VDC	500-600VDC
SP44K0050	3PH 380V 50Hz	57m–94m	50m³–30m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP44K0070	3PH 380V 50Hz	39m–50m	70m³–50m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP44K0100	3PH 380V 50Hz	24m–33m	100m³–80m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP64K0080	3PH 380V 50Hz	36m–56m	80m³–50m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP64K0110	3PH 380V 50Hz	22m–25m	110m³–100m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP64K0111	3PH 380V 50Hz	27m–37m	110m³–80m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP64K0175	3PH 380V 50Hz	18m–26m	175m³–110m³	76mm3"G	150mm	625-750VDC	500-600VDC
SP64K0350	3PH 380V 50Hz	9m–22m	350m³–150m³	76mm3"G	150mm	625-750VDC	500-600VDC
SP64K0500	3PH 380V 50Hz	6m–15m	500m³–150m³	76mm3"G	150mm	625-750VDC	500-600VDC
SP45K5030	3PH 380V 50Hz	117m–181m	30m³–15m³	40mm 1"1/2G	100mm	625-750VDC	500-600VDC
SP45K5050	3PH 380V 50Hz	65m–113m	50m³–30m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP45K5070	3PH 380V 50Hz	53m–67m	70m³–50m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP45K5080	3PH 380V 50Hz	42m–47m	80m³–70m³	50mm2"G	100mm	625-750VDC	500-600VDC
SP65K5080	3PH 380V 50Hz	48m–75m	80m³–50m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP65K5110	3PH 380V 50Hz	39m–53m	110m³–80m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC

AC SOLAR WATER PUMP SELECTION TABLE

Model	Input	Adapting Water Head	Daily Water Supply	Outlet Internal Dia.	Adapting Well Dia.	Recommended Open Circuit Voltage	Recommended MPP Voltage
SP65K5175	3PH 380V 50Hz	25m–35m	175m³–110m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP65K5350	3PH 380V 50Hz	12m–29m	350m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP65K5500	3PH 380V 50Hz	10m–22m	500m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP47K5030	3PH 380V 50Hz	154m–237m	30m³–15m³	40mm 1"1/2G	100mm	625-750VDC	500-600VDC
SP47K5050	3PH 380V 50Hz	79m–137m	50m³–30m³	50mm 2"G	100mm	625-750VDC	500-600VDC
SP47K5070	3PH 380V 50Hz	68m–87m	70m³–50m³	50mm 2"G	100mm	625-750VDC	500-600VDC
SP67K5080	3PH 380V 50Hz	67m–114m	80m³–40m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP67K5110	3PH 380V 50Hz	50m–67m	110m³–80m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP67K5175	3PH 380V 50Hz	30m–43m	175m³–110m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP67K5176	3PH 380V 50Hz	36m–51m	175m³–110m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP67K5350	3PH 380V 50Hz	15m–37m	350m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP69K2080	3PH 380V 50Hz	85m–139m	80m³–40m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP69K2110	3PH 380V 50Hz	60m–83m	110m³–80m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP69K2175	3PH 380V 50Hz	46m–61m	175m³–110m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP69K2350	3PH 380V 50Hz	18m–44m	350m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP69K2500	3PH 380V 50Hz	14m–30m	500m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP611K080	3PH 380V 50Hz	97m–159m	80m³–40m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP611K110	3PH 380V 50Hz	77m–105m	110m³–80m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP611K175	3PH 380V 50Hz	53m–70m	175m³–110m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP611K350	3PH 380V 50Hz	21m–51m	350m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP611K500	3PH 380V 50Hz	17m–38m	500m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP613K080	3PH 380V 50Hz	115m–189m	80m³–40m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP613K110	3PH 380V 50Hz	88m–120m	110m³–80m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP613K175	3PH 380V 50Hz	60m–79m	175m³–110m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP613K350	3PH 380V 50Hz	24m–59m	350m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP613K500	3PH 380V 50Hz	20m–45m	500m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP615K080	3PH 380V 50Hz	127m–209m	80m³–40m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP615K110	3PH 380V 50Hz	99m–135m	110m³–80m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP615K175	3PH 380V 50Hz	66m–86m	175m³–110m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP615K350	3PH 380V 50Hz	27m–66m	350m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP615K351	3PH 380V 50Hz	30m–73m	350m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP615K500	3PH 380V 50Hz	24m–53m	500m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP618K110	3PH 380V 50Hz	109m–143m	110m³–80m³	65mm 2"1/2G	150mm	625-750VDC	500-600VDC
SP618K175	3PH 380V 50Hz	75m–98m	175m³–110m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP618K350	3PH 380V 50Hz	33m–81m	350m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP618K351	3PH 380V 50Hz	36m–88m	350m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP618K500	3PH 380V 50Hz	27m–60m	500m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC
SP618K501	3PH 380V 50Hz	31m–68m	500m³–150m³	76mm 3"G	150mm	625-750VDC	500-600VDC

Solar Pumping Inverter

Solar pumping inverter can implement the control of the whole system operation, which drives the pump by converting DC power produced by the PV array to AC power. This inverter can adjust the output frequency according to the solar irradiation intensity in real time to implement the MPPT (maximum power point tracking).

- Compatible with 3-phase induction motors;
- Dynamic VI maximum power point tracking (MPPT) algorithm and optimized SPWM control method. Faster speed of response and good stability;
- Fully automatic operation. Free setting speed range based on practical situation of the system. Storage capacity for 8 years operational data;
- Intelligent power module used in main circuit. High reliability. 98% conversion efficiency;
- Full motor protection functions. Optional water level detecting and control circuit for overflow and idle running prevention;
- Anodized aluminum case. IP52 protection class. Ambient temperature: -10~+50℃.

Model	Maximum Input DC Voltage (V)	Recommended MPP Voltage (V)	Rated Output Current (A)	Output Frequency (Hz)	Output Voltage(V)	Net Weight (KG)	Gross Weight (KG)	Package Size (MM)		
								Length	Width	Height
PB400L	430	280-350	3	0-50	3PH 220V	3.4	4.9	320	280	225
PB750L	430	280-350	5	0-50	3PH 220V	3.4	4.9	320	280	225
PB1500L	430	280-350	7	0-50	3PH 220V	4.0	5.6	355	280	225
PB2200L	430	280-350	11	0-50	3PH 220V	4.0	5.6	355	280	225
PB3700H	750	500-600	9	0-50	3PH 380V	7.2	9.5	425	325	285
PB5500H	750	500-600	13	0-50	3PH 380V	7.3	9.6	425	325	285
PB7500H	750	500-600	18	0-50	3PH 380V	7.7	10	425	325	285
PB11KH	750	500-600	24	0-50	3PH 380V	8.2	10.5	425	325	285
PB15KH	750	500-600	30	0-50	3PH 380V	8.4	10.7	425	325	285
PB18KH	750	500-600	39	0-50	3PH 380V	8.4	10.7	425	325	285
PB22KH	750	500-600	45	0-50	3PH 380V	18.1	21.1	505	430	305
PB30KH	750	500-600	60	0-50	3PH 380V	18.1	21.1	505	430	305
PB37KH	750	500-600	75	0-50	3PH 380V	18.1	21.1	505	430	305
PB45KH	750	500-600	91	0-50	3PH 380V	18.1	21.1	505	430	305
PB55KH	750	500-600	112	0-50	3PH 380V	18.1	21.1	505	430	305

Definition of Inverter Model:

PB 2200 L

- L: Output Voltage (L: 220V H: 380V)
- 2200: Adapting Rated Power of Motor (W)
- PB: Inverter of Pumping Boy Series