Far from city? No electricity? Expensive oil?

Before

USE AC SOLAR PUMP INVERTER

After using solar AC pump system

Application Scope

Solar AC deep well pump system & other solar AC pump systems

Farm irrigation

Drinking water for livestock

Sewage treatment

Scenic spot fountain

Drinking water for people

Desert treatment

Solar PV AC Pump System Introduction

The solar pumping inverter converts DC power produced by solar panels to AC power which drives AC pump to pump water from borehole, river, lake etc. to the storage device.

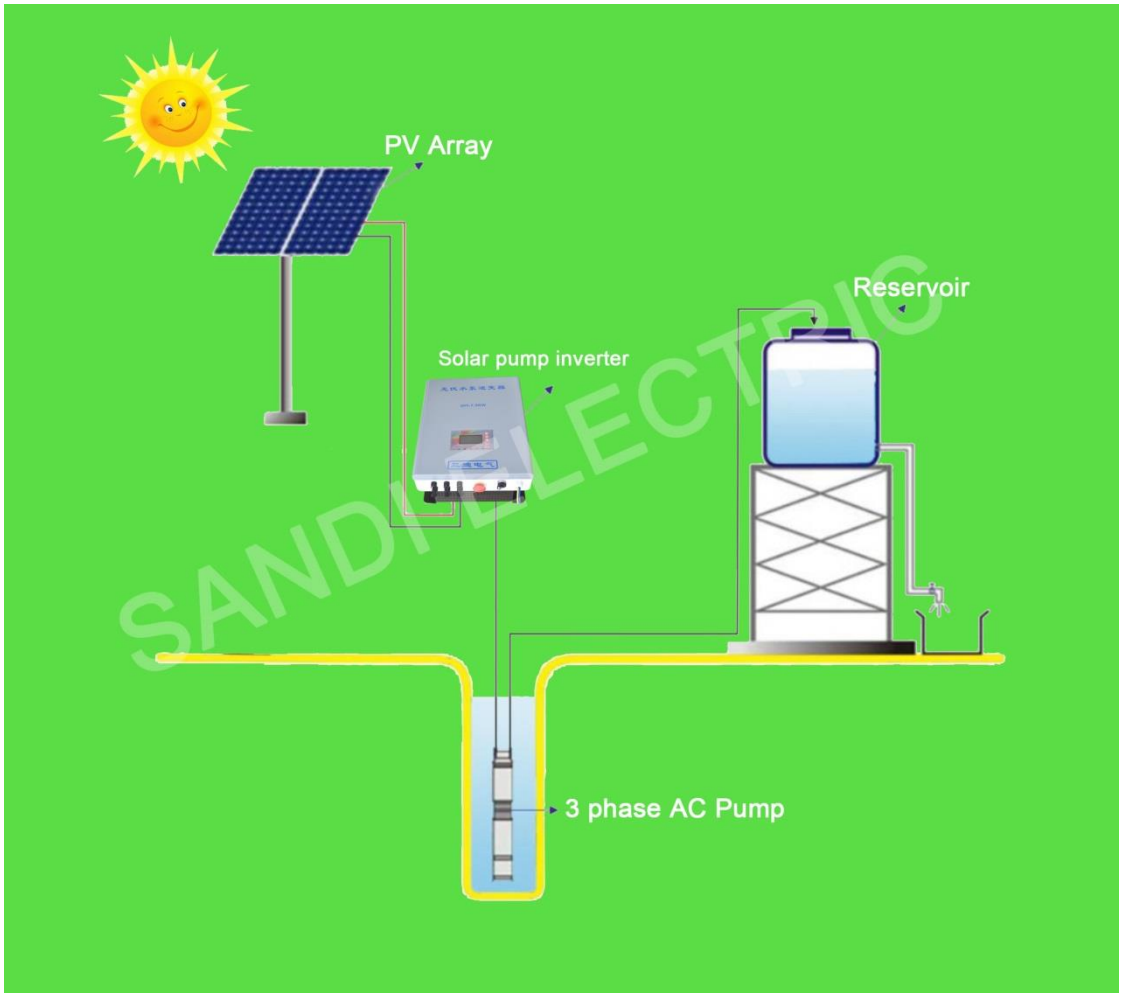
The inverter applies high efficiency MPPT algorithm to maximize power harvested from solar panels. It will make the system to maximize efficiency to get the water as much as possible.

The solar pumping system fulfills concept of low carbon, energy conservation, environmental protection to improve the living standard in water-deficient area.

1.1 AC PV Pump System Composition

AC solar pump system consists of four parts:PV array, solar pump inverter, three phase AC pump and water storage device.

The schematic diagram as shown in the figure below:



AC Solar Pump System Composition Schematic Diagram

1.2 AC solar pump advantages and disadvantages

Advantages:

1) Strong Applicability: AC series water pump not only can pump sewage but also can pump clear water, strong acid resistance;

2) Easy for selecting and outfitting: AC series water pump is a universal standard products, easy for selecting and outfitting;

3) Good Reliability: AC water pump with strong overload ability, long service life;

4) Good controllability: Can adopt current popular frequency conversion technology to control speed, for better protect the pump and maximum use of solar panel to pumping water.

Disadvantages:

Efficiency is relatively lower than DC water pump system: because it through a DC-AC transformation, inevitably there are some loss;

Introduction of the main equipment

2.1 Equipment Introduction

1) Solar Pump Inverter Product Features:

- VI maximum power point tracking (MPPT) algorithm, fast response speed, running stability, to solve the traditional MPPT method question of poor tracking effect, unstable running and even the problem of water hammer damaged under when under rapidly changes in the intensity of sunlight.
- Adopting high-efficiency IPM (intelligent power module) from Mitsubishi with powerful protection function and high stable performance.
- The system to run automatically, without human duty, saving a lot of manpower
- Adopted new type of variable frequency driver (VFD) technology, ensure the pump also can work in the case of less sunshine, greatly improves efficiency and maximum utilization of solar array.
- Full digital control, automatic operation, data storage, and perfect protection function, can achieve unattended.
- LCD display operating panel, can setting various parameters through LCD, easy to operation.

- Complete protection function for PV input under voltage, PV input over voltage, input connection Reverse Polarity, DC over current, output, over load, short circuit, dry Well, overflow, dry running, and blocking protection.
- Based on the design concept of developing environmental protection and economical PV products, choose water storage to replace battery storage, no battery device, direct drive pump, the unit with high reliability, and at the same time greatly reduce construction and maintenance costs.
- System modular design, stable operation, high reliability and safety, installation and maintenance is very convenient
- LCD display, you can view and set various operating parameters
- Equipped with RS485 data communication for remote monitoring (Optional).
- European CE (EMC, LVD) certificate

Flexible output

The PV pump inverter adjusts the pump speed according to changing radiation intensity so as to make the output power close to the solar array's maximum power. If the radiation is more than adequate, the system will control the pump speed from exceeding the rated speed; if the radiation is insufficient, it will automatically adjust the speed until stop working according to the set minimum operating frequency.

Pump is composed by the three-phase AC motor drive, pumping from deep wells into the storage tanks/pools or directly to irrigation and other systems. Different types of pumps can be used according to the actual system requirements and installation conditions.

Product Pictures：

Small Model (1.5kw~20kw)

Large Model (25kw~150kW)

Technical parameters:

Model	SPI-1.5KW	SPI-2.2KW
DC input		
Max. input DC voltage	650Vdc	
Recommended MPPT voltage	300~600Vdc	
Recommend PV Input Power	1.8KW	2.5KW
Rated DC voltage	360Vdc	
Rated input DC current	4.2A	6.1A
Max. MPPT efficiency	99%	
Input string of solar array	2 strings	2 strings
AC output		
Max. applicable motor output power	**1.5kW**	**2.2kW**
Rated output voltage	220~240Vac, single phase	
Output frequency range	0~50/60Hz	
Rated output current	6.8A	10A
Waveform	Pure sine wave	
System Parameters		
Max. efficiency	99%	
Protection Function	PV input under voltage, over voltage, input connection Reverse Polarity, DC over current, output over load, short circuit, dry Well, overflow, dry running, and blocking protection	
Protection Class	I	
Protection degree	IP45	
Operating Temperature	-20~+50℃; above 55℃ need derate operating	
Humidity	0-90% , no moisture condensation	
Cooling	Fan cooling	
Display	LCD	
Running mode	Working continuously	
Communication interface	RS485 (optional)	
Altitude	<3000m; above 3000m need derate operating	
Noise	<50dB	
Mechanical size		
Size (L *WH*H)	500/370/210(mm)	
Weight (Kg)	21Kg	
Meet the standards	EN 50178; IEC/EN 621091; IEC 61800	
Alarm: Please choose the right power of inverter according to PV array and pump motor load.		

Technical parameters:

Model	SPI-3KW	SPI-4KW
DC input		
Max. input DC voltage	850Vdc	
Recommended MPPT voltage	500~800Vdc	
Recommend PV Input Power	3.5KW	5KW
Rated DC voltage	600Vdc	
Rated input DC current	5A	6.7A
Max. MPPT efficiency	99%	
Input string of solar array	2 strings	2 strings
AC output		
Max. applicable motor output power	**3kW**	**4kW**
Rated output voltage	380~440Vac, 3-phase	
Output frequency range	0~50/60Hz	
Rated output current	5.5A	7.3A
Waveform	Pure sine wave	
System Parameters		
Max. efficiency	99%	
Protection Function	PV input under voltage, over voltage, input connection Reverse Polarity, DC over current, output over load, short circuit, dry Well, overflow, dry running, and blocking protection	
Protection Class	I	
Protection degree	IP45	
Operating Temperature	-20~+50℃; above 55℃ need derate operating	
Humidity	0-90% , no moisture condensation	
Cooling	Fan cooling	
Display	LCD	
Running mode	Working continuously	
Communication interface	RS485 (optional)	
Altitude	<3000m; above 3000m need derate operating	
Noise	<50dB	
Mechanical size		
Size (L *WH*H)	500/370/210(mm)	
Weight (Kg)	21Kg	
Meet the standards	EN 50178; IEC/EN 621091; IEC 61800	
Alarm: Please choose the right power of inverter according to PV array and pump motor load.		

Technical parameters:

Model	SPI-5.5KW	SPI-7.5KW
DC input		
Max. input DC voltage	850Vdc	
Recommended MPPT voltage	500~800Vdc	
Recommend PV Input Power	6.5KW	9KW
Rated DC voltage	600Vdc	
Rated input DC current	9.2A	12.5A
Max. MPPT efficiency	99%	
Input string of solar array	2 strings	2 strings
AC output		
Max. applicable motor output power	**5.5kW**	**7.5kW**
Rated output voltage	380~440Vac, 3-phase	
Output frequency range	0~50/60Hz	
Rated output current	10A	13.6A
Waveform	Pure sine wave	
System Parameters		
Max. efficiency	99%	
Protection Function	PV input under voltage, over voltage, input connection Reverse Polarity, DC over current, output over load, short circuit, dry Well, overflow, dry running, and blocking protection	
Protection Class	I	
Protection degree	IP45	
Operating Temperature	-20~+50℃; above 55℃ need derate operating	
Humidity	0-90% , no moisture condensation	
Cooling	Fan cooling	
Display	LCD	
Running mode	Working continuously	
Communication interface	RS485 (optional)	
Altitude	<3000m; above 3000m need derate operating	
Noise	<50dB	
Mechanical size		
Size (L *WH*H)	500/370/210(mm)	
Weight (Kg)	21Kg	
Meet the standards	EN 50178; IEC/EN 621091; IEC 61800	
Alarm: Please choose the right power of inverter according to PV array and pump motor load.		

Technical parameters:

Model	SPI-11KW	SPI-15KW
DC input		
Max. input DC voltage	850Vdc	
Recommended MPPT voltage	500~800Vdc	
Recommend PV Input Power	18KW	18KW
Rated DC voltage	600Vdc	
Rated input DC current	18A	25A
Max. MPPT efficiency	99%	
Input string of solar array	2 strings	2 strings
AC output		
Max. applicable motor output power	**11kW**	**15kW**
Rated output voltage	380~440Vac, 3-phase	
Output frequency range	0~50/60Hz	
Rated output current	20A	27A
Waveform	Pure sine wave	
System Parameters		
Max. efficiency	99%	
Protection Function	PV input under voltage, over voltage, input connection Reverse Polarity, DC over current, output over load, short circuit, dry Well, overflow, dry running, and blocking protection	
Protection Class	I	
Protection degree	IP45	
Operating Temperature	-20~+50℃; above 55℃ need derate operating	
Humidity	0-90% , no moisture condensation	
Cooling	Fan cooling	
Display	LCD	
Running mode	Working continuously	
Communication interface	RS485 (optional)	
Altitude	<3000m; above 3000m need derate operating	
Noise	<50dB	
Mechanical size		
Size (L *WH*H)	500/370/210(mm)	
Weight (Kg)	21Kg	
Meet the standards	EN 50178; IEC/EN 621091; IEC 61800	
Alarm: Please choose the right power of inverter according to PV array and pump motor load.		

Technical parameters:

Model	SPI-20KW	SPI-25KW
DC input		
Max. input DC voltage	850Vdc	
Recommended MPPT voltage	500~800Vdc	
Recommend PV Input Power	24KW	30KW
Rated DC voltage	600Vdc	
Rated input DC current	33A	42A
Max. MPPT efficiency	99%	
Input string of solar array	2 strings	1 string
AC output		
Max. applicable motor output power	**20kW**	**25kW**
Rated output voltage	380~440Vac, 3-phase	
Output frequency range	0~50/60Hz	
Rated output current	39A	58A
Waveform	Pure sine wave	
System Parameters		
Max. efficiency	99%	
Protection Function	PV input under voltage, over voltage, input connection Reverse Polarity, DC over current, output over load, short circuit, dry Well, overflow, dry running, and blocking protection	
Protection Class	I	
Protection degree	IP45	
Operating Temperature	-20~+50℃; above 55℃ need derate operating	
Humidity	0-90% , no moisture condensation	
Cooling	Fan cooling	
Display	LCD	
Running mode	Working continuously	
Communication interface	RS485 (optional)	
Altitude	<3000m; above 3000m need derate operating	
Noise	<50dB	
Mechanical size		
Size (L *WH*H)	500/370/210(mm)	550x550x860 (mm)
Weight (Kg)	21Kg	81Kg
Meet the standards	EN 50178; IEC/EN 621091; IEC 61800	
Alarm: Please choose the right power of inverter according to PV array and pump motor load.		

Technical parameters:

Model	SPI-30KW	SPI-37KW
DC input		
Max. input DC voltage	850Vdc	
Recommended MPPT voltage	500~800Vdc	
Recommend PV Input Power	35KW	44KW
Rated DC voltage	600Vdc	
Rated input DC current	50A	62A
Max. MPPT efficiency	99%	
Input string of solar array	1 string	1 string
AC output		
Max. applicable motor output power	**30kW**	**37kW**
Rated output voltage	380~440Vac, 3-phase	
Output frequency range	0~50/60Hz	
Rated output current	58A	72A
Waveform	Pure sine wave	
System Parameters		
Max. efficiency	99%	
Protection Function	PV input under voltage, over voltage, input connection Reverse Polarity, DC over current, output over load, short circuit, dry Well, overflow, dry running, and blocking protection	
Protection Class	I	
Protection degree	IP45	
Operating Temperature	-20~+50℃; above 55℃ need derate operating	
Humidity	0-90% , no moisture condensation	
Cooling	Fan cooling	
Display	LCD	
Running mode	Working continuously	
Communication interface	RS485 (optional)	
Altitude	<3000m; above 3000m need derate operating	
Noise	<50dB	
Mechanical size		
Size (L *WH*H)	550x550x860 (mm)	
Weight (Kg)	85Kg	90Kg
Meet the standards	EN 50178; IEC/EN 621091; IEC 61800	
Alarm: Please choose the right power of inverter according to PV array and pump motor load.		

Technical parameters:

Model	SPI-45KW	SPI-55KW
DC input		
Max. input DC voltage	850Vdc	
Recommended MPPT voltage	500~800Vdc	
Recommend PV Input Power	53KW	65KW
Rated DC voltage	600Vdc	
Rated input DC current	75A	92A
Max. MPPT efficiency	99%	
Input string of solar array	1 string	1 string
AC output		
Max. applicable motor output power	**45kW**	**55kW**
Rated output voltage	380~440Vac, 3-phase	
Output frequency range	0~50/60Hz	
Rated output current	87A	107A
Waveform	Pure sine wave	
System Parameters		
Max. efficiency	99%	
Protection Function	PV input under voltage, over voltage, input connection Reverse Polarity, DC over current, output over load, short circuit, dry Well, overflow, dry running, and blocking protection	
Protection Class	I	
Protection degree	IP45	
Operating Temperature	-20~+50℃; above 55℃ need derate operating	
Humidity	0-90% , no moisture condensation	
Cooling	Fan cooling	
Display	LCD	
Running mode	Working continuously	
Communication interface	RS485 (optional)	
Altitude	<3000m; above 3000m need derate operating	
Noise	<50dB	
Mechanical size		
Size (L *WH*H)	650x750x1200 (mm)	
Weight (Kg)	135Kg	145Kg
Meet the standards	EN 50178; IEC/EN 621091; IEC 61800	
Alarm: Please choose the right power of inverter according to PV array and pump motor load.		

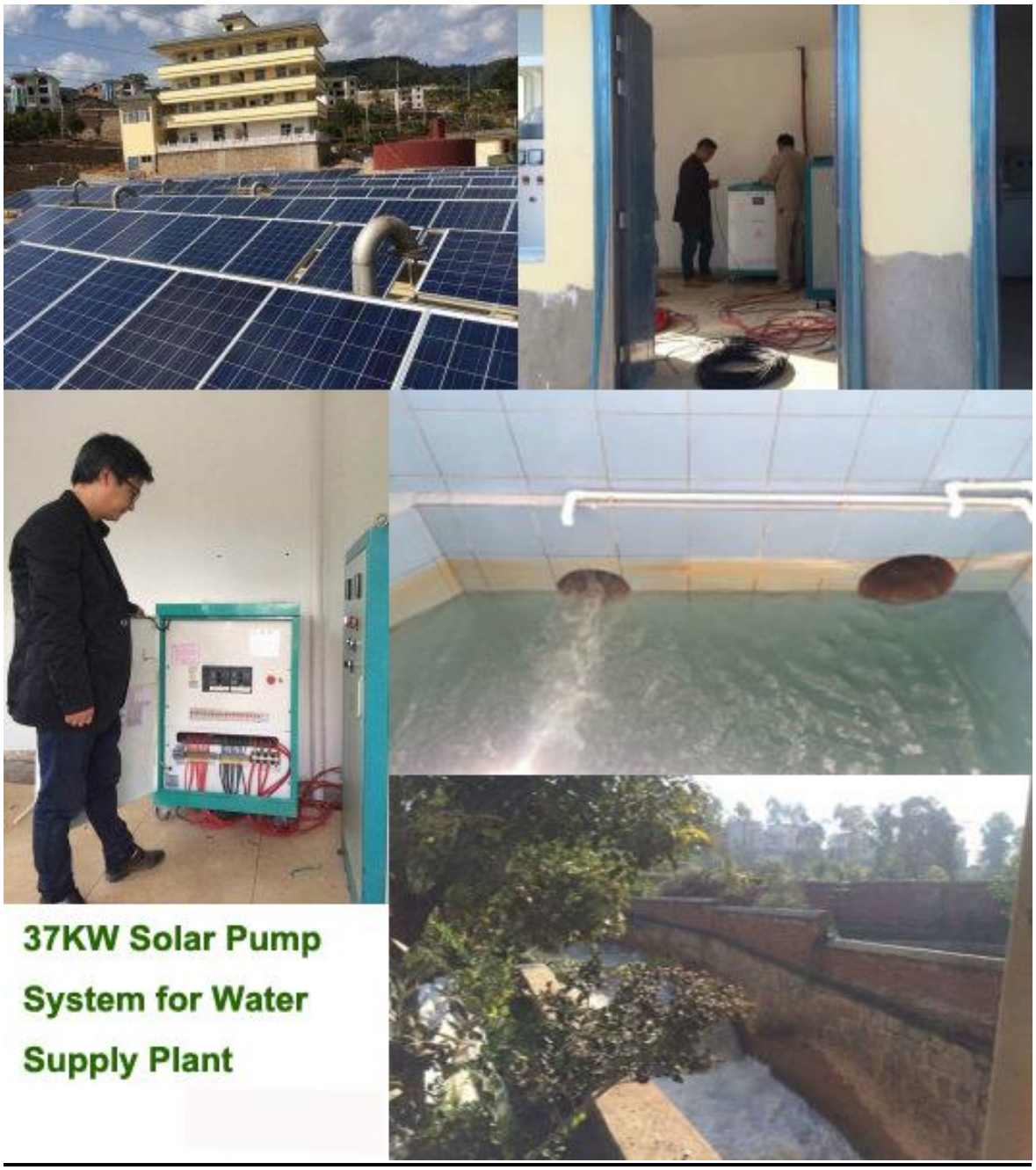
Technical parameters:

Model	SPI-63KW	SPI-75KW
DC input		
Max. input DC voltage	850Vdc	
Recommended MPPT voltage	500~800Vdc	
Recommend PV Input Power	74KW	88KW
Rated DC voltage	600Vdc	
Rated input DC current	105A	125A
Max. MPPT efficiency	99%	
Input string of solar array	1 string	1 string
AC output		
Max. applicable motor output power	**63kW**	**75kW**
Rated output voltage	380~440Vac, 3-phase	
Output frequency range	0~50/60Hz	
Rated output current	122A	145A
Waveform	Pure sine wave	
System Parameters		
Max. efficiency	99%	
Protection Function	PV input under voltage, over voltage, input connection Reverse Polarity, DC over current, output over load, short circuit, dry Well, overflow, dry running, and blocking protection	
Protection Class	I	
Protection degree	IP45	
Operating Temperature	-20~+50℃; above 55℃ need derate operating	
Humidity	0-90% , no moisture condensation	
Cooling	Fan cooling	
Display	LCD	
Running mode	Working continuously	
Communication interface	RS485 (optional)	
Altitude	<3000m; above 3000m need derate operating	
Noise	<50dB	
Mechanical size		
Size (L *WH*H)	650x750x1200 (mm)	750x750x1500 (mm)
Weight (Kg)	160Kg	190Kg
Meet the standards	EN 50178; IEC/EN 621091; IEC 61800	
Alarm: Please choose the right power of inverter according to PV array and pump motor load.		

Technical parameters:

Model	SPI-90KW	SPI-110KW
DC input		
Max. input DC voltage	850Vdc	
Recommended MPPT voltage	500~800Vdc	
Recommend PV Input Power	106KW	130KW
Rated DC voltage	600Vdc	
Rated input DC current	150A	183A
Max. MPPT efficiency	99%	
Input string of solar array	1 string	1 string
AC output		
Max. applicable motor output power	**90kW**	**110kW**
Rated output voltage	380~440Vac, 3-phase	
Output frequency range	0~50/60Hz	
Rated output current	175A	213A
Waveform	Pure sine wave	
System Parameters		
Max. efficiency	99%	
Protection Function	PV input under voltage, over voltage, input connection Reverse Polarity, DC over current, output over load, short circuit, dry Well, overflow, dry running, and blocking protection	
Protection Class	I	
Protection degree	IP45	
Operating Temperature	-20~+50℃; above 55℃ need derate operating	
Humidity	0-90% , no moisture condensation	
Cooling	Fan cooling	
Display	LCD	
Running mode	Working continuously	
Communication interface	RS485 (optional)	
Altitude	<3000m; above 3000m need derate operating	
Noise	<50dB	
Mechanical size		
Size (L *WH*H)	750x750x1500 (mm)	
Weight (Kg)	230Kg	245Kg
Meet the standards	EN 50178; IEC/EN 621091; IEC 61800	
Alarm: Please choose the right power of inverter according to PV array and pump motor load.		

3.4 System Application Case

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