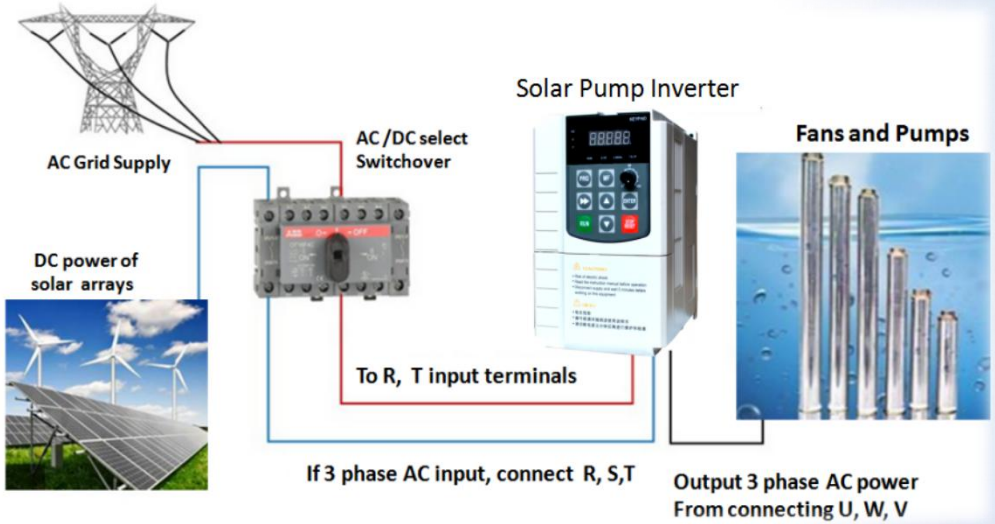
KEWO

Solar Pump inverters

SG600 series solar pump inverter breif introduction

** MPPT with 99% high efficiency
** Driving for AC induction motor or PMSM
** GPRS remote monitoring and control
** Long service life working and long warranty



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SOLAR PUMPS SYSTEM—SOLAR PANELS, SOLAR PUMP INVERTER, PUMPS

1. Main Features of solar pump system

Low carbon economy
In-built MPPT with high efficiency
Pump specific protection
Remote monitoring
Best off grid solution
Perfect stable frequency output

Solar panel

Applications

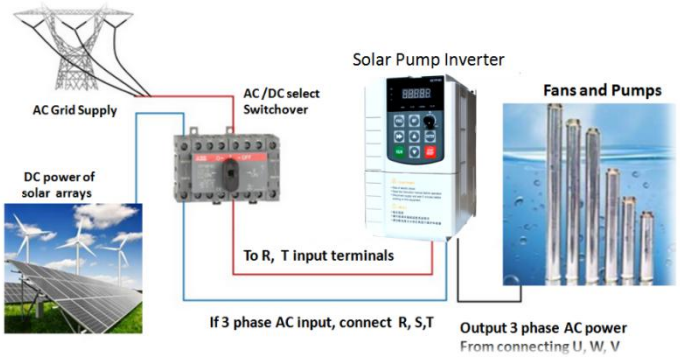
1. Ground water lowering,
2. Irrigation systems
3. Industrial Application
4. Drip irrigation& sprinkler
5. Tank/ cistern filling
6. Wildlife refuge
7. Rural water supply for ranches, cabins, and cottages
8. Fountains.

Solar Pump Drives

AC Pumps

2. Solar pump system introduction

Solar Pumping system becomes more and more popular, it can be applied to daily (underground water), agriculture irrigation, forestry irrigation, desert control, pasture animal husbandry, water supply for islands, waste water treatment engineering , and so on. In recent years, with the promotion of the utilization of new energy resources, solar pumping systems are more and more used in municipal engineering, city center squares, parks, tourist sites, resorts and hotels, the landscapes and fountain systems in the residential areas. This system is composed of a solar array, a pump and solar pumping inverter, or GPRS remote control model. Based on the design philosophy that it is better to store water than electricity, there is no energy storing device such as store battery in the system.



The solar array, an aggregation of many solar modules connected n series and parallel. Absorbs sunlight radiation and converts into electrical energy, providing dynamical water for the whole system. The pump inverter controls and adjusts the system operation and converts the DC produced by solar array into AC to drive the pump, and adjust the output frequency in real-time according to the variation of sunlight intensity to realize the maximum power point tracking(MPPT). The pump, driven by 3-phase AC motor, can draw water from the deep wells or rivers and lakes to pour into the storage tank or reservoir, or directly connect to the irrigation system, fountain system, etc. According to the actual system demand and installation conditions, different types of pump such as centrifugal pump, axial flow pump, mixed-flow pump or deep-well pump can be used.

Applications

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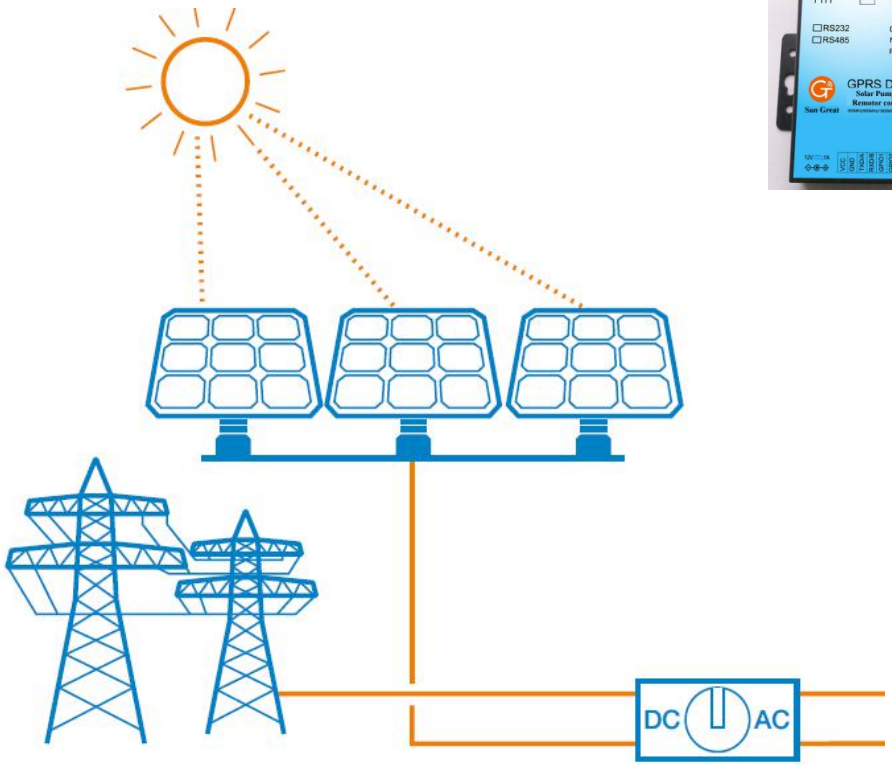
9. Fountains.

3. Features of Solar pump inverter.

advanced function
automatic start and stop of the inverter when there is enough power available. (auto/manual)

Remote monitoring
With the addition of optional GPRS modules you can monitor and configure inverter and application parameters from anywhere via Modbus RTU

Built-in MPPT
Maximum power point tracking functionality ensures that you get the most power output possible from your solar panel and maximizes the performance of your pump throughout the day



Built-in flow measurement and sensorless flow calculation.
And easy to get how much energy Generated by this system with Generated energy and calculating

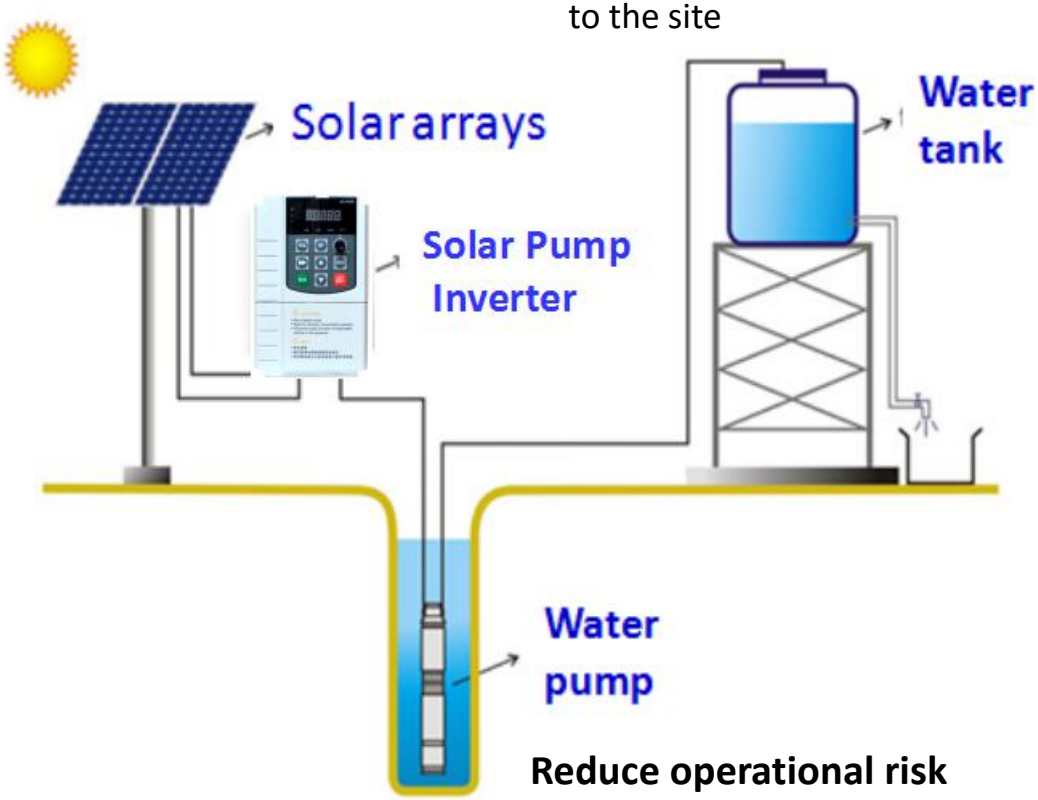
Best off-grid solution
Where electricity is very erratic and unpredictable, farmers need not to depend on grid electricity for their agricultural requirements

Pump specific protection
Motor phase short circuit, lowest frequency protection, maximum current setting….

Multiple pump motors with a single inverter control
Standard asynchronous motors as well as more efficient permanent magnet syn. motors. (PMSM)

Save in energy costs and maximize productivity
solar pump inverters ensure reliable power supply throughout the day with on and off-grid compatibility

Reduce maintenance costs
The inverters can be equipped with remote monitoring options, reducing maintenance trips to the site



Save environment
Harnessing the power of sun provides an environmentally friendly pumping without producing any CO2 emissions

Easy install and operation and little parameters Configuring.
End user ,who never used inverter before, can Install and operation it very well.

Reduce operational risk
Embedded pump-specific features such as dry run detection,
Minimum power input protection
Maximum current protection
Minimum frequency running protection
Flow and generated energy showing

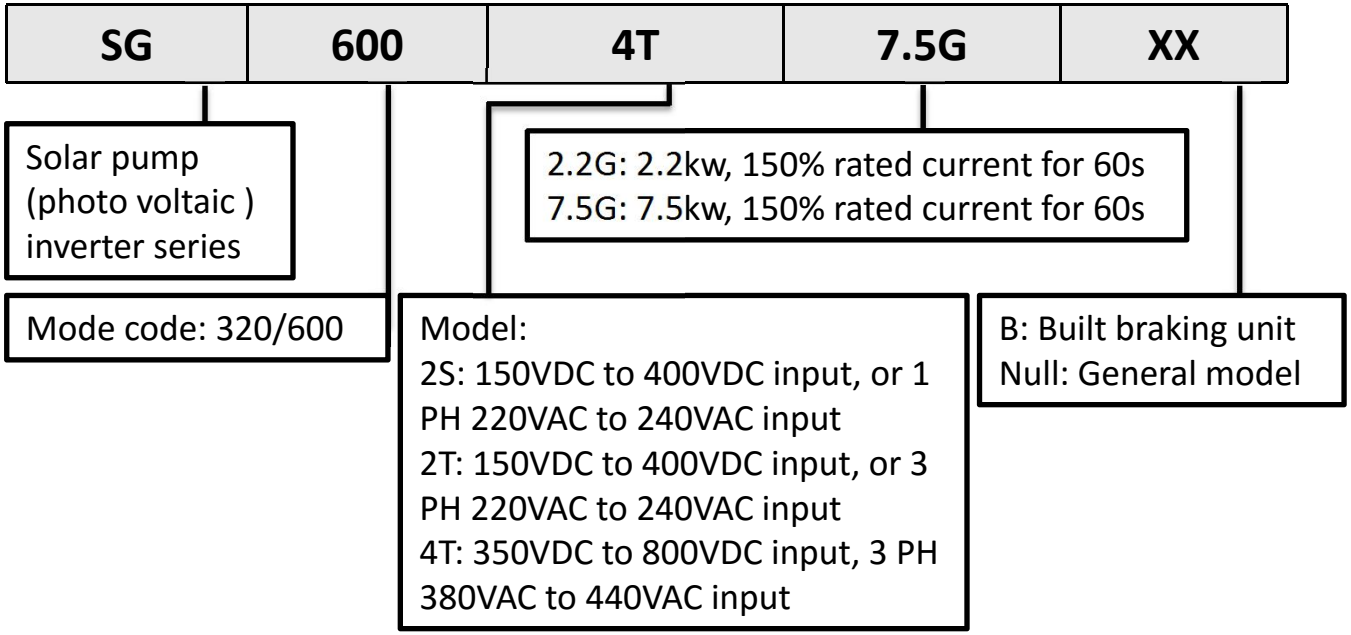
4. Technical Specification

Recommended MPPT voltage range	Vmpp 131 to 350 VDC for 1S (80V to 350VDC input, 3PH 110 to 220VAC output) Vmpp 280 to 375VDC for 2T (150V to 350VDC input, 3PH 220 to 240VAC output) Vmpp 486 to 750 VDC for 4T (250V to 800VDC input, 3PH 380 to 460VAC output)
Recommended input voltage (Voc and Vmmp)	Voc 180(VDC), Vmpp 155(VDC) for 1S model or 110V AC pumps Voc 355(VDC), Vmpp 310(VDC) for 2T model or 220V AC pumps Voc 620(VDC), Vmpp 540(VDC) for 4T model or 380V AC pumps
Motor type	Control for permanent magnet servo motor and asynchronous motor pumps.
Input power	DC power from solar arrays or AC grid power
Maximum DC power input	450VDC for 220AC output /800VDC for 380V AC output
Rated output voltage	3-phase , 110V/160V/220V. 3-phase, 220V/380V/480V
Output frequency range	0~50/60Hz
MPPT efficiency	97%,
Ambient temperature range	(G-type inverter with submersible pumps, and P type for general pumps.
Solar pump control special performance	MPPT (maximum power point tracking), CVT (constant voltage tracking), auto/manual operation, dry run protection, low stop frequency protection, minimum power input, motor maximum current protection, flow calculating, energy generated calculating.
Protection function	Phase loss protection, phase short circuit protection , ground to phase circuit protection , input and output short circuit protection. Stall protection
Protection degree	IP20, Air force cooling
Running mode	MPPT , CVT, variable frequency mode
Altitude	Below 1000m; above 1000m, derated 1% for every additional 100m.
Standard	CE, Design based on vector control inverter S100 series, more specification please refer to S100 series vector control inverter operation manual

SG600 solar pump inverter model list

No.	Models	Rate current	Output voltage (3PH VAC)	Applicable for pumps	MPPT voltage (VDC)
General type: 2S, 150 to 450 VDC or 220/ 240VAC input, Vmp 310, Voc 350					
7	SG600-2S-0K7GB	4A	220V/240V	0.75KW	260 to 375
8	SG600-2S-1K5GB	7A	220V/240V	1.5KW	260 to 375
9	SG600-2S-2K2GB	10A	220V/240V	2.2KW	260 to 375
10	SG600-2S-4K0GB	16A	220V/240V	4.0KW	260 to 375
General type: 4T, 250/350 to 800 VDC or 380/ 440VAC input, Vmp540, Voc620					
11	SG600-4T-0K7GB	2.5A	380V-440V	0.75KW	486 to 750
12	SG600-4T-1K5GB	3.7A	380V-440V	1.5KW	486 to 750
13	SG600-4T-2K2GB	5A	380V-440V	2.2KW	486 to 750
14	SG600-4T-4K0GB	10A	380V-440V	4.0KW	486 to 750
15	SG600-4T-5K5GB	13A	380V-440V	5.5KW	486 to 750
16	SG600-4T-7K5GB	17A	380V-440V	7.5KW	486 to 750
17	SG600-4T-011GB	22A	380V-440V	11KW	486 to 750
18	SG600-4T-015GB	30A	380V-440V	15KW	486 to 750
19	SG600-4T-018GB	37A	380V-440V	18KW	486 to 750
20	SG600-4T-022GB	45A	380V-440V	22KW	486 to 750
21	SG600-4T-030G	60A	380V-440V	30KW	486 to 750
22	SG600-4T-037G	75A	380V-440V	37KW	486 to 750
23	SG600-4T-045G	91A	380V-440V	45KW	486 to 750
24	SG600-4T-055G	110A	380V-440V	55KW	486 to 750
25	SG600-4T-075G	150A	380V-440V	75KW	486 to 750
26	SG600-4T-090G	180A	380V-440V	90KW	486 to 750
27	SG600-4T-110G	220A	380V-440V	110KW	486 to 750
28	SG600-4T-132G	260A	380V-440V	132KW	486 to 750
29	SG600-4T-160G	320A	380V-440V	160kw	486 to 750

SG600 solar pump inverter nameplate



SG600 solar pump inverter voltage range:

Model	Applicable for pumps	Working DC voltage	Over voltage point	Under voltage point	Suggest Vmp	Suggest Voc
SG600-2T	For 200V AC	150V – 350V	450V	100V	310VDC	355VDC
SG600-4T	For 400V AC	300V – 650V	800V	250V	540VDC	620VDC

5. SG600 Solar pump inverter----------Hardware design

High cost performance and very strong practicability

Solar pump inverter developed based on S100 high performance vector control AC inverter with software MPPT and hardware updated.
The S100 vector control inverter is renowned for his excellent hardware deign and powerful software performance, long service life design.

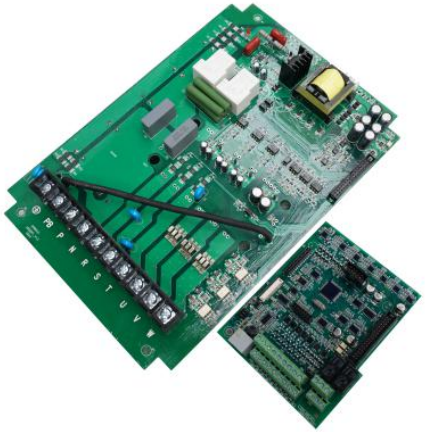
Excellent hardware design .

- Ti ‘s 32 bit DSP (28034/35), Germany Infineon intelligent modules;
- Enhanded and 4 layer PCB design PCB wire corssing
- Low temperature rising design with delta fans
- Good quality components selecting,
- Independent cooling duct for lower temperature rising.

3 halls for all models

Infineon iGBT

samyong capacity



Four layers design PCB, strong and reduce cable crossing on board

Delta fans

6. SG600 Solar pump inverter----------Software design

Software updated with MPPT design based on following solar inverter, ABB, Danfoss, Delta, Lorentz, INVT, VEICHI, SAJ.

✓Control mode: VF for induction motor pumps, open loop vector control for PMSM high speed pumps
✓MPPT function: always performance MPPT for gain highest efficiency
✓CVT: When sunlight is good, can select CVT control for excellent stable frequency output.
✓Dry run function: When little water or no water for pumping to protect pumps.
✓Maximum current protection: set maximum current protection is available
✓Minimum solar input power: When low power input, inverter no work
✓Stop frequency: Lower than stop frequency, inverter no work
✓Sleep mode: if lower than sleep voltage, inverter go to sleep, it will wake up when DC voltage rise.
✓Flow and generated energy calculating and monitoring
✓A lot of fault protection. Short circuit, ground short circuit, phase loss, over current, overheat…
✓Built in RS485 interface, it is easy to connect GPRS remote controller.

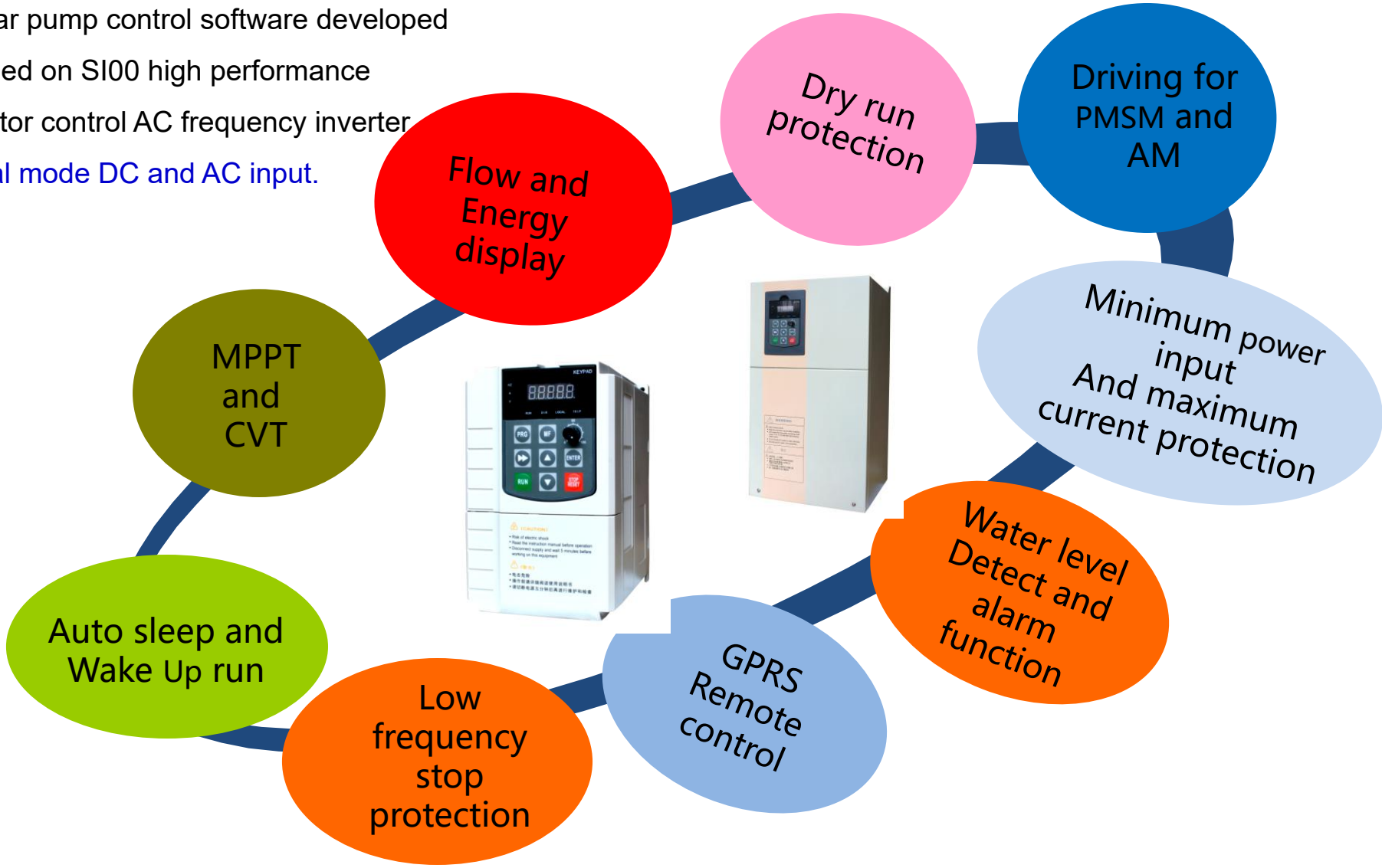
We developed it base on ABB, Lorentz, Fuji, Danfoss , INVT and VEICHI---- That is why we are Good performance and better.


Solar pump control software developed

Based on SI00 high performance

Vector control AC frequency inverter

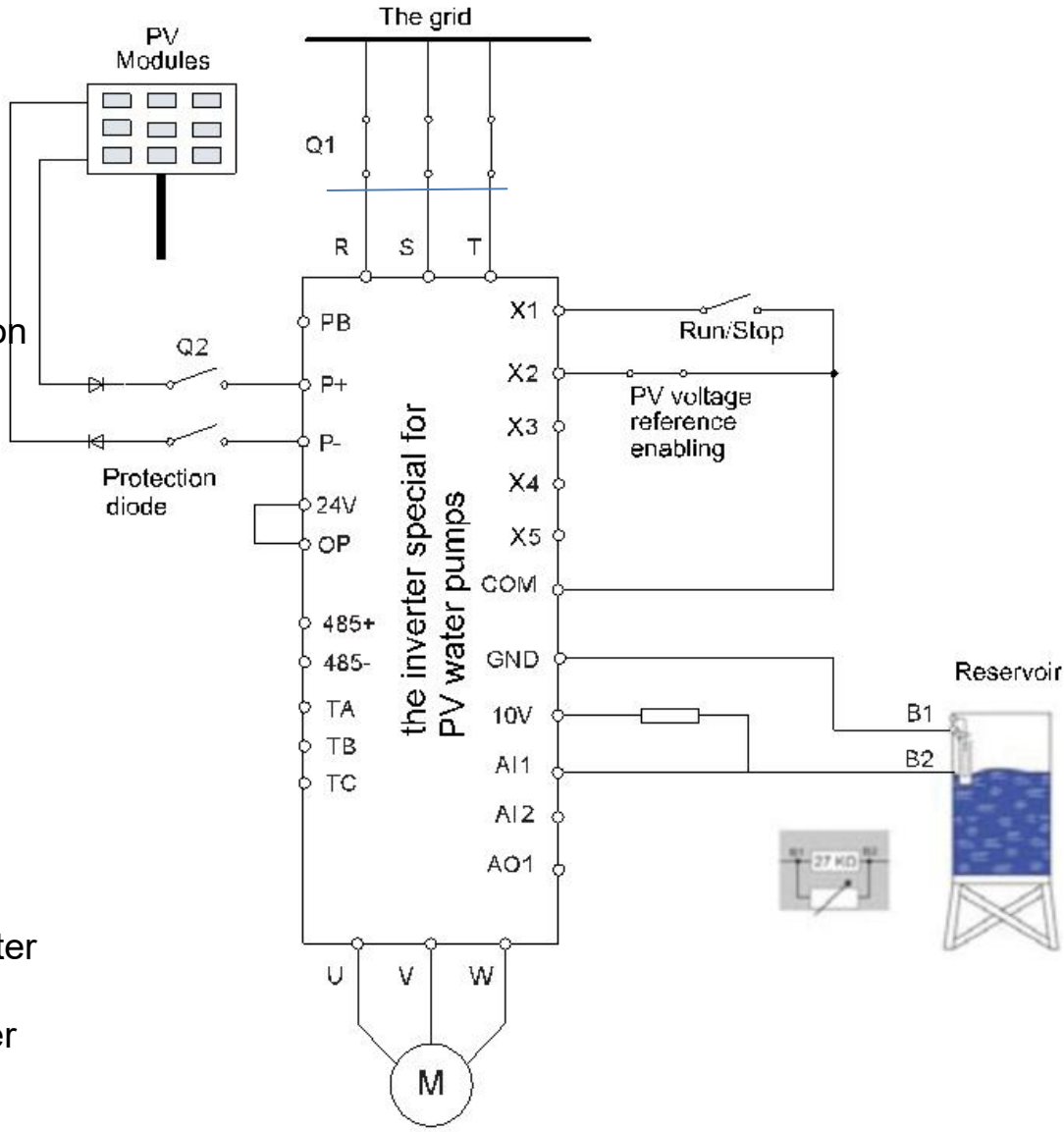
Dual mode DC and AC input.



SI100 solar drive developed based on SI100 high performance vector control drive.
When it used for solar pump control, the PID and vector control can’t work.

Wiring and commissioning

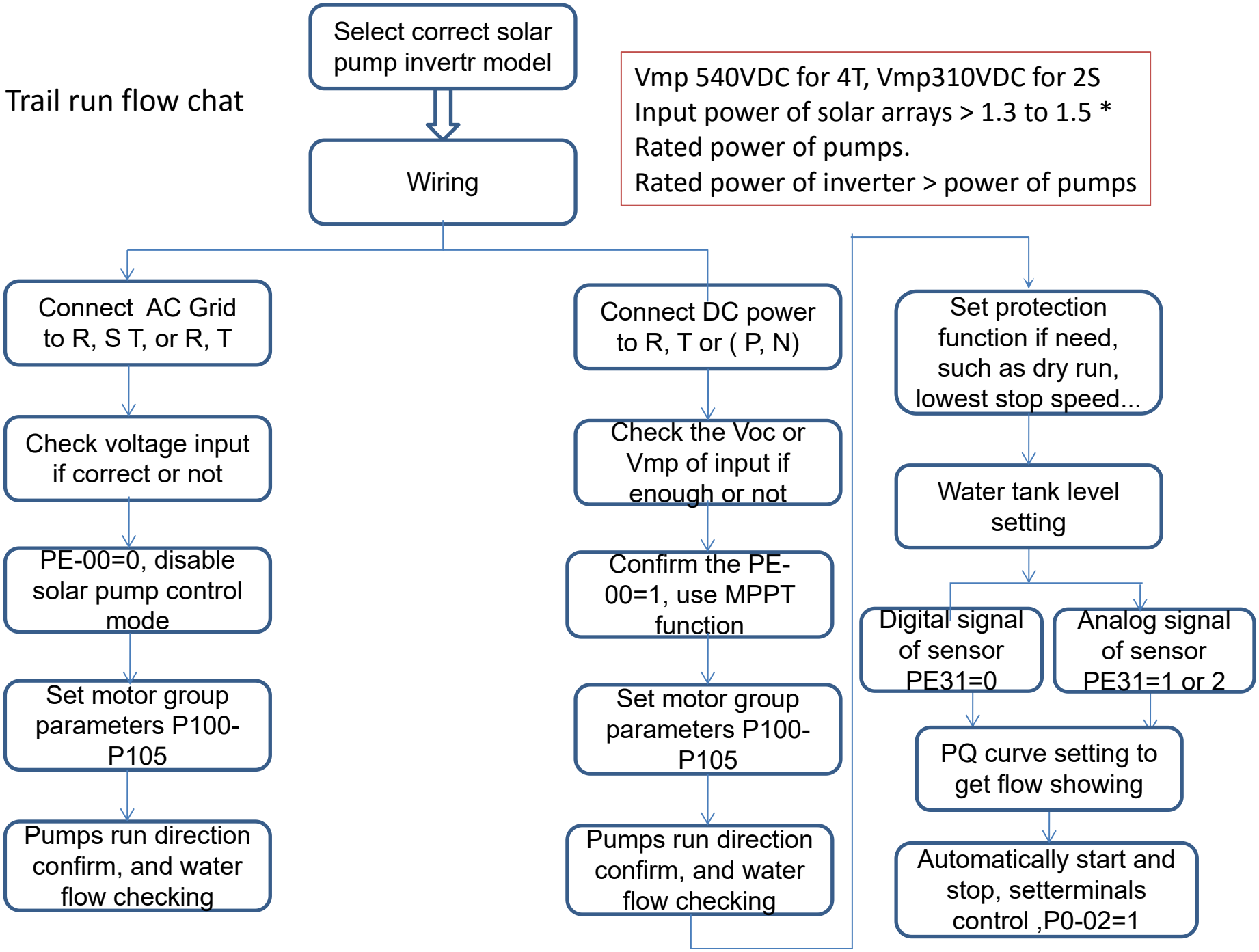
1. Connect DC power supply to P to P- (N) (DC power supply also can wire to R, T , no need consider to polarity connection)
a. Voc 350VDC for 2T model, (220V, pumps)
b. Voc 620VDC for 4T model, (380V pumps)
c, Total power should be 1.3 to 1.5 times of rated of pumps.
2. Check Voc input, if correct, switch Q2, power on
3. Set motor parameters as pumps nameplate.
4. Confirmed the solar pump control mode and MPPT function mode. (PE-000=1)
5. Trail running with press RUN button to check running direction.
6. Set dry run function, lowest stop frequency, maximum current, flow PQ curve if need.
If need auto start and stop, you can select to terminals control with switch on X1 to COM.
a). X1 and COM, (P4.00=1, forward running)
b), X2 and COM, (P4.01=2, reverse running)
c), X3 and COM, (P4.02=53, solar control mode disable)
d), X4 and COM, (P4.03=51, digital signal of water leveling detect 1)
e), X5 and COM (P4.04=52, digital signal of water leveling detect 2)



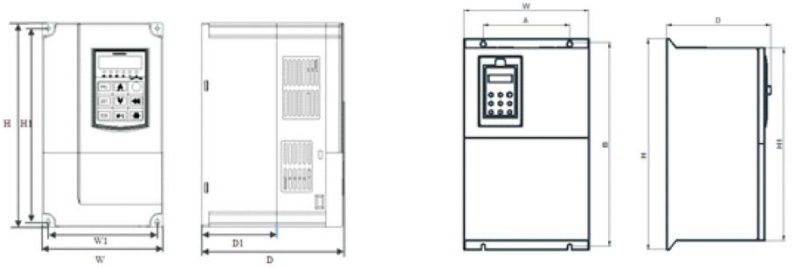
SG600 solar pump inverter

6. Using AI1 for analog signal of water level detecting-see fig.

Trail run flow chat



Size and dimension



3 phase 380V input and output， 50/60Hz								
Model	A	B	H1	H	W	D	Ø	(kg)
S600-4T-0.7GB	106.5	175	/	185	118	153.8	4.5	2.1
S600-4T-1.5GB								
S600-4T-2.2GB								
S600-4T-4.0GB/5.5PB								
S600-4T-5.5GB/7.5PB	148	235.5	/	247	160	175	5.5	4
S600-4T-7.5GB/11PB								
S600-4T-11GB/15PB								
**S600-4T-15GB/18.5	205	305	/	320	220	197.3	6.5	8
** S600-4T-18.5G/22P								
** S600-4T-22G/30P								
S600-4T-15GB/18.5PB	170	400	/	415	230	205	6.5	10
S600-4T-18.5G/22P								
S600-4T-22G/30P								
S600-4T-30G/37P	200	465	/	480	260	215	8	23
S600-4T-37G/45P								
S600-4T-45G/55P	180	550	/	575	320	310	8	30
S600-4T-55G/75P								
S600-4T-75G/90P	240	595	/	620	380	310	10	41
S600-4T-90G/110P								
S600-4T-110G/132P								

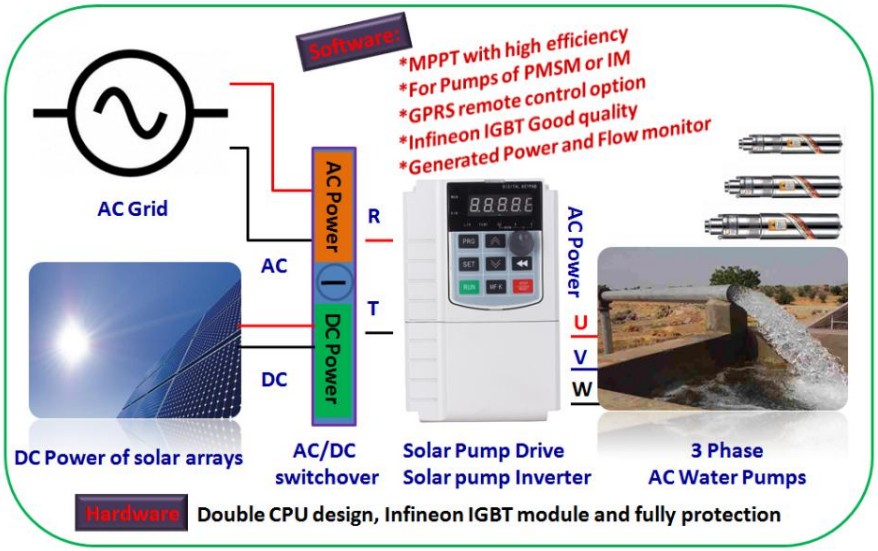
Appendix 1--Solar pump inveter water proof cabinet.

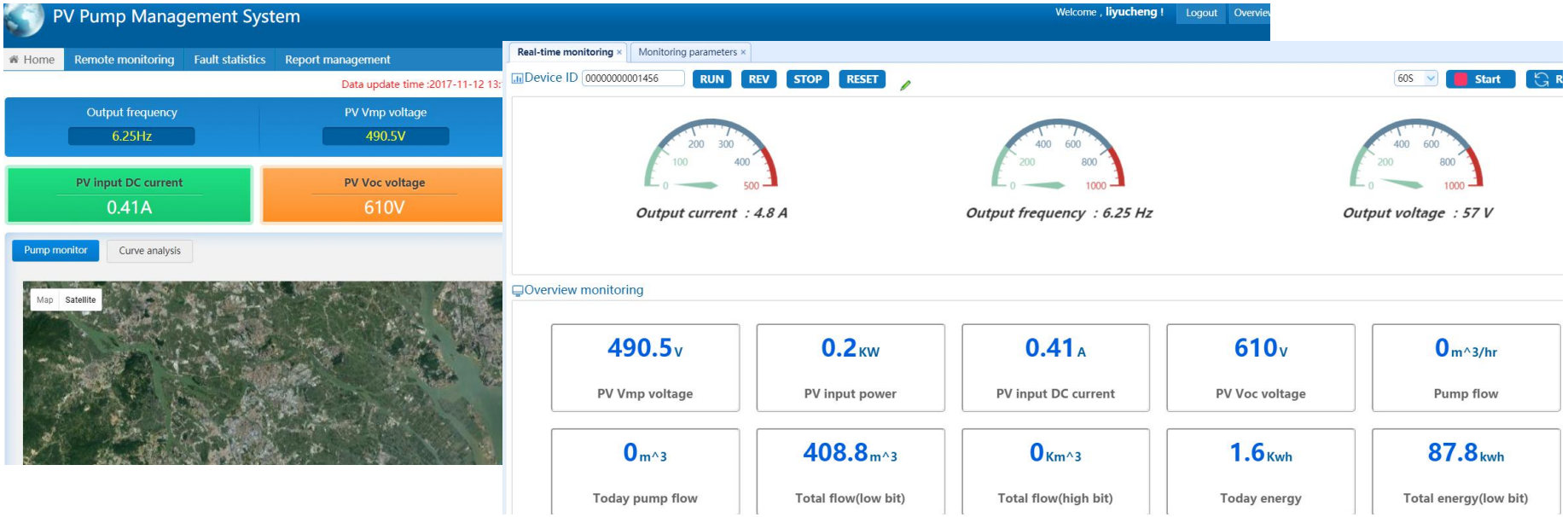
we provide beautiful outlook solar pump water proof cabinet (IP54).

Inbuit In built AC/DC manual switch, AC/DC circuit breaker, pumps connection terminals in cabinet.

Inbuit start/stop, reset button, shift button run & alarm LED

Appendix 2-Solar pump inverter GPRS





Appendix 3 ----For driving 1 phase AC pumps suggestion

Note: Please select bigger rated power of inverter for driving single phase pumps, because the current of 1 220VAC phase pumps is bigger than 3 phase 220V AC pumps

P0-01	The first motor control mode	3: 2 wires output for 1 phase pump 4: 3 wires output for 1 phase pump (if remove starting capacitor and running capacitor, please select 4. If only remove starting capacitor or difficult to remove starting and running capacitors. Please select 3).	0	×

Because the starting capacity of 1 phase 220VAC deep well pumps is difficult to remove.

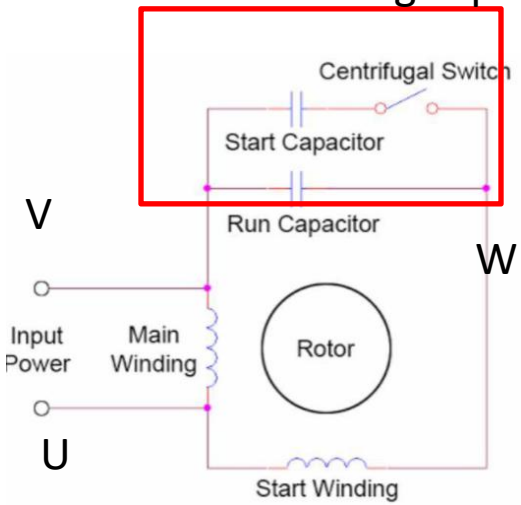
For driving this 1 PH pumps, Please set P0-01=2

Select one big power range inverter for 1PH pumps

Built a special algorithm for single phase motor, in which starting capacity can able to remove. (P0-01=1)

1. Remove starting capacity
2. Because the capacity has been remove, so there are 3 wires for U, V, W connecting

Remove starting capacity



Appendix 4- DC Voltage booster device------Low DC voltage input, output high DC voltage.

We provide 2 models DC voltage booster for solar pump inverter system for saving solar panels using.
1.LV40-70 design for "L" (3phase 220Vac) inverter and pumps, input voltage range :40 to 70Vdc, 1.5kw. Output will be 240V to 420VDC. (Kindly noted that: It need 310Vmp, 350VDC for 220V inverter)
2. LV60-90 design for"H" (3phase 380Vac) inverter, input voltage range :60 to 90Vdc. Output will be 480VDC to 720VDC, 1.5kw(Kindly noted that: It need 540Vmp, 620VDC for 380V inverter)

LV40-70, input 40-70VDC,
240V to 420VDC output, 1.5kw

LV40-70, input 40-70VDC,
240V to 420VDC output, 1.5kw

Note:Low voltage booster device is specially for small power solar pump inverter with low current and high voltage, especial for 0.75kw, 1.5kw 220V pumps, and 0.75kw, 1.5kw 380V pumps. Input voltage is DC60-90V or DC40-70 can work normally, output voltage is 5~7 times of input voltage. Output voltage changes according to input voltage so that solar pump inverter can track the maximum power of PV arrays.

Applications of solar pump inverter.









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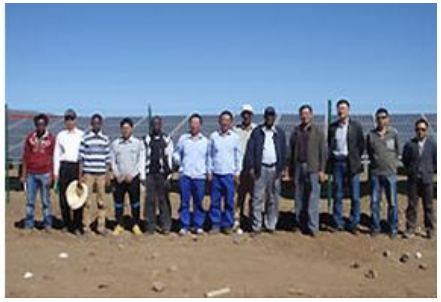




Solar City Water Landscape




Solar Living Water Supply




Solar Drought Control








Agriculture Irrigation




Agriculture Greenhouse Irrigation