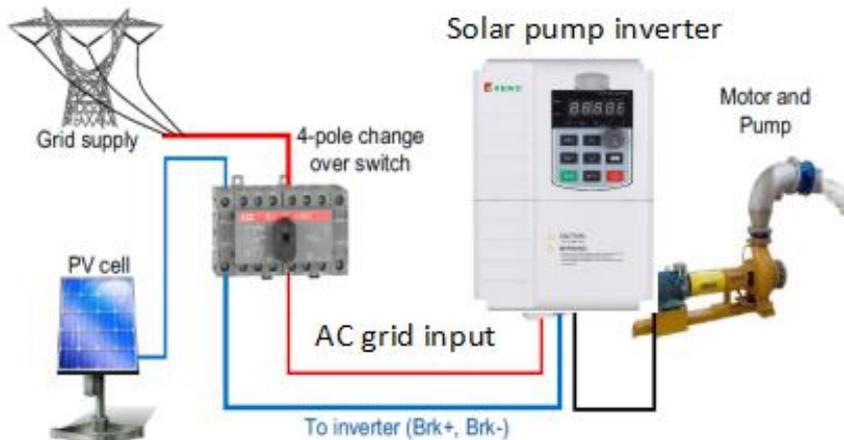




AC Drives/ Frequency Inverter/Solar Pumps inverters / Soft starter/ automation controller

Solar Pump inverters-----With MPPT, flow/generated energy measurement



www.kewodrive.com Tel:86-0755-23283620
Whatapp &MP: 86-13725501611, Email: service@kewodrive.com
Address: 3 Floor,Block 8,St George Industrial Park,Xinyu, Road,Shajing, Bao'an, Shenzhen, Guangdong, China

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

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 panel



Solar Pump Drives

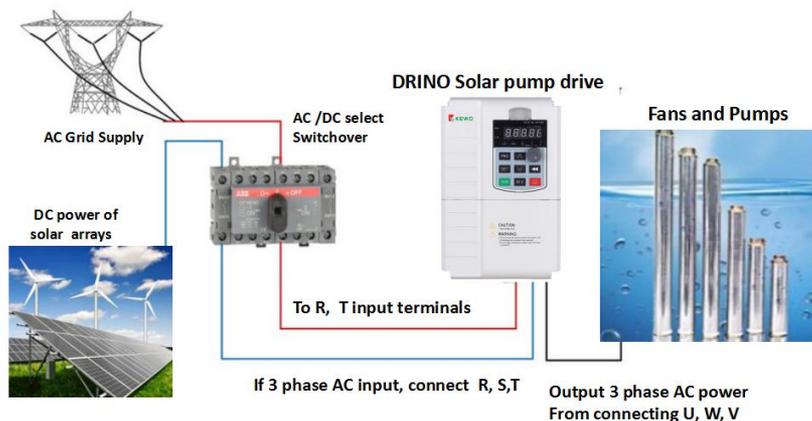


Pumps



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, wastewater 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 in 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

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.

3. Features of Solar pump inverter.

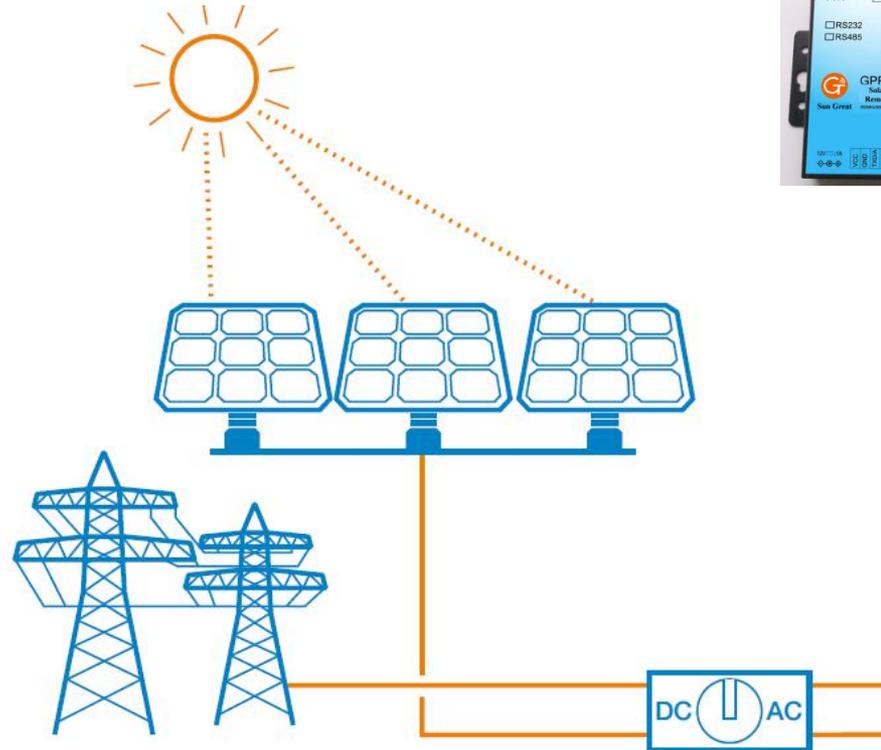
Built-in MPPT

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

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

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

Best off-grid solution

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



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

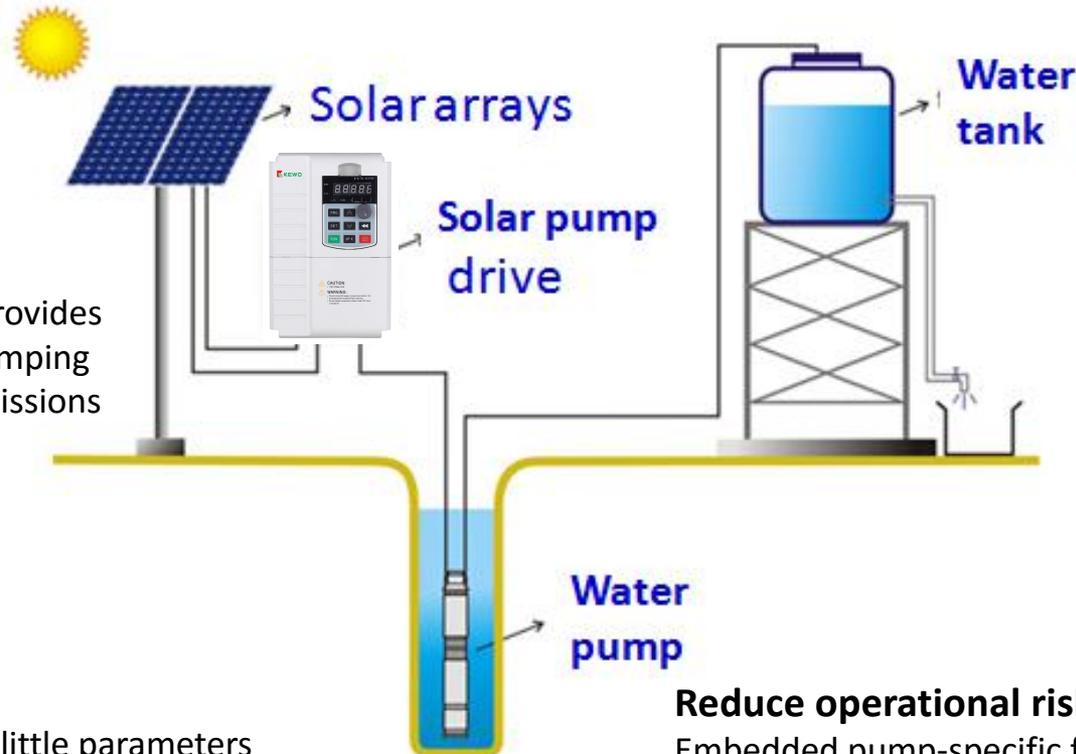
Save in energy costs and maximize productivity
solar pump inverters ensure reliable power supply throughout the day with on and off-grid compatibility

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 2S (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 Vmpp)	Voc 180(VDC), Vmpp 155(VDC) for 1S model or 110V AC pumps Voc 355(VDC), Vmpp 310(VDC) for 2S 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	400VDC 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 or CVT
Altitude	Below 1000m; above 1000m, derated 1% for every additional 100m.
Standard	CE, Design based on vector control inverter S300 and S3200 series, more specification please refer to S300 or S320 vector control inverter operation manual

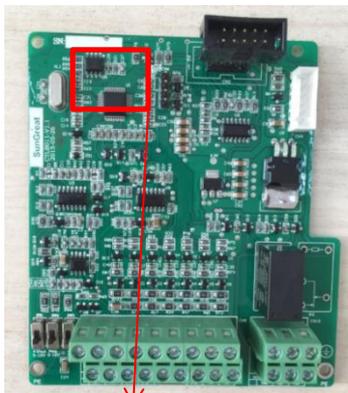
5. SG30 Solar pump inverter-----Hardware design

High cost performance and very strong practicability

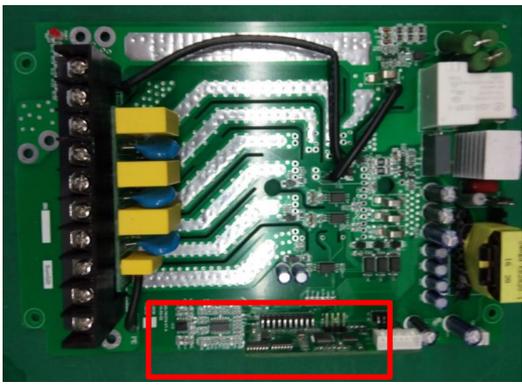
Solar pump inverter developed based on S300 high performance vector control AC inverter with software MPPT and hardware updated.
The S300 vector control inverter is renowned for his excellent hardware deign and powerful software performance, the failure rate less than 0.6% for 3 years.

Excellent hardware design

- Total brand new hardware design with two CPUs control way, which follow ABB and Schneider. **ST brand CPU.**
- Latest generation **Infineon** of Fuji IGBT using (Fuji brand for back up)
- Hot temperature working available design.
- Good quality components selecting

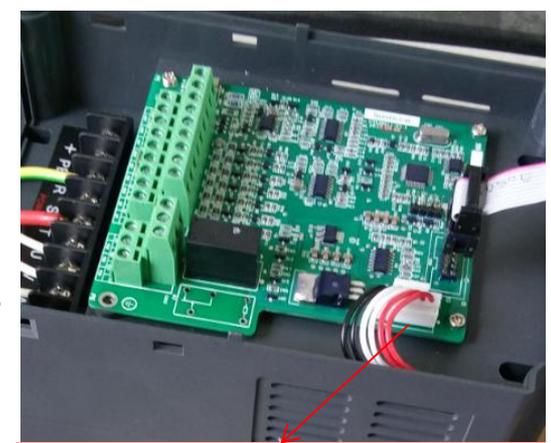


The 1st CPU for function control



The 2nd CPU for performance control

Ground to phase short
Circuit protection
design.
Phase short circuit
protection, ground to
short circuit protection,
Input to output short
circuit protection is
available .



Big and strong cable connect controller board to power power to enhanced stability

If any problem occurs in controller board, the inverter also can work well and safe to stop with another CPU control!

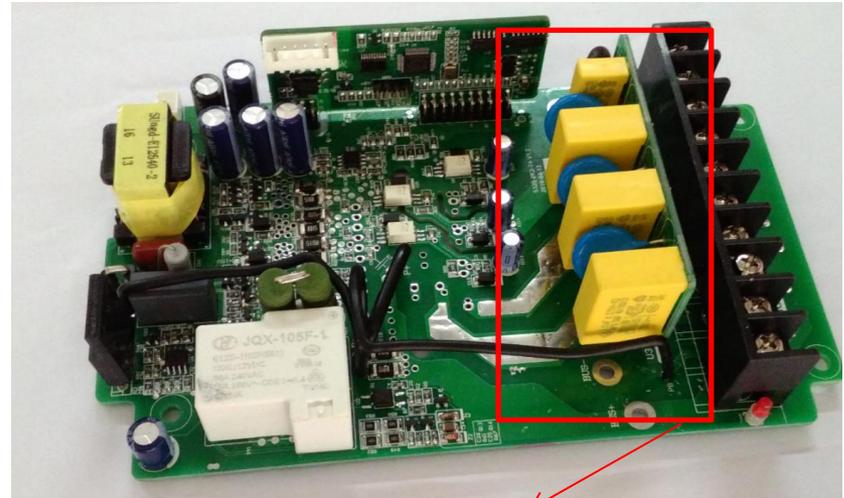
SG320 inverter 0.75kw to 4kw hardware design-



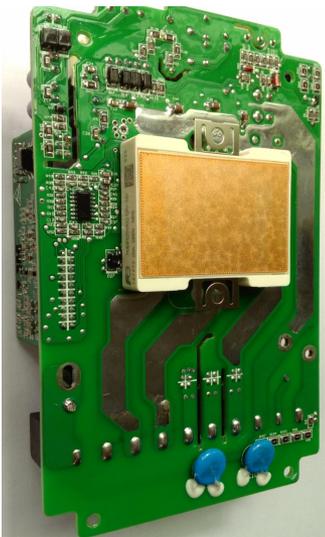
Big fans for good cooling



Two capacitors are installed bottom side for good cooling



DC current sensor, strong lighting protection, good!!!



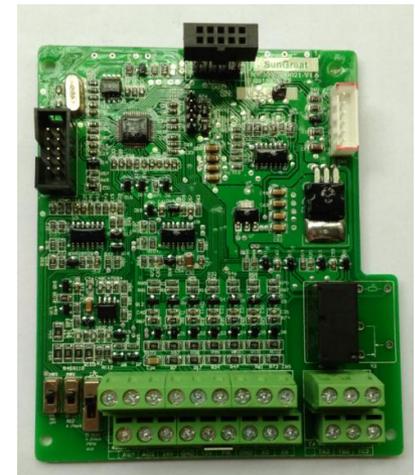
Infineon/Fuji IGBT module



Capacitor board



power board simple and stable design, one CUP board weld on it

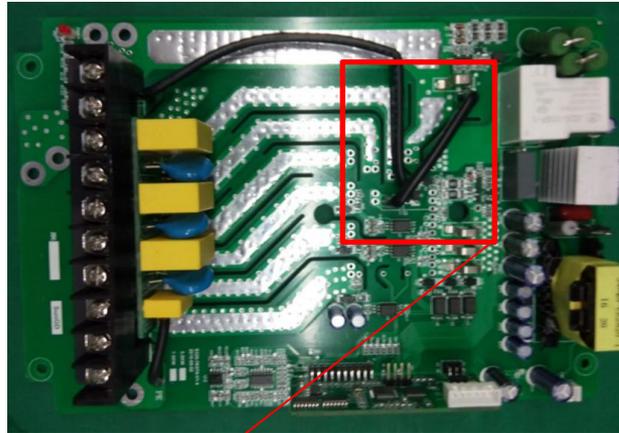


another cpu installed on the controller board

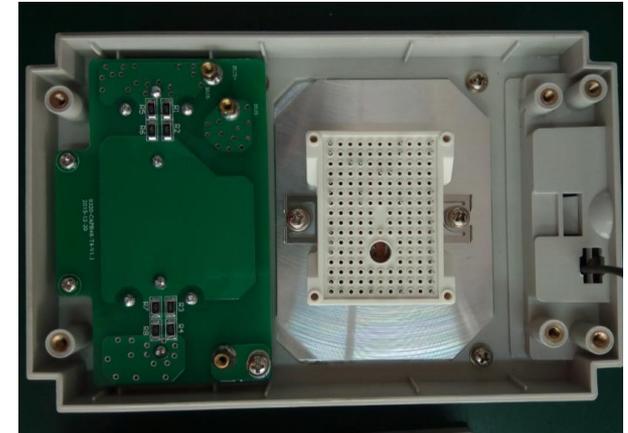
SG320 inverter 7.5kw to 11kw hardware design



beautiful outlook



DC current hall, lighting protection, fully protection



Infineon/Fuji IGBT for good quality assurance



big fan for good ventilation

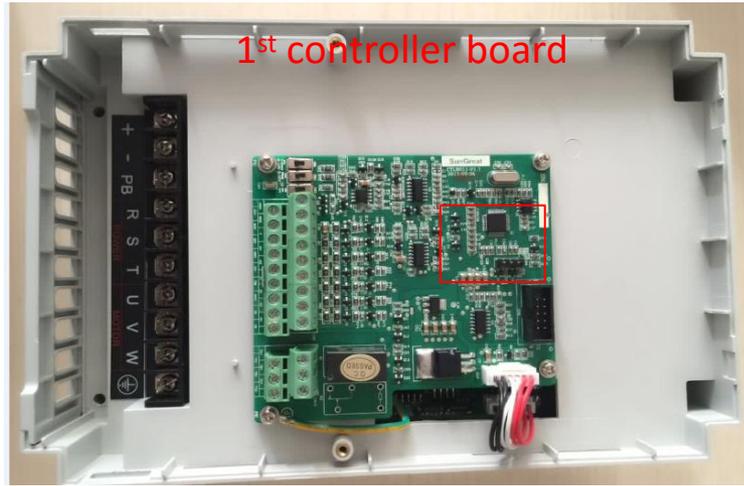


capacitors install bottom side

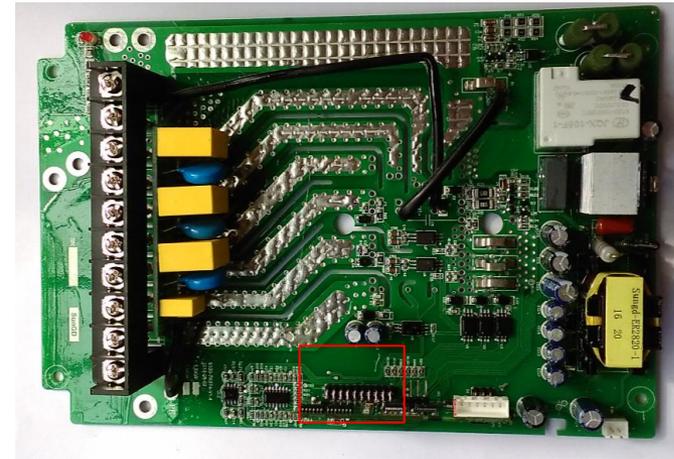


Controller board

SG320 inverter 0.75kw to 4.0kw hardware design



Built in 1st CUP board on power board, if this board Has problem, and will not cause inverter malfunction.



The 2nd CUP for function control, there are strong cable for power board and controller board connect DC current hall, lighting protection, short circuit protection



Infineon IGBT module, capacitors, big fans capacitors boards in bottom side SG3200, 11kw/15kw

6. SG30 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, vectorization VF, sensorless vector control 1, sensorless vector control 2
- ✓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, Delta, Danfoss , INVT and VEICHI---- That is why we are Good performance and better.



Solar pump control software developed

Based on S300 high performance

Vector control AC frequency inverter

Dual mode DC and AC input.



SG300 solar drive developed based on S300 high performance vector control drive. When it used for solar pump control, the PID and vector control can't work.

7. Solar pump inverter control parameters list

Code	Name	Description	Mini unit	Def. set	Property
FA-00	Solar pump inverter control selection	0: variable speed control for general 1:CVT (constant voltage control) 2: MPPT (maximum power point tracking)	1	2	×
FA-01	Auto/manual	0: Manual (operation panel) 1: Auto (terminals control) 2: Rs485 communication	0	0	☆
FA-02	CVT control voltage	0.0~100.0% open loop circuit voltage	0.1	80	×
FA-03	MPPT control upper limit voltage	0.0~100.0% open loop circuit voltage	0.1	90.0	×
FA-04	MPPT control lower limit voltage	0.0~100.0% open loop circuit voltage	0.1	75.0	×
FA-05	Frequency adjusting gain	1~5000 (suggest 25 to 100, low for bad sun light)	1	40	×
FA-06	Frequency adjusting allowable deviation	1~5 (acceleration /deceleration ratio, 2 or 3 is OK)	1	3	×
FA-07	MPPT Control period	0.01~10.00S	0.01	0.30	×
FA-08	Dc current correction offset	0.00~50.00A	0.01	0.00	☆
FA-09	Dc current correction gain	0.0~100.0%	0.1	100.0	☆
F0-00	Models selection	0: General purpose for constant torque 1: variable torque for fans and pumps.	1	0	×
F0-02	Running control mode selection	0: Control panel (keypad) , 1: External terminal 2: RS485 ports	1	1	☆
F0-12	Acceleration time 1	0.1~6000.s	0.1	*	☆
F0-13	Deceleration time 1	0.1~6000.0s	0.1	*	☆
F0-19	STOP key designation	0: Enable only in control panel mode 1:Enable in all command control mode	1	0	×
F0-17	Factory restore	0: No operation, 11:Factory setting initialization, 22: Clear all faults record	1	0	×
F0-18	Parameters protection	0: No protection 1: parameters can't modify	1	0	×

Solar pump control monitor and protection function parameters

Code	Name	Description	Mini unit	Default setting	Property
Fb-00	Sleep voltage	0~1000V	1	*	☆
Fb-01	Restore voltage in sleep mode	0~1000V	1	*	☆
Fb-02	Wake up waiting time	0.0~3000.0S	0.1	30.0	☆
Fb-03	Lowest Stop frequency	0.00~300.00Hz	0.01	20.00	☆
Fb-04	Stop delay time when reach lowest frequency	0.0~3000.0S	0.1	30.0	☆
Fb-05	Auto restore time in lowest stop mode	0.0~3000.0S	0.1	30.0	☆
Fb-06	Dry run load current	0.0~100.0A	0.1	1.0	☆
Fb-07	Dry run trip time	0.0~3000.0S	0.1	60.0	☆
Fb-08	Auto dry run reset time	0.0~3000.0S	0.1	120.0	☆
Fb-09	Motor over current setting	0~3000.0A	0.1	*	☆
Fb-10	Motor over current time detect time	0.0~3000.0S	0.1	30.0	☆
Fb-11	Motor over current reset time	0.0~3000.0S	0.1	30.0	☆
Fb-12	Input power protection value	0.00~100.00KW	0.01	0.00	☆
Fb-13	Input power detect time	0.0~3000.0S	0.1	10.0	☆
Fb-14	Minimum input power Reset time	0.0~3000.0S	0.1	10.0	☆
Fb-15	Alarm operation mode, 1 digit: low frequency , 2 digit: Dry run 3 digit: over current, 4 digit: Input minimum power	0: Alarm reset automatically 1: Manual rest	1	0000	☆
Fb-16	PQ CURVE P1	0.00~100.00KW	0.01	0.50	☆
Fb-17	PQ CURVE P2	0.00~100.00KW	0.01	1.00	☆
Fb-18	PQ CURVE P3	0.00~100.00KW	0.01	1.50	☆
Fb-19	PQ CURVE P4	0.00~100.00KW	0.01	2.00	☆
Fb-20	PQ CURVE P5	0.00~100.00KW	0.01	2.50	☆
Fb-21	PQ CURVE Q1	0.0~1000.0m ³ /h	0.1	0.0	☆
Fb-22	PQ CURVE Q2	0.0~1000.0m ³ /h	0.1	5.0	☆
Fb-23	PQ CURVE Q3	0.0~1000.0m ³ /h	0.1	10.0	☆
Fb-24	PQ CURVE Q4	0.0~1000.0m ³ /h	0.1	15.0	☆
Fb-25	PQ CURVE Q5	0.0~1000.0m ³ /h	0.1	20.0	☆
Fb-26	Today flow/ generated energy reset period	0.0~24.0hour	0.1	8.0	☆
Fb-27	Flow calculating offset	0.00~1000.0m ³ /h	0.1	0.0	☆

8. d group monitor parameters of solar pump control

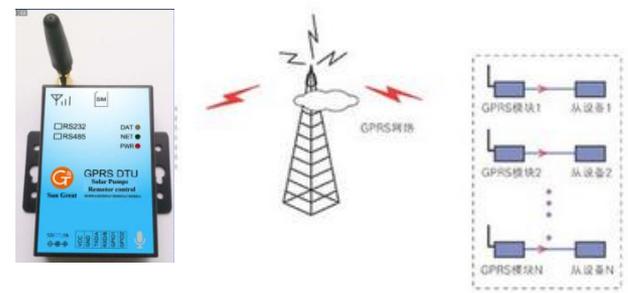
Monitor code	Display contents	Minimum unit.
d-00	Current output frequency	0.01Hz
d-01	Current output voltage	1V
d-02	Current output current	0.1A
d-05	DC bus voltage (Input DC bus voltage)	1V
d-06	Module temperature	0.1°C
d-09	Machine Speed	rmp
d-25	Open loop circuit voltage	1V
d-26	DC bus current	0.01A
d-27	MPPT tracking voltage	0.1%
d-28	Flow rate	0.1m3/h
d-29	Today flow	0.1m3
d-30	Cumulative flow 1	0.1m3
d-31	Cumulative flow 2	1Km3
d-32	Input power	0.01KW
d-33	Today generated energy	0.1KWH
d-34	Cumulative generated energy	0.1KWH
d-35	Cumulative generated energy	1MWH
d-36	Working status (0-6)	1
d-37	Rated voltage of inverter	1V
d-38	Rated current of inverter	0.1A
d-39	Software version	

•Red mark means 6 common indicator parameters
 •D-36, Working status, 0: stop, 1: running, 2: speed mode
 A.Luo, 3, low stop frequency A.LFr, 4: Dry run, A.LCr, 5:Over current, A.Ocr, 6: mini. Power input A.LPr.



Press this shift button to select monitor 6 common monitoring parameters in circulatory

6 common monitoring parameters: Output frequency, output voltage, output current, DC bus voltage, DC current, input power, etc, 6 parameters. See Red mark in D group.



GPS +GPRS both mode

The screenshot displays a web interface for remote control. On the left, the 'Working status monitor window' shows various parameters: Output frequency: 50Hz, Output voltage: 219V, Output current: 0A, Frequency set: 50Hz, DC bus Voltage: 311V, Vdc voltage: 320V, DC current: 0.01A, MPPT Tracking: 97.1%, Flow rated: 0m3/h, Today flow: 0m3. On the right, the 'Control panel' includes buttons for 'STOP', 'FORWARD', 'REVERSE', 'STOP', and 'SET'. Below it, the 'Parameters setting area' shows 'Function Code Base' set to 'FD-02 Running come' and 'Function Code Value' set to '2'.

Website platform for remote control

9. Nameplate introduction

SG	300/320	7K5GB	2S
SG	300-M	1K5PB	4T

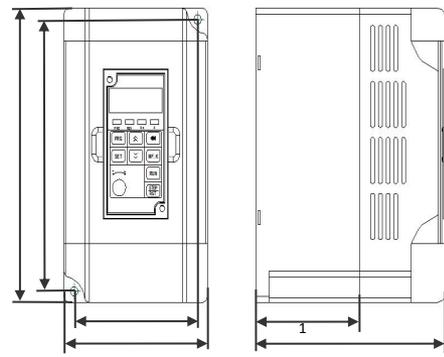
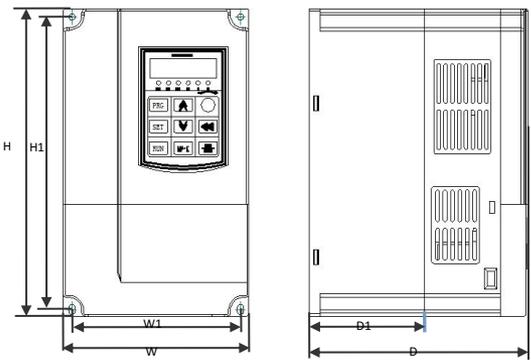
- SG: Solar pump inverter series
- SG100: bare board inverter without cover
- SG300/320: general models,
- SG300-M, mini models
- 7K5GB: 7.5kw
- 1S: = 90 to 370 V DC or 110 to 220VAC (optional)
- 2S: = 150 to 400 V DC or 200 to 240 V AC
- 4T: = 350 to 800 V DC or 380 to 480 V AC



SG300-M

SG300-0.75kw to 7.5kw

SG320 11-15kw



Power	H	H1	W	W1	D	D1	hole
0.75~4KW	185	173	125	115	159	79	Ø5
5.5~7.5KW	244	232	150	136	176.5	93	Ø5
11kw -15kw	247	235	160	147	178	101	Ø5

Power	H	H1	W	W1	D	D1	Hole
0.4~1.5KW	143	132	86	74	114	62.5	Ø4.5

Please refer to manual to get above 18kw power inverter

10. Solar pump inverter specification

SN	Models	Rate current	Recommend MPP voltage (DC)	Output voltage (3PH VAC)	Applicable for pumps	External of inverter size(mm)	M P P T voltage (VDC)	Weight (1)
Mini type 2S series : 150 to 400 VDC or 200 to 240VAC input (need Voc 355VDC input ,Vmp 280 to 311VDC)								
1	SG100-0K75GB-2S	4A	300 to 375	220V/240V	0.75KW	170*110*70	280 to 375	1
2	SG300-0K75GB-2S-M	4A	300 to 375	220V/240V	0.75KW	143*86*114	280 to 375	1.5
3	SG300-1K5GB-2S-M	7A	300 to 375	220V/240V	1.5KW	143*86*114	280 to 375	1.5
Mini type 4T series : 250 to 800 VDC or 380 to 460 VAC (need Voc 621VDC input, Vmp 486 to 750VDC)								
4	S300-0K7GB-4T-M	2.5A	520 to 750	380V-440V	0.75KW	143*86*114	486 to 750	1.5
5	S300-1K5GB-4T-M	3.7A	520 to 750	380V-440V	1.5KW	143*86*114	486 to 750	1.5
6	S300-2K2GB-4T-M	5A	520 to 750	380V-440V	2.2KW	143*86*114	486 to 750	1.5
General type 2S series : 150 to 400 V DC or 200 to 240 V AC (need Voc 355VDC input, Vmp 280 to 311VDC)								
7	S300-0K7GB-2S	4A	300 to 375	220V/240V	0.75KW	185*125*159	280 to 375	2.0
8	S300-1K5GB-2S	7A	300 to 375	220V/240V	1.5KW	185*125*159	280 to 375	2.0
9	S300-2K2GB-2S	10A	300 to 375	220V/240V	2.2KW	185*125*159	280 to 375	2.5
10	S300-4K0GB-2S	16A	300 to 375	220V/240V	4.0KW	245*150*177	280 to 375	3.5
General type 4T series : 350 to 800 VDC or 380 to 460VAC ((need Voc 621VDC input, Vmp 486 to 750VDC)								
11	S300-0K7GB-4T	2.5A	520 to 750	380V-440V	0.75KW	185*125*159	486 to 750	2
12	S300-1K5GB-4T	3.7A	520 to 750	380V-440V	1.5KW	185*125*159	486 to 750	2
13	S300-2K2GB-4T	5A	520 to 750	380V-440V	2.2KW	185*125*159	486 to 750	2
14	S300-4K0GB-4T	10A	520 to 750	380V-440V	4.0KW	185*125*159	486 to 750	2.5
15	S300-5K5GB-4T	13A	520 to 750	380V-440V	5.5KW	245*150*177	486 to 750	3.5
16	S300-7K5GB-4T	17A	520 to 750	380V-440V	7.5KW	245*150*177	486 to 750	4
17	S320-011GB-4T	22A	520 to 750	380V-440V	11KW	247*160*178	486 to 750	5
18	S320-015GB-4T	30A	520 to 750	380V-440V	15KW	247*160*178	486 to 750	5
19	SG300-018GB-4T	37A	520 to 750	380V-440V	18KW	335*217*190	486 to 750	10
20	SG300-022GB-4T	45A	520 to 750	380V-440V	22KW	335*217*190	486 to 750	18
21	SG300-030GB-4T	60A	520 to 750	380V-440V	30KW	463*285*225	486 to 750	18
22	SG300-037GB-4T	75A	520 to 750	380V-440V	37KW	463*285*225	486 to 750	29
23	SG300-045GB-4T	90A	520 to 750	380V-440V	45KW	600*385*270	486 to 750	29
24	SG300-055GB-4T	110A	520 to 750	380V-440V	55KW	600*385*270	486 to 750	29
25	SG300-075GB-4T	150A	520 to 750	380V-440V	75KW	600*385*270	486 to 750	43
26	SG300-090GB-4T	180A	520 to 750	380V-440V	90KW	700*473*307	486 to 750	47
27	SG300-110GB-4T	220A	520 to 750	380V-440V	110KW	700*473*307	486 to 750	90
28	SG300-132GB-4T	260A	520 to 750	380V-440V	132KW	930*579*375	486 to 750	100
29	SG300-160GB-4T	320A	520 to 750	380V-440V	160kw	930*579*375	486 to 750	130

Solar Pumps Inverter with MPPT for PMSM and IM pumps

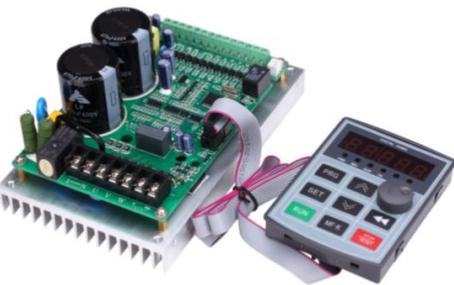


Solar pump inverter series.

- SG100-W, 0.75kw (no cover)
- SG300-M, mini type
- SG300, 0.75kw to 7.5kw
- SG3200, 11kw to 160kw



Absorb solar energy and convert into electricity



SG100-0K75GB-2S
Without cover, 0.75kw.

SG300-0K7GB-M
SG300-1K5GB-M
1. 0.75--1.5kw, 2S/220AC
2. 0.75 -2.2kw, 4T/380AC

SG300-0K7GB-2S
SG300-7K5GB-4T
1. 0.75-4.0kw, 2S/220AC
2. 0.75-7.5kw, 4T/380AC

SG320-4T
11 -15kw, 4T/380AC

SG320-4T
18 -160kw, 4T/380AC

Submersible Pumps

general pumps

Water pump for swimming pool, pool pumps



Control panel (keypad) operation description

Key symbol	Name	Function description
PRG	Menu key	Enter menu or exit
SET	Confirm key	Enter to menu step by step and confirm the setting value
	UP increase key	Data and function code increase
	DW reduce key	Data and function code reduce
		In the monitor status, press this key can select display monitoring parameter in circulation.
	Shift	
RUN	Running key	Us to start inverter in keypad control mode
MF.K	Multiple function key	Programmed by F4-31 setting. Default is reverse running
<u>STOP</u> RESET	Stop and reset	In running status, this key can use to stop operation (F0-02). Reset malfunction in alarm mode.

Parameters indicator description

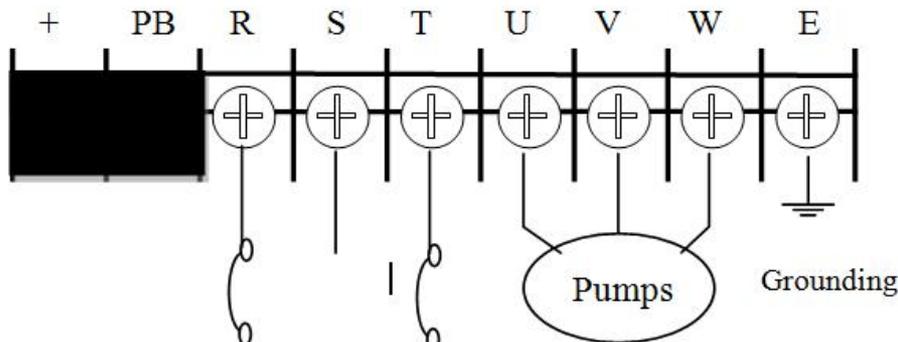
Symbol	Indicator description
Hz	Unit of frequency (Hz)
A	Unit of current (Amp)
V	Unit of voltage (V)
FWD	Forward run indicator
REV	Reverse run indicator
	FWD, REV both flash in stand when perform DC braking
ALM	Fault indicator (alarm for over current, over voltage but that don't reach the level of fault limit)

Potentiometer

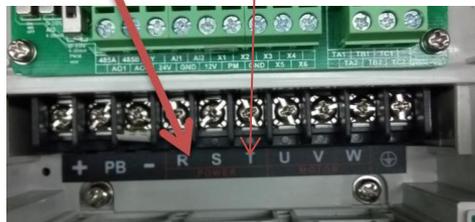


11. Solar pump system Wiring.

The power supply of solar arrays connect to **R and T**. and connect pump to U,V,W.



Connect to P and N of solar arrays.



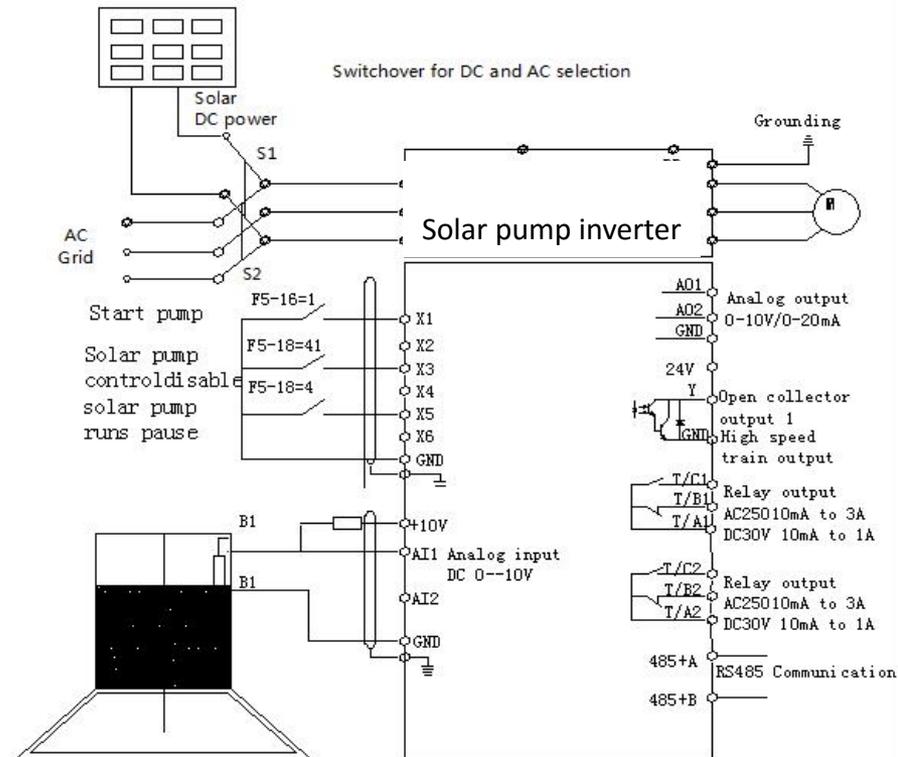
Parameters setting. (more description please refer to manual)

There are only a few parameters need to set.

1. Pump parameters. please set these parameters as pumps name plate.

If your pumps specification can match the inverter. Below parameters no need to se.

F2-01	Motor rated voltage	Per you motor name plate
F2-02	Motor rated frequency	Per you motor name plate
F2-03	Motor rated current	Per you motor name plate
F2-04	Rated slip frequency	Per you motor name plate
F2-05	Poles pair	Per you motor name plate



2. The inverter can detected Voc By itself when power on.

FC00=0 Voc automatic set

FC00=1, Voc manual set,

FC01=Voc setting value (250V to 800V)

3. Maximum frequency setting to protect the pumps.

If you want to adjust the frequency during the solar pump control.
Can use the maximum frequency to make it.

F0-08	Upper limit frequency	5.00~650.00 Hz	0.01	50.00	×
		0: Upper limit frequency digit set 1: AI1 2: AI2			
F3-21	Upper limit frequency source select	3: multiple speed 4: RS485 5: HDI 6: potentiometer of keypad	0	0	

4. Solar control parameters.

The default setting is control mode is MPPT.
The system can get maximum point power to ensure high efficiency.
If your sunlight is good. CVT (constant voltage tracking) also is OK.

FA-00	Solar pump inverter control selection	0: variable speed control for general 1:CVT (constant voltage control) 2: MPPT (maximum power point tracking)	1	2	
-------	---------------------------------------	--	---	---	--

Auto and manual operation selection. The control terminals X1 and GND must be ON, and F5-16=1.
The solar inverter can work automatically when sunlight is enough. (work at day, sleep at night)

FA-01	Auto/manual	1: Manual (Operation panel) 0: Auto (terminals control)	0	0	
-------	-------------	---	---	---	--

12. Command questions and solution

When the first time using, should check the inverter power if larger than pump's power, and the solar panel output power should be large than 1.3 times of inverter's power, Voc of solar panel should larger 1.15 times of DC bus voltage.

For example. For 3 phase, 380V pumps, 2.2kw pumps.

It need solar panel power around 2.8kw, and the Voc large than $1.15 \times 380V \times 1.41 = 620VDC$

For the 3 phase, 220V pumps, 2.2kw pumps.

It need solar panel power around 2.8kw, and the Voc large than $1.15 \times 220V \times 1.41 = 350VDC$

1. The water output is small when good sunlight and solar pump inverter runs well also ?

Solution. Check the rotation direction of pumps if correct or not.

2. Solar pump inverter place in stop status with 0.00Hz but sunlight is good ?

Solution: Review the **d-36** parameters to check which protection of solar pump inverter located, and then to check corresponding parameters of protection if correct.

If the acceleration/deceleration time setting is correct, also will cause this problem.

Fb-15 parameters can define alarm reset if by manual or auto.

3. DC current display is not correct ?

Solution: Uses FA-08 (DC current revise offset), FA-08(DC current revise proportion gain) to calibration.

4. The output frequency is fluctuation when sun light is good ?

Solution.: Adjust FA-05, make it smaller. or set F1.06 for bigger. If problem still has, set F0-12 acceleration time bigger, and make F0-13 smaller. (F012/F013=3 is default setting)

If the sunlight is good and no cloudy, can select CVT control mode. set FA-00 for 1.

5. If the output frequency can't reach to 50Hz with good sunlight ?

Solution: Check the total power of solar panels and Voc input, and select MPPT control mode. FA.00 for 2.

6. If your inverter power is bigger than pump's power, how to protect the motor ?

Solution: Set Fb-09 motor over current protection value to protect motor, and Fb-10, Fb-11 is delay and restore time. If output current is over than Fb-09 setting, inverter will be stop and display A.Ocr.

7. Dry run function how to set ?

Solution. If the well is not enough water for pumping, it will cause pump damage without water. And that time the output current is smaller. When output current lower than Fb-06, after a delay time, inverter will stop pump working.

8. How to reset all parameters to factory default setting?

F0-17	Factory restore	0: No operation 11: Factory setting initialization 22: Clear all faults record	1	0	×
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Solar Pumps Inverter with MPPT for PMSM and IM pumps



Selecting solar arrays matching selecting

Solar pumps inverter model	Maximum Input DC current	Solar arrays open circuit voltage specification									
		Open circuit voltage range 21V±2V			Open circuit voltage range 31V±2V			Open circuit voltage range 43V±2V			
		Power±3W P	Short circuit current	Serial, parallel No.	Power±3W P	Short circuit current	Serial, parallel No.	Power±3WP	Short circuit current	Serial, parallel No.	Inverter rated current
General type: 250 to 800 VDC or 380 to 480VAC											
S300-0K7GB-4T	4.6A	30WP	2.75A	30*1							2.3A
S300-1K5GB-4T	7A	60WP	3.48A	30*1							3.7A
S300-2K2GB-4T	10A	90WP	5.5A	30*1							5A
S300-4K0GB-4T	17A	85WP	4.7A	28*2							8.5A
S300-5K5GB-4T	23A				180WP	7.33A	19*2				13A
S300-7K5GB-4T	32A				240WP	8.81A	20*2	200WP	7.32A	15*3	17A
S320-011GB-4T	48A				180WP	7.33A	20*4	240WP	7.32A	15*4	25A
S320-015GB-4T	64A				240WP	8.81A	20*4	240WP	7.32A	15*5	32A
S320-018GB-4T	76A				240WP	8.81A	20*5	240WP	7.32A	15*6	38A
S320-022GB-4T	80A				240WP	8.81A	20*6	270WP	7.32A	15*7	45A
S320-030GB-4T	90A				240WP	8.81A	20*8	240WP	7.32A	15*10	60A
General type: 150 to 400 V DC or 200 to 240 V AC											
S300-0K7GB-2S	7A	30WP	2.75A	17*2							4A
S300-1K5GB-2S	14A	60WP	3.48A	17*2							7A
S300-2K2GB-2S	20A	90WP	5.5A	17*2							10A
S300-4K0GB-2S	32A	90WP	5.5A	17*3							16A

Note: The required input solar panel voltage is 1.15 times of solar inverter DC bus voltage.

For example: In 4T series, recommend $540V \times 1.15 = 621V$; in 2S series, recommend $311 \times 1.15 = 357V$.

The required power of solar arrays is 1.3 times of rated power of inverters, shouldn't less than 1.2 times of rated power of inverter.

For example, 7R5G, the required power is $7500 \times 1.3 = 9750w$.

The current of solar arrays selecting approximate to rated current of solar inverter is acceptable.

Solar pump inveter water proof cabinet.

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

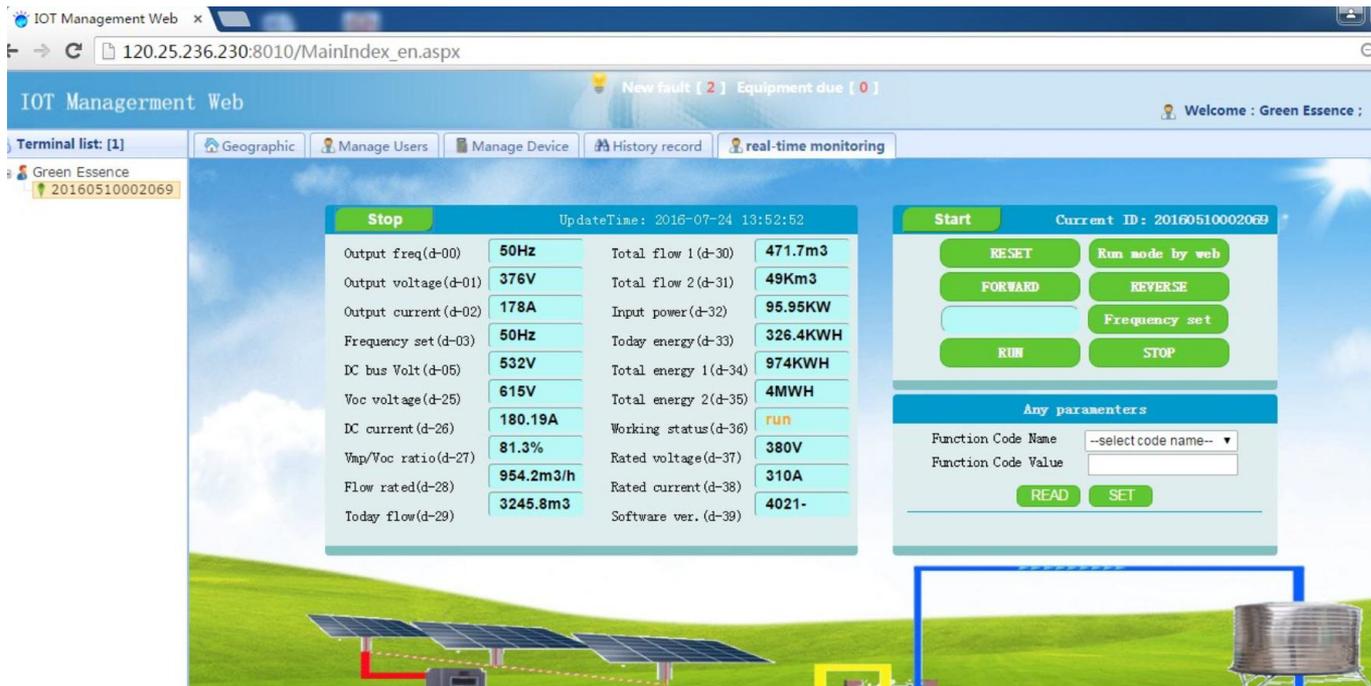
Inbuilt In built AC/DC manual switch, AC/DC circuit breaker, pumps connection terminals in cabinet.



Inbuilt start/stop, reset
run & alarm LED

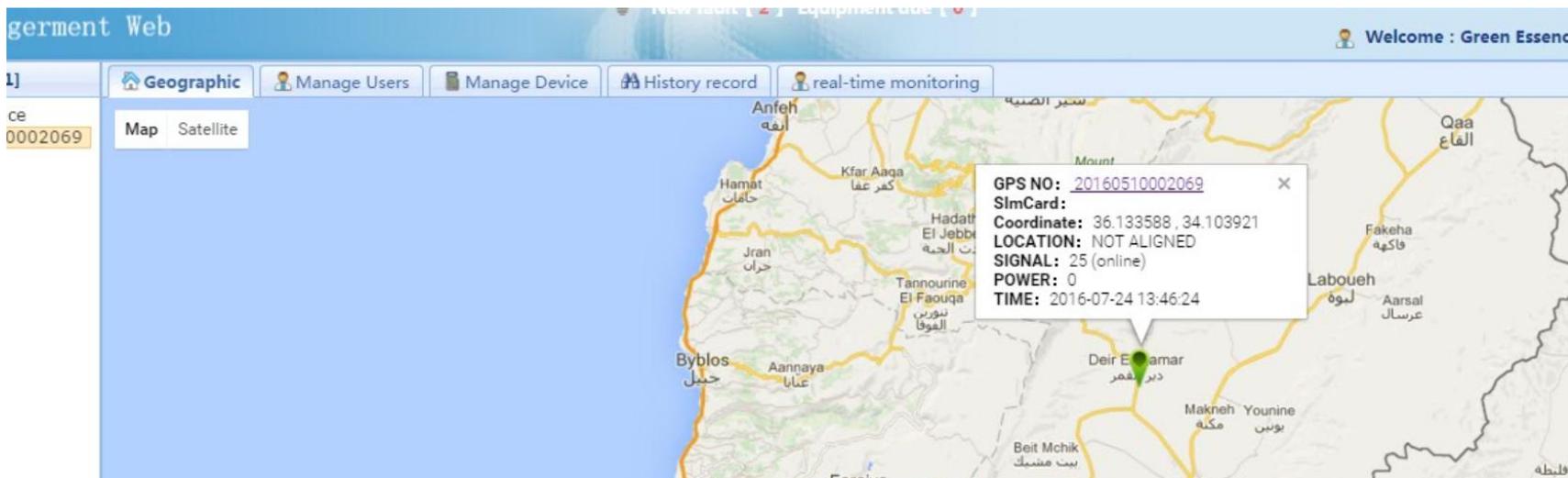


A big power 160kw, 310A solar pump inverter working in Lebanon



It can work with more than 40Hz at 9:30 AM, and stop until to 17:00 with more than 40Hz.

long working time with High efficiency



Solar Pumps Inverter with MPPT for PMSM and IM pumps



DeviceNum	Output frequency (Hz)	Output voltage(V)	Output current(A)	Frequency set(Hz)	DC bus Voltage(V)	Voc voltage(V)	DC current(A)	Vmp/voc ratio (%)	Flow rated(m3/h)	Today flow(m3)	Calculated flow 1(m3)	Calculated flow 2(Km3)	Output power (KW)	Today energy (KWH)	Cumul. energy 1(KWH)	Cumul. energy 2 (KWH)	Working status	Rated voltage (V)	Rated current(A)	Version(-)	RecordDate	remark
20160510002069	0	0	0	50	638	615	0	80	0	0	523.1	15	0	0	560.1	1	0	380	310	4021	2016-07-19 09:06:21	
20160510002069	41.7	318	157.1	41.6	524	615	118.48	80.7	615.8	103.4	626.5	15	61.96	10.4	570.5	1	1	380	310	4021	2016-07-19 09:21:22	it can start working at 9:00, but frequency is lower than 40Hz setlig, so it place in sleep mode
20160510002069	2.28	24	28.3	2.71	628	615	1.56	79	6	158.2	681.3	15	1.2	15.9	576	1	1	380	310	4021	2016-07-19 09:36:54	
20160510002069	0	0	0	0	631	615	0	80	0	231.6	754.7	15	0	23.3	583.4	1	3	380	310	4021	2016-07-19 09:52:11	
20160510002069	47.07	349	164.2	47.08	497	615	164.35	80	811.8	379.4	902.5	15	81.69	38.2	598.3	1	1	380	310	4021	2016-07-19 10:07:31	
20160510002069	48.08	354	170.5	48.13	502	615	172.87	81.2	862.8	580.4	103.5	16	86.82	58.4	618.5	1	1	380	310	4021	2016-07-19 10:21:25	
20160510002069	48.99	344	180	49	487	615	188.08	78.7	910.9	796.3	319.4	16	91.58	80.1	640.2	1	1	380	310	4021	2016-07-19 10:36:28	
20160510002069	49.53	347	183.3	49.53	491	615	191.85	79.6	936.9	1014.1	537.2	16	94.18	102	662.1	1	1	380	310	4021	2016-07-19 10:51:32	
20160510002069	44.61	339	167.4	44.62	555	615	133.94	85.3	738.4	1253.5	776.6	16	74.14	126.1	686.2	1	1	380	310	4021	2016-07-19 11:06:29	
20160510002069	49.9	363	182.5	49.9	511	615	188.6	82.8	958.8	1486.3	9.4	17	96.36	149.5	709.6	1	1	380	310	4021	2016-07-19 11:21:30	
20160510002069	50	364	181.8	50	514	615	187.71	78.1	959.3	1711.9	235	17	96.37	172.2	732.3	1	1	380	310	4021	2016-07-19 11:36:31	
20160510002069	50	364	181.8	50	514	615	186.88	81.5	955.8	1945.3	468.4	17	96.1	195.7	755.8	1	1	380	310	4021	2016-07-19 11:51:32	
20160510002069	50	364	181.4	50	516	615	187.55	76	962.7	2184.3	707.4	17	96.81	219.7	779.8	1	1	380	310	4021	2016-07-19 12:06:34	
20160510002069	50	370	180.4	50	522	615	185.02	80.7	960.8	2421.6	944.7	17	96.64	243.5	803.6	1	1	380	310	4021	2016-07-19 12:21:40	
20160510002069	50	373	179.4	50	528	615	182.48	81.3	959.3	2490.6	13.7	18	96.5	250.5	810.6	1	1	380	310	4021	2016-07-19 12:26:00	
20160510002069	50	370	180.2	50	523	615	184.62	76.4	960.7	2728.9	252	18	96.54	274.4	834.5	1	1	380	310	4021	2016-07-19 12:41:00	
20160510002069	50	366	181.2	50	516	615	186.63	82.5	957.6	2965.5	488.6	18	96.26	298.2	858.3	1	1	380	310	4021	2016-07-19 12:56:02	
20160510002069	50	371	179.7	50	524	615	185.17	81	965.3	3198.8	721.9	18	97.03	321.7	881.8	1	1	380	310	4021	2016-07-19 13:11:03	
20160510002069	50	364	180.9	50	519	615	186.21	78.1	962	3437.5	960.6	18	96.72	345.7	905.8	1	1	380	310	4021	2016-07-19 13:26:04	
20160510002069	50	376	178.6	50	532	615	181.38	78.5	959.9	3667.5	190.6	19	96.5	368.8	928.9	1	1	380	310	4021	2016-07-19 13:41:05	
20160510002069	50	379	178	50	538	615	178.48	81.1	955.4	3901.7	424.8	19	96.09	392.3	952.4	1	1	380	310	4021	2016-07-19 13:56:06	
20160510002069	50	378	178.6	50	533	615	181.11	81.1	960.4	4140	663.1	19	96.54	416.3	976.4	1	1	380	310	4021	2016-07-19 14:11:07	
20160510002069	45.24	344	165.6	45.32	566	615	133.31	87	748.6	4374.2	897.3	19	75.3	439.8	999.9	1	1	380	310	4021	2016-07-19 14:26:08	
20160510002069	50	378	178.9	50	534	615	181.59	75.9	964.5	4608.1	131.2	20	96.98	463.3	23.4	2	1	380	310	4021	2016-07-19 14:41:08	
20160510002069	50	375	178.8	50	531	615	181.36	75.7	958.6	4845.7	368.8	20	96.43	487.2	47.3	2	1	380	310	4021	2016-07-19 14:56:10	
20160510002069	50	374	179.3	50	529	615	183.17	75.3	963.8	4999.7	522.8	20	96.89	502.7	62.8	2	1	380	310	4021	2016-07-19 15:05:51	
20160510002069	49.99	368	181.4	49.95	520	615	186.92	84.3	966.6	5112.4	635.5	20	97.12	514	74.1	2	1	380	310	4021	2016-07-19 15:12:54	
20160510002069	49.66	358	182	49.63	507	615	189.01	82.2	953.2	5352.1	875.3	20	95.81	538.1	98.2	2	1	380	310	4021	2016-07-19 15:27:56	
20160510002069	49.41	360	179.3	49.31	509	615	184.46	82.3	933.9	5587.8	110.9	21	93.9	561.8	121.9	2	1	380	310	4021	2016-07-19 15:42:57	
20160510002069	44.68	340	170.4	44.77	540	615	135.95	82	727.8	5789.7	312.8	21	73.58	582.1	142.2	2	1	380	310	4021	2016-07-19 15:57:58	
20160510002069	44.16	336	167.5	44.04	535	615	131.5	81.7	701.1	5974.8	497.9	21	71.06	600.8	160.9	2	1	380	310	4021	2016-07-19 16:12:59	
20160510002069	44.58	331	159.3	44.53	515	615	138.65	79	709	6155.1	678.2	21	71.6	618.9	179	2	1	380	310	4021	2016-07-19 16:28:01	
20160510002069	43.66	322	151.2	43.45	498	615	132.62	76.6	651.5	6320.7	843.8	21	65.83	635.6	195.7	2	1	380	310	4021	2016-07-19 16:43:01	
20160510002069	0	0	0	0	645	615	0	80	0	9.3	900.9	21	0	0.9	201.4	2	3	380	310	4021	2016-07-20 09:29:52	
20160510002069	45.55	346	157.1	45.56	485	615	154.83	78.6	745.9	53.3	944.9	21	75.11	5.3	205.8	2	1	380	310	4021	2016-07-20 09:44:53	
20160510002069	47.36	358	163.8	47.36	505	615	162.47	81.7	815.5	240.9	132.5	22	82.06	24.2	224.7	2	1	380	310	4021	2016-07-20 09:59:55	
20160510002069	48.65	364	169.7	48.55	518	615	170.25	83.6	876.9	444	335.6	22	88.16	44.7	245.2	2	1	380	310	4021	2016-07-20 10:14:56	
20160510002069	45.85	350	174.6	45.75	554	615	151.06	86.4	821.5	661.4	553	22	82.14	66.5	267	2	1	380	310	4021	2016-07-20 10:29:00	

it can work with more than 40Hz until to 17:00 PM

History working data of solar pump inverter with 160kw in Lebanon, please feel free contact us if you need more in detail.



15. Applications of solar pump inverter. More than 3000 PCS solar pumps inverter used in currently



Solar Pumps Inverter with MPPT for PMSM and IM pumps





Solar City Water Landscape



Solar Living Water Supply



Solar Drought Control



Agriculture Irrigation



Agriculture Greenhouse Irrigation

Solar pump inverter and solar pump system is popular in bellow countries.

- India
- Pakistan
- Bangladesh
- Afghanistan
- Lebanon
- Morocco
- South Africa
- Zimbabwe
- Turkey
- Australia
- USA
- Germany
- Greece
- Yemen
- Indonesia
- Syria
- Egypt

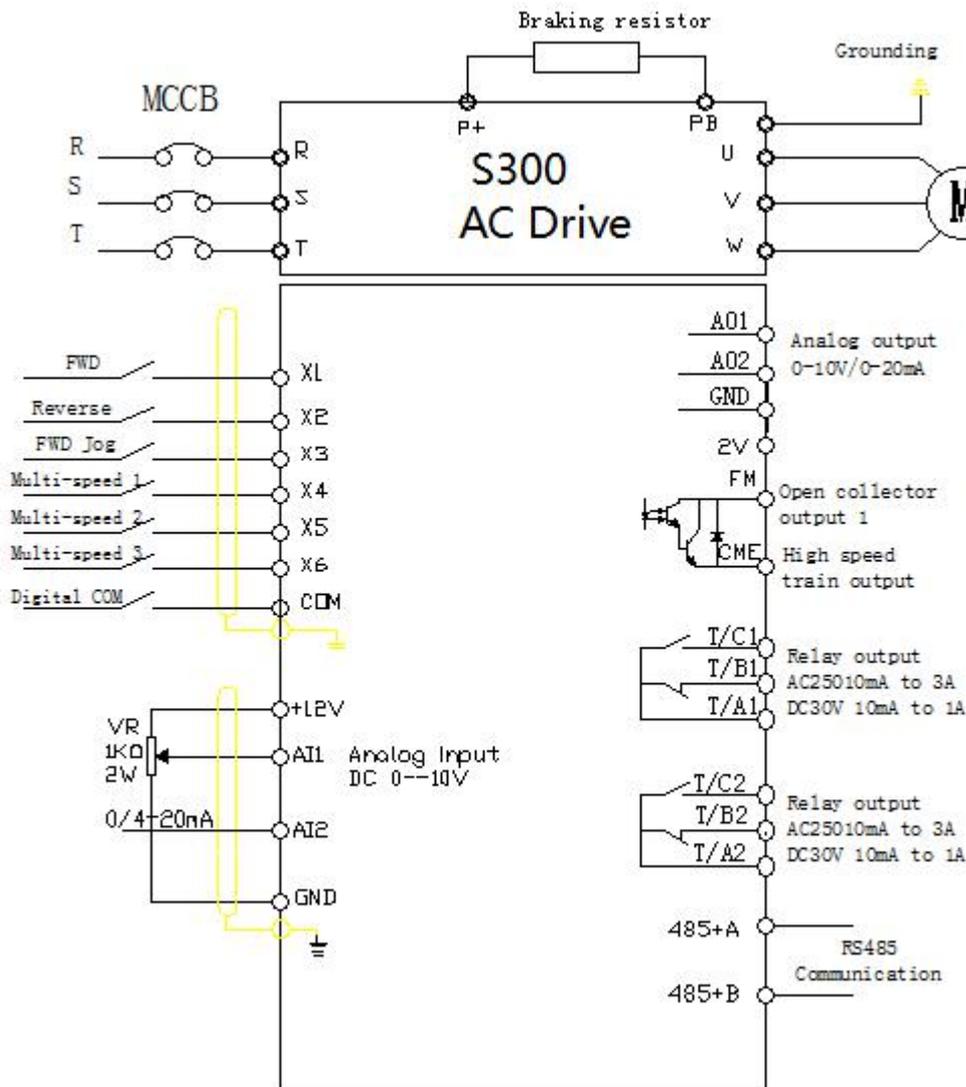


If the FA-00 set for 0, the SG solar pump inverter can use for high performance vector control AC inverter. It has following function.

F0-00	Models selection	0: General purpose for constant torque 1: variable torque for fans and pumps.	1	0	×
F0-01	Control mode	0: VF control 1: vectorizing VF control 2: Open loop vector control 1 3: Open loop vector control 2	1	0	×

1. High performance SVC control mode (vector control 1, and vector control 2)
 - Speed control accuracy: $\pm 0.3\%$
 - Speed control range: 1:200 upon vector control 2
 - Torque control responsive: less than 20ms
 - Starting torque: 0.5Hz: 150%(vector control 1), 0.25Hz: 150%(vector control 2)
2. Perfect protection function.
Built in over voltage, over current, under voltage, IGBT short circuit, grounding to output short circuit, overload protection, input to output short circuit...
3. Driving for asynchronous motor (AM) and permanent magnet synchronous motor (PMSM)
4. Torque control /speed control switchover, and torque limit
5. Special dead zone compensation function to ensure stable torque output.
6. Oscillation suppression function to reduce the mechanical resonance point
8. Strong overload capability
 - G type: 150% rated current for 1min, 180% rate current for 2s.
 - P type: 120% rated current for 1min, 150% rate current for 2s.
7. Rich input and output terminals function
 - 6 digital input
 - 2 analog input
 - 1 RS485 interface
 - 2 analog output, to support 0-1V or 0-20mA, A02 can compatible high speed trains input
 - 2 relay output, 1 collector programmable output

Ac inverter wiring diagram



Applications.

G type for general purpose constant torque, heavy load.
P type for fans, pumps, variable torque load.

Textile: P-jump Winders, Extruders, Tufting Machines, Dye Pumps

Packaging: In-feed / Out-feed, Case Packing, Bottling & Canning, Carton Manufacturing, Beverage packing

Plastics & Rubber: Extruders, Blow Molding, Thermoforming, Injection Molding.

Pulp & Paper: Paper Machines, Debarkers, Winders, Saw Mills

Converting: Coaters, Laminators, Slitters, Flying Cutters

Air Handling: Supply and Return Fans, Cooling Towers, Spray Booths, Dryers

Oil & Gas: Top inverters, Pump jacks, Down-hole Pumping, Centrifuges

Pumping: Metering, Irrigation, Chillers, Positive Displacement

Material Handling: Conveyors, Sortation, Palletizers, Coil Winding

Metals: Stamping / Punch Press, Wind /Unwind, Cut-to-length, Wire Draw

Construction Materials: Kilns, Planers, Flying Cutoff, Mixers

Laundry: Dryers, Extractors, Folders, Washers

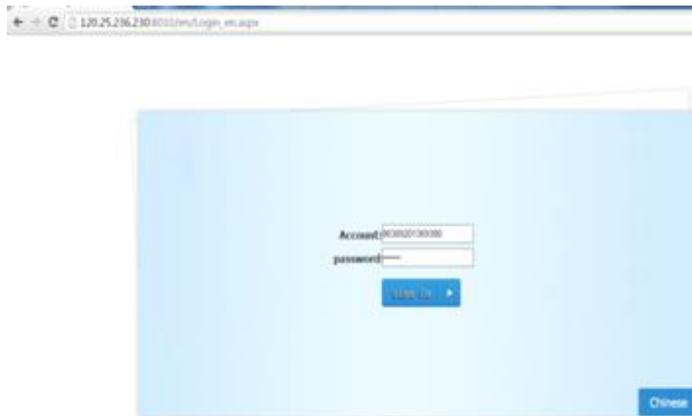
Food & Beverage: Conveyors, Fillers, Mixers, Centrifuges

Automotive: Stamping, Test Stands, Indexing, Metal Cutting

GPRS remote control (optional)

Functions of GPRS module establishing

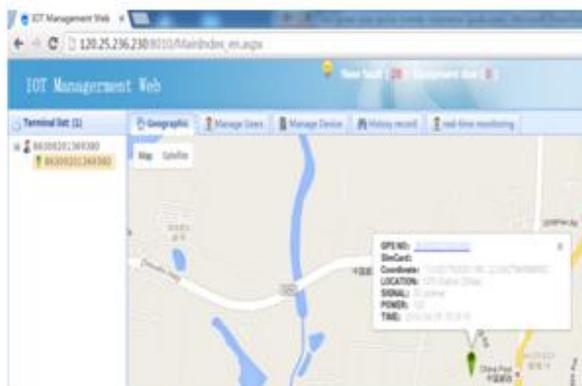
1. Working Status Monitoring;
2. Inverter Control and parameters review and modify
3. Positioning can see where the solar pump system working
4. History Data Record, possible record 3 months working data of system



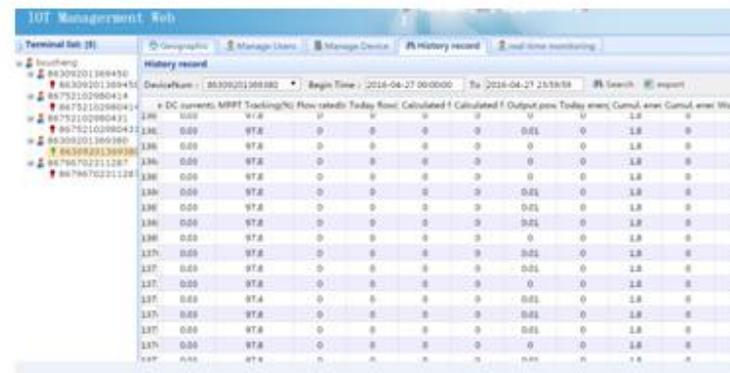
1. Login to website



2. Data monitor and control window



3. positioning



4. History data record