All-in-One Solar Pumping System Trendsetter

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National high-tech enterprise

SAJ Solar Pumping System

Guangzhou Sanjing Electric Co.,Ltd. **(stock code:835613)**

To build **green**, **intelligent**
and **efficient** energy
environment, and to create better,
happier and healthier lives
for people everywhere.

Content

About SAJ

Headquartered in Guangzhou, serves the world

Guangzhou Sanjing Electric Co., LTD(Stock Code: 835613,hereinafter referred to as SAJ) is a professional leading provider of motor drive and control technology, renewable energy conversion, transmission and storage solutions. Established in 2005, with the registered capital of 50.4 million RMB, SAJ has a strong Research & Development and technical service team.

Focusing on the technical innovation, SAJ masters the leading technology of high performance frequency vector control, motion control, and photovoltaic power generation. SAJ has been awarded as National High-tech Enterprise, Intertek "Authorized Satellite Lab", Guangzhou "Little Giant" Enterprise of Science & Technology, Guangdong Solar Inverter Engineering & Technology Research Center and so on. So far, the company has been authorized 20 invention patents , 76 utility model patents, 15 exterior design patents, 25 software copyrights and 6 software product registrations.

SAJ specializes in providing professional distributed solar inverter, energy storage hybrid solar inverter and monitoring solution, general frequency drive, smart pump drive, and solar pumping system. Now regarding the total shipment, SAJ general frequency drive (<11kW) ranks Top 5, smart pump drive and solar pumping system as Top 1 in domestic market, meanwhile, SAJ solar inverters has been awarded the Top 10 solar inverter brand in China for last five consecutive years, and become the golden supplier of Belgium largest community solar project. For the residential solar inverter (1kW-10kw), SAJ monthly average shipment has become the Top 3 as the first choice for residential solar investment, so far, SAJ has provided distributed solar inverters & solutions for poverty alleviation projects from more than 18 provinces.

With the strategy of local service network, SAJ has 16 branch offices and 50 service centers in China, overseas service center has expanded to Germany, Switzerland, Belgium, Australia and other countries. With the superior quality and comprehensive service network, SAJ has successfully applied 1 million sets of products around the world.

Adhering to the concept of "integrity, learning, innovation, win-win cooperation", SAJ is devoted to the development of the leading drive & zero-carbon and energy saving technology, to build green, smart and efficient energy environment, to make lives better, happier, and healthier.



Milestones

500 thousand sets

2017
- Released High PerformanceVM1000Vector Control VFD and PDG10 Smart Pump Drive
- Started HR Optimization Project With MERCER.
- Won “China Top 30 Science and Technology Innovation Pioneer” in the "Power of Role Model—Science and Technology Innovation Competition"
- SAJ eSolar Family Photovoltaic Academy Started National Tour from Foshan City
- Won SNEC "Top 10 Highlights" Golden Award of GW Level
- Won "2017 Asia Photovoltaic—Photovoltaic Application Award"
- Won the Honor of “China Top 10 Solar Inverter Enterprise ” for 5 Consecutive Years
- SAJ Jiangxi Factory with an area of 22,000 m2 has been put into Production and its Annual Production Capacity is up to 3GW
- SAJ eSolar Shared Operation and Maintenance Platform (eSolar O&M) Launched Officially

2016年
- Wins Top 10 National Low Voltage AC Drive Brand
- Set up SAJ Jiangxi Daughter Company
- Signed Strategic Cooperative Agreement with TüV Rheinland
- The 4th time to win China Top 10 Solar Inverter Enterprise(2016)
- Total 1000,000 AC Drive Released Since Established

2015
- Wins guangdong solar inverter engineering&technology research center
- Wins 2015 excellent supplier of string inverter
- Wins 2015 china top 10 solar inverter enterprise
- Wins 2015 top 10 solar innovation enterprises in asia
- Release pdm20 smart mini pump drive
- Passed the ohsas18001 occupational health and safety managementsystem certification
- Wins guangzhou little giant enterprises in science&technology

2014
- IEEE fellow, Chinese-American scientist Feng Lin introduced by Thousand Talents program joins SAJ
- Enters the field of water-application drive; launches IP54 water and dust proof 8200B series smart pump drive
- Passes ISO14001：2004 Environment Management System Certification
- Becomes the top 1 brand of smart pump drive industry in China
- Releases PDS23 high performance AC solar pump controller and entire solutions

2013
- Ranks in top 20 companies for patent creator in Guangzhou development zone
- Sets up European daughter company in Belgium to execute local managing strategy
- SAJ’s solar inverters are widely reported by CCTV news
- Wins 2013 innovation award on photovoltaic product

2012
- Releases the enhanced variable frequency drive 8000B
- Successfully rolls out the 500,000th set of variable frequency drive
- The first phase construction of SAJ Hi-TECH Park officially starts with annual production capacity increased to 300,000 sets and a total investment of 35 million RMB;

2011
- Starts using the new ERP system
- Obtains "software production" certificate of Guangdong
- Obtains "Enterprise of good faith and credit (grade A)
- Sets up SAJ Renewable Business, entering solar inverter industry
- Establishes the research and innovation base for graduate students in South China University of Technology
- Obtains Intertek "authorized satellite lab"
- Obtains German TUV, Australian SAA, and UK G83 certificate

2010
- Heads for servo drives with its successful application to injection molding machine
- Obtains "2010-2011 the best growth brand of Chinese automation"
- Successfully breaks through the vector control platform
- Establishes variable frequency drive engineering research center of Harbin Institute of Technology
- Passes ISO9001:2008 international quality system certification

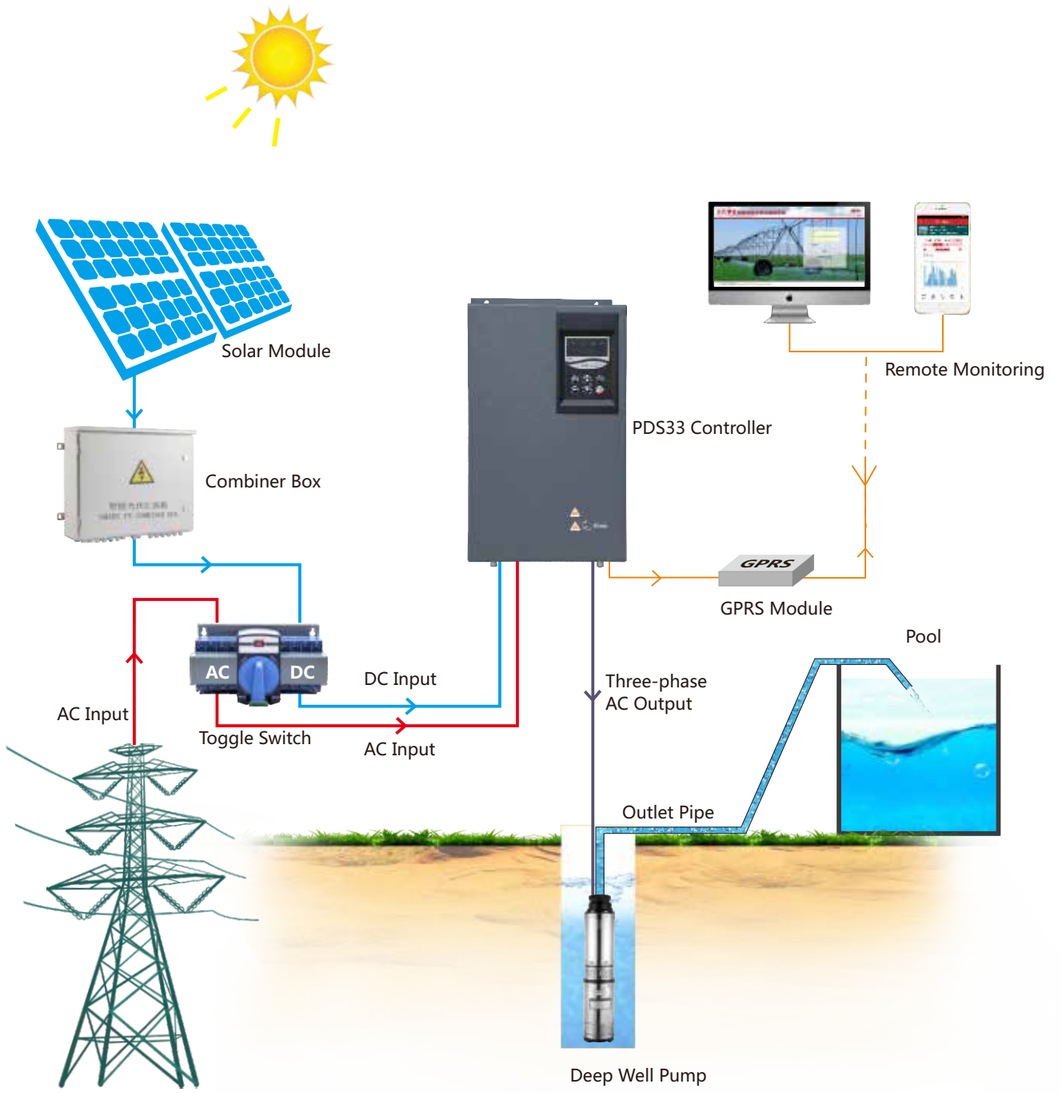
2009
- Obtains Private Science & Technology Enterprise Certificate
- Obtains National Hi-Tech Enterprise Certificate
- Obtains independent Import/Export License
- Moves to and headquartered in Science City,Guangzhou High-tech Zone

2007
- Builds the most cost-effective brand in industrial automation
- Launches 8000 series variable frequency drive

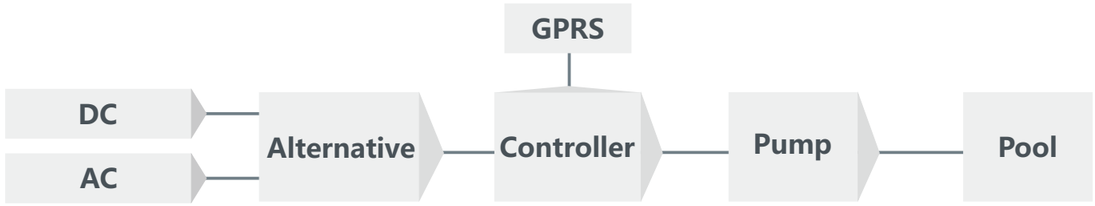
2005
- Enters the field of industrial automation
- Determines variable frequency drives as the core business
- Founded in Guangzhou, Guangdong Province

Solar Pumping System

Solar pumping system, is constituted by solar module array, combiner box, liquid level switch, solar pump etc. It aims at providing solutions for the region that suffers water shortage, no power supply or uncertain power supply.



■ Solar Water pump System Topology



■ The advantages and disadvantages between solar pumping system and traditional pumping system.

System type	Advantages	Disadvantages
Solar-powered pumping	Low maintenance; no fuel costs; easy installation; reliability; unattended operation; portable.	Higher initial costs; variable water delivery depending on sun intensity; higher return on investment depending on the insolation of the installation.
Diesel-powered pumping	Moderate initial costs; movable or portable; easy installation; requires certain system experience.	Requires regular maintenance and replacement of diesel: inadequate maintenance will reduce life expectancy; the higher cost of fuel and the long-term fuel cost trend is upward; environmental pollution of noise, smoke, and waste oil; requires an understanding of the installation environment.
Wind-powered pumping	Long life span; lower initial costs; no fuel costs.	High maintenance and replacement cost; difficult to purchase the replace components locally; greatly influenced by season; requires special tools to install; high labor costs; only works when wind conditions are adequate.
Ram pumping	Lower initial costs; low maintenance costs; no fuel costs; easy installation; reliable; simple	Rushing water is required.
Hauling water	Lowest initial costs; excellent mobility.	Highest labor cost.

With the development of science and technology, People's requirement for the water supply output and water quality is getting higher and higher. Also, they are taking the reliability of water supply system and environment protection into consideration. With the advantage of easy installations, low maintenance and operating cost, zero carbon emission, automatic running, and inexhaustible solar, the solar pumping system is gradually become the first choice for regions to solve the water use problems.

EASY INSTALLATION | AUTOMATIC RUNNING | REDUCED COST | HIGH RELIABILITY | ZERO CARBON EMISSION

One-stop Solar Pumping System Design

Four benefits strengthen perfect service

Trustworthy investment decision-making support

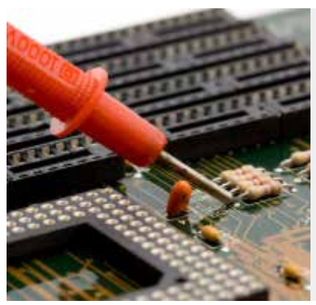
SAJ provides a website tool PDS Calculator for return on investment of PDS solar pumping systems compared with those diesel systems and help you make decisions only required the application address, actual dynamic head, daily water consumption and the current diesel prices.

Free all-in-one system design

1: Determine the daily water requirement for your system.
2: Input the days and tank size for water storage.
3: Input the total daily insolation of the application.
4: Calculate the total dynamic head.
5: Pump and motor selection.
6: Solar Drive selection.
7: Solar array sizing.
8: Check the whole output.

Quick Installation & Operation Guide

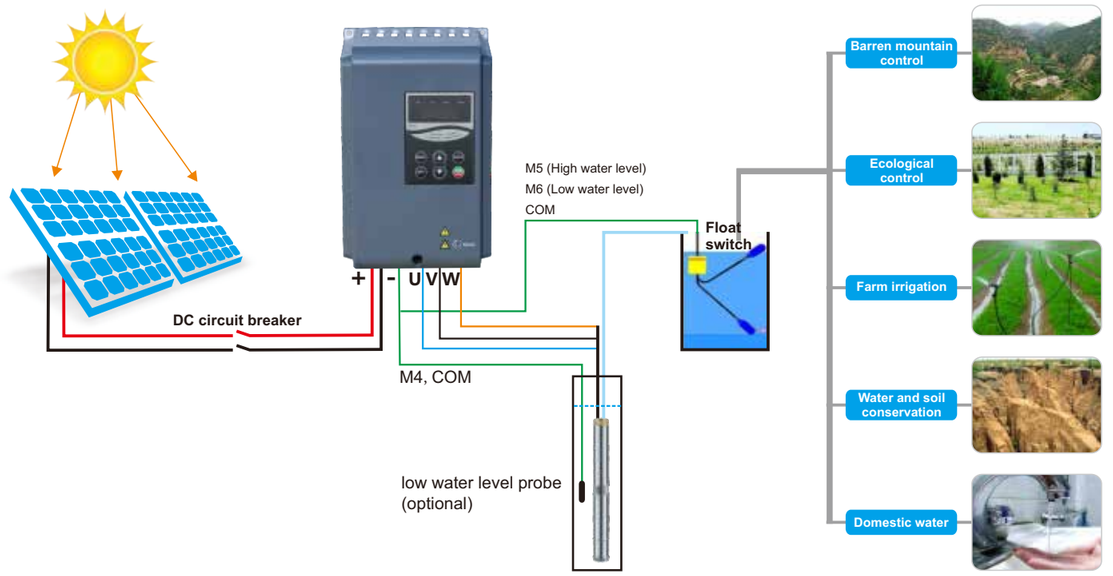
1: Make right decisions with PDS Calculator.
2: All-in-one designs your system with PDS Designer.
3: Purchase the rest components locally.
4: Follow the design report for standard installation.
5: Follow the PDS manual for commissioning electric pumping systems.



Trouble-free maintenance

1: Available with a ten-year standard warranty and a twenty five-year life span for solar modules.
2: Available with a one-year standard warranty for pump.
3: Available with a one-year standard warranty for motor.
4: Available with a standard warranty of a year and a half and a ten-year life span for solar controller.
5: Automatically start and stop every day and realize the control of automatic water level by level sensor.
6: Alarms and troubleshooting tools enable remote monitoring without artificial periodic inspection.

■ Solar pumping system diagram



■ Configuration table

Pump Power (kW)	Controller Model	The Configuration And Number Of Solar Modules						Combiner Box
		Component Model	Cascade Number	Input Voltage(V)	Parallel Number	Total	Total Power(W)	
2.2	PDS33-4T004	SZYL-P100-18	30	564	1	30	3000	/
4	PDS33-4T5R5	SZYL-P250-30	20	634	1	20	5000	/
5.5	PDS33-4T7R5	SZYL-P200-30	19	571.9	2	38	7600	4 Into 1
7.5	PDS33-4T011	SZYL-P250-30	20	634	2	40	10000	4 Into 1
11	PDS33-4T015	SZYL-P250-30	20	634	3	60	15000	4 Into 1
Max input voltage 800V, MPPT voltage range: DC 500-700V								

2kW deep-well pump

4kW deep-well pump

5.5kW deep-well pump

PDS33 Solar Pump Controller

PDS33 2.2~350kW

■ Flexibility
◎ Compatible with any IEC three-phase asynchronous motors
◎ Compatible with popular solar arrays
◎ Grid main supply optional

■ Smartness
◎ Self-adaptive maximum power point tracking technology with up to 99% efficiency
◎ Automatic regulation of pump flow
◎ Self-adaptation to the drive used in the installation

■ Cost effectiveness
◎ Plug-and-play system design
◎ Embedded pump functions
◎ Battery-free for most applications
◎ Effortless maintenance

■ Reliability
◎ 10-year market proven experience of leading motor and pump drive technology
◎ Soft start feature to prevent water hammer and increase system life
◎ Smart IGBT module integrated to simplify system design, reduce board space, simplify the manufacturing process and thus
◎ Built-in overvoltage, overload, overheat and dry-run motor protection

■ Remote Monitoring
◎ Standard RS485 interface equipped for each solar pump controller
◎ Optional GPRS RJ485 modules for remote access
◎ Spots value of solar pump parameters monitoring available from anywhere
◎ History of solar pump parameters and events lookup support
◎ Android/iOS monitoring APP support or PC

■ Datasheet

Controller Model	PDS33-2S2R2	PDS33-4T2R2	PDS33-4T004	PDS33-4T5R5	PDS33-4T7R5	PDS33-4T011	PDS33-4T015	PDS33-4T18R5
Input Data								
PV Source								
Max Input Voltage(Voc) [V]	450V DC	800V DC						
Recommended voltage, at MPPT	280~360V DC	500V DC~700V DC						
Recommended PV array power [kW]	2.7~3.5	2.7~3.5	4.8~6.4	6.6~8.8	9~12	13 2~17 6	18.0~24	22.2~29.6
Alternate AC Generator								
Input voltage	220 VAC Single Phase	380V AC(±15%), Three Phase						
Max Amps(RMS) [A]	23	5.8	10.5	14.6	20.5	26	35	38.5
Power and VA capability [kVA]	4	4	5.9	8.9	11	17	21	24
Output Data								
Output Power, rated [kW]	2.2	2.2	4	5.5	7.5	11	15	18.5
Output Voltage, rated	220 VAC Three Phase	380V AC(±15%), Three Phase						
Max Amps(RMS) [A]	9.6	5.1	9	13	17	25	32	37
Output Frequency	0-50Hz/60Hz							
Protection								
Surge protection	Integrated							
Overvoltage protection	Integrated							
Undervoltage protection	Integrated							
Locked pump protection	Integrated							
Open circuit protection	Integrated							
Short circuit protection	Integrated							
Overheated protection	Integrated							
Dry run protection	Integrated							
Communication								
Communication port	Standard isolater RS-485, Modbus protocol							
General Data								
Ambient Temperature Range	-20℃~60℃, >45℃,Derating as required							
Cooling Method	Fan Cooling							
Ambient Humidity	≤ 95%RH							
Dimensions(H*W*D) [mm]	186*130*154.8	241*162*180.2		360.5*182*195.4		385.5*219*196.9		
Gross Weight [kg]	2.8	4.2		9.0		10.8	11	
Standard Warranty [month]	18							
Certificates	IEC/EN 61800-5-1,IEC/EN 61800-2:2004,IEC/EN 61800-3:2004,CE							

Note: 1. According to the light conditions, in different regions, the PV array power can be 1.2-1.6 times to the pump power.
2. Use the deep well pump or the output power wire for a long occasion, the controller needs to enlarge one step.

■ Datasheet

Controller Model	PDS33-4T022	PDS33-4T030	PDS33-4T037	PDS33-4T045	PDS33-4T055	PDS33-4T075	PDS33-4T093	PDS33-4T110
Input Data								
PV Source								
Max Input Voltage(Voc) [V]	800V DC							
Recommended voltage, at MPPT	500V DC~700V DC							
PV array power [kW]	26.4~35.2	36~48	44~59.2	54~72	66~88	90~120	112~149	132~176
Alternate AC Generator								
Input voltage	380V AC(±15%), Three Phase							
Max Amps(RMS) [A]	46.5	62	76	92	113	157	180	214
Power and VA capability [kVA]	30	40	57	69	85	114	134	160
Output Data								
Output Power, rated [kW]	22	30	37	45	55	75	93	110
Output Voltage, rated	380V AC(±15%), Three Phase							
Max Amps(RMS) [A]	45	60	75	91	112	150	176	210
Output Frequency	0-50Hz/60Hz							
Protection								
Surge protection	Integrated							
Overvoltage protection	Integrated							
Undervoltage protection	Integrated							
Locked pump protection	Integrated							
Open circuit protection	Integrated							
Short circuit protection	Integrated							
Overheated protection	Integrated							
Dry run protection	Integrated							
Communication								
Communication port	Standard, isolated Rs-485, Modbus protocol							
General Data								
Ambient Temperature Range	-20℃~60℃, >45℃,Derating as required							
Cooling Method	Fan Cooling							
Ambient Humidity	≤ 95%RH							
Dimensions(H*W*D) [mm]	445*256*228.6		557.5*300*282.7		596.8*338*322.2			867*443*358
Gross Weight [kg]	16.3	16.3	30.8	30.8	39.4			71
Standard Warranty [month]	18							
Certificates	IEC/EN 61800-5-1,IEC/EN 61800-2:2004,IEC/EN 61800-3:2004,CE							

Note: 1. According to the light conditions, in different regions, the PV array power can be 1.2-1.6 times to the pump power.
2. Use the deep well pump or the output power wire for a long occasion, the controller needs to enlarge one step.

■ Datasheet

Controller Model	PDS33-4T132	PDS33-4T160	PDS33-4T200	PDS33-4T220	PDS33-4T250	PDS33-4T280	PDS33-4T315	PDS33-4T350
Input Data								
PV Source								
Max Input Voltage(Voc) [V]	800V DC							
Recommended voltage, at MPPT	500V DC~700V DC							
PV array power [kW]	159~211	192~256	240~320	264~352	300~400	336~448	378~504	426~568
Alternate AC Generator								
Input voltage	380V AC(±15%), Three Phase							
Max Amps(RMS) [A]	256	307	385	430	468	525	590	665
Power and VA capability [kVA]	192	231	250	280	355	396	445	500
Output Data								
Output Power, rated [kW]	132	160	200	220	250	280	315	350
Output Voltage, rated	380V AC(±15%), Three Phase							
Max Amps(RMS) [A]	235	304	377	426	465	520	585	650
Output Frequency	0-50Hz/60Hz							
Protection								
Surge protection	Integrated							
Overvoltage protection	Integrated							
Undervoltage protection	Integrated							
Locked pump protection	Integrated							
Open circuit protection	Integrated							
Short circuit protection	Integrated							
Overheated protection	Integrated							
Dry run protection	Integrated							
Communication								
Communication port	Standard, isolated Rs-485, Modbus protocol							
General Data								
Ambient Temperature Range	-20℃~60℃, >45℃,Derating as required							
Cooling Method	Fan Cooling							
Ambient Humidity	≤ 95%RH							
Dimensions(H*W*D) [mm]	867*443*358	1464.5*579*405.2				1735.6*800*398		
Gross Weight [kg]	71	169	169	171	175	197	220	250
Standard Warranty [month]	18							
Certificates	IEC/EN 61800-5-1,IEC/EN 61800-2:2004,IEC/EN 61800-3:2004,CE							

Note: 1. According to the light conditions, in different regions, the PV array power can be 1.2-1.6 times to the pump power.
2. Use the deep well pump or the output power wire for a long occasion, the controller needs to enlarge one step.

PDS23 Solar Pump Controller

PDS23 Plus 0.75~400kW

■ Flexibility

◎ Compatible with any IEC three-phase asynchronous motors
◎ Compatible with popular solar arrays
◎ Grid main supply optional

■ Smartness

◎ Self-adaptive maximum power point tracking technology with up to 99% efficiency
◎ Automatic regulation of pump flow
◎ Self-adaptation to the drive used in the installation

■ Cost effectiveness

◎ Plug-and-play system design
◎ Embedded pump functions
◎ Battery-free for most applications
◎ Effortless maintenance

■ Reliability

◎ 10-year market proven experience of leading motor and pump drive technology
◎ Soft start feature to prevent water hammer and increase system life
◎ Smart IGBT module integrated to simplify system design, reduce board space, simplify the manufacturing process and thus
◎ Built-in overvoltage, overload, overheat and dry-run motor protection

■ Remote Monitoring

◎ Standard RS485 interface equipped for each solar pump controller
◎ Optional GPRS/Wi-Fi/Ethernet RJ45 modules for remote access
◎ Spots value of solar pump parameters monitoring available from anywhere
◎ History of solar pump parameters and events lookup support
◎ Android/iOS monitoring APP support

■ Datasheet

Controller Model	PDS23-2SR75	PDS23-2S1R5	PDS23-2S2R2	PDS23-4T2R2	PDS23-4T004	PDS23-4T5R5	PDS23-4T7R5	PDS23-4T011
Input Data								
PV Source								
Max Input Voltage(Voc) [V]	450			800				
Recommended voltage, at mpp	280VDC~360VDC			500VDC~700VDC				
Recommended PV array power [kW]	0.9-1.2	1.8-2.4	2.7-3.5	2.7-3.5	4.8-6.4	6.6-8.8	9.0-12.0	13.2-17.6
Alternate AC Generator								
Input voltage	220/230/240V AC(±15%), Single Phase			380/400/415/440VAC(±15%), Three Phase				
Max Amps(RMS) [A]	8.2	14. 0	23. 0	5. 8	10. 5	14.6	20.5	26.0
Power and VA capability [kVA]	1.5	3.0	4.0	4. 0	5.9	8.9	11.0	17.0
Output Data								
Output Power,rated [kW]	0.75	1.5	2.2	2. 2	4	5.5	7.5	11
Output Voltage, rated	220-240VAC, Three Phase			380/400/415/440VAC,Three Phase				
Max Amps(RMS) [A]	4.0	7.0	9.6	5. 1	9.0	13. 0	17.0	25.0
Output Frequency	0-50Hz/60Hz							
Protection								
Surge protection	Integrated							
Overvoltage protection	Integrated							
Undervoltage protection	Integrated							
Locked pump protection	Integrated							
Open circuit protection	Integrated							
Short circuit protection	Integrated							
Overheated protection	Integrated							
Dry run protection	Integrated							
Communication								
MODBUS communication card	Optional, RS-485 isolated							
General Data								
Ambient Temperature Range	-20℃~60℃, >45℃,Derating as required							
Cooling Method	Fan Cooling							
Ambient Humidity	≤ 95%RH							
Dimensions(H*W*D) [mm]	186*126*171	248*160*183		186*126*171	248*160*183		322*208*192	
Gross Weight [kg]	2.8	4.2		2.8	4.2		9.0	
Standard Warranty [month]	18							
Certificates	IEC/EN 61800-5-1,IEC/EN 61800-2:2004,IEC/EN 61800-3:2004,CE							

Note: 1. According to the light conditions, in different regions, the PV array power can be 1.2-1.6 times to the pump power.
2. Use the deep well pump or the output power cord for a long occasion, the controller needs to reduce the amount of use.

■ Datasheet

Controller Model	PDS23-4T015	PDS23-4T18R5	PDS23-4T022	PDS23-4T030	PDS23-4T037	PDS23-4T045	PDS23-4T055	PDS23-4T075	PDS23-4T093	PDS23-4T110	PDS23-4T132	PDS23-4T160	PDS23-4T200	PDS23-4T220	PDS23-4T250	PDS23-4T280	PDS23-4T315	PDS23-4T355	PDS23-4T400
Input Data																			
PV Source																			
Max Input Voltage(Voc) [V]	800									800									
Min Input Voltage, at mpp [V]	500VDC~700VDC									500VDC~700VDC									
Recommended PV array power [kW]	18.0-24.0	22.2-29.6	26.4-35.2	36.0-48.0	44.0-59.2	54.0-72.0	66.0-88.0	90.0-120.0	112.0-149.0	132.0-176.0	159.0-211.0	192.0-256.0	240.0-320.0	264.0-352.0	300.0-400.0	336.0-448.0	378.0-504.0	426.0-568.0	480.0-640.0
Alternate AC Generator																			
Input voltage	380/400/415/440VAC(±15%), Three Phase									380/400/415/440VAC(±15%), Three Phase									
Max Amps(RMS) [A]	35.0	38.5	46.5	62.0	76.0	92.0	113.0	157.0	180.0	214.0	256.0	307.0	385.0	430.0	468.0	525.0	590.0	665.0	785.0
Power and VA capability [kVA]	21.0	24.0	30.0	40.0	57.0	69.0	85.0	114.0	134.0	160.0	192.0	231.0	250.0	280.0	355.0	396.0	445.0	500.0	565.0
Output Data																			
Output Power,rated [kW]	15	18	22	30	37	45	55	75	93	110	132	160	200	220	250	280	315	355	400.0
Output Voltage, rated	380/400V415/440VAC,Three Phase									380/400V415/440VAC,Three Phase									
Max Amps(RMS) [A]	32.0	37.0	45.0	60.0	75.0	91.0	112.0	150.0	176.0	210.0	235.0	304.0	377.0	426.0	465.0	520.0	585.0	650.0	725.0
Output Frequency	0-50Hz/60Hz									0-50Hz/60Hz									
Protection																			
Surge protection	Integrated									Integrated									
Overvoltage protection	Integrated									Integrated									
Undervoltage protection	Integrated									Integrated									
Locked pump protection	Integrated									Integrated									
Open circuit protection	Integrated									Integrated									
Short circuit protection	Integrated									Integrated									
Overheated protection	Integrated									Integrated									
Dry run protection	Integrated									Integrated									
Communication																			
MODBUS communication card	Optional, RS-485 isolated									Optional, RS-485 isolated									
General Data																			
Ambient Temperature Range	-20℃~60℃, >45℃,Derating as required									-20℃~60℃, >45℃,Derating as required									
Cooling Method	Fan Cooling									Fan Cooling									
Ambient Humidity	≤ 95%RH									≤ 95%RH									
Dimensions(H*W*D) [mm]	322*208*192	432*285*228			549*385*265			660*473*307		880*579*375			983*650*377			1203*800*400			
Gross Weight [kg]	9.0	17.2	17.2	17.6	42.0			71.0		169.0	169.0	171.0	197.0	220.0	220.0	290.0			
Standard Warranty [month]	18									18									
Certificates	IEC/EN 61800-5-1,IEC/EN 61800-2:2004,IEC/EN 61800-3:2004,CE									IEC/EN 61800-5-1,IEC/EN 61800-2:2004,IEC/EN 61800-3:2004,CE									

Note: 1. According to the light conditions, in different regions, the PV array power can be 1.2-1.6 times to the pump power.

2. Use the deep well pump or the output power cord for a long occasion, the controller needs to reduce the amount of use.

PDS23 Plus Solar Pump Controller

PDS23 Plus 2.2~11kW

■ Flexibility

▶ Compatible with IEC standard three-phase asynchronous induction motors
▶ Compatible with popular PV modules
▶ IP65 for outdoor installation
▶ External AC/DC junction box, switch to power supply(automatic/manual)

■ Reliability

▶ 10-year market proven experience of leading motor and pump drive technology
▶ Smart IGBT module integrated to simplify system design, reduce board space, and thus simplify the manufacturing process
▶ Choose high-quality material, excellent heat dissipation performance, improve system reliability

■ Smartness

▶ Self-adaptive maximum power point tracking，efficiency up to 99%
▶ Automatic regulation of pump flow
▶ Self-adaptation to the drive used in the installation

■ Remote Monitoring

▶ Standard RS485 interface equipped for each solar pump controller
▶ Optional GPRS modules for remote monitoring
▶ Function data and error records easy to lookup
▶ Android /iOS monitoring APP support of PC

■ Datasheet

Controller Model	PDS23 Plus 2.2K	PDS23 Plus 4K	PDS23 Plus 5.5K	PDS23 Plus 7.5K	PDS23 Plus 11K
Input Data					
PV source					
Max Input Voltage(Voc)	800V DC				
Recommended Voltage (mpp)	500~700V DC				
Recommended PV array power (kW)	2.7~3.5	4.8~6.4	6.6~8.8	9.0~12.0	13.2~17.6
Alternate AC Generator					
Input Voltage	380/400/415/440V AC(±15%), Three Phases				
Power and VA capability (kVA)	4.0	5.9	8.9	11.0	17.0
Output Data					
Rated Output Power (kW)	2.2	4.0	5.5	7.5	11.0
Rated Output Voltage	380/400/415/440VAC(±15%), Three Phases				
Rated Output Current (A)	5.1	9.0	13.0	17.0	25.0
Max Output Current (A)	9.0	13.0	17.0	25.0	32.0
Output Frequency	0~50Hz/60Hz				
Protection					
Surge Protection	Integrated				
Overvoltage Protection	Integrated				
Overvoltage protection	Integrated				
Deadlock Protection	Integrated				
Open Circuit Protection	Integrated				
Short Circuit Protection	Integrated				
High Temperature Protection	Integrated				
Dry-run Protection	Integrated				
Communication					
Communication port	Standard, isolated Rs-485, Modbus protocol				
General Data					
Ambient Temperature Range	-20℃~60℃>45℃, Derating as Required				
Cooling Method	Fan Cooling				
Protection Level	IP65				
Dimension[W*H*D](mm)	172*240*144			218*300*154	
Standard Warranty (month)	18				
Certificate	IEC/EN 61800-5-1,IEC/EN 61800-2:2004,IEC/EN 61800-3:2004,CE				

Note: 1. According to the light conditions, in different regions, the PV array power can be 1.2-1.6 times to the pump power.
2. Use the deep well pump or the output power wire for a long occasion, the controller needs to enlarge one step.

GPRS Module

Based on mobile operator
Stable & Reliable

Plug-in connection
Easy to maintain

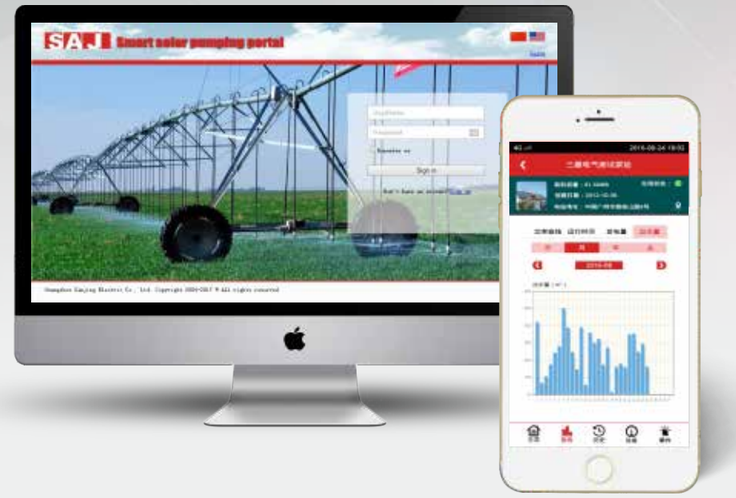
1~10 years
data package optional

Support
online recharge

Support
remote control

Datasheet

General parameters	
Connecting inverters No. [set]	1
Inverter communication port	RS485
Remote communication port	GPRS
Operating frequency [MHz]	850/900/1800/1900
Transmitted power	Class 4 (2W) GSM850、EGSM900/Class 1(1W) DCS1800、PCS1900
Data collection interval[min]	1~30 [Optional] ， 10 [Standard]
Access data method	Remote sever
Status display	3*LED
Electric parameter	
Input Voltage	DC 24V (±3%)
Static consumption [W]	<1
Max. instant consumption [W]	<8
Environment	
Operating temperature range	-40℃~+85℃
Storage temperature range	-45℃~+90℃
Dimensions [H*W*D][mm]	95*75*25
Weight [g]	300
Ingress protection	IP20
Others	
Mounting method	Wall hanging+Fastener installation
Warranty [Year]	18



Running Condition of Machine
Records for Fault Information

Free Monitoring Platform Using
Instant Remote Monitor

Current Running by Controller
Frequency Datashe Analysis & Comparison

Project References :

Atu Shiku Musake Village Xinjiang :

45kW solar pumping system irrigation station in Atu Shiku Musake Village, Xinjiang 50m³ water offered by a 37kW pump for villagers, water problem of 30 families solved

Scenic Spot of Daocheng Yading, Shangri-la :

System installed in Scenic Spot of Daocheng Yading, Shangri-la to cloth barren mountains with greenery scene. 3pcs 37kW solar pumps, 3pcs PDS23-4T075 Solar Pump Controllers.
System capacity: 160kW
Panels: 245W
Altitude: 3400m
Pumping height: 250m
Flow: 69m^3/h

Diaolai village,Baoting,Hainan:

Add: Diaolai village Baoting Hainan
Using area: rural drinking water supply safety project (supplying drinking water for over 80 households)
Project capacity: 9kW
Model: PDS23-7.5kW
Parameter of water pump: water head 108m,water flow 10m³/h

Solar Pumping system introduction--Yanshuai Town Lincang City Yunnan :

Function: Villages and towns centralized water supply project ,Vertical multistage pump: 30kW,32m³,225m 2 units, one for using and the other one for standby function.
Model: PDS23-4T037
Modules: 40kW 250W*20 strings*8 parallels 160pcs
Combiner box: PDS-CB12
Description for installation place: water supplying for the mountains, Transitional pools built outside of a house where water pump placed, water transferred through a 2.3km seamless tube to the take at a altitude of 150m, which is with 300m³ capacity

Test Records

The following chart is the result of the test of the PDS33 solar water pump controller used in June 2017, in Guangzhou, China.

Test Description							
Test location	GuangZhou China	Test head (m)	55	Test date	2017/6/19	Weather	Cloudy
Pump-Motor Details							
Manufacturer	Mastra	Rated head (m)	75	Type	Submersible Pump	Discharge Dia.(mm)	50
Rated power (kW)	4	Rated voltage(V)	380 3 Phase	Rated speed(rpm)	2850 (50Hz)		
Solar Modules Details							
Manufacturer	Liang Jing	Type	Polycrystalline	series	21	Vmp(V)	30.6
Imp(A)	8.17	P Max.(Wp)	250	Number	21	Total (W)	5250
ηm(%)	15.40						
Solar Pump Controller Details							
Manufacturer	SAJ	Model	PDS33-4T5R5	Rated power(kW)	5.5	Rated putout voltage(V)	380 3 phase
Tank							
Start flow	68m³	Stop flow	112.8m³				

Test Data					
Time	**DC input voltage [V]**	**DC input power [kW]**	**Output voltage 3 phase [V]**	**Output power [kW]**	**Output frequency [Hz]**
8:00:00	549.4	1.39	189	1.33	32.22
8:20:00	591.8	0.98	162	0.93	25.62
8:40:00	549.7	1.96	226	1.87	36.87
9:00:00	550.7	2.07	235	1.98	38.88
9:20:00	544.3	2.54	265	2.43	41.58
9:40:00	536.9	2.81	277	2.68	42.28
10:00:00	541.1	3.05	293	2.91	43.66
10:20:00	514.9	3.15	298	3.01	43.82
10:40:00	524.2	3.39	311	3.24	45.43
11:00:00	510.2	3.44	316	3.29	44.78
11:20:00	515.1	4.11	351	3.93	47.59
11:40:00	533.2	3.86	339	3.69	46.15
12:00:00	509.3	3.68	328	3.52	46.31
12:20:00	516.5	3.59	324	3.43	46.27
12:40:00	514	3.42	314	3.27	45.36
13:00:00	520.7	3.91	339	3.74	47.09
13:20:00	505.3	3.69	329	3.53	46.2
13:40:00	517.5	3.55	320	3.39	46.1
14:00:00	526.5	2.5	260	2.39	38.09
14:20:00	554.9	3.16	298	3.02	44.4
14:40:00	592.8	1.95	226	1.86	36.53
15:00:00	595.6	2.63	269	2.51	41.97
15:20:00	594.4	2.26	248	2.16	40.33
15:40:00	591.3	2.2	241	2.1	38.38
16:00:00	601.4	1.67	209	1.59	35.46
16:20:00	593.1	1.34	186	1.28	33.5
16:40:00	605.6	1.16	173	1.11	30.78
17:00:00	642.4	0.02	0	0.01	0.6

Table 1: Diagram of DC input voltage , Output 3 phase voltage and Output frequency.

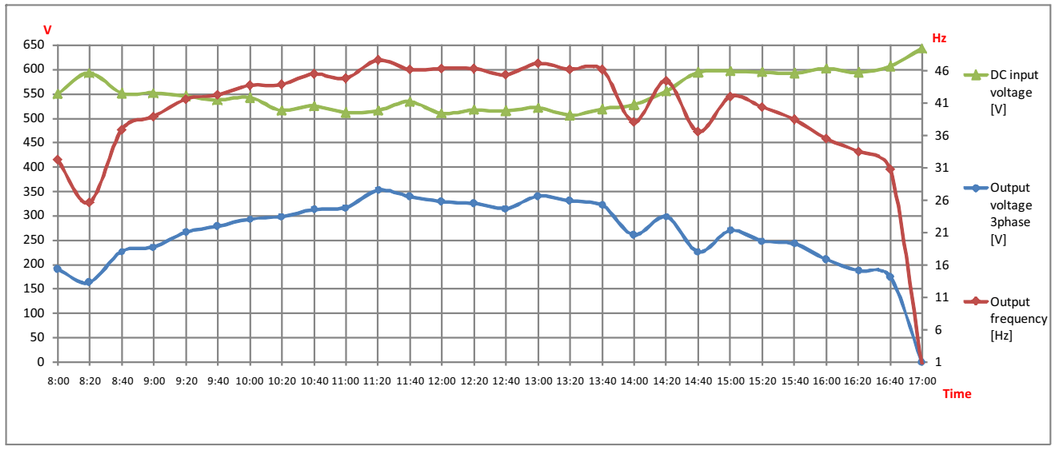
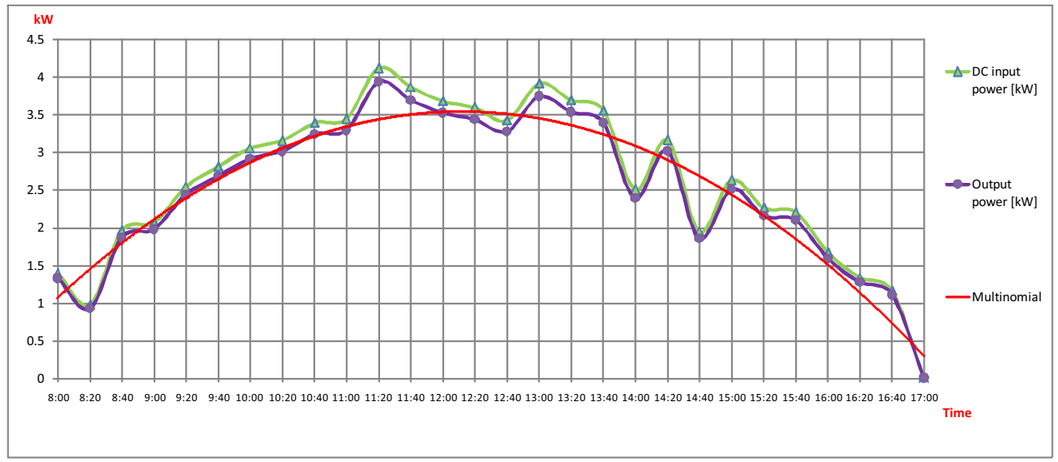


Table 2: Diagram of DC input power , Output power of PDS.



Total output power of solar modules (kWh)	**24.49**	Total output power of PDS33 (kWh)	**23.4**	Rated power of pump (kW)	**4**	Equivalent time for full load running (h)	**4.48**
Power of solar modules (kW)	**5.25**	Average conversion efficiency of PDS33	**95.5%**	Rated flow of pump (m³/h)	**10**	Saving energy (kWh)	**23.4**
Equivalent time for full power (h)	**4.66**	MAX. conversion efficiency of PDS33	**98%**	Total pumping capacity (m³)	**44.8**		

Test Conclusion:

In Guangzhou, P.R. China, the average peak sunshine duration for many years is 3.53 hour. On the day of testing, the operating time of the solar panels under equivalent efficiency and full rated power is 4.66 hour; the generating capacity of the tested systematic solar panels is 24.49 kWh, and the saved electric energy is 23.4 kWh. The maximum transfer efficiency of PDS33 solar pump controller can reach 98%.

According to experience, the PDS33 solar pump system can generate 6764kWh electricity annually in Guangzhou, P.R. China and save 6450 kWh electricity which equals to annual emission reduction of 6431kg CO_2 and 194kg SO_2 . The energy saving and emission reduction performance of the system will be better in areas with more sun illumination.