Solar Pumping Inverter
User Manual

Figure 1 ADA solar pumping inverter

Designed & Manufactured by

Shenzhen ADA Power Electronics Co., Ltd

Safety Instruction

To ensure safe operation of solar pumping inverter, it mustchoose the right way of transportation, installation,operation and maintenance. Please be aware of the safety notices before operation:

⚠ Warning: Misuse will result in fire, serious injury to person or even death.

⚠ Caution: misuse will cause low or middle-grade injury to person or equipment damage.

☞ Prompt: Point out some useful information

First Inspection

⚠ Caution
If inverter is damaged or missing parts, no installation allowed in case of any accidents.

Installation

⚠ Caution
1.It must be installed vertically for good convection cooling effect . 2.Keep under the condition of good ventilation opening or ventilating device. Never exposes directly to the sunlight.

Connection

⚠ Caution
1.All wirecable connection must be under the instruction of correct wiring diagram . 2.Handling by qualified electrical professionals, all wirecable shoud be wrapped with electrical tape for safety.

Storage

⚠ Caution
Placedindry,dust-free, no corrosivegas,liquid. Temperatureofthestoragelocationmustbeatthe-20　to+70　. RelativeHumidityofthestoragelocationmustbebetween5%to90%range,andno condensation.

Chapter 1 System Introduction

1.1 Brief Introduction

A complete solar pumping system consist of solar array, pump and solar pumping inverter. API series solar pumping inverter can convert the DC power from solar PV array to AC power to run pump motors.

Solar array, an aggregation of many solar modules connected in series and parallel, absorbs sunlight radiation and converts it into electrical energy, providing dynamical water for the whole system.

Inverter controls the system operation and adjust the output frequency in real-time according to the variation of sunlight intensity to realize the maximum power point tracking (MPPT).

Pump, drive 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.
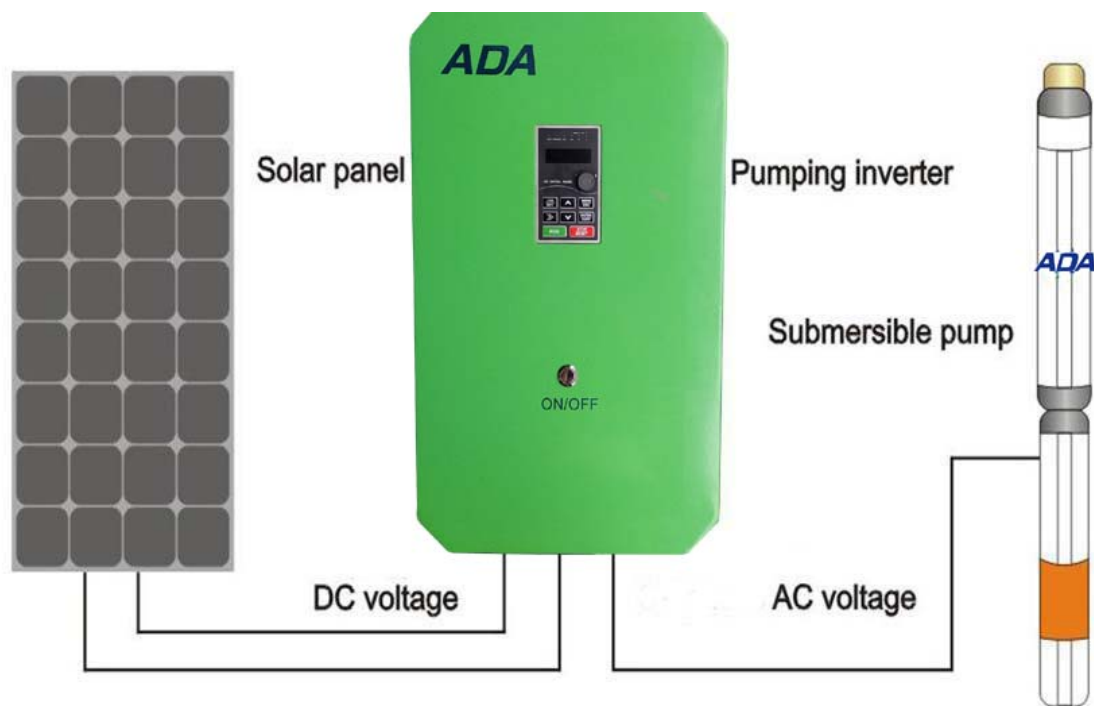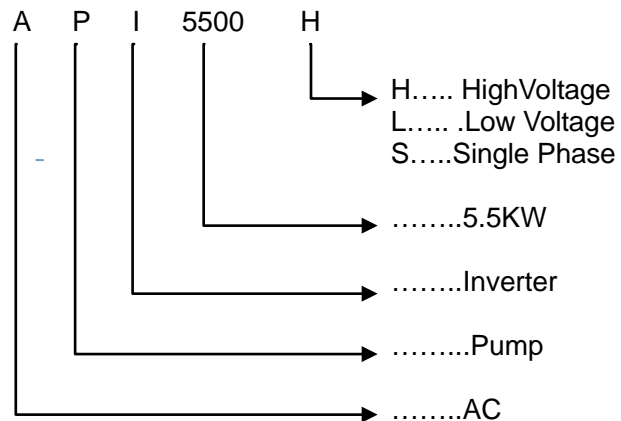

Figure 2 Structure of solar pumping system

Chapter 2   Solar Pumping Inverter

2.1 Inverter Specification

Model Description

```
A     P     I     5500     H
                            └──────→  H….. HighVoltage
                                      L….. .Low Voltage
                                      S…..Single Phase

                      └────────────→  ……..5.5KW

                └──────────────────→  ……..Inverter

          └────────────────────────→  ……...Pump

    └──────────────────────────────→  ……..AC
```

Remark:
"L" means low voltage,3 phase 220V;
"H" means high voltage,3 phase 380V.
"S"means single phase,220V

2.2 Inverter Features

· Apply to all kinds of single phase or 3 phase AC induction motor .

· With Infineon IGBT .Maximumpowerpoint tracking(MPPT)algorithmfordynamic VI, fast response speed,

  goodstability,the efficiency of 99%;

· Both AC and DC input ,and switch automatically .

. For single phase inverter , mppt working voltage is 180V~450V ; for three phase inverter , mppt working voltage is 250V~800V ,

· Remote control , support RS323/RS485 protocol.

. water level monitoring by switching/analogue.

· PV Junction Box with 2 input

· Outdoor water proofIP65 , working environmenttemperature:-10　~+40

· Lighting protection device.

· Start in the morning and stop in the late afternoon full automatically.

· Full protections : overload , overcurrent, over voltage , undervoltage ,short circuit , dry pumping etc.

· Support GRPSControl (Optional)

. Support Wifi/GSM/3G control (Optional)

2.3 Parameters :

Solar PumpInverter						Solar Array	AC Pump
Model	RatedPower (KW)	Max. DC InputVoltage (V)	MPPT Voltage(V)	Ratedoutput Voltage(V)	Output Frequency(Hz)	DC Power(KW)	Rated Power(KW)
API750S	0.75	800	250-400	Single PH 220	0-50/60	0.825	0.75
API1500S	1.5	800	250-400	Single PH 220	0-50/60	2.25	1.5
API2200S	2.2	800	250-400	Single PH 220	0-50/60	3.3	2.2
API750L	0.75	800	250-400	3PH220	0-50/60	0.825	0.75
API1500L	1.5	800	250-400	3PH220	0-50/60	2.25	1.5
API2200L	2.2	800	250-400	3PH220	0-50/60	3.3	2.2
API750H	0.75	800	450-800	3PH380	0-50/60	0.825	0.75
API1500H	1.5	800	450-800	3PH380	0-50/60	2.25	1.5
API2200H	2.2	800	450-800	3PH380	0-50/60	3.3	2.2
API4000H	4.0	800	450-800	3PH380	0-50/60	6	4.0
API5500H	5.5	800	450-800	3PH380	0-50/60	8.25	5.5
API7500H	7.5	800	450-800	3PH380	0-50/60	11.25	7.5
API11000H	11	800	450-800	3PH380	0-50/60	16.5	11
API15000H	15	800	450-800	3PH380	0-50/60	20	15
API18000H	18	800	450-800	3PH380	0-50/60	24	18.5
API22000H	22	800	450-800	3PH380	0-50/60	29	22
API30000H	30	800	450-800	3PH380	0-50/60	39	30
API37000H	37	800	450-800	3PH380	0-50/60	48	37
API45000H	45	800	450-800	3PH380	0-50/60	54	45
API55000H	55	800	450-800	3PH380	0-50/60	66	55
API75000H	75	800	450-800	3PH380	0-50/60	90	75

2.4 Technical Parameter Table

2.4.1 Single phase inverter   (API750S ,API1500S,API2200S)

Input specification	
PV Input	
Maximum Input DC Voltage	450VDC
Recommended MPPT Voltage Range	250～350VDC
Recommended Input Operation Voltage	310VDC (Vmpp)
Grid or backup generator input	
Input voltage	Single phase 220V(-15%～30%)
Output specification	
Rated output voltage	1PH &3PH 220V
Output frequency	0～600.00Hz（default: 0～50.00Hz）
Protection	
Built-in Protection	Lighting Protection, over-current, overvoltage, output phase-lose, under-load, under-voltage, short circuit, overheating, water pump run dry etc.

2.4.2 Three Phase inverter (API750L~API75000H)

Input specification	
PV Input	
Maximum Input DC Voltage	800VDC
Recommended MPPT Voltage Range	450～600VDC
Recommended Input Operation Voltage	540VDC (Vmpp)
Grid or backup generator input	
Input Voltage	Three phase 380V(-15%～30%)
Output specification	
Rated output voltage	3PH 380V
Output frequency	0～600.00Hz（Default 0～50.00Hz）
Protection	
Built-in Protection	Lighting Protection, over-current, overvoltage, output phase-lose, under-load, under-voltage, short circuit, overheating, water pump run dry etc.
General Parameters	
Application Site	No direct sunshine, no dust, corrosive gas, combustible gas, oil mist, steam, dripping or salinity etc.
Altitude	0～2000 m Derated use above 1000m,per 100m, the rated output

	current decrease 1%.
Environment Temperature	-10℃～40℃ (Environment Temperature be 40℃～50℃, please keep derated use.)
Humidity	5～95%,non-condensation
Vibration	less than 5.9 m/s^2（0.6g）
Storage Temperature	-20℃～+70℃
Efficiency	Rated Power Run≥93%
Installation	Wall or rail mounting
Protection Grade	IP65
Cooling	Forced Air Cooling

2.5 Inverter Introduction

2.5.1 Brief Instruction
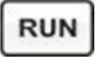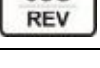

Figure 3 Inverter front panel

Figure 4 Inverter terminal board

Figure 5 Inverter keypad

2.5.2 Operation panel button and potentiometer function

MENU ESC	MENE/ESC	Enter or exit Level I menu
ENTER DATA	ENTER/DATA	Enter the menu interfaces level by level, and confirm the parameter setting
UP	UP	Increase data or function code
DOWN	DOWN	Decrease date or function code
SHIFT	SHIFT	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters
RUN	RUN	Start the inverter in the keypad control mode
STOP RESET	STOP/RESET	Stop the inverter when it is in the running state and perform the reset operation when it is in the fault state
JOG REV	JOG/REV	Perform function switchover (such as jog run and quick switchover of command source or direction)

2.5.3 Outer plug instruction:

Socket	Terminal	Wire description		Connection Description
	PV Input Positive	Red wire single strand		connected positive pole of PV array
	PV Input Negative	Black wire single strand		connected negative pole of PV array
	AC Input	3 Core Wire	Red Wire	L1 Phase
			Green Wire	L2 Phase
			Yellow Wire	L3 Phase
	AC Output	4 Core Wire	Black	U Phase
			Black	V Phase
			Black	W Phase
			Yellow-green	Ground
	Sensor	5 Core Wire	Yellow Wire	The high level of tank sensor
			Orange Wire	The low level of tank sensor
			Red Wire	The high level of reservoir sensor
			Black	The low level of reservoir
			Brown Wire	—

2.5.4 Tank water full and Well water dry protection:

Tips:

1 use the signal wire connect some screw or conductor to put the sensor inside the well or tank;

2 use the water as conductor to connect A, B or disconnect A, B to control the pump inverter ;

A, Tank water full protection
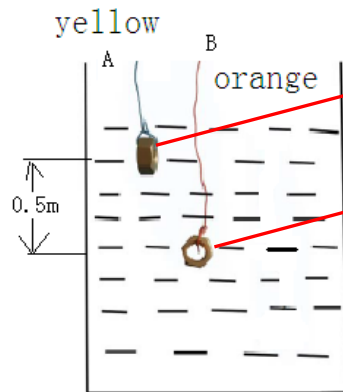
Put the yellow ring where you want to stop the pump

Put the orange B about 0.5 meter lower than yellow A

Reminder:

1, only two ring connected by water, and that can stop the pump; when disconnect in air or only one in water, pump continue its working.

2, the distance 0.5meter means not too close that stop the pump without water full, or not too far away that can't connect each other even both of them inside water.

3, Yellow A and Orange B can exchange the position.

B, Well water dry protection
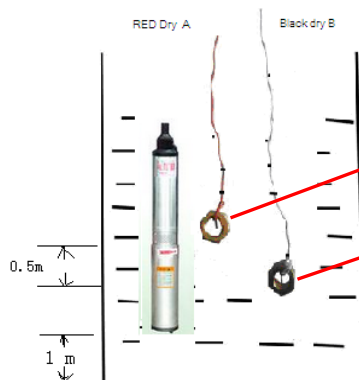
Put the Red A above the pump motor

Put Black B about 0.5 meter lower than Red A

Reminder:

1, only two ring disconnected from water, and that can stop the pump; when connect inside the water, pump continue its working.

2, the distance 0.5meter means not too close that cann't stop the pump when water dry, or not too far away that pump cann't start since always disconnected .

3, Red A and Black B can exchange the position.

Chapter 3　Function Parameters

3.1 The Basic Function Parameters

The symbols in the function code table are described as follows:

"○" means the value of this parameter can be modified in stop and running status of drive;

"◎" means the value of this parameter cannot be modified when drive is running;

"●" means this parameter is a measured value that cannot be modified;

Default: The value when restored to factory default. Neither measured parameter value nor recorded value will be restored.

Setting Range: the scope of setting and display of parameters.

Code	Name	Description	Factory Default	Attribute
P00.01	Command Source Selection of Run/Start	0：Operation Panel（LED off） 1：Terminal Panel（L/R on） 2：Computer Communications（L/R flash）	1	○
P00.14	Acceleration Time 0	0.0s~3600.0s	2.0s	○
P00.15	Deceleration Time 0	0.0s~3600.0s	0.1s	○
P01.05	Stop mode	0：Ramp to stop 1：Coast to stop	1	○
P01.22	Terminal Control When Power-On	0：Terminal Command Enabled 1：Terminal Command Disabled	1	○
P01.23	Restart when Power-off	0：Forbid to Restart 1：Allow to restart	1	○
P01.24	Wait Time of Restart When Power-off	0.0~3600.0s(whenP01.23, 1Mean Enabled)	1.0s	○
P02.00	Motor1 type	0：Asynchronous motor	0	●
P02.01	Motor 1 Rated Power	0.4kW~1000.0kW	Model Set	◎
P02.02	Motor 1 Rated Voltage	0V~1500V	Model Set	◎
P02.03	Motor 1 Rated Current	0.0A~2000.0A	Model Set	◎
P02.04	Motor 1 Rated Frequency	0.00Hz~650.00Hz	Model Set	◎
P02.05	Motor 1 Rated Rotational	0RPM~65535RPM	Model Set	◎

	Speed			
P05.01	Terminal DI1 Function Selection		1	◎
P05.02	Terminal DI2 Function Selection	0： Disabled	50	◎
P05.03	Terminal DI3 Function Selection	1： Forward run 49：PV Inverter Forbid	51	◎
P05.04	Terminal DI4 Function Selection	50：Full-Water 51：Dry -Water	49	◎
P05.05	Terminal DI5 Function Selection		0	◎
P05.11	Terminal DI1~DI5 Positive/Negative Logic	0x00~0x1FF	4	◎
P05.12	DI Terminal Filtering Time	0.000~1.000s	0.010s	○
P06.02	Output Terminal Positive/Negative Logic	0x0~0x1F	0x0	○
P06.03	DO1 Output Function	0：Disabled	16	○
P06.04	HDO1 Output Function	16：Weak Light Pre-Warning 17：Full-Water Pre-Warning	0	○
P06.05	Relay T1 Output Function	18：Reservoir Dry-Water 19：Analog Reservoir Dry Pumping	17	○
P06.06	RelayT2 Output Function	20：Terminal Reservoir Dry-Water	20	○
P08.26	PID Dormancy Wait Time	0.0s~6000.0s	1.0s	○
P11.16	PV Inverter Selection	0：Disabled 1：Enabled	1	○
P11.17	Vmpp Voltage Selection	0：Constant Voltage 1：Max. Power Point Tacking(MPPT)	1	○
P11.18	Vmpp Voltage Keypad Set	0.0~6553.5Vdc	555.0V	○
P11.19	PID OffsetLimits	0.0~100.0%(100.0%对应P11.18)	0.0%	◎
P11.20	PID Max. Output Frequency	0~100.0%	100.0%	○
P11.21	PID Min. Output Frequency	0.0%~100.0%	0.0%	○
P11.22	KP1	0.00~100.00	1.00	○
P11.23	KI1	0.00~100.00	1.00	○
P11.24	KP2	0.00~100.00	4.00	○
P11.25	KI2	0.00~100.00	4.00	○

P11.26	PI Amplitude	0.0~6553.5Vdc	50.0V	○
P11.27	Analog Channel Selection of Reservoir Water Level	0：Disabled 1：AI1 2：AI2 3：AI3	0	○
P11.28	Dry-Water Threshold	0.0~100.0%	25.0%	○
P11.29	Delay Time of Dry-Water	0~10000s	10s	○
P11.30	Wake-up Delay Time of Dry-Water	0~10000s	300s	○
P11.31	Dry Pumping Threshold	0.0~50.0%	0.0%	○
P11.32	Delay Time of Full-Water	0.0~1000.0s	60.0s	○
P11.33	Dry Pumping Function	0: Disabled 1: Enabled	0	○
P11.34	Reset Delay of Full-Water	0.0~1000.0s	300.0s	○
P11.35	Frequency of Weak Light	0~50Hz	5.00Hz	○
P11.36	Delay Time of Weak Light	0.0~3600.0s	100.0s	○
P11.37	Reset Delay of Weak Light	0.0~3600.0s	300.0s	○
P11.38	Reference Voltage of Given Display	0.0~2000.0V	0V	○
P11.39	Min. Voltage of MPPT	0.0~6553.5Vdc	100.0V	○
P11.40	Max. Voltage of MPPT	0.0~6553.5Vdc	800.0V	○
P14.01	Fault Code	0：No Fault A-LS　Warning of Weak Light A-LL　Warning of Dry-water A-TF　Warning of Full -water Er001：Acceleration Overcurrent（Hardware） Er002：Deceleration Overcurrent（Hardware） Er003：Constant-speed Overcurrent（Hardware） Er004：Acceleration Overcurrent Er005：Deceleration Overcurrent Er006：Constant-speed Overcurrent Er007：Acceleration Overvoltage Er008：Deceleration Overvoltage Er009：Constant-speed Overvoltage Er010：Bus Under voltage protection Er011：Motor Overload Er012：Inverter Overload Er013：Input Open-phase Er014：Output Open-phase Er015：Overheat Er016：Over Current Fault	0	●

		Er017：External Input Fault		
		Er018：Communication Fault		
		Er019：Current Inspect Fault		
		Er020：Self-identification Fault		
		Er021：EEPROM Version Incompatible		
		Er022：PID Feedback Over Limit		
		Er023：PIDfeedback Disconnection on Running		
		Er024：Motor Ground Circuit Fault		
		Er025：--		
		Er026：--		
		Er027：Run Time Over		
		Er028：Power-on Time Over		
		Er029：Off Load		
		Er030：--		
		Er031：--		
		Er032：--		
		Er033：--		
		Er034：Motor Over Heat		
		Er035：--		
		Er036：Electronic Over Load		
		Er037~Er040：--		
		Er041：User Defined Fault 1		
		Er042：User Defined Fault 2		
		Er043：User Defined Fault 3		
		Er044：User Defined Fault 4		
		Er060：User Time Lock		
		Er061：Factory Time Lock		
P14.02	Output Frequency When Fault	0.00~650.00Hz	0.00	●
P14.03	Output Current When Fault	0.0~2000.0A	0.0	●
P14.04	Output Voltage When Fault	0~2000V	0	●
P14.05	Busbar Voltage when Fault	0.0~2000.0V	0.0	●
P14.06	Input Terminal Status When Fault	0x00~0x1FF	0x00	●
P14.07	Output Terminal Status When Fault	0x00~0x1F	0x00	●
P14.08	Inverter Temperature When Fault	-20.0~120.0°C	0.0	●
P14.09	Run Time When Fault	0~65535min	0	●
P14.10	Power-On Time when Fault	0~65535min	0	●
P14.11	Total Run Time when Fault	0~65535h	0	●
P14.12	Total Power-on When Fault	0~65535h	0	●

P28.00	Run Frequency	0.00Hz~300.00	0.00	●
P28.01	Set Frequency	0.00Hz~300.00	0.00	●
P28.02	Slope Set Frequency	0.00Hz~300.00	0.00	●
P28.03	Busbar Voltage	0.0~2000.0V	0.0	●
P28.04	Output Voltage	0~1200V	0	●
P28.05	Output Current	0.0~2000.0A	0.0	●
P29.00	User Password	0~65535	0	○
P29.01	Parameter Initialization	0：No Operation 1：Factory Reset 2：Remove Factory Record 3：Remove Total Run/Power-On Time	0	◎
P29.02	Item Code	0~65535	Factory Set	●
P29.03	Software Version	1.00~10.00	Factory Set	●
P29.04	Inverter Rated Power	0.4~1000.0kW	Factory Set	●
P29.05	Inverter Rated Voltage	220~1140V	Factory Set	●
P29.06	Inverter Rated Current	2.4~2000.0A	Factory Set	●

Chapter 4   Warranty

4.1 Warranty

The warranty of this inverter is 18 months , or we provide 2% spare parts for free. When any fault

or damage occurs on the product, within the warranty period, our company will provide free

maintenance. After the warranty time, we can provide lifetime paid warranty service.

4.2 Supplementary

In order to enjoy better after-sales service , please pay attention to the following ：

Provide below information when inquiry, we will make good configuration for you.		
1	Pump	Power, Voltage, Phase
2	Solar Panel	Each panel power, voc voltage, vmp voltage
Provide below photos and information after installation.		
1	Pump	Photos show pump, pump specification, pump and inverter connection
2	Inverter	Photos show inverter installation environment, inverter connection and switch, LCD screen parameter setting.
3	Solar Panel	Photos show solar panel and inverter connection, solar panel specification, solar panel array and quantity.

Prompt: Warranty only covers the body of the inverter

4.3 Warranty agreement

1 The warranty of this inverter is 18 months , or 2% spare parts for free. When any fault or

damage occurs on the product, within the warranty period, our company will provide free

maintenance. After the warranty time, we can provide lifetime paid warranty service.

2 The warranty time starts from the date when the product is leaving the factory, and the machine

frame code is the only proof to determine the warranty period.

3 Certain maintenance charge should be considered during warranty period if the fault is caused

by the following reason:

·Fault caused by operating against the manual or surpass the standard specification

·Fault caused by self fix and modification without permission.

·Fault caused by poor preservation

·Fault by using the inverter in abnormal function

·Machine damage caused by fire, salt corrosion, gas corrosion, earthquake, storm, flood,

lightning, abnormal voltage or other force majeure.

4 Please be sure to retain this card and show it to the maintenance service.

User's Information

User Company: _____	**Contact person:** _____
Address: _____	**Phone:** _____
Dealer company: _____	**Post code:** _____
Model: _____	**Serial number:** _____
Purchase date: _____	**Handling person:** _____

Repair Record

Date	Record	Abstract	Technician	Signature