Preface

SPI series inverters are developed specially for solar pumping system, based on the core control arithmetic of vector control inverters, combined with the control requirements of PV water pump application. The function of maximum power point tracking (MPPT), dormant at weak light, wake up at strong light, high water level dormant, under-load pre-warning and other control protection functions can ensure normal operation of water pumps according to the customers' requirements to switch to the grid power supply.

Please refer to this manual to commission the inverter, product maintenance refer to AD100/AD200 user manual.

IMPORTANT NOTES

◆To illustrate the details of the products，pictures in this manual based on products with outer casing or safety cover being removed. When using this product, please be sure to well install outer casing or covering by the rules, and operating in accordance with the manual contents.

◆The illustrations in this manual are for illustration only and may vary with different products you have ordered.

◆The company is committed to continuous improvement of products, product features will continue to upgrade, the information provided is subject to change without notice.

◆If there is any questions when using, please contact our regional agents or our customer service center: 0086-13923777654.

◆For other products, please visit our website. http://www.variable-frequencydrives.com/

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Chapter One Product Overview

1.1 Name Plate

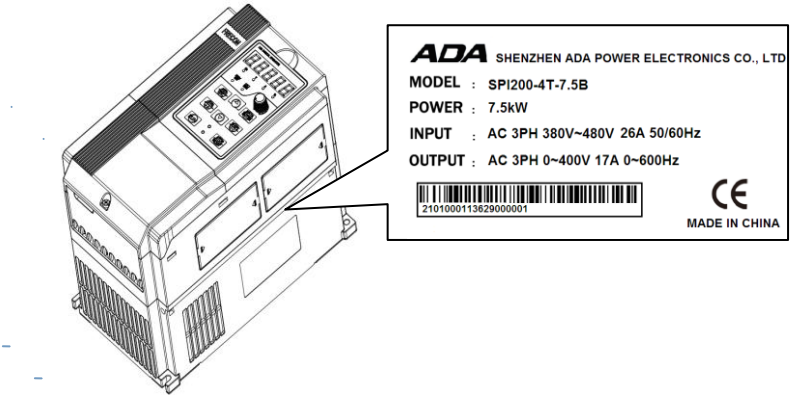


Figure 1-1 Name Plate

Model Instruction

Model numbers on name plate consist of numbers, symbols, and letters, to express its respective series, suitable power type, power level and other information.

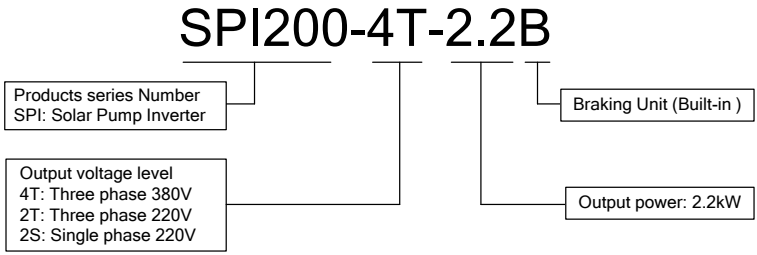


Figure 1-2 Product Model Naming Rules

1.2 Product Specifications

Table 1-1 SPI100 series technical parameter table

Model No.	Recommended Solar Array Power kWP	Maximum Input DC Current A	Output Current A	Adaptive Motor kW
SPI100-2T(/S)-0.2B	0.35	2.5	1.6	0.18, 0.2, 0.25
SPI100-2T(/S)-0.4B	0.6	4.5	2.5	0.37, 0.4
SPI100-2T(/S)-0.7B	1.1	7.5	4.2	0.75
SPI100-2T(/S)-1.5B	2.25	10	7.5	1.5
SPI100-2T(/S)-2.2B	3.3	18	9.5	2.2
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.			

Table 1-2 SPI200 series technical parameter table

Model No.	Recommended Solar Array Power kWP	Maximum Input DC Current A	Output Current A	Adaptive Motor kW
SPI200-4T-0.7B	1.1	4.5	2.5	0.75
SPI200-4T-1.5B	2.25	7.5	4.2	1.5
SPI200-4T-2.2B	3.3	10	5.5	2.2
SPI200-4T-4.0B	6	18	9.5	3.7, 4
SPI200-4T-5.5B	8.3	20	13	5.5
SPI200-4T-7.5B	11	30	17	7.5
SPI200-4T-011B	16	40	25	11
SPI200-4T-015B	22	50	32	15
SPI200-4T-018B	25.9	60	37	18.5
SPI200-4T-022B	33	80	45	22
SPI200-4T-030B	45	100	60	30

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	IP20
Cooling	Forced Air Cooling

1.3 Selection Table

Table 1-2 Selection Table

Model No.	Maximum DC Input Voltage (V)	Recommended Voltage Range (V)	Rated Output Current (A)	Output Frequency (Hz)	Rated Output Voltage (V)	Adaptive Motor kW
SPI100-2S-0.2B	450	250～350	1.6	0～600	1PH 220V	0.18, 0.2, 0.25
SPI100-2S-0.4B	450	250～350	2.5	0～600	1PH 220V	0.37, 0.4
SPI100-2S-0.7B	450	250～350	4.2	0～600	1PH 220V	0.75
SPI100-2S-1.5B	450	250～350	7.5	0～600	1PH 220V	1.5
SPI100-2S-2.2B	450	250～350	9.5	0～600	1PH 220V	2.2
SPI100-2T-0.2B	450	250～350	1.6	0～600	3PH 220V	0.18, 0.2, 0.25
SPI100-2T-0.4B	450	250～350	2.5	0～600	3PH 220V	0.37, 0.4
SPI100-2T-0.7B	450	250～350	4.2	0～600	3PH 220V	0.75
SPI100-2T-1.5B	450	250～350	7.5	0～600	3PH 220V	1.5
SPI100-2T-2.2B	450	250～350	9.5	0～600	3PH 220V	2.2
SPI200-4T-0.7B	800	450～600	2.5	0～600	3PH 380V	0.75
SPI200-4T-1.5B	800	450～600	4.2	0～600	3PH 380V	1.5
SPI200-4T-2.2B	800	450～600	5.5	0～600	3PH 380V	2.2
SPI200-4T-4.0B	800	450～600	9.5	0～600	3PH 380V	3.7, 4
SPI200-4T-5.5B	800	450～600	13	0～600	3PH 380V	5.5
SPI200-4T-7.5B	800	450～600	17	0～600	3PH 380V	7.5
SPI200-4T-011B	800	450～600	25	0～600	3PH 380V	11
SPI200-4T-015B	800	450～600	32	0～600	3PH 380V	15
SPI200-4T-018B	800	450～600	37	0～600	3PH 380V	18.5
SPI200-4T-022B	800	450～600	45	0～600	3PH 380V	22
SPI200-4T-030B	800	450～600	60	0～600	3PH 380V	30

1.3 Dimension Drawing

1.3.1 SPI100

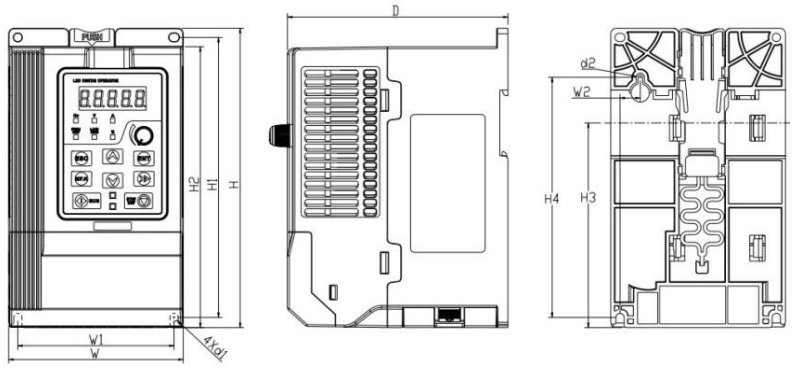


Figure 1-3 SPI100 dimension

Table 1-3 SPI100 outline and installation dimension list

Model No.	Dimensions and installation size（mm）											kG
	W	H	D	W1	W2	H1	H2	H3	H4	d1	d2	
SPI100-2T-0.2B	95	162	120	85	11	151.5	152	110.8	130	4.5	4.5	1.1
SPI100-2T-0.4B												
SPI100-2T-0.7B												
SPI100-2T-1.5B	110	173	135	100	11	163	163	121.8	140.5	4.5	5	1.5
SPI100-2T-2.2B												

1.3.2 SPI200

a: 0.75～15kW Dimensions and wall mounting dimensions

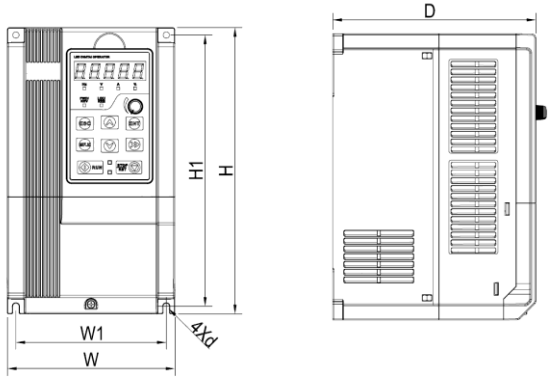


Figure 1-4 0.75～15kW Wall dimension

b: 18.5～30kW Dimensions and installation dimensions

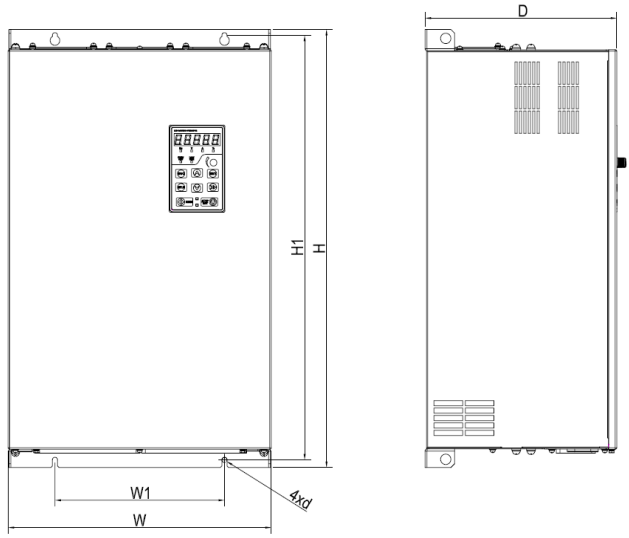


Figure 1-5 18.5～30kW dimension

Table 1-4 SPI200 outline and installation dimension list

Model No.	Dimensions and installation size（mm）						Weight（Kg）
	W	W1	H	H1	D	Installation Aperture	
SPI200-4T-0.7B	116.6	106.6	186.6	176.6	168	4.5	2.2
SPI200-4T-1.5B							
SPI200-4T-2.2B							
SPI200-4T-4.0B	146	131	249	236	177	5.5	3.2
SPI200-4T-5.5B							
SPI200-4T-7.5B							
SPI200-4T-011B	198	183	300	287	185	5.5	5.4
SPI200-4T-015B							
SPI200-4T-018B	255	176	451	436	220	7	15.5
SPI200-4T-022B							
SPI200-4T-030B							

Chapter Two Commissioning Guide

2.1 PV Power Supply Commissioning

1. Wiring according to Figure 2-1 system wiring diagram, and check to wiring to confirm correct, and then Q1 closed.

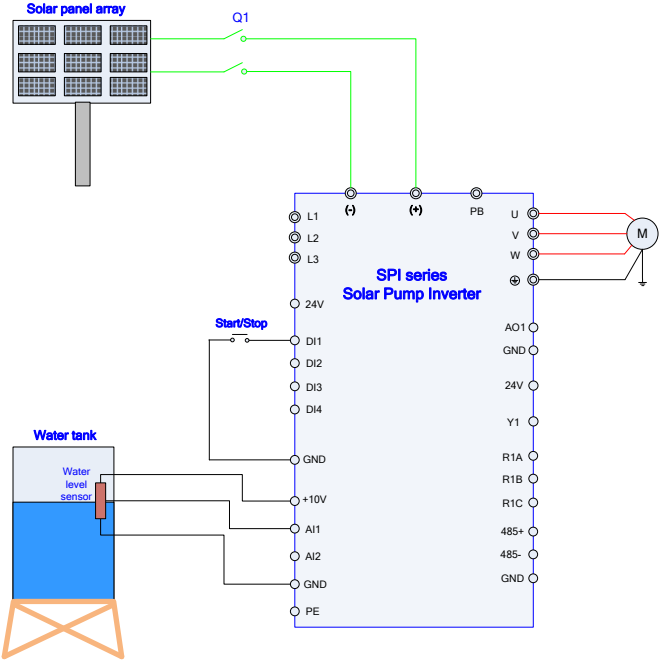


Figure 2-1 PV Cell Power Supply Wiring Diagram

PV Panels;：Three-phase; short films; Run/Stop; Tank; Water Level Sensor; PV Pump Inverter

2. Setting the Motor Parameters

   Setting the parameter of name plate on motor F08.01～F08.05。

3. Testing the water yield of pump

   Press the operation key “RUN”, under normal circumstance of light strength, if the operation frequency low or water yield less, which means the motor wiring may be reversed, please exchange two wirings of motor.

4. System Effluent Speed PI Regulating

   If the user has a high requirements for the effluent speed, PI parameters can be regulated appropriately（H00.09～H00.10）, the larger PI parameter, the stronger affection, the faster effluent, but the larger fluctuation of motor frequency; Otherwise, the slower water effluent, the more steady frequency of motor operation.

5. MPPT Tracing Speed Commissioning

H00.04 and H00.05 are respectively the lowest voltage and highest voltage under the MPPT mode, the smaller the range between them two, the faster tracing the maximum power, but the premise if that the bus voltage during normal operation must fall within this range, or the maximum power point may not be tracked. Generally speaking, the factory default value is OK.

6. Setting of fault point and fault delay reset time

If clients need to use the pre-warning of weak light, water-logged, under-load, failure monitoring point, delay time and reset time, water-logged/controlled function can be set as H00.15~H00.19 on demand; under-load function set as H00.20~H00.22; weak light function set as H00.13~H00.14. Users also can adopt the default value.

7. Parameter setting after the system operation normally

When the water yield is normal, and system run steadily, the commissioning will be finished. And then setting F02.00=1, change to terminal operation mode, setting failure auto reset times F11.27=5.

2.2 Grid or Generator power supply wirings

1. Wirings according to Figure 2-2 system wiring diagram, check and confirm to be correct.

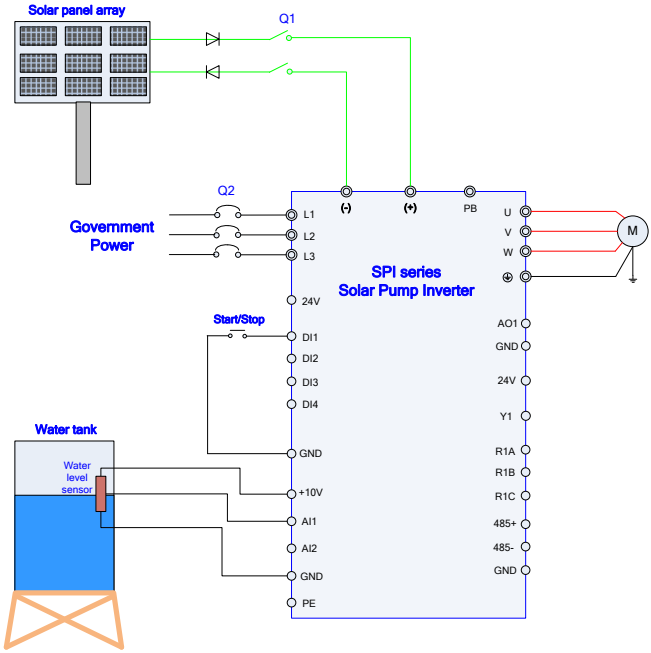


Figure 2-2 Grid or Generator Power Supply Wiring Diagram

2. Disconnect the switch Q1, and then close Q2, keep consistent with the figure above.
3. When grid or generator power supply, setting H00.01=0, power supplied by grid.

4. For water pump's frequency, please refer to F01 group code, H00.02~H00.12 function code does not work.
5. When change to PV power supply, just disconnect Q2, close Q1, setting F04.1=38 and close the terminal DI2 (or setting H00.01=1).

Note:

When the bus input terminal does not install the diode protection, PV panel switch Q1 will be prohibited to close together with grid power input switch Q2, or the panel will be damaged.

2.3 Product Terminal Configuration

2.3.1 Main Circuit Terminals

0.75～30KW main circuit terminals

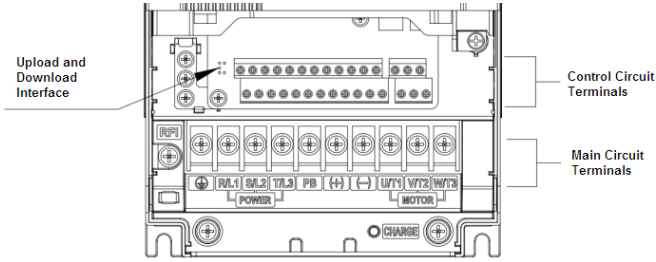


Figure 2-3 0.75～30kW Main Circuit Terminal Diagram

Table 2-1 Functions of Inverter Main Circuit Terminals

Terminal Label	Description
R/L1, S/L2, T/L3	AC Power Input Terminal, connected to three-phase 380V AC power.
U/T1, V/T2, W/T3	Inverter AC output terminal, connected to three-phase AC motor
(+), (-)	Respectively to be positive and negative terminal of internal DC bus
PB	Braking resistor connection terminals, one end connected to (+), the other end of PB.
⏚	Ground terminal, connected to the earth.

2.3.2 Control Circuit Terminals

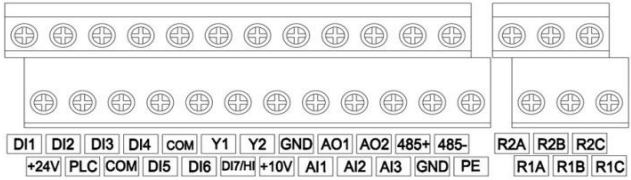


Figure 2-4 Control Terminals Diagram

Table 2-2 SPI200 Inverter Control Circuit Terminal Functions

Type	Terminal Symbol	Terminal Name	Description
Power Supply	+10V-GND	＋ 10V Power Supply	Output +10V Power Supply, Maximum Output Current: 10mA. Generally use for power supply of external potentiometer, resistance range of potentiometer: 1～5kΩ
	+24V-COM	24V Power Supply	Output +24V power supply, generally use for power supply of digital input/output terminal and external sensor, maximum output current: 200mA.
	PLC	External Power Input Terminal	Factory default in connection with +24V, when using an external signal to drive DI1~DI7, PLC need to be connected to external power, and disconnected with +24V power terminal.
Analog Input	AI1-GND	Analog Input Terminal 1	Input Range: DC 0 ～ 10V/0 ～ 20mA, selected by AI1, AI2 toggle switches on control board. Input Impedance: 250kΩ for voltage input, 250Ω for current input.
	AI2-GND	Analog Input Terminal 2	
	AI3-GND	Analog Input Terminal 3	Input voltage range: DC -10～+10V Input Impedance: 250kΩ
Digital Input	DI1- COM	Digital Input Terminal 1	Maximum input frequency: 200Hz Input Impedance: 2.4kΩ Voltage Range of level-input:9V～30V
	DI2- COM	Digital Input Terminal 2	
	DI3- COM	Digital Input Terminal 3	
	DI4- COM	Digital Input Terminal 4	
	DI5- COM	Digital Input Terminal 5	
	DI6- COM	Digital Input Terminal 6	
	DI7/HI-COM	Digital Input Terminal 7 or high-speed pulse input	Besides the features of DI1~DI6, DI7 also can be the channel of high-speed pulse input. Maximum input frequency: 100kHz.

Analog Output	AO1-GND	Analog Output Terminal 1	Output range： DC 0 ～ 10V/0 ～ 20mA, selected by A01, A02 toggle switches on control board. Impedance required≥10kΩ
	AO2-GND	Analog Output Terminal 2	
Digital Output	Y1-COM	Open Collector Output 1	Voltage Range: 0～24V Current Range: 0～50mA
	Y2/HO-COM	Open Collector Output 2or high-speed pulse output	Apart from Y1 characteristics, Y2 also can be the channel of high-speed pulse input. Maximum output frequency: 100kHz.
Relay Output	R1A-R1C	normal open terminal	Contact driving ability: AC250V， 3A， COSØ=0.4。 DC 30V，1A
	R1B-R1C	normal close terminal	
	R2A-R2C	normal open terminal	
	R2B-R2C	normal close terminal	
485 Communication	485+-485-	485 Communication Terminals	Speed: 4800/9600/19200/38400/57600/115200bps. RS485 toggle switch on control board, setting the terminal matching-resister
	GND	485 Communication Shield Ground	
Shielded	PE	Shield Grounding	It's use for grounding the shield of terminal-wire
Aid Interface		External Keyboard Interface	When connected to operation board, the longest communication distance is up to 50m, adopt the standard network cable (RJ45)
	UP/DOWNLOAD	Parameter Copy Card Interface	

Chapter Three Function Parameters

3.1 The Basic Function Parameters

Table 3-1 Basic Function Parameters

Function Code	Name	Descriptions	Default Value	Attribute
F00 Group: System Parameters				
F00.00	User Password	0～65535	0	×
F00.04	Default Value Control	0：Null 1：Factory Reset(Excluding motor parameters） 2: Clear the record information of fault 3：Backup user's current parameters 4：User's backup parameters were restored	0	×
F01 Group: Frequency Given				
F01.08	Maximum Frequency（Fmax)	20.00～600.00Hz	50.00Hz	×
F01.09	Upper Limit Frequency(Fup)	Fdown～Fmax	50.00Hz	×
F01.10	Lower Limit Frequency(Fdown)	0.00～Fup	0.00Hz	×
F01.11	Given frequency lower than the frequency control of lower limit	0：Run by the lower frequency 1：After running time of lower limit frequency, it will run on speed of 0.	0	×
F01.12	Running time of lower limit frequency	0.0～6000.0s	60.0s	×
F02 Group: Control of Run/Stop				
F02.00	Command Source Selection of Run/Start	0：Operation Panel（LED off） 1：External Terminal（LED on） 2：Computer Communications（LED flash）	0	×
F03 Group: Acceleration/Deceleration Time				
F03.00	Acceleration Time 1	0.0～6000.0s	15.0s	∆

F03.01	Deceleration Time 1	0.0～6000.0s	15.0s	Δ
F04 Group: Digital Input Terminals				
F04.00	Terminal DI1 Function Selection	0：No Function	1	×
F04.01	Terminal DI2 Function Selection	1：Forward Run（FWD）	2	×
F04.02	Terminal DI3 Function Selection	2：Reverse Operation（REV）	7	×
F04.03	Terminal DI4 Function Selection	3：Three-wire Operation Control …… 37：Special Machine Enabled 38：Solar Panels Power Enabled	13	×
F05 Group: Digital Output Terminal				
F05.00	Y1 Output Function Selection	0：No Output	1	×
F05.01	Y2 Output Function Selection	1：Inverter Operating	3	
F05.02	Relay R1 Output Function Selection	2：Inverter Fault …… 20：Under-load warning	2	×
F07 Group: Analog and Pulse Output				
F07.00	AO1 Output Function Selection	0：No Output	1	×
F07.01	AO2 Output Function Selection	1：Output Frequency	2	×
F07.02	Y2/HO Output Function Selection（When used as HO)	2：Set Frequency 3：Output Current（Inverter Rated Current） 4：Output Voltage（Inverter Rated Voltage） 5：Output Power 6：Bus Voltage 7：+10V 8：Keyboard Potentiometer 9：AI1 10：AI2 11：AI3 12：HI Input(100.0% corresponds	1	×

		100.00kHz) 13：Output Torque(Absolute Value of the Torque)		
F08 Group: Motor 1 Basic Parameters				
F08.01	Motor 1 Rated Power	0.10～600.00kW	Type fixed	×
F08.02	Motor 1 Rated Voltage	60～660V	Type fixed	×
F08.03	Motor 1 Rated Current	0.1～1500.0A	Type fixed	×
F08.04	Motor 1 Rated Frequency	20.00～Fmax	Type fixed	×
F08.05	Motor 1 Rated Rotational Speed	1～30000	Type fixed	×
F08.06	Motor 1 Wirings	0：Y 1：Δ	Type fixed	×
F08.07	Motor 1 Rated Power Factor	0.50～0.99	Type fixed	×
F08.08	Asynchronous Motor 1 Stator Resistance R_1	0.001～65.535Ω	Type fixed	×
F08.09	Asynchronous Motor 1 Rotor Resistance R_2	0.001～65.535Ω	Type fixed	×
F08.10	Asynchronous Motor 1 Leakage Inductance	0.001～65.535mH	Type fixed	×
F08.11	Asynchronous Motor 1 Mutual Inductance	0.1～6553.5mH	Type fixed	×
F08.12	Asynchronous Motor 1 No-load Field Current	0.1～1500.0A	Type fixed	×
F08.13	Asynchronous Motor 1 field-weakening coefficient 1	0.0～100.0	87%	×
F08.14	Asynchronous Motor 1 field-weakening coefficient 2	0.0～100.0	75%	×
F08.15	Asynchronous Motor 1 field-weakening coefficient 3	0.0～100.0	70%	×
F08.30	Parameters	0：Null	0	×

	Self-identification	1：Asynchronous Motor Static Self-identification		
		2：Asynchronous Motor Rotation Self-identification		
F09 Group: Motor 1VF Curve				
F09.00	Motor 1VF Curve Setting	0：Straight Line V/F	3	×
		1：Multipoint V/F		
		2：1.2th power of the V/F curve		
		3：1.4th power of the V/F curve		
		4：1.6th power of the V/F curve		
		5：1.8th power of the V/F curve		
		6：2.0th power of the V/F curve		
		7：VF Completed Separation Mode		
		8：VF Semi-separation Mode		
F09.01	Motor 1 Torque Boost	0.0～30.0% 0.0%：（Auto Torque Boost）	Type Fixed	Δ
F09.02	Motor 1 Cut-off frequency of Torque-Boost	0.00～Maximum Frequency	50.00Hz	Δ
F09.03	Motor 1Multipoint V/F frequency points 1	0.00～F09.05	0.00Hz	Δ
F09.04	Motor 1 Multipoint VF Voltage Points 1	0.0～100.0	0.0%	Δ
F09.05	Motor 1 Multipoint V/F frequency points 2	F09.03～F09.05	0.00Hz	Δ
F09.06	Motor 1 Multipoint VF Voltage Points 2	0.0～100.0	0.0%	Δ
F09.07	Motor 1 Multipoint V/F frequency points 3	F09.05～F09.09	0.00Hz	Δ
F09.08	Motor 1 Multipoint VF Voltage Points 3	0.0～100.0	0.0%	Δ
F09.09	Motor 1 Multipoint V/F frequency points 4	F09.07 ～ Rated Frequency of Motor	50.00Hz	Δ
F09.10	Motor 1 Multipoint VF Voltage Points 4	0.0～100.0 Ue=100.0%	100.0%	Δ
F09.11	VF Slip Compensation Gain	0.0～300.0%	0.0%	Δ
F09.12	VF Stator Voltage-drop	0.0～200.0%	100.0%	Δ

	Compensation Gain			
F09.13	VF Excitation Compensation Gain	0.0～200.0%	100.0%	Δ
F09.14	VF Oscillation Suppression Gain	0.0～300.0%	0.0%	Δ
F11 Group: Fault and Protection				
F11.00	Control of Overcurrent Stall	0：Null 1：Overcurrent Stall Mode 1 2: Overcurrent Stall Mode 2	1	×
F11.01	Protection current of Overcurrent Stall	100.0～200.0%	150.0%	×
F11.02	Frequency Fall Time of Constant Speed Overcurrent Stall	0.0～6000.0s (Mode 1 is Active）	5.0s	Δ
F11.03	Overcurrent Stall Mode 2 Proportion Coefficient	0.1～100.0%	3.0%	Δ
F11.04	Overcurrent Stall Mode 2 Integral Time	0.000～1.000s （0.000：Integral Invalid）	0.010s	Δ
F11.05	Control of Overvoltage Stall	0：Null 1：Overvoltage Stall Mode 1 2: Overvoltage Stall Mode 2	1	×
F11.06	Voltage of Overvoltage Stall	120.0～150.0%	130.0%	×
F11.07	Overvoltage Stall Mode 2 Proportion Coefficient	0.1～100.0%	3.0%	Δ
F11.08	Overvoltage Stall Mode 2 Integral Time	0.000～1.000s （0.000：Integral Invalid）	0.010s	Δ
F11.10	Selection of failsafe action 1	Ones: Bus Under voltage Protection（Err07) 0：Reporting faults and freely parking 1：Alarming and parking by deceleration mode 2：Alarm and continue running on fault frequency 3：Protection Invalid Tens: Input Phase-protection (Err09) (like ones) Hundreds: Output	03000	×

		Phase-protection (Err10) (like ones)		
		Thousands: Motor Overload Protection (Err10) (like ones)		
		Myriabit: Inverter Overload Protection（Err12)(like ones)		
F11.11	Selection of failsafe action 2	Ones: External Input Failure-protection（Err13）	00000	×
		0：Reporting faults and freely parking		
		1：Alarming and parking by deceleration mode		
		2：Alarm and continue running on fault frequency		
		Tens: Memory Failure (Err15) (like ones)		
		Hundreds: 485 communication timeout (Err18) (like ones)		
		Thousands: PID feedback disconnection when running（Err19）(like ones)		
		Myriabit: running time arrives（Err20）(like ones)		
F11.12	Selection of failsafe action 3	Ones: Disconnection Fault of Temperature Sensor（Err24）	00000	×
		0：Reporting faults and freely parking		
		1：Alarming and parking by deceleration mode		
		2：Alarm and continue running on fault frequency		
		Tens: Inverter load-lost（Err25）（0～3）		
		Hundreds: Reserved		
		Thousands: Reserved		
		Myriabit: Reserved		
F11.14	When failure, frequency selection of continue	0：Running on current setting frequency	0	×

	running	1：Running on setting frequency 2 ： Running on upper-limit frequency 3 ： Running on lower-limit frequency 4 ： Running on abnormal spare-frequency		
F11.15	Abnormal Alternate Frequency	0.00～Fmax	0.00Hz	×
F11.17	Protection time of Motor Overload	30.0～300.0s	60.0s	×
F11.18	Selection of Overload Pre-warning	Ones: selection of detection 0：always detection 1：detection only when constant speed Tens: condition selection of detection 0：responds to rated current of motor 1：responds to rated current of inverter	00	×
F11.19	Detectable Level of Overload Pre-alarm	20.0～200.0%	130.0%	×
F11.20	Detectable Time of Overload Pre-alarm	0.1～60.0s	5.0s	×
F11.21	Pre-alarm Temperature of Inverter Overheat	50.0～100.0℃	70.0℃	×
F11.22	Detectable Level of load-loss	5.0～100.0%	20.0%	×
F11.23	Detectable Time of load-loss	0.1～60.0s	5.0s	×
F11.24	Operation selection of instantaneous power failure	0：Null 1：Valid	1	×
F11.25	Frequency deceleration time of instantaneous power failure	0.0～6000.0s	5.0s	∆
F11.26	Selection control of fast current-limit	0：Prohibit 1：Permit	0	×

F11.27	Auto-Reset Times of failure	0～20	0	×
F11.28	Auto-Reset Interval of failure	0.1～100.0s	1.0s	×
F11.29	During the fault auto-resetting, program Of switch output terminal , is action selection of output fault	0：No action 1：Action	0	×
U00 Group: Status Monitoring				
U00.00	Output Frequency	0.00～Fup	0.00Hz	⊙
U00.01	Setting Frequency	0.00～Fmax	0.00Hz	⊙
U00.02	Actual value of output voltage	0～660V	0.0V	⊙
U00.03	Actual value of output current	0.0～3000.0A	0.0A	⊙
U00.04	Output Power	-3000.0～3000.0kW	0.0kW	⊙
U00.05	Output Rotation-rate	0～60000rpm	0rpm	⊙
U00.06	DC Bus Voltage	0～1200V	0V	⊙
U00.07	Synchronization Frequency	0.00～Fup	0.00Hz	⊙
U00.08	PLC Stage	1～15	1	⊙
U00.09	Program Running Time	0.0～6000.0s(h)	0.0s(h)	⊙
U00.10	PID Given	0～60000	0	⊙
U00.11	PID Arithmetic Feedback	0～60000	0	⊙
U00.12	DI1～DI5 Input Status	DI5 DI4 DI3 DI2 DI1	00000	⊙
U00.13	DI6～DI7 Input Status	DI7 DI6	00	⊙
U00.14	Digital Output Status	R2 R1 Y2 Y1	0000	⊙
U00.15	AI1 Input	0.0～100.0%	0.0%	⊙
U00.16	AI2 Input	0.0～100.0%	0.0%	⊙
U00.17	AI3 Input	-100.0～100.0%	0.0%	⊙
U00.18	Keyboard Potentiometer Input	0.0～100.0%	0.0%	⊙
U00.19	HI Pulse Input Frequency	0.00～100.00kHz	0.00kHz	⊙
U00.20	A01 Output	0.0～100.0%	0.0%	⊙
U00.21	A02 Output	0.0～100.0%	0.0%	⊙
U00.22	HO Pulse Output Frequency	0.00～100.00kHz	0.00kHz	⊙
U00.23	Temperature of Inverter Module	-40.0℃～120.0℃	0.0℃	⊙

U00.24	The Power-on Time	0～65535min	0min	⊙
U00.25	The Running Time	0～6553.5min	0.0min	⊙
U00.26	Cumulative Power-on Time	0～65535h	0h	⊙
U00.27	Cumulative Running Time	0～65535h	0h	⊙
U00.28	Actual Count Value	0～65535	0	⊙
U00.29	Actual Length Value	0～65535m	0m	⊙
U00.30	Line Speed	0～65535m/min	0m/Min	
U00.31	Output Torque	0.0～300.0%	0.0%	⊙
U01 Group: Failure Record				
U01.00	Current Fault Category	Err00： No Fault Err01：Accelerated Overcurrent Err02：Decelerated Overcurrent Err03 ： Constant Speed Overcurrent Err04：Accelerated Overvoltage Err05：Decelerated Overvoltage Err06 ： Constant Speed Overvoltage Err07 ： Bus Under voltage Protection Err08：Short Circuit Protection Err09：Input Open Phase Err10：Output Open Phase Err11：Motor Overload Err12：Inverter Overload Err13：Fault protection of external input Err14：Overheat Err15：Memory Failure Err16：Cancel Auto-tuning Err17：Auto-tuning Failure Err18 ： 485 Communication Timeout Err19 ： PID feedback disconnection on runtime Err20：running time arrives Err21：Parameter Upload Error Err22 ： Parameter Download	0	⊙

		Error		
		Err23：Braking Unit Failure		
		Err24：Disconnection fault of temperature sensor		
		Err25：Lose-load failure/alarm of Inverter		
		Err26：with-wave current limit fault		
		Err27：Soft-start relay unclosed		
		Err28：EEPROM Version Incompatible		
		Err29：Overcurrent tested by hardware		
		Err30：Overvoltage tested by hardware		
		Err31：		
		Err32: Hydraulic Probe Failure		
		Arn33:Pre-warning of weak light		
		Arn34:Pre-warning of full-water		
U01.01	Output frequency of the current fault	0.00～Fup	0.00Hz	⊙
U01.02	Output current of the current fault	0.0～3000.0A	0.0A	⊙
U01.03	c of the current fault	0～1200V	0V	⊙
U01.04	Cumulative runtime of the current fault	0～65535h	0h	⊙
U01.05	Former one fault category	Like the latest one fault record	0	⊙
U01.06	Output frequency of the former one fault	0.00～Fup	0.00Hz	⊙
U01.07	Output current of the former one fault	0.0～3000.0A	0.0A	⊙
U01.08	Bus Voltage of the former one fault	0～1200V	0V	⊙
U01.09	Cumulative runtime of the former one fault	0～65535h	0h	⊙
U01.10	Former two fault categories	Like the latest one fault record	0	⊙
U01.11	Output frequency of the	0.00～Fup	0.00Hz	⊙

	former two faults			
U01.12	Output current of the former two faults	0.0～3000.0A	0.0A	⊙
U01.13	Bus Voltage of the former two faults	0～1200V	0V	⊙
U01.14	Cumulative runtime of the former two faults	0～65535h	0h	⊙
H00 Group: PV Pump Special Set				
H00.00	Pump Machine Control	0：Null 1：Valid	1	×
H00.01	Selection of Inverter Power	0：Mains 1：Solar Panel	1	×
H00.02	Vmpp Selection of Voltage Given Mode	0：CVT（Constant Voltage appr Given） 1：Tracking of Max Power Point（MPPT）	1	×
H00.03	Vmpp voltage CVT setting	0～750V	540V	Δ
H00.04	Mini voltage reference of MPPT	0～Max Voltage	500V	×
H00.05	Max voltage reference of MPPT	Max Voltage～750V	600V	×
H00.06	PID Filter Time Given	0.000～10.000s	0.000s	Δ
H00.07	PID Filter Time Feedback	0.000～10.000s	0.000s	Δ
H00.08	PID Filter Time Output	0.000～10.000s	0.000s	Δ
H00.09	Ratio Gain Kp1	0.00～100.00	0.10	Δ
H00.10	Points Time KI	0.00～100.00	0.10	Δ
H00.11	PID Upper Limit of Output Frequency	PID Lower Limit of Output Frequency～100.0%（100.0% corresponds to the max frequency）	100.0%	×
H00.12	PID Lower Limit of Output Frequency	0.0%～PID Upper Limit of Output Frequency	20.0%	×
H00.13	Dormant Delay Time of Weak light Pre-warning	0.0～6000.0s	600.0s	Δ
H00.14	Wake-up Delay Time of Weak Light	0.0～6000.0s	100.0s	Δ
H00.15	Feedback Channel	0：Null	0	×

	Selection of Reservoir Water Level	1：AI1 2：AI2 3：AI3		
H00.16	Clean up the delay time of full-water pre-warning	0～10000s	600s	Δ
H00.17	Threshold of reservoir water level	0.0～100.0	25.0%	Δ
H00.18	Dormant Delay Time of Tank Water-full Pre-warning	0～10000s	60s	Δ
H00.19	Detection of reservoir hydraulic probe	0.0～100.0	100.0%	Δ
H00.20	Pre-warning delay time of pump under-load	0.0～1000.0s	60.0s	Δ
H00.21	Pre-warning current level of pump under-load	0.0～100.0% 0.0：Null	0.0%	Δ
H00.22	Reset delay time of pump under-load	0.0～1000.0s	60.0s	Δ
H00.23	Threshold of lag-frequency	0.00～200.00Hz	0.30Hz	Δ

3.2 H00 Group: Detailed Explanation of Function Code

H00.00	Control of PV Pump Inverter	0：Null 1：Valid	1	×

0：Null

For standard model

1：Valid

For PV pumps special inverter，H00 Group: Invalid

H00.01	Selection of inverter power supply	0：Mains 1：PV Panels	1	×

0：Mains

Inverter power supply through the grid, frequency given refer to group of F01, HOO.02～H00.12 invalid.

1：PV Panels

Inverter power supply through solar panels, frequency given mainly through tracking and adjusting the max power-point PI of solar panels to get. For more details, please refer to H00.02～H00.12.

H00.02	Vmpp selection of power	0：CVT（Constant Voltage appr	1	×

	given mode	Given）		
		1：Max Power Point Tracking（MPPT）		

0：CVT（Constant Voltage appr Given）

Adopt voltage given mode; reference voltage is a fixed value, given by H00.03.

1：Max power point tracking（MPPT）

Using max power point tracking the given reference voltage, the reference voltage will not stop changing until the system stable.

No matter which reference voltage mode adopted, when bus voltage higher than reference voltage, the target frequency will change to upper limit of PI output frequency; when bus voltage lower than reference voltage, target frequency will change to lower limit of PI output frequency.

H00.03	Vmpp voltage CVT setting	0～750V	540V	Δ

When H00.02 is zero, reference voltage will be given by this function code.

H00.04	MPPT mini voltage reference	0～Max Voltage	500V	×
H00.05	MPPT max voltage reference	Max Voltage～750V	600V	×

When H00.03 is 1, MPPT voltage will track within H00.04~H00.05, H00.05 must be larger than H00.04, the smaller the difference between them, the narrower the tracking range, tracking will be faster. But the voltage point of max power must fall in this range.

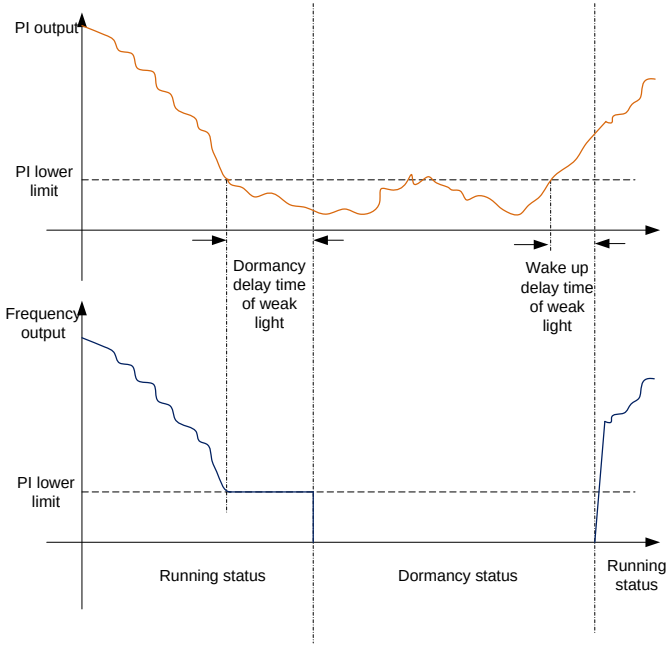
H00.06	PID Given Filter Time	0.000～10.000s	0.000s	Δ
H00.07	PID Response Filter Time	0.000～10.000s	0.000s	Δ
H00.08	PID Output Filter Time	0.000～10.000s	0.000s	Δ
H00.09	Ratio Gain Kp1	0.00～100.00	0.10	Δ
H00.10	Points Time KI	0.00～100.00	0.10	Δ
H00.11	PID Upper limit of output frequency	PID Lower limit of output frequency～100.0%（100.0% corresponds to the max frequency）	100.0%	×
H00.12	PID Lower limit of output frequency	0.0%～PID Upper limit of output frequency	20.0%	×

Refer to F13 group of PID function description in AD200 user manual.

H00.13	Delay time of weak light pre-warning sleep	0.0～6000.0s	600.0s	Δ
H00.14	Delay time of weak light wake-up	0.0～6000.0s	100.0s	Δ

When the output frequency less than or equal with the lower limit of PI output frequency (H00.12), delaying timing begins, continuing this state until delay time of weak light pre-warning (H00.13) arrives, weak-light pre-warning reported (Arn33), and start dormant.

In weak light pre-warning, when output frequency larger than lower limit of PI output frequency, delaying timing begins, and continue this status until arrival delay time （H00.14）of wake-up at weak light, clean the weak light pre-warning, re-enter the running status.



H00.15	Feedback channel selection of reservoir water level	0：Null 1：AI1 2：AI2 3：AI3	0	×

0：Null

Control of water level is invalid.

1：AI1

AI1 for analog signal source of water-level control

2：AI2

AI2 for analog signal source of water-level control

3：AI3

AI3 for analog signal source of water-level control

H00.16	Clean up the delay time of full-water pre-warning	0～10000s	600s	Δ
H00.17	Reservoir full of water control	0.0～100.0	25.0%	Δ
H00.18	Dormancy delay time of reservoir full of water pre-warning	0～10000s	60s	Δ

When the detected water level control analog signal less than water level threshold (H00.17), and continue this status over the delay time of H00.18, reporting the pre-warning of water-full (Arn34), and dormancy.

In water-full pre-warning, when the detected water level control analog signal larger than H00.17, delay timer begins, and continue this status over the delay time of H00.16, clear the full-water pre-warning, recover the normal operation.

H00.19	Detection of reservoir hydraulic probe	0.0～100.0	100.0%	Δ

0.0% means Null.

When not 0.0%, when the detected water level control analog signal larger than H00.19 hydraulic probe damaged point, hydraulic probe fault (Err32) will be reported directly, and stopped.

H00.20	Current level of pump under-load pre-warning.	0.0～100.0% 0.0: Null	0.0%	Δ
H00.21	Delay time of pump under-load pre-warning.	0.0～1000.0s	60.0s	Δ
H00.22	Delay time of pump under-load resetting.	0.0～1000.0s	60.0s	Δ

0.0%: Automatically detection of under-load, decided by under-load detection of inverter.

When it is not 0.0%, decided by H00.20 parameter setting, 100% correspondence to ratted current of motor.

When absolute value of the difference between target frequency and slop frequency continues less than or equal with H00.23 lag frequency threshold, if the current value continues less than H00.20 set value, over the H00.21 pump under-load delay time, reporting under-load pre-warning(Arn25).

In under-load pre-warning, delay H00.22 under-load reset time, under-load pre-warning restoration.

H00.23	Lag frequency threshold	0.00～200.00Hz	0.30Hz	Δ

Use for adjusting the condition of under-load operation. When absolute value of the difference between target frequency and slop frequency continues less than or equal with lag frequency threshold, current comparison will be required.

Chapter Four Troubleshooting and Countermeasures

SPI series solar pump inverters supply many kinds of warning information and protection functions, when failure occurred, function of protection actives, inverters will stop output, fault relay contact of inverter active, and display the fault code on inverter operation panel. Before asking support, users can self-check according to this chapter tips, and analyze the fault reasons, get the solutions. If fault still can't be solved, please ask for service, contact with agents or directly to ADA.

Operator Panel Displays	Fault Name	Fault Reasons	Troubleshooting
Err01	Acceleration Overcurrent	1, Inverter output circuit grounding or shorted 2, Acceleration time is too short 3, Manually boost the torque or V/F curve unsuitable 4, Voltage is too low 5, Start the rotating motor 6, Shock load on acceleration 7, Inverter selection is too small	1, Peripheral troubleshooting 2, Prolong the acceleration time 3, Adjust the V/F curve Or manually-torque-boost 4, The voltage adjusted to a normal range 5, Select start on rotational-speed tracking or waiting for motor stopped 6, Cancel shock-load 7, Select inverter with a larger power
Err02	Deceleration Overcurrent	1, Inverter output circuit grounding or shorted 2, Deceleration time is too short 3, Voltage is too low 4, Shock load on deceleration 5, No installation of braking resistor	1, Peripheral troubleshooting 2, Prolong the deceleration time 3, The voltage adjusted to a normal range 4, Cancel shock-load 5, Install braking resistor
Err03	Constant-speed Overcurrent	1, Inverter output circuit grounding or shorted 2, Voltage is too low 3, If there is shock-load during running 4, Inverter selection is too small	1, Peripheral troubleshooting 2, The voltage adjusted to a normal range 3, Cancel shock-load 4, Select inverter with a larger power

Err04	Acceleration Overvoltage	1, Input voltage is high 2, There is an external force during acceleration dragging the motor to work 3, Acceleration time is too short 4, No installation of braking resistor	1, The voltage adjusted to a normal range 2, Cancel the external power or install braking resistor 3, Prolong the acceleration time 4, Install braking resistor
Err05	Deceleration Overvoltage	1, Input voltage is high 2, There is an external force during deceleration dragging the motor to work 3, Deceleration time is too short 4, No installation of braking resistor	1, The voltage adjusted to a normal range 2, Cancel the external power or install braking resistor 3, Prolong the deceleration time 4, Install braking resistor
Err06	Constant-speed Overvoltage	1, Input voltage is too high 2, There is an external force during running dragging the motor to work	1, The voltage adjusted to a normal range 2, Cancel the external power or install braking resistor
Err07	Bus Under voltage protection	1, Momentary power failure 2, The inverter input voltage 3, Bus voltage abnormal 4, Rectifier bridge and buffer resistance are abnormal 5, Drive board abnormal 6, Control panel abnormal	1, Reset Failure 2, Adjust voltage to normal range 3, Ask for technical support 4, Ask for technical support 5, Ask for technical support 6, Ask for technical support
Err08	Short circuit protection	1, Inverter output circuit shorted 2, Acceleration/ Deceleration time is too short 3, Wirings between motor and inverter is too long 4, Module Overheating 5, Internal wirings of inverter loosened 6, Main Board Abnormal 7, Drive Board Abnormal 8, Inverter Module Abnormal	1, Peripheral troubleshooting 2, Prolong the acceleration/deceleration time 3, Install the reactor or output-filter 4, Check and confirm the air-channel unblocked, fans operation normal 5, All cables plugged 6, Ask for technical support 7, Ask for technical support 8, Ask for technical support

Err09	Input Open-phase	1, Power of three-phase-input is abnormal 2, Drive board abnormal 3, Lightning board abnormal 4, Main board abnormal	1, Check and solve the problems in peripheral wirings 2, Ask for technical support 3, Ask for technical support 4, Ask for technical support
Err10	Output Open-phase	1、Lead-wire from inverter to motor is abnormal 2、Three-phase output of inverter is unbalanced during motor-running 3, Drive board abnormal 4, Inverter Module Abnormal	1, Peripheral troubleshooting 2, Check and confirm the motor three-phase winding to be normal 3, Ask for technical support 4, Ask for technical support
Err11	Motor Overload	1, Motor-protection parameters F11.17 set incorrectly 2, Load is too large or motor rocked rotor 3, Inverter selection is too small	1, Setting the parameters correctly 2, Lowering the load and check the conditions of motor and mechanical 3, Select inverter with a larger power
Err12	Inverter Overload	1, Load is too large or motor rocked rotor 2, Inverter selection is too small	1, Reduce load and check the conditions of motor and mechanical 2, Select inverter with a larger power
Err13	Fault protection of external input	1, Input the external fault signal by multi-function terminal	1, Reset to run
Err14	Overheat	1, Ambient temperature is too high 2, Air-channel blocked 3, Fans damaged 4, Module thermistors damaged 5, Inverter module damaged	1, Lowering the ambient temperature 2, Clean up the air-channel 3, Replace the fans 4, Replace the thermistors 5, Replace the inverter module
Err15	Memory Failure	1, EEPROM Chips damage	1, Replace the Main Board
Err16	Cancel the self-identification	1, Press the button of STOP/RST during self-identification	1, Press STOP/RST for restoration

Err17	Self-identification failure	1, Motor and the inverter output terminals are not connected 2, Motor connects to load 3, Motor Failure	1, Check the wirings between inverter and motor 2, Motor breaks away from load 3, Check motor
Err18	485 Communication Timeout	1、Upper computer works abnormally 2, Communication cable is abnormal 3, F15 communication parameters set incorrectly	1, Check the wirings of upper computer 2, Check the communication cable 3, Set the communication parameters correctly
Err19	PID feedback disconnection on running	1, PID feedback lower than the value set by F13.24	1, Check the PID feedback signal or set F13.24 to be a suitable value
Err20	The running time arrives	1, Setting the function of running time arrives	1, Refer to description of F05.14
Err21	Parameter Upload Error	1, Copy card uninstalled or plugged unsuitable 2, Parameters copy card abnormal 3, Control board abnormal	1, Parameter copy card installed correctly 2, Ask for technical support 3, Ask for technical support
Err22	Parameter Download Error	1, Copy card uninstalled or plugged unsuitable 2, Parameters copy card abnormal 3, Control board abnormal	1, Parameter copy card installed correctly 2, Ask for technical support 3, Ask for technical support
Err23	Braking Unit failure	1, Braking wirings fault or braking tube damaged 2, Value of external braking resister is too small	1.Check the brake unit, and replace the new brake tube 2 . Increasing the braking resistor
Err24	Disconnection Fault of temperature sensor	1, Temperature sensor failure or cable break	1, Ask for technical support
Err25	Inverter loss-load	1, Running current of inverter is less than F11.22	1, Confirm whether the load loss or parameters of F11.22, F11.23 conform to the actual running conditions.
Err26	With-wave	1, Load is too large or motor	1, Reduce the load or check the

	current limit fault	rocked-rotor 2, Inverter selection is too small	conditions of motor or mechanical 2, Select the inverter with larger power
Err27	Soft-start relay unclosed	1, Grid voltage is too low 2, Rectifier module failure	1, Check the grid voltage 2, Ask for technical support
Err28	EEPROM Version Incompatible	1, Parameter version of up/download module is inconsistent with the one of control panel	1, Re-upload parameters to up/download modules
Err29	Hardware detect Overcurrent	1, Acceleration/Deceleration time is too short 2, Motor Parameters is Inaccurate 3, Hardware failure of Inverter	1, Prolong the acceleration/deceleration time 2, Setting the correct motor parameter 3, Ask for technical support
Err30	Hardware detect overvoltage	1, Deceleration time is too short 2, No installation of braking resistors 3, Hardware failure of Inverter	1, Prolong the deceleration time 2, Install the braking resistor 3, Ask for technical support
Err32	Hydraulic Probe Failure	Hydraulic Probe Failure	Hydraulic Probe Changed
Arn33	Pre-warning of Weak Light	Output frequency lower than or equal with lower limit of PI output frequency, and continues this status until arrives at delay time of weak light.	Check the lower limit of PI output frequency and weak-light delay the set value
Arn34	Pre-warning of Full-water	Water-lever feedback lower than the set threshold, and continue to the delay time	Check the pre-warning point of water level

Appendix: Recommended Solar Array Configuration

PV Pump Special Inverter Model	Open Circuit Voltage Level of Solar Cell Components			
	20±3V		30±3V	
	Power of Components ±5Wp	Numbers of component per string*Numbers of string	Power of Components ±5Wp	Numbers of component per string*Numbers of string
SPI200-4T-0.7B	30	29*1	-	-
SPI200-4T-1.5B	60	30*1	-	-
SPI200-4T-2.2B	90	30*1	-	-
SPI200-4T-4.0B	85	28*2	220	22*1
SPI200-4T-5.5B	-	-	-	-
SPI200-4T-7.5B	-	-	215	21*2
SPI200-4T-011B	-	-	200	22*3
SPI200-4T-015B	-	-	205	22*4
SPI200-4T-018B	-	-	-	-
SPI200-4T-022B	-	-	-	-
SPI200-4T-030B	-	-	-	-

PV Pump Special Inverter Model	Open Circuit Voltage Level of Solar Cell Components					
	36±3V		42±3V			
	Power of Components ±5Wp	Numbers of component per string*Numbers of string	Power of Components ±5Wp	Numbers of component per string*Numbers of string	Power of Components ±5Wp	Numbers of component per string*Numbers of string
SPI200-4T-0.7B	-	-	-	-	-	-
SPI200-4T-1.5B	-	-	-	-	-	-
SPI200-4T-2.2B	145	18*1	175	15*1	-	-
SPI200-4T-4.0B	140	17*2	160	15*2	-	-
SPI200-4T-5.5B	195	17*2	220	15*2	-	-
SPI200-4T-7.5B	175	17*3	200	15*3	300	15*2
SPI200-4T-011B	195	17*4	220	15*4	-	-
SPI200-4T-015B	200	18*5	240	15*5	300	15*4
SPI200-4T-018B	250	18*5	250	15*6	300	15*5
SPI200-4T-022B	250	18*6	300	15*6	-	-
SPI200-4T-030B	-	-	300	15*8	-	-