SC500PV Series

Solar Pump Inverter Manual

Hybrid Solar Pump Inverter

0.75KW~200KW

CONTENTS

1 Safety Precautions

1.1 Safety definition:

In this manual, safety precautions are classified as follows:

Danger: Operations which are not performed according to requirements may cause serious equipment loss or personnel injury.

Caution: Operations which are not performed according to requirements may cause medium hurt or light hurt or material loss.

Note: Physical hurt may occur if not follow relevant requirements.

During the installation, commissioning and maintenance of the system, please make sure to follow the safety and precautions of this chapter. In case of a result of illegal operations, caused any harm and losses is nothing to do with the company.

1.1.1 Before Installation:

 Danger	● Do not use the water-logged inverter, damaged inverter or inverter with missing parts. Otherwise, there may be risk of injury. ● Use the motor with Class B or above insulation. Otherwise, there may be risk of electric shock.
 Caution	● Carefully handled when loading, otherwise it may damage the inverter. ● Please don't use the damaged driver or inverter with missing parts, there may be risk of injury. ● Do not touch the electronic parts and components; otherwise it will cause static electricity.

1.1.2 During Installation:

 Danger	● Install the inverter on incombustible surface such as metal, and keep away from flammable substances. Otherwise it may cause fire. ● Do not loose the set screw of the equipment, especially the screws marked in RED.
 Caution	● Do not drop the cable residual or screw in the inverter. Otherwise it may damage the inverter. ● Please install the driver in the place where there is no direct sunlight or less Vibratory. ● When more than two inverters are to be installed in one cabinet, due attention should be paid to the installation locations (refer to Chapter 3 Mechanical Installation) to ensure the heat sinking effect.

1.1.3 During Wiring:

 Danger	● Operation should be performed by the professional engineering technician. Otherwise there will be danger of electric shock. ● There should be circuit breaker between the inverter and power supply. Otherwise, there may cause fire.

 Danger	● Make sure the power is disconnected prior to the connection. Otherwise there will be danger of electric shock. ● The ground terminal should be earthed reliably. Otherwise there may be danger of electric shock.
 Caution	● Never connect AC power to output U, V, W terminals. Please note the remark of the wiring terminals, connect them correctly. Otherwise it will cause inverter be damaged. ● Ensure the wiring circuit can meet the requirement of EMC and the area safety standard. Otherwise may cause injury or electric shock. ● Never connect the braking resistor between DC Bus (+), (-) terminals. Otherwise may cause fire.

1.1.4 Before Power-ON:

 Danger	● Please confirm whether the power voltage class is consistent with the rated voltage of the inverter, Otherwise it may damage the inverter. ● Whether the I/O cable connecting positions are correct and whether the connecting line is firm. Otherwise it may damage the inverter. ● The inverter is free from dielectric test because this test is performed prior to the delivery. Otherwise accident may occur. ● Check whether the external circuit is short circuited, Otherwise it may damage the inverter.
 Caution	● The cover must be well closed prior to the inverter power-on. Otherwise electric shock may be caused. ● Whether all the external fittings are connected correctly in accordance with the circuit provided in this manual. Otherwise accident may occur.

1.1.5 After Power-ON:

 Danger	● Do not open the cover of the inverter upon power-on. Otherwise there will be danger of electric shock. ● Do not touch the inverter and its surrounding circuit with wet hand. Otherwise there will be danger of electric shock. ● Do not touch the inverter terminals (including control terminal). Otherwise there will be danger of electric shock. ● At power-on, the inverter will perform the security check of the external heavy-currentcircuit automatically. Thus at the moment please do not touch the terminals U, V and W, or the terminals of motor, otherwise there will be danger of electric shock.
 Caution	● If parameter identification is required, due attention should be paid to the danger of injury arising from the rotating motor. Otherwise accident may occur. ● Do not change the factory settings at will. Otherwise it may damage the equipment.

1.1.6 During Operation:

 Danger	● Do not touch the fan or discharge resistor to sense the temperature. Otherwise, you may get burnt. ● Detection of signals during the operation should only be conducted by qualified technician. Otherwise, personal injury or equipment damage may be caused.
 Caution	● During the operation of the inverter, keep items from falling into the equipment. Otherwise, it may damage the equipment. ● Do not start and shut down the inverter by connecting and disconnecting the contactor. Otherwise, it may damage the equipment.

1.1.7 During Maintain:

 Danger	● Do not repair and maintain the equipment with power connection. Otherwise there will be danger of electric shock. ● Be sure to conduct repair and maintenance after the charge LED indictor of the inverter is OFF and wait 15minutes. Otherwise, the residual charge on the capacitor may cause personal injury. ● The inverter should be repaired and maintained only by the qualified person who has received professional training. Otherwise, it may cause personal injury or equipment damage. ● Carry out parameter setting after replacing the inverter, all the plug-ins must be plug and play when power outage.

1.2 Precautions

1.2.1 Motor Insulation Inspection

When the motor is used for the first time, or when the motor is reused after being kept, or when periodical inspection is performed, it should conduct motor insulation inspection so as to avoid damaging the inverter because of the insulation failure of the motor winding. The motor wires must be disconnected from the inverter during the insulation inspection. It is recommended to use the 500V megameter, and the insulating resistance measured should be at least 5MΩ.

1.2.2 Thermal Protection of the Motor

If the ratings of the motor does not match those of the inverter, especially when the rated power of the inverter is higher than the rated power of the motor, the relevant motor protection parameters in the in the inverter should be adjusted, or thermal relay should be mounted to protect the motor.

1.2.3 Running with Frequency higher than Standard Frequency

This inverter can provide output frequency of 0Hz to 300Hz. If the user needs to run the inverter with frequency of more than 50Hz, please take the resistant pressure of the mechanical devices into consideration.

1.2.4 Vibration of Mechanical Device

The inverter may encounter the mechanical resonance point at certain output frequencies, which can be avoided by setting the skip frequency parameters in the inverter.

1.2.5 Motor Heat and Noise

Since the output voltage of inverter is PWM wave and contains certain harmonics, the temperature rise, noise and vibration of the motor will be higher than those at power frequency.

1.2.6 Voltage-sensitive Device or Capacitor Improving Power Factor at the Output Side

Since the inverter output is PWM wave, if the capacitor for improving the power factor or voltage-sensitive resistor for lightning protection is mounted at the output side, it is easy to cause instantaneous over current in the inverter, which may damage the inverter. It is recommended that such devices not be used.

1.2.7 Switching Devices like Contactor Used at the Input and Output terminal

If a contactor is installed between the power supply and the input terminal of the inverter, it is not allowed to use the contactor to control the startup/stop of the inverter. If such contactor is unavoidable, it should be used with interval of at least one hour. Frequent charge and discharge will reduce the service life of the capacitor inside the inverter. If switching devices like contactor are installed between the output end of the inverter and the motor, it should ensure that the on/off operation is conducted when the inverter has no output. Otherwise the modules in the inverter may be damaged.

1.2.8 Use under voltage rather than rated voltage

If the inverter is used outside the allowable working voltage range as specified in this manual, it is easy to damage the devices in the inverter. When necessary, use the corresponding step-up or step-down instruments to change the voltage.

1.2.9 Change Three-phase Input to Two-phase Input

It is not allowed to change the three-phase inverter into two-phase one. Otherwise, it may cause fault or damage to the inverter.

1.2.10 Lightning Impulse Protection

The series inverter has lightning over current protection device, and has certain self-protection capacity against the lightning.In applications where lightning occurs frequently, the user should install additional protection devices at the front-end of the inverter.

1.2.11 Certain Special Use

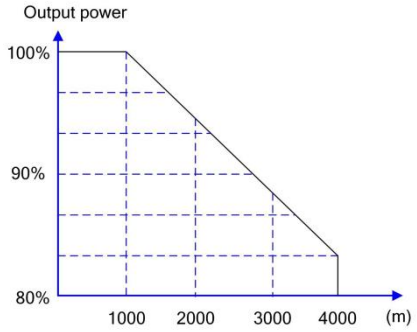
If the user needs to use the inverter with the methods other than the recommended wiring diagram in this manual, such as shared DC Bus, please consult our company.

1.2.12 Note of Inverter Disposal

The electrolytic capacitors on the main circuit and the PCB may explode when they are burnt. Emission of toxic gas may be generated when the plastic parts are burnt. Please dispose the inverter as industrial wastes.

1.2.13 Altitude and Derating

In areas with altitude of more than 1,000 meters, the heat sinking effect of the inverter may turn poorer due to rare air. Therefore, it needs to derate the inverter for using. Please make selection as the below derating diagram.



1.2.14 Adaptable Motor

1) The standard adaptable motor is four-pole squirrel-cage asynchronous induction motor. If such motor is not available, be sure to select adaptable motors in according to the rated current of the motor. In applications where drive permanent magnetic synchronous motor is required, please consult our company;

2) The cooling fan and the rotor shaft of the non-variable-frequency motor adopt coaxial connection. When the rotating speed is reduced, the cooling effect will be poorer. Therefore, a powerful exhaust fan should be installed, or the motor should be replaced with variable frequency motor to avoid the over heat of the motor.

3) Since the inverter has built-in standard parameters of the adaptable motors, it is necessary to perform motor parameter identification or modify the default values so as to comply with the actual values as much as possible, or it may affect the running effect and protection performance;

4) The short circuit of the cable or motor may cause alarm or explosion of the inverter. Therefore, please conduct insulation and short circuit test on the newly installed motor and cable. Such test should also be conducted during routine maintenance. Please note that the inverter and the test part should be completely disconnected during the test.

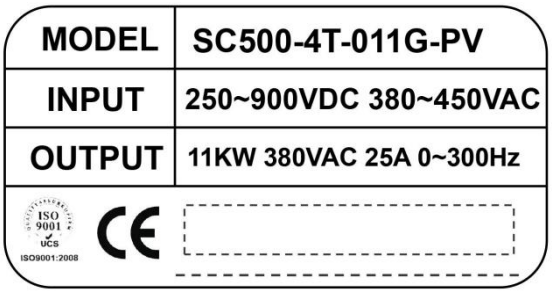
2 Product Information

2.1 Product Inspection

Confirmation Items	Method
Confirm if the inverter is what you ordered	Check name plate
Damaged or not	Inspect the entire exterior of the inverter to see if there are any scratches or other damage resulting from shipping
Confirm if the fastening parts (screws, etc.) are loose or not	Check with a screw driver if necessary
User's manual, certification and other spares	User's manual and the relative spares

Please contact the local agent or our company directly if there is any damage on the inverter.

2.2 Product nameplate



Note: This is a nameplate example of a standard inverter product.

2.3 Model designation code

A model designation code contains product information. You can find the model designation code on the inverter nameplate and simplified nameplate.

SC500 - 4 T - 011 G - PV

① ② ③ ④ ⑤ ⑥

SN	Naming rule	Description
①	Product Series	SC500: SC500 Series Inverters
②	Output Voltage	2: AC 3PH 220V (- 15%)~240(+15%)
		4: AC 3PH 380V (- 15%)~440(+15%)
③	Input Phase Class	S: Single Phase
		T: Three Phase
④	Reted Output Power	P75:0.75KW, 1P5:1.5KW
		011:11KW, 110: 110KW
⑤	Applicable Load Type	G: General Type
		S: Eonomic Type
⑥	Product Type	PV: SC500PV Series Hybrid Solar Pump Inverter
		Without PV: SC500 Series General Inverter(VFD)

2.4 Product specifications

Name	2S(standard)	2S(customize)	4T(standard)	4T(customize)
AC input voltage (V)	220~240(±15%) (1PH)	220~240 (±15%) (1PH)	380~440 (±15%) (3PH)	380~450 (±15%) (3PH)
Max. DC voltage (V)	400	450	800	900
Start-up voltage (V)	200	200	300	300
Min. working voltage (V)	150	150	250	250
Recommended DC input voltage range (V)	200~400	200~450	300~750	300~750
Recommended MPPT voltage (V)	260~375	260~375	486~750	486~750

2.5 Selection Guide

2.5.1 Economic Type(SC500S-PV Series)

Product Series	Model	Rated output power (kW-HP)		Rated input current (A)	Rated output current (A)	Max. DC input current (A)
2S~ 1PH 220VAC (0.75~4.0KW)	SC500-2T-P75S-PV	0.75	1	6.2	4	8
	SC500-2T-1P5S-PV	1.5	2	9.3	7	14
	SC500-2T-2P2S-PV	2.2	3	11	9.6	19.2
	SC500-2T-4P0S-PV	4.0	5.5	20.5	17	34
4T~ 3PH 380VAC (0.75~7.5KW)	SC500-4T-P75S-PV	0.75	1	3.4	2.8	5.6
	SC500-4T-1P5S-PV	1.5	2	5	4.4	8.8
	SC500-4T-2P2S-PV	2.2	3	6.5	5.8	11.6
	SC500-4T-4P0S-PV	4.0	5.5	11	10	20
	SC500-4T-5P5S-PV	5.5	7.5	14.6	13	26
	SC500-4T-7P5S-PV	7.5	10	20.5	17	34

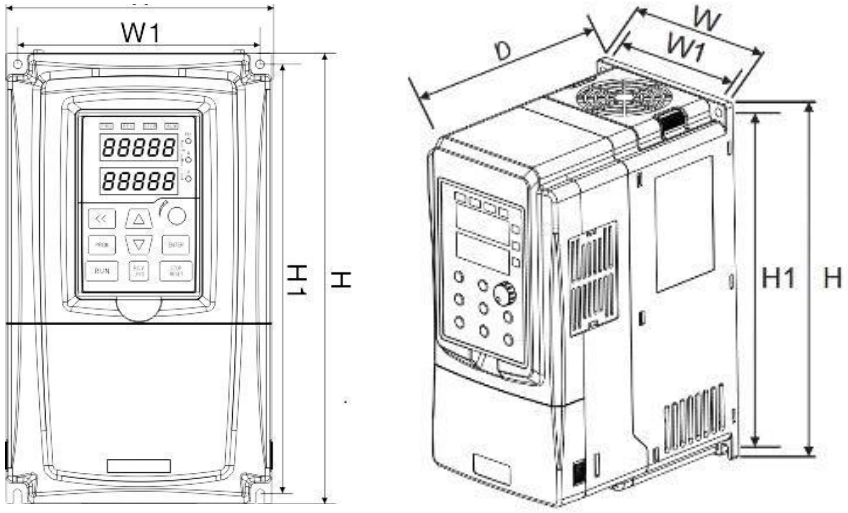
2.5.2 General Type(SC500G-PV Series)

Product Series	Model	Rated output power (kW-HP)		Rated input current (A)	Rated output current (A)	Max. DC input current (A)
2S~ 1PH 220VAC (0.75~160KW)	SC500-2S-P75G-PV	0.75	1	6.2	4	8
	SC500-2S-1P5G-PV	1.5	2	9.3	7	14
	SC500-2S-2P2G-PV	2.2	3	11	9.6	19.2
	SC500-2S-4P0G-PV	4.0	5.5	20.5	17	34
	SC500-2S-5P5G-PV	5.5	7.5	26	25	50
	SC500-2S-7P5G-PV	7.5	10	35	32	64
	SC500-2S-011G-PV	11	15	46.5	45	90
	SC500-2S-015G-PV	15	20	62	60	120
	SC500-2S-018G-PV	18.5	25	76	75	150

Product Series	Model	Rated output power (kW-HP)		Rated input current (A)	Rated output current (A)	Max. DC input current (A)
2S~ 1PH 220VAC (0.75~160KW)	SC500-2S-022G-PV	22	30	92	90	180
	SC500-2S-030G-PV	30	40	113	110	220
	SC500-2S-037G-PV	37	50	157	152	304
	SC500-2S-045G-PV	45	60	180	176	352
	SC500-2S-055G-PV	55	75	214	210	420
	SC500-2S-075G-PV	75	100	310	304	608
	SC500-2S-093G-PV	93	125	350	340	680
	SC500-2S-110G-PV	110	150	430	426	852
	SC500-2S-132G-PV	132	200	525	520	1040
	SC500-2S-160G-PV	160	250	590	585	1170
4T~ 3PH 380VAC (0.75~200KW)	SC500-4T-P75G-PV	0.75	1	3.4	2.8	5.6
	SC500-4T-1P5G-PV	1.5	2	5	4.4	8.8
	SC500-4T-2P2G-PV	2.2	3	6.5	5.8	11.6
	SC500-4T-4P0G-PV	4.0	5.5	11	10	20
	SC500-4T-5P5G-PV	5.5	7.5	14.6	13	26
	SC500-4T-7P5G-PV	7.5	10	20.5	17	34
	SC500-4T-011G-PV	11	15	26	25	50
	SC500-4T-015G-PV	15	20	35	32	64
	SC500-4T-018G-PV	18.5	25	38.5	37	74
	SC500-4T-022G-PV	22	30	46.5	45	90
	SC500-4T-030G-PV	30	40	62	60	120
	SC500-4T-037G-PV	37	50	76	75	150
	SC500-4T-045G-PV	45	60	92	90	180
	SC500-4T-055G-PV	55	75	113	110	220
	SC500-4T-075G-PV	75	100	157	152	304
	SC500-4T-093G-PV	93	125	180	176	352
	SC500-4T-110G-PV	110	150	214	210	420
	SC500-4T-132G-PV	132	200	260	253	506
	SC500-4T-160G-PV	160	250	310	304	608
	SC500-4T-185G-PV	185	275	355	350	700
	SC500-4T-200G-PV	200	300	385	380	760
	SC500-4T-220G-PV	220	300	430	426	852
	SC500-4T-250G-PV	250	400	468	465	930
	SC500-4T-280G-PV	280	470	525	520	1040
	SC500-4T-315G-PV	315	500	590	585	1170

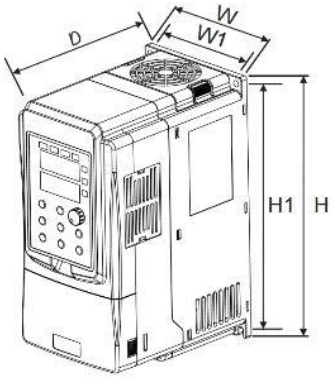
2.6 Appearance and Dimension

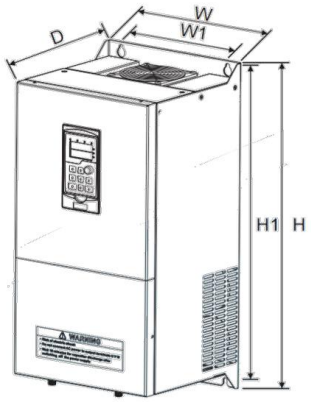
2.6.1 Dimension of Economic Type (SC500S-PV Series).

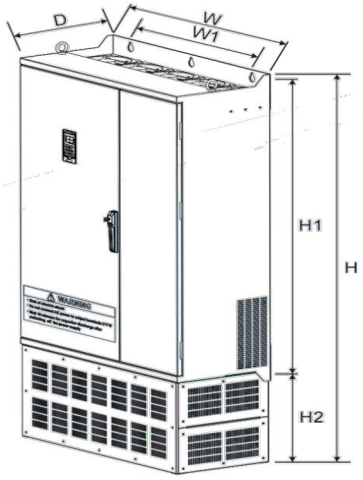


Model	H (mm)	W (mm)	D (mm)	H1 (mm)	W1 (mm)	Mounting Aperture(mm)
SC500-2S-P75S-PV	187	90	133	177	80	4.5
SC500-2S-1P5S-PV						
SC500-2S-2P2S-PV						
SC500-2S-4P0S-PV	247	130	162	236.5	115	5
SC500-4T-P75S-PV	187	90	133	177	80	4.5
SC500-4T-1P5S-PV						
SC500-4T-2P2S-PV						
SC500-4T-4P0S-PV	207	100	142	197	90	4.5
SC500-4T-5P5S-PV	247	130	162	236.5	115	5
SC500-4T-7P5S-PV						

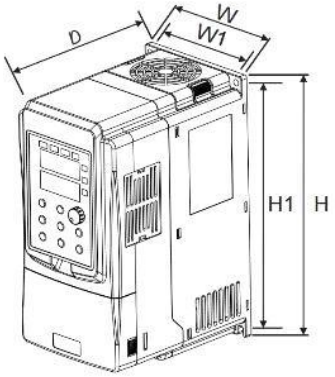
2.6.2 Dimension of General Type(SC500G-PV Series).

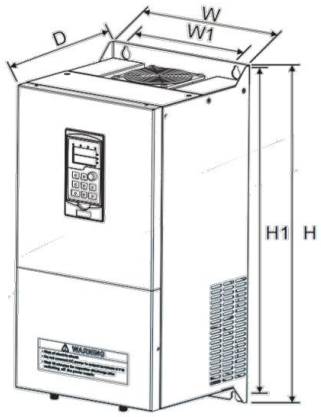


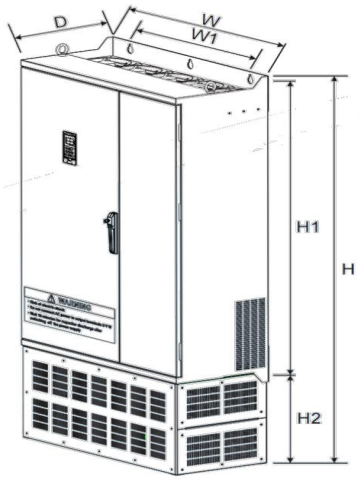




Model	H (mm)	W (mm)	D (mm)	H1 (mm)	H2 (mm)	W1 (mm)	Mounting Aperture(mm)
SC500-2S-P75G-PV	187	90	133	177	-	80	4.5
SC500-2S-1P5G-PV							
SC500-2S-2P2G-PV	207	100	142	197	-	90	4.5
SC500-2S-4P0G-PV	247	130	162	236.5	-	115	5
SC500-2S-5P5G-PV	272	160	201	259	-	146	5.2
SC500-2S-7P5G-PV							
SC500-2S-011G-PV	313	211	205	299	-	196	6.5
SC500-2S-015G-PV	418	252	206.9	399	-	201	9
SC500-2S-018G-PV							
SC500-2S-022G-PV	603	299	276.7	581	-	240	9
SC500-2S-030G-PV							
SC500-2S-037G-PV	643	338	312	619	-	280	11
SC500-2S-045G-PV							
SC500-2S-055G-PV							
SC500-2S-075G-PV	1126	410	383.7	776	356	320	12
SC500-2S-093G-PV							
SC500-2S-110G-PV	1472	650	430.2	1046.8	426	520	13
SC500-2S-132G-PV							
SC500-2S-160G-PV							







Model	H (mm)	W (mm)	D (mm)	H1 (mm)	H2 (mm)	W1 (mm)	Mounting Aperture(mm)
SC500-4T-P75G-PV	187	90	133	177	-	80	4.5
SC500-4T-1P5G-PV							
SC500-4T-2P2G-PV							
SC500-4T-4P0G-PV	207	100	142	197	-	90	4.5
SC500-4T-5P5G-PV	247	130	162	236.5	-	115	5
SC500-4T-7P5G-PV							
SC500-4T-011G-PV	272	160	201	259	-	146	5.2
SC500-4T-015G-PV							
SC500-4T-018G-PV	313	211	205	299	-	196	6.5
SC500-4T-022G-PV							
SC500-4T-030G-PV	418	252	206.9	399	-	201	9
SC500-4T-037G-PV							
SC500-4T-045G-PV	603	299	276.7	581	-	240	9
SC500-4T-055G-PV							
SC500-4T-075G-PV	643	338	312	619	-	280	11
SC500-4T-093G-PV							
SC500-4T-110G-PV							
SC500-4T-132G-PV	1126	410	383.7	776	356	320	12
SC500-4T-160G-PV							
SC500-4T-185G-PV							
SC500-4T-200G-PV							
SC500-4T-220G-PV	1472	650	430.2	1046.8	426	520	13
SC500-4T-250G-PV							
SC500-4T-280G-PV							
SC500-4T-315G-PV							

- **H2 is the base size, 132-200kw base is optional, and 220kw and above power is standard.**

3 Installation and wiring

3.1 Mechanical Installation

1) Ambient temperature: The ambient temperature exerts great influences on the service life of the inverter and is not allowed to exceed the allowable temperature range (- 10C to 50C).

2) The inverter should be mounted on the surface of incombustible articles, with sufficient spaces nearby for heat sinking. The inverter is easy to generate large amount of heat during the operation. The inverter should be mounted vertically on the base with screws.

3) The inverter should be mounted in the place without vibration or with vibration of less than 0.6G, and should be kept away from such equipment as punching machine.

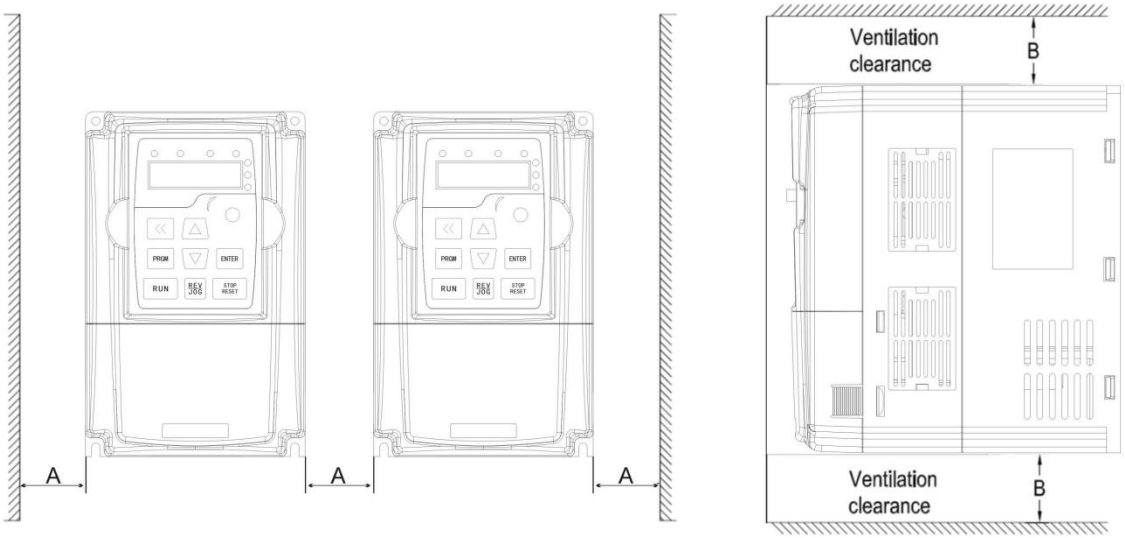
4) The inverter should be mounted in locations free from direct sunlight, high humidity and condensate.

5) The inverter should be mounted in locations free from corrosive gas, explosive gas or combustible gas.

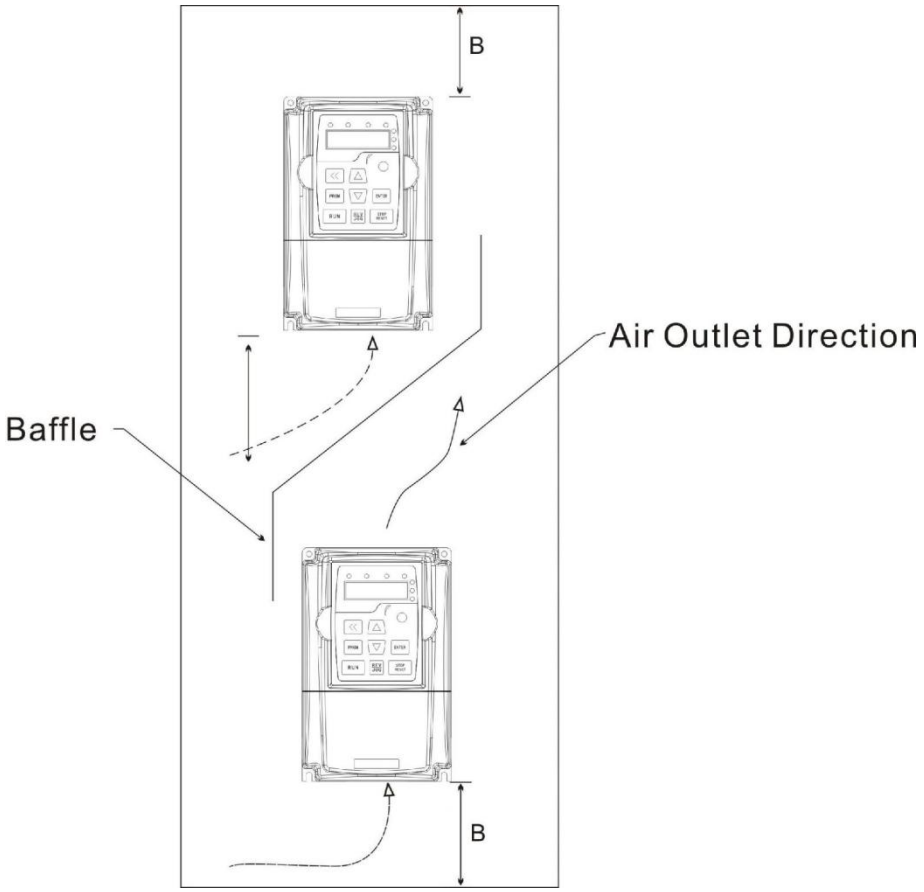
6) The inverter should be mounted in locations free from oil dirt, dust, and metal powder.

3.1.1 Installation diagram

a. Multiple inverters parallel installation



b. Multiple inverters vertical installation



Requirement of minimum mounting clearances

Drive model	Mounting clearances (mm)	
	A	B
0.75 ~ 15kW	≥50	≥ 100
18.5 ~ 45kW	≥50	≥200
55kW and above	≥ 150	≥300

3.1.2 Heat dissipation should be taken into account during the mechanical installation. Please pay attention the following items:

1) Install the inverter vertically so that the heat may be expelled from the top. However, the equipment cannot be installed upside down. If there are multiple inverters, parallel installation is a better choice. In applications where the upper and lower inverters need to be installed, please refer to 3. 1.2 "Inverter Installation Diagram" and install an insulating splitter.

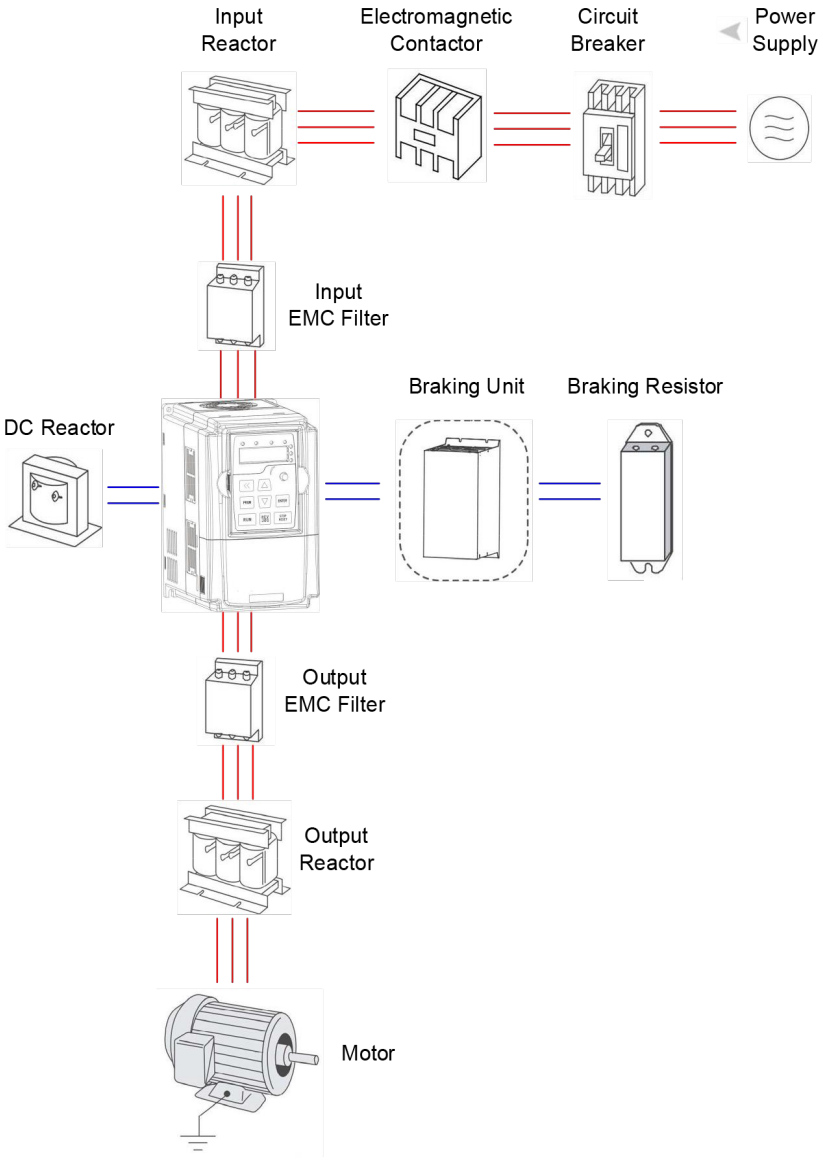
2) The mounting space should be as indicated as 3. 1.2, so as to ensure the heat dissipation space of the

inverter. However, the heat dissipation of other devices in the cabinet should also be taken into account.

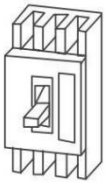
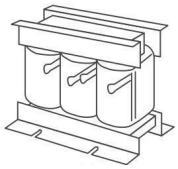
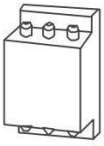
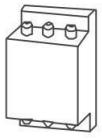
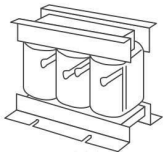
3) The installation bracket must be flame retardant.

4) In the applications where there are metal dusts, it is recommended to mount the radiator outside the cabinet. In this case, the space in the sealed cabinet should be large enough.

3.2 Configuration of Peripheral Devices



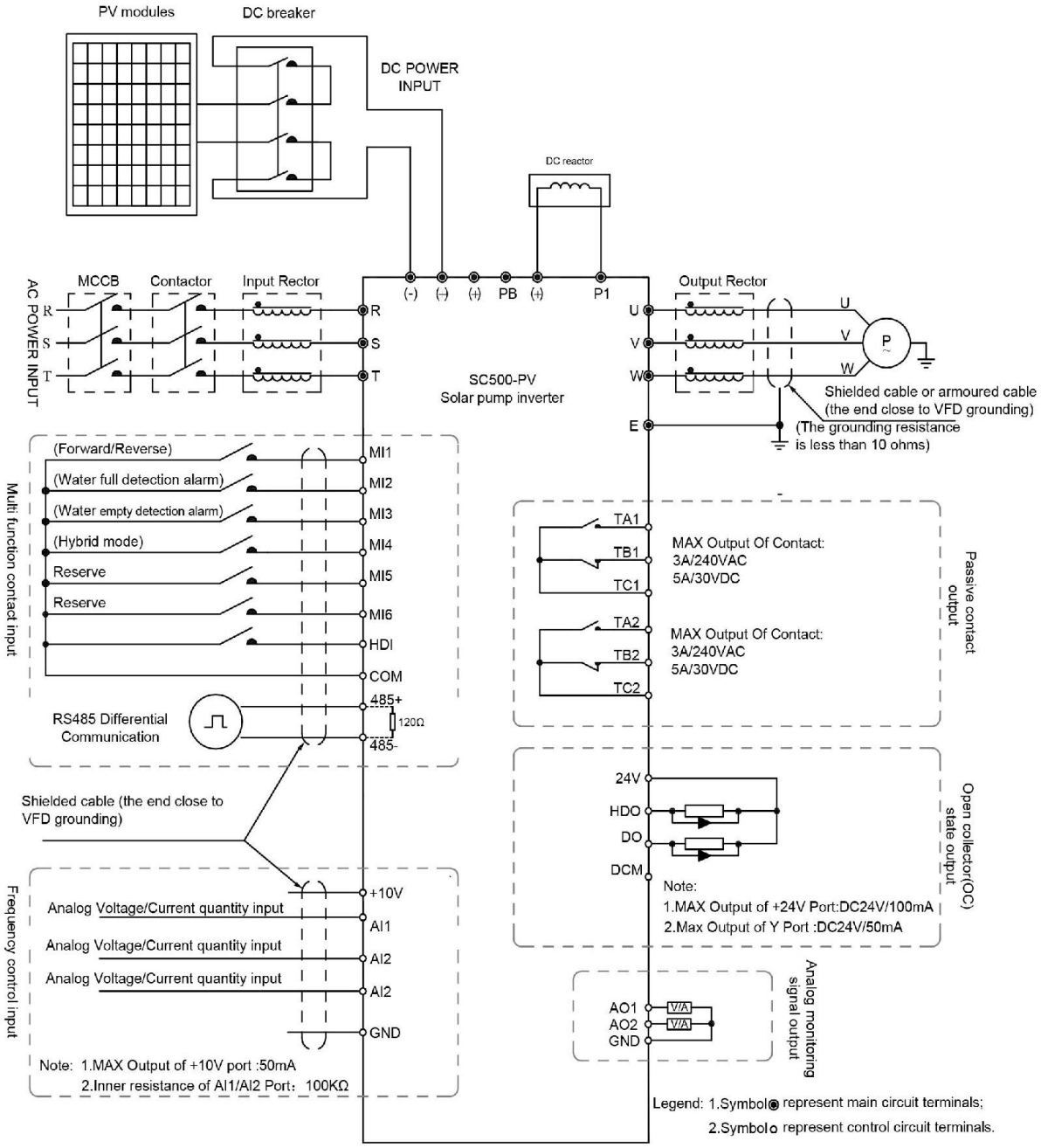
Instructions of peripheral devices

Picture	Device	Instructions
	Cable	Transmitting electrical signals.
	Circuit breaker	Purpose: disconnect power supply and protect the equipment in case of abnormal overcorrect occurs Type selection: breaking current of circuit breaker is defined to be 1.5~2 times the rated current of the drive Breaking time characteristic of circuit breaker should be selected based on overload protection time characteristic of the drive.
	AC Input reactor	Improve power factor Reduce the impact of imbalanced three-phase input AC power supply on the system Suppress higher harmonics and reduce the conducted and radiated interference to peripheral devices Restrict the impact of impulse current on rectifier bridges.
	Input EMC filter	Reduce conducted interference from power supply to the drive, improve the immunity of the drive from noise Reduce conducted and radiated interference of the drive to peripheral device.
	Braking resistor	Purpose: consume motor feedback energy to realize quick brake.
	Output EMC filter	Output filter and radiated interference of the drive to peripheral devices.
	AC Output reactor	Avoid the motor insulation damage result from harmonic voltage Reduce frequent protection from the drive caused by leakage current In case the cable connecting drive and motor is over 100 meters, output AC reactor recommended.

- Do not install the capacitor or surge suppressor at the output side of the inverter, otherwise it may cause inverter failure or capacitor and surge suppressor damaged.
- The Inverter input / output (main circuit) contains harmonic components, it may interfere with inverter accessories communications equipment. Therefore, please install anti-interference filter to minimize interference.
- The details of external devices and accessories selection refer to the manual of external devices.

3.3 Wiring diagram

3.3.1 General wiring diagram



Note:

1. Terminal "◉" refers to the main circuit terminal, terminal "**O**" refers to the control circuit terminal.

2. Built-in braking unit is standard in the inverters below 37kW (include).

3. Braking resistor is optional for user.

 **Danger**	● Make sure that the power switch is at OFF status prior to perform wiring connection. Otherwise there may be danger of electric shock. ● Only the qualified and trained personnel can perform wiring connection. Otherwise it may cause equipment and human injuries. ● It should be earthed reliably. Otherwise there may be danger of electric shock or fire.

 **Caution**	● Make sure that the rated value of the input power supply is consistent with that of the inverter. Otherwise it may damage the inverter. ● Make sure that the motor matches the inverter. Otherwise it may damage the motor or generate inverter protection. ● Do not connect the power supply to the terminals of U, V and W . Otherwise it may damage the inverter. ● Do not directly connect the brake resistor between the DC Bus terminals (+) and (-). Otherwise it may cause fire. ● When connecting the SC500PV model to the DC input of the solar panel, make sure that (+) and (-) are connected correctly. Otherwise it damage the inverter.

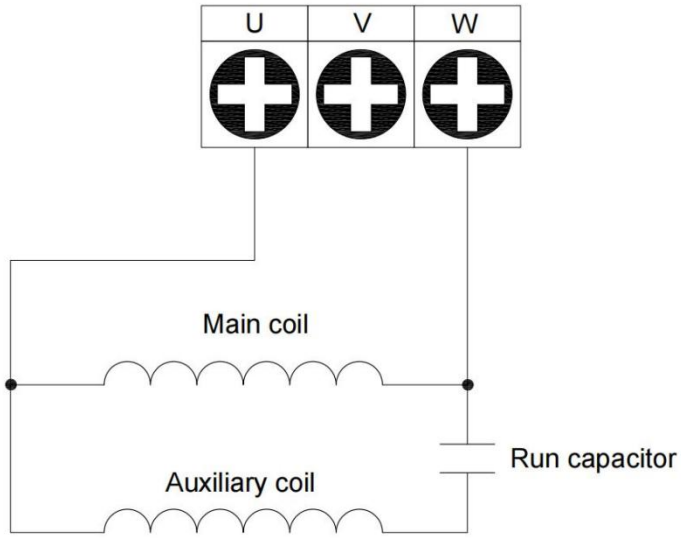
Instructions of main circuit terminals.

Terminal	Description
R, T	Connect to single-phase AC power
R, S, T	Connect to three-phase AC power
(+), (-)	Connect to solar panel DC input power
(+), PB	Reserved terminals for braking resistor (0.4kW~37kW)
P, (+)	Reserved terminals for external DC reactor
U, V, W	Connect to three phase motor/water pump
	Ground connection terminal

Note:

- If the cables' length between motor and frequency inverter is longer than 50 meters (220V inverter) or 100 meters (380V inverter), it must install an additional output reactor in the system.
- If the cables' length between motor and frequency inverter is long, please reduce the carrier frequency, if the carrier frequency is bigger, the leakage current of higher harmonic on the cable will be bigger, which will bring bad effect to frequency inverter and other devices.

3.3.2 Single phase pump/motor diagram



3.3.3 Control terminals and connections

A: 0.75~7.5KW terminals

HDO	DO	MI1	MI2	MI3	MI4	HDI	485+	AI1	AO1
TA	TB	TC	24V	OP	DCM	485−	AI2	10V	GND

B: 11~22KW terminals

TA1	TB1	TC1	MI1	MI2	MI3	MI4	MI5	MI6	HDI	485+	485−	AI1	AI2	AI3
TA2	TB2	TC2	HDO	DO	24V	24V	OP	DCM	DCM	GND	GND	AO1	AO2	10V

C: ≥30KW terminals

TA1	TB1	TC1	TA2	TB2	TC2

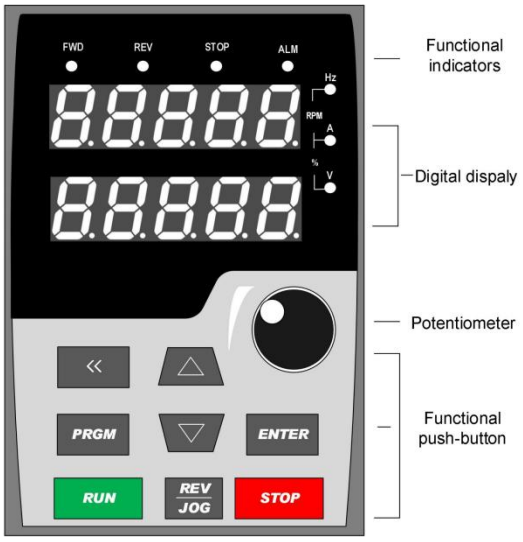
485+	485−	AI1	AI2	AI3		
GND	GND	AO1	AO2	10V		

MI1	MI2	MI3	MI4	MI5	MI6	HDI
HDO	DO	24V	24V	OP	DCM	DCM

4 Operation and Display

4.1 Keypad Description

With the operation keypad, it can perform such operations on the inverter as function parameter modification, working status monitor and running control (start and stop).



1) Function keys description

Functional indicator	Description
FWD	Indication of inverter forward running
REW	Indication of inverter reverse running
STOP	Inverter is stopping
ALM	Inverter with fault

2) Digital display zone

Five-number digit LED display, can display setting frequency, output frequency, various monitoring data and alarm code.

The first line LED display of two lines keypad is operated and displayed the same like single line LED keypad. The second line LED displays the DC output Voltage.

3) Keypad push-button description

Button	Name	Function
PRGM	**Programming key**	Entry and exit of primary menu.
ENTER	**Confirmation key**	Progressively enter menu, and confirm parameters.
△	**Increment key**	Progressively increase of data or function codes.
▽	**Decrement key**	Progressively decrease of data or function codes.
≪	**Shift key**	Select the displayed parameters in turn on the stop display interface and running display interface, and select the modification bit of parameters when modifying parameters.
RUN	**Running key**	Start to run inverter under keyboard control mode.
STOP	**Stop / Reset**	Stop inverter in running status and reset operation in fault alarm status.
REV JOG	**Multi- function selection key**	The corresponding functions are defined by P7.

4.2 Function Code Checking and Modification Methods Description

The operation keypad of the Inverter adopts three-level menu structure to carry out operations such as parameter setting.

1) Function parameter group (level 1 menu)

2) Function code (level 2 menu)

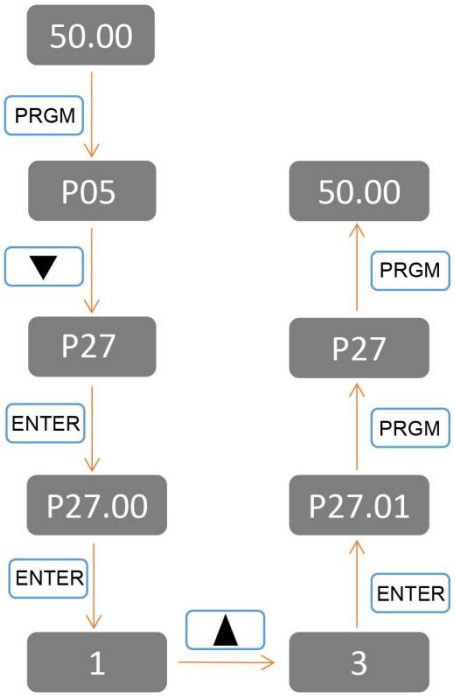
3) Function code setting value (level 3 menu)

Description: When operating on level 3 menu, press **PRGM** key or **ENTER** key to return to level 2 menu. The difference between **PRGM** key and **ENTER** key is described as follows:

1) Pressing **ENTER** key will save the setup parameter and return to the level 2 menu and then automatically shift to the next function code.

2) Pressing **PRGM** key will directly return to level 2 menu without saving the parameter, and it will return to the current function code.

Example: Modify the function code P27.00 from 1(Auto running) to 3(Communication running).



In level 3 menu, if there is no flashing bit, it means this function code cannot be modified. The possible reasons are:

1) The function code is an unchangeable parameter, such as actual detection parameter, running record parameter, etc.

2) The function code cannot be modified in running status. It can be modified only when the inverter is stopped.

4.3 Power-on Initialization

Firstly the system initializes during the inverter power-on, and LED displays "**8.8.8.8.8.8**". After initialization, the inverter is in fault protection status if a fault happens, or the inverter is in stand-by status

4.4 Fault Protection

In fault status, inverter will display fault code & record output current, output voltage, etc. For details, please refer to (fault and protection) parameter group. Fault can be reset via **STOP/RESET** key or external terminals.

4.5 Stand By

In stop or stand by status, parameters of multi-status can be displayed.The displaying of the chosen parameters can be switched in sequence by pressing >> button.

4.6 Running

In running status, the displaying of the chosen parameters can be switched in sequence by pressing >> button.

4.7 Password Setting

The inverter provides user password protection function. When P27- 18 is set to non-zero value, it indicates the user password, and the password protection turns valid after exiting the function code editing status. When pressing PRGM key again, "------"will be displayed, and common menu cannot be entered until user password is input correctly.

To cancel the password protection function, enter with password and set P27. 18-00 to "0" .

4.8 Motor Parameters setting

When customers use SC500-PV series inverters, they should ensure that better motor parameters are matched. The following parameters can be input to meet the actual motor parameters:

P27.33 Rated power of motor

P27.34 Rated voltage of motor

P27.35 Rated current of motor

P27.36 Rated speed of motor

P27.37 Rated frequency of motor

5 Function Parameter List

This manual is a dedicated manual for SC500PV series PV inverter. If you need to set the function of the PV inverter, please refer to **P27 Group**. The detailed functional parameters are listed in below table.

The instruction of the symbols in function parameter list is as following:

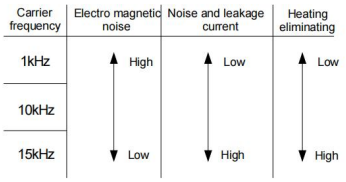
○ : Can't be modified while running.

● : Can be modified while running.

×: Read only.

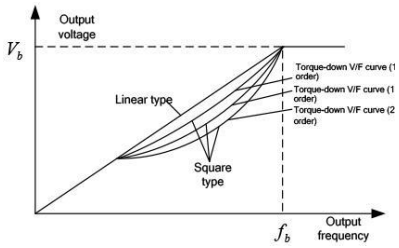
Code	Name	Setting range	Description	Default setting	Property
P00 Group Basic Functions					
P00.00	Speed control mode	0~2	0: SVC 1: SVC mode 2: Space voltage vector control mode	2	○
P00.01	Channel of running commands	0~2	Used to select the channel of running inverter control commands. The inverter control commands include the start, stop, forward run, reverse run, jog, and fault reset commands. 0: Keypad 1: Terminal 2: Communication	0	●
P00.03	Max. output frequency	P00.04 ~300Hz	Used to set the max. output frequency of the inverter. Pay attention to this parameter because it is the foundation of the frequency setting and the speed of acceleration (ACC) and deceleration (DEC). Setting range: P00.04~300.00Hz	50.00Hz	○
P00.04	Upper limit of running frequency	P00.05 ~300Hz	The upper limit of the running frequency is the upper limit of the output frequency of the inverter	50.00Hz	○

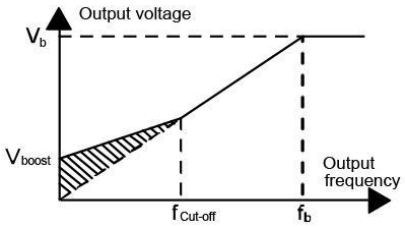
Code	Name	Setting range	Description	Default setting	Property
			which is lower than or equal to the maximum frequency. When the set frequency is higher than the upper limit of the running frequency, the upper limit of the running frequency is used for running. Setting range: P00.05~P00.03 (Max. output frequency)		
P00.05	Lower limit of running frequency	0~300Hz	The lower limit of the running frequency is that of the output frequency of the inverter. The inverter runs at the lower limit frequency if the set frequency is lower than the lower limit. Note: Max.output frequency ≥ Upper limit frequency ≥ Lower limit frequency. Setting range: 0.00Hz~P00.04 (Upper limit of running frequency).	0.00Hz	○
P00.10	Keypad set frequency	0.00Hz ~P00.03	When frequency commands are selected as "keypad setting", this parameter will be the initial value of VFD reference frequency Setting range: 0.00Hz~P00.03 (the max. frequency)	50.00Hz	●
P00.11	ACC time 1	0.0~ 3600.0s	ACC time means the time needed if the inverter speeds up from 0Hz to the Max.output frequency (P00.03). DEC time means the time needed if the inverter speeds down from the Max. output frequency to 0Hz (P00.03). The inverter has four groups of ACC/DEC time which can be selected by P05. The factory default ACC/DEC time of the inverter is the first group. Setting range of P00. 11 and P00.12: 0.0~3600.0s	Depend on mode	●
P00.12	DEC time 1			Depend on mode	●

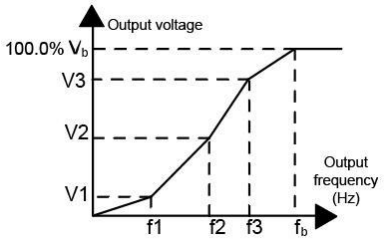
Code	Name	Setting range	Description	Default setting	Property
P00.13	Running direction	0~1	0: Run at the default direction. The inverter runs in the forward direction. FWD/REVindicator is off. 1: Run at the opposite direction. The inverter runs in the reverse direction. FWD/REV indicator is on. Modify P00.13 to shift the rotation direction of the motor. This effect equals to the shifting the rotation direction by adjusting either two of the motor lines (U, V and W). The motor rotation direction can be changed by QUICK/JOG on the keypad. Refer to parameter P07.02. **Note:** When the parameter is restored to the default value, the motor's running direction is restored to the default one. Exercise caution before using this function if the change of motor rotation direction is disallowed after commissioning.	0	●
P00.14	Carrier frequency setting	1.0~ 15.0 kHz	 Advantages of high carrier frequency: ideal current waveform, less current harmonics, and less motor noise. Disadvantages of high carrier frequency: the switching loss increases, the temperature rise of the inverter increases, and the output capacity of the inverter is affected. Under high carrier frequency, the inverter needs to be derated; Electromagnetic interference increases. A low carrier frequency is the opposite of the above. When the user uses more than the default carrier frequency, it needs to be derated. For each additional 1k carrier frequency, the derating is 10%.	Depend on mode	○

Code	Name	Setting range	Description	Default setting	Property
P00.15	Motor Parameter autotuning	0~3	0: No operation 1: Rotation autotuning Comprehensive motor parameter autotuning. It is recommended to use rotation autotuning when high control accuracy is needed. 2: Static autotuning Used in scenarios where the motor cannot be disconnected from load. 3: Static autotuning 2 Empty-load current and mutual inductance are not autotuned.	0	○
P00.16	AVR function selection	0~ 1	0: invalid 1: The whole process is valid The automatic adjustment function of the output voltage of the inverter eliminates the influence of the bus voltage fluctuation on the output voltage of the inverter.	1	○
P00.18	Function parameter recovery	0~2	0: No operation 1: Restore default values 2: Clear fault records After the selected operation is performed, the function code is automatically restored to 0. Restoring the default values may delete the user password. Exercise caution before using this function.	0	●
P01 Group Start and Stop Control					
P01.08	Stop mode	0~1	0: Decelerate to stop. When a stop command takes effect, the inverter lowers output frequency based on the DEC mode and the defined DEC time; when the frequency drops to 0Hz, the inverter stops. 1: Coast to stop. When a stop command takes effect, the inverter stops output immediately.	0	●

Code	Name	Setting range	Description	Default setting	Property
P01.18	Terminal-based running command protection at power-on	0~1	0: The terminal running command is invalid at power-on. 1: The terminal running command is valid at power-on.	0	●
P01.21	Power-off restart selection	0~1	0: Disable restart 1: Enable restart	0	●
P01.25	0Hz output selection	0~2	Select the inverter output mode at 0Hz. 0: no voltage output 1: With voltage output 2: According to stop DC braking current output	0	●
P02 Group Parameters of Motor 1					
P02.00	Motor type	0~1	0: Asynchronous motor 1: Reserved	0	○
P02.01	Rated power of asynchronous motor	0.1~300 0.0kW	Set the parameter of the asynchronous motor. In order to ensure the controlling performance, according to the nameplate of the asynchronous motor. SC500-PV series VFD provide the function of parameter auto. Correct parameter auto comes from the correct setting of the motor nameplate. In order to ensure the controlling performance, please configure the motor according to the standard principles, if the gap between the motor and the standard one is huge, the features of the VFD will decrease. Resetting the rated power (P27.33) of the motor can initialize the motor parameters P02.02~ P02.10.	Depend on mode	○
P02.02	Rated frequency of asynchronous motor	0.01Hz~ P00.03		Depend on mode	○
P02.03	Rated rotating speed of asynchronous motor	1~3600 0 rpm		Depend on mode	○
P02.04	Rated voltage of asynchronous motor	0~1200 V		Depend on mode	○
P02.05	Rated current of asynchronous motor	0.8~600 0.0A		Depend on mode	○
P02.06	Stator resistor of asynchronous motor	0.001~6 5.535Ω	After motor parameter auto is properly performed, the values of P02.06–P02.10 are automatically updated.	Depend on mode	●
P02.07	Rotor resistor of asynchronous motor	0.001~6 5.535Ω		Depend on mode	●

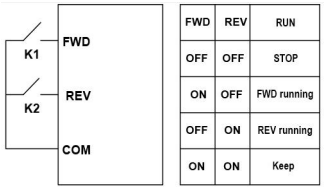
Code	Name	Setting range	Description	Default setting	Property
P02.08	Leakage inductance of asynchronous motor	0. 1~655 3.5 mH	These parameters are the benchmark parameters for high -performance vector control, directly affecting the control performance. Note: Do not modify these parameters unless it is necessary.	Depend on mode	•
P02.09	Mutual inductanc of asynchronous motor	0. 1~655 3.5 mH		Depend on mode	•
P02.10	Non-load current of asynchronous motor	0. 1~655 3.5 A		Depend on mode	•
P04 Group SVPWM Control					
P04.00	V/F curve setting	0~5	This group of function code defines the V/F curve of motor 1 to meet the needs of different loads.  0: Straight-line V/F curve, applicable to constant torque loads 1: Multi-dots V/F curve 2: Torque-down V/F curve (power of 1.3) 3: Torque-down V/F curve (power of 1.7) 4: Torque-down V/F curve (power of 2.0) Curves 2–4 are applicable to the torque loads such as fans and water pumps. You can adjust according to the characteristics of the loads to achieve best performance. 5: Customized V/F(V/F separation); in this mode, V can be separated from f and f can be adjusted through the frequency given channel set by P00.06 or the voltage given channel set by P04.27 to change the feature of the curve	4	○

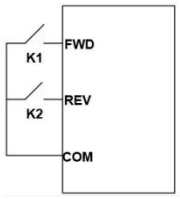
Code	Name	Setting range	Description	Default setting	Property
			Note: In the following figure, Vb is the motor rated voltage and fb is the motor rated frequency.		
P04.01	Torque boost	0.0%~10.0%	In order to compensate for low-frequency torque characteristics, you can make some boost compensation for the output voltage. P04.01 is relative to the max. output voltage Vb. P04.02 defines the percentage of cut-off frequency of manual torque boost to the rated motor frequency fb. Torque boost can improve the low-frequency torque characteristics in space voltage vector control mode. You need to select torque boost based on the load. For example, larger load requires larger torque boost, however, if the torque boost is too large, the motor will run at over-excitation, which may cause increased output current and motor overheating, thus decreasing the efficiency. When torque boost is set to 0.0%, the inverter uses automatic torque boost. Torque boost cut-off threshold: Below this frequency threshold, torque boost is valid; exceeding this threshold will invalidate torque boost.  	01.0%	•
P04.02	Torque boost cut-off	0.0%~50.0%		20.0%	•
P04.03	V/F frequency point 1 of motor 1	0.00Hz ~P04.05	If P04.00 =1, the user can set V//F curve by P04.03~P04.08. V/F is set to the motor load. Note: V1＜V2＜V3; f1＜f2＜f3. If the	0.00	•
P04.04	V/F voltage point 1 of motor 1	0.0% ~110.0%		0.00	•

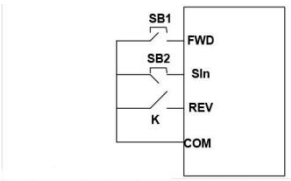
Code	Name	Setting range	Description	Default setting	Property
P04.05	V/F frequency point 2 of motor 1	P04.03~P04.07	low-frequency voltage is high, overtemperature and burning may occur and the overcurrent stall and protection may occur to the inverter.  Setting range of P04.03: 0.00Hz ~P04.05 Setting range of P04.04: 0.0% ~ 110.0% (rated voltage of motor1) Setting range of P04.05: P04.03 ~P04.07 Setting range of P04.06: 0.0% ~ 110.0%(rated voltage of motor1) Setting range of P04.07: P04.05 ~P02.02(rated frequency of motor1) or P04.05~P02. 16 (rated frequency of motor1) Setting range of P04.08: 0.0% ~ 110.0%(rated voltage of motor1)	0.00	•
P04.06	V/F voltage point 2 of motor 1	0.0% ~ 110.0%		0.00	•
P04.07	V/F frequency point 3 of motor 1	P04.05 ~P02.02		0.00	•
P04.08	V/F voltage point 3 of motor 1	0.0% ~ 110.0%		0.00	•
P04.09	V/F slip compensation gain	0.0~200.0%	Used to compensate for the motor rotating speed change caused by load change in the space voltage vector mode, and thus improve the rigidity of the mechanical characteristics of the motor. You need to calculate the rated slip frequency of the motor as follows: △ f=fb-n*p/60 Of which, fb is the rated frequency of the motor, corresponding to function code P02.01. n is the rated rotating speed of the motor, corresponding to function code. P02.02. p is the number of pole pairs of the motor. 100.0% corresponds to the rated slip frequency △f of the	0.00	•

Code	Name	Setting range	Description	Default setting	Property
			motor. Setting range: 0.0~200.0%		
P04.34	Two phase control selection of single-phase motor	-	Ones: Reserved Tens: Reversal of the secondary winding (V-phase) voltage 0: Not reversed; 1: Reversed Setting range: 0~0x1 1	00	○
P04.35	Voltage ratio of V-phase and U-phase	-	0.00~2.00	1.00	●
P05 Group Input Terminals					
P05.00	HDI input type	0~ 1	0: High-speed pulse input 1: HDI switch input	1	○
P05.01	MI1 terminals function selection	0~63	0: No function 1: Forward rotation operation 2: Reverse rotation operation 3: 3-wire control operation 4: Forward jogging 5: Reverse jogging 6: Coast to stop 7: Fault reset 8: Operation pause 9: External fault input 10: Increasing frequency setting (UP) 1 1: Decreasing frequency setting (DOWN) 12: Cancel the frequency change setting 13: Shift between A setting and B setting 14: Shift between combination setting and A setting 15: Shift between combination setting and B setting 16: Multi-step speed terminal 1 17: Multi-step speed terminal 2 18: Multi-step speed terminal 3 19: Multi-step speed terminal 4 20: Multi-step speed pause 21: ACC/DEC time 1 22: ACC/DEC time 2	01	○
P05.02	MI2 terminals function selection			43	○
P05.03	MI3 terminals function selection			44	○
P05.04	MI4 terminals function selection			42	○
P05.05	MI5 terminals function selection			00	○
P05.06	MI6 terminals function selection			00	○
P05.07	MI7 terminals function selection			00	○
P05.08	MI8 terminals function selection			00	○
P05.09	HDI terminals function selection			46	○

Code	Name	Setting range	Description	Default setting	Property
			23: Simple PLC stop reset 24: Simple PLC pause 25: PID control pause 26: Traverse pause (stop at the current frequency) 27: Traverse reset (return to the center frequency) 28: Counter reset 29: Torque control prohibition 30: ACC/DEC prohibition 31: Counter trigger 32: Reserved 33: Cancel the frequency change setting 34: DC brake 35: Reserved 36: Shift the command to the keypad 37: Shift the command to terminals 38: Shift the command to communication 39: Pre-magnetized command 40: Clear the power 41: Keep the power 42: Hybrid mode: Forced switch to power frequency input (Switching-on indicates switching to power frequency input; switching-off indicates the input mode is controlled by the keypad.) 43: Full water signal 44: Non-water signal 45: Two-phase control mode of the single-phase motor 46: PV voltage digital input when no boost module is applied (in auto switching mode) 47–63: Reserved		
P05.10	Polarity selection of the input terminals	000~10F	This function code is used to set the polarity of the input terminal. When the bit is set to a value of 0, the input terminal is positive;	000	○

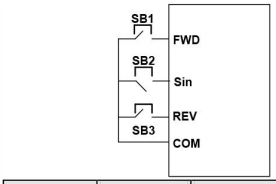
Code	Name	Setting range	Description	Default setting	Property
			When the bit is set to a value of 1, the input terminal is negative.		
P05. 11	Switch filter time	0.000~ 1 .000s	Set the filtering time of MI1~MI8, HDI terminal sampling. In the case of large interference, this parameter should be increased to prevent misoperation.	0.010s	●
P05. 12	Virtual terminal setting	0~4	Enable virtual input terminal function in communication mode. 0x000~0x1FF (0: disable, 1: enable) BIT0: MI1 virtual terminal enable BIT1: MI2 virtual terminal enable BIT2: MI3 virtual terminal enable BIT3: MI4 virtual terminal enable BIT4: MI5 virtual terminal enable BIT5: MI6 virtual terminal enable BIT6: MI7 virtual terminal enable BIT7: MI8 virtual terminal enable BIT8: HDI virtual terminal enable Note: After the virtual terminal is enabled, the terminal state can only be changed through communication, and address is 0x200A.	0	○
P05. 13	Terminal control run mode	0~3	0: Two-wire control 1; enable and direction are unified. This mode is the most commonly used two-wire mode. The forward and reverse rotation of the motor is determined by the defined FWD/ REV terminal command.  FWD REV RUN OFF OFF STOP ON OFF FWD running OFF ON REV running ON ON Keep 1: Two-wire control 2; Enable and direction are separated. When using this mode, the defined FWD is the enable terminal.	0	○

<table>
<tr><th>Code</th><th>Name</th><th>Setting range</th><th>Description</th><th>Default setting</th><th>Property</th></tr>
<tr><td></td><td></td><td></td><td>
The direction is determined by the state of the defined REV.


<table>
<tr><th>FWD</th><th>REV</th><th>RUN command</th></tr>
<tr><td>OFF</td><td>OFF</td><td>STOP</td></tr>
<tr><td>ON</td><td>OFF</td><td>FWD running</td></tr>
<tr><td>OFF</td><td>ON</td><td>STOP</td></tr>
<tr><td>ON</td><td>ON</td><td>REV running</td></tr>
</table>
2: Three-wire control 1; this mode defines Sin as the enable terminal, the running command is generated by FWD, and the direction is controlled by REV.
When the inverter is running, the terminal Sin needs to be closed, the terminal FWD generates a rising edge signal, the inverter starts to run, and the state of the terminal REV determines the running direction; When the inverter stops, the terminal Sin needs to be disconnected to complete the stop.


During run, the direction control is as follows:
<table>
<tr><th>SIn</th><th>REV</th><th>Before</th><th>NOW</th></tr>
<tr><td rowspan="2">ON</td><td rowspan="2">OFF→ON</td><td>FWD running</td><td>REV running</td></tr>
<tr><td>REV running</td><td>FWD running</td></tr>
<tr><td rowspan="2">ON</td><td rowspan="2">ON→OFF</td><td>REV running</td><td>FWD running</td></tr>
<tr><td>FWD running</td><td>REV running</td></tr>
<tr><td>ON→OFF</td><td>ON</td><td colspan="2">Slow down and stop</td></tr>
</table>
SIn: three-wire running control, FWD: forward running, REV: reverse running.

3: Three-wire control 2; this mode defines Sin as the enable terminal, the running command is generated by FWD or REV, and both control the running direction.
</td><td></td><td></td></tr>
</table>

<table>
<tr><th>Code</th><th>Name</th><th>Setting range</th><th>Description</th><th>Default setting</th><th>Property</th></tr>
<tr><td></td><td></td><td></td><td>When the inverter is running, the terminal Sin needs to be in the closed state, and the terminal FWD or REV generates a rising edge signal to control the running and direction of the inverter;
When the inverter stops, the terminal Sin needs to be disconnected to complete the shutdown.
 

<table>
<tr><th>Sin</th><th>FWD</th><th>REV</th><th>RUN direction</th></tr>
<tr><td rowspan="2">ON</td><td rowspan="2">OFF→ON</td><td>ON</td><td>FWD running</td></tr>
<tr><td>OFF</td><td>FWD running</td></tr>
<tr><td rowspan="2">ON</td><td>ON</td><td rowspan="2">OFF→ON</td><td>REV running</td></tr>
<tr><td>OFF</td><td>REV running</td></tr>
<tr><td rowspan="2">ON→OFF</td><td></td><td></td><td rowspan="2">Slow down and stop</td></tr>
<tr><td></td><td></td></tr>
</table>
Sln: three-wire running control, FWD: forward running, REV: reverse running.</td><td></td><td></td></tr>
<tr><td colspan="6">P06 Group Output Terminals</td></tr>
<tr><td>P06.03</td><td>Relay RO1 output selection</td><td rowspan="2">0~30</td><td>0: Invalid
1: In operation
2: Forward rotation operation
3: Reverse rotation operation
4: Jogging operation
5: VFD fault
6: VFD Underload
7: VFD Low speed output protection
8: Frequency arrival
9: Zero speed running
10: Upper limit frequency arrival
1 1: Lower limit frequency arrival
12: Ready for operation
13: Pre-magnetizing
14: Overload alarm
15: Underload alarm
16: Completion of simple PLC stage
17: Completion of simple PLC cycle</td><td>05</td><td>●</td></tr>
<tr><td>P06.04</td><td>Relay RO2 output selection</td><td>05</td><td>●</td></tr>
</table>

Code	Name	Setting range	Description	Default setting	Property
			18: Setting count value arrival 19: Defined count value arrival 20: External fault valid 21: Reserved 22: Running time arrival 23: Modbus communication virtual terminals output 24–26: Reserved 27: Weak light 28–29: Reserved 30: Shift to PV mode (If the system works in PV mode, relay output is high.)		
P06.05	Polarity selection of output terminals	0~F	The function code is used to set the pole of the output terminal. When the current bit is set to 0, output terminal is positive. When the current bit is set to 1, output terminal is negative.	0	●
P06.10	Delay time for opening relay RO1	0.000~50.000s	Delay closing time 1	10.000s	●
P06.11	Delay time for relay RO1 disconnection	0.000~50.000s	Extend disconnection time 1	10.000s	●
P06.12	Delay time for opening relay RO2	0.000~50.000s	Delay closing time 2	0.000s	●
P06.13	Delay time for relay RO2 disconnection	0.000~50.000s	Extend disconnection time 2	0.000s	●
P07 Group Keyboard Function					
P07.02	REV/JOG function selection	0~6	0: No function 1: Jogging running. Press REV/JOG to begin the jogging running. 2: Shift the display state by the shifting key. Press REV/JOG to shift the displayed function code from	0	○

Code	Name	Setting range	Description	Default setting	Property
			right to left. 3: Shift between forward rotations and reverse rotations. Press REV/JOG to shift the direction of the frequency commands. This function is only valid in the keypad commands channels. 4: Clear UP/DOWN settings. Press REV/JOG to clear the set value of UP/DOWN. 5: Coast to stop. Press REV/JOG to coast to stop. 6: Shift the running commands source. Press REV/JOG to shift the running commands source.		
P07.03	REV/JOG the shifting sequence of running command	0~3	When P07.02=6, set the shifting sequence of running command channels. 0: Keypad control→terminal control → communication control 1: Keypad control←→terminals control 2: Keypad control← → communication control 3: Terminals control← → communication control	1	●
P07.04	STOP/RESET stop function	0~3	Select the stop function by STOP/ RESET. STOP/ RESET is effective in any state for the keypad reset. 0: Only valid for the keypad control 1: Both valid for keypad and terminals control 2: Both valid for keypad and communication control 3: Valid for all control modes	3	●
P07.08	Frequency display factor		0.01~10.00 Display frequency = running frequency * P07.08 1.00	1.00	●
P07.12	IGBT temperature		-20.0~120.0°		×

Code	Name	Setting range	Description	Default setting	Property
P07.14	Cumulative running time of the machine		0~65535h		×
P07.15	High power consumption of inverter	0~65535 °(*1000)	Display the power consumption of the frequency converter. Power consumption of Frequency inverter=P07.15 * 1000+P07.16 Unit: kWh		×
P07.16	Low power consumption of inverter	0.0~ 999.9°			×
P07.27	The previous failure type		0: No fault 1: Inverter unit U phase protection (OUt1) 2: Inverter unit V phase protection (OUt2) 3: Inverter unit W phase protection (OUt3) 4: ACC overcurrent (OC1) 5: DEC overcurrent (OC2) 6: Constant-speed overcurrent (OC3) 7: ACC overvoltage (OV1) 8: DEC overvoltage (OV2) 9: Constant-speed overvoltage (OV3) 10: Bus undervoltage (UV) 11: Motor overload (OL1) 12: VFD overload (OL2) 13: Input side phase loss (SPI) 14: Output side phase loss (SPO) 15: Overheat of the boost module (OH1) 16: Overheat fault of the inverter module (OH2) 17: External fault (EF) 18: 485 communication fault (CE) 19: Current detection fault (ItE) 20: Motor antotune fault (tE) 21: EEPROM operation fault (EEP) 22: PID response offline fault (PIDE) 23: Braking unit fault (bCE) 24: Running time arrival (END) 25: Electrical overload (OL3)		×
P07.28	The first 1 failure types				×
P07.29	The first 2 failure types				×
P07.30	The first 3 failure types				×
P07.31	The first 4 failure types				×
P07.32	The first 5 failure types				×

Code	Name	Setting range	Description	Default setting	Property
			26–31:Reserved 32: Grounding short circuit fault 1 (ETH1) 33: Grounding short circuit fault 2 (ETH2) 34: Speed deviation fault (dEu) 35: Maladjustment (STo) 36:Underload fault (LL) 37: Hydraulic probe damage (tSF) 38: PV reverse connection fault (PINV) 39: PV overcurrent (PVOC) 40: PV overvoltage (PVOV) 41: PV undervoltage (PVLV) 42: Fault on communication with the boost module (E-422) 43: Bus overvoltage detected on the boost module (OV) Alarms: Weak light alarm (A-LS) Underload alarm (A-LL) Full water alarm (A-tF) Water-empty alarm (A-tL)		
P07.33	Current fault operating frequency			0.00Hz	×
P07.35	Current fault output voltage			0V	×
P07.36	Current fault output current			0.0A	×
P07.37	Current fault bus voltage			0.0V	×
P07.38	Maximum temperature at current fault			0.0℃	×
P07.41	The frequency of the previous failure			0.00Hz	×
P07.43	The output voltage of the previous failure			0V	×
P07.44	The output current of the previous			0.0A	×

Code	Name	Setting range	Description	Default setting	Property
	failure				
P07.45	The bus voltage of the previous failure			0.0V	×
P07.46	The highest temperature of the previous failure			0.0℃	×
P07.49	The frequency of the first 2 faults			0.00Hz	×
P07.51	The output voltage of the first 2 faults			0V	×
P07.52	The output current of the first 2 faults			0.0A	×
P07.53	The Bus voltage of the first 2 faults			0.0V	×
P07.54	The highest temperature at the time of the first 2 faults			0.0℃	×
P08 Group Enhanced Function Group					
P08.28	Fault automatic reset times	0~10	-	5	●
P08.29	Fault automatic reset interval time setting	0.1~3 600.0s	-	10.0s	●
P11 Group Protection Parameters					
P11.00	Phase loss protection	0x000 ~0x011	0x000–0x011 LED ones: 0: Input phase loss software protection disabled 1: Input phase loss software protection enabled LED tens: 0: Output phase loss software protection disabled 1: Output phase loss software protection enabled LED hundreds: Reserved 000~1 1 1	010	●

Code	Name	Setting range	Description	Default setting	Property
P11.01	Frequency decrease at sudden power loss	0~ 1	0: Disable 1: Enable	0	●
P11.02	Frequency decrease ratio at sudden power loss	0.00Hz~ P00.03/s	After the power loss of the grid, the bus voltage drops to the sudden frequency decrease point, the VFD begin to decrease the running frequency at P11.02, to make the VFD generate power again. The returning power can maintain the bus voltage to ensure a rated running of the VFD until the recovery of power.	3.00Hz/s	●
P14 Serial Communication Function Group					
P14.00	Local communication address	1~247	When the master is writing a frame and the slave communication address is set to 0, it is broadcast Communication address. All slaves on Modbus will accept this frame, But the slave does not respond. The local communication address is unique in the communication network, which is the realization of the upper level. It is the basis of point-to-point communication between machine and frequency converter. Note: the slave address cannot be set to 0.	001	●
P14.01	Communication baud rate setting	0~6	Set the data transmission rate between the upper computer and the frequency converter. 0 ： 1200BPS 1 ： 2400BPS 2 ： 4800BPS 3 ： 9600BPS 4 ： 19200BPS 5 ： 38400BPS 6 ： 57600BPS Note: the baud rate set by the upper computer and the frequency converter must be the same,	3	●

Code	Name	Setting range	Description	Default setting	Property
			otherwise, the communication cannot be carried out. The higher the baud rate, the faster the communication speed.		
P14.02	Data bit verification setting	0~5	The data format set by the upper computer and the frequency converter must be consistent, otherwise, the communication cannot be carried out. 0: no verification (N, 8, 1) for RTU 1: Parity check (E, 8, 1) for RTU 2: Odd check (O, 8, 1) for RTU 3: No verification (N, 8, 2) for RTU 4: Parity check (E, 8, 2) for RTU 5: Odd check (O, 8, 2) for RTU	0	•
P14.03	Communication response delay	0~ 200ms	It refers to the interval time from the end of the inverter data reception to the sending of the response data to the upper computer.	005	•
P14.04	Communication timeout failure time	00.0~60 .0s	0.0 (invalid) When the function code is set to 0.0, the communication timeout parameter is invalid. When the function code is set to a non-zero value, if the interval between one communication and the next communication exceeds the communication timeout time, the system will report "485 communication failure" (CE). Normally, it is set to invalid. If this parameter is set in a system with continuous communication, the communication status can be monitored.	00.0	•
P14.05	Transmission error handling	0~3	0: Alarm and free parking 1: do not alarm and continue to run 2: Stop according to stop mode without alarm (only in communication	0	•

Code	Name	Setting range	Description	Default setting	Property
			control mode) 3: Stop according to stop mode without alarm (under all control modes)		
P14.06	Communication processing action selection	0~1	LED units: 0: There is a response to the write operation; the inverter responds to the read and write commands of the upper computer. 1: There is no response to the write operation; the inverter only responds to the read command from the host computer, There is no response to the write command, which can improve the communication efficiency. LED ten digit: 0: The communication encryption setting is invalid 1: Communication encryption setting is valid	00	•
P15 Group Functions Special					
P15.00	Inverter selection	0~1	0: Disable 1: Enable The value 0 indicates solar control is invalid, and this function group is not used. The value 1 indicates solar control is valid, this function group can be modified.	1	○
P15.01	Vmpp voltage giving method	0~1	0: Voltage 1: Max. power tracking The value 0 indicates using the voltage giving method, the reference voltage is P15.02, and it is a fixed value. The value 1 indicates the reference voltage is given by tracking the max. power. The reference voltage keeps	1	○

Code	Name	Setting range	Description	Default setting	Property
			changing until the system becomes stable. **Note:** This parameter is invalid when terminal function 43 is valid.		
P15.02	Vmpp voltage given through keypad	0.0~6553.5	0.0~6553.5 Vdc When P15.01 is 0, this parameter determines the reference voltage. (During testing, the reference voltage value must be less than the PV input voltage. Otherwise, the system runs at the lower limit of frequency.)	Depend on mode	•
P15.03	PI control deviation limit	-	0.0~ 100.0% (100.0% corresponds to P15.02) PI adjustment is performed only when the ratio of the difference between the actual voltage and reference voltage to the reference voltage, which is abs (Actual voltage – Reference voltage) * 100.0% /(Reference voltage), exceeds P15.03. The default value is 0.0%. abs: absolute value	0.0	•
P15.04	PID output upper limit frequency	-	P15.05~ 100.0% (100.0% corresponds to P00.03) P15.04 is used to limit the Max. value of target frequency, and 100.0% corresponds to P00.03. After PI adjustment, the target frequency cannot exceed the upper limit.	50.00	•
P15.05	PID output lower limit frequency	-	0.0%~P15.04 (100.0% corresponds to P00.03) P15.05 is used to limit the Min. value of target frequency, and 100.0% corresponds to P00.03. After PI adjustment, the target frequency cannot be less than the lower limit.	10.00	•

Code	Name	Setting range	Description	Default setting	Property
P15.06	KP1	0.00~ 100.00	0.00~ 100.00 Proportion coefficient 1 of the target frequency. A greater value indicates stronger effect and faster adjustment.	Depend On mode	•
P15.07	KI1	0.00~ 100.00	0.00~ 100.00 Integral coefficient 1 of target frequency. A greater value indicates stronger effect and faster adjustment.	Depend On mode	•
P15.08	KP2	0.00~ 100.00	0.00~ 100.00 Proportion coefficient 2 of target frequency. A greater value indicates stronger effect and faster adjustment.	Depend On mode	•
P15.09	KI2	0.00~ 100.00	0.00~ 100.00 Integral coefficient 2 of the target frequency. A greater value indicates stronger effect and faster adjustment.	Depend On mode	•
P15.10	PI switching point	0.0~6553.5Vdc	0.0~6553.5Vdc If the absolute value of PV voltage minus reference value is greater than P15. 10, P15.08 and P15.09 are used. Otherwise,P15.06 and P15.07 are used.	20.0	○
P15.25	Initial actual reference voltage given display		0.0~2000.0V	-	×
P15.26	Maximum Power Tracking Minimum Voltage Reference	0.00~1.00	The minimum voltage reference for maximum power tracking can be set through this function code, and the minimum voltage reference for maximum power tracking = open-circuit voltage of photovoltaic panels * P15.26. Photovoltaic panel open circuit voltage = P15.25+ P15.28.	0.70	•

<table>
<tr><th>Code</th><th>Name</th><th>Setting range</th><th>Description</th><th>Default setting</th><th>Property</th></tr>
<tr><td></td><td></td><td></td><td>The maximum power tracking voltage will be tracked within the range of the minimum voltage reference ~ P15.27, P15.27 must be greater than the minimum voltage reference, the smaller the difference between them, the narrower the tracking range and the faster the tracking. But be sure to ensure that the voltage point of the normal maximum power falls within this range. P15.26 and P15.27 must be properly adjusted according to the site conditions.</td><td></td><td></td></tr>
<tr><td>P15.27</td><td>Maximum Power Tracking Maximum Voltage Reference</td><td></td><td>Maximum Power Tracking Minimum Voltage Reference ~P15.31.
It is valid during MPPT maximum power tracking, and it is the maximum voltage for tracking.
<table><tr><th>model</th><th>Max voltage reference</th><th>Vmppt max</th></tr><tr><td>2S</td><td>400</td><td>400</td></tr><tr><td>4T</td><td>750</td><td>750</td></tr></table></td><td>-</td><td>•</td></tr>
<tr><td>P15.28</td><td>Reference voltage initial value adjustment</td><td>0.0~200.0V</td><td>MPPT starts to perturb from the initial value of the reference voltage. Reference voltage initial value = PV voltage - P15.28</td><td>10.0v</td><td>•</td></tr>
<tr><td>P15.29</td><td>Automatically adjust Vmppt upper and lower limit time</td><td>0.0~10.0s</td><td>When P15.29 is set to 0.0, the automatic adjustment of the upper and lower limits of Vmppt is invalid.
When it is not 0.0, the upper and lower limits of Vmppt will be automatically adjusted every interval set by P15.29. The adjusted center is the current PV voltage, and the upper and lower limits are P15.30, namely:</td><td>1.0s</td><td>•</td></tr>
</table>

Code	Name	Setting range	Description	Default setting	Property
			Maximum/minimum reference voltage = current PV voltage ± P15.30 and automatically updated to P15.26 and P15.27 at the same time.		
P15.30	Automatically adjust the upper and lower limits of Vmppt	5.0~100.0V	When automatically adjusting Vmppt, the adjustment of the upper and lower range amplitudes	30.0V	●
P15.31	Vmppt max	P15.27~6553.5V	The maximum value of Vmppt. During the process of maximum power tracking, the upper limit of the reference voltage of the battery board will not exceed the value set by P15.31. The factory value of this value is determined according to the model, the factory default of 4T model is 750V, and the factory default of 2S model is 400V	400.0V	●
P15.32	Solar input and power frequency input selection	0~2	0: Automatic switching mode 1: Power frequency input mode 2: Photovoltaic input mode	2	○
P15.33	Switch to power frequency input threshold setting	0.0V~P15.34	When the PV voltage is lower than the threshold or the light is weak, it can be switched to power frequency input through the relay output. When it is 0, it is invalid. For models without a booster module, the switching point voltage is set by an external voltage detection circuit;	140.0V	●
P15.34	Switch to PV input threshold setting	P15.33~400.0V	When the PV voltage is higher than the threshold value, the system can be switched to photovoltaic input through the relay output through the weak light wake-up delay of P15.24. In order to avoid switching back and forth, this threshold should be a little higher than the threshold of P15.33. When it is 0.0, it is invalid. The factory value is determined by the model.	200.0V	●
P15.37	PV undervoltage point voltage setting	0.0~400.0V	When the PV voltage is lower than the set voltage value, the system will report PV undervoltage fault	140.0V	●

<table>
<tr><th>Code</th><th>Name</th><th>Setting range</th><th>Description</th><th>Default setting</th><th>Property</th></tr>
<tr><td></td><td></td><td></td><td>The factory value is determined by the model:<table><tr><th>Model</th><th>PV undervoltage point</th></tr><tr><td>2S</td><td>170</td></tr><tr><td>4T</td><td>270</td></tr></table></td><td></td><td></td></tr>
<tr><td>P15.39</td><td>Product model</td><td>0~3</td><td>This function code is provided for the user to change the model of the product. For example, the factory is a 4T model. If the user wants to use it as a 2S model, he needs to set P15.39 to 2.</td><td>0</td><td>○</td></tr>
<tr><td colspan="6">P17 Group State Viewing</td></tr>
<tr><td>P17.00</td><td>Set frequency</td><td>0.00Hz ~P27.07</td><td>Displays the current set frequency of the frequency inverter.</td><td>-</td><td>×</td></tr>
<tr><td>P17.01</td><td>output frequency</td><td>0.00Hz ~P27.07</td><td>Displays the current output frequency of the frequency inverter.</td><td>-</td><td>×</td></tr>
<tr><td>P17.02</td><td>Slope given frequency</td><td>0.00Hz ~P27.07</td><td>Display the given frequency of the current slope of the frequency inverter.</td><td>-</td><td>×</td></tr>
<tr><td>P17.03</td><td>output voltage</td><td>0.0 ~ 1200V</td><td>Displays the current output voltage of the frequency inverter.</td><td>-</td><td>×</td></tr>
<tr><td>P17.04</td><td>Output current</td><td>0.0 ~500.0A</td><td>Displays the effective value of the current output current of the frequency inverter.</td><td>-</td><td>×</td></tr>
<tr><td>P17.05</td><td>motor speed</td><td>0~65535 rpm</td><td>Displays the current motor speed.</td><td>-</td><td>×</td></tr>
<tr><td>P17.06</td><td>Torque current</td><td>0.0 ~500.0A</td><td>Displays the current torque current of the frequency inverter.</td><td>-</td><td>×</td></tr>
<tr><td>P17.07</td><td>Excitation current</td><td>0.0 ~500.0A</td><td>Displays the current excitation current of the frequency inverter</td><td>-</td><td>×</td></tr>
<tr><td>P17.08</td><td>Motor power</td><td>-300.0 ~300.0%</td><td>Display the power of the current motor, 100.0% relative to the rated power of the motor,The positive value is the electric state, and the negative value is the power generation state</td><td>-</td><td>×</td></tr>
<tr><td>P17.09</td><td>Output torque</td><td>-250.0~ 250.0%</td><td>Display the current output torque of the frequency inverter, 100.0% relative to the rated torque of the motor Torque, positive value refers</td><td>-</td><td>×</td></tr>
</table>

Code	Name	Setting range	Description	Defautl setting	Property
P17.09	Output torque	-250.0~250.0%	to electric state and negative value refers to power generation state	-	×
P17.10	Estimate motor frequency	0.00 ~P27.07	Estimated motor rotor frequency under open-loop vector conditions.	-	×
P17.1 1	DC BUS Voltage	0.0~1000.0V	Displays the current DC bus voltage of the frequency inverter.	-	×
P17.12	Switching value input terminal status	0000 ~00FF	Displays the current switching value input terminal status of the frequency inverter.	-	×
P17.13	Switching value output terminal status	0000 ~000F	Displays the current switching value output terminal status of the frequency inverter.	-	×
P17.14	Digital adjustment	0.00Hz ~P27.07	Display the adjustment amount of the frequency inverter through the keyboard.	-	×
P17.15	Torque ration	-300.0% ~300.0 %(motor rated current)	Displays the given torque as a percentage of the rated torque of the current motor.	-	×
P17.16	Linear velocity	0 ~65535	Display the current front speed of the frequency inverter.	-	×
P17.17	Reserved	-	-	-	×
P17.18	Count value	0 ~65535	Displays the current count value of the frequency inverter.	-	×
P17.19	DC input power	0.0~500 .00kw	Reserved. Unit: kW	-	×
P17.20	DC input current	0.0~100 0.0A	Reserved. Unit: A	-	×
P17.21	DC input voltage	0.0~100 0.0V	It is transferred from the boost module or equal to the bus voltage.	-	×

Code	Name	Setting range	Description	Default setting	Property
P27 Group Special Functions for PV Inverters					
P27.00	Running control mode	0~3	0: Keypad 1: Auto 2: Terminal 3. Communication	1	●
P27.01	Single phase motor mode	0~1	0: Invalid 1: Valid Single-phase input parameter set to 1	0	○
P27.02	Motor direction	0~1	0: Forward 1: Reverse	0	○
P27.03	Control system	0~2	0:VFD control system 1: MPPT control system 2: CVT control system	1	○
P27.04	CVT target voltage	0.0~900.0Vdc	This parameter represents the final stable voltage value expected in CVT mode. It can be modified only in CVT mode. The default value of 0 means invalid. It is valid only after modification. This function is only effective when P27.03 is equal to 2	000.0V	●
P27.05	Waiting time in Auto-run model	0~9	0. 10S 1.30S 2.60S 3.90S 4. 180S 5.300S 6.600S 7. 1200S 8. 1800S 9.0S In the automatic start mode, it will run automatically after the set time	9	○
P27.06	Reserve	-		00000	
P27.07	Maximum output frequency	0.00~400.00Hz	The maximum output frequency or rated output frequency	50.00Hz	●
P27.08	Fault rese delay	0.0-6553.5s	When fault appear, the solar pump inverter stop, starts after the setting	600.0s	○

Code	Name	Setting range	Description	Default setting	Property
			time of P27.08 automatically, it avoid repeated startup, with the unit of 0. 1s.		
P27.09	Fault reset times	0-65535	The maximum times of fault resetting. It won't be reset when over then number.	10	○
P27.10	Under- voltage setting	0-400V	Threshold of under voltage, 'UV' appears on the keypad when DC voltage over then P27.10	4T:270V 2S: 170V	○
P27.1 1	Over- voltage setting	0-950V	Threshold of over voltage, 'OV' appears on the keypad when DC voltage over then P27.1 1. 900VDC(Special model) Note: this parameter will not be restored to the factory.	4T:900V or 4T:800V 2S:450V	○
P27.12	Acceleration time	-	The time required for solar pump inverter to accelerate from 0Hz to the maximum frequency (modes other than MPPT)	Related to the model	●
P27.13	Deceleration time	-	The time required for solar pump inverter to decelerate from the maximum frequency to 0Hz (modes other than MPPT)	Related to the model	●
P27.14	Frequency reduction temperature	0-95C	When the inverter temperature corresponds to the temperature point set in P27. 13, the output frequency will be reduced automatically	82℃	●
P27.15	Frequency decrease at sudden power loss	0~ 1	0.Invalid 1.Valid Frequency decrease at sudden power loss switch	0	○
P27.16	Frequency decrease ratio at sudden power loss	0-50.00 Hz/s	When the bus voltage drops, inverter starts to reduce the operating frequency according to the frequency decrease at sudden power loss set in P27. 16, with the unit of 0.01hz/s	3.00hz	○
P27.17	Factory parameters restore	0~ 1	0:No action 1: Restore	0	○

Code	Name	Setting range	Description	Default setting	Property
P27.18	Parameter setting password	-	0: No password,other number will be password,if P27. 18 not equal to 0, P27. 18 will be ther password for setting parameters.	00000	○
P27.19	Software version	-	-	-	×
P27.20	Reserve	-	-	00000	×
P27.21	IGBT temperature	-	-	-	○
P27.22	Phase loss protection	0~ 1	00~ 11 LED units digit: (display Rightmost - 010) 0: Input phase loss protection prohibited 1: Input phase loss protection is allowed LED ten digit: (display middle - 010) 0: Output phase loss protection disabled 1: Output phase loss protection is allowed ≤ 15kW: 1→0, indicating that the protection is closed -SP0. Single motor setting is 27.22=000.	010	●
P27.23	Tank fulfilled detect time	0~10000s	After the water tank full signal is detected and maintained for P27.23, the inverter will stop automatically, and A-tf will be appeared on the keypad	5s	●
P27.24	Tank fulfilled restore time	0~10000s	After the tank full signal isn't detected and maintained for the time of P27.24, the A-tf fault will disappeared.	20s	●
P27.25	Tank empty detect time	0~10000s	After the water tank empty signal is detected and maintained for P27.25, the inverter will stop automatically, and A-tL will be appeared on the keypad	5s	●
P27.26	Tank empty restore time	0~10000s	After the tank full signal isn't detected and maintained for the time of P27.26, the A-tL fault will disappeared.	20s	●

Code	Name	Setting range	Description	Default setting	Property
P27.27	Under-load detect current	0.0~1000.0A	When the output current is lower than the under load current set in P27.27 and continues to exceed the detection time set in P27.28, it will alarm A-LL. When the alarm A-LL lasts for the reset time set in P27.29, the inverter resets and runs automatically. If P27.30 set to 0.0, it is not protected Note: this parameter(27.27) will not be restored to the factory.	Related to the model	●
P27.28	Under-load protection detect time	0~3000.0s		30s	●
P27.29	Under-load protection detect time	0~3000.0s		300s	●
P27.30	Low speed protection threshold	0~300Hz	When the output frequency is lower than the frequency set in P27.30 and continues to exceed the detection time set in P27.31 Alarm A-LS. When the alarm A-LS continues to reset for the reset time set in P27.32, the inverter will be reset Alarm and start again automatically. If it is set to 0.0, it is not protected.	10.00Hz	●
P27.31	Low speed detect time	0~ 1000.0s		10s	●
P27.32	Low speed restore time	0~1000.0s		300s	●
P27.33	Rated power of motor	0.7~400kw	Rated power of motor	Related to the model	○
P27.34	Rated voltage of motor	220V~450V	Rated voltage of motor	Related to the model	○
P27.35	Rated current of motor	1.0~ 1000.0A	Rated current of motor	Related to the model	○
P27.36	Rated speed of motor	100~ 10000rpm/min	Rated speed of motor	Related to the model	○
P27.37	Rated frequency of motor	0.00~300.00Hz	Rated frequency of motor	Related to the model	○

Code	Name	Setting range	Description	Default setting	Property
P27.38	The last fault	-	0: No fault 1: Inverter unit U phase protection (OUt 1) 2: Inverter unit V phase protection (OUt2) 3: Inverter unit W phase protection (OUt3) 4: ACC overcurrent (OC1) 5: DEC overcurrent (OC2) 6: Constant-speed overcurrent (OC3) 7: ACC overvoltage (OV1) 8: DEC overvoltage (OV2) 9: Constant-speed overvoltage(OV3) 10: Bus undervoltage (UV) 1 1: Motor overload (OL1) 12: VFD overload (OL2) 13: Input side phase loss (SPI) 14: Output side phase loss (SPO) 15: Overheat of the boost module (OH1) 16: Overheat fault of the inverter module (OH2) 17: External fault (EF) 18: 485 communication fault (CE) 19: Current detection fault (ItE) 20: Motor antotune fault (tE) 21: EEPROM operation fault (EEP) 22: PID response offline fault (PIDE) 23: Braking unit fault (bCE) 24: Running time arrival (END) 25: Electrical overload (OL3) 26–31:Reserved 32: Grounding short circuit fault 1 (ETH1) 33: Grounding short circuit fault 2 (ETH2) 34: Speed deviation fault (dEu) 35: Maladjustment (STo)	-	×
P27.39	The second last fault	-		-	×
P27.40	The third last fault	-		-	×

Code	Name	Setting range	Description	Default setting	Property
			36:Underload fault (LL) 37: Hydraulic probe damage (tSF) 38: PV reverse connection fault (PINV) 39: PV overcurrent (PVOC) 40: PV overvoltage (PVOV) 41: PV undervoltage (PVLV) 42: Fault on communication with the boost module (E-422) 43: Bus overvoltage detected on the boost module (OV) Note: Faults 38–40 can be detected in boost. The boost module stops working once after detecting a fault. The boost module sends back the fault information to the inverter module in the next data send back. Alarms: Weak light alarm (A-LS) Underload alarm (A-LL) Full water alarm (A-tF) Water-empty alarm (A-tL)		
P27.41	Stop mode selection	0~ 1	0: Decelerate to stop; after the stop command is valid, the inverter reduces the output frequency according to the deceleration mode and the defined deceleration time, and stops after the frequency drops to 0Hz. 1: Coast to stop; after the stop command is valid, the inverter stops output immediately. The load coasts to a stop according to the mechanical inertia.	0	•
P27.42	Carrier frequency setting	1.0~ 15.0 kHz	Advantages of high carrier frequency: ideal current waveform, less current harmonics, and less motor noise. Disadvantages of high carrier frequency: the switching loss increases, the temperature rise of	Related to the model	•

Code	Name	Setting range	Description	Default setting	Property
			the inverter increases, and the output capacity of the inverter is affected. Under high carrier frequency, the inverter needs to be derated; Electromagnetic interference increases. A low carrier frequency is the opposite of the above, When the user uses more than the default carrier frequency, it needs to be derated. For each additional 1k carrier frequency, the derating is 10%.		
P27.43	Overheat threshold temperature	70.0~100.0℃	-	95℃	●
P27.44	Chip operation status monitoring	-	-	123	×
P27.45	Overload selection	0~1	0: Invalid 1: Valid	1	○
P27.46	Overheat selection	0~1	0: Invalid 1: Valid	1	○
P27.47	Reserve	-	Password	-	○
P27.48	Inverter power level setting	-	-	Related to the model	×
P27.49	Inverter power	-	-	Related to the model	×

6 Fault diagnosis and solution

Do as follows after the inverter encounters a fault:

1. Check to ensure there is nothing wrong with the keypad. If not, please contact with the local SOCON office.

2. If there is nothing wrong, please check P27.38, P27.39, P27.39 and ensure the corresponding recorded fault parameters to confirm the real state when the current fault occurs by all parameters.

3. See the following table for detailed solution and check the corresponding abnormal state.

4. Eliminate the fault and ask for relative help.

5. Check to eliminate the fault and carry out fault reset to run the inverter.

Fault code	Fault type	Possible cause	Solutions
OUt 1	Inverter unit U phase protection	1. The acceleration is too fast. 2. This phase IGBT is damaged internally. 3. Interference causes misoperation. 4. The drive wire is connected improperly. 5. The load transients or is abnormal. 6. The grounding is short circuited.	1. Increase the acceleration time. 2. Change the power unit. 3. Check the drive wire. 4. Check whether the peripheral equipment has strong interference sources.
OUt2	Inverter unit V phase protection		
OUt3	Inverter unit W phase protection		
OV1	ACC overvoltage	1. The input voltage is abnormal. 2. There is large energy feedback. 3. No braking components. 4. Braking energy is not open.	1. Check the input power. 2. Check if the DEC time of the load is too short or the VFD starts during the rotation of the motor or it needs to increase the energy consumption components. 3. Install the braking components. 4. Check the setting of relative function codes.
OV2	DEC overvoltage		
OV3	Constant- speed overvoltage		
OC1	ACC overcurrent	1. The acceleration or deceleration is too fast. 2. The voltage of the grid is too low. 3. The power of the VFD is too low. 4. The load transients or is abnormal.	1. Increase the ACC time. 2. Check the input power. 3. Select the VFD with a larger power. 4. Check if the load is short circuited (the grounding short circuited or the wire short circuited) or the rotation is not smooth. 5. Check the output configuration.
OC2	DEC overcurrent		
OC3	Constant- speed overcurrent		

Fault code	Fault type	Possible cause	Solutions
		5. The grounding is short circuited or the output is phase loss. 6. There is strong external interference. 7. The overvoltage stall protection is not open. 8.The distance between the water pump cable and the inverter is too long, more than 50m.	6. Check if there is strong interference. 7. Check the setting of relative function codes. 8.Add AC output reactor and connect it to the inverter output side. 9.It may be that the mppt parameter is too large, and the P15.06 and P15.08 parameter settings are reduced by half. If are not resolved, It's will be further reduced parameter value.
UV	Bus undervoltage	1. The voltage of the power supply is too low. 2. The overvoltage stall protection is not open	1. Check the input power of the supply line. 2. Check the setting of relative function codes.
OL1	Motor overload	1. The voltage of the power supply is too low. 2. The motor setting rated current is incorrect. 3. The motor stall or load transients is too strong.	1. Check the power of the supply line. 2. Reset the rated current of the motor. 3. Check the load and adjust the torque lift.
OL2	VFD overload	1. The acceleration is too fast. 2. The rotating motor is reset. 3. The voltage of the power supply is too low. 4. The load is too heavy. 5. The motor power is too small.	1. Increase the ACC time. 2. Avoid the restarting after stopping. 3. Check the power of the supply line. 4. Select a VFD with bigger power. 5. Select a proper motor.
SPI	Input phase loss	Phase loss or fluctuation of input R,S,T	1. Check input power. 2. Check installation distribution.
SPO	Output phase loss	U,V,W phase loss output (or serious asymmetrical three phase of the load) Single motor is used, and the output phase loss is not closed.	1. Check the output distribution. 2. Check the motor and cable. 3. Setting P27.22=000.
OH1	Rectifier overheat	1. Air duct jam or fan damage 2. Ambient temperature is too high. 3. The time of overload	1. Dredge the wind channel or change the fan. 2. Decrease the environment temperature.
OH2	Inverter module overheat		

Fault code	Fault type	Possible cause	Solutions
		running is too long.	
EF	External fault	SI external fault input terminals action	Check the external device input.
CE	Communication error	1. The baud rate setting is incorrect. 2. Fault occurs to the communication wiring. 3. The communication address is wrong. 4. There is strong interference to the communication.	1. Set proper baud rate. 2. Check the communication connection distribution 3. Set proper communication address. 4. Change or replace the connection distribution or improve the anti-interference capability.
ItE	Current detection fault	1. The connection of the control board is not good. 2. Assistant power is bad 3. Hall components is broken 4. The magnifying circuit is abnormal.	1. Check the connector and repatch. 2. Change the Hall. 3. Change the main control panel.
tE	Auto-tuning fault	1. The motor capacity does not comply with the VFDcapability. 2. The rated parameter of the motor is not set correctly. 3. The offset between the parameters from autotune and the standard parameter is huge 4. Autotune overtime	1. Change the VFD mode. 2. Set the rated parameter according to the motor name plate. 3. Empty the motor load. 4. Check the motor connection and set the parameter. 5. Check if the upper limit frequency is above 2/3 of the rated frequency.
EEP	EEPROM fault	1. Error of controlling the write and read of the parameters 2. Damage to EEPROM	1. Press STOP/RST to reset. 2. Change the main control panel.
PIDE	PID feedback fault	1. PID feedback is offline. 2. The PID feedback source disappears.	1. Check the PID feedback signal 2. Check the PID feedback source.
END	Time arrival of factory setting	1.The actual running time of the VFD is above the internal setting running time.	1.Ask for the supplier and adjust the setting running time.
OL3	Electrical overload	1.The VFD will report overload pre-alarm according to the set value.	1.Check the load and the overload pre-alarm point.

Fault code	Fault type	Possible cause	Solutions
ETH1	Grounding short circuit fault 1	1.The grounding of the VFDoutput terminal is short circuited. 2.The current detection circuit is faulty. 3.The actual motor power sharply differs from the VFD power.	1.Check whether the motor wiring is proper. 2.Change the Hall. 3.Change the main control panel. 4.Set motor parameters correctly.
ETH2	Grounding short circuit fault 2		
dEu	Velocity deviation fault	1.The load is too heavy or stalled.	1. Check the load and ensure it is normal. Increase the detection time. 2. Check whether the control parameters are normal.
STo	Maladjustment fault	1. The control parameters of the synchronous motors not set properly. 2. The autotuning parameter is not correct. 3. The VFD is not connected to the motor.	1. Check the load and ensure it is normal. 2. Check whether the control parameter is set properly or not. 3. Increase the maladjustment detection time.
LL	Electronic underload fault	1.The VFD will report the underload pre-alarm according to the set value.	1.Check the load and the underload pre-alarm point.
tSF	Hydraulic probe damage	1.Hydraulic probe damage	1.Change the damaged hydraulic probe.
PINV	PV reverse connection fault	1.Incorrect PV wiring	1.Change the wiring direction of the positive and negative terminals and connect the cables again.
PVOC	PV overcurrent	1. The acceleration or deceleration is too fast. 2. The VFD power is too low. 3. The load transients or is abnormal. 4. The grounding is short circuited.	1. Increase the ACC or DCC time. 2. Select the VFD with a larger power. 3. Check if the load is short circuited (the grounding short circuited or the wire short circuited) or the rotation is not smooth.
PVOV	PV overvoltage	1. The solar cell panel input voltage is too high. 2. Model -4 is set as another model.	1. Reduce the number of solar cell panels that are wired in series. 2. Check and reset the model.

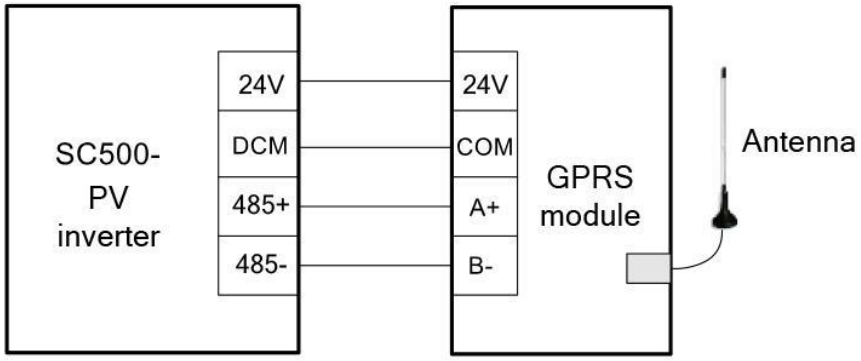
Fault code	Fault type	Possible cause	Solutions
PVLV	PV undervoltage	1. The power of the solar cellpanel series is too low or it is cloudy and rainy weather. 2. The motor start-up current is too high.	1. Increase the number of solar cell panels or perform the test in the normal sun light. 2. Change the motor.
A-LS	Weak light alarm	1.The sun light is weak or the solar cell panel configuration is insufficient.	1.The equipment automatically runs when the light becomes strong. Check whether the solar panel configuration is proper.
A-LL	Underload alarm	1.The reservoir is empty.	1.Check the reservoir. If it's just used, check P27.27(current), because there is no load connected at this time.
A-tF	Full-water alarm	1.The reservoir is full.	1.If the user has set the full-water alarm function, the equipment automatically stops when the full-water alarm time reaches the specified time. In this situation, the user does not need to perform any operation. Otherwise, check whether terminals are wired incorrectly.
A-tL	Empty-water alarm	1.The reservoir is empty.	1.If the user has set the empty-water alarm function, the equipment automatically stops when the empty-water alarm time reaches the specified time. In this situation, the user does not need to perform any operation. Otherwise, check whether terminals are wired incorrectly.

7 Appendix

7.1 IOT - GPRS module and monitoring APP

The pump inverter supports an optional GPRS module to implement remote monitoring, and the GPRS module connects to the inverters through 485 communication. The running state of the inverter can be monitored in real time on the APP in the mobile phone or web page.

Method for connecting the GPRS module to the inverter:



Connection between the GPRS module and the inverter

- Parameter setting: P27.00=3 (communication control)

Note:

- When GPRS and inverter terminals are connected, pay attention to the 24V short connector. If it is loose, it cannot supply power to the IOT module.
- After the IOT module is correctly connected, the red LED of the IOT module flashes once every 3 seconds, indicating that the communication has been successful.
- If the red light is on for a long time, it means that the communication is not successful, and need to check the phone card.

7.2 Selection of blocking diode

The blocking diodes in Table are the recommended models. You can select the appropriate model according to the actual situation, or consult the local agent.

Diode model & Polarity	Diode rated DC current(A)	Max. input DC voltage of diode(V)	Max. DC current of PV inverter(A)	Input voltage of PV inverter(V)	Applicable PV inverter model (KW)
25HFR75 +	25	750V	14	1 Phase 220~240VAC	SC500-2S- 1P5G-PV
30HFR75 +	30	750V	19.2		SC500-2S-2P2G-PV
50HFR75 +	50	750V	34		SC500-2S-4P0G-PV
60HFR75 +	60	750V	50		SC500-2S-5P5G-PV
16HFR120 +	16	1200V	8.8	3 Phase 380~450VAC	SC500-4T- 1P5G-PV
25HFR120 +	25	1200V	11.6		SC500-4T-2P2G-PV
30HFR120 +	30	1200V	20		SC500-4T-4P0G-PV
40HFR120 +	40	1200V	26		SC500-4T-5P5G-PV
50HFR120 +	50	1200V	34		SC500-4T-7P5G-PV
60HFR120 +	60	1200V	50		SC500-4T-011G-PV
70HFR120 +	70	1200V	64		SC500-4T-015G-PV
85HFR120 +	85	1200V	74		SC500-4T-018G-PV
100UR120 +	100	1200V	90		SC500-4T-022G-PV
150UR120 +	150	1200V	120		SC500-4T-030G-PV
200UR120 +	200	1200V	150		SC500-4T-037G-PV
250UR120 +	250	1200V	180		SC500-4T-045G-PV
300UR120 +	300	1200V	220		SC500-4T-055G-PV
SD400R120 +	400	1200V	304		SC500-4T-075G-PV
SD400R120 +	400	1200V	352		SC500-4T-093G-PV
SD500R120 +	500	1200V	420		SC500-4T- 1 10G-PV
SD600R120 +	600	1200V	506		SC500-4T- 132G-PV

Note:

- The mechanism of the recommended model in the table is positive pole **"+"**. When connecting the solar panel cable, the positive pole needs to be connected, and the direction need to been confirmed. If you are not clear, you can contact the local agent or manufacturer.

7.3 Selection of reactor

When the distance between the inverter and motor is longer than 50 m, the parasitic capacitance between the long cable and ground may cause large leakage current, and overcurrent protection of the inverter may be frequently triggered. To prevent this from happening and avoid damage to the motor insulator, compensation must be made by adding an output reactor. When an inverter is used to drive multiple motors, take the total length of the motor cables (that is, sum of the lengths of the motor cables) into account.

When the total length is longer than 50m, an output reactor must be added on the output side of the inverter. If the distance between inverter and motor exceeds 50m, select reactor according to the following table.

Reactor selection is based on inverter power, for example, 3-phase 380V-7.5KW inverter is suitable for 3-phase 380V-7.5KW output reactor.

Output reactor model selection:

Inverter Model	Output reactor (KW)
SC500-2S-1P5G-PV	2S-1.5KW
SC500-2S-2P2G-PV	2S-2.2KW
SC500-2S-4P0G-PV	2S-4.0KW
SC500-2S-5P5G-PV	2S-5.5KW
SC500-4T-1P5G-PV	4T-1.5KW
SC500-4T-2P2G-PV	4T-2.2KW
SC500-4T-4P0G-PV	4T-4.0KW
SC500-4T-5P5G-PV	4T-5.5KW
SC500-4T-7P5G-PV	4T-7.5KW
SC500-4T-011G-PV	4T-11KW
SC500-4T-015G-PV	4T-15KW
SC500-4T-018G-PV	4T-18.5KW
SC500-4T-022G-PV	4T-22KW
SC500-4T-030G-PV	4T-30KW
SC500-4T-037G-PV	4T-37KW
SC500-4T-045G-PV	4T-45KW
SC500-4T-055G-PV	4T-55KW
SC500-4T-075G-PV	4T-75KW
SC500-4T-093G-PV	4T-93KW
SC500-4T-110G-PV	4T-110KW
SC500-4T-132G-PV	4T-132KW

7.4 Selection guide of electric cable

Inverter Model	Circuit Breaker (MCCB) (A)	Recommended Contactor(A)	Recommended cable size (mm2)	
			(+)/(-), R/S/T, U/V/W	Control Circuit
SC500-2S-P75G-PV	10	10	2.5	1.0
SC500-2S-1P5G-PV	16	10	2.5	1.0
SC500-2S-2P2G-PV	16	10	2.5	1.0
SC500-2S-4P0G-PV	40	32	4.0	1.0
SC500-2S-5P5G-PV	63	40	6.0	1.0
SC500-4T-P75G-PV	10	10	1.5	1.0
SC500-4T-1P5G-PV	16	10	1.5	1.0
SC500-4T-2P2G-PV	16	10	2.5	1.0
SC500-4T-4P0G-PV	25	16	2.5	1.0
SC500-4T-5P5G-PV	32	25	4.0	1.0
SC500-4T-7P5G-PV	40	32	4.0	1.0
SC500-4T-011G-PV	63	40	6.0	1.0
SC500-4T-015G-PV	63	40	10	1.0
SC500-4T-018G-PV	100	63	16	1.5
SC500-4T-022G-PV	100	63	25	1.5
SC500-4T-030G-PV	125	100	25	1.5
SC500-4T-037G-PV	160	100	35	1.5
SC500-4T-045G-PV	200	125	35	1.5
SC500-4T-055G-PV	200	125	50	1.5
SC500-4T-075G-PV	250	160	70	1.5
SC500-4T-093G-PV	250	160	95	1.5
SC500-4T-110G-PV	350	350	120	1.5
SC500-4T-132G-PV	400	400	185	1.5
SC500-4T-160G-PV	500	400	240	1.5

Note:

- The cables recommended for the main circuit can be used in scenarios where the ambient temperature is lower than 40°C, the wiring distance is shorter than 100 m, and the current is the rated current.
- If a control cable and power cable must cross each other, ensure that the angle between them is 90 degrees.