

SP100H Energy storage inverter technical specifications

Version: V3.0



1. Product introduction

This specification describes the main functions and performance indicators of SP100H micro grid energy storage inverter products, mainly for an efficient and high protection energy storage inverter developed for medium and large energy storage microgrid. It supports multiple parallel operation, supports oil engine hybrid operation, supports and off-grid mode, and supports DC power scheduling and AC power scheduling. Support constant flow, constant power and other charging and discharge modes

The main topology



2. Product features:

highly active

1. The standby power consumption is 15W, and the no-load operation loss is less than 130W
2. The charge-discharge conversion time is 20ms
3. The highest conversion efficiency is 98.7%

function:

1. Compatible with 3P4L and 3P3L application scenarios.
2. Support the mainstream BMS protocol,
3. Support grid-connected, off-grid and off-grid operation
- 4, support high and low crossing, island protection, black start and other functions
- 5.100% standby capacity
6. Support 15 parallel-machine off-grid operation
- 7, support the oil engine mixing work, mainly, PCS, mixed mode.operation

- 1, group serial application, the fault does not affect the operation of other branches
2. Perfect fault protection function and fault recording wave analysis
3. Product naming

3. Product naming

SP100HC: Air-cooled high-protection PCS

SP110HS: liquid-cooled high protection PCS

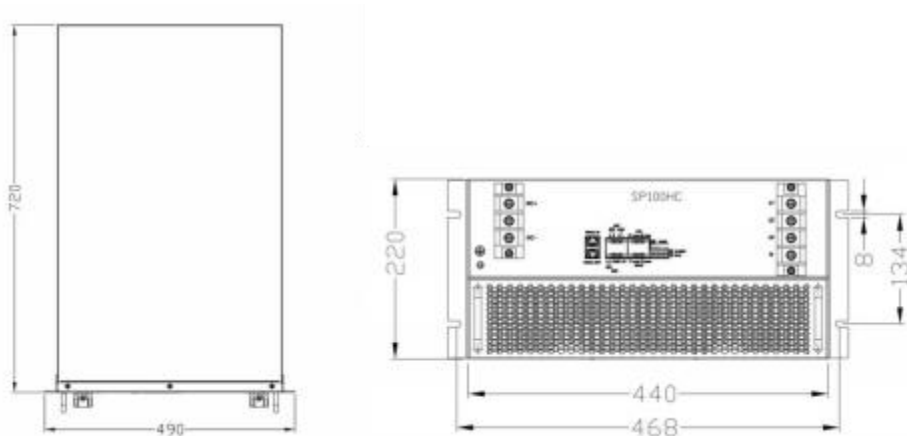
4. Product appearance and dimensions (SP100HC)

4.1 Appearance of air-cooled products



graph 1

4.2 Product dimensions



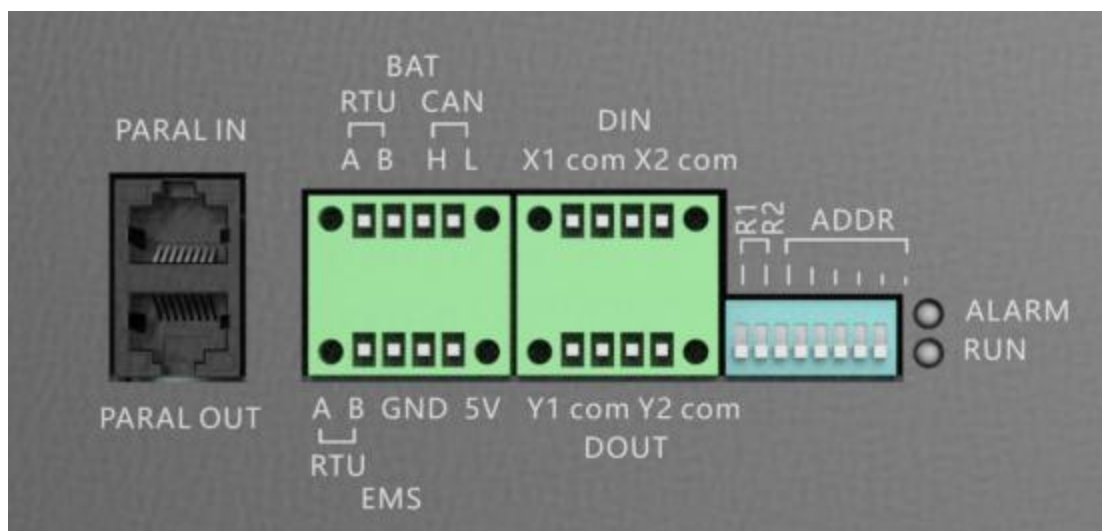
graph 2

4.3 Electrical interface identification



graph 3

DC+/DC-	Battery input terminal	OT terminal (RNB 38-6), recommended 35mm ² cable
L1/L2/L3/N	AC output terminal	OT terminal (RNB 38-6), recommended 35mm ² cable

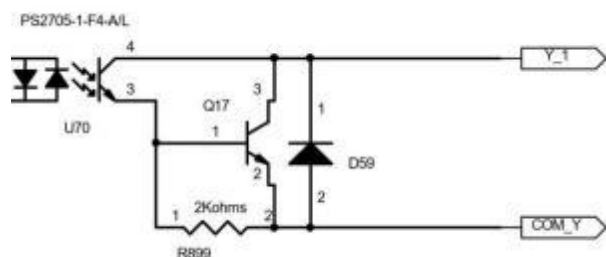


graph 4

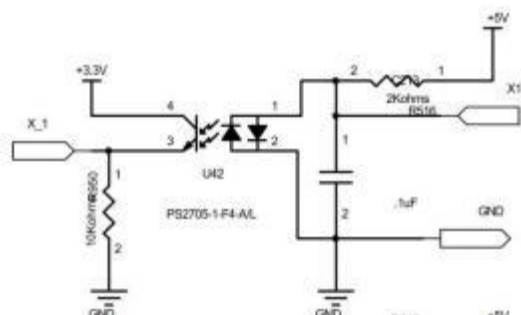
PARAL IN	And machine line input		And machine line
PARAL OUT	And machine line output		And machine line
BAT_RTU	Battery_RS485 interface		BAT interface
BAT_CAN	Battery_CAN interface		

RTU(A-B)	Customer RS485 interface	protocol	
X1	Dry contact input	obligate	DIN
X1_com	Dry contact input	obligate	
_X2	Dry contact input	obligate	
X2_com	Dry contact input	obligate	
Y1			DOUT
com			
Y2			
com			
R1	And machine matching resistance	The top is ON	module 1 and the last module dial ON.
R2	And machine matching resistance	The top is ON	module 1 and the last module dial ON.
ADDR	Module address dial	The top is ON	Module address 000001 address is 1 Module address 000100 address is 4
ALARM			Warning light
RUN			Run the lamp

Control diagram of the output dry contact point:



Enter dry contact:

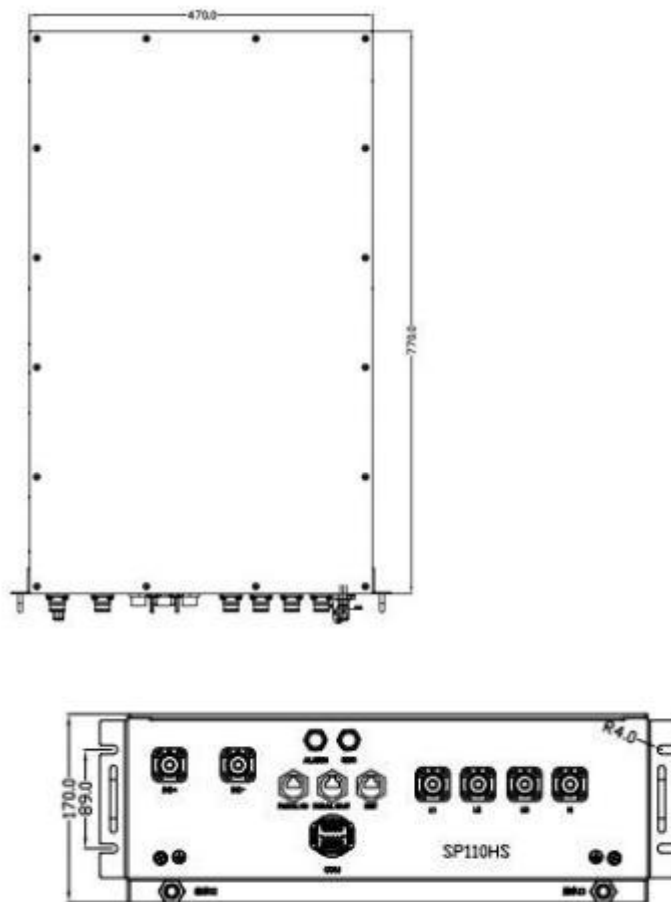


4.4 Appearance of liquid-cooled Products (SP110HS)



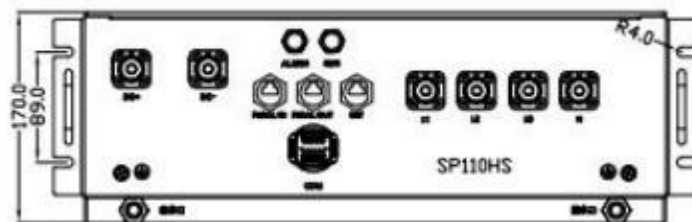
graph 5

4.5 Product Dimensions



graph 6

4.6 Electrical interface marking



graph 7

DC+/DC-	Battery input terminal	Follow the machine attachment
L1/L2/L3/N	AC output terminal	Follow the machine attachment
PE	earth terminal	M6 specifications

graph 4

PARAL IN	And machine line input		Parated cable (Class 6 or above standard network cable)
PARAL OUT	And machine line output		Parated cable (Class 6 or above standard network cable)
BAT_RTU	Battery_RS485 interface		BAT interface
BAT_CAN	Battery_CAN interface		

RTU-A	Customer RS485 interface	1	EMS(interface)
RTU-B	Customer RS485 interface	2	
ALARM			Warning light
RUN			Running light (often on: operation flashing: upgrade)

5. Specifications and parameters

5.1 Parameters

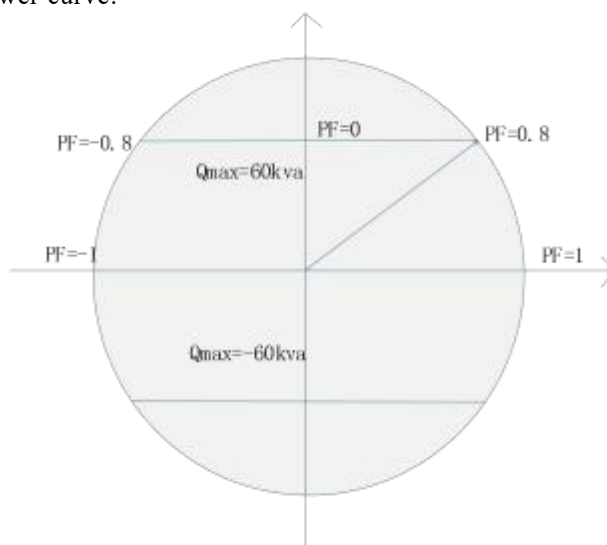
parameter	SP100HC	SP110HS
direct current side		
maximum voltage	950 V	
minimum voltage	600 V	
range of nominal tension	Grid-connected (600V-950V) / off-grid (650V-950V)	

Maximum input current	185 A	
AC side (grid connection)		
output power	110 kVA @ 40°C	110 kVA
	100 kVA @ 45°C	
maximum output current	152	160A
rated voltage	400 V / 230V	
range of nominal tension	-20%~15%	
frequency range	50Hz / 47Hz~52Hz	
	60Hz / 57Hz~62Hz	
harmonic wave	<3% (more than 30% load)	
power factor	-100%~100% (see the figure below)	
AC-side side (off-grid)		
rated voltage	400 V / 230V	
Output voltage harmonic	<1.5% (resistive load)	
degree of unbalancedness	100%	
frequency range	50/60Hz	
Output overload	1.25/10S,1.5/0.1S	
system parameter		
Communication mouth	EMS：CAN\RS485 Battery: CAN \ RS485	
DIDO	2 Road	
maximal efficiency	98.5%	

way to install	Plug in the box	
loss	Standby <15W no-load power <130W	
weight kg	48	52
protect	IP20	IP65
temperature range	-30--60°C	
Humidity range	0-100%	
cooling-down method	Intelligent forced air cooling	liqukd cooling
height m	2000 (3000 / 4000 m reduced by 90% / 80% respectively)	
attestation	EN50549, EN 62477, EN I EC 61000 CQC	
Power grid support	LVRT, HVRT, SVG	

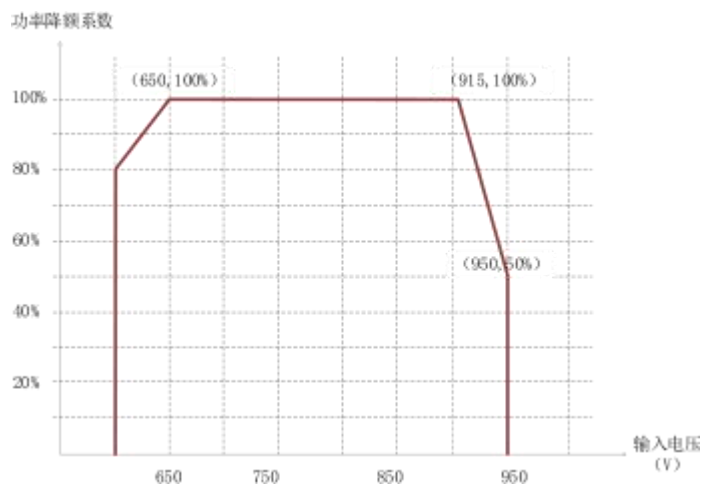
5.2 Power and reactive power curve

The reactive power curve:



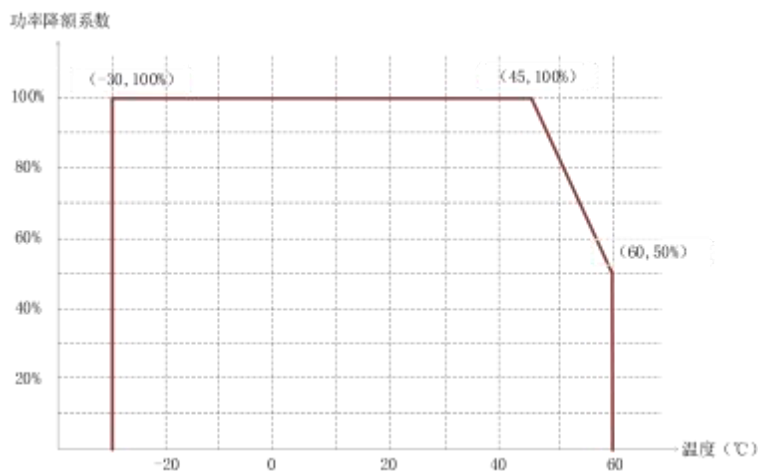
graph 8

Power rating curve (input voltage rating curve)



graph 9

Output voltage drop curve



graph 10

5.3 Efficiency curve (yellow off-grid, green grid-connected)

load voltage	600V	650V		700V		750V		800V		850V		900V		950V
10%	98.26	97.91	98.28	97.74	97.99	97.44	97.90	97.31	98.07	97.03	97.58	96.95	97.31	96.61
20%	98.61	98.14	98.17	97.88	98.35	97.88	98.19	97.6	98.05	97.52	97.91	97.27	97.80	97.29
30%	98.59	98.79	98.5	98.64	98.36	98.59	98.24	98.5	98.06	98.22	97.89	98.2	97.82	98.14
40%	98.51	98.61	98.28	98.42	98.32	98.27	98.14	98.16	98.07	98.02	97.82	97.74	97.76	97.75
50%	98.36	98.36	98.25	98.14	98.16	98.11	98.02	97.95	97.91	97.85	97.80	97.7	97.74	97.57
60%	98.28	98.3	98.18	98.11	98.08	98.05	98.00	97.91	97.88	97.8	97.76	97.67	98.68	97.53
70%	98.22	98.08	98.05	98.04	98.00	97.83	97.88	97.77	97.78	97.59	97.71	97.48	97.56	93.31
80%	98.08	97.94	97.96	97.9	97.90	97.71	97.80	97.6	97.71	97.47	97.55	97.36	97.46	97.14
90%	98.01	97.88	97.89	97.93	97.78	97.72	97.67	97.62	97.57	97.5	97.44	97.36	97.35	97.24
100%	97.88	97.79	97.81	97.69	97.69	97.55	97.56	97.37	97.47	97.27	97.33	97.14	97.21	96.99

Note: The above is the discharge efficiency data is for reference only

5.4 Certification specification requirements

1. CQC / EN50549, EN 62477, EN I EC 61000
2. Insulation resistance > 10M Ω (500V)
3. withstand the ground pressure for 2120Vdc 1 minutes

5.5 Protection

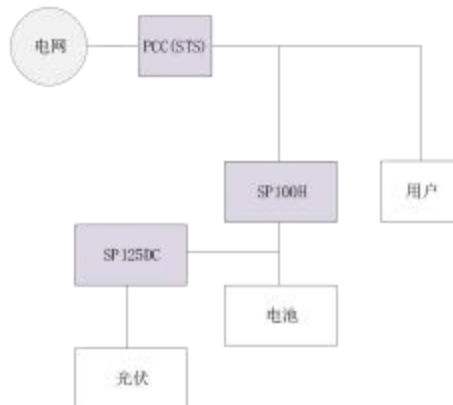
1. Air duct isolation and control warehouse sealing
2. Humidity range is 5% -99%
3. disturbance resistance 2KV ground, class C lightning protection, PCS application process of the AC side needs or power distribution unit increase level II lightning protection
4. Salt fog test test and verification
5. Running vibration test, testing of material transportation

6. Application scenarios

STS 200 / 400 / 600 kva is optional

SP65HPV / SP125HPV / SP125HDC is applied in the DC coupling scenarios

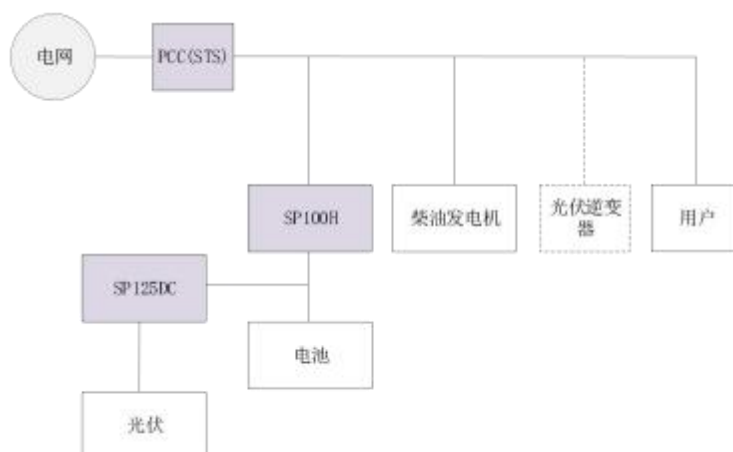
6.1 Light storage + backup power application



6.2 Weak mixed light storage and diesel microgrid solution



6.3 Strong hybrid light storage and firewood microgrid solution



7. Configuration parameter table

7.1 Module part RS485 communication configuration parameters table is shown below:

Configuration parameter table			
RTU address	variable	scope	Windows default
135	AC-side active power scheduling	-1000~1000 (accuracy:0.1kw)	0 parameter is not saved
320	SCI, Baud rate	0 : 115200 1 : 1200: 2 : 2400 3 : 4800 4 : 9600 5 : 19200 6 : 38400 7 : 57600	0
321	SCI, stop bit	1:1-bit stop-bit 2:2-bit stop bits	1
322	The SCI parity check bit	0: No check 1: Double check 2: Strange verification	0
330	The BMS protocol selection	0: invalid 0x0B00: PYLONTECH 0x0C00: ALPHA 0x1100: BCU _ CAN	0
334	Power scheduling associated BMS enables	0: Don't make it 1: Enable	0
650	starting up	1: Boot up	0
651	shut down	1: Shutdown	0

653	synchronize and close	1: Grid connected	0
654	Off-grid	1: Off-grid	0
659	Save parameters	1: Save the parameters	0
750	Output voltage system	0 : 3P4W 1:3P3W	0
758	Grid-connected power dispatching mode	0: AC-side power 1: AC-side current 2: DC side power 3: DC side current 4: Constant voltage of the DC side (reserved)	0
759	AC-side constant current expectation value	-1500~1500 (accuracy:0.1A)	0 The parameter is not saved
760	Constant power expectation value on the DC side	-1000~1000 (accuracy:0.1kw)	0 The parameter is not saved
761	Expected value of the constant current on the DC side	-1500~1500 (accuracy:0.1A)	0 The parameter is not saved
768	Protection amplitude of power grid overvoltage in section 1	40~130	115
769	Grid overvoltage: 1 period of protection time	2~30000 (accuracy:10ms)	10
770	Protection amplitude of power grid overvoltage in 2 sections	40~130	115
771	Power grid overvoltage for 2 periods of protection time	2~30000 (accuracy:10ms)	10
772	Protection amplitude of undervoltage	40~130	85
773	Grid undervoltage: 1 period of protection time	2~30000 (accuracy:10ms)	10
774	Grid undervoltage 2 section protection amplitude	40~130	85
775	Power grid undervoltage for 2 periods of protection time	2~30000 (accuracy:10ms)	10
776	Grid undervoltage 3-segment protection amplitude	40~130	85
777	Power grid undervoltage 3 protection time	2~30000 (accuracy:10ms)	10
778	Protection amplitude of power grid over-frequency 1 segment	4500~6500 (accuracy:0.01hz)	5500
779	Power grid over-frequency 1 period of protection time	2~30000 (accuracy:10ms)	10

780	Protection amplitude of power grid over-frequency 2 segments	4500~6500 (accuracy:0.01hz)	5500
781	Power grid over-frequency 2-period of protection time	2~30000 (accuracy:10ms)	10
782	Protection amplitude of grid frequency 1	4500~6500 (accuracy:0.01hz)	4800
783	Power grid underfrequency 1 protection time	2~30000	10
		(accuracy:10ms)	
784	Grid underfrequency 2-segment protection amplitude	4500~6500 (accuracy:0.01hz)	4800
785	Power grid underfrequency 2 protection time	2~30000 (accuracy:10ms)	10
790	Island detection	0: Don't make it 1: Enable	1

7.2 Alarm fault code and troubleshooting measures

7.2.1 Module faults are divided into several categories. The specific categories and troubleshooting measures are shown in the following table:

Name of the alarm or fault	fault code	Whether to shut down	Fault recovery method	Troubleshooting
Soft failure	1	shut down	Since the recovery	<ol style="list-style-type: none"> 1. Power on the module and wait for 1~2 minutes, the module will restart; 2. After the above operation, if the fault still exists, please contact the customer service of Zhongtian Micro network for handling
Invalid address for duplicate / address	3	shut down	Check before startup, and power recovery	<ol style="list-style-type: none"> 1. Power on the module, and reselect the module address that is inconsistent with the system, and the address range is # 1~ # 10; 2, the address range is # 1~ # 10, the dial switch from left to right, the left is the address high, the right is the address low, dial to the "NO" position is valid, according to the binary calculation. 3. After the address is reset, the power down needs to restart.
ECAP hitch	4	shut down	Since the recovery	<ol style="list-style-type: none"> 1. Check whether the network cable between the parallel machines is missing, connect well, and reconnect the parallel machine network cable 2. Replace the parallel machine network cable
The AC relay is short-circuit	5	shut down	Lower power recovery	<ol style="list-style-type: none"> 1. Power down the module and check whether the inverter intermediate relay is damaged
CPLD wave limiting fault	6	shut down	Since the recovery	<ol style="list-style-type: none"> 1. If the machine, check the load or wiring
Short circuit between the Inv output lines	8	shut down	Since the recovery	<ol style="list-style-type: none"> 1. Power down the module and check for any short circuit between the lines of each phase
Overload protection shutdown	9	shut down	Since the recovery	<ol style="list-style-type: none"> 1. In the overload state for a long time, please check the load

7.2.2 Battery failure

Name of the alarm or fault	fault code	Whether to shut down	Failure recovery mode	Troubleshooting
The bus bus, unbalanced	17	shut down	Since the recovery	1. Power on the module and wait for 1~2 minutes before the module starts 2. Contact the customer service for solutions
Overpressure of bus bus	18	shut down	Since the recovery	1. Check whether the P and N of the bus are overvoltage, and wait for 1 minute to power on again
Bus bus underpressure	19	shut down	Since the recovery	1. Check whether the P and N of the bus are undervoltage and whether the input voltage is too low 2. Contact the customer service for solutions
The bus bus sampling error	20	shut down	Since the recovery	1. The bus bus voltage is not equal to P + N, and there is a sampling error
DC soft start failed	21	shut down	Since the recovery	1. Wait for the bus voltage to get up and start it on again
Battery backconnection	22	shut down	Since the recovery	1. Check whether the positive and negative poles of the battery are connected and reverse
The battery overpressure	23	shut down	Since the recovery	1. Check whether the input of the battery is overvoltage, and wait for 1 minute
Battery under pressure	24	shut down	Since the recovery	1. Check whether the battery input is undervoltage
Discharge overflow	25	shut down	Since the recovery	1 Check for overflow during the discharge
Charging over the flow	26	shut down	Since the recovery	1 Check for overflow during charging
DC contactor fault	32	shut down	Since the recovery	1. PTC abnormal or DC contactor abnormal

7.2.3 Power grid failure

Name of the alarm or fault	fault code	Whether to shut down	Fault recovery method	Troubleshooting
Low power grid frequency	33	shut down	Since the recovery	1. Check whether the low-frequency protection point of the power grid is set up too high 2. Check whether the time of the low-frequency protection point of the power grid is too short
High frequency of power grid	34	shut down	Since the recovery	1. Check whether the high-frequency protection point of the power grid is set up too low 2. Check whether the time of the high-frequency protection point of the power grid is too short
Low power grid voltage	35	shut down	Since the recovery	1. Check whether the undervoltage protection point of the power grid is set up too high 2. Check whether the undervoltage protection point of the power grid is too short
The power grid voltage is high	36	shut down	Since the recovery	1. Check whether the overvoltage protection point of the power grid is set up too low 2. Check whether the time of the power grid overvoltage protection point is too short
Phase sequence and reverse	37	shut down	Since the recovery	1. Check whether the sequential and reverse
Island fault	40	shut down	Since the recovery	
Output current anomaly	41	shut down	Since the recovery	1. Check whether the current output is overcurrent 2. Check for a short circuit
The reverse overcurrent current is abnormal	43	Don't shut down	Alarm, self-recovery	The machine inductive current is inconsistent with the output current
The leakage current is abnormal	47	Don't shut down	Alarm, self-recovery	1. Check whether the leakage current protection point is set up too low 2. Check whether the time of the leakage current protection point is too short

7.2.4, system failure category

Name of the alarm or fault	fault code	Whether to shut down	Fault recovery method	Troubleshooting
Fan fault	50	Don't shut down	Alarm, self-recovery	1. Check if the fan is damaged
Mode error	52	shut down	Since the recovery	1. Phase locking failed in VF mode
Auxiliary source anomaly	53	shut down	Since the recovery	1. Check whether the auxiliary source voltage is too low
SysFault	54	shut down	Since the recovery	1. Report other faults and lead to shutdown. To eliminate this fault, you need to eliminate other faults first
Arm hitch	55	shut down	Since the recovery	1. Check whether the address dial code error, or communication interruption, emergency stop fault, etc
Excessive temperature failure	57	shut down	Since the recovery	1. Check whether the machine environment is too high and strengthen ventilation
IGBT, with a temperature anomaly	58	shut down	Since the recovery	1. Check whether the temperature gap between the three IGBT is too large
Flash, an initialization error	59	shut down	Since the recovery	1.EEPROM chip initialization failed
Internal communication failure	61	shut down	Since the recovery	1. Check whether the wiring between DSP and ARM is unstable or disconnected 2. Whether there is no program for DSP or ARM
CPLD unusual	64	shut down	Since the recovery	1. The CPLD hardware version number is abnormal