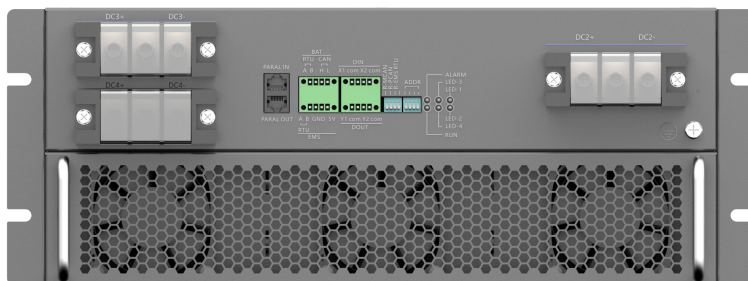# SP120HCPV2 Converter
User Manual

Version：V1.2

1、 Product introduction

The third generation semiconductor is adopted, which is small in size and high in efficiency. Air duct isolation, good environmental adaptability, main photovoltaic power generation, MPPT function, 2 MPPT inputs.
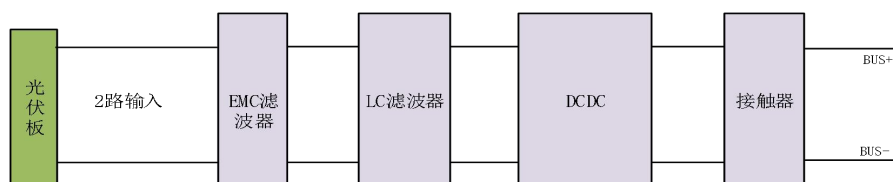
Main topology

| 光伏板 | 2路输入 | EMC滤波器 | LC滤波器 | DCDC | 接触器 | BUS+ BUS- |

图 1

2、 Product features

1) High efficiency and reliability

● **Low Power**：low standby power consumption≤15W，No-load running loss<100W；

● **Fast optimization**：Optimization step size 1s，Quickly find the maximum power point；

● **High efficiency:** the highest conversion efficiency 99.3%；

● **High protection**：The design scheme of air duct isolation is adopted, and the core control part has IP5X protection level.；

● **High reliability**：Support the function of completely disconnecting the converter from the battery when the battery or converter is abnormal.

2) function：

● **Parallel machine function**：Support 15 units in parallel, and the single unit can be controlled independently.；

3) Ease of use：

● **High versatility**：Support a variety of communication protocols, support mainstream BMS protocols, and access to EMS system, which is convenient for remote monitoring and management；

● **High maintainability**：Front wiring and maintenance；

● **Fault protection**：Perfect fault protection and fault recording function；

● **Wide input voltage**：Wide input voltage, strong adaptability, and can meet the energy demand of different capacity requirements.

3、 Product Module

SP120HCPV2

4、 Product appearance and interface definition

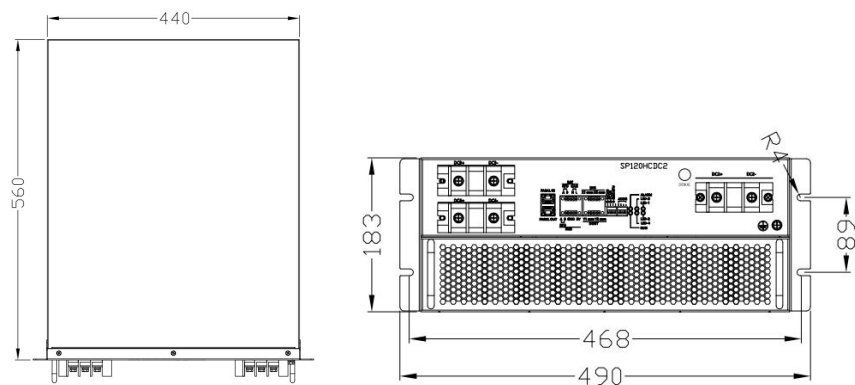1) SP120HCPV2 Product appearance：

图 2

2) SP120HCPV2 Product Size：

图 3

3) Electrical interface definition

name	function	remarks
DC3+/DC3-	PV1 Side terminal	OT terminal(RNB38-6S)，recommend35mm² wire cable
DC4+/DC4-	PV2 Side terminal	OT terminal(RNB38-6S)，recommend35mm² wire cable
DC2+/DC2-	High Voltage Side terminal	OT terminal(RNB38-6S)，recommend50mm² wire cable

SP120HCPV2：

4) Definition of communication interface

| Name	function	remarks
PARAL IN	Parallel line input	Parallel line
PARAL OUT	Parallel line output	Parallel line
BAT_RTU	Battery RS485 interface	BAT communication interface
BAT_CAN	Battery CAN interface	
RTU(A-B)	Customer RS485 interface	EMS communication interface
X1	Dry contact input	EPO+
X1_com	Dry contact input	EPO-
X2	Dry contact input	reserve
X2_com	Dry contact input	reserve
Y1	Output dry contact	DOUT
com		
Y2	Output dry contact	
com		
R-MCAN	Parallel communication matching resistor	Top is ON，Module 1 and the last module are turned ON.。
R-PCAN	Parallel communication matching resistor	
R-EMS RTU	EMS RTU Communication matching resistance	
ADDR	Module address dialing	Top is ON The module address 00001 is 1 Module address 00100 Address 4
ALARM	trouble lamp	
RUN	status indicator lamp	
LED-1	PV1status indicator lamp	
LED-2	PV2status indicator lamp	
LED-3	PV3status indicator lamp	
LED-4	PV4status indicator lamp	
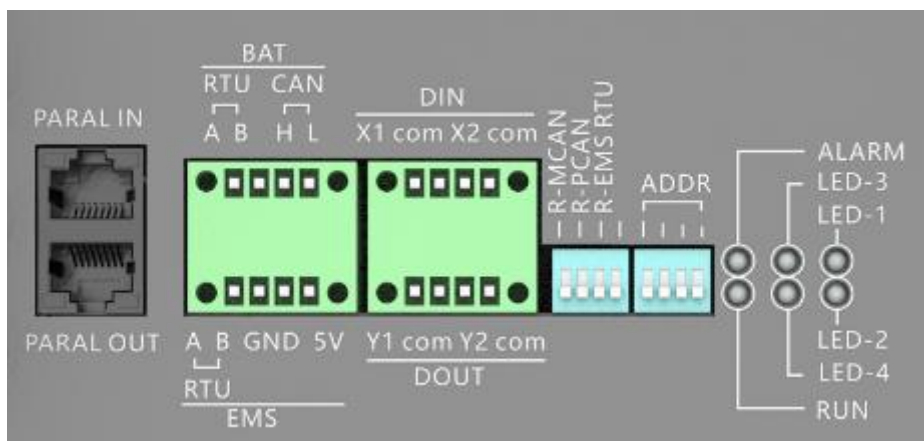
figure 4

Schematic diagram of output dry contact：
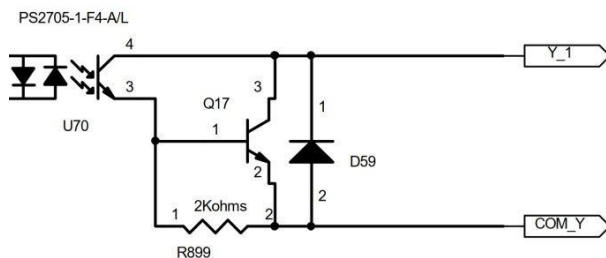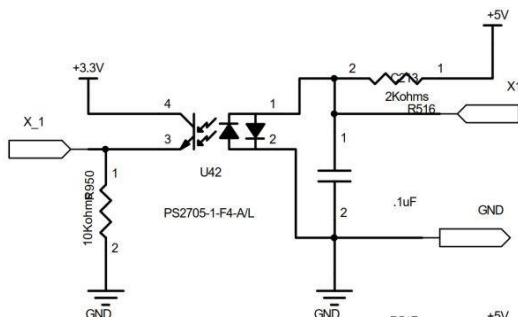

figure 5

Schematic diagram of input dry contact：

figure 6

5、 Specification parameter

1) Parameter

Parameter	SP120HCPV2
PV parameter	
Rated power	120kW
PV Open circuit voltage range	200V-900V
MPPT voltage range	200V-850V
Rated voltage	600V
Starting voltage	250V
PV Input number	2
Maximum PVcurrent	100A+100A
Short circuit	120A+120A
High voltage side parameter	
Voltage range	500V-950V
Rated voltage	680V
Maximum current	180A
System parameter	
Communication port	EMS：RS485 Battery：CAN or RS485
DIDO	DI：2 Paths，DO：2 paths
Maximum efficiency	99.3%
Installation mode	Insert frame
Wastage	Bide one's time<15W，operate without load<100W
Weight	29KG
Measure	W * H * D：440*183*560mm
Protect	IP5X（Core control part）
Temperature range	-30~60℃
Humidity range	5%~95%
Cooling mode	Intelligent forced air cooling
Noise	50dB
Altitude	4000m(>2000m derate)
Protect	OTP、OCP、OVP、CP
Authentication	CE，IEC62477，IEC62019，IEC6100
Soft-start circuitry	Yes

2) Power derating curve

SP120HCPV2/Power derating curve (PV voltage）：
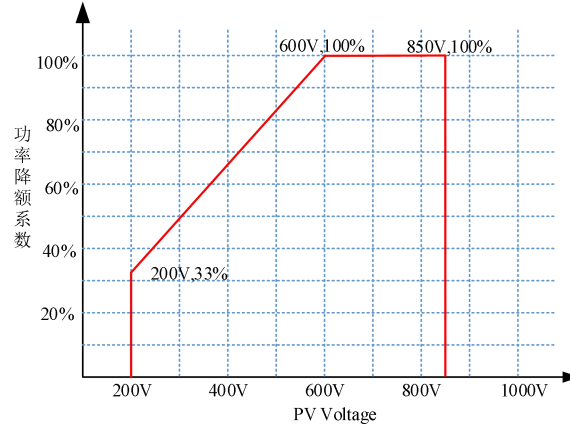

figure 7
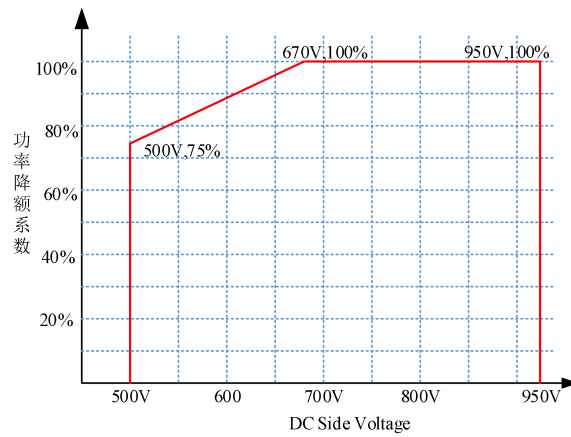
SP120HCPV2/Power derating curve (DC side voltage)：
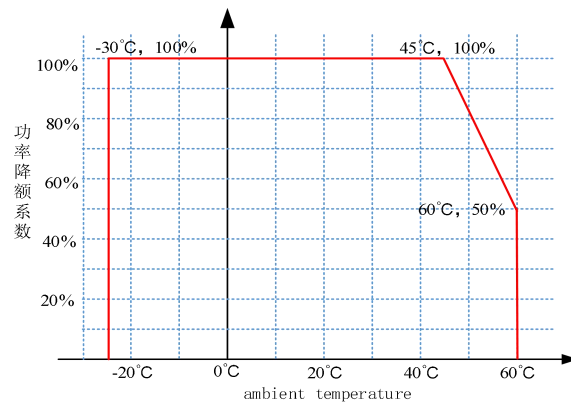

figure 8

3) Temperature derating curve

figure 9

6

5) Safety protection

● Air duct isolation、salt spray prevention、control warehouse sealing；

● Humidity range 5%-95%；

● Anti-interference 2KV is grounded. If the length of high and low voltage voltage side exceeds 20M during application, it is suggested to add DC lightning arrester.；

● Running vibration test, transportation test with packing material。

6、 Debugging software installation

1) Software installation

Software installation
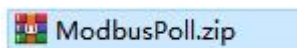
Step1：Unzip the installation package ModbusPoll.zip。、

figure 10

Step 2：Install 32-bit or 64-bit software according to computer matching.。

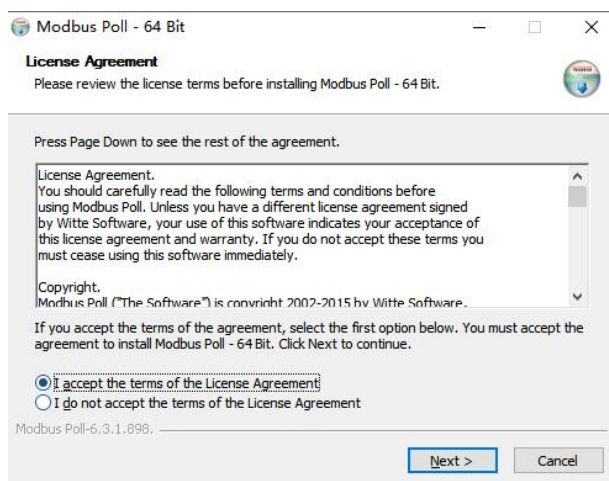figure 11

Step 3: Install according to the prompts.。

figure 12
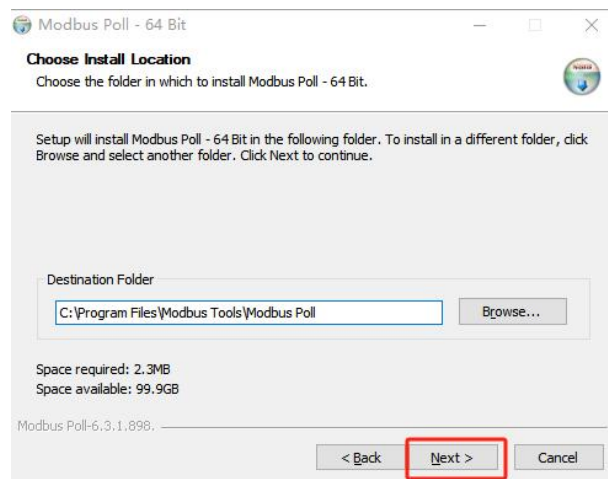
figure 13

Step4：After the software is successfully installed, the desktop will generate shortcuts.

figure 14

2) Communication connection

Connect RTU communication port of EMS with 485 debugging tool

3) Software debugging function

a) Communication connection page

Step1：Double click to open the software.

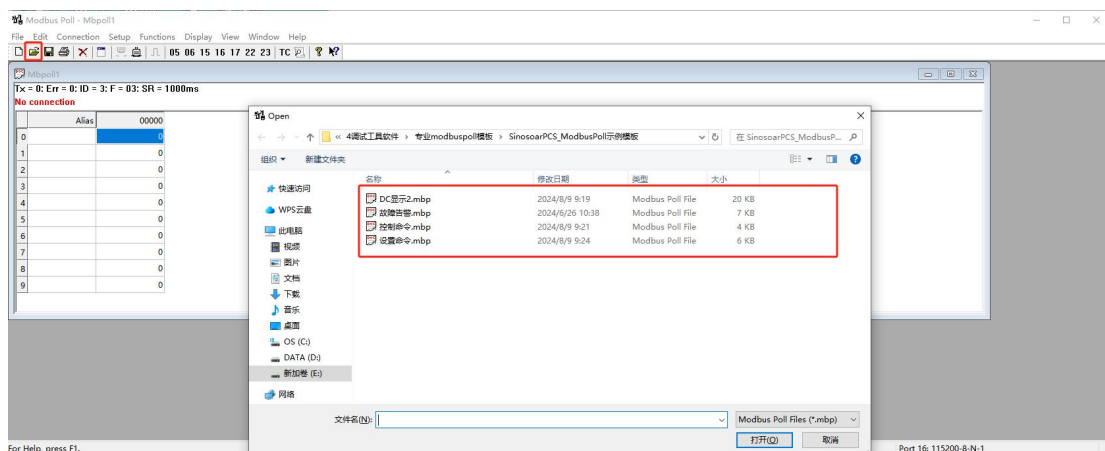Step2：Open the corresponding template file.

figure 15

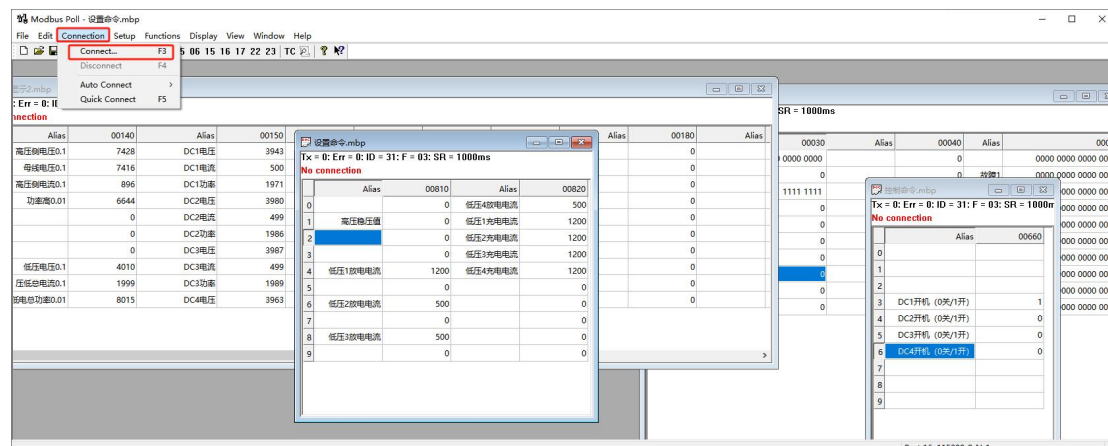Stept3：Communication connection, select corresponding serial port and baud rate.
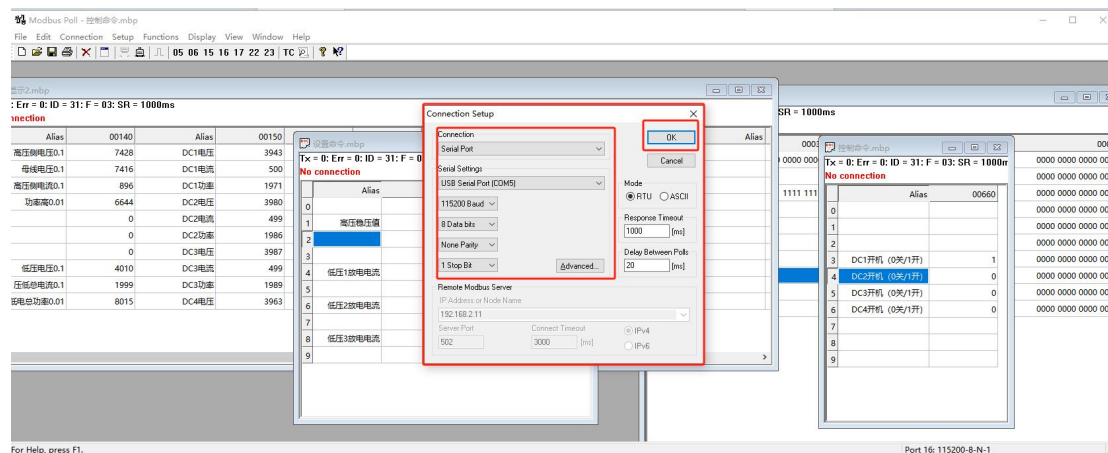

figure 16
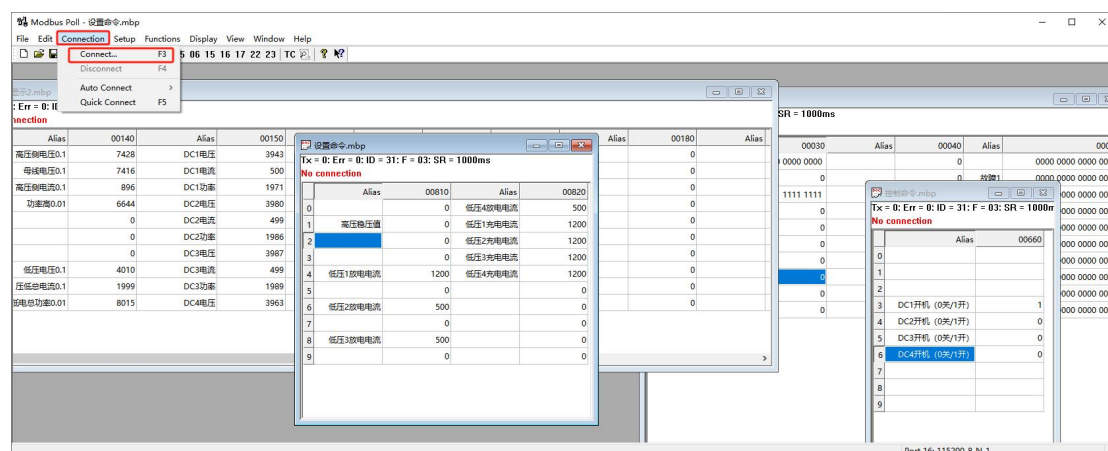

figure 17

b) display the interface

figure 18

There are four boxes for display, control, setting and fault respectively.

7、 alarm fault code and fault handling measures

1) Module failures are divided into several categories, and the specific categories and

troubleshooting measures are shown in the following table：

Alarm or fault name	breakdown code	Shut down or not	Fault recovery mode	Troubleshooting measures
Soft start failure	1	shut down	Self-recovery	1. Power down the module, wait for 1~2 minutes, and then restart the module; 2. After the above operations, if the fault still exists, please contact Sino soar Hybrid Customer Service for handling.
Duplicate address/invalid address	3	shut down	Pre-startup detection, power-down recovery	1. When the module is powered off, re-select the module address which is inconsistent with the system, and the address range is # 1 ~ # 10; 2, the address range is #1~#10, dip switch from left to right, high address on the left, low address on the right, dial the "NO" position effectively, according to the binary calculation. 3. After the address is reset, it needs to be powered off and restarted to take effect.
ECAP Fault	4	shut down	Self-recovery	1. Check whether the network cables between parallel machines are not connected properly, and reconnect the parallel network cables. 2. Replace the parallel network cable
CPLD Wave by wave current limiting fault	6	shut down	Self-recovery	1.The machine has overcurrent. Check the load or wiring.
Output short circuit	8	shut down	Self-recovery	1.Power down the module and check whether there is a short circuit between the outputs.
Overload protection shutdown	9	shut down	Self-recovery	1.Overload for a long time, please check the load.

2) Battery fault

Alarm or fault name	breakdown code	Shut down or not	Fault recovery mode	Troubleshooting measures
BUS overvoltage	18	shut down	Self-recovery	1. Check whether P and N of the bus are over-voltage, turn off the power and wait for 1 minute before turning it on again.

BUS undervoltage	19	shut down	Self-recovery	1. Check whether P and N of the bus are undervoltage and the input voltage is too low. 2. Contact customer service to solve it
DC Soft start failure	21	shut down	Self-recovery	1. Wait for the bus voltage to rise before restarting.
Battery reverse connection	22	shut down	Self-recovery	1.Check whether the positive and negative poles of the battery are reversed.
Battery overvoltage	23	shut down	Self-recovery	1. Check whether the input of the battery is over-voltage, power off and wait for 1 minute before power on again.
Battery undervoltage	24	shut down	Self-recovery	1. Check whether the battery input is undervoltage.
Discharge overcurrent	25	shut down	Self-recovery	1.Check whether there is overcurrent during discharge.
Charging overcurrent	26	shut down	Self-recovery	1 Check whether there is overcurrent when charging.
DC Contactor fault	32	shut down	Self-recovery	1.PTC Abnormal or abnormal DC contactor

3) System fault class

Alarm or fault name	breakdown code	Shut down or not	Fault recovery mode	Troubleshooting measures
Fan fault	50	Didn't turn it off	Alarm, self-recovery	1.Check whether the fan is damaged
Mode error	52	shut down	Self-recovery	1.VF Phase locking failure in mode
Auxiliary source anomaly	53	shut down	Self-recovery	1.Check whether the auxiliary source voltage is too low.
SysFault	54	shut down	Self-recovery	1.Other faults are reported, which leads to shutdown. To eliminate this fault, other faults need to be eliminated first.
Arm fault	55	shut down	Self-recovery	1.Check whether there is an address dialing error, or communication interruption, emergency stop fault, etc.
Overheat fault	57	shut down	Self-recovery	1.Check whether the machine environment is too high and strengthen ventilation.
IGBT temperature anomaly	58	shut down	Self-recovery	1. check whether the temperature difference between three IGBT is too large.
Flash Initialization error	59	shut down	Self-recovery	1.EEPROM Chip initialization failed.

Internal communication fault	61	shut down	Self-recovery	1. Check whether the wiring between DSP and ARM is unstable or disconnected. 2. Is there no program for 2.DSP or ARM?
CPLD abnormal	64	shut down	Self-recovery	1.CPLD Abnormal hardware version number