OffGrid SPF5000 Modbus RS485&RS232 RTU Protocol

V0.14
2020-10-16

No.	Version	Date	Notice	Signature
1	V0.01	2016-12-27	The first version	Zhenyuan.li
2	V0.02	2017-1-12	1、 modify input reg 0, system status; 2、add input reg 44 for send DTC to server to identify machine type;	Zhenyuan.li
3	V0.03	2017-2-6	1、 modify Holding reg 29, Model Low;	Zhenyuan.li
4	V0.04	2017-2-16	1、add Holding reg 39, battery type; 2、 modify Holding reg 0, On/Off; 3、 modify Input reg 46, Production Line Mode;	Zhenyuan.li
5	V0.05	2017-3-10	1、 modify Input reg 17、28、29, Battery Voltage;	Zhenyuan.li
6	V0.06	2017-3-15	1、 modify Holding reg 29, Model L;	Zhenyuan.li
7	V0.07	2017-5-25	1、 modify Hold reg 29; 2、 modify Input reg 36~39; 3、 add Input reg 68~82;	Zhenyuan.li
8	V0.08	2017-5-26	1、 add Input reg 90~131 for BMS infomation;	Zhenyuan.li
9	V0.09	2017-7-4	1、 add Input reg 135~179 for SolarCharger infomation;	Zhenyuan.li
10	V0.10	2017-7-12	1、add Input reg 83~86 for Machine Rate Power ;	Zhenyuan.li
11	V0.11	2017-8-09	1、 Change Machine Rate Power from Input Reg 83~86 to Holding Reg 76~79; 2、 Adjust BMS info, and add BMS2 info; 3、 Add Solar Charger Info at Input Reg 180~224;	Zhenyuan.li
12	V0.13	2020-06-16		Jianjian.Yu
13	V0.14	2020-10-16	Modify 37,82,95 holding register's description	Jianjian.Yu
14	V0.15	2020-04-20	Add 41 and 42 new function of holding register; Modify 43 of input register;	Xiao.jin

V0.01   2016-12-27:

1, Update the register map tables from sp3000 RTU protocol for spf3-5K;

V0.02   2017-1-12:

1, modify input reg 0, system status;

2, add input reg 44 for send DTC to server to identify machine type;

V0.03   2017-2-6:

1, modify Holding reg 29, model Low;

V0.04   2017-2-16:

1, add Holding reg 39, battery type; it can be set by server;

2, modify Holding reg 0, On/Off; add remote control ac output and set standby state function;

3, modify Input reg 46, Production Line Mode; add production line mode set 2 to clear fault, decrease test time;

V0.05   2017-3-10:

1, modify Input reg 17、28、29, Battery Voltage; change uint 0.1V to uint 0.01V;

V0.06   2017-3-15:

1, modify Holding reg 29, Model L; Add S bit for Aging Mode;

V0.07   2017-5-25:

1, modify Holding reg 29, Model L; U bit add two user:CPS and cODM_Haiti;

2, modify Input reg 36~39 for AC input Power;

3, add Input reg 68 for AC charge current; add Input reg 69~72 for AC discharge power; add Input reg 73~76 for battery discharge power; add Input reg 77~78 for battery power; add Input reg 80 for battery over charge flag; add Input reg 81~82 for fan speed;

V0.08   2017-5-26:

1, add Input reg 90~131 for BMS 2nformation;

V0.09   2017-7-4:

1, add Input reg 135~179 for SolarCharger 2nformation;

V0.10   2017-7-12:

1, add Input reg 83~86 for Machine Rate Power;

V0.11   2017-8-09:

1, Change Machine Rate Power from Input Reg 83~86 to Holding Reg 76~79;

2, Adjust BMS info, and add BMS2 info;

3, Add Solar Charger Info at Input Reg 180~224;

V0.12   2020-6-16:

1 Data format

Address	Function	Data	CRC check
8 bits	8 bits	N×8bits	16bits

Valid slave device addresses are in the range of 0 – 247 decimal.

The individual slave devices are assigned addresses in the range of 1 – 247.

0 is the broadcast address

It is 16bits (two bytes) unsigned integer for each holding and input register;

2 Command Format

Function 3 Read holding register

```
QUERY

Field Name                        Example
                                  (Hex)

Slave Address                     01
Function                          03
Starting Address Hi               00
Starting Address Lo               6B
No. of Points Hi                  00
No. of Points Lo                  03
Error Check (LRC or CRC)          —
```

```
RESPONSE

Field Name                        Example
                                  (Hex)

Slave Address                     01
Function                          03
Byte Count                        06
Data Hi (Register 40108)          02
Data Lo (Register 40108)          2B
Data Hi (Register 40109)          00
Data Lo (Register 40109)          00
Data Hi (Register 40110)          00
Data Lo (Register 40110)          64
Error Check (LRC or CRC)          —
```

Response Error:

　　11 0x80|0x03 Errornum CRC   (Errornum as a byte)

Function 4 Read input   register

```
QUERY

                            Example
Field Name                  (Hex)

Slave Address               01
Function                    04
Starting Address Hi         00
Starting Address Lo         08
No. of Points Hi            00
No. of Points Lo            01
Error Check (LRC or CRC)    —
```

```
RESPONSE

                            Example
Field Name                  (Hex)

Slave Address               01
Function                    04
Byte Count                  02
Data Hi (Register 30009)    00
Data Lo (Register 30009)    0A
Error Check (LRC or CRC)    —
```

Response Error:

11 0x80|0x04 Errornum CRC   (Errornum as a byte)

Function 6 Preset single register

```
QUERY

                            Example
Field Name                  (Hex)

Slave Address               01
Function                    06
Register Address Hi         00
Register Address Lo         01
Preset Data Hi              00
Preset Data Lo              03
Error Check (LRC or CRC)    —
```

```
RESPONSE

                           Example
Field Name                 (Hex)

Slave Address              01
Function                   06
Register Address Hi        00
Register Address Lo        01
Preset Data Hi             00
Preset Data Lo             03
Error Check (LRC or CRC)   —
```

Response Error:

11 0x80|0x06 Errornum CRC   (Errornum as a byte)

Function 16 Preset multiple register

```
QUERY

                           Example
Field Name                 (Hex)

Slave Address              01
Function                   10
Starting Address Hi        00
Starting Address Lo        01
No. of Registers Hi        00
No. of Registers Lo        02
Byte Count                 04
Data Hi                    00
Data Lo                    0A
Data Hi                    01
Data Lo                    02
Error Check (LRC or CRC)   —
```

```
RESPONSE

                           Example
Field Name                 (Hex)

Slave Address              01
Function                   10
Starting Address Hi        00
Starting Address Lo        01
No. of Registers Hi        00
No. of Registers Lo        02
Error Check (LRC or CRC)   —
```

Response Error:

11 0x80|0x10 Errornum CRC   (Errornum as a byte)

3 Device Message Transmission Mode / Framing

RTU Mode
When controllers are setup to communicate on a Modbus network using RTU (Remote Terminal Unit) mode, each 8–bit byte in a message contains two 4–bit hexadecimal characters. Each message must be transmitted in a continuous stream.

The format for each byte in RTU mode is:
> Coding System: 8–bit binary, hexadecimal 0–9, A–F
> Two hexadecimal characters contained in each
> 8–bit field of the message

Bits per Byte:
> 1 start bit
> 8 data bits, least significant bit sent first
> None parity
> 1 stop bit
> Error Check Field: Cyclical Redundancy Check (CRC)

The baud rate of the transmission is:
> Baud Rate: 9600 bps

Minimum CMD period (RS485 Time out): 850ms.
> Wait for minimum 850ms to send a new CMD after last CMD. Suggestion is 1s;

Maximum Data Length Define:
> Maximum read data length is 45 words in read command;
> Maximum update data length is 45 words in preset command;
> Read or update registers NO. should in the range of times of 45,
> > eg: 1~45 or 96~123 are OK,   but 40~60 is not OK;

Note:
    Except the CEI0-21 and VDE-AR-N 4105 power management registers, you should refer the manufactory's suggestion when writing other registers;

4 Register map

It is 16bits (two bytes) unsigned integer for each holding and input register;

4.1 Holding Reg

Reg NO.	Variable Name	Description	Customer Write	Value	Unit	Initial value	Note
00	On/Off	The Standby On/Off state and the AC output DisEN/EN state; The low byte is the Standby on/off(1/0), the high byte is the AC output disable/enable (1/0).		0x0000: Output enable; 0x0100: Output disable;		0	
01	OutputConfig	AC output set	W	0: BAT First; 1: PV First; 2: UTI First; 3: PV&UTI First		0	
02	ChargeConfig	Charge source set	W	0: PV first; 1: PV&UTI; 2: PV Only;		0	
03	UtiOutStart	Uti Output Start Time	W	0-23	H(hour)	0	
04	UtiOutEnd	Uti Output End Time	W	0-23	H(hour)	0	
05	UtiChargeStart	Uti Charge Start Time	W	0-23	H(hour)	0	
06	UtiChargeEnd	Uti Charge End Time	W	0-23	H(hour)	0	
07	PVModel	PV Input Mode	W	0:Independent; 1: Parallel;		0	
08	ACInModel	AC Input Mode	W	0: APL,90-280VAC; 1: UPS,170-280VAC; 2: GEN		0	
09	Fw version H	Firmware version (high)			ASCII		
10	Fw version M	Firmware version (middle)					
11	Fw version L	Firmware version (low)					
12	Fw version2 H	Control Firmware version (high)			ASCII		

13	Fw version2 M	Control Firmware version (middle)					
14	Fw version2 L	Control Firmware version (low)					
15	LCD language	LCD language	W	0-1		1	English
16	GridV_Adj						
17	InvV_Adj						
18	OutputVoltType	Output Volt Type	W	0: 208VAC; 1: 230VAC 2: 240VAC 3:220VAC 4:100VAC 5:110VAC 6:120VAC		1	
19	OutputFreqType	Output Freq Type	W	0: 50Hz; 1: 60Hz		0	
20	OverLoadRestart	Over Load Restart	W	0:Yes; 1:No; 2: Swith to UTI;		0	Yes(over Load 1mins to restart, after over Load three times to stop output)
21	OverTempRestart	Over Temperature Restart	W	0:Yes; 1:No;		0	Yes(over Temperature to restart， after over Temperature three times to stop output)
22	BuzzerEN	Buzzer on/off enable	W	1:Enable; 0:Disable;		1	
23	Serial NO. 5	Serial number 5	W		ASCII		
24	Serial No. 4	Serial number 4	W				
25	Serial No. 3	Serial number 3	W				
26	Serial No. 2	Serial number 2	W				
27	Serial No. 1	Serial number 1	W				
28	Moudle H	Inverter Moudle (high)	W				Can be set at standy state Only
29	Moudle L	Inverter Moudle (low)	W	P-battery type: 0: Lead_Acid; 1: Lithium; 2: CustomLead_Acid; U-user type:			Can be set at standy state Only

				0: No verndor; 1: Growatt; 2: CPS; 3: Haiti; **M-power rate:** 3: 3KW; 5:5KW; **S-Aging;** 0: Normal Mode; 1: Aging Mode;			
30	Com Address	Communicate address	W	1~254		1	
31	FlashStart	Update firmware	W	0x0001: own 0X0100: control broad			
32	Reset User Info	Reset User Information	W	0x0001			
33	Reset to factory	Reset to factory	W	0x0001			
34	MaxChargeCurr	Max Charge Current	W	0~180	1A	70	
35	BulkChargeVolt	Bulk Charge Volt	W	500~640	0.1V	564	
36	FloatChargeVolt	Float Charge Volt	W	500~560	0.1V	540	
37	BatLowToUtiVolt	Bat Low Volt Switch To Uti	W	200~640 (non Lithium) or 5~100 (Lithium)	0.1V Or 1%	460 Or 50%	
38	ACChargeCurr	AC Charge Current	W	0~100	1A	30	
39	Battery Type	Battery Type	W	0: AGM 1: FLD 2: USE 3: Lithium; 4: USE2		1	**Can be set at standy state Only**
40	Aging Mode	Aging Mode	W	0: Normal Mode; 1: Aging Mode;		0	**Can be set at standy state Only**
41	Function Mask		W	bit0=Etl check enable			0:Disable; 1:Enable;
				bit1=Pv ISO Check enable			0:Disable; 1:Enable;
				bit2~bit15: reserved			
42	Safety Type		W	1. standard 2. ETL 3. AS4777 4. CQC 5. VDE4105			

43	DTC	Device Type Code		&*6			
44							
45	Sys Year	System time-year	W	Year offset is 2000			
46	Sys Month	System time- Month	W				
47	Sys Day	System time- Day	W				
48	Sys Hour	System time- Hour	W				
49	Sys Min	System time- Min	W				
50	Sys Sec	System time- Second	W				
51							
52	uwAcVoltHighL						
53	uwAcVoltLowL						
54	uwAcFreqHighL						
55	uwAcFreqLowL						
56							
57							
58							
59	Manufacturer Info 8	Manufacturer information (high)			ASCII		
60	Manufacturer Info 7	Manufacturer information (middle)					
61	Manufacturer Info 6	Manufacturer information (low)					
62	Manufacturer Info 5	Manufacturer information (high)					
63	Manufacturer Info 4	Manufacturer information (middle)					
64	Manufacturer Info3	Manufacturer information (low)					
65	Manufacturer Info 2	Manufacturer information (low)					
66	Manufacturer Info 1	Manufacturer information (high)			ASCII		
67	FW Build No. 4	Control FW Build No. 2					
68	FW Build No. 3	Control FW Build No. 1					
69	FW Build No. 2	COM FW Build No. 2					
70	FW Build No. 1	COM FW Build No. 1					

71							
72	Sys Weekly	Sys Weekly	W	0-6			
73	ModbusVersion	Modbus Version		Eg：207 is V2.07	Int(16bits)		
74							For par avg power
75	SCC_ComMode	SCC Communication Mode					For BMS board, SCC cntrl
76	Rate Watt H	Rate active power(high)			0.1W		
77	Rate Watt L	Rate active power(low)			0.1W		
78	Rate VA H	Rata apparent power (high)			0.1VA		
79	Rate VA L	Rate apparent power (low)			0.1VA		
80	ComboardVer	Communicaiton board Version					For bms boad
81	uwBatPieceNum						
82	wBatLowCutOff	Bat voltage low cutoff		200~640 (non Lithium) or 5~100 (Lithium)	0.1V Or 1%	460 Or 50%	
83							
84	NomGridVolt						
85	NomGridFreq						
86	NomBatVolt						
87	NomPvCurr						
88	NomAcChgCurr						
89	NomOpVolt						
90	NomOpFreq						
91	NomOpPow						
92							
93							
94							
95	uwAC2BatVolt	AC switch to Battery		200~640 (non Lithium) or 5~100 (Lithium)	0.1V Or 1%	460 Or 50%	
96	BypEnable						
97	PowSavingEn						
98	SpowBalEn						
99	ClrEnergyToday						
100	clrEnergyAll						

101	BurnInTestEn						
102	ManualStartEn						
103	SciLossChkEn						
104	BlightEn						
105	ParaMaxChgCurr	Parallel System Maximum charge current					
106	LiProtocolType	Protocol type for battery			1~99	1	
107	AudioAlarmEn						
108	uwEqEn						
109	uwEqChgVolt						
110	uwEqTime						
111	uwEqTimeOut						
112	uwEqInterval						
113	uwMaxDisChgCurr						
162	BLVersion2	Boot loader version2	R				M3 bootloader version

4.2 Input Reg

(Some of input Registers can be wrote by Manufacturer, write address offset is 0x1000, start at 0x1000. Can not be wrote by customer.)

Reg NO.	Variable Name	Description	Value	Unit	Note
00	System Status	System run state	0: Standby; 1; PV an Grid Combine Discharge 2: Discharge; 3: Fault; 4: Flash; 5: PV charge; 6: AC charge; 7: Combine charge; 8: Combine charge and Bypass; 9: PV charge and Bypass; 10: AC charge and		

			Bypass; 11: Bypass; 12: PV charge and Discharge;		
01	Vpv1	PV1 voltage		0.1 V	
02	Vpv2	PV2 voltage		0.1 V	
03	Ppv1 H	PV1 charge power (high)		0.1 W	
04	Ppv1 L	PV1 charge power (low)		0.1 W	
05	Ppv2 H	PV2 charge power (high)		0.1 W	
06	Ppv2 L	PV2 charge power (low)		0.1 W	
07	Buck1Curr	Buck1 current		0.1 A	
08	Buck2Curr	Buck2 current		0.1 A	
09	OP_Watt H	Output active power (high)		0.1 W	
10	OP_Watt L	Output active power (low)		0.1 W	

11	OP_VA H	Output apparent power (high)		0.1 VA	
12	OP_VA L	Output apparent power (low)		0.1 VA	
13	ACChr_Watt H	AC charge watt (high)		0.1 W	
14	ACChr_Watt L	AC charge watt (low)		0.1 W	
15	ACChr_VA H	AC charge apparent power (high)		0.1 VA	
16	ACChr_VA L	AC charge apparent power (low)		0.1 VA	
17	Bat Volt	Battery volt (M3)		0.01 V	
18	BatterySOC	Battery SOC	0~100	1 %	
19	Bus Volt	Bus Voltage		0.1 V	
20	Grid Volt	AC input Volt		0.1 V	
21	Line Freq	AC input frequency		0	

				. 0 1 H z	
22	OutputVolt	AC output Volt		0 . 1 V	
23	OutputFreq	AC output frequency		0 . 0 1 H z	
24	Ouput DCV	Ouput DC Volt		0 . 1 V	
25	InvTemp	Inv Temperature		0 . 1 C	
26	DcDc Temp	DC-DC Temperature		0 . 1 C	
27	LoadPercent	Load Percent	0~1000	0 . 1 %	
28	Bat_s_Volt	Battery-port volt (DSP)		0 . 0 1 V	
29	Bat_Volt_DSP	Battery-bus volt (DSP)		0 . 0 1 V	
30	Time total H	Work time total (high)		0 . 5	

				S	
31	Time total L	Work time total (low)		0.5S	
32	Buck1_NTC	Buck1 Temperature		0.1C	
33	Buck2_NTC	Buck2 Temperature		0.1C	
34	OP_Curr	Output Current		0.1A	
35	Inv_Curr	Inv Current		0.1A	
36	AC_InWatt H	AC input watt (high)		0.1W	
37	AC_InWatt L	AC input watt (low)		0.1W	
38	AC_InVA H	AC input apparent power (high)		0.1VA	
39	AC_InVA L	AC input apparent power (low)		0.1VA	
40	Fault bit	fault bit	&*1		
41	Warning bit	Warning bit	&*1		
42	Warning bit high				
43	warning value	warning value			
44	DTC	Device Type Code	&*6		

45	Check Step	Product check step	1:PV1 charge power check; 2:PV2 charge power check; 3:AC charge Power check		
46	Production Line Mode	Production Line Mode	0: Not at Production Line Mode; 1: Production Line Mode; 2: Production Line Clear Fault Mode;		
47	ConstantPowerOKFlag	Constant Power OK Flag	0: Not OK; 1: OK;		
48	Epv1_today H	PV Energy today			
49	Epv1_today L	PV Energy today		0.1 kWh	
50	Epv1_total H	PV Energy total			
51	Epv1_total L	PV Energy total		0.1 kWh	
52	Epv2_today H	PV Energy today			
53	Epv2_today L	PV Energy today		0.1 kWh	
54	Epv2_total H	PV Energy total			
55	Epv2_total L	PV Energy total		0.1 kWh	
56	Eac_chrToday H	AC charge Energy today			

57	Eac_chrToday L	AC charge Energy today		0.1 kWh	
58	Eac_chrTotal H	AC charge Energy total			
59	Eac_chrTotal L	AC charge Energy total		0.1 kWh	
60	Ebat_dischrToday H	Bat discharge Energy today			
61	Ebat_dischrToday L	Bat discharge Energy today		0.1 kWh	
62	Ebat_dischrTotal H	Bat discharge Energy total			
63	Ebat_dischrTotal L	Bat discharge Energy total		0.1 kWh	
64	Eac_dischrToday H	AC discharge Energy today			
65	Eac_dischrToday L	AC discharge Energy today		0.1 kWh	
66	Eac_dischrTotal H	AC discharge Energy total			
67	Eac_dischrTotal L	AC discharge Energy total		0.1 kWh	
68	ACChrCurr	AC Charge Battery Current		0.1	

				A	
69	AC_DisChrWatt H	AC discharge watt (high)		0.1 W	
70	AC_DisChrWatt L	AC discharge watt (low)		0.1 W	
71	AC_DisChrVA H	AC discharge apparent power (high)		0.1 VA	
72	AC_DisChrVA L	AC discharge apparent power (low)		0.1 VA	
73	Bat_DisChrWatt H	Bat discharge watt (high)		0.1 W	
74	Bat_DisChrWatt L	Bat discharge watt (low)		0.1 W	
75	Bat_DisChrVA H	Bat discharge apparent power (high)		0.1 VA	
76	Bat_DisChrVA L	Bat discharge apparent power (low)		0.1 VA	
77	Bat_Watt H	Bat watt (high)	**(signed int 32)** Positive:Battery Discharge Power; Negative: Battery Charge Power;	0.1 W	
78	Bat_Watt L	Bat watt (low)		0.1	

				W	
79	uwSlaveExistCnt	uwSlaveExistCnt			
80	BatOverCharge	Battery Over Charge Flag	0:Battery not over charge; 1:Battery over charge;		
81	MpptFanSpeed	Fan speed of MPPT Charger	0~100	1%	
82	InvFanSpeed	Fan speed of Inverter	0~100	1%	
83	TotalChgCur	Total Charge current		0.1A	
85	Eop_dischrToday_H	Op discharge Enerday today			
86	Eop_dischrToday_L				
87	Eop_dischrTotal_H	Op discharge Enerday total			
88	Eop_dischrTotal_L				
90	ParaChgCurr	Para system charge current		0.1A	

&*1: Off Grid Inverter fault code Bit(See &*8):

Fault type value	Means(The message showed on the inverter when the inverter has fault)
2	Over Temperature 过温
3	Bat Voltage High 电池电压过高
5	Output short 输出短路
6	Output voltage high 输出电压过高
7	Over Load 过载
8	Bus voltage high 直流母线电压过高
9	Bus start fail 直流母线软起失败
51	over current 过流
52	Bus voltage low 直流母线电压过低
53	inverter softstart fail 逆变软起失败
56	battery open 电池未接
58	output voltage low 输出电压过低
60	negtive power 负功过大
61	PV voltage high PV 电压过高
62	SCI com error 内部通讯故障
80	can fault Can 通讯失败
81	host loss 主机丢失

&*5: Inverter Model: A , could be show: "T0 Q0 PF U1 M5 S1" or "00F151"

$$Tx=(A\&0XF00000)>>20$$
$$Qx=(A\&0X0F0000)>>16$$
$$Px=(A\&0x00F000)>>12$$
$$Ux=(A\&0x000F00)>>8$$
$$Mx=(A\&0x0000F0)>>4$$
$$Sx=(A\&0x00000F)$$

&*6: DTC(Device type code)

Code No.	Device type	Note
001xx	Inverter	1 tracker and 1phase Grid connect PV inverter TL
002xx	Inverter	2 tracker and 1phase Grid connect PV inverter TL
003xx	Inverter	1 tracker and 1phase Grid connect PV inverter HF
004xx	Inverter	2 tracker and 1phase Grid connect PV inverter HF
005xx	Inverter	1 tracker and 1phase Grid connect PV inverter LF
006xx	Inverter	2 tracker and 1phase Grid connect PV inverter LF
007xx	Inverter	1 tracker and 3phase Grid connect PV inverter TL
008xx	Inverter	2 tracker and 3phase Grid connect PV inverter TL
009xx	Inverter	1 tracker and 3phase Grid connect PV inverter LF
010xx	Inverter	2 tracker and 3phase Grid connect PV inverter LF
……		
10001	Data logger	RF-ShineVersion
10002	Data logger	Web-ShinePano
10003	Data logger	Web-ShineWebBox
10004	Data logger	WL-WIFI Module
……		
11001	Confluence box	Confluence box 1
……		
031xx	PV Storage	Front 1 tracker PV Storage
034xx	OffGrid	OffGrid SPF 3-5K

&*7: Grid network power control command password:

Inverter is in lock state after power on; change the power control by network command should unlock
inverter first; default pw is XXXXXX;

Unlock: send 0 to 3-135, then send password to 3-136~138; inverter will auto lock in 5min after
unlocked;

Change PW: unlock first, then send 1 to 3-135, then send new password to 3-136~138;

Lock: send 0 or 2 to 3-135;

&*8: Off Grid Inverter warning code

Warning code		
Warning bit(41)		
0x0001	Fan lock warning	风扇被锁
0x0002	Over charge	电池过充
0x0004	Battery voltage low	电池电压过低
0x0008	Over load	过载
0x0010	Op power derating	输出功率降额
0x0020	Solar stop due to bat low	电池过低太阳能停止充电
0x0040	Solar stop due to Pv high	太阳能电压过高太阳能停止充电
0x0080	solar stop due to over load	过载太阳能停止充电
0x0100	Grid different	并机市电输入不一致
0x0200	Grid phase error	并机输入相序错误
0x0400	Op phase loss	并机输出缺相
0x0800	Over temprature	过温
0x1000	Buck current over	Buck 电流过大
0x2000	Battery disconnected	电池未接
0x4000	BMS com error	BMS 通讯失败
0x8000	Pv power insufficient	Pv 功率不足
Warning bit high(42)		
0x0001	No bat parallel disable	无电池不并机
0x0002	Parallel version different	并机版本不兼容
0x0004		
0x0008	Capacity different	并机机器容量不一致
0x0010	Host Loss	主机丢失
0x0020	BmsCellOverVolt	BMS 单体过压
0x0040	BmsTotalOverVolt	BMS 整体过压
0x0080	BmsDischgOverCurr	BMS 放电过流
0x0100	BmsChgOverCurr	BMS 充电过流
0x0200	BmsOverTemp	BMS 过温
0x0400	Battery voltage consistent	

5 Set address

Refer to the Inverter user manual.   Always is :

Knock the pv inverter to let the lcd display to the "COM Addr: xxx", then double knock, if displays "Move", you should another double knock, until it displays a address number, then you can give a single knock to change the address, this address will be remembered when the lcd backlight off.

6 Notice

1) It can drive mostly 32 pv inverters for one rs485 comport.

2) There are only read input and hold registers commands even the newest version.

3) App user could only care the input register.

4) App user could not care the holding registers.

5) Except the CEI0-21 and VDE-AR-N 4105 power management registers, you should refer the manufactory's suggestion when writing the other registers;