Growatt OffGrid SPF5000 Modbus RS485 RTU Protocol

V0.11

2017-8-09

Growatt New Energy CO.,LTD

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

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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 infomation;

V0.09   2017-7-4:

    1, add Input reg 135~179 for SolarCharger infomation;

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;

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	11
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	11
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           11
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           11
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           11
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                 11
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                 11
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                 11
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: Standby off, Output enable; 0x0001: Standby on, Output enable; 0x0100: Standby off, Output disable; 0x0101: Standby on, Output disable;		0	
01	OutputConfig	AC output set	W	0: BAT First; 1: PV First; 2: 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;		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							
17							
18	OutputVoltType	Output Volt Type	W	0: 208VAC; 1: 230VAC 2: 240VAC		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:** 0: No verndor; 1: Growatt; 2: CPS; 3: Haiti;			**Can be set at standy state Only**

				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	10~130	1A	70	
35	BulkChargeVolt	Bulk Charge Volt	W	500~580	0.1V	564	
36	FloatChargeVolt	Float Charge Volt	W	500~560	0.1V	540	
37	BatLowToUtiVolt	Bat Low Volt Switch To Uti	W	444~514	0.1V	464	
38	FloatChargeCurr	Float Charge Current	W	0~80	0.1A		
39	Battery Type	Battery Type	W	0: Lead_Acid;		1	**Can be set at standy state Only**
				1: Lithium;			
				2: CustomLead_Acid;			
40	Aging Mode	Aging Mode	W	0: Normal Mode;		0	**Can be set at standy state Only**
				1: Aging Mode;			
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							
57							
58							
59	Manufacturer Info 8	Manufacturer information (high)			ASCII		
60	Manufacturer Info 7	Manufacturer information (middle)					
61	Manufacturer	Manufacturer					

	Info 6	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			ASCII		
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			ASCII		
71							
72	Sys Weekly	Sys Weekly	W	0-6			
73	ModbusVersion	Modbus Version		Eg：207 is V2.07	Int(16bits)		
…							
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	Factory	The ODM Info code					
….							
161							
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; （**No Use**） 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		0.1V	
02	Vpv2	PV2 voltage		0.1V	
03	Ppv1 H	PV1 charge power (high)		0.1W	
04	Ppv1 L	PV1 charge power (low)		0.1W	
05	Ppv2 H	PV2 charge power (high)		0.1W	
06	Ppv2 L	PV2 charge power (low)		0.1W	
07	Buck1Curr	Buck1 current		0.1A	
08	Buck2Curr	Buck2 current		0.1A	
09	OP_Watt H	Output active power (high)		0.1W	
10	OP_Watt L	Output active power (low)		0.1W	
11	OP_VA H	Output apparent power (high)		0.1VA	
12	OP_VA L	Output apparent power (low)		0.1VA	
13	ACChr_Watt H	AC charge watt (high)		0.1W	
14	ACChr_Watt L	AC charge watt (low)		0.1W	
15	ACChr_VA H	AC charge apparent power (high)		0.1VA	
16	ACChr_VA L	AC charge apparent power (low)		0.1VA	
17	Bat Volt	Battery volt (M3)		0.01V	
18	BatterySOC	Battery SOC	0~100	1%	
19	Bus Volt	Bus Voltage		0.1V	
20	Grid Volt	AC input Volt		0.1V	
21	Line Freq	AC input frequency		0.01Hz	
22	OutputVolt	AC output Volt		0.1V	
23	OutputFreq	AC output frequency		0.01Hz	
24	Ouput DCV	Ouput DC Volt		0.1V	

25	InvTemp	Inv Temperature		0.1C	
26	DcDc Temp	DC-DC Temperature		0.1C	
27	LoadPercent	Load Percent	0~1000	0.1%	
28	Bat_s_Volt	Battery-port volt (DSP)		0.01V	
29	Bat_Volt_DSP	Battery-bus volt (DSP)		0.01V	
30	Time total H	Work time total (high)		0.5S	
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	fault value	fault value			
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		0.1kWh	
50	Epv1_total H	PV Energy total			
51	Epv1_total L	PV Energy total		0.1kWh	
52	Epv2_today H	PV Energy today			

53	Epv2_today L	PV Energy today		0.1kWh	
54	Epv2_total H	PV Energy total			
55	Epv2_total L	PV Energy total		0.1kWh	
56	Eac_chrToday H	AC charge Energy today			
57	Eac_chrToday L	AC charge Energy today		0.1kWh	
58	Eac_chrTotal H	AC charge Energy total			
59	Eac_chrTotal L	AC charge Energy total		0.1kWh	
60	Ebat_dischrToday H	Bat discharge Energy today			
61	Ebat_dischrToday L	Bat discharge Energy today		0.1kWh	
62	Ebat_dischrTotal H	Bat discharge Energy total			
63	Ebat_dischrTotal L	Bat discharge Energy total		0.1kWh	
64	Eac_dischrToday H	AC discharge Energy today			
65	Eac_dischrToday L	AC discharge Energy today		0.1kWh	
66	Eac_dischrTotal H	AC discharge Energy total			
67	Eac_dischrTotal L	AC discharge Energy total		0.1kWh	
68	ACChrCurr	AC Charge Battery Current		0.1A	
69	AC_DisChrWatt H	AC discharge watt (high)		0.1W	
70	AC_DisChrWatt L	AC discharge watt (low)		0.1W	
71	AC_DisChrVA H	AC discharge apparent power (high)		0.1VA	
72	AC_DisChrVA L	AC discharge apparent power (low)		0.1VA	
73	Bat_DisChrWatt H	Bat discharge watt (high)		0.1W	
74	Bat_DisChrWatt L	Bat discharge watt (low)		0.1W	
75	Bat_DisChrVA H	Bat discharge apparent power (high)		0.1VA	
76	Bat_DisChrVA L	Bat discharge apparent power (low)		0.1VA	
77	Bat_Watt H	Bat watt (high)	**(signed int 32)**	0.1W	
78	Bat_Watt L	Bat watt (low)	Positive:Battery Discharge Power; Negative: Battery Charge Power;	0.1W	
79	Reserved	Not Used			
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%	
90	BMS_Status	Status from BMS	**Detail information, refer to document: Growatt xxSxxP ESS Protocol;**	
91	BMS_Error	Error infomation from BMS		
92	BMS_ WarnInfo	Warning info from BMS		
93	BMS_SOC	SOC from BMS		
94	BMS_ BatteryVolt	Battery voltage from BMS		
95	BMS_ BatteryCurr	Battery current from BMS		
96	BMS_ BatteryTemp	Battery temperature from BMS		
97	BMS_ MaxCurr	Max. charge/discharge current from BMS		
98	BMS_ ConstantVolt	CV voltage from BMS		
99	BMS_ BMSInfo	BMS Information from BMS		
100	BMS_ PackInfo	Pack Information from BMS		
101	BMS_ UsingCap	Using Cap from BMS		
102	BMS_ Cell1_Volt	Cell1_Voltage from BMS		
…	…	…		
117	BMS_ Cell16_Volt	Cell16_Voltage from BMS		
118	BMS2_Status	Status from BMS2	**Detail information, refer to document: Growatt xxSxxP ESS Protocol;**	
119	BMS2_Error	Error infomation from BMS		
120	BMS2_ WarnInfo	Warning info from BMS2		
121	BMS2_SOC	SOC from BMS2		
122	BMS2_ BatteryVolt	Battery voltage from BMS2		
123	BMS2_ BatteryCurr	Battery current from BMS2		
124	BMS2_ BatteryTemp	Battery temperature from BMS2		
125	BMS2_ MaxCurr	Max. charge/discharge current from BMS2		
126	BMS2_ ConstantVolt	CV voltage from BMS2		
127	BMS2_ BMSInfo	BMS Information from BMS2		
128	BMS2_ PackInfo	Pack Information from BMS2		
129	BMS2_ UsingCap	Using Cap from BMS2		
130	BMS2_ Cell1_Volt	Cell1_Voltage from BMS2		
…	…	…		
145	BMS2_ Cell16_Volt	Cell16_Voltage from BMS2		
180	Solar1_Status	Solar Charger1 Status			
181	Solar1_FaultCode	Solar Charger1 FaultCode			
182	Solar1_WarningCode	Solar Charger1 WarningCode			

183	Solar1_BatVolt	Solar Charger1 battery voltage		0.01V	
184	Solar1_PV1Volt	Solar Charger1 PV1 voltage		0.1V	
185	Solar1_PV2Volt	Solar Charger1 PV2 voltage		0.1V	
186	Solar1_Buck1Curr	Solar Charger1 Buck1 current		0.1A	
187	Solar1_Buck2Curr	Solar Charger1 Buck2 current		0.1A	
188	Solar1_PV1ChrPower H	Solar Charger1 PV1 charge Power High 16 bit		0.1W	
189	Solar1_PV1ChrPower H	Solar Charger1 PV1 charge Power Low 16 bit		0.1W	
190	Solar1_PV2ChrPower H	Solar Charger1 PV2 charge Power High 16 bit		0.1W	
191	Solar1_PV2ChrPower H	Solar Charger1 PV2 charge Power Low 16 bit		0.1W	
192	Solar1_HS1Temp	Solar Charger1 Buck1 Temperature		0.1C	
193	Solar1_HS2Temp	Solar Charger1 Buck2 Temperature		0.1C	
194	Solar1_Epv1_today	Solar Charger1 PV1 Energy today		0.1k Wh	
195	Solar1_Epv2_today L	Solar Charger1 PV2 Energy today		0.1k Wh	
196	Solar1_Epv1_total H	Solar Charger1 PV1 Energy total High 16 bit		0.1k Wh	
197	Solar1_Epv1_total L	Solar Charger1 PV1 Energy total Low 16 bit		0.1k Wh	
198	Solar1_Epv2_total H	Solar Charger1 PV2 Energy total High 16 bit		0.1k Wh	
199	Solar1_Epv2_total L	Solar Charger1 PV2 Energy total Low 16 bit		0.1k Wh	
200	Solar2_Status	Solar Charger2 Status			
201	Solar2_FaultCode	Solar Charger2 FaultCode			
202	Solar2_WarningCode	Solar Charger2 WarningCode			
203	Solar2_BatVolt	Solar Charger2 battery voltage		0.01V	
204	Solar2_PV1Volt	Solar Charger2 PV1 voltage		0.1V	
205	Solar2_PV2Volt	Solar Charger2 PV2 voltage		0.1V	
206	Solar2_Buck1Curr	Solar Charger2 Buck1 current		0.1A	
207	Solar2_Buck2Curr	Solar Charger2 Buck2 current		0.1A	
208	Solar2_PV1ChrPower H	Solar Charger2 PV1 charge Power High 16 bit		0.1W	
209	Solar2_PV1ChrPower H	Solar Charger2 PV1 charge Power Low 16 bit		0.1W	
210	Solar2_PV2ChrPower H	Solar Charger2 PV2 charge Power High 16 bit		0.1W	

211	Solar2_PV2ChrPower H	Solar Charger2 PV2 charge Power Low 16 bit		0.1W	
212	Solar2_HS1Temp	Solar Charger2 Buck1 Temperature		0.1C	
213	Solar2_HS2Temp	Solar Charger2 Buck2 Temperature		0.1C	
214	Solar2_Epv1_today	Solar Charger2 PV1 Energy today		0.1kWh	
215	Solar2_Epv2_today	Solar Charger2 PV2 Energy today		0.1kWh	
216	Solar2_Epv1_total H	Solar Charger2 PV1 Energy total High 16 bit		0.1kWh	
217	Solar2_Epv1_total L	Solar Charger2 PV1 Energy total Low 16 bit		0.1kWh	
218	Solar2_Epv2_total H	Solar Charger2 PV2 Energy total High 16 bit		0.1kWh	
219	Solar2_Epv2_total L	Solar Charger2 PV2 Energy total Low 16 bit		0.1kWh	
220	Solar_ConnectOKFlag	Slave Solar Connect OK Flag	1：Solar Charger1； 2：Solar Charger2； 3：Solar Charger1 和 2；		
221	Solar_BatVoltConsistFlag	Check Slave Solar Battery Voltage Consist OK Flag	1：Check Solar Charger1 电池电压 OK； 2：Check Solar Charger2 电池电压 OK； 3：Check Solar Charger1 和 2 电池电压 OK；		
222	Solar_TypeSwState	Solar Charger Type Swtich State	0:Master SolarCharger; 1:Slaver SolarCharger;		
223	Solar_ModeSwState	Solar Charger Mode Swtich State	0: Parallel Mode; 1:Single Mode;		
224	Solar_AddrSwState	Solar Charger Addr Swtich State	2~3;		
360	BMS_ GaugeRM	Gauge RM from BMS	Detail information, refer to document: Growatt xxSxxP ESS Protocol;		
361	BMS_GaugeFCC	Gauge FCC from BMS			
362	BMS_ FW	BMS_ FW			
363	BMS_ DeltaVolt	Delta V from BMS			
364	BMS_ CycleCnt	Cycle Count from BMS			
365	BMS_ SOH	SOH from BMS			
366	BMS_ GaugeICCurr	Gauge IC current from BMS			
367	BMS_ MCUVersion	MCU Software version from BMS			

368	BMS_ GaugeVersion	Gauge Version from BMS			
369	BMS_ wGaugeFRVersion_ L	Gauge FR Version L16 from BMS			
370	BMS_ wGaugeFRVersion_H	Gauge FR Version H16 from BMS			
371	BMS2_ GaugeRM	Gauge RM from BMS2	**Detail information, refer to document: Growatt xxSxxP ESS Protocol;**		
372	BMS2_GaugeFCC	Gauge FCC from BMS2			
373	BMS2_ FW	BMS2_ FW			
374	BMS2_ DeltaVolt	Delta V from BMS2			
375	BMS2_ CycleCnt	Cycle Count from BMS2			
376	BMS2_ SOH	SOH from BMS2			
377	BMS2_ GaugeICCurr	Gauge IC current from BMS2			
378	BMS2_ MCUVersion	MCU Software version from BMS2			
379	BMS2_ GaugeVersion	Gauge Version from BMS2			
380	BMS2_ wGaugeFRVersion_ L	Gauge FR Version L16 from BMS2			
381	BMS2_ wGaugeFRVersion_H	Gauge FR Version H16 from BMS2			

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

Fault type value	Means(The message showed on the inverter when the inverter has fault)
1~7、11~24、28~32	" Error: 99+x ",
8	Bat Voltage High
9	Over Temperature
10	Over Load
25	MOV Break
26	Over Current
27	Li-Bat Over Load

&*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 fault code and warning code

Fault code		Warning code	
0x00000001	\	0x0001	Battery voltage low warning
0x00000002	CPU A to B Communication error	0x0002	Over temprature warning
0x00000004	Battery sample inconsistent	0x0004	Over load warning
0x00000008	BUCK over current	0x0008	Fail to read EEPROM.
0x00000010	BMS communication fault	0x0010	Firmware version unmacth
0x00000020	Battery unnormal	0x0020	Fail to write EEPROM.
0x00000040	\	0x0040	BMS warning
0x00000080	Battery voltage high	0x0080	Li-Battery over load warning
0x00000100	Over temprature	0x0100	Li-Battery aging warning
0x00000200	Over load	0x0200	Fan lock warning
0x00000400	\	0x0400	\
0x00000800	\	0x0800	\
0x00001000	\	0x1000	\
0x00002000	\	0x2000	\
0x00004000	\	0x4000	\
0x00008000	\	0x8000	\
0x00010000	Battery reverse connection		
0x00020000	BUS soft start fail		
0x00040000	DC-DC unnormal		
0x00080000	DC voltage high		
0x00100000	CT detect failed		
0x00200000	CPU B to A Communication error		
0x00400000	BUS voltage high		
0x00800000	\		
0x01000000	MOV break		
0x02000000	Output short circuit		
0x04000000	Li-Battery over load		
0x08000000	Output voltage high		
0x10000000	\		
0x20000000	\		
0x40000000	\		
0x80000000	\		

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;