Growatt PV Inverter Modbus RS485 RTU Protocol

V3.00

2012-08-15

Growatt New Energy CO.,LTD

No.	Version	Date	Notice	Signature
1	V1.00	2011-8-30	The fist version	Paco
2	V1.10	2011-10-20	X	Lin
3	V2.01	2011-11-2	Update Modbus mostly protocol	Xin.Chen
4	V2.02	2011-11-4	Add the flash command	Xin.Chen
5	V2.03	2012-03-01	Combine the read and write register map table Update the register map of 4.1 and 4.2 by blue marked	Dongyu.Li
6	V2.04	2012-03-05	Add system time	Dongyu.Li
7	V2.05	2012-03-06	Add Grid V/F Outrange protect time limit	Dongyu.Li
8	V2.06	2012-03-21	Add Autotest, and shift Manufacturer	Dongyu.Li
9	V2.07	2012-04-19	Add some registers	Jumi
10	V2.08	2012-04-28	Shift the Reg address	Jumi
11	V2.09	2012-05-09	Add 4-44 3-90 registers	Jumi
12	V2.10	2012-05-10	Add 4-180~429 registers	Jumi
13	V2.11	2012-05-29	Add 3-1,100~107 registers	Jumi
14	V2.12	2012-06-14	chg 3-3,3-90~99 registers, add 3-135~138	Jumi
15	V2.13	2012-06-27	chg 3-99 register, add 3-108~112	Jumi
16	V2.14	2012-07-17	add 3-74，98，80~98，4-80~89	Jumi
17	V2.15	2012-07-31	add 4-48~57	Jumi
18	V2.16	2012-07-31	add 4-58~63	Jumi
19	V3.00	2012-8-15	add 3-113~115, 4-48~63, 4-450~575,	Jumi

V2.01   2011-11-2:

    1, Update the four register map tables

    2, Add maximum data length define

    3,Change the parity type of RS232

V2.02 2011-11-4:

    1, Add the flash command

V2.03 2012-03-01

    1, Combine the read and write register map table

    2, Update the register map of 4.1 and 4.2 by blue marked;

V2.04 2012-03-05

    1，Add system time read and write cmd

V2.05 2012-03-06

    1, Add Grid V/F Outrange protect time read and write cmd

V2.06 2012-03-21

    1, Add Auto test start cmd;

    2, Move Manufacturer   info from 13 to 60.

V2.07 2012-04-19

    1, Add holding registers: 13~15, 40~45, 68~71, 73, 74;

V2.08 2012-04-28

    1, Shift the all reg address, start at 0x0000;

V2.09 2012-05-09

    1, Add 4-45 PF register, to read and adjust inverter output PF;

    2,Add3-90~99 registers, to set the PF limit line,(this function is resaved for internal);

V2.10 2012-05-10

    1, Add 4-180~429 registers, for the 50 records of the inverter error info;

V2.11 2012-05-29

    1, Add 3-1,100~107 registers, for the frequency – load limit rate and the PF check adjust values;

    2, Change the Input Pac registers's unit, from watt to power (W--VA) ;

V2.12 2012-06-14

    1, Change 3-3 register define;

    2, Change 3-90~99 registers, change the PF line   define;

    3, Add 3-135~138 grid spec network command password registers,

V2.13 2012-06-27

    1, chg 3-99 register, add 3-108~112

V2.14 2012-07-17

    1, add 3-74 euro inverter spec select cmd, 3-98 CEI freq. test cmd;

    2,add 3-80~89, 4-80~89 resaved registers,   for the outsourcing device updating;

V2.15 V2.16 2012-07-31

    1, add 4-48~63   pv energy , reactive power and energy registers;

V3.00 2012-08-15

    1, add 3-113~115 registers, for CEI021 model set;

    2, add 4-48~63 registers, for PV energy and reactive ac energy;

    3, add 4-450~575 registers, for history energy records;

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

2 Command Format

Function 3 Read holding register

```
QUERY

                              Example
Field Name                    (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

                              Example
Field Name                    (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

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

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

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

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

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;

4 Register map

4.1 Holding Reg

Register NO	Variable Name	Description	Length	Register Type	Write Enable	Value	Note
00	OnOff	The Inverter On/Off state and the auto start state, The low byte is the on/off(1/0), the	2Byte	Holding Reg	W	0x0000; 0x0001; 0x0100; 0x0101;	INIT is 0x0101

		high byte is the auto start state or not(1/0).					
01	SPIenable	SPI(system protection interface) function enable	2Byte	Holding Reg	W	1	
02	PF CMD memory state	Set the following 3,4,5,99 CMD will be memory or not(1/0), if not, the 4,5,6 setting is the initial value.(Resaved)	2Byte	Single Reg	W	0or1,	INIT is 0
03	Active P Rate	Read Inverter max output active power percent	2Byte	Holding Reg	W	0-100	INIT is 100
04	Reactive P Rate	Read Inverter max output reactive power percent	2Byte	Holding Reg	W	0-100	INIT is 100
05	Power factor	Read Inverter output power factor's 10000 times	2Byte	Holding Reg	W	0-20000，0-10000 is underexcitec, other is overexcited	INIT is 10000
06	Pmax H	Rated power (high)	2Byte	Holding Reg			0.1VA
07	Pmax L	Rated power (low)	2Byte	Holding Reg			0.1VA
08	Vnormal	Normal work voltage	2Byte	Holding Reg			0.1V
09	Fw version H	Firmware version (high)	2Byte	Holding Reg			
10	Fw version M	Firmware version (middle)	2Byte	Holding Reg			
11	Fw version L	Firmware version (low)	2Byte	Holding Reg			
12	Fw version2 H	Control Firmware version (high)	2Byte	Holding Reg			

13	Fw version2 M	Control Firmware version (middle)	2Byte	Holding Reg			
14	Fw version2 L	Control Firmware version (low)	2Byte	Holding Reg			
15	LCD language	LCD language	2Byte	Holding Reg	W		
16	LCD Contrast	LCD Contrast	2Byte	Holding Reg	W		
17	Vpv start	Input start voltage	2Byte	Holding Reg	W		0.1V
18	Time start	Start time	2Byte	Holding Reg	W		1S
19	Vac low	Grid voltage low limit protect	2Byte	Holding Reg	W		0.1V
20	Vac high	Grid voltage high limit protect	2Byte	Holding Reg	W		0.1V
21	Fac low	Grid frequency low limit protect	2Byte	Holding Reg	W		0.01 Hz
22	Fac high	Grid high frequency limit protect	2Byte	Holding Reg	W		0.01 Hz
23	Serial NO. 5	Serial number 5	2Byte	Holding Reg	W		
24	Serial No. 4	Serial number 4	2Byte	Holding Reg	W		
25	Serial No. 3	Serial number 3	2Byte	Holding Reg	W		
26	Serial No. 2	Serial number 2	2Byte	Holding Reg	W		
27	Serial No. 1	Serial number 1	2Byte	Holding Reg	W		
28	Moudle H	Inverter Moudle (high)	2Byte	Holding Reg	W	&*5	
29	Moudle L	Inverter Moudle (low)	2Byte	Holding Reg	W		
30	Com Address	Communicate address	2Byte	Holding Reg	W		
31	FlashStart	Update firmware	2Byte	Holding Reg	W	0x0001:own 0X0100:other	

32	Reset User Info	Reset User Information	2Byte	Holding Reg	W	0x0001	
33	Reset to factory	Reset to factory	2Byte	Holding Reg	W	0x0001	
34	AutoTestStart	AutoTestStart	2Byte	Holding Reg	W	0x0001	
35	Vac low 2	Grid voltage low limit protect 2	2Byte	Holding Reg	W		0.1V
36	Vac high 2	Grid voltage high limit protect 2	2Byte	Holding Reg	W		0.1V
37	Fac low 2	Grid frequency low limit protect 2	2Byte	Holding Reg	W		0.01 Hz
38	Fac high 2	Grid high frequency limit protect 2	2Byte	Holding Reg	W		0.01 Hz
39	Vac low C	Grid low voltage limit connect to Grid	2Byte	Holding Reg	W		0.1V
40	Vac high C	Grid high voltage limit connect to Grid	2Byte	Holding Reg	W		0.1V
41	Fac low C	Grid low frequency limit connect to Grid	2Byte	Holding Reg	W		0.01 Hz
42	Fac high C	Grid high frequency limit connect to Grid	2Byte	Holding Reg	W		0.01 Hz
43	DTC	Device Type Code	2Byte	Holding Reg		&*6	
44	TP	Input tracker num and output phase num	2Byte	Holding Reg		Eg:0x0203 is two MPPT and 3ph output	
45	Sys Year	System time-year	2Byte	Holding Reg	W	Year offset is 2000	
46	Sys Month	System time-Month	2Byte	Holding Reg	W		
47	Sys Day	System time-Day	2Byte	Holding Reg	W		
48	Sys Hour	System time-Hour	2Byte	Holding Reg	W		
49	Sys Min	System time-	2Byte	Holdin	W		

		Min			g Reg			
50	Sys Sec	System time-Second	2Byte	Holding Reg	W			
51	Vac low1 time	Grid voltage low limit protect time 1	2Byte	Holding Reg	W			ms
52	Vac high1 time	Grid voltage high limit protect time 1	2Byte	Holding Reg	W			ms
53	Vac low2 time	Grid voltage low limit protect time 2	2Byte	Holding Reg	W			ms
54	Vac high2 time	Grid voltage high limit protect time 2	2Byte	Holding Reg	W			ms
55	Fac low1 time	Grid frequency low limit protect time 1	2Byte	Holding Reg	W			ms
56	Fac high1 time	Grid frequency high limit protect time 1	2Byte	Holding Reg	W			ms
57	Fac low2 time	Grid frequency low limit protect time 2	2Byte	Holding Reg	W			ms
58	Fac high2 time	Grid frequency high limit protect time 2	2Byte	Holding Reg	W			ms
59	Manufacturer Info 8	Manufacturer information (high)	2Byte	Holding Reg				
60	Manufacturer Info 7	Manufacturer information (middle)	2Byte	Holding Reg				
61	Manufacturer Info 6	Manufacturer information (low)	2Byte	Holding Reg				
62	Manufacturer Info 5	Manufacturer information (high)	2Byte	Holding Reg				
63	Manufacturer Info 4	Manufacturer information (middle)	2Byte	Holding Reg				
64	Manufacturer Info3	Manufacturer information	2Byte	Holding Reg				

		(low)					
65	Manufacturer Info 2	Manufacturer information (low)	2Byte	Holding Reg			
66	Manufacturer Info 1	Manufacturer information (high)	2Byte	Holding Reg			
67	FW Build No. 4	Control FW Build No. 2	2Byte	Holding Reg			
68	FW Build No. 3	Control FW Build No. 1	2Byte	Holding Reg			
69	FW Build No. 2	COM FW Build No. 2	2Byte	Holding Reg			
70	FW Build No. 1	COM FW Build No. 1	2Byte	Holding Reg			
71							
72	Sys Weekly	Sys Weekly	2Byte	Holding Reg	W	0-6	
73	ModbusVersion	Modbus Version	2Byte	Holding Reg		Eg：207 is V2.07	
74	ModelSelected	Model Selected or not	2Byte	Holding Reg	W	0: need to select; 1: have selected	
……							
79							
80-89	GTresaved	Resaved	2Byte	Holding Reg	W		Resaved as word
90	PFLineP1_LP	PF limit line point 1 load percent	2Byte	Holding Reg	W	0-255	
91	PFLineP1_PF	PF limit line point 1 power factor	2Byte	Holding Reg	W	0-20000	
92	PFLineP2_LP	PF limit line point 2 load percent	2Byte	Holding Reg	W	0-255	
93	PFLineP2_PF	PF limit line point 2power factor	2Byte	Holding Reg	W	0-20000	
94	PFLineP3_LP	PF limit line	2Byte	Holdin	W	0-255	

		point 3 load percent		g Reg			
95	PFLineP3_PF	PF limit line point 3 power factor	2Byte	Holding Reg	W	0-20000	
96	PFLineP4_LP	PF limit line point 4 load percent	2Byte	Holding Reg	W	0-255	
97	PFLineP4_PF	PF limit line point 4 power factor	2Byte	Holding Reg	W	0-20000	
98	LCMDTest	Local command test	2Byte	Holding Reg	W	1 to test	
99	PFModel	Set PF function Model	2Byte	Holding Reg	W	0: PF=1 1: PF by set 2: default PF line 3: User PF line 4：UnderExcited (Inda) Reactive Power 5：OverExcited(Capa) Reactive Power 6：Q(v)model	
100	FLrate	Frequency – load limit rate	2Byte	Holding Reg	W	0-100	10times
101	PFAdj1	PF adjust value 1	2Byte	Holding Reg	W	4096 is 1	
102	PFAdj2	PF adjust value 2	2Byte	Holding Reg	W	4096 is 1	
103	PFAdj3	PF adjust value 3	2Byte	Holding Reg	W	4096 is 1	
104	PFAdj4	PF adjust value 4	2Byte	Holding Reg	W	4096 is 1	
105	PFAdj5	PF adjust value 5	2Byte	Holdin	W	4096 is 1	

				g Reg			
106	PFAdj6	PF adjust value 6	2Byte	Holding Reg	W	4096 is 1	
107	LVCPenable	Low voltage cross protection enable	2Byte	Holding Reg	W	1	
108	V1S	CEI021 V1S	2Byte	Holding Reg	W		0.1V
109	V2S	CEI021 V2S	2Byte	Holding Reg	W		0.1V
110	V1L	CEI021 V1L	2Byte	Holding Reg	W		0.1V
111	V2L	CEI021 V2L	2Byte	Holding Reg	W		0.1V
112	U10min	Volt protection for 10 min	2Byte	Holding Reg	W	1.1Vn	0.1V
113	Qlockinpower	Q(v) lock in active power of CEI021	2Byte	Holding Reg	W	0-100	
114	LIGridV	Lock in gird volt of CEI021	2Byte	Holding Reg	W	nVn	0.1V
115	LOGridV	Lock out gird volt of CEI021	2Byte	Holding Reg	W	nVn	0.1V
134			2Byte	Holding Reg			
135	SpecPasswordType	Unlock or set Specpassword	2Byte	Holding Reg		0:unlock ,auto lock in 5 minute; 1:set (should unlock first)，2：lock, &*7	
136	SpecPassword3	SpecPassword3	2Byte	Holding Reg		For the spec setting change	XX

137	SpecPassword2	SpecPassword2	2Byte	Holding Reg		..	XX
138	SpecPassword1	SpecPassword1	2Byte	Holding Reg		..	XX
139	GTsetModel	Resaved	2Byte	Holding Reg	W		
140	GFCI_old	GFCI model	2Byte	Holding Reg	W	1 is old	

4.2 Input Reg

(These Registers write address offset is 0x1000, start at 0x1000. Input register writ function is for auto check on product line.)

Register NO.	Variable Name	Description	Length	Register Type	Write Enable	Value	Note
00	Inverter Status	Inverter run state	2Byte	Input Reg		0:waiting, 1:normal, 3:fault	
01	Ppv H	Input power (high)	2Byte	Input Reg	W		0.1W
02	Ppv L	Input power (low)	2Byte	Input Reg	W		0.1W
03	Vpv1	PV1 voltage	2Byte	Input Reg	W		0.1V
04	PV1Curr	PV1 input current	2Byte	Input Reg	W		0.1A
05	PV1Watt H	PV1 input watt (high)	2Byte	Input Reg	W		0.1W
06	PV1Watt L	PV1 input watt (low)	2Byte	Input Reg	W		0.1W
07	Vpv2	PV2 voltage	2Byte	Input Reg	W		0.1V
08	PV2Curr	PV2 input current	2Byte	Input Reg	W		0.1A
09	PV2Watt H	PV2 input watt (high)	2Byte	Input Reg	W		0.1W
10	PV2Watt L	PV2 input watt (low)	2Byte	Input Reg	W		0.1W
11	Pac H	Output power (high)	2Byte	Input Reg	W		0.1W
12	Pac L	Output power	2Byte	Input	W		0.1W

		(low)		Reg			
13	Fac	Grid frequency	2Byte	Input Reg	W		0.01Hz
14	Vac1	Three/single phase grid voltage	2Byte	Input Reg	W		0.1V
15	Iac1	Three/single phase grid output current	2Byte	Input Reg	W		0.1A
16	Pac1 H	Three/single phase grid output watt (high)	2Byte	Input Reg	W		0.1VA
17	Pac1 L	Three/single phase grid output watt (low)	2Byte	Input Reg	W		0.1VA
18	Vac2	Three phase grid voltage	2Byte	Input Reg	W		0.1V
19	Iac2	Three phase grid output current	2Byte	Input Reg	W		0.1A
20	Pac2 H	Three phase grid output power (high)	2Byte	Input Reg	W		0.1VA
21	Pac2 L	Three phase grid output power (low)	2Byte	Input Reg	W		0.1VA
22	Vac3	Three phase grid voltage	2Byte	Input Reg	W		0.1V
23	Iac3	Three phase grid output current	2Byte	Input Reg	W		0.1A
24	Pac3 H	Three phase grid output power (high)	2Byte	Input Reg	W		0.1VA
25	Pac3 L	Three phase grid output power (low)	2Byte	Input Reg	W		0.1VA
26	Energy today H	Today generate energy (high)	2Byte	Input Reg	W		0.1KWH
27	Energy today L	Today generate energy today (low)	2Byte	Input Reg	W		0.1KWH

28	Energy total H	Total generate energy (high)	2Byte	Input Reg	W		0.1KWH
29	Energy total L	Total generate energy (low)	2Byte	Input Reg	W		0.1KWH
30	Time total H	Work time total (high)	2Byte	Input Reg	W		0.5S
31	Time total L	Work time total (low)	2Byte	Input Reg	W		0.5S
32	Temperature	Inverter temperature	2Byte	Input Reg	W		0.1C
33	ISO fault Value	ISO Fault value	2Byte	Input Reg			0.1V
34	GFCI fault Value	GFCI fault Value	2Byte	Input Reg			1mA
35	DCI fault Value	DCI fault Value	2Byte	Input Reg			0.01A
36	Vpv fault Value	PV voltage fault value	2Byte	Input Reg			0.1V
37	Vac fault Value	AC voltage fault value	2Byte	Input Reg			0.1V
38	Fac fault Value	AC frequency fault value	2Byte	Input Reg			0.01 Hz
39	Temperature fault Value	Temperature fault value	2Byte	Input Reg			0.1C
40	Fault code	Inverter fault bit	2Byte	Input Reg		&*1	
41	IPM Temperature	The inside IPM in inverter Temperature	2Byte	Input Reg	W		0.1C
42	P Bus Voltage	P Bus inside Voltage	2Byte	Input Reg	W		0.1V
43	N Bus Voltage	N Bus inside Voltage	2Byte	Input Reg	W		0.1V
44	Check Step	Product check step	2Byte	Input Reg	W	Internal Resaved	
45	IPF	Inverter output PF	2Byte	Input Reg	W	0-20000	
46	ResetCHK	Reset check data	2Byte	Input Reg	W	1 to reset	
47			2Byte	Input Reg			
48	Epv1_today H	PV Energy today	2Byte	Input Reg			

49	Epv1_today L	PV Energy today	2Byte	Input Reg			0.1kWh
50	Epv1_total H	PV Energy total	2Byte	Input Reg			
51	Epv1_total L	PV Energy total	2Byte	Input Reg			0.1kWh
52	Epv2_today H	PV Energy today	2Byte	Input Reg			
53	Epv2_today L	PV Energy today	2Byte	Input Reg			0.1kWh
54	Epv2_total H	PV Energy total	2Byte	Input Reg			
55	Epv2_total L	PV Energy total	2Byte	Input Reg			0.1kWh
56	Epv_total H	PV Energy total	2Byte	Input Reg			
57	Epv_total L	PV Energy total	2Byte	Input Reg			0.1kWh
58	Rac H	AC Reactive power	2Byte	Input Reg			
59	Rac L	AC Reactive power	2Byte	Input Reg			0.1Var
60	E_rac_today H	AC Reactive energy	2Byte	Input Reg			
61	E_rac_today L	AC Reactive energy	2Byte	Input Reg			0.1kVarh
62	E_rac_total H	AC Reactive energy	2Byte	Input Reg			
63	E_rac_ total L	AC Reactive energy	2Byte	Input Reg			0.1kVarh
...							
79			2Byte	Input Reg			
80-89	GTresaved	Resaved	2Byte	Input Reg			Resaved as word
90	Grid Fault record 1 - code	Grid Fault record 1 - code	2Byte	Input Reg			
91	Grid Fault record 1 - year|month	Grid Fault record 1 - year|month	2Byte	Input Reg		Year offset is 2000	
92	Grid Fault record 1 - day|	Grid Fault record 1 - day|	2Byte	Input Reg			

	hour	hour				
93	Grid Fault record 1 - min|sec	Grid Fault record 1 - min|sec	2Byte	Input Reg		
94	Grid Fault record 1-value	Grid Fault record 1-value	2Byte	Input Reg	&*2	
95	Grid Fault record 2 - code	Grid Fault record 2 - code	2Byte	Input Reg		
96	Grid Fault record 2 - year|month	Grid Fault record 2 - year|month	2Byte	Input Reg	Year offset is 2000	
97	Grid Fault record 2 - day|hour	Grid Fault record 2 - day|hour	2Byte	Input Reg		
98	Grid Fault record 2 - min|sec	Grid Fault record 2 - min|sec	2Byte	Input Reg		
99	Grid Fault record 2-value	Grid Fault record 2-value	2Byte	Input Reg		
100	Grid Fault record 3 - code	Grid Fault record 3 - code	2Byte	Input Reg		
101	Grid Fault record 3 - year|month	Grid Fault record 3 - year|month	2Byte	Input Reg	Year offset is 2000	
102	Grid Fault record 3 - day|hour	Grid Fault record 3 - day|hour	2Byte	Input Reg		
103	Grid Fault record 3 - min|sec	Grid Fault record 3 - min|sec	2Byte	Input Reg		
104	Grid Fault record 3-value	Grid Fault record 3-value	2Byte	Input Reg		
105	Grid Fault record 4 - code	Grid Fault record 4 - code	2Byte	Input Reg		
106	Grid Fault record 4 - year|month	Grid Fault record 4 - year|month	2Byte	Input Reg	Year offset is 2000	
107	Grid Fault record 4 - day|hour	Grid Fault record 4 - day|hour	2Byte	Input Reg		
108	Grid Fault record 4 - min|sec	Grid Fault record 4 - min|sec	2Byte	Input Reg		
109	Grid Fault	Grid Fault	2Byte	Input		

	record 4-value	record 4-value		Reg			
110	Grid Fault record 5 - code	Grid Fault record 5 - code	2Byte	Input Reg			
111	Grid Fault record 5 - year| month	Grid Fault record 5 - year| month	2Byte	Input Reg		Year offset is 2000	
112	Grid Fault record 5 - day| hour	Grid Fault record 5 - day| hour	2Byte	Input Reg			
113	Grid Fault record 5 - min| sec	Grid Fault record 5 - min| sec	2Byte	Input Reg			
114	Grid Fault record 5-value	Grid Fault record 5-value	2Byte	Input Reg			
115							
116							
...							
...							
...							
133							
134							
135	bTestProcess<< 8 | bAutoTestStep	Auto test process or auto test step	2Byte	Input Reg		&*3	
136	wAutoTestResult	Auto test result	2Byte	Input Reg		&*4	
137	cTestStepStop	Auto test stop step	2Byte	Input Reg		&*4	
138	0	0	2Byte	Input Reg			0
139	Value Limit	Safety voltage/freque ncy limit value	2Byte	Input Reg			0.1V
140	Time Limit	Safety time limit value	2Byte	Input Reg			1ms
141	Real value	Real voltage/freque ncy value	2Byte	Input Reg			0.1V
142	Test value	Auto testing voltage/freque ncy value	2Byte	Input Reg			0.1V
143	Test treat value	Auto test voltage/freque	2Byte	Input Reg			0.1V

		ncy treat value				
144	Test treat time	Auto test treat time	2Byte	Input Reg			1ms
145						
146						
...						
...						
....						
178						
179						
180	Inverter Error record 1 - code	Inverter Error record 1 - code	2Byte	Input Reg		
181	Inverter Error record 1 - year| month	Inverter Error record 1 - year| month	2Byte	Input Reg		Year offset is 2000
182	Inverter Error record 1 - day| hour	Inverter Error record 1 - day| hour	2Byte	Input Reg		
183	Inverter Error record 1 - min| sec	Inverter Error record 1 - min| sec	2Byte	Input Reg		
184	Inverter Error record 1-value	Inverter Error record 1-value	2Byte	Input Reg		
185	Inverter Error record 2 - code	Inverter Error record 2 - code	2Byte	Input Reg		
186	Inverter Error record 2 - year| month	Inverter Error record 2 - year| month	2Byte	Input Reg		Year offset is 2000
187	Inverter Error record 2 - day| hour	Inverter Error record 2 - day| hour	2Byte	Input Reg		
188	Inverter Error record 2 - min| sec	Inverter Error record 2 - min| sec	2Byte	Input Reg		
189	Inverter Error record 2-value	Inverter Error record 2-value	2Byte	Input Reg		
190	Inverter Error record 2 - code	Inverter Error record 2 - code	2Byte	Input Reg		
191-419	Inverter Error record……	Inverter Error record……	2Byte	Input Reg		
420	Inverter Error record49 - code	Inverter Error record 49- code	2Byte	Input Reg		

421	Inverter Error record49 - year｜month	Inverter Error record49 - year｜month	2Byte	Input Reg		Year offset is 2000	
422	Inverter Error record49 - day｜hour	Inverter Error record49 - day｜hour	2Byte	Input Reg			
423	Inverter Error record49 - min｜sec	Inverter Error record49 - min｜sec	2Byte	Input Reg			
424	Inverter Error record49-value	Inverter Error record49-value	2Byte	Input Reg			
425	Inverter Error record50 - code	Inverter Error record 50- code	2Byte	Input Reg			
426	Inverter Error record50 - year｜month	Inverter Error record50 - year｜month	2Byte	Input Reg		Year offset is 2000	
427	Inverter Error record50 - day｜hour	Inverter Error record50 - day｜hour	2Byte	Input Reg			
428	Inverter Error record50 - min｜sec	Inverter Error record50 - min｜sec	2Byte	Input Reg			
429	Inverter Error record50-value	Inverter Error record50-value	2Byte	Input Reg			
430							
…							
450	E_hour0 H	Energy of latest hour	2Byte	Input Reg			
451	E_hour0 L	Energy of latest hour	2Byte	Input Reg			
452	E_hour1 H	Energy of latest 1st hour	2Byte	Input Reg			
453	E_hour1 L	Energy of latest 1st hour	2Byte	Input Reg			
454	E_hour	…	2Byte	Input Reg			
…	E_hour	…	2Byte	Input Reg			
496	E_hour23 H	Energy of latest 23 th hour	2Byte	Input Reg			
497	E_hour23 L	Energy of latest 23 th hour	2Byte	Input Reg			
498	E_ day0 H	Energy of latest	2Byte	Input			

		day		Reg			
499	E_day0 L	Energy of latest day	2Byte	Input Reg			
500	E_ day1 H	Energy of latest 1st day	2Byte	Input Reg			
501	E_ day1 L	Energy of latest 1st day	2Byte	Input Reg			
502	E_ day	...	2Byte	Input Reg			
...	E_ day	...	2Byte	Input Reg			
510	E_ day 6 H	Energy of latest 6 th day	2Byte	Input Reg			
511	E_ day 6L	Energy of latest 6 th day	2Byte	Input Reg			
512	E_ month0 H	Energy of latest month	2Byte	Input Reg			
513	E_ month0 L	Energy of latest month	2Byte	Input Reg			
514	E_ month1 H	Energy of latest 1st month	2Byte	Input Reg			
515	E_ month1 L	Energy of latest 1st month	2Byte	Input Reg			
516	E_ month	...	2Byte	Input Reg			
...	E_ month	...	2Byte	Input Reg			
534	E_ month11 H	Energy of latest 11 th month	2Byte	Input Reg			
535	E_ month11L	Energy of latest 11 th month	2Byte	Input Reg			
536	E_ year0 H	Energy of latest year	2Byte	Input Reg			
537	E_ year 0 L	Energy of latest year	2Byte	Input Reg			
538	E_ year 1 H	Energy of latest 1st year	2Byte	Input Reg			
539	E_ year 1 L	Energy of latest 1st year	2Byte	Input Reg			
540	E_ year	...	2Byte	Input Reg			
...	E_ year	...	2Byte	Input Reg			

574	E_ year 19 H	Energy of latest 11 th year	2Byte	Input Reg			
575	E_ year19 L	Energy of latest 11 th year	2Byte	Input Reg			

&*1:   Inverter fault code:

Fault type value	Means(The message showed on the inverter when the inverter has fault)
1~23	" Error: 99+x ",
24	"Auto Test Failed",
25	"No AC Connection",
26	"PV Isolation Low",
27	" Residual I High",
28	" Output High DCI",
29	" PV Voltage High",
30	" AC V Outrange ",
31	" AC F Outrange ",
32	" Module Hot "

&*2:   The value is 0.1V when the fault is the voltage, is 0.01Hz when the fault is the frequency;

&*3:

High byte value	Means	low byte value	Means
0	Auto test stop	0	No test
1	Auto test starting	1	Testing grid volt high pro
2	Auto testing	2	Testing grid volt low pro
		3	Testing grid frequency high pro
		4	Testing grid frequency low pro

&*4: The variable "wAutoTestResult" and "cTestStepStop": wAutoTestResult is the step test time counter, when it reach cTestStepStop, this step test will stop and fail.

&*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
......		
11001	Confluence box	Confluence box 1
......		

&*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;

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.