Growatt Inverter Modbus RTU Protocol

V1. 20

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Change Record

Index	Version	Change Content	Make	Make date
1	00	First Republic	Weiwei.shi	2020.4.28

Instruction：Register range for various types of inverter

TL-X（MIN Type）：03 register range：0~124, 3000~3124；04 register range：3000~3124, 3125~3249

TL3-X(MAX、MID、MAC Type)：03 register range：0~124, 125~249；04 register range：0~124, 125~249

Storage(MIX Type)：03 register range：0~124, 1000~1124；04 register range：0~124, 1000~1124

Storage(SPA Type)：03 register range：0~124, 1000~1124；04 register range：1000~1124, 2000~2124

Storage(SPH Type)：03 register range：0~124, 1000~1124；04 register range：0~124, 1000~1124

catalog

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 – 254 decimal.

The individual slave devices are assigned addresses in the range of 1 – 254.

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 ErrornumCRC(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 ErrornumCRC   (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

Field Name                      Example
                                (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 ErrornumCRC   (Errornum as a byte)

Function 16 Preset multiple register

```
QUERY

Field Name                      Example
                                (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

Field Name                      Example
                                (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 ErrornumCRC   (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:

Default Baud Rate: 9600 bps

Can be set through hold register 22

Minimum CMD period (RS485 Time out): 850ms.

Wait for minimum850ms to send a new CMD after last CMD. Suggestion is 1s;

Maximum Data Length Define:

Maximum read data length is **125 words** in read command;

Maximum update data length is 125 words in preset command;

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

Register NO.	Variable Name	Description	Write or not	Value	Unit	Initial value	Note
First group							
00	OnOff	Remote On/Off . On（1）；Off（0）	W	0or1		1	When PV restart, recover 1.
01	SaftyFuncEn	Bit0: SPI enable Bit1: AutoTestStart Bit2: LVFRT enable Bit3:FreqDerating Enable Bit4: Softstart enable Bit5: DRMS enable Bit6:PowerVoltFunc Enable Bit7: HVFRT enable Bit8:ROCOF enable Bit9: Recover FreqDeratingMode Enable Bit10~15:预留	W	0 : disable 1: enable			SPI: system protection interface Bit0~3:for CEI0-21 Bit4~6:for SAA
02	PF CMD memory state	Set Holding register3,4,5,99 CMD will be memory or not(1/0), if not, these settings are the initial value.	W	0or1		0	Means these settings will be acting or not when next power on
03	Active P Rate	Inverter Max output active power percent	W	0-100 or 255	%	255	255: power is not be limited
04	Reactive P Rate	Inverter max output reactive power percent	W	-100-100 or 255	%	255	255: power is not be limited
05	Power factor	Inverter output power factor's 10000 times	W	0-20000, 0-10000 is		0	

			underexcited, other is overexcited			
06	Pmax H	Normal power (high)			0.1VA	
07	Pmax L	Normal power (low)			0.1VA	
08	Vnormal	Normal work PV voltage			0.1V	
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	0-5		0: Italian; 1: English; 2: German; 3: Spanish; 4: French; 5: Chinese; 6：Polish 7：Portugues 8：Hungary
16	CountrySelected	Country Selected or not	W	0: need to select; 1: have selected		
17	Vpv start	Input start voltage	W		0.1V	
18	Time start	Start time	W		1s	
19	RestartDelayTime	Restart Delay Time after fault back;	W		1s	
20	wPowerStartSlope	Power start slope	W	1-1000	0.1%	
21	wPowerRestartSlopeEE	Power restart slope	W	1-1000	0.1%	
22	wSelectBaud	Select	W	0-1	0	

	rate	communicationbaudrate 0: 9600bps 1:38400bps				
23	Serial NO	Serial number 1-2			ASCII	
24	Serial NO	Serial number 3-4				
25	Serial NO	Serial number 5-6				
26	Serial NO	Serial number 7-8				
27	Serial NO	Serial number 9-10				
28	Module H	Inverter Module (high)		&*5		
29	Module L	Inverter Module (low)		&*5		
30	Com Address	Communicate address	W	1-254		1
31	FlashStart	Update firmware	W	1		
32	Reset User Info	Reset User Information	W	0x0001		
33	Reset to factory	Reset to factory	W	0x0001		
34	Manufacturer Info 8	Manufacturer information (high)			ASCII	
35	Manufacturer Info 7	Manufacturer information (middle)				
36	Manufacturer Info 6	Manufacturer information (low)				
37	Manufacturer Info 5	Manufacturer information (high)				
38	Manufacturer Info 4	Manufacturer information (middle)				
39	Manufacturer Info3	Manufacturer information (low)				
40	Manufacturer Info 2	Manufacturer information (low)				
41	Manufacturer Info 1	Manufacturer information (high)				
42	bfailsafeEn;	G100 fail safe	W	Enable:1 Disable:0		English G100 fail safe set
43	DTC	Device Type Code		&*6		
44	TP	Input tracker num and output phase num		Eg:0x0203 is two MPPT and 3ph output		

45	Sys Year	System time-year	W	Year offset is 0			Local time
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	Sys Weekly	System Weekly	W	0-6			
52	Vac low	Grid voltage low limit protect	W		0.1V		
53	Vac high	Grid voltage high limit protect	W		0.1V		
54	Fac low	Grid frequency low limit protect	W		0.01 Hz		
55	Fac high	Grid high frequencylimit protect	W		0.01 Hz		
56	Vac low 2	Grid voltage low limit protect 2	W		0.1V		
57	Vac high 2	Grid voltage high limit protect 2	W		0.1V		
58	Fac low 2	Grid frequency low limit protect 2	W		0.01 Hz		
59	Fac high 2	Grid high frequency limit protect 2	W		0.01 Hz		
60	Vac low 3	Grid voltage low limit protect 3	W		0.1V		
61	Vac high 3	Grid voltage high limit protect 3	W		0.1V		
62	Fac low 3	Grid frequency low limit protect 3	W		0.01Hz		
63	Fac high 3	Grid frequency high limit protect 3	W		0.01Hz		
64	Vac low C	Grid low voltage limit connect to Grid	W		0.1V		
65	Vac high C	Grid high voltage limit connect to Grid	W		0.1V		
66	Fac low C	Grid low frequency limit connect to Grid	W		0.01 Hz		
67	Fac high C	Grid high frequency limit connect to Grid	W		0.01 Hz		
68	Vac low1 time	Grid voltage low limit protect time 1	W		Cycle		

69	Vac high1 time	Grid voltage high limit protect time 1	W		Cycle		
70	Vac low2 time	Grid voltage low limit protect time 2	W		Cycle		
71	Vac high2 time	Grid voltage high limit protect time 2	W		Cycle		
72	Fac low1 time	Grid frequency low limit protect time 1	W		Cycle		
73	Fac high1 time	Grid frequency high limit protect time 1	W		Cycle		
74	Fac low2 time	Grid frequency low limit protect time 2	W		Cycle		
75	Fac high2 time	Grid frequency high limit protect time 2	W		Cycle		
76	Vac low3 time	Grid voltage low limit protect time 3	W		Cycle		
77	Vac high3 time	Grid voltage high limit protect time 3	W		Cycle		
78	Fac low3 time	Grid frequency low limit protect time 3	W		Cycle		
79	Fac high3 time	Grid frequency high limit protect time 3	W		Cycle		
80	U10min	Volt protection for 10 min	W		0.1V	1.1Vn	
81	PV Voltage High Fault	PV Voltage High Fault	W		0.1V		
82	FW Build No. 5	FW Build version			ASCII		
83	FW Build No. 4	FW Build version			ASCII		
84	FW Build No. 3	DSP1 FW Build No.			ASCII		
85	FW Build No. 2	DSP2 FW Build No.			ASCII		
86	FW Build No. 1	M3 FW Build No.			ASCII		
87	FW Build No. 0	CPLD FW Build No.			ASCII		
88	ModbusVersion	Modbus Version		Eg：207 is V2.07	Int(16 bits)		
89	PFModel	Set PF function Model 0: PF=1	W				

		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 7：Direct Control mode					
90	GPRS IP Flag	Bit0-3:read:1;Set GPRS IP Successed Write:2;Read GPRS IP Successed Bit4-7:GPRS status	W	Bit0-3:about GPRS IP SET Bit4-7:about GRPRS Status			
91	FreqDerateStart	Frequency derating start point	W		0.01HZ		
92	FLrate	Frequency – load limit rate	W	0-100	10times		
93	V1S	CEI021 V1S Q(v)	W	V1S<V2S	0.1V		
94	V2S	CEI021 V2S Q(v)	W		0.1V		
95	V1L	CEI021 V1L Q(v)	W	V1L<V1S	0.1V		
96	V2L	CEI021 V2L Q(v)	W	V2L<V1L	0.1V		
97	Qlockinpower	Q(v) lock in active power of CEI021	W	0-100	Percent		
98	QlockOutpower	Q(v) lock Out active power of CEI021	W	0-100	Percent		
99	LIGridV	Lock in gird volt of CEI021 PF line	W	nVn	0.1V		
100	LOGridV	Lock out gird volt of CEI021 PF line	W	nVn	0.1V		
101	PFAdj1	PF adjust value 1		4096 is 1			
102	PFAdj2	PF adjust value 2		4096 is 1			
103	PFAdj3	PF adjust value 3		4096 is 1			
104	PFAdj4	PF adjust value 4		4096 is 1			
105	PFAdj5	PF adjust value 5		4096 is 1			
106	PFAdj6	PF adjust value 6		4096 is 1			
107	QVRPDelayTimeEE	QV Reactive Power delaytime	W	0-30	1S	3S	
108	OverFDeratD	Overfrequency derati	W	0-20	50ms	0	

	elayTimeEE	ngdelaytime				
109	QpercentMax	Qmax for Q(V) curve	W	0-1000	0.1%	
110	PFLineP1_LP	PF limit line point 1 load percent	W	0-255	percent	255 means no this point
111	PFLineP1_PF	PF limit line point 1 power factor	W	0-20000		
112	PFLineP2_LP	PF limit line point 2 load percent	W	0-255	percent	255 means no this point
113	PFLineP2_PF	PF limit line point 2power factor	W	0-20000		
114	PFLineP3_LP	PF limit line point 3 load percent	W	0-255	percent	255 means no this point
115	PFLineP3_PF	PF limit line point 3 power factor	W	0-20000		
116	PFLineP4_LP	PF limit line point 4 load percent	W	0-255	percent	255 means no this point
117	PFLineP4_PF	PF limit line point 4 power factor	W	0-20000		
118	Module 4	Inverter Module (4)		&*11		SxxBxx
119	Module 3	Inverter Module (3)		&*11		DxxTxx
120	Module 2	Inverter Module (2)		&*11		PxxUxx
121	Module 1	Inverter Module (1)		&*11		Mxxxx Power
122	ExportLimit_En/dis	ExportLimit_En/dis	R/W	1/0		ExportLimit enable, 0: Disable exportLimit; 1: Enable 485 exportLimit; 2: Enable 232 exportLimit; 3: Enable CT exportLimit;
123	ExportLimitPowerRate	ExportLimitPowerRate	R/W	-1000~+1000	0.1%	ExportLimit PowerRate
124	TrakerModel	Traker Model	W	0,1,2		0:Independent 1:DC Source 2:Parallel
Second group						
125	INV Type-1	Inverter type-1	R		ASCII	Reserved
126	INV Type-2	Inverter type-2	R		ASCII	
127	INV Type-3	Inverter type-3	R		ASCII	
128	INV Type-4	Inverter type-4	R		ASCII	
129	INV Type-5	Inverter type-5	R		ASCII	
130	INV Type-6	Inverter type-6	R		ASCII	
131	INV Type-7	Inverter type-7	R		ASCII	
132	INV Type-8	Inverter type-8	R		ASCII	

133	BLVersion1	Boot loader version1	R				Reserved
134	BLVersion2	Boot loader version2	R				Reserved
135	BLVersion3	Boot loader version3	R				Reserved
136	BLVersion4	Boot loader version4	R				Reserved
137	Reactive P ValueH	Reactive PowerH	R/W		0.1var		
138	Reactive P ValueL	Reactive PowerL	R/W		0.1var		
139	ReactiveOutputPriorityEnable	ReactiveOutput Priority Enable	R/W		0/1		0：disable 1：enable
......							
141	SvgFunctionEnable	Svg enable on night	R/W		0/1		0：disable 1：enable
142	uwUnderFUploadPoint	UnderF Upload Point	R/W		0.01HZ		
143	uwOFDerateRecoverPoint	OFDerate RecoverPoint	R/W		0.01HZ		
144	uwOFDerateRecoverDelayTime	OFDerate RecoverDelayTime	R/W	0-30000	50ms		
145	ZeroCurrentEnable	ZeroCurrent Enable	R/W	0-1			
146	uwZeroCurrentStaticlowVolt	ZeroCurrent StaticlowVolt	R/W	46-230V	0.1V	115V	
147	uwZeroCurrentStaticHighVolt	ZeroCurrent StaticHighVolt	R/W	230-276V	0.1V	276V	
148	uwHVoltDerateHighPoint	HVoltDerate HighPoint	R/W	0-1000V	0.1V		
149	uwHVoltDerateLowPoint	HVoltDerate LowPoint	R/W	0-1000V	0.1V		
150	uwQVPowerStableTime	QVPower Stable Time	R/W	0-60S	0.1S		
151	uwUnderFUploadStopPoint	UnderF Upload StopPoint	R/W		0.01HZ		
152	fUnderFreqPoint	Underfrequency load start point	R/W	46.00-50.00	0.01Hz	49.80	CEI
153	fUnderFreqE	Underfrequency down	R/W	46.00-50.	0.01Hz	49.10	CEI

	ndPoint	load end point		00			
154	fOverFreqPoint	Over frequency loading start point	R/W	50.00-52.00	0.01Hz	50.20	CEI
155	fOverFreqEndPoint	Over frequency loading end point	R/W	50.00-52.00	0.01Hz	51.50	CEI
156	fUnderVoltPoint	Undervoltage load shedding start point	R/W	160-300	0.1V	220.0	CEI
157	fUnderVoltEndPoint	Undervoltage derating end point	R/W	160-300	0.1V	207.0	CEI
158	fOverVoltPoint	Overvoltage loading start point	R/W	160-300	0.1V	230.0	CEI
159	fOverVoltEndPoint	Overvoltage loading end point	R/W	160-300	0.1V	245.0	CEI
160	uwNominalGridVolt	NominalGridVolt Select	R/W	0~3			UL
161	uwGridWattDelay	GridWatt DelayTime	R/W	0~3000	20ms		UL
162	uwReconnectStartSlope	Reconnect StartSlope	R/W	1~1000	0.1		UL
163	uwLFRTEE	LFRT1 Freq	R/W	5500~6500	0.01Hz		UL
164	uwLFRTTimeEE	LFRT1 Time	R/W		20ms		UL
165	uwLFRT2EE	LFRT2 Freq	R/W	5500~6500	0.01Hz		UL
166	uwLFRTTime2EE	LFRT2 Time	R/W		20ms		UL
167	uwHFRTEE	HFRT1 Freq	R/W	5500~6500	0.01Hz		UL
168	uwHFRTTimeEE	HFRT1 Time	R/W		20ms		UL
169	uwHFRT2EE	HFRT2 Freq	R/W	5500~6500	0.01Hz		UL
170	uwHFRTTime2EE	HFRT2 Time	R/W		20ms		UL
171	uwHVRTEE	HVRT1 Volt	R/W		0.001 Un		UL
172	uwHVRTTimeEE	HVRT1 Time	R/W		20ms		UL
173	uwHVRT2EE	HVRT2 Volt	R/W		0.001 Un		UL
174	uwHVRTTim	HVRT2 Time	R/W		0.001		UL

	e2EE				Un		
175	uwUnderFUploadDelayTime	UnderF UploadDelayTime	R/W	0-2s	50ms	0s	50549
176	uwUnderFUploadRateEE	UnderF UploadRate	R/W				50549
177	uwGridRestart_H_Freq	GridRestart HighFreq	R/W		0.01Hz		50549
178	OverFDeratResponseTime	OverFDerat ResponseTime	W/R	0-500			
179	UnderFUploadResponseTime	UnderFUpload ResponseTime	W/R	0-500			
Intelligent control reads relevant data, used to identify the logo 180-200							
180	MeterLink	Whether to elect the meter	R/W				0: Missed, 1: Received
181	OPT Number	Number of connection optimizers	R/W	0-64			The total number of optimizers connected to the inverter
182	OPT ConfigOK Flag	Optimizer configuration completion flag	R/W				0x00:Not configured success 0x01:Configuration is complete
183	PvStrScan	String Num	R/W	0、8、16、32			0：Not support Other：PvString Num
……							
200	Reserved						Reserved
201	PID Working Model	PID Operating mode	W	0: automatic 1: continuous 2: All night			
202	PID On/Off Ctrl	PID Break control	W	0:On 1:Off			
203	PID Volt Option	PID Output voltage option	W	300~1000 V			

......							Reserved
209	New Serial NO	Serial number 1-2			ASCII		
210	New Serial NO	Serial number 3-4			ASCII		
211	New Serial NO	Serial number 5-6			ASCII		
212	New Serial NO	Serial number 7-8			ASCII		
213	New Serial NO	Serial number 9-10			ASCII		
214	New Serial NO	Serial number 11-12			ASCII		
215	New Serial NO	Serial number 13-14			ASCII		
216	New Serial NO	Serial number 15-16			ASCII		
217	New Serial NO	Serial number 17-18			ASCII		
218	New Serial NO	Serial number 19-20			ASCII		
219	New Serial NO	Serial number 21-22			ASCII		
220	New Serial NO	Serial number 23-24			ASCII		
221	New Serial NO	Serial number 25-26			ASCII		
222	New Serial NO	Serial number 27-28			ASCII		
223	New Serial NO	Serial number 29-30			ASCII		
......							Reserved
229	EnergyAdjust	Power generation incremental calibration coefficient	W/R		0.1%		1-1000,(Percent ratio)
230~249 for growatt debug setting							
230	IslandDisable	Island Disable or not. 1:disable 0:Enable	W	0,1		0	
231	FanCheck	Start Fan Check	W	1			
232	EnableNLine	Enable N Line of grid	W	1		0	
233	wCheckHard	wCheckHardware					

Register NO.	Variable Name	Description	Write or not	Value	Unit	Initial value	Note
	ware	Bit0: GFCIBreak; Bit1:SPSDamage Bit8:EepromReadWarning Bit9:EEWriteWarning					
234	wCheckHardware2						reserved
235	ubNToGNDDetect	Dis/enable N to GND detect function	W	1:enable 0:disable		1	
236	NonStdVacEnable	Enable/Disable Nonstandard Grid voltage range	W	0-2		0	0:Disable; 1:Enable Voltgrade1 2:Enable Voltgrade2
237	uwEnableSpecSet	Disablse/enable appointed spec setting	W	1:enable 0:disable	Binary	0x0000	Bit 0: Hungary
238	Fast MPPT enable	About Fast mppt		0,1,2		0	Reserved
239	/	/	/	/		/	Reserved
240	Check Step		W				
241	INV-Lng	Inverter Longitude	W				Longitude
242	INV-Lat	Inverter Latitude	W				Latitude
......							Reserved
249							Reserved

Six group for Storage Power

Register NO.	Variable Name	Description	Write or not	Value	Unit	Initial value	Note
1000.	Float charge current limit	When charge current battery need is lower than this value, enter into float charge	W		0.1A	600	CC current
1001.	PF CMD memory state	Set the following 19-22 CMD will be memory ornot(1/0), if not, these settings are the initial value.	W	0or1,		0	Means these settings will be acting or not when next power on(02 repeat)
1002.	VbatStartForDischarge	LV Vbat	R/W		0.1V		Lead-acid battery LV voltage
1003.	VbatlowWarnClr	LoadPercent(only lead-Acid):	W		0.1V		Clear battery low voltage error voltage point

		45.5V ＜20% 48.0V 20%~50% 49.0V ＞50				
1004.	Vbatstopfordischarge	Should stop discharge when lower than this voltage(only lead-Acid): 46.0V ＜20% 44.8V 20%~50% 44.2V ＞50%	W		0.01V	
1005.	Vbat stop for charge	Should stop charge when higher than this voltage	W		0.01V	5800	
1006.	Vbat start for discharge	Should not discharge when lower than this voltage	W		0.01V	4800	
1007.	Vbat constant charge	can charge when lower than this voltage	W		0.01V	5800	CV voltage（acid）
1008.	EESysInfo.SysSetEn	Bit0：Resved； Bit1：Resved； Bit2：Resved； Bit3：Resved； Bit4：Resved； Bit5：bDischargeEn； Bit6：ForceDischrEn； Bit7：ChargeEn； Bit8：bForceChrEn； Bit9：bBackUpEn； Bit10：bInvLimitLoadE； Bit11：bSpLimitLoadEn； Bit12：bACChargeEn； Bit13：bPVLoadLimitEn； Bit14,15:UnUsed；	W			System Enable
1009.	Battemp lower limit d	Battery temperature lower limit for discharge	W	0-200:0-20℃ 1000-140	0.1℃	1170	

				0：-40-0℃			
1010.	Bat temp upper limit d	Battery temperature upper limit for discharge	W	200-1000	0.1℃	420	
1011.	Bat temp lower limit c	Battery temperature lower limit for charge	W	0-200:0-20℃ 1000-1400：-40-0℃	0.1℃	30	Lower temperature limit
1012.	Bat temp upper limit c	Battery temperature upper limit for charge	W	200-1000	0.1℃	370	Upper temperature limit
1013.	uwUnderFreDischargeDelyTime	Under Fre Delay Time	s	0-20	50ms		Under Fre Delay Time
1014.	BatMdlSerialNum	Battery serial number	W	00:00			SPH4-11K used
1015.	BatMdlParallNum	Battery parallel section	W	00:00			SPH4-11K used
1016.	/	/	/	/	/	/	Reserve
1017.	/	/	/	/	/	/	Reserve
1018.	/	/	/	/	/	/	Reserve
1019.	/	/	/	/	/	/	Reserve
1020.	/	/	/	/	/	/	Reserve
1021.	/	/	/	/	/	/	Reserve
1022.	/	/	/	/	/	/	Reserve
1023.	/	/	/	/	/	/	Reserve
1024.	/	/	/	/	/	/	Reserve
1025.	/	/	/	/	/	/	Reserve

1026.	/	/	/	/	/	/	Reserve
1027.	/	/	/	/	/	/	Reserve
1028.	/	/	/	/	/	/	Reserve
1029.	/	/	/	/	/	/	Reserve
1030.	/	/	/	/	/	/	Reserve
1031.	/	/	/	/	/	/	Reserve
1032.	/	/	/	/	/	/	Reserve
1033.	/	/	/	/	/	/	Reserve
1034.	/	/	/	/	/	/	Reserve
1035.	/	/	/	/	/	/	Reserve
1036.	/	/	/	/	/	/	Reserve
1037.	bCTMode	Use the CTMode to Choose RFCT \ Cable CT\METER	W	2:METER 1:cWirelessCT 0:cWiredCT		0	
1038.	CTAdjust	CTAdjust enable	W	0:disable 1:enable		0	
1039.	/	/	/	/	/	/	Reserve
1040.	/	/	/	/	/	/	Reserve
1041.	/	/	/	/	/	/	Reserve
1042.	/	/	/	/	/		Reserve
1043.	/	/	/	/	/	/	Reserve

1044.	Priority	ForceChrEn/ForceDischrEn Load first/bat first /grid first	R	0.Load(default)/1.Battery/2.Grid			bForceChrEn/disbForceDischrEn/dis
1045.	/	/	/	/	/	/	Reserve
1046.	/	/	/	/	/	/	Reserve
1047.	AgingTestStep Cmd	Command for aging test		0: default 1: charge 2: discharge			Cmd for aging test
1048.	BatteryType	Battery type choose of buck-boost input		0:Lithium 1:Lead-acid 2:other		0	Battery type
1049.	/	/	/	/	/		Reserve
1050.	/	/	/	/	/	/	Reserve
1051.	/	/	/	/	/		Reserve
1052.	/	/	/	/	/		Reserve
1053.	/	/	/	/	/		Reserve
1054.	/	/	/	/	/	/	Reserve
1060.	BuckUpsFunEn	Ups function enable or disable		0:disable 1:enable			
1061.	BuckUPSVoltSet	UPS output voltage		0:230 1:208 2:240		230V	
1062.	UPSFreqSet	UPS output frequency		0:50Hz 1:60Hz		50Hz	
. . .	/	/		/	/	/	reverse
Priority set							

1070.	GridFirstDischargePowerRate	Discharge Power Rate when Grid First	W	0-100	1%	Discharge Power Rate when Grid First	
1071.	GridFirstStopSOC	Stop Discharge soc when Grid First	W	0-100	1%	Stop Discharge soc when Grid First	
1072···1079	/	/	/	/	/	/	reverse
1080.	Grid First Start Time 1	High eight bit：hour Low eight bit：minute		0-23 0-59			
1081.	Grid First Stop Time 1	High eight bit：hour Low eight bit：minute		0-23 0-59			
1082.	Grid First Stop Switch 1	Enable :1 Disable:0		0 or 1		Grid First enable	
1083.	Grid First Start Time 2	High eight bit：hour Low eight bit：minute		0-23 0-59			
1084.	Grid First Stop Time 2	High eight bit：hour Low eight bit：minute		0-23 0-59			
1085.	Grid First Stop Switch 2	ForceDischarge.bSwitch&LCD_SET_FORCE_TRUE_2)==LCD_SET_FORCE_TRUE_2		0 or 1		Grid First enable	ForceDischarge; LCD_SET_FORCE_TRUE_2
1086.	Grid First Start Time 3	High eight bit：hour Low eight bit：minute		0-23 0-59			
1087.	Grid First Stop Time 3	High eight bit：hour Low eight bit：minute		0-23 0-59			
1088.	Grid First Stop Switch 3	Enable :1 Disable:0		0 or 1		Grid First enable	
1089.	/	/	/	/	/	/	reserve
1090.	BatFirstPowerRate	Charge Power Rate when Bat First	W	0-100	1%	Charge Power Rate when Bat First	
1091.	wBatFirst stop SOC	Stop Charge soc when Bat First	W	0-100	1%	Stop Charge soc when Bat First	

1092.	AC charge Switch	When Bat First Enable:1 Disable:0		Enable:1 Disable:0		AC Charge Enable	
1093… 1099							
1100.	Bat First Start Time 1	High eight bit：hour Low eight bit：minute		0-23 0-59			
1101.	Bat First Stop Time 1	High eight bit：hour Low eight bit：minute		0-23 0-59			
1102.	BatFirst on/off Switch 1	Enable :1 Disable:0		0 or 1		Bat First Enable1	
1103.	Bat First Start Time 2	High eight bit：hour Low eight bit：minute		0-23 0-59			
1104.	Bat First Stop Time 2	High eight bit：hour Low eight bit：minute		0-23 0-59			
1105.	BatFirston/off Switch 2	Enable :1 Disable:0		0 or 1		Bat First Enable2	
1106.	Bat First Start Time 3	High eight bit：hour Low eight bit：minute		0-23 0-59			
1107.	Bat First Stop Time 3	High eight bit：hour Low eight bit：minute		0-23 0-59			
1108.	BatFirston/off Switch 3	Enable :1 Disable:0		0 or 1		Bat First Enable3	
1109.	/	/	/	/	/	/	reserve
1110.	Load First Start Time 1	High eight bit：hour Low eight bit：minute		0-23 0-59			SPA/ reserve
1111.	Load First Stop Time 1	High eight bit：hour Low eight bit：minute		0-23 0-59			SPA/ reserve
1112.	Load First Switch 1	Enable :1 Disable:0		0 or 1		Load First Enable	SPA/ reserve
1113.	Load First Start Time2	High eight bit：hour Low eight bit：minute		0-23 0-59			SPA/ reserve
1114.	Load First Stop Time 2	High eight bit：hour Low eight bit：minute		0-23 0-59			SPA/ reserve
1115.	Load First Switch 2	Enable :1 Disable:0		0 or 1		Load First Enable	SPA/ reserve

1116.	Load First Start Time 3	High eight bit：hour Low eight bit：minute		0-23 0-59		SPA/ reserve
1117.	Load First Stop Time 3	High eight bit：hour Low eight bit：minute		0-23 0-59		SPA/ reserve
1118.	Load First Switch 3	Enable :1 Disable:0		0 or 1	Load First Enable	SPA/ reserve
1119.	/	/	/	/	/	/	reserve
1120.	BackUpEn	BackUp Enable				MIX US
1121.	SGIPEn	SGIP Enable				MIX US
·········	1122~1124	/	/	/	/	/	reserve
Use for TL-X and TL-XH						
3000	ExportLimitFailedPowerRate	The power rate when exportLimit failed	R/W		0.1%	The power rate when exportLimit failed
3001	New Serial NO	Serial number 1-2	R/W		ASCII	The new model uses the following registers to record the serial number; The representation is the same as the original: one register holds two characters and the new serial number is 30 characters.
3002	New Serial NO	Serial number 3-4	R/W		ASCII	
3003	New Serial NO	Serial number 5-6	R/W		ASCII	
3004	New Serial NO	Serial number 7-8	R/W		ASCII	
3005	New Serial NO	Serial number 9-10	R/W		ASCII	
3006	New Serial NO	Serial number 11-12	R/W		ASCII	
3007	New Serial NO	Serial number 13-14	R/W		ASCII	
3008	New Serial NO	Serial number 15-16	R/W		ASCII	
3009	New Serial NO	Serial number 17-18	R/W		ASCII	
3010	New Serial NO	Serial number 19-20	R/W		ASCII	
3011	New Serial NO	Serial number 21-22	R/W		ASCII	

3012	New Serial NO	Serial number 23-24	R/W			ASCII		
3013	New Serial NO	Serial number 25-26	R/W			ASCII		
3014	New Serial NO	Serial number 27-28	R/W			ASCII		
3015	New Serial NO	Serial number 29-30	R/W			ASCII		
3016	DryContactFuncEn	DryContact function enable	R/W	0:Disable 1: Enable				DryContact function enable
3017	DryContactOnRate	The power rate of drycontact turn on	R/W	0~1000	0.1%			The power rate of drycontact turn on
3018	Reserved							
3019	DryContactOffRate	DryContactOffRate	Dry contact closure power	R/W	0~1000	0.1%		Dry contact closure power percentage
3020	BoxCtrlInvOrder	BoxCtrlInvOrder	Off-net box control instruction	R/W				
3021	ExterCommOffGridEn	External communication setting manual off-network enable	R/W					0x00: Disable;（default） 0x01: Enable;
3022	Reserved							
3023	Reserved							
3024	Float charge current limit	When charge current battery need is lower than this value, enter into float charge	R/W		0.1A	600		CC current
3025	VbatWarning	"Battery-low" warning setup voltage	R/W		0.1V	4800		Lead acid battery LV voltage
3026	VbatlowWarnClr	"Battery-low" warning clear voltage	R/W		0.1V			Clear battery low voltage error voltage point LoadPercent(only lead-Acid):

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							45.5V(Load < 20%); 48.0V(20%<=Load <=50%); 49.0V(Load > 50%);
3027	Vbatstopfordischarge	Battery cut off voltage	R/W		0.1V		Should stop discharge when lower than this voltage(only lead-Acid): 46.0V(Load < 20%); 44.8V(20%<=Load <=50%); 44.2V(Load > 50%);
3028	Vbat stop for charge	Battery over charge voltage	R/W		0.01V	5800	Should stop charge when higher than this voltage
3029	Vbat start for discharge	Battery start discharge voltage	R/W		0.01V	4800	Should not discharge when lower than this voltage
3030	Vbat constant charge	Battery constant charge voltage	R/W		0.01V	5800	CV voltage（acid） can charge when lower than this voltage
3031	Battemp lower limit d	Battery temperature lower limit for discharge	R/W		0.1℃	1170	0-200:0-20℃ 1000-1400：-40-0℃
3032	Bat temp upper limit d	Battery temperature upper limit for discharge	R/W		0.1℃	420	
3033	Bat temp lower limit c	Battery temperature lower limit for charge	R/W		0.1℃	30	Battery temperature lower limit 0-200:0-20℃ 1000-1400：-40-0℃

3034	Bat temp upper limit c	Battery temperature upper limit for charge	R/W		0.1℃	370	Battery temperature upper limit
3035	uwUnderFreDischargeDelyTime	Under Fre Delay Time	R/W		50ms		Under Fre Delay Time
3036	GridFirstDischargePowerRate	Discharge Power Rate when Grid First				1-255	
3037	GridFirstStopSOC	Stop Discharge soc when Grid First				1-100	
3038	Time 1(xh)	Period 1: [Start Time ~ End Time], [Charge/Discharge], [Disable/Enable] 3038 enable, charge and discharge, start time, end time 3039	R/W				Bit0~7: minutes; Bit8~12: hour; Bit13~14, 0: load priority; 1: battery priority; 2: Grid priority; Bit15, 0: prohibited; 1: enabled;
3039			R/W				Bit0~7: minutes; Bit8~12: hour; Bit13~15: reserved
3040	Time 2(xh)	Time period 2: [start time ~ end time], [charge / discharge], [disable / enable] 3040 enable, charge and discharge, start time, 3041 end time	R/W				Bit0~7: minutes; Bit8~12: hour; Bit13~14, 0: load priority; 1: battery priority; 2: Grid priority; Bit15, 0: prohibited; 1: enabled;
3041			R/W				Bit0~7: minutes; Bit8~12: hour; Bit13~15: reserved
3042	Time 3(xh)	With Time1	R/W				With Time1
3043			R/W				With Time1
3044	Time 4(xh)	With Time1	R/W				With Time1
3045			R/W				With Time1
3046	Grid First Stop Switch 3	Grid first time-3 enable					Enable :1 Disable:0

3047	BatFirstPower Rate	Charge Power Rate when Bat First				1-100	
3048	wBatFirst stop SOC	Stop Charge soc when Bat First				1-100	
3049	AcChargeEna ble	AcChargeEnable					Enable :1 Disable:0
3050	Time 5(xh)	同 Time1	R/W				With Time1
3051			R/W				With Time1
3052	Time 6(xh)	同 Time1	R/W				With Time1
3053			R/W				With Time1
3054	Time 7(xh)	同 Time1	R/W				With Time1
3055			R/W				With Time1
3056	Time 8(xh)	同 Time1	R/W				With Time1
3057			R/W				With Time1
3058	Time 9(xh)	同 Time1	R/W				With Time1
3059			R/W				With Time1
3060~ 3069	Reserved						
3070	BatteryType	Battery type choose of buck-boost input	R/W				Battery type 0:Lithium 1:Lead-acid 2:other
3071	BatMdlSeria/ ParalNum	BatMdlSeria/ParalNum	R/W				BatMdlSeria/Paral Num; SPH4-11K used The upper 8 bits indicate the number of series segments； The lower 8 bits

						indicate the number of parallel sections;
3072	Reserved					
3073	Reserved					
3074	Reserved					
3075	Reserved					
3076	Reserved					
3077	Reserved					
3078	Reserved					
3079	UpsFunEn	Ups function enable or disable	R/W		0	0:disable 1:enable
3080	UPSVoltSet	UPS output voltage	R/W		0	0:230V 1:208V 2:240V
3081	UPSFreqSet	UPS output frequency	R/W		0	0:50Hz 1:60Hz
3082	bLoadFirstStopSocSet	StopSoc When LoadFirst	R/W		13-100	ratio
3083	Reserved					
3084	Reserved					
3085	Com Address	Communication addr	R/W		1	1 : Communication addr=1 1 ~ 254 : Communication addr=1~254
3086	BaudRate	Communication BaudRate	R/W		0	0: 9600 bps 1: 38400 bps
3087	Serial NO	Serial Number 1-2	R/W	ASCII		For battery
3088	Serial No	Serial Number 3-4	R/W	ASCII		
3089	Serial No	Serial Number 5-6	R/W	ASCII		
3090	Serial No	Serial Number 7-8	R/W	ASCII		
3091	Serial No	Serial Number 9-10	R/W	ASCII		
3092	Model H	Model H	R/W			
3093	Model L	Model L	R/W			
3094	Pdischr max H	Max Discharge Power	R	0.1W		
3095	Pdischr max L					
3096	Pchr max H	Max Charge Power	R	0.1W		
3097	Pchr max L					
3098	DTC	DTC	R			

3099	FW Code1	FW Code1	R		ASCII		
3100	FW Code2	FW Code2	R		ASCII		
3101	Processor1 FW Vision	Processor1 FW Vision	R		ASCII		
3102	Reset User Info	Reset User Info	W				
3103	Reset to factory	Reset to factory	W				
3104 ~ 3124	Reserved						

4.2 Input Reg

NO.	Variable Name	Description	Value	Unit	Note
First group					
0.	Inverter Status	Inverter run state	0:waiting, 1:normal, 3:fault		
1.	Ppv H	Input power (high)		0.1W	
2.	Ppv L	Input power (low)		0.1W	
3.	Vpv1	PV1 voltage		0.1V	
4.	PV1Curr	PV1 input current		0.1A	
5.	Ppv1 H	PV1 input power(high)		0.1W	
6.	Ppv1 L	PV1 input power(low)		0.1W	
7.	Vpv2	PV2 voltage		0.1V	
8.	PV2Curr	PV2 input current		0.1A	
9.	Ppv2 H	PV2 input power (high)		0.1W	
10.	Ppv2 L	PV2 input power (low)		0.1W	
11.	Vpv3	PV3 voltage		0.1V	
12.	PV3Curr	PV3 input current		0.1A	
13.	Ppv3 H	PV3 input power (high)		0.1W	
14.	Ppv3 L	PV3 input power (low)		0.1W	
15.	Vpv4	PV4 voltage		0.1V	
16.	PV4Curr	PV4 input current		0.1A	
17.	Ppv4 H	PV4 input power (high)		0.1W	
18.	Ppv4 L	PV4 input power (low)		0.1W	
19.	Vpv5	PV5 voltage		0.1V	
20.	PV5Curr	PV5 input current		0.1A	
21.	Ppv5H	PV5 input power(high)		0.1W	

22.	Ppv5 L	PV5 input power(low)		0.1W	
23.	Vpv6	PV6 voltage		0.1V	
24.	PV6Curr	PV6 input current		0.1A	
25.	Ppv6 H	PV6 input power (high)		0.1W	
26.	Ppv6 L	PV6 input power (low)		0.1W	
27.	Vpv7	PV7 voltage		0.1V	
28.	PV7Curr	PV7 input current		0.1A	
29.	Ppv7 H	PV7 input power (high)		0.1W	
30.	Ppv7 L	PV7 input power (low)		0.1W	
31.	Vpv8	PV8 voltage		0.1V	
32.	PV8Curr	PV8 input current		0.1A	
33.	Ppv8 H	PV8 input power (high)		0.1W	
34.	Ppv8 L	PV8 input power (low)		0.1W	
35.	Pac H	Output power (high)		0.1W	
36.	Pac L	Output power (low)		0.1W	
37.	Fac	Grid frequency		0.01Hz	
38.	Vac1	Three/single phase grid voltage		0.1V	
39.	Iac1	Three/single phase grid output current		0.1A	
40.	Pac1 H	Three/single phase grid output watt VA (high)		0.1VA	
41.	Pac1 L	Three/single phase grid output watt VA(low)		0.1VA	
42.	Vac2	Three phase grid voltage		0.1V	
43.	Iac2	Three phase grid output current		0.1A	
44.	Pac2 H	Three phase grid output power (high)		0.1VA	
45.	Pac2 L	Three phase grid output power (low)		0.1VA	
46.	Vac3	Three phase grid voltage		0.1V	
47.	Iac3	Three phase grid output current		0.1A	
48.	Pac3 H	Three phase grid output power (high)		0.1VA	
49.	Pac3 L	Three phase grid output power (low)		0.1VA	
50.	Vac_RS	Three phase grid voltage		0.1V	Line voltage
51.	Vac_ST	Three phase grid voltage		0.1V	Line voltage
52.	Vac_TR	Three phase grid voltage		0.1V	Line voltage
53.	Eactoday H	Today generate energy (high)		0.1kWH	
54.	Eac today L	Today generate energy (low)		0.1kWH	
55.	Eac total H	Total generate energy (high)		0.1kWH	
56.	Eac total L	Total generate energy (low)		0.1kWH	
57.	Time total H	Work time total (high)		0.5s	
58.	Time total L	Work time total (low)		0.5s	
59.	Epv1_today H	PV1Energy today(high)		0.1kWh	
60.	Epv1_today L	PV1Energy today (low)		0.1kWh	

61.	Epv1_total H	PV1Energy total(high)		0.1kWh	
62.	Epv1_total L	PV1Energy total (low)		0.1kWh	
63.	Epv2_today H	PV2Energy today(high)		0.1kWh	
64.	Epv2_today L	PV2Energy today (low)		0.1kWh	
65.	Epv2_total H	PV2Energy total(high)		0.1kWh	
66.	Epv2_total L	PV2Energy total (low)		0.1kWh	
67.	Epv3_today H	PV3 Energy today(high)		0.1kWh	
68.	Epv3_today L	PV3 Energy today (low)		0.1kWh	
69.	Epv3_total H	PV3 Energy total(high)		0.1kWh	
70.	Epv3_total L	PV3 Energy total (low)		0.1kWh	
71.	Epv4_today H	PV4Energy today(high)		0.1kWh	
72.	Epv4_today L	PV4Energy today (low)		0.1kWh	
73.	Epv4_total H	PV4Energy total(high)		0.1kWh	
74.	Epv4_total L	PV4Energy total (low)		0.1kWh	
75.	Epv5_today H	PV5Energy today(high)		0.1kWh	
76.	Epv5_today L	PV5Energy today (low)		0.1kWh	
77.	Epv5_total H	PV5Energy total(high)		0.1kWh	
78.	Epv5_total L	PV5Energy total (low)		0.1kWh	
79.	Epv6_today H	PV6Energy today(high)		0.1kWh	
80.	Epv6_today L	PV6Energy today (low)		0.1kWh	
81.	Epv6_total H	PV6Energy total(high)		0.1kWh	
82.	Epv6_total L	PV6Energy total (low)		0.1kWh	
83.	Epv7_today H	PV7Energy today(high)		0.1kWh	
84.	Epv7_today L	PV7Energy today (low)		0.1kWh	
85.	Epv7_total H	PV7 Energy total(high)		0.1kWh	
86.	Epv7_total L	PV7Energy total (low)		0.1kWh	
87.	Epv8_today H	PV8Energy today(high)		0.1kWh	
88.	Epv8_today L	PV8Energy today (low)		0.1kWh	
89.	Epv8_total H	PV8Energy total(high)		0.1kWh	
90.	Epv8_total L	PV8Energy total (low)		0.1kWh	
91.	Epv_total H	PV Energy total(high)		0.1kWh	
92.	Epv_total L	PV Energy total (low)		0.1kWh	
93.	Temp1	Inverter temperature		0.1C	
94.	Temp2	The inside IPM in inverter Temperature		0.1C	
95.	Temp3	Boost temperature		0.1C	
96.	Temp4				reserved
97.	uwBatVolt_DSP	BatVolt_DSP		0.1V	BatVolt(DSP)
98.	P Bus Voltage	P Bus inside Voltage		0.1V	
99.	N Bus Voltage	N Bus inside Voltage		0.1V	

100.	IPF	Inverter output PF now	0-20000		
101.	RealOPPercent	Real Output power Percent		1%	
102.	OPFullwatt H	Output Maxpower Limited high			
103.	OPFullwatt L	Output Maxpower Limited low		0.1W	
104.	DeratingMode	DeratingMode	0:no derate; 1:PV; 2:*; 3:Vac; 4:Fac; 5:Tboost; 6:Tinv; 7:Control; 8:*; 9:*OverBack ByTime;		
105.	Fault code	Inverter fault code	&*1		MAX
106.	Fault Bitcode H	Inverter fault code high	&*8		MAX
107.	Fault Bitcode L	Inverter fault code low			
108.	RemoteCtrlEn	/	0.Load First 1.BatFirst 2.Grid	/	StoragePower (SPA)
109.	RemoteCtrlPower	/		/	StoragePower (SPA)
110.	Warning bit H	Warning bit H	&*8		
111.	Warning bit L	Warning bit L			
112.	bINVWarnCode	bINVWarnCode			MAX
	EACharge_Today_H	ACCharge energy today		0.1kwh	Storage Power
113.	real Power Percent	real Power Percent	0-100	%	MAX
	EACharge_Today_L	ACCharge energy today		0.1kwh	Storage Power
114.	inv start delay time	inv start delay time			MAX
	EACharge_Total_H	ACCharge energy total		0.1kwh	Storage Power
115.	bINVAllFaultCode	bINVAllFaultCode			MAX
	EACharge_Total_L	ACCharge energy total		0.1kwh	Storage Power
116.	AC charge Power_H	Grid power to local load		0.1kwh	Storage Power

117.	AC charge Power_L	Grid power to local load		0.1kwh	Storage Power
118.	Priority	0:Load First 1:Battery First 2:Grid First			Storage Power
119.	Battery Type	0：Lead-acid 1：Lithium battery			Storage Power
120.	AutoProofreadCMD	Aging mode 自动校准命令			Storage Power
...	reserved				reserved
124.	reserved				reserved
Second group					
125.	PID PV1+ Voltage	PID PV1PE Volt	0~1000V	0.1V	
126.	PID PV1+ Current	PID PV1PE Curr	-10~10mA	0.1mA	
127.	PID PV2+ Voltage	PID PV2PE Volt	0~1000V	0.1V	
128.	PID PV2+ Current	PID PV2PE Curr	-10~10mA	0.1mA	
129.	PID PV3+ Voltage	PID PV3PE Volt	0~1000V	0.1V	
130.	PID PV3+ Current	PID PV3PE Curr	-10~10mA	0.1mA	
131.	PID PV4+ Voltage	PID PV4PE Volt	0~1000V	0.1V	
132.	PID PV4+ Current	PID PV4PE Curr	-10~10mA	0.1mA	
133.	PID PV5+ Voltage	PID PV5PE Volt	0~1000V	0.1V	
134.	PID PV5+ Current	PID PV5PE Curr	-10~10mA	0.1mA	
135.	PID PV6+ Voltage	PID PV6PE Volt	0~1000V	0.1V	
136.	PID PV6+ Current	PID PV6PE Curr	-10~10mA	0.1mA	
137.	PID PV7+ Voltage	PID PV7PE Volt	0~1000V	0.1V	
138.	PID PV7+ Current	PID PV7PE Curr	-10~10mA	0.1mA	
139.	PID PV8+ Voltage	PID PV8PE Volt	0~1000V	0.1V	
140.	PID PV8+ Current	PID PV8PE Curr	-10~10mA	0.1mA	
141.	PID Status	Bit0~7:PID Working Status 1:Wait Status 2:Normal Status 3:Fault Status Bit8~15:Reversed	0~3		
142.	V _String1	PV String1 voltage		0.1V	
143.	Curr _String1	PV String1 current	-15~15A	0.1A	
144.	V _String2	PV String2 voltage		0.1V	
145.	Curr _String2	PV String2 current	-15~15A	0.1A	
146.	V _String3	PV String3 voltage		0.1V	
147.	Curr _String3	PV String3 current	-15~15A	0.1A	
148.	V _String4	PV String4 voltage		0.1V	

149.	Curr _String4	PV String4 current	-15~15A	0.1A	
150.	V _String5	PV String5 voltage		0.1V	
151.	Curr _String5	PV String5 current	-15~15A	0.1A	
152.	V _String6	PV String6 voltage		0.1V	
153.	Curr _String6	PV String6 current	-15~15A	0.1A	
154.	V _String7	PV String7 voltage		0.1V	
155.	Curr _String7	PV String7 current	-15~15A	0.1A	
156.	V _String8	PV String8 voltage		0.1V	
157.	Curr _String8	PV String8 current	-15A~15A	0.1A	
158.	V _String9	PV String9 voltage		0.1V	
159.	Curr _String9	PV String9 current	-15A~15A	0.1A	
160.	V _String10	PV String10 voltage		0.1V	
161.	Curr _String10	PV String10 current	-15~15A	0.1A	
162.	V _String11	PV String11 voltage		0.1V	
163.	Curr _String11	PV String11 current	-15~15A	0.1A	
164.	V _String12	PV String12 voltage		0.1V	
165.	Curr _String12	PV String12 current	-15~15A	0.1A	
166.	V _String13	PV String13 voltage		0.1V	
167.	Curr _String13	PV String13 current	-15A~15A	0.1A	
168.	V _String14	PV String14 voltage		0.1V	
169.	Curr _String14	PV String14 current	-15~15A	0.1A	
170.	V _String15	PV String15 voltage		0.1V	
171.	Curr _String15	PV String15 current	-15~15A	0.1A	
172.	V _String16	PV String16 voltage		0.1V	
173.	Curr _String16	PV String16 current	-15~15A	0.1A	
174.	StrUnmatch	Bit0~15: String1~16 unmatch			suggestive
175.	StrCurrentUnblance	Bit0~15: String1~16 current unblance			suggestive
176.	StrDisconnect	Bit0~15: String1~16 disconnect			suggestive
177.	PIDFaultCode	Bit0:Output over voltage Bit1: ISO fault Bit2: BUS voltage abnormal Bit3~15:reserved			
178.	String Prompt	String Prompt Bit0:String Unmatch Bit1:StrDisconnect Bit2:StrCurrentUnblance Bit3~15:reserved			
179	PV Warning Value	PV Warning Value			
180	DSP075 Warning Value	DSP075 Warning Value			

181	DSP075 Fault Value	DSP075 Fault Value			
182	DSP067 Debug Data1	DSP067 Debug Data1			
183	DSP067 Debug Data2	DSP067 Debug Data2			
184	DSP067 Debug Data3	DSP067 Debug Data3			
185	DSP067 Debug Data4	DSP067 Debug Data4			
186	DSP067 Debug Data5	DSP067 Debug Data5			
187	DSP067 Debug Data6	DSP067 Debug Data6			
188	DSP067 Debug Data7	DSP067 Debug Data7			
189	DSP067 Debug Data8	DSP067 Debug Data8			
190	DSP075 Debug Data1	DSP075 Debug Data1			
191	DSP075 Debug Data2	DSP075 Debug Data2			
192	DSP075 Debug Data3	DSP075 Debug Data3			
193	DSP075 Debug Data4	DSP075 Debug Data4			
194	DSP075 Debug Data55	DSP075 Debug Data5			
195	DSP075 Debug Data6	DSP075 Debug Data6			
196	DSP075 Debug Data7	DSP075 Debug Data7			
197	DSP075 Debug Data8	DSP075 Debug Data8			
198	bUSBAgingTestOkFlag	USBAgingTestOkFlag	0-1		
199	bFlashEraseAgingOkFlag	FlashEraseAgingOkFlag	0-1		
200	PVISO	PVISOValue		KΩ	
201	R_DCI	R DCI Curr		0.1mA	
202	S_DCI	S DCI Curr		0.1mA	
203	T_DCI	T DCI Curr		0.1mA	

204	PID_Bus	PIDBusVolt		0.1V	
205	GFCI	GFCI Curr		mA	
206	SVG/APF Status+SVGAPFEqualRatio	SVG/APF Status+SVGAPFEqualRatio	High 8 bit : SVGAPFEqualRatio Low 8 bit : SVG/APF Status 0:None 1:SVG Run 2:APF Run 3:SVG/APF Run		
207	CT_I_R	R phase load side current for SVG		0.1A	
208	CT_I_S	S phase load side current for SVG		0.1A	
209	CT_I_T	T phase load side current for SVG		0.1A	
210	CT_Q_R H	R phase load side output reactive power for SVG(High)		0.1Var	
211	CT_Q_R L	R phase load side output reactive power for SVG(low)		0.1Var	
212	CT_Q_S H	S phase load side output reactive power for SVG(High)		0.1Var	
213	CT_Q_S L	S phase load side output reactive power for SVG(low)		0.1Var	
214	CT_Q_T H	T phase load side output reactive power for SVG(High)		0.1Var	
215	CT_Q_T L	T phase load side output reactive power for SVG(low)		0.1Var	
216	CT HAR_I_R	R phase load side harmonic		0.1A	
217	CT HAR_I_S	S phase load side harmonic		0.1A	
218	CT HAR_I_T	T phase load side harmonic		0.1A	
219	COMP_Q_R H	R phase compensate reactive power for SVG(High)		0.1Var	
220	COMP_Q_R L	R phase compensate reactive power for SVG(low)		0.1Var	
221	COMP_Q_S H	S phase compensate reactive power for SVG(High)		0.1Var	
222	COMP_Q_S L	S phase compensate reactive power for SVG(low)		0.1Var	
223	COMP_Q_T H	T phase compensate reactive power for SVG(High)		0.1Var	
224	COMP_Q_T L	T phase compensate reactive power		0.1Var	

		for SVG(low)			
225	COMP HAR_I_R	R phase compensate harmonic for SVG		0.1A	
226	COMP HAR_I_S	S phase compensate harmonic for SVG		0.1A	
227	COMP HAR_I_T	T phase compensate harmonic for SVG		0.1A	
228	bRS232AgingTestOkFlag	RS232AgingTestOkFlag	0-1		
229	bFanFaultBit	Bit0: Fan 1 fault bit Bit1: Fan 2 fault bit Bit2: Fan 3 fault bit Bit3: Fan 4 fault bit Bit4-7: Reserved			
230	Sac H	Output apparent power H		0.1W	
231	Sac L	Output apparent power L		0.1W	
232	ReActPowerH	Real Output Reactive Power H	Int32	0.1W	
233	ReActPowerL	Real Output Reactive Power L			
234	ReActPowerMaxH	Nominal Output Reactive Power H		0.1var	
235	ReActPowerMaxL	Nominal Output Reactive Power L			
236	ReActPower_Total H	Reactive power generation		0.1kwh	
237	ReActPower_Total L	Reactive power generation			
…	238~249				reserved
Ninth group for Storage power					
1000.	uwSysWorkMode	System work mode	0x00:waiting module 0x01: Self-test mode, optional 0x02 : Reserved 0x03 : SysFault module 0x04: Flash module 0x05 : PVBATOnline module, 0x06 : BatOnline		Theworkingmode displayed by the monitoring to the customer is： 0x00: waiting module 0x01: Self-test mode, 0x03:fault module 0x04:flash module 0x05|0x06|0x07|0x08:normal module

			module, 0x07 : PVOfflineMod e module, 0x08 : BatOfflineMo de module,		
1001.	Systemfault word0	System fault word0			Please refer to thefault description of Hybrid
1002.	Systemfault word1	System fault word1			
1003.	Systemfault word2	System fault word2			
1004.	Systemfault word3	System fault word3			
1005.	Systemfault word4	System fault word4			
1006.	Systemfault word5	System fault word5			
1007.	Systemfault word6	System fault word6			
1008.	Systemfault word7	System fault word7			
1009.	Pdischarge1 H	Discharge power(high)		0.1W	
1010.	Pdischarge1 L	Discharge power (low)		0.1W	
1011.	Pcharge1 H	Charge power(high)		0.1W	
1012.	Pcharge1 L	Charge power (low)		0.1W	
1013.	Vbat	Battery voltage		0.1V	
1014.	SOC	State of charge Capacity	0-100	1%	lith/leadacid
1015.	Pactouser R H	AC power to user H		0.1w	
1016.	Pactouser R L	AC power to user L		0.1w	
1017.	Pactouser S H	Pactouser S H		0.1w	
1018.	Pactouser S L	Pactouser S L		0.1w	
1019.	Pactouser T H	Pactouser T H		0.1w	
1020.	Pactouser T L	Pactouser T H		0.1w	
1021.	PactouserTotal H	AC power to user total H		0.1w	
1022.	PactouserTotal L	AC power to user total L		0.1w	
1023.	Pac to grid R H	AC power to grid H		0.1w	Ac output
1024.	Pac to grid R L	AC power to grid L		0.1w	
1025.	Pactogrid S H			0.1w	
1026.	Pactogrid S L			0.1w	
1027.	Pactogrid T H			0.1w	
1028.	Pactogrid T L			0.1w	
1029.	Pactogrid total H	AC power to grid total H		0.1w	
1030.	Pactogrid total L	AC power to grid total L		0.1w	
1031.	PLocalLoad R H	INV power to local load H		0.1w	

1032.	PLocalLoad R L	INV power to local load L		0.1w	
1033.	PLocalLoad S H			0.1w	
1034.	PLocalLoad S L			0.1w	
1035.	PLocalLoadT H			0.1w	
1036.	PLocalLoadT L			0.1w	
1037.	PLocalLoad total H	INV power to local load total H		0.1w	
1038.	PLocalLoad total L	INV power to local load total L		0.1w	
1039.	IPM Temperature	REC Temperature		0.1℃	No use
1040.	Battery Temperature	Battery Temperature		0.1℃	Lead acid/lithium battery temp
1041.	SP DSP Status	SP state			CHG/DisCHG
1042.	SP Bus Volt	SP BUS2 Volt		0.1V	
1043.					
发电量数据					
1044.	Etouser_today H	Energy to user today high		0.1kWh	
1045.	Etouser_today L	Energy to user today low		0.1kWh	
1046.	Etouser_total H	Energy to user total high		0.1kWh	
1047.	Etouser_ total L	Energy to user total high		0.1kWh	
1048.	Etogrid_today H	Energy to grid today high		0.1kWh	
1049.	Etogrid _today L	Energy to grid today low		0.1kWh	
1050.	Etogrid _total H	Energy to grid total high		0.1kWh	
1051.	Etogrid _ total L	Energy to grid total high		0.1kWh	
1052.	Edischarge1_today H	Discharge energy1 today		0.1kWh	
1053.	Edischarge1_today L	Discharge energy1 today		0.1kWh	
1054.	Edischarge1_total H	Total discharge energy1 (high)		0.1kWh	
1055.	Edischarge1_total L	Total discharge energy1 (low)		0.1kWh	
1056.	Echarge1_today H	Charge1 energy today		0.1kWh	
1057.	Echarge1_today L	Charge1 energy today		0.1kWh	
1058.	Echarge1_total H	Charge1 energy total		0.1kWh	
1059.	Echarge1_total L	Charge1 energy total		0.1kWh	
1060.	ELocalLoad_Today H	Local load energy today		0.1kWh	
1061.	ELocalLoad_Today L	Local load energy today		0.1kWh	
1062.	ELocalLoad_Total	Local load energy total		0.1kWh	

		H				
1063.	ELocalLoad_Total L	Local load energy total		0.1kWh	
1064.	dwExportLimitApparentPower	ExportLimitApparentPower H		0.1kWh	ApparentPower
1065.	dwExportLimitApparentPower	ExportLimitApparentPower L		0.1kWh	ApparentPower
1066.	/	/	/	/	reserved

Ups information (offline)

1067.	EPS Fac	UPSfrequency	5000/6000	0.01Hz	
1068.	EPS Vac1	UPS phase R output voltage	2300	0.1V	
1069.	EPS Iac1	UPS phase R output current		0.1A	
1070.	EPS Pac1 H	UPS phase R output power (H)		0.1VA	
1071.	EPS Pac1 L	UPS phase R output power (L)		0.1VA	
1072.	EPS Vac2	UPS phase S output voltage		0.1V	
1073.	EPS Iac2	UPS phase S output current		0.1A	No use
1074.	EPS Pac2 H	UPS phase S output power (H)		0.1VA	
1075.	EPS Pac2 L	UPS phase S output power (L)		0.1VA	
1076.	EPS Vac3	UPS phase T output voltage		0.1V	
1077.	EPS Iac3	UPS phase T output current		0.1A	No use
1078.	EPS Pac3 H	UPS phase T output power (H)		0.1VA	
1079.	EPS Pac3 L	UPS phase T output power (L)		0.1VA	
1080.	Loadpercent	Load percent of UPS ouput	0-100	1%	
1081.	PF	Power factor	0-2	0.1	Primary Value+1

BMS Infomation

1082.	BMS_StatusOld	StatusOld from BMS	**Detail information, refer to document:GrowattxxSxxP ESS Protocol;**	
1083.	BMS_Status	Status from BMS		W/R
1084.	BMS_ErrorOld	Error info Old from BMS		
1085.	BMS_Error	Errorinfomation from BMS		
1086.	BMS_SOC	SOC from BMS		R SPH6K
1087.	BMS_BatteryVolt	Battery voltage from BMS		R SPH6K
1088.	BMS_BatteryCurr	Battery current from BMS		
1089.	BMS_BatteryTemp	Battery temperature from BMS		
1090.	BMS_MaxCurr	Max. charge/discharge current from BMS (pylon)		
1091.	BMS_GaugeRM	Gauge RM from BMS		
1092.	BMS_GaugeFCC	Gauge FCC from BMS		
1093.	BMS_FW			

1094.	BMS_DeltaVolt	Delta V from BMS			
1095.	BMS_CycleCnt	Cycle Count from BMS			
1096.	BMS_SOH	SOH from BMS			
1097.	BMS_ConstantVolt	CV voltage from BMS			
1098.	BMS_WarnInfoOld	Warning info old from BMS			
1099.	BMS_WarnInfo	Warning info from BMS			
1100.	BMS_GaugeICCurr	Gauge IC current from BMS			
1101.	BMS_MCUVersion	MCU Software version from BMS			
1102.	BMS_GaugeVersion	Gauge Version from BMS			
1103.	BMS_wGaugeFRVersion_ L	Gauge FR Version L16 from BMS			
1104.	BMS_wGaugeFRVersion_H	Gauge FR Version H16 from BMS			
1105.	BMS_BMSInfo	BMSInformation from BMS			
1106.	BMS_PackInfo	Pack Information from BMS			
1107.	BMS_UsingCap	Using Cap from BMS			
1108.	BMS_ Cell1_Volt	Cell1_Voltage from BMS			
1109.	BMS_ Cell2_Volt	Cell_Voltage from BMS			
…					
1123	BMS_ Cell16_Volt	Cell16_Voltage from BMS			
1124	AC Charge Energy Today H	AC Charge Energy today	kwh		Energy today
Ninth group reserved for storage power					
1125.	ACCharge Energy TodayL	AC Charge Energy today	kwh		
1126.	AC Charge Energy Total H				Energy total
1127.	ACCharge Energy Total L				
1128.	AC Charge Power H	AC Charge Power	W		
1129.	AC Charge Power L	AC Charge Power	w		
1130.	70% INV Power adjust	uwGridPower_70_AdjEE_SP	W		

1131.	Extra AC Power to grid_H	Extra inverte AC Power to grid High	For SPA connect inverter		SPA used
1132.	Extra AC Power to grid_L	Extrainverte AC Power to grid Low			SPA used
1133.	Eextra_today H	Extra inverter PowerTOUser_Extra today (high)	R	0.1kWh	SPA used
1134.	Eextra_today L	Extra inverter PowerTOUser_Extra today (low)	R	0.1kWh	SPA used
1135.	Eextra_total H	Extra inverter PowerTOUser_Extra total(high)		0.1kWh	SPA used
1136.	Eextra_total L	Extra inverter PowerTOUser_Extra total(low)		0.1kWh	SPA used
1137.	Esystem_today H	System electric energy today H		0.1kWh	SPA used System electric energy today H
1138.	Esystem_ today L	System electric energy today L		0.1kWh	SPA used System electric energy today L
1139.	Esystem_total H	System electric energy total H		0.1kWh	SPA used System electric energy total H
1140.	Esystem_ total L	System electric energy total L		0.1kWh	SPA used System electric energy total L
……	/	/	/	/	reversed
1249.	/	/	/	/	reversed

thirteen group for Storage power's SPA					
2000	Inverter Status	Inverter run state	0:waiting, 1:normal, 3:fault		SPA
……	reversed				
2035	Pac H	Output power (high)		0.1W	SPA
2036	Pac L	Output power (low)		0.1W	SPA
2037	Fac	Grid frequency		0.01Hz	SPA
2038	Vac1	Three/single phase grid voltage		0.1V	SPA
2039	Iac1	Three/single phase grid output current		0.1A	SPA
2040	Pac1 H	Three/single phase grid output watt VA (high)		0.1VA	SPA
2041	Pac1 L	Three/single phase grid output watt		0.1VA	SPA

		VA(low)			
······	reversed				
2053	Eac today H	Today generate energy (high)		0.1kWH	SPA
2054	Eac today L	Today generate energy (low)		0.1kWH	SPA
2055	Eac total H	Total generate energy (high)		0.1kWH	SPA
2056	Eac total L	Total generate energy (low)		0.1kWH	SPA
2057	Time total H	Work time total (high)		0.5s	SPA
2058	Time total L	Work time total (low)		0.5s	SPA
······	reversed				
2093	Temp1	Inverter temperature		0.1C	SPA
2094	Temp2	The inside IPM in inverter Temperature		0.1C	SPA
2095	Temp3	Boost temperature		0.1C	SPA
2096	Temp4				reserved
2097	uwBatVolt_DSP	BatVolt_DSP		0.1V	BatVolt(DSP)
2098	P Bus Voltage	P Bus inside Voltage		0.1V	SPA
2099	N Bus Voltage	N Bus inside Voltage		0.1V	SPA
2100	RemoteCtrlEn	/	0.Load First 1.BatFirst 2.Grid	/	Remote setup enable
2101	RemoteCtrlPower	/		/	Remotely set power
2102	Extra AC Power to grid_H	Extra inverte AC Power to grid High	For SPA connect inverter		SPA used
2103	Extra AC Power to grid_L	Extrainverte AC Power to grid Low			SPA used
2104	Eextra_today H	Extra inverter PowerTOUser_Extra today (high)	R	0.1kWh	SPA used
2105	Eextra_today L	Extra inverter PowerTOUser_Extra today (low)	R	0.1kWh	SPA used
2106	Eextra_total H	Extra inverter PowerTOUser_Extratotal(high)		0.1kWh	SPA used
2107	Eextra_total L	Extra inverter PowerTOUser_Extra total(low)		0.1kWh	SPA used
2108	Esystem_today H	System electric energy today H		0.1kWh	SPA used System electric energy today H
2109	Esystem_ today L	System electric energy today L		0.1kWh	SPA used System electric

					energy today L
2110	Esystem_total H	System electric energy total H		0.1kWh	SPA used System electric energy total H
2111	Esystem_ total L	System electric energy total L		0.1kWh	SPA used System electric energy total L
2112	EACharge_Today _H	ACCharge energy today		0.1kwh	Storage Power
2113	EACharge_Today _L	ACCharge energy today		0.1kwh	Storage Power
2114	EACharge_Total _H	ACCharge energy total		0.1kwh	Storage Power
2115	EACharge_Total _L	ACCharge energy total		0.1kwh	Storage Power
2116	AC charge Power_H	Grid power to local load		0.1kwh	Storage Power
2117	AC charge Power_L	Grid power to local load		0.1kwh	Storage Power
2118	Priority	0:Load First 1:Battery First 2:Grid First			Storage Power
2119	Battery Type	0：Lead-acid 1：Lithium battery			Storage Power
2120	AutoProofreadC MD	Aging mode			Storage Power
…	reserved				reserved
2124.	reserved				reserved
Use for TL-X and TL-XH					
3000	Inverter Status	Inverter run state High 8 bits mode (specific mode) 0: Waiting module 1: Self-test mode, optional 2: Reserved			

		3：SysFault module 4: Flash module 5：PVBATOnline module: 6：BatOnline module 7：PVOfflineMode 8：BatOfflineMode The lower 8 bits indicate the machine status (web page display) 0: StandbyStatus; 1: NormalStatus; 3: FaultStatus 4：FlashStatus;			
3001	Ppv H	PV total power		0.1W	
3002	Ppv L				
3003	Vpv1	PV1 voltage		0.1V	
3004	Ipv1	PV1 input current		0.1A	
3005	Ppv1 H	PV1 power		0.1W	
3006	Ppv1 L				
3007	Vpv2	PV2 voltage		0.1V	
3008	Ipv2	PV2 input current		0.1A	
3009	Ppv2 H	PV2 power		0.1W	
3010	Ppv2 L				
3011	Vpv3	PV3 voltage		0.1V	
3012	Ipv3	PV3 input current		0.1A	
3013	Ppv3 H	PV3 power		0.1W	
3014	Ppv3 L				
3015	Vpv4	PV4 voltage			
3016	Ipv4	PV4 input current			
3017	Ppv4H	PV4 power			
3018	Ppv4L				
3019	Reserved				
3020	Reserved				
3021	Reserved				
3022	Reserved				
3023	Pac H	Output power		0.1W	Output power
3024	Pac L				
3025	Fac	Grid frequency		0.01Hz	Grid frequency
3026	Vac1	Three/single phase grid voltage		0.1V	Three/single phase grid

					voltage
3027	Iac1	Three/single phase grid output current		0.1A	Three/single phase grid output current
3028	Pac1 H	Three/single phase grid output watt VA		0.1VA	Three/single phase grid output watt VA
3029	Pac1 L				
3030	Vac2	Three phase grid voltage		0.1V	Three phase grid voltage
3031	Iac2	Three phase grid output current		0.1A	Three phase grid output current
3032	Pac2 H	Three phase grid output power		0.1VA	Three phase grid output power
3033	Pac2 L				
3034	Vac3	Three phase grid voltage		0.1V	Three phase grid voltage
3035	Iac3	Three phase grid output current		0.1A	Three phase grid output current
3036	Pac3 H	Three phase grid output power		0.1VA	Three phase grid output power
3037	Pac3 L				
3038	Vac_RS	Three phase grid voltage		0.1V	
3039	Vac_ST	Three phase grid voltage		0.1V	
3040	Vac_TR	Three phase grid voltage		0.1V	
3041	Ptouser total H	Total forward power		0.1W	Total forward power
3042	Ptouser total L				
3043	Ptogrid total H	Total reverse power		0.1W	Total reverse power
3044	Ptogrid total L				
3045	Ptoload total H	Total load power		0.1W	Total load power
3046	Ptoload total L				
3047	Time total H	Work time total		0.5s	
3048	Time total L				
3049	Eac today H	Today generate energy		0.1kWh	Today generate energy
3050	Eac today L				

3051	Eac total H	Total generate energy		0.1kWh	Total generate energy
3052	Eac total L				
3053	Epv_total H	PV energy total		0.1kWh	PV energy total
3054	Epv_total L				
3055	Epv1_today H	PV1 energy today		0.1kWh	
3056	Epv1_today L				
3057	Epv1_total H	PV1 energy total		0.1kWh	
3058	Epv1_total L				
3059	Epv2_today H	PV2 energy today		0.1kWh	
3060	Epv2_today L				
3061	Epv2_total H	PV2 energy total		0.1kWh	
3062	Epv2_total L				
3063	Epv3_today H	PV3 energy today		0.1kWh	
3064	Epv3_today L				
3065	Epv3_total H	PV3 energy total		0.1kWh	
3066	Epv3_total L				
3067	Etouser_today H	Today energy to user		0.1kWh	Today energy to user
3068	Etouser_today L				
3069	Etouser_total H	Total energy to user		0.1kWh	Total energy to user
3070	Etouser_total L				
3071	Etogrid_today H	Today energy to grid		0.1kWh	Today energy to grid
3072	Etogrid_today L				
3073	Etogrid_total H	Total energy to grid		0.1kWh	Total energy to grid
3074	Etogrid_total L				
3075	Eload_today H	Today energy of user load		0.1kWh	Today energy of user load
3076	Eload_today L				
3077	Eload_total H	Total energy of user load		0.1kWh	Total energy of user load
3078	Eload_total L				
3079	Reserved				
3080	Reserved				
3081	Reserved				
3082	Reserved				
3083	Reserved				
3084	Reserved				

3085	Reserved					
3086	DeratingMode	DeratingMode				0:cNOTDerate 1:cPVHighDerate 2: cPowerConstantDerate 3: cGridVHighDerate 4:cFreqHighDerate 5:cDcSoureModeDerate 6:cInvTemprDerate 7:cActivePowerOrder 8:cLoadSpeedProcess 9:cOverBackbyTime 10:cInternalTemprDerate 11:cOutTemprDerate 12:cLineImpeCalcDerate 13: cParallelAntiBackflowDerate 14:cLocalAntiBackflowDerate 15:cBdcLoadPriDerate 16:cChkCTErrDerate
3087	ISO	PV ISO value		1KΩ		
3088	DCI_R	R DCI Curr		0.1mA		
3089	DCI_S	S DCI Curr		0.1mA		
3090	DCI_T	T DCI Curr		0.1mA		
3091	GFCI	GFCI Curr		1mA		
3092	Reserved					

3093	Temp1	Inverter temperature		0.1℃	
3094	Temp2	The inside IPM in inverter temperature		0.1℃	
3095	Temp3	Boost temperature		0.1℃	
3096	Temp4	Reserved		0.1℃	
3097	Temp5	Commmunication broad temperature		0.1℃	
3098	P Bus Voltage	P Bus inside Voltage		0.1V	
3099	N Bus Voltage	N Bus inside Voltage		0.1V	
3100	IPF	Inverter output PF now			0-20000
3101	RealOPPercent	Real Output power Percent		1%	1~100
3102	OPFullwatt H	Output Maxpower Limited		0.1W	Output Maxpower Limited
3103	OPFullwatt L				
3104	StandbyFlag	Inverter standby flag		bitfield	bit0:turn off Order；bit1:PV Low；bit2:AC Volt/Freq out of scope；bit3~bit7：Reserved
3105	Fault code	Inverter fault code			
3106	Warning code	Inverter Warning code			
3107	Systemfault word0	System fault word0		bitfield	
3108	Systemfault word1	System fault word1		bitfield	
3109	Systemfault word2	System fault word2		bitfield	
3110	Systemfault word3	System fault word3		bitfield	
3111	Systemfault word4	System fault word4		bitfield	
3112	Systemfault word5	System fault word5		bitfield	
3113	Systemfault word6	System fault word6		bitfield	
3114	Systemfault word7	System fault word7		bitfield	
3115	inv start delay time	inv start delay time		1S	inv start delay time
3116	Reserved				
3117	Reserved				

3118	BDC_OnOffState	BDC connect state			0:No BDC Connect 1:BDC1 Connect 2:BDC2 Connect 3:BDC1+BDC2 Connect
3119	DryContactState	Current status of DryContact			Current status of DryContact 0: turn off; 1: turn on;
3120	Reserved				
3121	Reserved				
3122	Reserved				
3123	Reserved				
3124	Reserved				
3125	Edischr_today H	Today discharge energy		0.1kWh	Today discharge energy
3126	Edischr_today L				
3127	Edischr_total H	Total discharge energy		0.1kWh	Total discharge energy
3128	Edischr_total L				
3129	Echr_today H	Charge energy today		0.1kWh	Charge energy today
3130	Echr_today L				
3131	Echr_total H	Charge energy total		0.1kWh	Charge energy total
3132	Echr_total L				
3133	Eacchr_today H	Today energy of AC charge		0.1kWh	Today energy of AC charge
3134	Eacchr_today L				
3135	Eacchr_total H	Total energy of AC charge		0.1kWh	Total energy of AC charge
3136	Eacchr_total L				
3137	Reserved				
3138	Reserved				
3139	Reserved				
3140	Reserved				
3141	Reserved				
3142	Reserved				
3143	Reserved				
3144	Priority	Word Mode			0 LoadFirst 1

						BatteryFirst 2 GridFirst
3145	EPS Fac	UPS frequency			0.01Hz	
3146	EPS Vac1	UPS phase R output voltage			0.1V	
3147	EPS Iac1	UPS phase R output current			0.1A	
3148	EPS Pac1 H	UPS phase R output power			0.1VA	
3149	EPS Pac1 L					
3150	EPS Vac2	UPS phase S output voltage			0.1V	
3151	EPS Iac2	UPS phase S output current			0.1A	
3152	EPS Pac2 H	UPS phase S output power			0.1VA	
3153	EPS Pac2 L					
3154	EPS Vac3	UPS phase T output voltage			0.1V	
3155	EPS Iac3	UPS phase T output current			0.1A	
3156	EPS Pac3 H	UPS phase T output power			0.1VA	
3157	EPS Pac3 L					
3158	EPS Pac H	UPS output power			0.1VA	
3159	EPS Pac L					
3160	Loadpercent	Load percent of UPS ouput			0.10%	
3161	PF	Power factor			0.1	
3162	DCV	DC voltage			1mV	
3163	Reserved					
3164	Reserved					
3165	Reserved					
3166	SysState_Mode	System work State and mode 高 8 位表示模式； 0：No charge and discharge； 1：charge； 2：Discharge； 低 8 位表示状态； 0: StandbyStatus; 1: NormalStatus; 2: FaultStatus 3：FlashStatus;				BDC1
3167	FaultCode	Storge device fault code				
3168	WarnCode	Storge device warning code				
3169	Vbat	Battery voltage			0.01V	
3170	Ibat	Battery current			0.1A	
3171	SOC	State of charge Capacity			1%	
3172	Vbus1	BUS1 voltage			0.1V	

3173	Vbus2	BUS2 voltage		0.1V	
3174	Ibb	BUCK-BOOST Current		0.1A	
3175	Illc	LLC Current		0.1A	
3176	TempA	Temperture A		0.1℃	
3177	TempB	Temperture B		0.1℃	
3178	Pdischr H	Discharge power		0.1W	
3179	Pdischr L				
3180	Pchr H	Charge power		0.1W	
3181	Pchr L				
3182	Edischr_total H	Discharge total energy of storge device		0.1kWh	
3183	Edischr_total L				
3184	Echr_total H	Charge total energy of storge device		0.1kWh	
3185	Echr_total L				
3186	Reserved	Reserved			
3187	BDC1_Flag	BDC mark (charge and discharge, fault alarm code) Bit0: ChargeEn; BDC allows charging Bit1: DischargeEn; BDC allows discharge Bit2~7: Resvd; reserved Bit8~11: WarnSubCode; BDC sub-warning code Bit12~15: FaultSubCode; BDC sub-error code			
3188	Reserved				
3189	SysState_Mode	System work State and mode 高 8 位表示模式： 0：No charge and discharge； 1：charge； 2：Discharge； 低 8 位表示状态： 0: StandbyStatus; 1: NormalStatus; 2: FaultStatus 3：FlashStatus；			
3190	FaultCode	Storge device fault code			
3191	WarnCode	Storge device warning code			BDC2
3192	Vbat	Battery voltage		0.01V	
3193	Ibat	Battery current		0.1A	
3194	SOC	State of charge Capacity		1%	

3195	Vbus1	BUS1 voltage		0.1V	
3196	Vbus2	BUS2 voltage		0.1V	
3197	Ibb	BUCK-BOOST Current		0.1A	
3198	Illc	LLC Current		0.1A	
3199	TempA	Temperture A		0.1℃	
3200	TempB	Temperture B		0.1℃	
3201	Pdischr H	Discharge power		0.1W	
3202	Pdischr L				
3203	Pchr H	Charge power		0.1W	
3204	Pchr L				
3205	Edischr_total H	Discharge total energy of storge device		0.1kWh	
3206	Edischr_total L				
3207	Echr_total H	Charge total energy of storge device		0.1kWh	
3208	Echr_total L				
3209	reserved	reserved			
3210	BDC2_Flag	BDC mark (charge and discharge, fault alarm code) Bit0: ChargeEn; BDC allows charging Bit1: DischargeEn; BDC allows discharge Bit2~7: Resvd; reserved Bit8~11: WarnSubCode; BDC sub-warning code Bit12~15: FaultSubCode; BDC sub-error code			
3211	Reserved				
3212	BMS_Status	Status from BMS	R	1	
3213	BMS_Error	Error information from BMS	R	1	
3214	BMS_WarnInfo	Warning information from BMS	R	1	
3215	BMS_SOC	SOC from BMS	R	1%	
3216	BMS_BatteryVolt	Battery voltage from BMS	R	0.01V	
3217	BMS_BatteryCurr	Battery current from BMS	R	0.01A	
3218	BMS_BatteryTemp	Battery temperature from BMS	R	0.1℃	
3219	BMS_MaxCurr	Max. charge/discharge current from BMS (pylon)	R	0.01A	
3220	BMS_DeltaVolt	Delta V from BMS	R	0.01A	
3221	BMS_CycleCnt	Cycle Count from BMS	R	1	

3222	BMS_SOH	SOH from BMS	R	1	
3223	BMS_ConstantVolt	CV voltage from BMS	R	0.01V	
3224	BMS_BMSInfo	BMSInformation from BMS	R	1	
3225	BMS_PackInfo	Pack Information from BMS	R	1	
3226	BMS_UsingCap	Using Cap from BMS	R	1	
3227	BMS_FW		R	1	
3228	BMS_MCUVersion	MCU Software version from BMS	R	1	
3229	BMSCommType	BMS Communication Type			BMS Communication Type 0: RS485; 1: CAN;
3230 ~ 3233	Reserved				
3234 ~ 3249	Debug data	Debug data			

&*1:   Inverter fault code Bit:

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: "A1 B0 D0 T0 PF U1 M5 S1" or "1000F151"

$$Ax=(A\&0XF00000000)>>28$$
$$Bx=(A\&0XF0000000)>>24$$
$$Dx=(A\&0XF000000)>>20$$
$$Tx=(A\&0XF00000)>>16$$
$$Px=(A\&0x00F000)>>12$$
$$Ux=(A\&0x000F00)>>8$$
$$Mx=(A\&0x0000F0)>>4$$
$$Sx=(A\&0x00000F)$$

&*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
……		

&*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: Inverter fault code and warning code

Fault code		Warning code	
0x00000001	\	0x0001	Fan warning
0x00000002	Communication error	0x0002	String communication abnormal
0x00000004	\	0x0004	StrPIDconfig Warning
0x00000008	StrReverse or StrShort fault	0x0008	\
0x00000010	Model Init fault	0x0010	DSP and COM firmware unmatch
0x00000020	Grid Volt Sample diffirent	0x0020	\
0x00000040	ISO Sample diffirent	0x0040	SPD abnormal
0x00000080	GFCI Sample diffirent	0x0080	GND and N connect abnormal
0x00000100	\	0x0100	PV1 or PV2 circuit short
0x00000200	\	0x0200	PV1 or PV2 boost driver broken
0x00000400	\	0x0400	\
0x00000800	\	0x0800	\
0x00001000	AFCI Fault	0x1000	\
0x00002000	\	0x2000	\
0x00004000	AFCI Module fault	0x4000	\
0x00008000	\	0x8000	\
0x00010000	\		
0x00020000	Relay check fault		
0x00040000	\		
0x00080000	\		
0x00100000	\		
0x00200000	Communication error		
0x00400000	Bus Voltage error		
0x00800000	AutoTest fail		
0x01000000	No Utility		
0x02000000	PV Isolation Low		
0x04000000	Residual I High		
0x08000000	Output High DCI		
0x10000000	PV Voltage high		
0x20000000	AC V Outrange		
0x40000000	AC F Outrange		
0x80000000	TempratureHigh		

&*9 Warning Value

	Warning Value 1	Warning Value 2	Warning Value 3
0x0001	String1abnormal	PV1ShortCircuit	AC SPD abnormal
0x0002	String2abnormal	PV2ShortCircuit	DC SPD abnormal
0x0004	String3abnormal	PV3ShortCircuit	
0x0008	String4abnormal	PV4ShortCircuit	
0x0010	String5abnormal	PV5ShortCircuit	
0x0020	String6abnormal	PV6ShortCircuit	
0x0040	String7abnormal	PV7ShortCircuit	
0x0080	String8abnormal	PV8ShortCircuit	
0x0100	String9abnormal	BT1DriverFault	
0x0200	String10abnormal	BT2DriverFault	
0x0400	String11abnormal	BT3DriverFault	
0x0800	String12abnormal	BT4DriverFault	
0x1000	String13abnormal	BT5DriverFault	
0x2000	String14abnormal	BT6DriverFault	
0x4000	String15abnormal	BT7DriverFault	
0x8000	String16abnormal	BT8DriverFault	

&*11: Inverter Model: A , could be show: "S0A D01 B01 T06 P0F U01 M03E8" or "0A0101060F0103E8"

$$Sx=(A\&0XFF00000000000000)>>56$$
$$Dx=(A\&0X00FF000000000000)>>48$$
$$Bx=(A\&0X0000FF0000000000)>>40$$
$$Tx=(A\&0X000000FF00000000)>>32$$
$$Px=(A\&0x00000000FF000000)>>24$$
$$Ux=(A\&0x0000000000FF0000)>>16$$
$$Mx=(A\&0x000000000000FFFF)$$

HybridAbnoram/Fault/warning bit definition
(Abnormal:record event for debug,continueworking;fault:record event and show for debug,stopworking;Warning:record event and show,continue working)

Word definition		Bit definition		comment
System fault word0	Byte0	MasterForceINVFault	0.	M3 on/off control
		MasterForceSPFault	1.	
		BusVoltHigh_TZ	2.	restart PWM
		BusVoltHigh_ISR	3.	restartPWM
		reserved	4.	
		reserved	5.	
		reserved	6.	

		reserved	7.	
	Byte1	GridZClossFault	8.	Grid side abnormal
		reserved	9.	
		reserved	10.	
		GFCIHigh	11.	
		GridR_VFault	12.	
		GridS_VFault	13.	
		GridT_VFault	14.	
		GridFFault	15.	
System fault word1	Byte2	RelayFault	0.	Grid side abnormal
		GFCIDamage	1.	
		GridR_VLowFault	2.	
		GridR_VHighFault	3.	
		GridS_VLowFault	4.	
		GridS_VHighFault	5.	
		GridT_VLowFault	6.	
		GridT_VHighFault	7.	
	Byte3	INVCurrOCP_ISR	8.	Grid side abnormal
		INVCurrOCP_TZ	9.	
		DCIHigh	10.	
		reserved	11.	
		INVR_CurrOCP_Rms	12.	
		INVS_CurrOCP_Rms	13.	
		INVT_CurrOCP_Rms	14.	
		NoUtility	15.	
System fault word2	Byte4	GridFLowFault	0.	Grid side abnormal
		GridFHighFault	1.	
		GridVolt_Unbalance_Fault	2.	
		AC_PLL_Fault	3.	
		OverLoadFault	4.	
		reserved	5.	
		reserved	6.	
		reserved	7.	
	Byte5	EPS_LineVoltR_Loss	8.	EPS side abnormal
		EPS_LineVoltS_Loss	9.	
		EPS_LineVoltT_Loss	10.	
		reserved	11.	
		reserved	12.	
		reserved	13.	
		reserved	14.	
		reserved	15.	

System fault word3	Byte6	BatTerminalReversed	0.	BAT Side abnormal
		~~BatTerminalOpen~~ <mark>BMS Battery Open</mark>	1.	
		BatteryVoltageLow	2.	
		~~BatteryVoltageHigh~~	3.	
		reserved	4.	
		reserved	5.	
		reserved	6.	
		reserved	7.	
	Byte7	reserved	8.	BAT Side abnormal
		reserved	9.	
		reserved	10.	
		reserved	11.	
		reserved	12.	
		reserved	13.	
		reserved	14.	
		reserved	15.	
System fault word4	Byte8	reserved	0.	PV Side Abnormal
		reserved	1.	
		reserved	2.	
		reserved	3.	
		reserved	4.	
		PV1_VoltLowWarn	5.	
		PV2-VoltLowWarn	6.	
		reserved	7.	
	Byte9		8.	PV Side Abnormal
			9.	
			10.	
		reserved	11.	
		reserved	12.	
		reserved	13.	
		reserved	14.	
		reserved	15.	
System fault word5	Byte10	NEDetectFault	0.	Sytem fault
		PVISOFault	1.	
		reserved	2.	
		BusVoltHighFault_ISR	3.	
		BusSampleFault	4.	
		UHCTFault	5.	
		AComFault	6.	
		BComFault	7.	

	Byte11	~~BusVoltHighFault_TZ~~	8.	
		AuotTestFault	9.	
		~~DCIHigh~~	10.	
		NTCOpenFault	11.	Sytem fault
		reserved	12.	
		BBHeatsink_TempOver	13.	
		BBOCP_FaultISR	14.	
		BBOCP_FaultTZ	15.	
System fault word6	Byte12	PV1_VoltHighFault	0.	
		PV2_VoltHighFault	1.	
		BTHeatsink_Overtemp	2.	
		INVHeatsink_Overtemp	3.	
		reserved	4.	Sytem fault
		reserved	5.	
		reserved	6.	
		reserved	7.	
	Byte13	BoostDriver1Warn	8.	
		BoostDriver2Warn	9.	
		WARN104	10.	
		PV1_ShortFault	11.	
		PV2_ShortFault	12.	System warning
		Meter Comm Loss	13.	
		PairingTimeOut	14.	
		CT LN Reversed	15.	
	Byte14	BMS COM Fault	0.	
		BMS Error: xxx	1.	
		~~Battery reversed~~	2.	
		BAT NTC Open	3.	
		SS Timeout	4.	
		Bat voltage low	5.	
		Bat T Outrange	6.	
System fault word6		BATOutput_Overload	7.	
	Byte15	reserved	8.	
		reserved	9.	
		reserved	10.	
		reserved	11.	
		reserved	12.	
		reserved	13.	
		reserved	14.	
		reserved	15.	
System fault word7		reserved		

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;