MODBUS RTU three-phase
energy storage communication
protocol

Change Log

Version number	Change content	Responsible person	Change Date
V100	Initial Version	Liu Shengli	2020.09.16

1. Overview

This protocol applies to the communication protocol between our three-phase energy storage inverter and the supervisor monitoring and DSP. MODBUS RTU is used
Communication protocol. This protocol allows real-time reading of inverter operation information and control operation of the inverter.

2. Physical Interface

2.1. **RS485/RS232**, asynchronous transceiver mode, master-slave mode, fixed baud rate.

---- baud rate: 9600bps
---- Parity check bit: None
---- data bits: 8
---- stop bit: 1

2.2. Inter-frame interval time requirement

3. Data frame format

Slave Address	Function code	Data	CRC Check
8-Bits	8-Bits	Nx8-Bits	16-Bits

Slave Address field: is the corresponding slave address, must match with the slave address of the inverter.

Function code field: Function code, currently only 03H, 10H function code is open.

Function code(Hex)	Chinese Name	Register Address	Function
02H	Read switch input status		Read the contents of the fault message register
03H	Read Holding Register	0~59/500~2000	Read setting register content
04H	Read input register		Read the contents of the inverter message
05H	Write a single coil		Switching setting function
06H	Write single holding register		Set single-byte function
10H	Write multiple holding registers	60-499	Set multi-byte function

Data field: including start register address, data length, number of data
bytes, data content. All of them are high byte first and low byte second.

CRC Check field: CRC table check mode, low byte in front and high byte at the end.

4. Handling of error messages and data

Slave response (hexadecimal system).

Slave Address	Function code	Error code	CRC Check	
			Low Byte	High Byte
xx	xx|0x80	xx	xx	xx

When the inverter communication module detects an error other than a CRC code error, it must send a message back to the host with the highest position of the function code being 1, i.e. 128 added to the function code sent by the host.

The inverter communication module responds to the error code sent back.

0x01 Illegal function codes Server does not understand function codes

0x02 Illegal data address Related to request

0x03 Illegal data values Related to the request

0x04 Service fault Inverter communication module cannot take out data fault during execution

5. Detailed Protocol Description

0-59 Register address is readable register type, **0x03** function code.

60-499 Register address is read/write register type, **0x10** function code.

500-2000 Register address is readable register type, **0x03** function code.

5.1. 03 Read intrinsic property area, corresponding to function code **0x03**, address range **0~59**

Addr	Register meaning	R/W	data range	unit	note
000	Equipment Type Device type	R			0X0200　Stringers inverter 0X0300 Single-phase energy storage machine hybird 0X0400　Micro Inverter MI microinverter 0X0500　three-phase energy storage machine phase3 hybird
001	Modbus address	R	[1,247]		
002	Communication Agreement Version Communication protocol version	R	'0'~'9'; 'A'~'Z'		The version of this protocol to which the firmware adheres, e.g. 0x 0102 Represents version 1.2
003	SN byte 01 SN byte 02	R	'0'~'9'; 'A'~'Z'		The serial number is ten ASCII characters, If "AH12345678", Byte 01 is 0x41 (A), The 02nd byte is 0x48 (H), ... The 09th byte is 0x37 (7), The tenth byte is 0x38 (8).
004	SN byte 03 SN byte 04	R	'0'~'9'; 'A'~'Z'		
005	SN byte 05 SN byte 06	R	'0'~'9'; 'A'~'Z'		
006	SN byte 07 SN byte 08	R	'0'~'9'; 'A'~'Z'		
007	SN byte 09 SN byte 10	R	'0'~'9'; 'A'~'Z'		
008	Power Rating Rated Power	R	0x0000		
009	Reserved words undefined	R	0x0000		

010	Reserved words undefined	R			
011	Control board auxiliary microcontroller software version number Assistant program version	R	0XFFFF		Bit0-7 bootloader software Bit8-15 Assistant program
	Control board bootloader version number bootloader software version				
012	Reserved undefine	R			
013	Reserved undefine	R			
014	Control Board Firmware Version -Field 2 Control panel　　panel firmware version-2	R			
015	**Control Board Firmware Version -Master Version** Control panel　　panel firmware master version	R			
016	Communication Board Firmware Version-Field 1 Comm　panel firmware version-1	R			
017	Communication Board Firmware Version-Field 2 Comm　panel firmware version-2	R			
018	**Communication Board Firmware Version - Master Version** Comm　　panel firmware master version	R			
019	Type of safety regulations Safety type	R			
020	Rated power low word Rated power low word	R		0.1W	
021	Rated power high word Rated power high word	R		0.1W	

Addr	Register meaning	R/W	data range	unit	note
022	Number of MPPT paths and phases MPPT number and phases	R	[1,8]/[1,3]		MI0x0503: five-mppts three-phase
023	Grid-connected voltage levels/Rated Grid Voltage	R	[0-3]		0: 127/220V1: 220/380V
024					
025	Reserved SN byte 01 Reserved SN byte 02				
026	Reserved SN byte 03 Reserved SN byte 04				
027	Reserved SN byte 05 Reserved SN byte 06				
028	Reserved SN byte 07 Reserved SN byte 08				
029	Reserved SN byte 09				
030	Reserved SN byte 10				
031					
059					

5.1. 10 The read/write variable attribute area, corresponding to the function code 0x10.

Addr	Register meaning	R/W	data range	unit	note
60	Remote Lock Enable Remote Lock	R/W			0x0002 Shutdown turn off 0x0000 Power on turn on
61	Power-on self-test time Self-check time	R/W	[0,1000]	S	MI
	System time byte 1 system timebyte 01	R/W	[0,255]	Year Year	MI based on the year 20 00 Based on the year 2000

62	System time byte 2 system timebyte 02	R/W	[1,12]	Month Month	
63	System time byte 3 system timebyte 03	R/W	[1,31]	Day Day	
63	System time byte 4 system timebyte 04	R/W	[0,23]	Time Hour	
64	System time byte 5 system timebyte 05	R/W	[0,59]	Minutes Minute	
64	System time byte 6 system timebyte 06	R/W	[0,59]	seconds Sec	
65	Lower limit of insulation resistance insulation Minimum impedance	R/W	[100,20000]	0.1KΩ	
66	Reserved Undefine				
67	Reserved Undefine				
68	Reserved Undefine				
69	Reserved Undefine				
70	Reserved Undefine				
71	Reserved Undefine				
72	Reserved Undefine				
73	Reserved Undefine				
74	Correspondence address Communication address	R	0x0000	-	
75	Communication baud rate Communication baud rate MI:Zigbee or PLC	R	0x0000	-	
76	Reserved Undefine	R/W			
77	Active power regulation Active power regulation	R/W	[0,1200]	0.1% / 1%	For example, 800 means adjust to 80.0% MI If 800, adjust to 80.0%
78	Reactive power regulation Reactive power regulation	R/W	[0,1200]	0.1%	For example, 800 means adjust to 80.0%. If 800, adjust to 80.0%

79	Apparent power regulation Apparent power regulation	R/W	[0,1200]	0.1%	For example, 800 means adjust to 80.0%. If 800, adjust to 80.0%
80	Switching Enable Switch on and off enable	R/W	[0,1]	-	0: Shutdown 1: Power on MI 2: Power off 0: power off 1: power on
81	Restore factory enable Factory reset enable	R/W	[0,1]		0: disable 1: enable
82	Self-check time Self-checking time	R/W	[0,1]	-	0-360 seconds
83	Island protection enablement Island protection enable	R/W	[0,1]		0: disable 1: enable
84	MPPT number MPPT number	R/W	[0,1]	-	0: disable 1: enable
85	GFDI Enable GFDI enable	R/W	[0,1]		0: disable 1: enable
86					
87	RISO Enable RISO enable	R/W	[0,1]		0: disable 1: enable
88	Grid-connected standards GridStandard	R/W	[0,20]		1, China 2, Brazil 3, India
					4, EN50438 5, Other
89					
90	Low voltage crossing enablement Low voltage across enable				0: disable 1: enable
91	Control board EEPROM initial enable MCU-EEPROM initial enabled	R/W	[0,2]	-	0: work normal work normal 1: Initialize the control boardEEPROM initmcu eeprom
92	Communication board EEPROM initial enable Comm-EEPROM initial enabled	R/W			0: normal work normal 1: Initialize the communication board EEPROM init comm eeprom

93	Control board test control commands Factory only				Bit0 Test enable=1 if use later bit Bit1 Open all fans of the inverter open all fan Bit4 Open Gen singal relay open Gen singal relay
94	Communication board test control command Factory only	R/W	[0,3]	-	Bit0 Test enable=1 if use later bit Bit2 Flash all LEDs of the display board, honey, backlight, display red, yellow and blue Flash display board for all LEDs, honey maker, backlight, display red, yellow and blue Bit3 Open lithium battery interface test Bit5 Restart LCD program Restart lcd
95					
96	Power generation correction factor PowerWH Factor	R/W		-0.01	100mean 1 111 mean 1.11
97	Solar input is SPU TEST MODE				
98	Battery charging type Control Mode	R/W	-	-	0x0000Lead-Battery, four-stage charging method 0x0001Lithium battery
99	Equalization V	R/W	[3800,6100]	0.01V	1480 means 14.8v
100	Absorption V	R/W	[3800,6100]	0.01V	1440 means 14.4v
101	Float V	R/W	[3800,6100]	0.01V	1440 means 14.4v
102	Battery Capacity Batt Capacity	R/W	[0,2000]	1 Ah	200 means 200AH
103	Empty_v	R/W		0.01V	
104	Minimum limit starting power ZeroExport power	R/W			
105	Balanced charging is performed once every few days Equalization day cycle	R/W	[0 90]	Day	
106	Balanced execution time Equalization time	R/W	[0 20]	0.5Hour	Resolution 0.5 hours Resolution 0.5 h [0-20] corresponds to 0- 10 hours

					But the sending MCU is [0-100]
107	Temperature compensation value TEMPCO	R/W	[0,50]	1mV/°C	int with positive and negative Signed int
108	Maximum battery charging current Max A Charge	R/W	[0,185]	1A	0-185A
109	Maximum battery discharge current Max A discharge	R/W	[0,185]	1A	0-185A
110	Reserved undefined	R/W			
111	Battery work according to voltage or capacity battery operates according to voltage or capacity	R/W			According to the voltage According to the capacity 2　　No battery no battery
112	Lithium battery wake-up flag bit Lithium battery wake up sign bit	R/W			0　enabled 1　Disable
113	Battery internal resistance value batteryresistance value	R/W	[0,6000]	mΩ	
114	Battery charging efficiency Battery charging efficiency	R/W	[0-100]	0.1%	983 means 98.3% 983 is 98.3%
115	Battery Capacity ShutDown battery capacity ShutDown	R/W	[0,100]	1%	Low volume cut-off point Low capacity cutoff point
116	Battery CapacityRestart battery capacityRestart	R/W	[0,100]	1%	Protected recovery points Protection recovery point
117	Battery Capacity LowBatt battery capacityLowBatt	R/W	[0,100]	1%	
118	Battery Voltage ShutDown battery voltageShutDown	R/W	[3800,6100]	0.01V	Low protection point cutoff 41V Low protection point cutoff 41V
119	Battery VoltageRestart battery voltageRestart	R/W	[3800,6100]	0.01V	Reboot /recover 52V
120	Battery voltage LowBatt battery voltageLowBatt	R/W	[3800,6100]	0.01V	Discharge Depth 46V Discharge depth 46V

121	Maximum generator runtime Maximum operating time of generator			0.1 hours	120 means 12 hours 120 is 12 hours
122	Generator cooling time Generator cooling time			0.1 hours	120 means 12 hours 120 is 12 hours
123	Generator charging start voltage point Generator charging Starting voltage point	R/W	[0000 6300]	0.01V	Battery voltage is less than this value Generator turns on charging The battery voltage is less than this value
124	Generator charging and starting capacity point Generator charging starting capacity point	R/W	[0000 6300]	1%	Battery capacity less than this value generator on charging The battery capacity is less than this value
125	Generator to battery charging current Generator charges the battery current	R/W	[0000 185]	1A	Generator to battery charging current The generator charges the battery
126	Utility charging start voltage point Grid charging Start voltage point o	R/W	[0000 6300]	0.01v	
127	Utility charging start capacity point Grid charging charging start capacity point	R/W	[0000 6300]	1%	
128	Utility charging current to the battery Grid chargethe battery current	R/W	[0000 185]	1A	Utility charging current to the battery Grid chargethe battery current
129	Generator charging enable Generator is charged to enable	R/W			
130	Utility charging enable Gridis charged to enable	R/W			
131	AC couple Frequency limit setting	R/W	5000-6500		5000-6500
132	Forced on generator as load function Force on generator as load function	R/W			The prerequisite is that register 235 is enabled 1 The premise is that register 234 has enabled 1 0 Do not force 1 force

133	Generator input as load output enable generator input is enabled as the load output	R/W			0 Only Gen use as generator input 1 Smart load output only smart load output 2 Enable as inverter input only microinverter input
134	Generator load OFF voltage SmartLoad OFF batt Voltage	R/W	[3800 6300]	0.01V	
135	Generator load OFF power SmartLoad OFF batt	R/W	[0000 100]	1%	
136	Generator load ON voltage SmartLoad ON batt Voltage	R/W	[3800 6300]	0.01V	
137	Generator load ON power SmartLoad ON batt	R/W	[0000 100]	1%	
138	Output voltage level setting	R/W			0　　Indicates 220V means 220V
	Output voltage level setting				1　　Indicates 230V means 230V 2　　Indicates 240V means 240V 3　　Indicates 120V means 120V 4　　133VAC
139	Minimum solar power to turn on the generator minimum solar power required to start a generator	R/W	[0,8000]	1W	
140	Generator grid connection signal Gen Grid Signal On				
141	Energy management model				Bit0-110 Battery priority mode battery first mode 11 Load priority mode load first mode Bit2-3　　Represents passive grid-connected power balance function 10 Do not turn on colse 11 Open open Bit4-5　indicates active grid-connection power balance function Represents active grid-connection power balance function 10 Do not turn on close 11 Open open

142	limit control function limit control function	R/W		0/1	0x00 E n a b l i n g power sales sell electricity enabled 0x01 Enabled built-in built-in-abled 0x02 Enabled external extraposition enabled
143	Limit the maximum power output of grid-connected of the grid connection	R/W	[0,8000]	1W	Represents total power Represents total power
144	External current sensor direction External current Sensor clamp phase	R/W	[xx,00]	1W	[11][12]
145	Photovoltaic selling electricity Solar sell	R/W			0x00 photovoltaic does not sell electricity solarDon't sell 0x01 light solar sell
146	Advanced peak and valley reduction function enabled Time of of Use Selling enabled	R/W			Bit00 disable 1 enable Bit1 Monday 0-disable 1-enable Bit2 Tuesday
					...... Bit7 Sunday
147	Three-phase ABC grid phase sequence setting Grid Phase	R/W			0 0 120 240 1 0 240 120
148	Sell electricity mode time point 1 Sell mode time point 1	R/W	[0000 2359]		2359 indicates time 23:59 2359 means time 23:59
149	Sell mode time point 2 Sell mode time point 2	R/W	[0000 2359]		Time

150	Sell electricity mode time point 3 Sell mode time point 3	R/W	[0000 2359]		
151	Sell electricity mode time point 4 Sell mode time point 4	R/W	[0000 2359]		
152	Sell electricity mode time point 5 Sell mode time point5	R/W	[0000 2359]		
153	Sell electricity mode time point 6 Sell mode time point6	R/W	[0000 2359]		
154	Sell power mode time point 1 power Sell mode time point 1	R/W	[0000 8000]	1W	Affected by the maximum discharge power of the battery
155	Sell power mode time point 2 power Sell mode time point 2	R/W	[0000 8000]	1W	Power
156	Sell power mode time point 3 power Sell mode time point 3	R/W	[0000 8000]	1W	
157	Sell power mode time point 4 Power Sell mode time point 4	R/W	[0000 8000]	1W	
158	Sell power mode time point 5 Power Sell mode time point 5	R/W	[0000 8000]	1W	
159	Sell power mode time point 6 Power Sell mode time point 6	R/W	[0000 8000]	1W	
160	Sell Power Mode Time Point 1 Voltage Sell mode time point 1	R/W	[0000 6300]	0.01V	Affected by battery voltage Is affected by the battery voltage
161	Sell power mode time point 2 Voltage Sell mode time point 2	R/W	[0000 6300]	0.01V	Voltage
162	Sell power mode time point 3 Voltage Sell mode time point 3	R/W	[0000 6300]	0.01V	
163	Sell power mode time point 4 Voltage Sell mode time point 4	R/W	[0000 6300]	0.01V	
164	Sell power mode time point 5 Voltage Sell mode time point 5	R/W	[0000 6300]	0.01V	
165	Sell power mode time point 6 Voltage Sell mode time point 6	R/W	[0000 6300]	0.01V	

166	1 capacity 1 capacity	R/W	[0,100]	1%	Soc
167	2 capacity 2 capacity	R/W	[0,100]	1%	
168	3 capacity 3 capacity	R/W	[0,100]	1%	
169	4 capacity 4 capacity	R/W	[0,100]	1%	
170	5 capacity 5 capacity	R/W	[0,100]	1%	
171	6 capacity 6 capacity	R/W	[0,100]	1%	
172	Time point 1 charging enable Time point 1 charge enable	R/W	[0,1]		Bit0　Indicates grid charging enable grid charging enable Bit1　Indicates generator charging enable gen charging enable
173	Time point 2 charging enable Time point 2 charge enable	R/W	[0,1]		Id.
174	Time point 3 charging enable Time point 3 charge enable	R/W	[0,1]		Id.
175	Time point 4 charging enable Time point 4 charge enable	R/W	[0,1]		Id.
176	Time point 5 charging enable Time point 5 charge enable	R/W	[0,1]		Id.
177	Time point 6 charging enable Time point 6 charge enable	R/W	[0,1]		Id.

178	Control board special function bit 1
	Microinverter export to grid cutoff
		R/W	[0,1]		need two bits control
					-00 no action -01 no action -10 disable -11 enable
					-00Nowork-01Nowork-10Disable-11Enable
					Bit0-1 10:Disable
					          11:enable
					          Bit2-310:Gen peak-shaving disable 11:Gen peak-shaving enable
					Bit4- 5: 10:Grid peak-shaving disable
					          11:Grid peak-shaving enable
					          Bit6-710:On Grid always on disable 11:On Grid always on enable
					          Bit8-910:external relay disable 11:external relay disable
					          Bit10-1110: Loss of lithium battery report fault disable
					          11: Loss of lithium battery report fault enable Loss of lithium battery report fault enable

179	Control board special function bits 2 1,External CT automatic detection direction 2,Forced off-grid	R/W	[0,1]		Bit0-110: External CT auto detect direction disable Externl ct direction check disable 11: enable Bit2-310: Forced off-grid work disable Forced off-grid work disable 11: enable
180	Restoration of grid connection time Restore connection time	R/W	[10,300]		
181	Solar Arc Fault mode on Solar Arc Arc Fault Mode	R/W	[0 1]		0x00 Close 0x01 Open open
182	Grid-connected standards Grid Mode	R/W	[0 1]		0=general standard 1= UL1741&IEE1547 2= CPUC RULE21 3= SRD-UL1741 ......
183	Grid frequency setting Grid Frequency	R/W	[0 1]		0x00 50HZ 0x01 60hz

184	Grid type setting Grid Type Now it is three phase, invalid	R/W	[0 3]		0x00 Single-phase Default 220V Single-phase 240 v / 230 v / 220 v 0x01 indicates two-phase 120V/240V Stands for two-phase 120V/240V 0x02 Represents the three-phase system 208V 120 degrees 120V Represents the three-phase system 208V 120 degrees 120V 0X03120V Single Phase
185	Grid high voltage protection points Grid Vol High	R/W	[1800 2700]	0.1V	
186	Grid low voltage protection points Grid Vol Low	R/W	[1800 2700]	0.1V	
187	Grid frequency high protection point Grid Hz High	R/W	[4500 6500]	0.01Hz	
188	Grid frequency low protection point Grid Hz Low	R/W	[4500 6500]	0.01Hz	
189	Generator connected to grid input The generator is connected to the grid input	R/W	[1 0]		0 disable 1 enabled
190	GEN peak shaving power	R/W	[0 16000]	1w	
191	GRID peak shaving power	R/W	[0 16000]	1w	
192	Smart Load Open Delay	R/W	[1,120]	1Minute	
193	Output PF value setting (active regulation) Output PF value Settings	R/W	[800 1200]		800 indicates adjustment to 80% 1200 marks adjustment to 120% 800 for 80%, 1200 for 120%
194	External Relay Bits External relay bit	R/W	[0 0xFFFF]		Bit0-8 corresponds to 8 relay bits Bit0-8 corresponds to 8 relay bits
195	ARC_facTory_B high ARC_facTory_B high word	R/W	[0,65535]		High and status combinations can be displayed as values High and status combination, with numerical display can be
196	Low Low word	R/W	[0,65535]		
197	ARC_facTory_I High Bit ARC_facTory_I high word	R/W	[0,65535]		
198	Low Low word	R/W	[0,65535]		

199	ARC_facTory_F high ARC_facTory_F high word	R/W	[0,65535]		
200	Low Low word	R/W	[0,65535]		
201	ARC_facTory_D High ARC_facTory_D high word	R/W	[0,65535]		
202	Low Low word	R/W	[0,65535]		
203	ARC_facTory_T High ARC_facTory_T high word	R/W	[0,65535]		
204	Low Low word	R/W	[0,65535]		
205	ARC_facTory_C high ARC_facTory_C high word	R/W	[0,65535]		
206	Low Low word	R/W	[0,65535]		
207	ARC_facTory_Frz high ARC_facTory_Frz high word	R/W	[0,65535]		
208	Low Low word	R/W	[0,65535]		
209	Ups_delay time	R/W		1S	0 is the default 1 1S
210	Charging voltage charging voltage	R/W		0.01V	
211	Discharge voltage discharge voltage	R/W		0.01V	
212	Charging current limit Charging current limiting	R/W		1A	
213	Discharge current limit Discharge current limiting	R/W		1A	
214	Current Capacity real time capacity	R/W		1%	
215	Current Voltage real time voltage	R/W		0.01V	
216	Current Current real time current	R/W		1A	
217	Current Temperature real time temp	R/W		0.1C	1000 corresponds to 0 degrees 1200 means 20.0 degrees 800 means -20.0C 1000 corresponds to 0 degrees 1200 means 20.0 degrees 800 means -20.0C

218	Off-grid charging current limit Max. Maximum charge current limit	R/W		1A	
219	Off-grid discharge current limit Max. Maximum discharge current limiting	R/W			
220	Lithium battery alarm bit Lithium battery Alarm position	R/W			0x0001
221	Lithium battery failure bit Lithium battery fault location	R/W	[0,65535]		
222	Lithium battery mark 2 Lithium battery symbol 2	R/W	[0,65535]		Bit0　　Vacancy Bit1　　Strong impact marks
223	Lithium battery type Lithium battery type	R/W			0x0000　　ZTE Pyrotechnics Delanen Lithium PYLON　　SOLAX General CAN Protocol 0x0001　　Tempstar RS485modbus protocol 0x0002　　KOK Protocol 0x0003　　keith 0X0004 Topology protocol 0X0005　　Painan 485 protocol 0X0006　　Jellyfish 485 protocol 0X0007　　Shinwa 485 protocol 0X0008　　Xinrenen 485 protocol 0X0009　　Tempstar 485 protocol 0X000A Shenggao Electric can protocol
224	Lithium battery SOH Lithium battery SOH				
225					
226					
227	Upgrade LCD test	R/W	[0,1]		
228	Communication board setting function Comm board setting function	R/W			Bit0-1　　Time calibration Bit2-3　　beep Bit4-5　　AM/PM

					Bit6-7Auto dim
					-00 no action no work
					-01 no action no work
					-10 disable disable
					-11 enable enable
229					
230					
231					
232					
233					
234					
235					
236					
237					
238					
239					
240	Access to in-plant preliminary testing procedures	R/W			=12345 Enter
241					
242					
243					
244					
245					
246					
247					
248					
249					
250					
251					
252					
253					
254					
255					
256					
257					
258					
259					
260					
261					
262					
263					
264					
265					

266					
267					
268					
269	Grid1_I				
270	Grid2_I				
271	Grid3_I				
272	Grid_V_L1				
273	Grid_V_L2				
274	Grid_V_L3				
275	Limit1_I				
276	Limit2_I				
277	Limit3_I				
278	PV1_V				
279	PV1_I				
280	PV2_V				
281	PV2_I				
282	INV_A_I				
283	INV_B_I				
284	INV_C_I				
285	INV_A_V				
286	INV_B_V				
287	INV_C_V				
288	BAT_I				
289	BAT_V				
290					
291					
292					
293					
294					
295					
296					
297					
298					
299					
300					
301					
302					
303					
304					
305					
306					
307					
308					

309						
310	Solar does Wind input enable Solar makes Wind input enable	R/W	[0,1]		Bit0	Solar1
					Bit1	Solar2
311	Voltage 1	R/W	[500,5000]	0.1V		
312	Voltage 2	R/W		0.1V		
313	Voltage 3	R/W		0.1V		
314	Voltage 4	R/W		0.1V		
315	Voltage 5	R/W		0.1V		
316	Voltage 6	R/W		0.1V		
317	Voltage 7	R/W		0.1V		
318	Voltage 8	R/W		0.1V		
319	Voltage 9	R/W		0.1V		
320	Voltage 10	R/W		0.1V		
321	Voltage 11	R/W		0.1V		
322	Voltage 12	R/W		0.1V		
323	Current 1	R/W	[0-200]	0.1A		
324	Current 2	R/W		0.1A		
325	Current 3	R/W		0.1A		
326	Current 4	R/W		0.1A		
327	Current 5	R/W		0.1A		
328	Current 6	R/W		0.1A		
329	Current 7	R/W		0.1A		
330	Current 8	R/W		0.1A		
331	Current 9	R/W		0.1A		
332	Current 10	R/W		0.1A		
333	Current 11	R/W		0.1A		
334	Current 12	R/W		0.1A		
335	Reserved Undefine					
336	Parallel 1 Parallel-1					
337	Parallel 2 Parallel-2					
338	Reserved Undefine					
339	Reserved Undefine					
340	Photovoltaic maximum selling power Max Solar Sell Power		R/W	1W		
341	Reserved Undefine					

342	Reserved Undefine				
343	Reserved Undefine				
344	Grid information monitoring methods Grid check from Meter or CT	R/W			BIT00: 0: CT 1 : Meter BIT01: -BIT15: undefine
345					
346					
347	External CT Variable Ratio CT ratio	R/W		30<-> 30:1	U16
348	External Meter CT ratio Meter CT ratio	R/W		30<-> 30:1	U16
349					
350	Input slope control of the Charge loop Positive numbers	R/W	[0-500]	W	Cycle-by-cycle power variation Cycle by cycle power variation
351	Input slope control of the Charge loop Negative numbers	R/W	[0-500]	W	Cycle-by-cycle power variation Cycle by cycle power variation
359	Off-grid overload Voltage less than 180V Duration				
360					
380	California low pressure high pressure through CA_LHVRT enable through CA_LHVRT enable	R/W	[0,1]		0: disable 1: enable
381	CA_HV2	R/W	[1000,3000]		
382	CA_HV1	R/W			
383	CA_LV1	R/W			
384	CA_LV2	R/W			
385	CA_LV3	R/W			
386	CA_HV2_Time	R/W	[0,300]		0 is 0.16S
387	CA_HV1_Time	R/W			
388	CA_LV1_Time	R/W			
389	CA_LV2_Time	R/W			
390	CA_LV3_Time	R/W			

391	California low frequency high frequency Crossover CA_LHFRT enable frequency traverses CA_LHFRT enable	R/W		
392	CA_HF2	R/W	[4500,6500]	0.01Hz
393	CA_HF1	R/W		
394	CA_LF1	R/W		
395	CA_LF2	R/W		
396	CA_HF2_Time	R/W	[0,300]	
397	CA_HF1_Time	R/W		
398	CA_LF1_Time			
399	CA_LF2_Time			
400	California CA_QV Enable CaliforniaCA_ QV enable			
401	CA_QV_V1		[1000,3000]	
402	CA_QV_V2			
403	CA_QV_V3			
404	CA_QV_V4		[-44,+44]	0.01
405	CA_QV_Q1			
406	CA_QV_Q2			
407	CA_QV_Q3			
408	CA_QV_Q4			
409	California CA_FW Enable CaliforniaCA_ FW enable			
410	CA_Fstart			
411	CA_Fstop			
412	California CA_VW Enable California CA_VW enable			
413	CA_Vstart			
414	CA_Vstop			
415	Normal slope of rise Normal upward slope	R/W	[1 100]	1%
416	Soft start rise rate Soft start rise rate	R/W	[1 100]	1%
417	QV Response time	R/W	[0,90]	S
418	VW Response time	R/W	[0,60]	S
419	FW Response time			

5.2. 03 The read-only real-time attribute area, corresponding to the function code is 0x03.

Addr	Register meaning	R/W	data range	unit	note
500	Operation Status run state	R	[0,5]	-	0000 Standby standby 0001 Self-check selfcheck 0002 normal 0003 alarm 0004 fault
501	Inverter grid-side active power generation for the day active power generation of today	R	[-32768,32767]	0.1kWh	
502	Inverter grid-side reactive power generation for the day reactive power generation of today	R	[-32768,32767]	0.1kVarh	
503	Same day grid connection time Grid connection time of today	R	[0,65535]	S	
504	Inverter grid-side total active power generation low word active power generation of total low byte	R	[0,0xFFFFFFFF]	0.1kWh	
505	Inverter grid-side total active power generation high word active power generation of total high byte	R			
506	Inverter grid-side total reactive power generation low word reactive power generation of total low byte				
507	Inverter grid-side total reactive power generation high word reactive power generation of total high byte				

508	~~Inverter status bit 1~~	R			**Debug only** for debugging, meaningless Bit0:Internal fan presence bit; 1 yes 0 no Bit1:External fan presence bit; 1 yes 0 no
509	~~Inverter status bit 1~~	R			**Debug only** for debugging, meaningless
510					
511					
512					
513					
514	Battery charge amount for the day Today charge of the battery			0.1kwh	
515	Battery discharge for the day Today discharge of the battery			0.1kwh	
516	Battery accumulated charge low word Total charge of the battery low byte			0.1kwh	
517	Battery cumulative charge high word Total charge of the battery high byte			0.1kwh	
518	Battery accumulated discharge low word Total discharge of the battery low byte			0.1kwh	
519	Battery cumulative discharge high word Total discharge of the battery high byte			0.1kwh	
520	Electricity purchased by the grid on the same day Day_GridBuy_Power Wh			0.1kwh	
521	Grid power sales for the day Day_GridSell_Power Wh			0.1kwh	
522	Low word for cumulative power purchase from the grid Total_GridBuy_Power Wh_low word			0.1kwh	
523	High word for cumulative power purchase from the grid Total_GridBuy_Power			0.1kwh	

	Wh_high word				
524	Low word for cumulative electricity sales in the grid Total_GridSell_Power Wh_low word			0.1kwh	
525	Cumulative electricity sales of the grid high word Total_GridSell_Power Wh_high word			0.1kwh	
526	Electricity consumption for the day Day_Load_Power Wh			0.1kwh	
527	Cumulative electricity consumption low word Total_Load_Power Wh_low word			0.1kwh	
528	Cumulative electricity consumption high word Total_Load_Power Wh_high word			0.1kwh	
529	Total PV generation for the day Day_PV_Power Wh	R	[0,65535]	0.1kWh	
530	PV-1 power generation for the day Day_PV-1_Power Wh			0.1kWh	
531	PV-2 power generation for the day Day_PV-2_Power Wh			0.1kWh	
532	PV-3 power generation for the day Day_PV-3_Power Wh			0.1kWh	
533	PV-4 power generation for the day Day_PV-4_Power Wh			0.1kWh	
534	Historical PV generation low word Total PV_power Wh_low word	R		0.1kWh	
535	Historical PV generation high word Total PV_power Wh_high word	R		0.1kWh	

536					
537					
538					
539	Daily working hours of generators Generator working hours per day			0.1h	
540	DC Transformer Temperature (DCTransformer) temperature)	R	[0,3000]	0.1° C	Offset 1000
541	Heat sink temperature Heat sink temperature		[0,3000]	0.1° C	
542	Reserved temperature1 undefine		[0,3000]	0.1° C	
543	Reserved temperature2 undefine	R	[0,3000]	0.1° C	
544	Reserved temperature3 undefine	R	[0,3000]	0.1° C	
545					
546					
547					
548	Fault status of communication board Failure status of communication board	R	[0,0xFFFF]		Bit0Flash chip error Bit1time error Bit2EEPROM error
549	MCU test flag bit MCU test flag				Bit0 Arc pull communication sign Bit1 Parallel CAN communication possible Parallel CAN communication
550	LCD test flag bit LCD test flag	R	0x0000		Bit8 Lithium electric interface RS485 Lithium electric interface RS485 Bit9 Lithium electric interface CAN Bit10 key1234 key1234 Bit11 LCD interrupt status lcd interrupt status
551	Switching status Turn off/on status	R			Low 4 bits indicate switching signal 0000 Shutdown power off 0001 Power on power on

552	AC side relay status AC realy status	R			0 off 1 on Bit0INV relay INV relay Bit1 Load relay Reserved undefine Bit2 grid relay Bit3 Generator relay gen relay Bit4 Grid give power to relay
					Bit5 Dry contact
553	Alarm message 1st word Warning message word 1	R	[0,65535]		Bit0: reserved Bit1:Fan failure FAN_WARN Bit2:Grid phase wrong grid phase wrong Bit3:
554	Alarm message 2nd word Warning message word 2	R	[0,65535]		
555	Fault message 1st word Fault information word 1	R	[0,65535]		
556	Fault message 2nd word Fault information word 2	R	[0,65535]		
557	Fault message 3rd word Fault information word 3	R	[0,65535]		
558	Fault message 4th word Fault information word 4	R	[0,65535]		See fault information code table
559	Reserved				
560	Reserved				
561	Commissioning data Debug Data				
	561-583 23 keys in total Test data				
583	Commissioning data Debug Data	R	0x0000		
584	Reserved undefine				
585	Reserved undefine				
586	Battery temperature battery temperature	R	[0,3000]	0.1° C	
587	Battery voltage battery voltage	R		0.01V	
588	Battery power battery capacity	R	[0,100]	1%	

589	Reserved undefined	R			
590	Battery output power Battery output power	R		1W	S16
591	Battery output current Battery output current	R		0.01A	S16
592	Battery capacity after calibration Corrected_AH		[0,3000]	1AH	100 is 100AH
593					
594					
595					
596					
597					
598	Grid side phase voltage A Grid phase voltage A	R		0.1V	
599	Grid phase voltage B Grid phase voltage B	R		0.1V	
600	Grid phase voltage C	R		0.1V	
601	Grid side line voltage AB Grid line voltage AB	R		0.1V	Reserved
602	Grid-side line voltage BC Grid line voltage BC	R		0.1V	
603	Grid side line voltage CA Grid line voltage CA	R		0.1V	
604	Grid-side inner A-phase power A phase power on the inner side of the grid	R		1W	S16
605	Grid-side inner B-phase power B phase power on the inner side of the grid	R		1W	S16
606	Grid-side inner C-phase power C phase power on the inner side of the grid	R		1W	S16
607	Total active power from side to side of the grid	R		1W	
608	Grid-side - Inside total apparent power Grid side - inside total apparent power	R		1W	Reserved
609	Grid-side frequency Grid-side frequency				

610	Grid-side inside current A grid side inner current A	R		0.01A	S16
611	Grid-side inside current B grid side inner current B	R		0.01A	S16
612	Grid-side inside current C grid side inner current C	R		0.01A	S16
613	Off-grid-current A Out-of-grid - current A	R		0.01A	S16
614	Off-grid-current B Out-of-grid - current B	R		0.01A	S16
615	Off-grid-current C Out-of-grid - current C	R		0.01A	S16
616	Grid Out-of-grid - power A	R		1W	S16
617	Off-grid-Power B Out-of-grid -power B	R		1W	S16
618	Grid Out-of-grid - power C	R		1W	S16
619	Off-grid - total active power Out-of-grid -total power	R		1W	S16
620	Off-grid - total apparent power	R		1VA	S16
	Out-of-grid -total apparent power				
621	Grid-connected power factor PF Grid-connected power factor PF	R	R/W	[0,1000]	Real Value*1000

622	Grid-side A-phase power
	Grid side A-phase power
				1W	The following three registers change
					according to the built-in external
					settings
					  The following three registers vary according
					  to the built-in and external Settings

623	Grid-side B-phase power Grid side B-phase power			1W	
624	Grid-side C-phase power Grid side C-phase power			1W	
625	Grid side - total active power Grid side total power			1W	
626					
627	Inverter output phase voltage A Inverter output phase voltage A	R		0.1V	
628	Inverter output phase voltage B Inverter output phase	R		0.1V	

	voltage B				
629	Inverter output phase voltage C Inverter output phase voltage C	R		0.1V	
630	Inverter output phase current A Inverter output phase current A			0.01A	S16
631	Inverter output phase current B Inverter output phase current B			0.01A	S16
632	Inverter output phase current C Inverter output phase current C			0.01A	S16
633	Inverter output phase power A Inverter output phase power A	R		1W	S16
634	Inverter output phase power B Inverter output phase power B	R		1W	S16
635	Inverter output phase power C Inverter output phase power C			1W	S16
636	Inverter output total active power Inverter output total power	R		1W	S16
637	Inverter output total apparent power Inverter output total apparent power			1W	S16
638	Inverter frequency Inverter frequency			0.01Hz	U16
639					
640	UPS load-side phase power A UPS load-side phase power A			1W	U16
641	UPS load-side phase power B UPS load-side phase power B			1W	U16

642	UPS load-side phase power C UPS load-side phase power C			1W	U16
643	UPS load-side total power C UPS load-sidetotal power			1W	U16
644	Load phase voltage A Load phase voltage A	R		0.1V	U16
645	Load phase voltage B Load phase voltage B	R		0.1V	U16
646	Load phase voltage C Load phase voltage C			0.1V	U16
647	Load measurement current A Invalid Load phase current A no use	R		0.01A	S16
648	Load measurement current B Invalid Load phase current B no use	R		0.01A	S16
649	Load measurement current C Invalid Load phase current C no use	R		0.01A	S16
650	Load side phase power A Load phase power A	R		1W	S16
651	Load side phase power B Load phase power B	R		1W	S16
652	Load-side phase power C Load phase power C	R		1W	S16
653	Total active power on the load side Load totalpower	R		1W	S16
654	Total load-side apparent power Reserved Load phase apparent power undefine	R		1W	S16
655	Load frequency Load frequency	R		0.01Hz	
656					
657					
658					
659					
660					
661	Phase voltage of Gen port A Phase voltage of Gen port A			0.1V	
662	Phase voltage of Gen port B Phase voltage of Gen port B			0.1V	
663	Phase voltage of Gen port C			0.1V	

	Phase voltage of Gen port C				
664	Power of Gen port A Phase power of Gen port A	R		1W	
665	Power of Gen port B Phase power of Gen port B			1W	
666	Power of Gen port C Phase power of Gen port C			1W	
667	Total power of Gen port total power of Gen port			1W	
668					
669					
670					
671					
672	PV1 input power PV1 input power	R		1W	
673	PV2 input power PV2 input power	R		1W	
674	PV3 input power PV3 input power	R		1W	
675	PV4 input power PV4 input power	R		1W	
676	DC voltage1 Dc voltage 1	R	[0,65535]	0.1V	
677	DC current1 Dc current 1	R	[0,65535]	0.1A	
678	DC voltage2 Dc voltage 2	R	[0,65535]	0.1V	
679	DC current2 Dc current 2	R	[0,65535]	0.1A	
680	DC voltage3 Dc voltage 3	R	[0,65535]	0.1V	
681	DC current3 Dc current 3	R	[0,65535]	0.1A	
682	DC voltage4 Dc voltage 4	R	[0,65535]	0.1V	
683	DC current4 Dc current 4	R	[0,65535]	0.1A	
	Reserved				
	Reserved				
	Reserved				
1000	Grid information monitoring methods Grid power check mode	R			BIT00: 0: CT 1: Meter BIT01-BIT15: undefine

5.3. 03 Battery read-only area

Addr	Register meaning	R/W	data range	unit	note
2000-2999 is the lithium battery register					
	Battery ID				
	Shengyang Battery				
500	No. 1 1-byte	R	'0'- '9' 'A'- 'Z'		ASCII characters
	No. 1 2 bytes				
501	No. 1 3 bytes	R			
	No. 1 4-byte				
502	No. 1 5 bytes				
	No. 1 6 bytes				
503	No. 1 7 bytes				
	No. 1 8-byte				
504	No. 1 9 bytes				
	No. 1 10 bytes				
505	No. 1 11 bytes				
	No. 1 12-byte				
506	No. 2 1 byte	R	'0'- '9' 'A'- 'Z'		ASCII characters
	No. 2 2-byte				
	No. 2 3 bytes	R			

507	No. 2 4-byte				
508	No. 2 5 bytes				
	No. 2 6 bytes				
509	No. 2 7 bytes				
	No. 2 8-byte				
510	No. 2 9 bytes				
	No. 2 10 bytes				
511	No. 2 11 bytes				
	No. 2 12-byte				
512	No. 3 1 byte	R	'0'- '9' 'A'- 'Z'		ASCII characters
	No. 3 2 bytes				
513	No. 3 3-byte	R			
	3 No. 4 bytes				
514	No. 3 5 bytes				
	No. 3 6 bytes				
515	No. 3 7 bytes				
	No. 3 8-byte				
516	No. 3 9 bytes				
	No. 3 10 bytes				
517	3 No. 11 bytes				
	No. 3 12-byte				
518	No. 4 1 byte	R	'0'- '9' 'A'- 'Z'		ASCII characters
	No. 4 2 bytes				
519	No. 4 3 bytes	R			
	4 No. 4 bytes				
520	4 No. 5 bytes				
	No. 4 6 bytes				
521	No. 4 7 bytes				
	No. 4 8-byte				
522	No. 4 9 bytes				
	No. 4 10 bytes				
523	No. 4 11 bytes				
	No. 4 12-byte				
524	No. 5 1 byte	R	'0'- '9' 'A'- 'Z'		ASCII characters
	No. 5 2 bytes				
525	No. 5 3 bytes	R			
	No. 5 4-byte				
526	5 No. 5 bytes				
	No. 5 6 bytes				
527	No. 5 7 bytes				
	No. 5 8-byte				
528	No. 5 9 bytes				
	No. 5 10 bytes				

529	No. 5 11 bytes				
	No. 5 12-byte				
530	No. 6 1 byte	R	'0'- '9' 'A'-		ASCII characters
	No. 6 2 bytes		'Z'		
531	No. 6 3 bytes	R			
	No. 6 4-byte				
532	No. 6 5 bytes				
	No. 6 6 bytes				
533	No. 6 7 bytes				
	No. 6 8-byte				
534	No. 6 9 bytes				
	No. 6 10 bytes				
535	No. 6 11 bytes				
	No. 6 12-byte				
536	No. 7 1 byte	R	'0'- '9' 'A'-		ASCII characters
	No. 7 2 bytes		'Z'		
537	No. 7 3 bytes	R			
	No. 7 4-byte				
538	No. 7 5 bytes				
	No. 7 6 bytes				
539	No. 7 7 bytes				
	No. 7 8-byte				
540	No. 7 9 bytes				
	No. 7 10 bytes				
541	No. 7 11 bytes				
	No. 7 12-byte				
542	No. 8 1 byte	R	'0'- '9' 'A'-		ASCII characters
	No. 8 2 bytes		'Z'		
543	No. 8 3 bytes	R			
	No. 8 4-byte				
544	No. 8 5 bytes				
	No. 8 6 bytes				
545	No. 8 7 bytes				
	No. 8 8-byte				
546	No. 8 9 bytes				
	No. 8 10 bytes				
547	No. 8 11 bytes				
	No. 8 12-byte				
548	No. 9 1 byte	R	'0'- '9' 'A'-		ASCII characters
	No. 9 2 bytes		'Z'		
549	No. 9 3 bytes	R			
	No. 9 4-byte				
	No. 9 5 bytes				

550	No. 9 6 bytes				
551	No. 9 7 bytes				
	No. 9 8-byte				
552	No. 9 9 bytes				
	No. 9 10 bytes				
553	No. 9 11 bytes				
	No. 9 12-byte				
554	No. 10 1 byte	R	'0'– '9' 'A'– 'Z'		ASCII characters
	No. 10 2 bytes				
555	No. 10 3 bytes	R			
	No. 10 4-byte				
556	No. 10 5 bytes				
	No. 10 6 bytes				
557	No. 10 7 bytes				
	No. 10 8-byte				
558	No. 10 9 bytes				
	No. 10 10 bytes				
559	No. 10 11 bytes				
	No. 10 12 bytes				
560	No. 11 1 Byte	R	'0'– '9' 'A'– 'Z'		ASCII characters
	No. 11 2 bytes				
561	No. 11 3 bytes	R			
	No. 11 4-byte				
562	No. 11 5 bytes				
	No. 11 6 bytes				
563	No. 11 7 bytes				
	No. 11 8-byte				
564	No. 11 9 bytes				
	No. 11 10 bytes				
565	No. 11 11 bytes				
	No. 11 12 bytes				
566	12 No. 1 Byte	R	'0'– '9' 'A'– 'Z'		ASCII characters
	12 No. 2 bytes				
567	12 No. 3 bytes	R			
	12 No. 4 bytes				
568	12 No. 5 bytes				
	12 No. 6 bytes				
569	12 No. 7 bytes				
	12 No. 8 bytes				
570	12 No. 9 bytes				
	12 No. 10 bytes				
571	12 No. 11 bytes				
	No. 12 12-byte				

572	No. 13 1 Byte	R	'0'– '9' 'A'–		ASCII characters
	No. 13 2 bytes		'Z'		
573	No. 13 3 bytes	R			
	No. 13 4-byte				
574	No. 13 5-byte				
	No. 13 6 bytes				
575	No. 13 7 bytes				
	No. 13 8-byte				
576	No. 13 9 bytes				
	No. 13 10 bytes				
577	13 No. 11 bytes				
	No. 13 12 bytes				
578	No. 14 1 byte	R	'0'– '9' 'A'–		ASCII characters
	No. 14 2 bytes		'Z'		
579	No. 14 3-byte	R			
	No. 14 4-byte				
580	14 No. 5 bytes				
	No. 14 6 bytes				
581	14 No. 7 bytes				
	14 No. 8 bytes				
582	No. 14 9 bytes				
	No. 14 10 bytes				
583	14 No. 11 bytes				
	No. 14 12-byte				
584	15 No. 1 Byte	R	'0'– '9' 'A'–		ASCII characters
	No. 15 2 bytes		'Z'		
585	15 No. 3 bytes	R			
	15 No. 4 bytes				
586	15 No. 5 bytes				
	No. 15 6 bytes				
587	15 No. 7 bytes				
	15 No. 8 bytes				
588	No. 15 9 bytes				
	15 No. 10 bytes				
589	15 No. 11 bytes				
	15 No. 12 bytes				
600	PACK1	Module Voltage			0.01V	
601		Module Current			0.1A	
602		Temperater –AVE				1250 mean 25.0℃

603		SOC			0.1	
604		Remain Capacity			0.1AH	
605		Total Capacity			0.1AH	
606		Charge Voltage			0.01V	
607		Charge Current			0.1A	
608		Discharge Current			0.1A	
609		Max Cell V			0.01V	
610		Min Cell V			0.01V	
611		Cycle number			1	
612		Warming			—	
613		Fault			—	
614		Module Voltage				
615		Module Current				
616		Temperater -AVE				
617		SOC				
618		Remain Capacity				
619		Total Capacity				
620	PACK2	Charge Voltage				
621		Charge Current				
622		Discharge Current				
623		Max Cell V				
624		Min Cell V				
625		Cycle number				
626		Warming				
627		Fault				
628		Module Voltage				
629	PACK3	Module Current				

630		Temperater－AVE				
631		SOC				
632		Remain Capacity				
633		Total Capacity				
634		Charge Voltage				
635		Charge Current				
636		Discharge Current				
637		Max Cell V				
638		Min Cell V				
639		Cycle number				
640		Warming				
641		Fault				
642		Module Voltage				
643		Module Current				
644		Temperater－AVE				
645		SOC				
646		Remain Capacity				
647		Total Capacity				
648	PACK4	Charge Voltage				
649		Charge Current				
650		Discharge Current				
651		Max Cell V				
652		Min Cell V				
653		Cycle number				
654		Warming				
655		Fault				

656	PACK5	Module Voltage				
657		Module Current				
658		Temperater -AVE				
659		SOC				
660		Remain Capacity				
661		Total Capacity				
662		Charge Voltage				
663		Charge Current				
664		Discharge Current				
665		Max Cell V				
666		Min Cell V				
667		Cycle number				
668		Warming				
669		Fault				
670	PACK6	Module Voltage				
671		Module Current				
672		Temperater -AVE				
673		SOC				
674		Remain Capacity				
675		Total Capacity				
676		Charge Voltage				
677		Charge Current				
678		Discharge Current				
679		Max Cell V				
680		Min Cell V				

681		Cycle number			
682		Warming			
683		Fault			
684	PACK7	Module Voltage			
685		Module Current			
686		Temperater -AVE			
687		SOC			
688		Remain Capacity			
689		Total Capacity			
690		Charge Voltage			
691		Charge Current			
692		Discharge Current			
693		Max Cell V			
694		Min Cell V			
695		Cycle number			
696		Warming			
697		Fault			
698	PACK8	Module Voltage			
699		Module Current			
700		Temperater -AVE			
701		SOC			
702		Remain Capacity			
703		Total Capacity			
704		Charge Voltage			
705		Charge Current			
706		Discharge Current			

707		Max Cell V			
708		Min Cell V			
709		Cycle number			
710		Warming			
711		Fault			
712	PACK9	Module Voltage			
713		Module Current			
714		Temperater -AVE			
715		SOC			
716		Remain Capacity			
717		Total Capacity			
718		Charge Voltage			
719		Charge Current			
720		Discharge Current			
721		Max Cell V			
722		Min Cell V			
723		Cycle number			
724		Warming			
725		Fault			
726	PACK10	Module Voltage			
727		Module Current			
728		Temperater -AVE			
729		SOC			
730		Remain Capacity			
731		Total Capacity			
732		Charge Voltage			

733		Charge Current				
734		Discharge Current				
735		Max Cell V				
736		Min Cell V				
737		Cycle number				
738		Warming				
739		Fault				
740	PACK11	Module Voltage				
741		Module Current				
742		Temperater-AVE				
743		SOC				
744		Remain Capacity				
745		Total Capacity				
746		Charge Voltage				
747		Charge Current				
748		Discharge Current				
749		Max Cell V				
750		Min Cell V				
751		Cycle number				
752		Warming				
753		Fault				
754	PACK12	Module Voltage				
755		Module Current				
756		Temperater-AVE				
757		SOC				
758		Remain Capacity				

759		Total Capacity				
760		Charge Voltage				
761		Charge Current				
762		Discharge Current				
763		Max Cell V				
764		Min Cell V				
765		Cycle number				
766		Warming				
767		Fault				
768		Module Voltage				
769		Module Current				
770		Temperater -AVE				
771		SOC				
772		Remain Capacity				
773		Total Capacity				
774	PACK13	Charge Voltage				
775		Charge Current				
776		Discharge Current				
777		Max Cell V				
778		Min Cell V				
779		Cycle number				
780		Warming				
781		Fault				
782		Module Voltage				
783		Module Current				
784		Temperater -AVE				

785	PACK14	SOC				
786		Remain Capacity				
787		Total Capacity				
788		Charge Voltage				
789		Charge Current				
790		Discharge Current				
791		Max Cell V				
792		Min Cell V				
793		Cycle number				
794		Warming				
795		Fault				
796		Module Voltage				
797		Module Current				
798		Temperater -AVE				
799		SOC				
800		Remain Capacity				
801		Total Capacity				
802	PACK15	Charge Voltage				
803		Charge Current				
804		Discharge Current				
805		Max Cell V				
806		Min Cell V				
807		Cycle number				
808		Warming				
809		Fault				

5.4. Memory log table

Memory log table					
Addr.	Register Meaning	R/W	Range	Unit	note
1000	Inverter fault information	R			Length range is 500
......		R			
......		R			
1499		R			

5.5. Fault Code

Alarm Code

Error code	Description / Description	Solutions/solutions
W01	Fan failure	
W02	Phase error	

Fault Code

Error code	Description / Description	Solutions/solutions
F07	DC/DC_Softsart_Fault DC/DC Soft Start Fault	DC/DC softstart fault 1. Check the battery fuse; 2. Restart and check whether it is in normal; 3. Seek help from us, if can't go back to noarmal state
F10	AuxPowerBoard_Failure Auxiliary power failure	Auxiliary power supply failure 1. Wait for minutes then check; 2. Remove wifi plug or other communicator; 3. Seek help from us, if can't go back to noarmal state
F13	Working mode change Mode Switching	Inverter work mode changed 1. Wait for a minute and check; 2. Seek help from us, if can't go back to normal state.
F18	AC over current fault of hardware Hardware AC overcurrent	AC side over current fault 1. Please check whether the backup load power and common load power are within the range; 2. Restart and check whether it is in normal; 3. Seek help from us, if can not go back to normal state.

F20	DC over current fault of the hardware Hardware DC overcurrent	DC side over current fault 1. Check PV module connect and battery connect; 2. Turn off the DC switch and AC switch and then wait one minute, then turn on the DC/AC switch again; 3. Seek help from us, if can not go back to normal state.
F22	Tz_EmergSStop_Fault Emergency stop failure (inverter locked out)	Tz_EmergSStop_Fault Seek help from us,This failure hardly happens.
F23	AC leakage current is transient over current transient leakage current fault	Leakage current fault 1. Check the cable of PV module and inverter; 2. Restart inverter; 3. Seek help from us, if can not go back to normal state.
F24	DC insulation impedance failure Square insulation impedance fault	PV isolation resistance is too low 1. Check the connection of PV panels and inverter is firmly and correctly; 2. Check whether the PE cable of inverter is connected to ground; 3. Seek help from us, if can not go back to normal state.
F26	The DC busbar is unbalanced DC bus unbalance	1. Please wait for a while and check whether it is normal; 2. If still the same, and turn off the DC switch and AC switch and wait for one minute and then turn on the DC/AC switch; 3. Seek help from us, if can not go back to normal state.
F29	Parallel_CANBus_Fault Parallel communication failure	This fualt only for inverters working in parallel mode 1. Check the parallel setting according to the instructions; 2. Check the connection of the CANBus; 3. Seek help from us
F35	No AC grid No utility	No Utility 1. Please confirm grid is lost or not; 2. Check the grid connection is good or not; 3. Check the switch between inverter and grid is on or not; 4. Seek help from us, if can not go back to normal state.
F41	Parallel_system_Stop Parallel system shutdown failure	In parallel system,due to other inverter faults. 1. Wait for minutes then check all inverters in this parallel system; 2. If the inverter can't go back to normal state, record fault codes of all inverters, then seek help from us.
F42	AC line low voltage Line voltage too low fault	Grid voltage fault 1. Check the AC voltage is in the range of standard voltage in specification; 2. Check whether grid AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.

F46/F49	Bcakup_Battery_Fault Backup battery failure	Backup battery fault. 1. Check the battery capacity; 2. Check the connection between batteries and inverters; 3. If inverter can't go back to normal after load reduction, seek help from us
F47	AC over frequency AC overfrequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.
F48	AC lower frequency AC under frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.
F56	DC busbar voltage is too low Bus voltage too low	Battery voltage low 1. Check whether battery voltage is too low; 2. If the battery voltage is too low, using PV or grid to charge the battery; 3. Seek help from us, if can not go back to normal state.
F58	BMS communication fault BMS communication failure	
F63	ARC fault Arc pulling fault	1. ARC fault detection is only for the US market; 2. Check PV module cable connection and clear the fault; 3. Seek help from us, if can not go back to normal state.
F64	Heat sink high temperature failure Heat sink temperature is too high	Heat sink temperature is too high 1. Check whether the work environment temperature is too high; 2. Turn off the inverter for 10mins and restart; 3. Seek help from us, if can not go back to normal state.

6. Appendix

6.1. Appendix I.

6.2. Appendix II.

6.3. Appendix III.

6.4. Appendix IV

6.5. Appendix V.