Modbus RTU Protocol

Administrator

2025/3/13

Version	Changes	Date of change	Responsible person	Remark
V00	First version	2024.02.23		
V01	Definition modifications on Hold reg19 and Hold reg 20. Add Hold 21 register as the Permit Service function.	2024.04.24	Mason Chloe	
V02	1.Add Hold233 uFuntion4. DryContactorMultiplex bit4-7,Select dry contact multiplexing function ; 2. Add Input206、207，AC couple power for S-phase and T-phase （TriP 6-20K）; 3. Add Hold248~251,CT ratio and direction for WattNode meter 4. Add Hold233 uFuntion4 .uExCTPosition bit8-9 External power grid CT settings 5. Add Hold252 Used for NEC120% Rule BusBar current limiting setting 6. Add Hold110 CTSampleRatio、PVCTSampleRatio 7. Add Hold233 Bit10 ： EN50549 F-stop opening and closing of over frequency load shedding logic Added hold253: DeltaSOC, used to set the hysteresis of battery SOC 8. Added hold254: DeltaVolt, used to set the hysteresis of the battery Volt 9. Add hold120 bit8：SeparateZeroExportEn 10. Add Rule 24(TOR),25(Denmark DK2) （TriP 6-20K） 10. Add hold255 Bit3-7 Used to read WattNode meter frequency	2024.10.16	JiaLuo	
V03	1. Add input214, input215, and input216 to store three temperatures 2. Add input217-231 to store the voltage and power, daily energy, and total energy of PV4-PV6 3. Add an option in bit 1 - 3 of hold 120 for 12K: AC charging Enable bit (both time period and SOC/Volt are required); 4. Add hold 256 - 259 to store Generator start time and end time; 5. Added input232,used to display Smart load power 6. Add input210,Remaining seconds of one click charging process 7. For 12K, Change the CT ratio setting bits 5-6 and 12-13 of hold110 to CTSampleRatioL2 and CTSampleRatioH2, and merge them into a 4-bit CTSampleRatio to increase the CT ratio option settings. 8.Add the Input174 register Bit10 as a flag to indicate whether the generator quick start function is displayed 9. Add hold260 as the alarm voltage setting value for BUS overvoltage point 10. Add input176、177、178 to display the historical events of three-phase ExceptionReason1, ExceptionReason2, ChgDischgDisabReason; 11. Add Trip_LV low-voltage LCD11 to the LCD coding definition 12. New Hold261 register: Recovery discharge threshold setting register (including voltage and SOC). The recovery of battery low warning point, off grid discharge cut-off point, and grid connected discharge cut-off point will all share the same	2025.3.13	JiaLuo	

	threshold. Discharge recovery point=discharge cut-off point+discharge recovery threshold			

Directory

c

1. Introduction to the Modbus RTU protocol

1) Message Format

Address	Function Code	Data	CRC checksum	
1 byte	1 byte	1-252 byte	Low byte	High byte

Table 1 Message Format

The Modbus protocol utilizes several function codes, including:

Function Code 0x03: Read Holding Registers

Function Code 0x04: Read Input Registers

Function Code 0x06: Write Single Holding Register

Function Code 0x10: Write Multiple Holding Registers

2) Byte Order

Start bit	Data								Stop bit
1	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	1

Table 2 Byte Order

3) Requests and Responses

Responses include normal responses and exception responses, the exception codes are defined as follows:

Exception code	Description of the exception	Remark
0x01	Illegal Function	Secondary does not recognize the function code
0x02	Illegal Data Address	The data address does not match the length
0x03	Illegal Data Value	The data value is out of bounds or the number of registers is incorrect
0x04	Secondary read and write failed	Read and write errors
0x06	Secondary Busy	Secondary busy

Table 3 Exception Code Definitions

a) Read the hold and input registers

Request	Normal Response	Exception Response
Address	**Address**	**Address**
Function code(0x03/0x04)	**Function Code(0x03/0x04)**	**Function Code(0x83/0x84)**
SN[0]	SN[0]	SN[0]
SN[1]	SN[1]	SN[1]
SN[2]	SN[2]	SN[2]
SN[3]	SN[3]	SN[3]
SN[4]	SN[4]	SN[4]
SN[5]	SN[5]	SN[5]
SN[6]	SN[6]	SN[6]
SN[7]	SN[7]	SN[7]
SN[8]	SN[8]	SN[8]
SN[9]	SN[9]	SN[9]
Start address A low byte	Start address A low byte	Start address A low byte
Start address A high byte	Start address A high byte	Start address A high byte
Number of registers N low bytes	Number of bytes	Exception code
Number of registers N high bytes	Register A value is low byte	CRC checks low bytes
CRC checks low bytes	Register A value high bytes	CRC checks high bytes
CRC checks high bytes	Register A+1 value low bytes	
	Register A+1 value high bytes	
	……	
	……	
	Register A+N-1 value low bytes	
	Register A+N-1 value high bytes	
	CRC checks low bytes	
	CRC checks high bytes	

Table 4 Read Requests and Responses

b) Write a single hold register

Request	Normal Response	Exception Response
Address	**Address**	**Address**
Function Code(0x06)	**Function Code(0x06)**	**Function Code(0x86)**
SN[0]	SN[0]	SN[0]
SN[1]	SN[1]	SN[1]
SN[2]	SN[2]	SN[2]
SN[3]	SN[3]	SN[3]
SN[4]	SN[4]	SN[4]
SN[5]	SN[5]	SN[5]
SN[6]	SN[6]	SN[6]
SN[7]	SN[7]	SN[7]
SN[8]	SN[8]	SN[8]
SN[9]	SN[9]	SN[9]
Register address low byte	Register address low byte	Register address low byte
Register address high bytes	Register address high bytes	Register address high bytes
Register value low byte	Register value low byte	Exception code
Register value high bytes	Register value high bytes	CRC checks low bytes
CRC checks low bytes	CRC checks low bytes	CRC checks high bytes
CRC checks high bytes	CRC checks high bytes	

Table 5 Writing Individual Registers and Responses

c) Write multiple hold registers

Request	Normal Response	Exception Response
Address	**Address**	**Address**
Function Code(0x10)	**Function Code(0x10)**	**Function Code(0x90)**
SN[0]	SN[0]	SN[0]
SN[1]	SN[1]	SN[1]
SN[2]	SN[2]	SN[2]
SN[3]	SN[3]	SN[3]

SN[4]	SN[4]	SN[4]
SN[5]	SN[5]	SN[5]
SN[6]	SN[6]	SN[6]
SN[7]	SN[7]	SN[7]
SN[8]	SN[8]	SN[8]
SN[9]	SN[9]	SN[9]
Start address A low byte	Start address A low byte	Start address A low byte
Start address A high byte	Start address A high byte	Start address A high byte
Number of registers N low bytes	Number of registers N low bytes	Exception code
Number of registers N high bytes	Number of registers N high bytes	CRC checks low bytes
Number of bytes	CRC checks low bytes	CRC checks high bytes
Register A value low bytes	CRC checks high bytes	
Register A value high bytes		
Register A+1 value low bytes		
Register A+1 value high bytes		
……		
……		
Register A+N-1 value low bytes		
Register A+N-1 value high bytes		
CRC checks low bytes		
CRC checks high bytes		

Table 6 Writing Multiple Registers and Responses

2. Communication Configuration

1) Physical interface: RS-485

2) Communication mode: Universal asynchronous transceiver (UART)

3) Baud rate: 19200bps

4) One start bit, 8 data bits, no parity bits, one stop bit, total 10 bytes.

5) Minimum polling period: 1s

6) Register width: 2 bytes

7) 16-bit integer decoding order: The high and low byte order is reversed, for example 0x01 0x02, it should be parsed as 0x0201=513

8) 32-bit integer decoding order: The high and low byte order is reversed, the byte sequence within the word reversed, for example 0x01 0x02 0x03 0x04, should be parsed as 0x04030201=67305985

9) A maximum of 40 registers can be queried in a single request. The inverter software groups the registers in sets of 40, starting from 0-39 for the first group, 40-79 for the second group, 80-119 for the third group, and so on. When querying 40 registers, the starting address must be 0 (0-39), 40 (40-79), 80 (80-119), and so on. It is not allowed to query registers that span across different groups simultaneously. For example, if you need to query the values of registers 38-40, you must perform two separate queries because 38-39 are in the first group and 40 is in the second group.

10) The maximum number of registers that can be queried in a single request for the new inverter is 127.

3. Register Mapping Table

1) Input Register

It is used to store the operational data of the energy storage inverter, which can only be read and not written, and supports function codes 0x04.

Input Addr	Item	Unit	Range	Note
0	State		0-65535	For more information,see the definition of the operation mode of off-grid-connected energy storage all-in-one file
1	Vpv1	0.1V	0-65535	PV1 voltage, the AC energy storage system does not have this variable
2	Vpv2	0.1V	0-65535	PV2 voltage, the AC energy storage system does not have this variable
3	Vpv3	0.1V	0-65536	PV3 voltage, the AC energy storage system does not have this variable
4	Vbat	0.1V	0-65535	Battery voltage
5	SOC	%	0-100	Battery capacity
	SOH	%	0-100	Battery State of health
6	Internal Fault		0-65535	For more information, see Internal Fault Code Definition file
7	Ppv1	W	0-65535	PV1 power/ AC energy storage Ppv
8	Ppv2	W	0-65535	PV2 power, the AC energy storage system does not have this variable
9	Ppv3	W	0-65536	PV3 power (total PV power, obtained by adding PV1, 2, 3), the AC energy storage system does not have this variable
10	Pcharge	W	0-65535	Charging power (power flowing into the battery)
11	Pdischarge	W	0-65535	Discharging power (power flowing out of battery power)
12	VacR	0.1V	0-65535	R-phase utility grid voltage
13	VacS	0.1V	0-65535	S-phase utility grid voltage
14	VacT	0.1V	0-65535	T-phase utility grid voltage
15	Fac	0.01Hz	0-65535	Utility grid frequency
16	Pinv	W	0-65535	**On-gird inverter power (For three phase: R phase)**
17	Prec	W	0-65535	**AC charging rectification power (For three phase: R phase)**
18	IinvRMS	0.01A	0-65535	**Inverter rms current output (For three phase: R phase)**
19	PF	0.001	0-2000	**Power factor xε(0,1000]->x/1000 xε(1000,2000)->(1000-x)/1000 (For three phase: R phase)**
20	VepsR	0.1V	0-65535	**R phase off-grid output voltage**
21	VepsS	0.1V	0-65535	**S phase off-grid output voltage**
22	VepsT	0.1V	0-65535	**T phase off-grid output voltage**

23	Feps	0.01Hz	0-65535	Off-grid output frequency
24	Peps	W	0-65535	**Off-grid inverter power (For three phase: R phase)**
25	Seps	VA	0-65535	**Off-grid apparent power (For three phase: R phase)**
26	Ptogrid	W	0-65535	**User on-grid power (For three phase: R phase)**
27	Ptouser	W	**0-65535**	**Grid power capacity (For three phase: R phase)**
28	Epv1_day	0.1kWh	0-65535	PV1 power generation today / AC Energy Storage Epv_day
29	Epv2_day	0.1kWh	0-65535	PV2 power generation today, the AC energy storage system does not have this variable
30	Epv3_day	0.1kWh	0-65535	PV3 power generation today (total PV=PV1+PV2+PV3), the AC energy storage system does not have this variable
31	Einv_day	0.1kWh	0-65535	Today's on-grid inverter output energy
32	Erec_day	0.1kWh	0-65535	Today's AC charging rectifier energy
33	Echg_day	0.1kWh	0-65535	Energy Charge today
34	Edischg_day	0.1kWh	0-65535	Energy Discharge today
35	Eeps_day	0.1kWh	0-65535	Today's off-grid output energy
36	Etogrid_day	0.1kWh	0-65535	Today's export to gird energy
37	Etouser_day	0.1kWh	0-65535	Electricity supplied to user from the grid today
38	Vbus1	0.1V	0-65535	Voltage of Bus 1
39	Vbus2	0.1V	0-65535	Voltage of Bus 2
40	Epv1_all L	0.1kWh	0-65535	PV1 cumulative power generation/AC energy storage Epv_all Low byte
41	Epv1_all H	0.1kWh	0-65535	PV1 cumulative power generation/AC energy storage Epv_all high byte
42	Epv2_all L	0.1kWh	0-65535	PV2 cumulative power generation low byte, AC energy storage does not have this variable
43	Epv2_all H	0.1kWh	0-65535	PV2 cumulative power generation high byte, AC energy storage does not have this variable
44	Epv3_all L	0.1kWh	0-65535	PV3 cumulative power generation low byte (total PV=PV1+PV2+PV3), AC energy storage does not have this variable.
45	Epv3_all H	0.1kWh	0-65535	PV3 cumulative power generation high byte (total PV=PV1+PV2+PV3), AC energy storage does not have this variable
46	Einv_all L	0.1kWh	0-65535	Inverter output accumulated power low byte

47	Einv_all H	0.1kWh	0-65535	Inverter output accumulates power high byte
48	Erec_all L	0.1kWh	0-65535	AC charging accumulates rectified power Low byte
49	Erec_all H	0.1kWh	0-65535	AC charging accumulates rectified power high byte
50	Echg_all L	0.1kWh	0-65535	Cumulative charge energy low byte
51	Echg_all H	0.1kWh	0-65535	Cumulative charge energy high byte
52	Edischg_all L	0.1kWh	0-65535	Cumulative discharge charge energy Low byte
53	Edischg_all H	0.1kWh	0-65535	Cumulative discharge charge energy High byte
54	Eeps_all L	0.1kWh	0-65535	Cumulative inverter off-grid output energy Low byte
55	Eeps_all H	0.1kWh	0-65535	Cumulative inverter off-grid output energy High byte
56	Etogrid_all L	0.1kWh	0-65535	Accumulate export energy Low byte
57	Etogrid_all H	0.1kWh	0-65535	Accumulate export energy High byte
58	Etouser_all L	0.1kWh	0-65535	Cumulative import energy Low byte
59	Etouser_all H	0.1kWh	0-65535	Cumulative import energy high byte
60	FaultCode L		0-65535	For more information, see Fault code definition file
61	FaultCode H		0-65535	For more information, see Fault code definition file
62	WarningCode L		0-65535	For more information, see Alarm code definition file
63	WarningCode H		0-65535	For more information, see Alarm code definition file
64	Tinner	celsius	0-65535	Internal temperature
65	Tradiator1	Celsius	0-65535	Radiator temperature 1
66	Tradiator2	celsius	0-65535	Radiator temperature 2
67	Tbat	celsius	0-65535	Battery temperature
69	RunningTime L	second		Runtime duration
70	RunningTime H	second		Runtime duration
71	AutoTestStart	Bit0-3		0 - not started ; 1 - started
	UbAutoTestStatus	Bit4-7		0-waiting 1-testing 2-test fail 3-V test OK 4-F test OK 5- test pass
	UbAutoTestStep	Bit8-11		1-V1L test 2-V1H 3-F1L test 4-F1H test

				5-V2L test 6-V2H test 7-F2L test 8-F2H test
72	wAutoTestLimit	0.1V/0.01Hz		When ubAuto Test Step=1,2,5,6, is the voltage limit; When ubAutoTest Step=3,4,7,8, it is the frequency limit
73	uwAutoTestDefaultTime	ms		
74	uwAutoTestTripValue	0.1V/0.01Hz		When ubAuto Test Step=1,2,5,6, is the voltage limit; When ubAutoTestStep=3,4,7,8, it is the frequency limit
75	uwAutoTestTripTime	ms		
77	ACInputType	Bit0	0 or 1	0-Grid 1-Generator for 12KHybrid
	ACCoupleInverterFlow	Bit1	0 or 1	0-no flow 1-show flow
	ACCoupleEn On	Bit2	0 or 1	0-Disable 1-Enable
	SmartLoadFlow	Bit3	0 or 1	0-no flow 1-show flow When Bit4 is 1 and smartload power>0, set it to 1; Used to monitor the power arrow displayed on the homepage;
	SmartLoadEnOn	Bit4	0 or 1	0-Disable 1-Enable Set to 1 when the user enables SmartLoad and the machine has reached the activation condition; Display power;
	EpsLoadPowerShow	Bit5	0 or 1	0-no power display 1-power display Temporarily set to 1 during initialization for compatibility with new and old software; Monitor whether the EPS side load power is displayed based on this flag
	GridLoadPowerShow	Bit6	0 or 1	0-no power display 1-power display Temporarily set to 1 during initialization for compatibility with new and old software; Monitor whether the Grid side load power is displayed based on this flag
	PloadPowerShow	Bit7	0 or 1	0-no power display 1-power display Temporarily set to 1 during initialization for compatibility with new and old software;Monitor whether to display the total load power based on the flag position
80	BatTypeAndBrand			For more information, see the model definition file
	BatComType		0 or 1	0-CAN 1-485
81	MaxChgCurr	0.01A		The maximum charging current of BMS limits
82	MaxDischgCurr	0.01A		The maximum discharging current of BMS limits
83	ChargeVoltRef	0.1V		Recommends charging voltage by BMS
84	DischgCutVolt	0.1V	**11** / **41**	Recommends a discharging cut-off voltage by BMS
85	BatStatus0_BMS			Status information of BMS
86	BatStatus1_BMS			Status information of BMS

87	BatStatus2_BMS			Status information of BMS
88	BatStatus3_BMS			Status information of BMS
89	BatStatus4_BMS			Status information of BMS
90	BatStatus5_BMS			Status information of BMS
91	BatStatus6_BMS			Status information of BMS
92	BatStatus7_BMS			Status information of BMS
93	BatStatus8_BMS			Status information of BMS
94	BatStatus9_BMS			Status information of BMS
95	BatStatus_INV			The inverter aggregates lithium battery status information
96	BatParallelNum			Number of batteries in parallel
97	BatCapacity	Ah		Battery capacity
98	BatCurrent_BMS	0.01A		Battery current , with signed number
99	FaultCode_BMS			

100	WarningCode_BMS			
101	MaxCellVolt_BMS	0.001V		Maximum voltage of cell
102	MinCellVolt_BMS	0.001V		Minimum voltage of cell
103	MaxCellTemp_BMS	0.1℃		Maximum temperature of cell, with signed number
104	MinCellTemp_BMS	0.1℃		Minimum temperature of cell, with signed number
105	BMSFWUpdateState		1-3	1-Upgrade in process 2-Upgrade successful 3- Upgrade failed
106	CycleCnt_BMS			Number of charging/discharging cycles
107	BatVoltSample_INV	0.1V		Tnverter samples the battery voltage
108	T1	0.1℃		BT temperature for 12k
109	T2	0.1℃		Reserved
110	T3	0.1℃		Reserved
111	T4	0.1℃		Reserved
112	T5	0.1℃		Reserved
113	MasterOrSlave	Bit0~1	1,2	Master or Slave 1: Master 2: Slave
	SingleOrThreePhase	Bit2~3	1-3	Parallel phase 1:R 2:S 3:T
	Phases sequence	Bit4~5	0-1	0- Positive order 1- Negative order
	Rsvd	Bit6~7		Reserved
	ParallelNum	Bit8~16	1~255	Number of inverters in parallel
114	OnGridloadPower	W		Load power of the 12k inverter when it is not off-grid
115	SN[0]-Year		'0'-'9' 'A'-'Z'	The serial number is a ten-digit ASCII code For example: The serial number is AB12345678 SN[0]=0x41(A) : : : : SN[9]=0x38(8)
	SN[1]-week		'0'-'9' 'A'-'Z'	
116	SN[2]-week		'0'-'9' 'A'-'Z'	
	SN[3]-factory		'0'-'9' 'A'-'Z'	
117	SN[4]-product code		'0'-'9' 'A'-'Z'	
	SN[5] -product code		'0'-'9' 'A'-'Z'	

118	SN[6] -serial number		'0'-'9' 'A'-'Z'	
	SN[7]-serial number		'0'-'9' 'A'-'Z'	
119	SN[8] -serial number		'0'-'9' 'A'-'Z'	
	SN[9] -serial number		'0'-'9' 'A'-'Z'	
120	VBusP	0.1V		Half BUS voltage
121	GenVolt	0.1V		Generator voltage Voltage of generator for three phase: R phase
122	GenFreq	0.01Hz		Generator frequency
123	GenPower	W		Voltage of generator for three phase: R phase
124	Egen_day	0.1kWh		Energy of generator today
125	Egen_all L	0.1kWh		Low byte of total generator energy
126	Egen_all H	0.1kWh		High byte of total generator energy
127	EPSVoltL1N	0.1V		Voltage of EPS L1N Voltage of generator for three phase: S phase
128	EPSVoltL2N	0.1V		Voltage of EPS L2N Voltage of generator for three phase: T phase
129	Peps_L1N	W		Active power of EPS L1N Off-grid active power of three phase: S phase
130	Peps_L2N	W		Active power of EPS L2N Off-grid active power of three phase: T phase
131	Seps_L1N	VA		Apparent power of EPS L1N Off-grid apparent power of three phase: S phase
132	Seps_L2N	VA		Apparent power of EPS L2N Off-grid apparent power of three phase: T phase
133	EepsL1N_day	0.1kWh		Daily energy of EPSL1N Off-grid daily energy of three phase: S phase
134	EepsL2N_day	0.1kWh		Daily energy of EPSL2N Off-grid daily energy of three phase: T phase
135	EepsL1N_all L	0.1kWh		Low byte of total EPSL1N energy Total off-grid power of three phase: S phase
136	EepsL1N_all H	0.1kWh		High byte of total EPSL1N energy Total off-grid power of three cameras: S phase
137	EepsL2N_all L	0.1kWh		Low word of total EPSL2N energy Total off-grid power of three phase: T phase

138	EepsL2N_all H	0.1kWh		High byte of total EPSL2N energy Total off-grid power of three byte: T phase
139	Qinv	Var		Reactive power
140	AFCI_CurrCH1	mA		AFCI current
141	AFCI_CurrCH2	mA		AFCI current
142	AFCI_CurrCH3	mA		AFCI current
143	AFCI_CurrCH4	mA		AFCI current
144	AFCIFlag.ArcAlarmCH1	Bit0		Arc status of CH1 0-Normal 1-Alarm
	AFCIFlag.ArcAlarmCH2	Bit1		Arc status of CH2 0-Normal 1-Alarm
	AFCIFlag.ArcAlarmCH3	Bit2		Arc status of CH3 0-Normal 1-Alarm
	AFCIFlag.ArcAlarmCH4	Bit3		Arc status of CH4 0-Normal 1-Alarm
	AFCIFlag.SelfTestResult CH1	Bit4		Test result of CH1 0-Normal 1-fail
	AFCIFlag.SelfTestResult CH2	Bit5		Test result of CH2 0-Normal 1-fail
	AFCIFlag.SelfTestResult CH3	Bit6		Test result of CH3 0-Normal 1-fail
	AFCIFlag.SelfTestResult CH4	Bit7		Test result of CH4 0-Normal 1-fail
	AFCI_ArcAlarm.rsvd	Bit8-15		
145	AFCI_ArcCH1			Real time arc of CH1
146	AFCI_ArcCH2			Real time arc of CH2
147	AFCI_ArcCH3			Real time arc of CH3
148	AFCI_ArcCH4			Real time arc of CH4
149	AFCI_MaxArcCH1			Max arc of CH1
150	AFCI_MaxArcCH2			Max arc of CH2
151	AFCI_MaxArcCH3			Max arc of CH3
152	AFCI_MaxArcCH4			Max arc of CH4
153	ACCouplePower	W		AC Coupled inverter power
154	AutoTestTripValue[0]	0.1V/0.01Hz		
……				
161	AutoTestTripValue[7]	0.1V/0.01Hz		
162	AutoTestTripTime [0]	ms		
……				
169	AutoTestTripTime [7]	ms		
170	Pload	W		Load consumption when working in on-grid mode
171	Eload_day	0.1kWh		Load energy for today
172	Eload_allL	0.1kWh		Load energy for total High byte
173	Eload_allH	0.1kWh		Load energy for total Low byte
174	SwitchState.SafetySw	Bit0~4	0~0x1F	The status of the 5-digit safety DIP switch
	SwitchState.rsvd	Bit5-7	0	Reserved
	SwitchState.EpsSwOn	Bit8		Status of EPS switch
	SwitchState.DrySwOn	Bit9		Generator dry contact status
	SwitchState.GenQuick StartUsed	Bit10		generator quick start flag displayed
	SwitchState.rsvd	Bit11-14		Reserved
	SwitchState.SwRegUsed	Bit15		Determine whether the switch register is being used
175	EPS overload ctrl time	s		Connect in xx S after triggering the EPS overload issue

176	ExceptionReason1	Bit0~3		3phase:PVGridOn Exit Reason
		Bit4~7		3phase:PVChgGridOn Exit Reason
		Bit8~11		3phase:BatGridOn Exit Reason
		Bit12~15		3phase:PVBatGridOn Exit Reason
177	ExceptionReason2	Bit0~3		3phase:PVCharge Exit Reason
		Bit4~7		3phase:ACCharge Exit Reason
		Bit8~11		3phase:PVACCharge Exit Reason
		Bit12~15		3phase:EPS Exit Reason
178	ChgDischgDisableReason	Bit0~7		3phase:Charge Exit Reason
		Bit8~15		3phase:Discharge Exit Reason
……	**……**	**……**	**……**	**……**
180	Pinv_S	W	0-65535	On grid inverter power of three phase: S phase

181	Pinv_T	W	0-65535	On grid inverter power of three phase: T phase
182	Prec_S	W	0-65535	Charging rectification power of three phase: S phase
183	Prec_T	W	0-65535	Charging rectification power of three phase: T phase
184	Ptogrid_S	W	0-65535	User on-grid power of three phase: S phase
185	Ptogrid_T	W	0-65535	User on-grid power of three phase: T phase
186	Ptouser_S	W	0-65535	Grid supply power of three phase: S phase
187	Ptouser_T	W	0-65535	Grid supply power of three phase:T phase
188	GenPower_S	W	0-65535	Power of generator for three phase: S phase
189	GenPower_T	W	0-65535	Power of generator for three phase: T phase
190	IinvRMS_S	0.01	0-65535	Effective value of three phase inverter current: S phase
191	IinvRMS_T	0.01	0-65535	Effective value of three phase inverter current: T phase
192	PF_S	0.001	0-2000	Power factor of phase S in three-phase inverter xϵ(0,1000]->x/1000 xϵ(1000,2000)->(1000-x)/1000
193	GridVoltL1N	0.1V		Voltage of Grid L1N （for US model）
194	GridVoltL2N	0.1V		Voltage of Grid L2N（for US model）
195	GenVoltL1N	0.1V		Voltage of Gen L1N（for US model）
196	GenVoltL2N	0.1V		Voltage of Gen L2N（for US model）
197	PinvL1N	W	0-65535	Inverting power of phase L1N （for US model）
198	PinvL2N	W	0-65535	Inverting power of phase L2N （for US model）
199	PrecL1N	W	0-65535	Rectifying power of phase L1N （for US model）
200	PrecL2N	W	0-65535	Rectifying power of phase L2N （for US model）
201	Ptogrid_L1N	W	0-65535	Grid export power of phase L1N (for US model）
202	Ptogrid_L2N	W	0-65535	Grid export power of phase L2N (for US model）
203	Ptouser_L1N	W	0-65535	Grid import power of phase L1N (for US model）
204	Ptouser_L2N	W	0-65535	Grid import power of phase L2N (for US

				model）
205	PF_T	0.001	0-2000	Power factor of phase T in three-phase inverter xϵ(0,1000]->x/1000 xϵ(1000,2000)->(1000-x)/1000
206	ACCouplePower_S	W		AC Couple inverter power_S
207	ACCouplePower_T	W		AC Couple inverter power_T
208	OnGridloadPowerS	W		Load power of S-phase the Trip6-20k inverter when it is not off-grid
209	OnGridloadPowerT	W		Load power of T-phase the Trip6-20k inverter when it is not off-grid
210	Remaining seconds	S		Remaining seconds of one click charging process
...				
214	uwNTCForINDC	celsius	0-65535	Internal temperature
215	uwNTCForDCDCL	Celsius	0-65535	Radiator temperature 1
216	uwNTCForDCDCH	celsius	0-65535	Radiator temperature 2
217	Vpv4	0.1V	0-65535	PV4 voltage, the AC energy storage system does not have this variable
218	Vpv5	0.1V	0-65535	PV5 voltage, the AC energy storage system does not have this variable
219	Vpv6	0.1V	0-65536	PV6 voltage, the AC energy storage system does not have this variable
220	Ppv4	W	0-65535	PV4 power, the AC energy storage system does not have this variable
221	Ppv5	W	0-65535	PV5 power, the AC energy storage system does not have this variable
222	Ppv6	W	0-65535	PV6 power, the AC energy storage system does not have this variable
223	Epv4_day	0.1kWh	0-65535	PV4 power generation today, the AC energy storage system does not have this variable
224	Epv4_all L	0.1kWh	0-65535	PV4 cumulative power generation low byte, AC energy storage does not have this variable
225	Epv4_all H	0.1kWh	0-65535	PV4 cumulative power generation high byte, AC energy storage does not have this variable
226	Epv5_day	0.1kWh	0-65535	PV5 power generation today, the AC energy storage system does not have this variable
227	Epv5_all L	0.1kWh	0-65535	PV5 cumulative power generation low byte, AC energy storage does not have this variable
228	Epv5_all H	0.1kWh	0-65535	PV5 cumulative power generation high byte, AC energy storage does not have this variable
229	Epv6_day	0.1kWh	0-65535	PV6 power generation today, the AC energy storage system does not have this variable
230	Epv6_all L	0.1kWh	0-65535	PV6 cumulative power generation low byte, AC energy storage does not have this variable
231	Epv6_all H	0.1kWh	0-65535	PV6 cumulative power generation high byte, AC energy storage does not have this variable
232	Smart Load Power	W		Smart Load output power

Table 7 Input Register Mapping Table (Signed numbers indicated with a green background)

2) Hold Register

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It is used to store the operational data of the energy storage inverter, which can only be read and written, and supports function codes 0x03, 0x06, 0x10.

Hold Addr	Item	Unit	Range and default	Note
7	FWCode0		'A'-'Z' 'a'-'z'	For more information of the model code, see Software Version Definition file
	FWCode1		'A'-'Z' 'a'-'z'	For more information of the code name for the derived model, see the software version definition file
8	FWCode2		'A'-'Z' 'a'-'z'	For more information of the ODM code,see Software Version Definition
	FWCode3		'A'-'Z' 'a'-'z'	For more information of the region code, see Software Version Definition file
9	Slave Ver		0-255	For more information of the software version number for redundant CPU, see Software version definition file
	Com Ver		0-255	For Communication CPU software version number, see software version definition file
10	Cntl Ver		0-255	For Control CPU software version number, see software version definition file
	FWVer		0-255	For external software version number, see Software Version

11	...	Bit0	0/1	
	ResetSetting.AlltoDefault	Bit1	0/1	System settings restored to default values
	...	Bit2	0/1	
	...	Bit3	0/1	
	...	Bit4	0/1	
	...	Bit5	0/1	
	...	Bit6	0/1	
	ResetSetting. InvReboot	Bit7	0/1	0-null 1- restart inverter
	ResetSetting.rsvd	Bit8	0/1	Retain
	ResetSetting.rsvd	Bit9	0/1	Retain
	ResetSetting.rsvd	Bit10	0/1	Retain
	ResetSetting.rsvd	Bit11	0/1	Retain
	ResetSetting.rsvd	Bit12	0/1	Retain
	ResetSetting.rsvd	Bit13	0/1	Retain
	ResetSetting.rsvd	Bit14	0/1	Retain
	ResetSetting.rsvd	Bit15	0/1	Retain
12	Time_Year		17-255	inverter time-year
	Time_Month		1-12	inverter time-month
13	Time_Date		1-31	inverter time-day
	Time_Hour		0-23	inverter time-hour
14	Time_Minute		0-59	inverter time-minute
	Time_Second		0-59	inverter time-second
15	Com Addr		0-150	MODBUS address
16	Language		0-1	0-English 1-German Language 0-English 1-German
19	DTC:Device type		0-31	0： Default 3: XOLTA (for high-speed communication interval)
20	PVInputModel		0-4 For 12KHybrid:0-7	0: No PV plug in 1: PV1 plug in 2: PV2 plug in 3: two PVs in parallel 4: two separate PVs, AC energy storage does not have this variable. For 12KHybrid： 0-No PV 1-PV1 in 2-PV2 in 3-PV3 in 4-PV1&2 in 5-PV1&3 in 6-PV2&3 in 7-PV1&2&3 in For TriP 6-20k : 0-All MPPTs with individual PV strings 1- PV1&2 in parallel connection 2- PV1 & 3 in parallel connection 3 - PV2 and PV3 in parallel connection

				4 - PV1&2&3 in parallel connection
21	FuncEn.EPSEn	0	0/1	Off-grid mode enable
	FuncEn.OVFLoadDerateEn	1	0/1	Overfrequency load reduction enable
	FuncEn.DRMSEn	2	0/1	DRMS enable

	FuncEn.LVRTEn	3	0/1	Low voltage ride-through enable
	FuncEn.AntiIslandEn	4	0/1	Anti-islanding enablement
	FuncEn.NeutralDetectEn	5	0/1	Ground neutral detection enable
	FuncEn.GridOnPowerSSEn	6	0/1	On-grid power soft start enable
	FuncEn.ACChargeEn	7	0/1	AC charging enable
	FuncEn.SWSeamlesslyEn	8	0/1	seamless off-grid mode switching enable
	FuncEn.SetToStandby	9	0/1	0: Standby 1: Power on
	FuncEn.ForcedDischgEn	10	0/1	Forced discharge enable
	FuncEn.ForcedChgEn	11	0/1	Force charge enable
	FuncEn.ISOEn	12	0/1	ISO enable, and AC energy storage does not have this variable
	FuncEn.GFCIEn	13	0/1	GFCI enable
	FuncEn.DCIEn	14	0/1	DCI enable
	FuncEn.FeedInGridEn	15	0/1	0-disable 1-enable
22	StartPVVolt	0.1V	900-5000	PV start-up voltage, AC energy storage does not have this variable
23	ConnectTime	s	30-600	Waiting time of on-grid
24	ReconnectTime	s	0-900	Waiting time of Reconnect on-gird
25	GridVoltConnLow	0.1V	According to specific regulatory requirements	The lower limit of the allowed on-grid voltage.
26	GridVoltConnHigh	0.1V	According to specific regulatory requirements	The upper limit of the the allowed on-grid voltage.
27	GridFreqConnLow	0.01Hz	According to specific regulatory requirements	The lower limit of the allowable on-grid frequency
28	GridFreqConnHigh	0.01Hz	According to specific regulatory requirements	The upper limit of the the allowed on-grid frequency.
29	GridVoltLimit1Low	0.1V	According to specific regulatory requirements	Grid voltage level 1 undervoltage protection point

30	GridVoltLimit1High	0.1V	According to specific regulatory requirements	Grid voltage level 1 overvoltage protection point
31	GridVoltLimit1LowTime	Main period	According to specific regulatory requirements	Grid voltage level 1 undervoltage protection time
32	GridVoltLimit1HighTime	Main period	According to specific regulatory requirements	Grid voltage level 1 overvoltage protection time
33	GridVoltLimit2Low	0.1V	According to specific regulatory requirements	Grid voltage level 2 undervoltage protection point
34	GridVoltLimit2High	0.1V	According to specific regulatory requirements	Grid voltage level 2 overvoltage protection point
35	GridVoltLimit2LowTime	Main period	According to specific regulatory requirements	Grid voltage level 2 undervoltage protection time
36	GridVoltLimit2HighTime	Main period	According to specific regulatory requirements	Grid voltage level 2 overvoltage protection time
37	GridVoltLimit3Low	0.1V	According to specific regulatory requirements	Grid voltage level 3 undervoltage protection point
38	GridVoltLimit3High	0.1V	According to specific regulatory requirements	Grid voltage level 3 overvoltage protection point
39	GridVoltLimit3LowTime	Main period	According to specific regulatory requirements	Grid voltage level 3 undervoltage protection time
40	GridVoltLimit3HighTime	Main period	According to specific regulatory requirements	Grid voltage level 3 overvoltage protection time
41	GridVoltMovAvgHigh	0.1V	According to specific regulatory	Grid voltage sliding average overvoltage protection point

42	GridFreqLimit1Low	0.01Hz	requirements According to specific regulatory requirements	Grid frequency level 1 underfrequency protection point
43	GridFreqLimit1High	0.01Hz	According to specific regulatory requirements	Grid frequency level 1 overfrequency protection point
44	GridFreqLimit1LowTime	Main period	According to specific regulatory requirements	Grid frequency level 1 underfrequency protection time
45	GridFreqLimit1HighTime	Main period	According to specific regulatory requirements	Grid frequency level 1 overfrequency protection time
46	GridFreqLimit2Low	0.01Hz	According to specific regulatory requirements	Grid frequency level 2 underfrequency protection point
47	GridFreqLimit2High	0.01Hz	According to specific regulatory requirements	Power grid frequency level 2 overfrequency protection point
48	GridFreqLimit2LowTime	Main period	According to specific regulatory requirements	Grid frequency level 2 underfrequency protection time
49	GridFreqLimit2HighTime	Main period	According to specific regulatory requirements	Grid frequency level 2 overfrequency protection time
50	GridFreqLimit3Low	0.01Hz	According to specific regulatory requirements	Grid frequency level 3 underfrequency protection point
51	GridFreqLimit3High	0.01Hz	According to specific regulatory requirements	Grid frequency level 3 overfrequency protection point
52	GridFreqLimit3LowTime	Main period	According to specific regulatory requirements	Grid frequency level 3 underfrequency protection time
53	GridFreqLimit3HighTime	Main period	According to specific regulatory requirements	Grid frequency level 3 overfrequency protection time

54	MaxQPercentForQV	%	According to specific regulatory requirements	The maximum percentage of reactive power for the Q(V) curve
55	V2L	0.1V	According to specific regulatory requirements	Q(V) curve undervoltage 2
56	V1L	0.1V	According to specific regulatory requirements	Q(V) curve undervoltage 1
57	V1H	0.1V	According to specific regulatory requirements	Q(V) curve overvoltage 1
58	V2H	0.1V	According to specific regulatory requirements	Q(V) curve overvoltage 2
59	ReactivePowerCMDType		0-7	Reactive power command type 0 - unit power factor 1 - fixed PF 2 - default PF curve (American machine: Q(P)) 3 - custom PF curve 4 - capacitive reactive power percentage 5- inductive reactive power percentage 6-QV curve 7-QV_Dynamic
60	ActivePowerPercentCMD	%	0-100	Active power percentage set value
61	ReactivePowerPercentCMD	%	0-60	Reactive power percentage set value
62	PFCMD	0.001	750-1000, 1750-2000	PF set value, 750-1000(under), 1750-2000(over)
63	PowerSoftStartSlope	‰/min	1-4000	Loading rate, the percentage of power increase per minute.
64	ChargePowerPercentCMD	%	0-100	Charging power percentage setting
65	DischgPowerPercentCMD	%	0-100	Discharging power percentage setting
66	ACChgPowerCMD	%	0-100	AC charge percentage setting
67	ACChgSOCLimit	%	0-100	SOC limit setting for AC charging
68	ACChgStartHour	hour	0-23	AC charging start time - hour setting.
	ACChgStartMinute	min	0-59	AC charging start time_minute setting

69	ACChgEndHour	hour	0-23	AC charging end time_hour setting
	ACChgEndMinute	min	0-59	AC charging end time_minute setting
70	ACChgStartHour1	hour	0-23	AC charging start time_hour setting
	ACChgStartMinute1	min	0-59	AC charging start time_minutesetting
71	ACChgEndHour1	hour	0-23	AC charging end time_hour setting
	ACChgEndMinute1	min	0-59	AC charging end time_minute setting
72	ACChgStartHour2	hour	0-23	AC charging start time_hour setting
	ACChgStartMinute2	min	0-59	AC charging start time_minute setting
73	ACChgEndHour2	hour	0-23	AC charging end time_hour setting
	ACChgEndMinute2	min	0-59	AC charging end time_minute setting
74	ChgFirstPowerCMD	%	0-100	Charging priority percentage setting
75	ChgFirstSOCLimit	%		Charging priority SOC limit setting
76	ChgFirstStartHour	hour	0-23	Charging priority start time_hour setting
	ChgFirstStartMinute	min	0-59	Charge priority start time_min setting
77	ChgFirstEndHour	hour	0-23	Charging priority end time_hour setting
	ChgFirstEndMinute	min	0-59	Charging priority end time_minute setting
78	ChgFirstStartHour1	hour	0-23	Charging priority start time_hour setting
	ChgFirstStartMinute1	min	0-59	Charging priority start time_min setting
79	ChgFirstEndHour1	hour	0-23	Charging priority end time_hour setting
	ChgFirstEndMinute1	min	0-59	Charging priority end time_minute setting
80	ChgFirstStartHour2	hour	0-23	Charging priority start time_hour setting
	ChgFirstStartMinute2	min	0-59	Charging priority start time_minute setting
81	ChgFirstEndHour2	hour	0-23	Charging priority end time_hour setting
	ChgFirstEndMinute2	min	0-59	Charging priority end

				time_minut setting
82	ForcedDischgPowerCMD	%	0-100	Forced discharge percentage setting
83	ForcedDischgSOCLimit	%	0-100	Forced discharge SOC limit setting
84	ForcedDischgStartHour	hour	0-23	Forced discharge start time_hour setting
	ForcedDischgStartMinute	min	0-59	Forced discharge start time_minute setting
85	ForcedDischgEndHour	hour	0-23	Forced discharge end time_hour setting
	ForcedDischgEndMinute	min	0-59	Forced discharge end time_minute setting
86	ForcedDischgStartHour1	hour	0-23	Forced discharge start time_hour setting
	ForcedDischgStartMinute1	min	0-59	Forced discharge start time_minute setting
87	ForcedDischgEndHour1	hour	0-23	Forced discharge end time_hour setting
	ForcedDischgEndMinute1	min	0-59	Forced discharge end time_minute setting
88	ForcedDischgStartHour2	hour	0-23	Forced discharge start time_hour setting
	ForcedDischgStartMinute2	min	0-59	Forced discharge start time_minute setting
89	ForcedDischgEndHour2	hour	0-23	Forced discharge end time_hour setting
	ForcedDischgEndMinute2	min	0-59	Forced discharge end time_minute setting
90	EPSVoltageSet	1V	230,240, 277,208 ,220	Off-grid output voltage level setting
91	EPSFreqSet	1Hz	50,60	Off-grid output frequency system settings
92	LockInGridVForPFCurve	0.1V	2300-3000	cosphi(P)lock in voltage
93	LockOutGridVForPFCurve	0.1V	1500-3000	cosphi(P)lock out voltage
94	LockInPowerForQVCurve	%	0-100	Q(V) lock in power
95	LockOutPowerForQVCurve	%	0-100	Q(V) lock out power

96	DelayTimeForQVCurve	Main period	0-2000	Q(V) delay
97	DelayTimeForOverFDerate	Main period	0-1000	Overfrequency load reduction delay
99	ChargeVoltRef	0.1V	500-590	Lead-acid battery charging specified voltage
100	CutVoltForDischg	0.1V	400-520	Lead-acid battery discharge cut-off voltage
101	~~ChargeRate~~ ChargeCurr	A	0-140	Charging current
102	~~DischgRate~~ DischgCurr	A	0-140	Discharging current
103	MaxBackFlow	%	0-100	Feed-in grid power setting
105	EOD	%	10%-90%	Cut SOC for discharging
106	TemprLowerLimitDischg	0.1℃	0-65536	Lead-acid Temperature low limit for discharging
107	TemprUpperLimitDischg	0.1℃	0-65536	Lead-acid Temperature high limit for discharging
108	TemprLowerLimitChg	0.1℃	0-65536	Lead-acid Temperature low limit for charging
109	TemprUpperLimitChg	0.1℃	0-65536	Lead-acid Temperature high limit for charging
110	FunctionEn1.ubPVGridOffEn	Bit0	0,1	0 - disable 1 - enable, AC energy storage does not have this variable
	FunctionEn1.ubFastZeroExport	Bit1		0 - disable 1 - enable
	FunctionEn1.ubMicroGridEn	Bit2		0 - disable 1 - enable
	FunctionEn1. ubBatShared	Bit3		0 - disable 1 - enable
	FunctionEn1. ubChgLastEn	Bit4		0 - disable 1 - enable
	FunctionEn1. CTSampleRatio	Bit5-6		0 :1/1000 1:1/3000 2:1/2000 For 12k: CTSampleRatioL2bit, Combine CTSampleRatioH2 bit to form a 4-bit CTSampleRatio 0：1/1000 1:1/3000 2:1/2000 3:1/4000 4:1/6000
	FunctionEn1. BuzzerEn	Bit7		0-disable 1-enable, only available for off-grid For 12k: DrycontactorCntl En
	FunctionEn1. PVCTSampleType	Bit8-9		For ACS3600: 0-PV power 1-SpecLoad For 12k :L2N CT reuse 0- no reuse 1-SpecLoad 2-ACCouple power
	FunctionEn1. TakeLoadTogether	Bit10		For off-grid: 0-disable 1- enable, for 12K : 0-ongrid disable 1-enable
	FunctionEn1. OnGridWorkingMode	Bit11		For 12K: consistant chk mask 0-disable 1-enable 0-self consumption 1-Charge First, only available for off-grid For 12K: consistantchk mask 0-

				disable 1-enable
	FunctionEn1. PVCTSampleRatio	Bit12-13		0 : 1/1000 1- 1/3000 2:1/2000 For 12k: CTSampleRatioL2bit, Combine CTSampleRatioH2 bit to form a 4-bit CTSampleRatio 0：1/1000 1:1/3000 2:1/2000 3:1/4000 4:1/6000
	FunctionEn1.GreenModeEn	Bit14		0-disable 1- enable, only available for off-grid For 12K: AbsoluteZeroExport 0-disable 1- enable,
	FunctionEn1.EcoModeEn	Bit15		0-disable 1- enable, only available for off-grid For 12K: 0-20ms 1-EPSRY on ahead(10ms)
112	SetSystemType		0,1,2,3,4	Set the single/parallel type 0-no parallel (single one) 1- Single-phase parallel operation forms a single-phase system. (Primary, which will not show on off-grid mode) 2-Secondary (will not show on off-grid mode) 3-Three phase parallel(Master) operation forms a three-phase System 4-2*208(Master) Option used for two split-phase inverter to make up a three-phase system
113	SetComposedPhase	Write only	Set 0	Clear the detected phases
		Write only	Set 1-3	Set Composed phase 1-R 2-S 3-T
		Read only	Bit0-7	Off-grid composed phases
		Read only	Bit8-15	On-grid detected phases
114	ClearFunction		1	Parallel Alarm clear 1- clear
115	OVFDerateStartPoint	0.01Hz	5000-5200	Over-frequency load reduction start frequency point
116	PtoUserStartdischg	1W	50W	Device starts discharging when Ptouser higher than this value
117	PtoUserStartchg	1W	-50W	Device starts charging when Ptouser less than this value
118	VbatStartDerating	0.1V	>CutVoltForDischg+2V	For lead-acid battery, according to given curve decrease discharging power when voltage lower than this value
119	wCT_PowerOffset	1W	±1000W	signed short int; CT Power compensation, PtoUser direction is positive.

120	stSysEnable.bit.HalfHourACChrStartEn	Bit0	0,1	0-Disable， 1-Enable； Default:0;
	stSysEnable.bit.ACChargeType	Bit1~3	0-5	0-disable 1-according to time 2-accoridng to voltage 3-according to SOC 4-according to Voltage and Time 5-according to SOC and Time For 12K: 0 - according to time 1 - according to SOC/Volt 2 - according to time with SOC/Volt
	stSysEnable.bit.DischgCtrlType	Bit4~5	0-2	0-according to voltage 1-according to SOC 2- according to both
	stSysEnable.bit.OnGridEODType	Bit6	0-1	0-according to voltage 1-according to SOC
	stSysEnable.bit.GenChargeType	Bit7	0-1	0-According to Battery voltage 1-According to Battery SOC
	stSysEnable.bit.SeparateZeroExportEn	Bit8	0-1	0-Disable(Default)，1-Enable

124	OVFDerateEndPoint	0.01Hz	5000-5200	Overfrequency load reduction ends at the frequency point
125	SOCLowLimitForEPSDischg	%	0-EOD	SOC low limit for EPS discharge
126	OptimalChg_DisChg.Time0	Bit0~1	0~2	0:00~0:30 Mark of time period charging and discharging. Default: 0; 0 - does not operate, 1-AC charge, 2-PV charge, 3 - discharge
	OptimalChg_DisChg.Time1	Bit2~3	0~2	0:30~1:00 Mark of time period charging and discharging.
	OptimalChg_DisChg.Time2	Bit4~5	0~2	1:00~1:30 Mark of time period charging and discharging.
	….			
	OptimalChg_DisChg.Time7	Bit14~15	0~2	3:30~4:00 Mark of time period charging and discharging.
127	OptimalChg_DisChg.Time8	Bit0~1	0~2	4:00~4:30 Mark of time period charging and discharging. Default: 0; 0 - does not operate, 1-AC charge, 2-PV charge, 3 - discharge
	OptimalChg_DisChg.Time9	Bit2~3	0~2	4:30~5:00 Mark of time period charging and discharging.
	OptimalChg_DisChg.Time10	Bit4~5	0~2	5:00~5:30 Mark of time period charging and discharging.
	….			
	OptimalChg_DisChg.Time15	Bit14~15	0~2	7:30~8:00 Mark of time period charging and discharging.

128	OptimalChg_DisChg.Time16	Bit0~1	0~2	8:00~8:30 Mark of time period charging and discharging. Default: 0; 0 - does not operate, 1-AC charge, 2-PV charge, 3 - discharge
	OptimalChg_DisChg.Time17	Bit2~3	0~2	8:30~9:00 Mark of time period charging and discharging.
	OptimalChg_DisChg.Time18	Bit4~5	0~2	9:00~9:30 Mark of time period charging and discharging.
	….			
	OptimalChg_DisChg.Time23	Bit14~15	0~2	11:30~12:00 Mark of time period charging and discharging.
129	OptimalChg_DisChg.Time24	Bit0~1	0~2	12:00~12:30 Mark of time period charging and discharging. Default: 0; 0 - does not operate, 1-AC charge, 2-PV charge, 3 - discharge;
	OptimalChg_DisChg.Time25	Bit2~3	0~2	12:30~13:00 Mark of time period charging and discharging.
	OptimalChg_DisChg.Time26	Bit4~5	0~2	13:00~13:30 Mark of time period charging and discharging.
	….			
	OptimalChg_DisChg.Time31	Bit14~15	0~2	17:00~17:30 Mark of time period charging and discharging.
130	OptimalChg_DisChg.Time32	Bit0~1	0~2	16:00~16:30 Mark of time period charging and discharging. 0 - does not operate, 1-AC charge, 2-PV charge, 3 - discharge;
	OptimalChg_DisChg.Time33	Bit2~3	0~2	16:30~17:00 Mark of time period charging and discharging.

	OptimalChg_DisChg.Time34	Bit4~5	0~2	17:00~17:30 Mark of time period charging and discharging.
	….			
	OptimalChg_DisChg.Time39	Bit14~15	0~2	19:30~20:00 Mark of time period charging and discharging.
131	OptimalChg_DisChg.Time40	Bit0~1	0~2	20:00~20:30 Mark of time period charging and discharging. 0-does not operate, 1-AC charge, 2-PV charge, 3 - discharge
	OptimalChg_DisChg.Time41	Bit2~3	0~2	20:30~21:00 Mark of time period charging and discharging.
	OptimalChg_DisChg.Time42	Bit4~5	0~2	21:00~21:30 Mark of time period charging and discharging.
	….			
	OptimalChg_DisChg.Time47	Bit14~15	0~2	23:30~0:00 Mark of time period charging and discharging.
132	BatCellVoltLow	0.1V	0-200	Battery cell voltage lower limit.
	BatCellVoltHigh	0.1V	0-200	Battery cell voltage upper limit
133	BatCellSerialNum	1	0-200	Number of battery cells in series
	BatCellParaNum	1	0-200	Number of battery cells in parallel
134	UVFDerateStartPoint	0.01Hz	4500-5000	Underfrequency load reduction starting point
135	UVFDerateEndPoint	0.01Hz	4500-5000	The end point of underfrequency load reduction
136	OVFDerateRatio	%Pm/Hz	1-100	Underfrequency load ramp rate
137	SpecLoadCompensate	w	0-65535	The maximum amount of compensation for a specific load
138	ChargePowerPercentCMD	0.1%	0-1000	Charging power percentage setting
139	DischgPowerPercentCMD	0.1%	0-1000	Discharging power percentage setting
140	ACChgPowerCMD	0.1%	0-1000	AC charge percentage setting
141	ChgFirstPowerCMD	0.1%	0-1000	Charging priority percentage setting

142	ForcedDischgPowerCMD	0.1%	0-1000	Forced discharge percentage setting
143	ActivePowerPercentCMD	0.1%	0-1000	Inverse active percentage setting
144	FloatChargeVolt	0.1V	500-560	Float charge voltage
145	OutputPrioConfig		0-3	0-bat first 1-PV first 2-AC first
146	LineMode		0-2	0-APL(90-280V 20ms) 1-UPS (170-280V 10ms)2-GEN (90-280V 20ms)
147	Battery capacity	Ah	0-10000	Battery capacity, for unmatched batteries
148	Battery nominal Voltage	0.1V	400-590	Battery rating voltage, for unmatched batteries
149	EqualizationVolt		500-590	Battery equalization voltage
150	EqualizationInterval	Day	0-365	Balancing interval
151	EqualizationTime	hour	0-24	Balancing duration
152	ACFirstStartHour	hour	0-23	AC load start time_hours setting
	ACFirstStartMinute	min	0-59	AC load start time _minutes setting
153	ACFirstEndHour	hour	0-23	AC load end time _hours setting
	ACFirstEndMinute	min	0-59	AC load end ime_minutes setting
154	ACFirstStartHour1	hour	0-23	AC load start time_hours setting
	ACFirstStartMinute1	min	0-59	AC load start time_minutes setting
155	ACFirstEndHour1	hour	0-23	AC load end time_hours setting
	ACFirstEndMinute1	min	0-59	AC load end time_minutes setting
156	ACFirstStartHour2	hour	0-23	AC load start time_Hours setting
	ACFirstStartMinute2	min	0-59	AC load start time_minutes setting
157	ACFirstEndHour2	hour	0-23	AC load end time_hours setting
	ACFirstEndMinute2	min	0-59	AC load end time_minutes setting
158	ACChgStartVolt	0.1V	385-520	Battery voltage of AC charging start, which will be valid after selecting ACChg according to voltage
159	ACChgEndVolt	0.1V	480-590	Battery voltage of AC charging cut-off, effective after selecting ACChg according to voltage.
160	ACChgStartSOC	%	0-90	SOC of AC charging start , which will be valid after selecting ACChg according to SOC

161				
162	BatLowVoltage	0.1V	400-500	Battery under-voltage alarm point, which will be valid after selecting DisChgCtrl according to voltage or both voltage and time
163	BatLowBackVoltage	0.1V	420-520	Battery under-voltage alarm recovery point, which will be valid after selecting DisChgCtrl according to voltage or bothvoltage and time
164	BatLowSOC	%	0-90	Battery under-voltage alarm point, which will be valid after selecting DisChgCtrl according to SOC or both SOC and time
165	BatLowBackSOC	%	20-100	Battery under-voltage alarm recovery point, which will be valid after selecting DisChgCtrl according to SOC or both SOC and time
166	BatLowtoUtilityVoltage	0.1V	444-514	Voltage point for battery undervoltage to grid transfer, which will be valid after selecting DisChgCtrl according to voltage or both.
167	BatLowtoUtilitySOC	%	0-100	SOC for battery under-voltage to grid transfer, which will be valid after selecting DisChgCtrl according to SOC or both.
168	ACCharge Bat Current	A	0-140	Charge Current from AC
169	OngridEOD_Voltage	0.1V	400-560	On-grid end of dischage voltage
…				
171	SOCCurve_BatVolt1	0.1V	400-600	Voltage point 1 for SOC calibration
172	SOCCurve_BatVolt 2	0.1V	400-600	Voltage point 2 for SOC calibration
173	SOCCurve_SOC1	1%	0-100	SOC reading based on Voltage point 1
174	SOCCurve_SOC2	1%	0-100	SOC reading based on Voltage point 2
175	SOCCurve_InnerResistance	mΩ	0-100	Inner resistance of the battery
176	MaxGridInputPower	W		Max. Grid import power limitation
177	GenRatePower	W		The rated power of generator input
179	uFunctionEn2.ACCTDirection	Bit0	0,1	0-Normal 1-Reversed
	uFunctionEn2.PVCTDirection	Bit1	0,1	0-Normal 1-Reversed
	uFunctionEn2.AFCIAlarmClr	Bit2	0,1	0-null 1-clear For ACS 0-single phase compensation，1-three phase compensation
	uFunctionEn2.~~BatWakeupEn~~ PVSellFirst	Bit3	0,1	0-Disable 1-Enable

	uFunctionEn2.VoltWattEn	Bit4	0,1	0-Disable 1-Enable
	uFunctionEn2.TriptimeUnit	Bit5	0,1	0-Disable 1-Enable
	uFunctionEn2.ActPowerCMDEn	Bit6	0,1	0-Disable 1-Enable
	uFunctionEn2.ubGridPeakShaving	Bit7	0,1	0-Disable 1-Enable
	uFunctionEn2.ubGenPeakShaving	Bit8	0,1	0-Disable 1-Enable
	uFunctionEn2.ubBatChgcontrol	Bit9	0,1	0-SOC,1-Volt
	uFunctionEn2.ubBatDischgControl	Bit10	0,1	0-SOC,1-Volt
	uFunctionEn2.ubACcoupling	Bit11	0,1	0-Disable 1-Enable
	uFunctionEn2.ubPVArcEn	Bit12	0,1	0-Disable 1-Enable
	uFunctionEn2. ubSmartLoadEn	Bit13	0,1	0-Generator 1-Smart Load
	uFunctionEn2.ubRSDDisable	Bit14	0,1	0-Enable 1-Disable
	uFunctionEn2.OnGridAlwaysOn	Bit15	0,1	0-Disable 1-Enable
180	AFCIArcThreshold			
181	VoltWatt_V1	0.1V		1.05Vn-1.09Vn, default1.06Vn
182	VoltWatt_V2	0.1V		(V1+0.01Vn)-1.10Vn, default1.1Vn
183	VoltWatt_DelayTime	Main cnt	500-60000ms	Default 10000ms
184	VoltWatt_P2	%	0-200	
185	Vref_QV	0.1V		
186	Vref_filtertime	s	300-5000	
187	Q3_QV	%		
188	Q4_QV	%		
189	P1_QP	%		
190	P2_QP	%		
191	P3_QP	%		
192	P4_QP	%		
193	UVFIncreaseRatio	%Pm/Hz	1-100	Underfrequency load ramp rate
194	GenChgStartVolt	0.1V	384-520	Intitial voltage for generator charging the battery, which will

				be valid after selecting GenChg according to voltage.
195	GenChgEndVolt	0.1V	480-590	Battery voltage at the end of generator charging, which will be valid after selecting GenChg according to voltage.
196	GenChgStartSOC	%	0-90	SOC limit for generator charging the battery, which will be valid after selecting charge according to SOC
197	GenChgEndSOC	%	20-100	SOC limit to end thegenerator charging, which will be valid after selecting charge according to SOC
198	MaxGenChgBatCurr	A	0-4000	Max. Charge current from generator
199	OverTempDeratePoint	0.1℃	600-900	Overtemperature load reduction point
201	ChgFirstEndVolt	0.1V	480-590	Charging priority voltage limit
202	ForceDichgEndVolt	0.1V	400-560	Forced discharge voltage limit
203	GridRegulation			Grid regulation settings
204	LeadCapacity	Ah	50-5000	Capacity of the lead acid battery
205	GridType			0-Split240V/120V 1-3phase 208V/120V 2-Single 240V 3-Single 230V 4-Split 200V/100V
206	GridPeakShavingPower	0.1kw	0-255	
207	GridPeakShavingSOC	%	0-100	
208	GridPeakShavingVolt	0.1V	480-590	
209	PeakShavingStartHour	hour	0-23	PeakShaving start time_Hour setting
	PeakShavingStartMinute	min	0-59	PeakShaving start time_minutes setting
210	PeakShavingEndHour	hour	0-23	PeakShaving end time_hours setting
	PeakShavingEndMinute	min	0-59	PeakShaving end time_minutes setting
211	PeakShavingStartHour1	hour	0-23	PeakShaving sttart ime_hours setting
	PeakShavingStartMinute1	min	0-59	PeakShaving start time_minutes setting
212	PeakShavingEndHour1	hour	0-23	PeakShaving end time_ hours

				setting
	PeakShavingEndMinute 1	min	0-59	PeakShaving end time_minutes setting
213	SmartLoadOnVolt	0.1V	480-590	
214	SmartLoadOffVolt	0.1V	400-520	
215	SmartLoadOnSOC	%	0-100	
216	SmartLoadOffSOC	%	0-100	
217	StartPVpower	0.1kW	0-120	
218	GridPeakShavingSOC1	%	0-100	
219	GridPeakShavingVolt1	0.1V	480-590	
220	ACCoupleStartSOC	%	0-100	
221	ACCoupleEndSOC	%	0-255	
222	ACCoupleStartVolt	0.1V	400-595	
223	ACCoupleEndVolt	0.1V	420-800	
224	LCDVersion	But0~7	0-255	
	LCDScreenType	Bit8	0-1	0-screen of B size 1-screen of S size
	LCDODM	Bit9~15	0-127	See LCD Definition Table
225	LCDPassword		0~65535	Password for LCD Advanced page
227	BatStopChgSOC	%	10-101	When battery SOC reaches set value , inverter will stop charging the battery , and when the battery SOC < = (Set value -5), inverter will return charging the battery
228	BatStopChgVolt	0.1V	400-595	When battery Voltage reaches set value , inverter will stop charging the battery , and when the battery Volt < = (Set value -20), inverter will return charging the battery
230	unMeterCfg.MetersNum	Bit0~3	0-15	Meter Numbers
	RSVD0	Bit4~7		
	unMeterCfg.MeterMeasureType	Bit8	0,1	0-Meter1(Addr=1)measure AC Meter2(Addr=2)measure PV 1-reversed
	unMeterCfg.InstallPhase	Bit9~10	0-3	0-R phase，1-S phase，2-T phase，ensure the Install Phases of all meters are the same ，(only valid for 3phase meter)
	RSVD1	Bit11~12	0-3	
	RSVD2	Bit13~15		RVSD
231	unResetRecord.bit.G100	Bit0	0,1	1-Reset the G100 lockout state
	unResetRecord.bit.Rsvd			RVSD
232	GridPeakShavingPower1	0.1kW	0-255	

	uFunction4En. ubQuickChgStartEn	Bit0	0,1	
	uFunction4En. ubBattBackupEn	Bit1	0,1	
	uFunction4En. ubMaintenaceEn	Bit2	0，1	1-Enable， Once enabled ,andif battery is detected to be never got charged fully within 30days ， then battery will get fully charged from grid at 23：00 of the last day of 30days duration
	uFunction4En.ubWorkingMode	Bit3	0，1	0：arranging the work mode 1 for a 7-days time period 1：arranging the work mode 2 for a 7-days time period
	uFunction4En.ubDryContactorMultiplex	Bit4-7		0 - null 1 - RSD 2 - Dark Start 3 - Smart load 4 - Non-critical Load
	uFunction4En.ubExCTPosition	Bit8-9		0-GridtoUser 1-InvGridPort
233	uFunction4En.ubOverFreq_fstop	Bit10	0，1	0：deactivated , 1：activated
234	QuickChgTime	min		
	uwNoFullChgDay	Bit0~Bit7(Read only)	0~255	Days counter since the last time that battery SOC>=99
235	uwNoFullChgDayNumSet	Bit8~Bit15	0~255	Calibration period (Days) from the last time that battery SOC< 99
236	FloatChgThreshold	0.01C	1-255	When charge current in CV getting lower than this setting, switch to float charge
237	GenCoolDownTime	0.1min	1-255	Gen cool down time when dry contactor is off
241	Permit Service			0-disable , non 0-enable
242	uwNPEThreshold	0.1V	0-65535	Zero ground detection voltage range setting value
243	...			
	Bootloader_Version	Bit0-7	0-255	Bootloader Version
244	Bootloader_UpdateFlag	Bit8-15		
245	FlashSize		0-65535	
248	WattNode uwCtAmps1	A	0-6000	CT1 ratio of wattnode meters
249	WattNode uwCtAmps2	A	0-6000	CT2 ratio of wattnode meters
250	WattNode uwCtAmps3	A	0-6000	CT3 ratio of wattnode meters
	WattNode uwCtDirections1	Bit0	0,1	CT1 direction of wattnode meter
	WattNode uwCtDirections2	Bit1	0,1	CT2 direction of wattnode meter
	WattNode uwCtDirections3	Bit2	0,1	CT3 direction of wattnode meter
	WattNode_UpdateFrequency	Bit3~5	0~7	0 - 1S 1 - 5S 2 - 20S 3 - 60S 4 - 100 ms 5- 200ms 6- 500 ms
251	Resvd	Bit6~15	…	…
252	NEC120BusBarLimit	A		For NEC 120% Rule
253	DeltaSOC	%	5~80	SOC hysteresis, only set lower limit, to be improved
254	DeltaVolt	0.1V	20~100	Volt hysteresis, only set lower limit, to be improved
256	GenStartHour	hour	0-23	Generator start time_Hour setting
	GenStartMinute	min	0-59	Generator start time_minutes setting
257	GenEndHour	hour	0-23	Generator end time_hours setting
	GenEndMinute	min	0-59	Generator end time_minutes setting
258	GenStartHour1	hour	0-23	Generator start time_Hour setting
	GenStartMinute1	min	0-59	Generator start time_minutes setting
259	GenEndHour1	hour	0-23	Generator end time_hours setting

	GenEndMinute1	min	0-59	Generator end time_minutes setting
260	uwBusVoltHightSet	1 V	550-595	BUS overvoltage point alarm voltage setting value
261	bDisRecovSocThresh	%	Min:5%	Battery discharge recovery threshold：SOC
	bDisRecovVoltThresh	0.1V	Min:1V	Battery discharge recovery threshold：Volt

Table 8 Hold register mapping table

4. Appendix

1) Definition of the operation mode of on/off-grid energy storage all in one machine.

Status code	Device work status	Remark

0x00	Standby	
0x01	Fault	
0x02	Programming	
0x04	PV PV connected to grid	PV power feed back to grid, AC energy storage does not have this variable.
0x08	PV PV charging	PV power charge the battery, AC energy storage does not have this variable.
0x0C	PV charging connected to the grid	A portion of the PV power is used for battery charging, while another portion is used for feeding back to grid, and AC energy storage does not have this variable.
0x10	The battery connect to the grid	The power od battery discharging will feed back to grid
0x14	(PV+ battery) connected to the grid	Battery discharge and PV energy are connected to the grid together, and AC energy storage does not have this variable
0x20	AC charging	Grid charges the battery
0x28	(PV+AC) charging	PV and grid power charge the battery together, and AC energy storage does not have this variable.
0x40	The battery is off-grid	off-grid mode, battery discharge
0x60	Off-grid + battery charging	On-grid system charge the battery (AC Coupled)
0x80	PV off-grid	PV power fluctuates randomly, the off-grid output is unstable, and the inverter is prohibited from working in this state, and AC energy storage does not have this variable.
0xC0	(PV+ battery) off-grid	In 0ff-gird mode, PV power and battery discharge, AC energy storage does not have this variable.
0x88	PV charging + off-grid	A portion of the PV power is used for off-grid output, while another portion is used for battery charging, and AC energy storage does not have this variable.

Table 9 Operational mode definitions

2） Fault and Alarm Code Definitions

Bit0-31	Fault information	Fault Code	Warning information	Warning Code
0	Internal communication failure 1	E000	Battery communication failed	W000
1	Model fault	E001	AFCI communication failure	W001
2	rsvd	E002	AFCI High Battery low temperature AFCI High	W002
3	rsvd	E003	Meter communication failed	W003
4	rsvd	E004	The battery cannot be	W004

			charged and discharged	
5	rsvd	E005	The automated test failed	W005
6	rsvd	E006	RSD Active	W006
7	rsvd	E007	LCD communication failure	W007
8	Parallel CAN communication failure	E008	Software version mismatch	W008
9	The host is missing	E009	The fan is stuck and not rotating	W009
10	The rated power output of multiple hosts or parallel machines is inconsistent 8-12K:Inconsistent rated power output for grid connection Trip6-20k:Inconsistent rated power output for grid connection	E010	Rsvd Trip6-20k: Grid overload	W010
11	The AC of the parallel system is inconsistent or the safety settings of the parallel system are inconsistent 8-12K:Inconsistent parallel machine safety regulations Trip6-20k:Inconsistent parallel machine safety regulations	E011	The number of secondary units for parallel operation exceeds the Limit Trip6-20k:Rsvd	W011
12	UPS short circuit	E012	Battery reverse MOS becomes abnormal 8-12k:The parallel system is experiencing phase loss Trip6-20k:The parallel system is experiencing phase loss	W012
13	UPS reverse current	E013	Temperature of the radiator is out of range 8-12k:The parallel system does not have a designated primary unit Trip6-20k:The parallel system does not have a designated primary unit	W013
14	BUS short circuit	E014	Set up multiple hosts in the parallel system	W014
15	The phase of the three-phase parallel system is abnormal	E015	Battery reverse	W015
16	Relay failure	E016	No grid connection	W016
17	Internal communication failure 2	E017	The grid voltage exceeds the specified range	W017
18	Internal communication failure 3	E018	The grid frequency exceeds the specified range	W018
19	BUS overvoltage	E019	rsvd	W019
20	EPS connection fault	E020	The insulation resistance is low, and AC energy storage does not have this variable	W020
21	PV overvoltage, AC energy storage without this fault	E021	The leakage current is too high	W021

22	~~Overcurrent protection~~	E022	DCI exceeded the standard	W022
23	Neutral fault	E023	PV short circuit, AC energy storage does not have this variable	W023
24	PV short circuit, AC energy storage has no such fault	E024	Rsvd Trip6-20k:GFCI module failure	W024
25	Heatsink temperature out of range	E025	Battery overvoltage	W025
26	Internal failure	E026	Battery undervoltage	W026

27	Consistency failure	E027	Battery open circuit	W027
28	The generator connection in parallel system is inconsistent	E028	EPS overload	W028
29	Parallel synchronization triggers signal loss	E029	EPS voltage high	W029
30	rsvd	E030	Meter reversed	W030
31	Internal communication failure 4	E031	DCV exceeded the standard	W031

Table 10 Fault and alarm definitions

FaultCode	Fault decription	LCD display	Trouble shooting
E000	Internal communication fault1	E000	Restart inverter, if the error still exist, contact us (DSP&M3)
E001	Model fault	E001	Reset model, check if safety standard switch is at the right place
E002	rsvd	E002	
E003	rsvd	E003	
E004	rsvd	E004	
E005	rsvd	E005	
E006	rsvd	E006	
E007	rsvd	E007	
E008	**Parallel CAN communication failure**	E008	Check CAN cable connection
E009	**The host is missing**	E009	Check parallel setting
E010	Muti Master units in parallel system 8-12KW : Para Rating Watt Diff Inverters are with different power rating configurations	E010	Check parallel setting
E011	Inconsistent AC connection 8-12k: grid safety settings in parallel computing systems.	E011	Check parallel connection Check parallel setting
E012	**UPS**	E012	Check parallel connection or contact us

	UPS short circuit		
E013	**UPS** **UPS backfilling**	E013	Restart inverter, if the error still exist, contact us
E014	**BUS BUS short circuit**	E014	Contact us
E015	Phase abnormality in a three-phase parallel system	E015	Check parallel connection and setting
E016	Relay fault	E016	Restart inverter, if the error still exist, contact us
E017	Internal communication fault2	E017	Restart inverter, if the error still exist, contact us (DSP&M8)
E018	Internal communication fault3	E018	Restart inverter, if the error still exist, contact us (DSP&M3)
E019	Bus voltage high	E019	Check PV input connection
E020	EPS connection fault	EPS CN Fault	Check EPS and AC connection
E021	PV voltage high	PV voltage high	Check PV input connection
E023	Neutral fault	Neutral fault	Check neutral connection
E024	PV short	E024	Check PV connection
E025	Temperature over range	NTC Open	Check NTC connection
E026	Internal Fault	E026	Restart inverter, if the error still exist, contact us (Bus sample)
E027	Sample inconsistant between main and slave CPU	E027	Restart inverter, if the error still exist, contact us
E028	SNA 3000-6000: sync signal lost in parallel system ; The parallel synchronization signal is lost 8-12KW :Para Gen connection unAccord; the generator connection is abnormal	E028	Check CAN cable connection Check Gen connection
E029	sync triger signal lost in parallel system. Parallel synchronization triggers signal loss	E029	Check CAN cable connection
E030	rsvd	E030	

E031	Internal communication fault4	E031	Restart inverter, if the error still exist, contact us (DSP&M8)

Table 11 Failure Information Table

WarningCode	Warning decription	LCD display	Trouble shooting
W000	Communication failure with battery	Batery Com Fault	Check communication cable, if the warning still exist, contact us
W001			
W002			
W003	Communication failure with meter	Meter Com Fault	Check communication cable, if the warning still exist, contact us
W004	Battery failure	Battery failure	Restart battery, if the warning still exist, contact us
W005	AutoTest failure	AutoTest failure	Restart inverter, if the error still exist, contact us
W006			
W007	LCD communication Fault	W007	Restart battery, if the warning still exist, contact us
W008	Software mismatch	W008	
W009	Fan Stuck	W009	Restart inverter, if the error still exist, contact us
W010	Same para address	W010	
W011	Secondary overflow	W011	Check parallel number
W012	BatOnMos 8-12KW: Phase loss for parallel system	W012	Restart inverter, if the error still exist, contact us
W013	Overtemprature 8-12KW: No primary set in parallel system	W013	Restart inverter(or check parallel setting), if the error still exist, contact us
W014	8-12KW: Muti-Primary set in parallel system	W014	Check parallel setting
W015	Battery Reverse	W015	Check battery input polarities(available for SNA unit)
W016	No AC Connection	No AC Connection	Check AC Connection
W017	AC Voltage out of range	AC V Outrange	Check AC voltage
W018	AC Frequency out of range	AC F Outrange	Check AC frequency
W019	AC inconsistent in parallel system2 The parallel AC is inconsistent	W019	Check parallel connection or contact us

W020	PV Isolation low	PV Isolation low	Restart inverter, if the error still exist, contact us
W021	Leakage I high	Leakage I high	Restart inverter, if the error still exist, contact us
W022	DC injection high	DC injection high	Restart inverter, if the error still exist, contact us
W023	PV short circuit	PV short	Check PV input connection
W024			
W025	Battery voltage high	Bat Volt High	Check battery connection
W026	Battery voltage low	Bat Volt Low	Check battery connection
W027	Battery open	Battery open	Check battery connection
W028	EPS Overload	EPS Over load	Check EPS load
W030	Meter Reversed	W030	Check meter connection
W031	EPS DCV high	W031	Restart inverter, if the error still exist, contact us

Table 12 Alarm information table

3）On-grid Regulatory Mapping Table

Bit0-31	Type of safety	Remark	American model voltage system Safety type
0	General	Same VDE0126	UL1741&IEEE1547
1	VDE0126	Germany	Hawaii（HECO）
2	AS4777	Australia	USA(rule21)
3	NEWZEALAND	New Zealand	PR-LUMA
4	CGC	China	KIUC
5	G59	United Kingdom	
6	G83	United Kingdom	
7	N4105	Germany	
8	CEI0-21	Italy	
9	EN50438		
10	EN50438_Finland	Finland	
11	Japan	Japan	
12	PEA	Thailand	
13	MEA	Thailand	

14	EN50438_Ireland	Ireland	
15	Czech	Czech Republic	
16	South Africa	South Africa	
17	Barbadors	Barbadors	
18	CEI021ARETI		
19	EN50549		
20	Denmark	Denmark	
21	Poland	Poland	
22	Spain	Spain	
23	C10/C11	Belgium	
24	TOR	Austria	
25	Denmark-2	Denmark(DK2)	
26			
27			
28			
29			
30			
31			

Table 13: on-grid regulatory mapping table

4) LCD Definition Table

Code	Definition	
	Brand	Machine type
LCD0	Luxpowertek	LXP-LB-8-12K
LCD1	EG4	LXP-LB-8-12K
LCD2	CROWN	LXP-LB-8-12K
LCD3	EG4 MINUS	LXP-LB-8-12K
LCD4	Luxpowertek	10K
LCD5	EG4	10K
LCD6	CROWN	10K
LCD7	Luxpowertek	100K
LCD8	Luxpowertek	6-20K
LCD9	EG4	6-20K
LCD10	CROWN	6-20K
LCD11	Luxpowertek	Trip_LV
LCD12	Luxpowertek	GEN3-6K
LCD13	EG4	GEN3-6K
LCD14	CROWN	GEN3-6K
LCD15	...	...
LCD16	Luxpowertek	GEN7-10K
LCD17	EG4	GEN7-10K
LCD18	CROWN	GEN7-10K
LCD19	...	...
LCD20	Luxpowertek	SNA
LCD21	EG4	SNA
LCD22	CROWN	SNA
RSVD	...	...