



EG4 18KPV-12LV

Modbus RTU Protocol

1. Modbus RTU Introduction

1) Format

Table 1 format of message

Address	Function Code	Data	CRC	
1Byte	1Byte	1-252Bytes	Low Byte	High Byte

Function Code

0x03 Read Hold

0x04 Read Input

0x06 Write Single Hold

0x10 Write Multi hold registers

2) Bit definition

Table 2 Bit sequency

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

3) Request and Response

The response includes normal response and error response, where the error code is defined as follows:

Table 3 Error code

Error code	Error description	Remarks
0x01	Illegal function code	The slave cannot recognize the function code
0x02	illegal data address	Data address does not match length
0x03	illegal data value	Data value out of bounds or wrong

		number of registers
0x04	Slave read and write failure	read and write errors
0x06	Slave is busy	Slave is busy

a) Read Hold and Input registers

Table 4 Read requests and responses

Requests	Normal response	Error response
address	address	address
Function code (0x03/0x04)	Function code (0x03/0x04)	Error 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 byte	number of bytes	Error code
Number of registers N high byte	Register A value low byte	CRC check low byte

CRC check low byte	Register A value high byte	CRC check high byte
CRC check high byte	Register A+1 value low byte	
	Register A+1 value high byte	
	...	
	...	
	Register A+N-1 value low byte	
	Register A+N-1 value high byte	
	CRC check low byte	
	CRC check high byte	

b) Write a single hold register

Table 5 Write a single hold register

Request	Normal response	Error response
Address	Address	Address
Function code (0x06)	Function code (0x06)	Error 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 A address low byte	Register A address low byte	Start address A low byte
Register A address high byte	Register A address high byte	Start address A high byte
Register A value low byte	Register A value low byte	Error code
Register A value high byte	Register A value high byte	CRC check low byte
CRC check low byte	CRC check low byte	CRC check high byte
CRC check high byte	CRC check high byte	

b) Write multiple hold registers

The command is only available for device serial number and time setting.

Table 6 Write multiple hold registers

Request	Normal response	Error response
Address	Address	Address
Function code (0x10)	Function code (0x10)	Error 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 byte	Number of registers N low byte	Error code
Number of registers N high byte	Number of registers N high byte	CRC check low byte
Number of Bytes	CRC check low byte	CRC check high byte
Register A value low byte	CRC check high byte	
Register A value high byte		
Register A +1 value low byte		
Register A +1 value high byte		
.....		
.....		
Register A +N-1 value low byte		
Register A +N-1 value high byte		
CRC check low byte		
CRC check high byte		

2. Communication configuration

- 1) Physical interface: RS-485
- 2) Communication method: Universal Asynchronous Transceiver (UART)
- 3) Baud rate: 19200bps
- 4) One start bit, 8 data bits, no parity bit, one stop bit, 10 bytes in total
- 5) Minimum polling period: 1s
- 6) Register width: 2 bytes
- 7) 16-bit integer decoding order: high and low byte order is reversed, such as 0x01 0x02, it should be parsed as 0x0201=513
- 8) 32-bit integer decoding order: the high and low word order is reversed, and the byte order within the word is reversed, such as 0x01 0x02 0x03 0x04, which should be parsed as 0x04030201=67305985
- 9) A maximum of 40 registers can be queried at a time. The inverter software groups the registers into 40 groups of 0-39, 40-79, 80-119 and so on. When querying 40 registers, the starting address must be 0 (0-39), 40 (40-79), 80 (80-119), it is not allowed to query registers across groups at the same time, if you need to query the values of these registers 38-40, because 38-39 is in the first group, 40 is in the second group, so it must be divided into two query.

3. Register mapping table

- 1) Input register

It is used to store the running data of the energy storage machine. It can only be read but not written. It supports the 0x04 function code.

Table 7 Input register mapping table (the green background is a signed number)

Input Addr	Item	Unit	Range	Note
0	State		0-65535	see operating mode definition table
1	Vpv1	0.1V	0-65535	PV1 voltage,
2	Vpv2	0.1V	0-65535	PV2 voltage
3	Vpv3	0.1V	0-65536	PV3 voltage

4	Vbat	0.1V	0-65535	battery voltage
5	SOC	%	0-100	battery capacity
	SOH	%	0-100	State of health
6	InternalFault		0-65535	See Internal DTC Definitions
7	Ppv1	W	0-65535	PV1 power
8	Ppv2	W	0-65535	PV2 power
9	Ppv3	W	0-65536	PV3 power
10	Pcharge	W	0-65535	Charging power (incoming battery power)
				Discharge power (outflow battery power)
11	Pdischarge	W	0-65535	Discharge power (outflow battery power)
12	VacR	0.1V	0-65535	R-phase mains voltage
13	VacS	0.1V	0-65535	S-phase mains voltage
14	VacT	0.1V	0-65535	T-phase mains voltage
15	Fac	0.01Hz	0-65535	Mains frequency
16	Pinv	W	0-65535	inverter output power(Grid port)
				AC charging rectified power
17	Prec	W	0-65535	AC charging rectified power
18	linvRMS	0.01A	0-65535	Inverter current RMS
19	PF	0.001	0-2000	$Pf \times \epsilon(0,1000] \rightarrow x/1000$ $\times \epsilon(1000,2000) \rightarrow (1000-x)/1000$
20	VepsR	0.1V	0-65535	R-phase off-grid output voltage
				S-phase off-grid output voltage
21	VepsS	0.1V	0-65535	S-phase off-grid output voltage
				T-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
25	Seps	VA	0-65535	Off-grid apparent power
26	Ptgrid	W	0-65535	export power to grid
27	Ptouser	W	0-65535	import power from grid
28	Epv1_day	0.1kWh	0-65535	PV1 power generation today
29	Epv2_day	0.1kWh	0-65535	PV2 power generation today
30	Epv3_day	0.1kWh	0-65535	PV3 power generation today
31	Einv_day	0.1kWh	0-65535	Today's grid-connected inverter output energy
				Today's AC charging rectified energy
32	Erec_day	0.1kWh	0-65535	Today's AC charging rectified energy
33	Echg_day	0.1kWh	0-65535	Charged energy today
34	Edischg_day	0.1kWh	0-65535	Discharged energy today
35	Eeps_day	0.1kWh	0-65535	Off-grid output energy today
36	Etogrid_day	0.1kWh	0-65535	Today's export energy to grid
37	Etouser_day	0.1kWh	0-65535	Today's import energy from grid

38	Vbus1	0.1V	0-65535	Bus 1 Voltage
39	Vbus2	0.1V	0-65535	Bus 2 Voltage
40	Epv1_all L	0.1kWh	0-65535	PV1 cumulative power generation low word
41	Epv1_all H	0.1kWh	0-65535	PV1 cumulative power generation high word
42	Epv2_all L	0.1kWh	0-65535	PV2 cumulative power generation low word
43	Epv2_all H	0.1kWh	0-65535	PV2 cumulative power generation high word
44	Epv3_all L	0.1kWh	0-65535	Low word of PV3 cumulative power generation
45	Epv3_all H	0.1kWh	0-65535	PV3 cumulative power generation high word
46	Einv_all L	0.1kWh	0-65535	inverter accumulative output energy low word
47	Einv_all H	0.1kWh	0-65535	inverter accumulative output energy High word
48	Erec_all L	0.1kWh	0-65535	AC charging accumulative rectified energy low word
49	Erec_all H	0.1kWh	0-65535	AC charging accumulative rectified energy High word
50	Echg_all L	0.1kWh	0-65535	Cumulative charge energy level low word
51	Echg_all H	0.1kWh	0-65535	Cumulative charge energy High word
52	Edischg_all L	0.1kWh	0-65535	Cumulative discharge energy low word
53	Edischg_all H	0.1kWh	0-65535	Cumulative discharge energy High word
54	Eeps_all L	0.1kWh	0-65535	Cumulative off-grid inverter power Low word
55	Eeps_all H	0.1kWh	0-65535	Cumulative off-grid inverter power High word
56	Etogrid_all L	0.1kWh	0-65535	Cumulative export energy to grid low word
57	Etogrid_all H	0.1kWh	0-65535	Cumulative export energy to grid High word
58	Etouser_all L	0.1kWh	0-65535	Cumulative import energy from grid low word
59	Etouser_all H	0.1kWh	0-65535	Cumulative import energy from grid High word
60	FaultCode L		0-65535	Check Fault code definition table
61	FaultCode H		0-65535	Check Fault code definition table
62	WarningCode L		0-65535	Check warning code definition table
63	WarningCode H		0-65535	Check warning code definition table
64	Tinner	°C	0-65535	Internal ring temperature
65	Tradiator1	°C	0-65535	Radiator temperature 1
66	Tradiator2	°C	0-65535	Radiator temperature 2
67	Tbat	°C	0-65535	battery temperature

68				
69	RunningTime L	Second		runtime
70	RunningTime H	Second		runtime
71	AutoTestStart	Bit0-3		0-Not activated 1-Activated
	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/0.01 Hz		If ubAutoTestStep=1,2,5,6, Voltage limit; If ubAutoTestStep=3,4,7,8, Frequency limit
73	uwAutoTestDefaultTime	ms		
74	uwAutoTestTripValue	0.1V/0.01 Hz		If ubAutoTestStep=1,2,5,6, Voltage limit; If ubAutoTestStep=3,4,7,8, Frequency limit
75	uwAutoTestTripTime	ms		
76				
77	ACInputType		0 or 1	0-Grid 1-Generator for 12KHybrid
78				
79				
81	MaxChgCurr	0.01A		BMS limited maximum charging current
82	MaxDischgCurr	0.01A		BMS limited maximum discharge current
83	ChargeVoltRef	0.1V		BMS recommended charging voltage
84	DischgCutVolt	0.1V		BMS recommends discharge cut-off voltage
85	BatStatus0_BMS			BMS status information
86	BatStatus1_BMS			BMS status information
87	BatStatus2_BMS			BMS status information
88	BatStatus3_BMS			BMS status information
89	BatStatus4_BMS			BMS status information
90	BatStatus5_BMS			BMS status information
91	BatStatus6_BMS			BMS status information
92	BatStatus7_BMS			BMS status information
93	BatStatus8_BMS			BMS status information
94	BatStatus9_BMS			BMS status information
95	BatStatus_INV			Inverter summarizes lithium battery status information
96	BatParallelNum			Number of batteries in parallel
97	BatCapacity	Ah		battery capacity
98	BatCurrent_BMS	0.01A		battery current, signed
99	FaultCode_BMS			
100	WarningCode_BMS			

101	MaxCellVolt_BMS	0.001V		Maximum cell voltage
102	MinCellVolt_BMS	0.001V		Minimum cell voltage
103	MaxCellTemp_BMS	0.1°C		Maximum monomer temperature, signed number
104	MinCellTemp_BMS	0.1°C		Minimum monomer temperature, signed number
105	BMSFWUpdateState		1-3	1-Upgrading 2-Upgrading successful 3-Upgrading failed
106	CycleCnt_BMS			Number of charge and discharge cycles
107	BatVoltSample_INV	0.1V		Inverter battery voltage sampling
108	T1	0.1°C		12K BT temperature
109	T2	0.1°C		reserved
110	T3	0.1°C		reserved
111	T4	0.1°C		reserved
112	T5	0.1°C		reserved
113	MasterOrSlave	Bit0~1	1,2	1:master; 2:slave
	SingleOrThreePhase	Bit2~3	1-3	Phase 1:R; 2:S ; 3:T;
	Resvd	Bit4~7		reserved
	ParallelNum	Bit8~16	1~255	Number of parallel machines
114				
115				
116				
117				
118				
119				
120	VBusP	0.1V		Half BUS voltage
121	GenVolt	0.1V		Generator voltage
122	GenFreq	0.01Hz		Generator frequency
123	GenPower	W		Generator power
124	Egen_day	0.1kWh		Daily energy of generator
125	Egen_all L	0.1kWh		Low word of total generator energy
126	Egen_all H	0.1kWh		High word of total generator energy
127	EPSVoltL1N	0.1V		Voltage of EPS L1N
128	EPSVoltL2N	0.1V		Voltage of EPS L2N
129	Peps_L1N	W		Active power of EPS L1N
130	Peps_L2N	W		Active power of EPS L2N
131	Seps_L1N	VA		Apparent power of EPS L1N

132	Seps_L2N	VA		Apparent power of EPS L2N
133	EepsL1N_day	0.1kWh		Daily energy of EPSSL1N
134	EepsL2N_day	0.1kWh		Daily energy of EPSSL2N
135	EepsL1N_all L	0.1kWh		Low word of total EPSSL1N energy
136	EepsL1N_all H	0.1kWh		High word of total EPSSL1N energy
137	EepsL2N_all L	0.1kWh		Low word of total EPSSL2N energy
138	EepsL2N_all H	0.1kWh		High word of total EPSSL2N energy
139				
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.SelfTestResultCH1	Bit4		Test result of CH1 0-Normal 1-fail
	AFCIFlag.SelfTestResultCH2	Bit5		Test result of CH2 0-Normal 1-fail
	AFCIFlag.SelfTestResultCH3	Bit6		Test result of CH3 0-Normal 1-fail
	AFCIFlag.SelfTestResultCH4	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

2) Hold register

Used to store the system parameters of the energy storage machine, etc., readable and writable, supports 0x03, 0x06, 0x10 function codes

Table 8 Hold Register Mapping Table

Hold Addr	Item	Unit	Range and default	Note
2	SN[0]-Year		'0'-'9' 'A'-'Z'	The Serial number consists of the bytes ASCII code ie: AB12345678 SN[0]=0x41(A) : : : : SN[9]=0x38(8)
	SN[1]-week		'0'-'9' 'A'-'Z'	
3	SN[2]-week		'0'-'9' 'A'-'Z'	
	SN[3]-factory		'0'-'9' 'A'-'Z'	
4	SN[4]-Product code		'0'-'9' 'A'-'Z'	
	SN[5]-Product code		'0'-'9' 'A'-'Z'	
5	SN[6]-Product code		'0'-'9' 'A'-'Z'	
	SN[7]-batch number		'0'-'9' 'A'-'Z'	
6	SN[8]-batch number		'0'-'9' 'A'-'Z'	
	SN[9]-batch number		'0'-'9' 'A'-'Z'	
7				
8				
9	Slave Ver		0-255	Redundant CPU FW version,
	Com Ver		0-255	Communication CPU FW version,
10	Cntl Ver		0-255	Control CPU FW version,
	FWVer		0-255	FW Version code ,
11	ResetSetting.EnergyRecordClr	Bit0	0/1	Power and running time reset
	ResetSetting.AlltoDefault	1	0/1	Restoring system settings to default values
	ResetSetting.AdjRatioClr	2	0/1	Correction coefficient returns to default (1)
	ResetSetting.FaultRecordClr	3	0/1	Clear fault record
	ResetSetting.MonitorData	4	0/1	Clear offline monitoring data records
	ResetSetting.BMSChgSWOn	5	0/1	0-null 1- turn on charge switch
	ResetSetting.BMSDischgSWOn	6	0/1	0-null 1- turn on discharge switch
	ResetSetting.InvReboot	7	0/1	0-null 1- restart inverter

	ResetSetting.rsvd		0/1	
	ResetSetting.rsvd		0/1	
	ResetSetting.rsvd		0/1	
	ResetSetting.rsvd		0/1	
	ResetSetting.rsvd		0/1	
	ResetSetting.rsvd		0/1	
	ResetSetting.rsvd		0/1	
12	Time_Year		17-255	year
	Time_Month		1-12	moon
13	Time_Date		1-31	day
	Time_Hour		0-23	Time
14	Time_Minute		0-59	Minute
	Time_Second		0-59	Second
15	Com Addr		0-150	mailing address
16	Language		0-1	Language 0-English 1-German
17				
18				
20	PVInputModel		0-4 For 12KHybrid:0-7	0:No PV plug in 1: PV1 plug in 2: PV2 plug in 3: two parallel PV 4: two separate PV, 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
21	FuncEn.EPSEn	0	0/1	Off-grid mode enabled
	FuncEn.OVFLoadDerateEn	1	0/1	Over frequency load reduction enable
	FuncEn.DRMSEn	2	0/1	DRMS enabled
	FuncEn.LVRTEn	3	0/1	Low Voltage Ride Through Enable
	FuncEn.AntiIslandEn	4	0/1	Anti-islanding enable
	FuncEn.NeutralDetectEn	5	0/1	Zero ground detection enable
	FuncEn.GridOnPowerSSEn	6	0/1	Grid-connected power soft start enable
	FuncEn.ACChargeEn	7	0/1	AC Charge Enable
	FuncEn.SWSeamlesslyEn	8	0/1	Off-grid mode seamless switching enabled
	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 enabled,
	FuncEn.GFCIEn	13	0/1	GFCI enabled
	FuncEn.DCIEn	14	0/1	DCI enable
	FuncEn.FeedInGridEn	15	0/1	0-disable 1-enable
22	StartPVPVlt	0.1V	900-5000	PV working starting voltage,
23	ConnectTime	s	30-600	Grid connection waiting time
24	ReconnectTime	s	0-900	Reconnection waiting time
25	GridVoltConnLow	0.1V	According to Grid regulation	The lower limit of the allowable grid-connected mains voltage range
26	GridVoltConnHigh	0.1V	According to Grid regulation	The upper limit of the allowable grid-connected mains voltage range
27	GridFreqConnLow	0.01Hz	According to Grid regulation	The lower limit of the allowable grid-connected mains voltage range
28	GridFreqConnHigh	0.01Hz	According to Grid regulation	The upper limit of the allowable grid-connected mains voltage range
29	GridVoltLimit1Low	0.1V	According to Grid regulation	Grid voltage level 1 undervoltage protection point
30	GridVoltLimit1High	0.1V	According to Grid regulation	Grid voltage level 1 overvoltage protection point
31	GridVoltLimit1LowTime	Main period	According to Grid regulation	Grid voltage level 1 undervoltage protection time
32	GridVoltLimit1HighTime	Main period	According to Grid regulation	Grid voltage level 1 overvoltage protection time
33	GridVoltLimit2Low	0.1V	According to Grid regulation	Grid voltage level 2 undervoltage protection point
34	GridVoltLimit2High	0.1V	According to Grid regulation	Grid voltage level 2 overvoltage protection point
35	GridVoltLimit2LowTime	Main period	According to Grid regulation	Grid voltage level 2 undervoltage protection time

			n	
36	GridVoltLimit2HighTime	Main period	According to Grid regulation	Grid voltage level 2 overvoltage protection time
37	GridVoltLimit3Low	0.1V	According to Grid regulation	Grid voltage level 3 undervoltage protection point
38	GridVoltLimit3High	0.1V	According to Grid regulation	Grid voltage level 3 overvoltage protection point
39	GridVoltLimit3LowTime	Main period	According to Grid regulation	Grid voltage level 3 undervoltage protection time
40	GridVoltLimit3HighTime	Main period	According to Grid regulation	Grid voltage level 3 overvoltage protection time
41	GridVoltMovAvgHigh	0.1V	According to Grid regulation	Grid voltage sliding average overvoltage protection point
42	GridFreqLimit1Low	0.01Hz	According to Grid regulation	Grid frequency class 1 underfrequency protection point
43	GridFreqLimit1High	0.01Hz	According to Grid regulation	Grid frequency class 1 overfrequency protection point
44	GridFreqLimit1LowTime	Main period	According to Grid regulation	Grid frequency class 1 underfrequency protection time
45	GridFreqLimit1HighTime	Main period	According to Grid regulation	Grid frequency class 1 overfrequency protection time
46	GridFreqLimit2Low	0.01Hz	According to Grid regulation	Grid frequency level 2 under-frequency protection point
47	GridFreqLimit2High	0.01Hz	According to Grid regulation	Grid frequency class 2 overfrequency protection point
48	GridFreqLimit2LowTime	Main period	According to Grid regulation	Grid frequency level 2 under-frequency protection time
49	GridFreqLimit2HighTime	Main period	According to Grid regulation	Grid frequency class 2 overfrequency protection

			n	time
50	GridFreqLimit3Low	0.01Hz	According to Grid regulation	Grid frequency level 3 under-frequency protection point
51	GridFreqLimit3High	0.01Hz	According to Grid regulation	Grid frequency class 3 overfrequency protection point
52	GridFreqLimit3LowTime	Main period	According to Grid regulation	Grid frequency level 3 under-frequency protection time
53	GridFreqLimit3HighTime	Main period	According to Grid regulation	Grid frequency class 3 overfrequency protection time
54	MaxQPercentForQV	%	According to Grid regulation	Maximum reactive power percentage of Q(V) curve
55	V1L	0.1V	According to Grid regulation	Q(V) curve undervoltage 1
56	V2L	0.1V	According to Grid regulation	Q(V) curve undervoltage 2
57	V1H	0.1V	According to Grid regulation	Q(V) curve overvoltage1
58	V2H	0.1V	According to Grid regulation	Q(V) curve overvoltage 2
59	ReactivePowerCMDType		0-7	Reactive 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 setting value
62	PFCMD	0.001	750-1000, 1750-2000	PF setting value, 750-1000(under), 1750-2000(over)

63	PowerSoftStartSlope	‰ /min	1-4000	Loading rate, percent power increase per minute
64	ChargePowerPercentCMD	%	0-100	Charging power percentage setting
65	DischgPowerPercentCMD	%	0-100	Discharge power percentage setting
66	ACChgPowerCMD	%	0-100	AC charge percentage setting
67	ACChgSOCLimit	%	0-100	AC charging SOC limit setting
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_min setting
70	ACChgStartHour1	hour	0-23	AC charging start time_hour setting
	ACChgStartMinute1	min	0-59	AC charging start time_minute setting
71	ACChgEndHour1	hour	0-23	AC charging end time_hour setting
	ACChgEndMinute1	min	0-59	AC charging end time_min 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_min setting
74	ChgFirstPowerCMD	%	0-100	Charging priority percentage setting
75	ChgFirstSOCLimit	%	0-100	Charging priority SOC limit setting
76	ChgFirstStartHour	hour	0-23	Charging priority start time_hour setting
	ChgFirstStartMinute	min	0-59	Charging priority start time_min setting
77	ChgFirstEndHour	hour	0-23	Charging priority end time_hour setting
	ChgFirstEndMinute	min	0-59	Charging priority end time_min 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_min setting
80	ChgFirstStartHour2	hour	0-23	Charging priority start time_hour setting
	ChgFirstStartMinute2	min	0-59	Charging priority start time_min setting
81	ChgFirstEndHour2	hour	0-23	Charging priority end time_hour setting
	ChgFirstEndMinute2	min	0-59	Charging priority end time_min 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_min setting
85	ForcedDischgEndHour	hour	0-23	Forced discharge end time_hour setting
	ForcedDischgEndMinute	min	0-59	Forced discharge end time_min setting
86	ForcedDischgStartHour1	hour	0-23	Forced discharge start time_hour setting
	ForcedDischgStartMinute1	min	0-59	Forced discharge start time_min setting
87	ForcedDischgEndHour1	hour	0-23	Forced discharge end time_hour setting
	ForcedDischgEndMinute1	min	0-59	Forced discharge end time_min setting
88	ForcedDischgStartHour2	hour	0-23	Forced discharge start time_hour setting
	ForcedDischgStartMinute2	min	0-59	Forced discharge start time_min setting
89	ForcedDischgEndHour2	hour	0-23	Forced discharge end time_hour setting
	ForcedDischgEndMinute2	min	0-59	Forced discharge end time_min setting
90	EPSPVoltageSet	1V	230,240, 277,208	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) Time delay
97	DelayTimeForOverFDerate	Main period	0-1000	Over frequency load reduction delay
98	AutoTestStart		0/1	0-Stop 1-Start
99	ChargeVoltRef	0.1V	500-590	Lead-acid battery charging given voltage
100	CutVoltForDischg	0.1V	400-500	Lead-acid battery discharge cut-off voltage
101	ChargeCurr	%A	0-140	recharging current
102	DischgCurr	%A	0-140	Discharge current
103	MaxBackFlow	%	0-100	Feed-in grid power set
104	DischgChgSWCMD		0-2	0-No action 1-Discharge to charge 2-charge to discharge
105	EOD	%	10%-90%	Cut SOC for discharge
106	TemprLowerLimitDischg	0.1°C	0-65536	Lead-acid Temperature low limit for discharge
107	TemprUpperLimitDischg	0.1°C	0-65536	Lead-acid Temperature high limit for discharge
108	TemprLowerLimitChg	0.1°C	0-65536	Lead-acid Temperature low limit for charge
109	TemprUpperLimitChg	0.1°C	0-65536	Lead-acid Temperature high limit for charge
110	FunctionEn1.ubPVGridOffEn	Bit0	0,1	0-disable 1-enable
	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
		FunctionEn1. PVCTSampleRatio	Bit12-13	
111				
112	SetSystemType		0,1,2	System type 0-no parallel (non-parallel system) 1-single phase parallel(master) 2-slave

				3-three phase parallel(master)
113	SetComposedPhase		1-3	Composed phases in parallel system 1-R 2-S 3-T
114	ClearFunction		1	Clear fault code of parallel connection 1- clear
115	OVFDerateStartPoint	0.01Hz	5000-5200	Over Frequency Derating power Start point
116	PtoUserStartdischg	1W	50W-	Ptouser limit to use battery power
118	VbatStartDerating	0.1V	>CutVolt ForDischg +2V	For lead-acid battery, according to given curve decrease discharge 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	0-3	0-disable 1-according to time 2-according to voltage 3-according to SOC
	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
121	BusVoltHighEE Q2_QV	0.1V-%	4500-5500	
124	OVFDerateEndPoint	0.01Hz	5000-5200	Overfrequency load reduction end frequency point
125	SOCLowLimitForEPSDischg	%	0-EOD	SOC low limit for EPS discharge
126	OptimalChg_DisChg.Time0	Bit0~1	0~2	0:00~0:30 time period charge and discharge mark;
	OptimalChg_DisChg.Time1	Bit2~3	0~2	Default: 0;
	OptimalChg_DisChg.Time2	Bit4~5	0~2	0-no action, 1-charging, 2-discharging;
	...			0:30~1:00 time period charge and discharge mark;
	OptimalChg_DisChg.Time7	Bit14~15	0~2	1:00~1:30 time period charge and discharge mark;
127	OptimalChg_DisChg.Time8	Bit0~1	0~2	

	OptimalChg_DisChg.Time9	Bit2~3	0~2	3:30~4:00 time period charge and discharge mark;
	OptimalChg_DisChg.Time10	Bit4~5	0~2	4:00~4:30 time period charge and discharge mark;
	...			
	OptimalChg_DisChg.Time15	Bit14~15	0~2	7:30~8:00 time period charge and discharge mark;
128	OptimalChg_DisChg.Time16	Bit0~1	0~2	8:00~8:30 time period charge and discharge mark;
	OptimalChg_DisChg.Time17	Bit2~3	0~2	Default: 0;
	OptimalChg_DisChg.Time18	Bit4~5	0~2	0-no action, 1-charging, 2-discharging;
	...			
	OptimalChg_DisChg.Time23	Bit14~15	0~2	11:30~12:00 time period charge and discharge mark;
129	OptimalChg_DisChg.Time24	Bit0~1	0~2	12:00~12:30 time period charge and discharge mark;
	OptimalChg_DisChg.Time25	Bit2~3	0~2	Default: 0;
	OptimalChg_DisChg.Time26	Bit4~5	0~2	0-no action, 1-charging, 2-discharging;
	...			
	OptimalChg_DisChg.Time31	Bit14~15	0~2	15:30~16:00 time period charge and discharge mark;
130	OptimalChg_DisChg.Time32	Bit0~1	0~2	16:00~16:30 time period charge and discharge mark;
	OptimalChg_DisChg.Time33	Bit2~3	0~2	Default: 0;
	OptimalChg_DisChg.Time34	Bit4~5	0~2	0-no action, 1-charging, 2-discharging;
	...			
	OptimalChg_DisChg.Time39	Bit14~15	0~2	19:30~20:00 time period charge and discharge mark;
131	OptimalChg_DisChg.Time40	Bit0~1	0~2	20:00~20:30 time period charge and discharge mark;
	OptimalChg_DisChg.Time41	Bit2~3	0~2	Default: 0;
	OptimalChg_DisChg.Time42	Bit4~5	0~2	0-no action, 1-charging, 2-discharging;
	...			
	OptimalChg_DisChg.Time47	Bit14~15	0~2	23:30~0:00 time period charge and discharge mark;
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	The number of battery cells in series
	BatCellParaNum	1	0-200	The number of battery cells in parallel
134	UVFDerateStartPoint	0.01Hz	4500-5000	Underfrequency load reduction starting point
135	UVFDerateEndPoint	0.01Hz	4500-5000	Underfrequency derating end point
136	OVFDerateRatio	%Pm/Hz	1-100	Underfrequency load shedding slope
137	SpecLoadCompensate	w	0-65535	Maximum compensation amount for a specific load
138	ChargePowerPercentCMD	0.1%	0-1000	Charging power percentage setting
139	DischgPowerPercentCMD	0.1%	0-1000	Discharge 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	Inverter active power percentage setting
144	FloatChargeVolt	0.1V	500-560	Float given 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 rated voltage for unmatched batteries
149	EqualizationVolt		500-590	Cell Balancing Voltage
150	EqualizationInterval	Day	0-365	Equalization interval
151	EqualizationTime	hour	0-24	Equilibrium duration
152	ACFirstStartHour	hour	0-23	AC load start time_hour setting
	ACFirstStartMinute	min	0-59	AC load start time_minute setting
153	ACFirstEndHour	hour	0-23	AC load end time_hour setting
	ACFirstEndMinute	min	0-59	AC load end time_minute setting
154	ACFirstStartHour1	hour	0-23	AC load start time_hour setting
	ACFirstStartMinute1	min	0-59	AC load start time_minute setting

				setting
155	ACFirstEndHour1	hour	0-23	AC load end time_hour setting
	ACFirstEndMinute1	min	0-59	AC load end time_minute setting
156	ACFirstStartHour2	hour	0-23	AC load start time_hour setting
	ACFirstStartMinute2	min	0-59	AC load start time_minute setting
157	ACFirstEndHour2	hour	0-23	AC load end time_hour setting
	ACFirstEndMinute2	min	0-59	AC load end time_minute setting
158	ACChgStartVolt	0.1V	384-520	AC charging starting battery voltage, valid after selecting ACChg according to voltage
159	ACChgEndVolt	0.1V	480-590	AC charging cut off the battery voltage, valid after selecting ACChg according to voltage
160	ACChgStartSOC	%	0-90	AC charging starting SOC, valid after selecting ACChg according to SOC
161	ACChgEndSOC	%	20-100	AC charging stops SOC, it is valid after selecting ACChg according to SOC
162	BatLowVoltage	0.1V	400-500	Battery undervoltage alarm point, DisChgCtrl selects according to voltage or both to be valid
163	BatLowBackVoltage	0.1V	420-520	Battery undervoltage alarm recovery point, DisChgCtrl selects according to voltage or both is valid
164	BatLowSOC	%	0-90	Battery undervoltage alarm point, DisChgCtrl selects according to SOC or both is valid
165	BatLowBackSOC	%	20-100	Battery undervoltage alarm recovery point, DisChgCtrl selects according to SOC or both is valid
166	BatLowtoUtilityVoltage	0.1V	444-514	When the battery is under voltage to the mains voltage point, DisChgCtrl selects according to voltage or both to be valid
167	BatLowtoUtilitySOC	%	0-100	The battery undervoltage is converted to the mains SOC. DisChgCtrl selects according to SOC or both to be valid.

168	ACCharge Bat Current	A	0-140	ChargeCurrent from AC
169	OngridEOD_Voltage	0.1V	400-560	Active When TakeLoadTogether enabled
170				
171	SOCCurve_BatVolt1	0.1V	400-600	SOC(V)
172	SOCCurve_BatVolt 2	0.1V	400-600	
173	SOCCurve_SOC1	1%	0-100	
174	SOCCurve_SOC2	1%	0-100	
175	SOCCurve_InnerResistance	mΩ	0-100	
176	MaxGridInputPower	W		
177	GenRatePower	W		
178				
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
	uFunctionEn2.BatWakeupEn	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.all	Bit7-15		
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 loading slope
194	GenChgStartVolt	0.1V	384-520	Generator charging starting battery voltage, valid after selecting GenChg according to voltage
195	GenChgEndVolt	0.1V	480-590	The battery voltage is cut off when the alternator is charged. It is valid after selecting GenChg according to voltage.
196	GenChgStartSOC	%	0-90	Generator charging starting SOC, valid after selecting GenChg according to SOC
197	GenChgEndSOC	%	20-100	The SOC of the alternator is stopped when charging, and it is valid after selecting GenChg according to SOC.
198	MaxGenChgBatCurr	A	0-60	Charge current from generator

4. Annex

1) Working modes definition

Table 9 Working modes definition

Status code	Description	Remark
0x00	Standby	Standby
0x01	Fault	Inverter is in Fault status
0x02	Programming	Firmware update is in progress
0x04	PV on-grid mode	PV power export to load and grid
0x08	PV Charge mode	PV power used to charge battery
0x0C	PV Charge+on-grid mode	PV used to charge battery, and excess part export to load or grid
0x10	Battery on-grid mode	Battery discharge power to load or grid

0x14	PV+Battery on-grid mode	PV and Battery discharge power to load or grid
0x20	AC Charge mode	Grid power used to charge battery
0x28	PV+AC charge mode	PV power and grid power used to charge battery
0x40	Battery off-grid mode	Battery power backup
0x80	PV off-grid mode	PV power power backup (PV power is unstable and this mode is not suggested)
0xC0	PV+battery off-grid mode	PV+ Battery power backup
0x88	PV charge +off-grid mode	PV power used to power backup and the excess part used to charge battery

2) Fault code and Warning code Definition

Table 10 Fault code and warning code definition

Bit0-31	Fault Description	FaultCode	Warning Description	Warning Code
0	Internal communication fault 1	E000	Battery communication failure	W000
1	Model fault	E001	AFCI communication failure	W001
2	rsvd	E002	AFCI High	W002
3	rsvd	E003	Meter communication failure	W003
4	rsvd	E004	Both charge and discharge forbidden by battery	W004
5	rsvd	E005	Auto test failed	W005
6	rsvd	E006	rsvd	W006
7	rsvd	E007	LCD communication failure	W007
8	Paralleling CANcommunication lost	E008	FW version mismatching	W008
9	Master unit lost in paralleling system	E009	Fan stuck	W009
10	Multiple master units in paralleling system	E010	rsvd	W010
11	AC input inconsistent in paralleling system	E011	Parallel number out of range	W011
12	UPS short	E012	rsvd	W012
13	Reverse current on UPS output	E013	rsvd	W013
14	BUS short	E014	rsvd	W014
15	Grid phases inconsistent in 3phase paralleling system	E015	Battery reverse connection	W015
16	Relay Check Fault	E016	Grid power outage	W016
17	Internal communication fault 2	E017	Grid voltage out of range	W017
18	Internal communication fault 3	E018	Grid frequency out of range	W018
19	BUS Voltage high	E019	rsvd	W019
20	EPS connection fault	E020	PV insulation low	W020
21	PV Voltage high	E021	Leakage current high	W021

22	Over current protection	E022	DCI high	W022
23	Neutral fault	E023	PV short,	W023
24	PV short,	E024	rsvd	W024
25	Radiator temperature out of range	E025	Battery voltage high	W025
26	Internal Fault	E026	Battery voltage low	W026
27	Sample inconsistent between Main CPU and redundant CPU	E027	Battery open circuit	W027
28	rsvd	E028	EPS overload	W028
29	rsvd	E029	EPS voltage high	W029
30	rsvd	E030	Meter reverse connection	W030
31	Internal communication fault 4	E031	DCV high	W031