

# RS485\_MODBUS RTU Hybrid Inverter Protocol

Translated on 2020. Sept. 15<sup>th</sup>

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## Revision History

Version	Main Content	Write By	Date
V000B000D000	First Draft		2018.04.09
V000B000D001	1. Add 43069, Active/Reactive power control (Power off saving function)	CHM	2018.07.11
V000B000D002	-	CHM	2018.10.18
V000B000D003	1. Add 04 function code Address 33020 2. Add 06 function code Address 43008	CHM	2019/04/02
V000B000D004	1. Add 06 function code Address 43009 2. Add 04 function code Address 33047/33048/33160 3. Add 06 function code Address 43124	CHM	2019/04/10
V000B000D005	1. Add 04 function code Address 33132 and Add 06 function code Address 43110 2. Delete “Add 06 function code” Address 43124	CHM	2019/04/23
V000B000D006	1. Add userdefine battery parameter 2. Add Address 43010-43017	CHM	2019/05/06
V000B000D007	1. Add 02 function code Address 92/93	CHM	2019/06/10
V000B000D008	1. Add 33247/33248/33249 EPM info 2. Add 43073/43074/43075 EPM setting 3. Modify 43012/43013 current limitation from 90A to 100A, default 50A to 62.5A	CHM	2019/07/09
V000B000D009	1. Add 43055 Itlay standard ON/OFF	CHM	2019/07/24
V000B000D00A	1. Add function code 04 Address 33200-33214	CHM	2019/09/04
V000B000D00B	1. Add function code 06 Address 43077 2. Add function code 06 43078/43079 3. Add function code 04 33221-33242	CHM	2019/09/24
V000B000D00E	1、 04 Function code Address 33160, redefine the HV hybrid battery model. 06 Function code address 43009 as well. 2、 04 Function code Address 33250, add explanation.	CHM	2020/02/14
V002B000D00F	1、 Add function code 04 Address 35000, to define the protocol and model 2、 Add Meter2 info. Function code 33299-33324, for Meter2 info display	CHM	2020/02/20
V002B000D010	1、 Add function code 04 Address 33153-33156, for three phase hybrid backup voltage and current	CHM	2020/03/10
V002B000D011	1、 33142 BMS current accuracy change to 0.1A	CHM	2020/03/31

	2、 Meter2 register address modification		
V002B000D012	<ul style="list-style-type: none"> <li>1、 43009 Address add LV hybrid battery model</li> <li>2、 43018-43021 Forcecharge SOC, Rated capacity, Overdischarge Voltage, Forcecharge Voltage</li> <li>3、 43138-43140 EPS DoD, EPS switching time, Meter type and location</li> <li>4、 Appendix 7 BIT05 indicates allow grid charge battery or not</li> </ul>	JW	2020/04/01
V002B000D013	1. Add function code 06/10 register 43076 AFCI ON/OFF	CHM	2020/04/08
V002B000D014	<ul style="list-style-type: none"> <li>1. Add 43132-43136 address for Remote Control and Force Battery Charge function</li> <li>2. Add 43249 Special Settings – MPPT parallel &amp; IgFollow</li> <li>3. Add 43301 self-check function ON/OFF BIT00 indicates fan self-check</li> <li>4. Updated Appendix 3</li> <li>5. Add 33096 Lead-acid battery Temperature</li> </ul>	JW	2020/05/07
V002B000D015	<ul style="list-style-type: none"> <li>1、 33248 Redefine: BIT00 for EPM switch, BIT01 for failsafe switch;</li> <li>2、 33250 BIT05 for FailSafe switch;</li> <li>3、 43082-43089 Add fault recover and startup grid voltage and frequency</li> <li>4、 43073 BIT05 add Failsafe switch;</li> <li>5、 Remove 43075</li> </ul>	JW	2020/05/09
V002B000D016	1 、 03/06/10 Function code-Address 43010&43011 , Overdischarge/Overcharge SOC ratio as 1:1. Accuracy 1%	JW	2020/05/15
V002B000D017	<ul style="list-style-type: none"> <li>1、 43038-43049, Italy three control mode. OV-F/UN-F parameters</li> <li>2、 43050 Working Mode Set 43051 Working Mode 4 Reactive power Set 43054 Working Mode 3 PF Set</li> <li>3、 43082-43089, Recover/Startup Voltage/frequency range</li> <li>4、 43108-43109, 10mins overvoltage limits</li> <li>5、 43200-43220, Working mode1,2,5 set</li> <li>6、 Delete 43114-43118;</li> </ul>	JW	2020/05/25

	7、33281&33332 Meter PF accuracy 0.01 8、Update Appendix 2		
V002B000D018	1、Add 06 10 function code Register 43012-43017 2、Add 04 function code 33208-33211 3、Modify the unit of 33213-33214	CHM	2020/06/09
V002B000D019	1、Add 43034-43037 Unit 0.1V; 2、Update 33151-33152; 3、Add 33157; 4、Add 33181; 5、Add 43022; 6、Add 43032; 7、Add 43033 8、Add 43055 9、Add 43117-43118 max charge/discharge limit; 10、Add 43221-43248; 11、Update 43249 Special settings; 12、Add 43080	JW	2020/06/21
V002B000D01A	1、Add 3010---OGI Off grid inverter. 2、Add 43024 Battery Reserve Mode SOC	CHM	2020/06/23
V002B000D01B	1、Add 43024 2、Update battery brands; 3、Add fault code 0x2017-0x2019 , 0x2020-0x2021;	JW	2020/08/21

## 1. General

This protocol is suitable for the communication between the hybrid grid-tied inverters and the upper computer monitoring system. MODBUS RTU is applied. This protocol can read the real-time operating information of the inverter and control the inverter as well.

## 2. Physical Interface

### 2.1. Using RS485, asynchronous transmitting and receiving method, Master-slave mode, Fixed Baud rate

---- Baud Rate: 9600bps  
---- Odd-even check: None  
---- Data Bits: 8  
---- Stop Bit: 1

### 2.2. Inter-frame interval requirement

Require higher than 300ms (Not included) of inter-frame interval. Recommend max data frame of 100bytes (50 register address)

## 3. Data frame

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

**Slave Address:** it is the corresponding slave address, it must be matched with inverter address

**Function code:** 03H, 04H, 06H and 10H are available currently.

Function code(Hex)	Name	Register Address	Function
02H	Read the switch input status	10001-19999	Read the fault information registers
03H	Read the holding registers	40001-49999	Read the setting content of holding registers
04H	Read the setting content of holding registers	30001-39999	Read the setting content of holding registers
05H	Write single coil	00001-09999	Set ON/OFF function
06H	Write a single holding register	40001-49999	Write a single holding register
10H	Write a single holding register	40001-49999	Set multi-byte function

**Data:** Including the start register address, data length, the number of data bytes, data content.

High-byte first, and followed by low byte.

**CRC Check:** CRC look-up table checking mode. Low-byte first, and followed by High byte.

## 4. Error information and data process

Slave Response (Hex)

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

When the inverter communication module detected an error other than CRC error, it must response to the master device. (High byte of function code is 1 which is adding 128 to the function code)

### Inverter com module response to the Error Code

0x01 illegal function code, the server doesn't understand the function code

0x02 illegal data address, in relation to requests

0x03 illegal data, in relation to requests.

0x04 Service failure, Inverter com module can't get access to the data during execution

## 5. Detailed description of the protocol

00001-09999(0X) register is a write-only register type which support 0x05 function code.

10001-19999(1X)register is a read-only register which support 0x02 function code

30001-39999(3X)register is a read-only register which support 0x04 function code

40001-49999(4X)register is a read/write register which support 0x03, 0x06 and 0x10 function code

### 5.1. Read single of multiple input status, corresponding function code is 0x02. The following table has the same address with the actual address of the message frame. No need extra offset or transform.

Register Addr (Dec)	Meaning	Meaning
12501	No Grid	0—No 1—Yes
12502	Grid over voltage	0—No 1—Yes
12503	Grid under voltage	0—No 1—Yes
12504	Grid over frequency	0—No 1—Yes
12505	Grid under frequency	0—No 1—Yes
12506	Unbalanced grid	0—No 1—Yes
12507	Gird frequency jitter	0—No 1—Yes
12508	Over grid impedance	0—No 1—Yes
12509	Grid current tracking error	0—No 1—Yes
12510	METER communication fail	0—No 1—Yes
12511	FailSafe	0—No 1—Yes

12512	Reserved	0—No 1—Yes
12513	Reserved	0—No 1—Yes
12514	Reserved	0—No 1—Yes
12515	Reserved	0—No 1—Yes
12516	Reserved	0—No 1—Yes
12517	Backup Overvoltage Fault	0—No 1—Yes
12518	Backup Overload Fault	0—No 1—Yes
12519	Reserved	0—No 1—Yes
12520	Reserved	0—No 1—Yes
12521	Reserved	0—No 1—Yes
12522	Reserved	0—No 1—Yes
12523	Reserved	0—No 1—Yes
12524	Reserved	0—No 1—Yes
12525	Reserved	0—No 1—Yes
12526	Reserved	0—No 1—Yes
12527	Reserved	0—No 1—Yes
12528	Reserved	0—No 1—Yes
12529	Reserved	0—No 1—Yes
12530	Reserved	0—No 1—Yes
12531	Reserved	0—No 1—Yes
12532	Reserved	0—No 1—Yes
12533	Battery not connected	0—No 1—Yes
12534	Battery overvoltage detection	0—No 1—Yes
12535	Battery undervoltage detection	0—No 1—Yes
12536	Reserved	0—No 1—Yes
12537	Reserved	0—No 1—Yes
12538	Reserved	0—No 1—Yes
12539	Reserved	0—No 1—Yes
12540	Reserved	0—No 1—Yes
12541	Reserved	0—No 1—Yes
12542	Reserved	0—No 1—Yes
12543	Reserved	0—No 1—Yes
12544	Reserved	0—No 1—Yes
12545	Reserved	0—No 1—Yes
12546	Reserved	0—No 1—Yes
12547	Reserved	0—No 1—Yes
12548	Reserved	0—No 1—Yes
12549	DC overvoltage	0—No 1—Yes
12550	DC Bus overvoltage	0—No 1—Yes
12551	DC Bus unbalanced voltage	0—No 1—Yes
12552	DC Bus undervoltage	0—No 1—Yes
12553	DC Bus unbalanced voltage 2	0—No 1—Yes
12554	DC overcurrent on A circuit	0—No 1—Yes

12555	DC overcurrent on B circuit	0—No 1—Yes
12556	DC input interference	0—No 1—Yes
12557	Grid overcurrent	0—No 1—Yes
12558	IGBT overcurrent	0—No 1—Yes
12559	Grid interference 02	0—No 1—Yes
12560	AFCI self detection protection	0—No 1—Yes
12561	AFCI Fault (Reserved)	0—No 1—Yes
12562	Grid current sampling error	0—No 1—Yes
12563	Reserved	0—No 1—Yes
12564	Reserved	0—No 1—Yes
12565	Grid interference	0—No 1—Yes
12566	Over DC component	0—No 1—Yes
12567	Over temperature protection	0—No 1—Yes
12568	Relay check protection	0—No 1—Yes
12569	Under temperature protection	0—No 1—Yes
12570	PV insulation fault	0—No 1—Yes
12571	12V undervoltage protection	0—No 1—Yes
12572	Leak current protection	0—No 1—Yes
12573	Leak current self check protection	0—No 1—Yes
12574	DSP initializing protection	0—No 1—Yes
12575	DSP_B proection	0—No 1—Yes
12576	Battery overvoltage hardware fault	0—No 1—Yes
12577	LLC hardware overcurrent	0—No 1—Yes
12578	Gird transient overcurrent	0—No 1—Yes
12579	CAN COM fail	0—No 1—Yes
12580	DSP COM fail	0—No 1—Yes
12581	Normal operation	0—No 1—Yes
12582	Initializing	0—No 1—Yes
12583	Controlled turning OFF	0—No 1—Yes
12584	Fault leads to turning OFF	0—No 1—Yes
12585	Stand-by	0—No 1—Yes
12586	Limited Operation (Caused by temperature, frequency, etc.)	0—No 1—Yes
12587	Limited Operation (Caused by external factors)	0—No 1—Yes
12588	Backup Overload	0—No 1—Yes
12589	Load Status	0—No 1—Yes
12590	Grid Status	0—No 1—Yes
12591	Battery Status	0—No 1—Yes
12592	Grid Surge(Warn)	0—No 1—Yes
12593	Fan Fault(Warn)	0—No 1—Yes
12594	Reserved	0—No 1—Yes
12595	Reserved	0—No 1—Yes

**Note: 12501-12516: Grid fault status. 12517-12532: Load fault status. 12533-12548: Battery**



fault status. 12549-12580: Device fault status. 12581-12595: Normal Status. 12581-12587: Normal device status.

**5.2. Inverter model information, corresponding function code is 0x04.**

The following table has the same address with the actual address of the message frame. No need extra offset or transform

Register (Dec)	Meaning	Data Type	Note
35000	Solis Inverter Model definition	U16	<p>Explanation:</p> <p>0000---no definition            1010---1phase grid-tied inverter            1020---3 phase grid-tied inverter            2030--- 1 phase LV Hybrid inverter            2031--- 1 phase LV AC Couple energy storage inverter            2040---1 phase HV Hybrid inverter            2050--- 3 phases LV Hybrid inverter            2060--- 3 phases HV Hybrid inverter            1070--- External EPM device            3010---OGI Off-grid inverter</p> <p><b>Description:</b></p> <p>1、 high 8 bit means protocol version, low 8 bit means inverter model            10: see 《RS485_MODBUS(INV-3000ID EPM-36000ID) inverter protocol》            20: see 《RS485_MODBUS(ESINV-33000ID) energy storage inverter protocol》            2、 0000H-no definition model。            3、 The address is available as long as the LCD is powered</p>

**5.3. Inverter operating information parameter address, corresponding function code is 0x04. The following table has the same address with the actual address of the message frame. No need extra offset or transform**

Register (Dec)	Meaning	Data Type	Unit	Note
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33000	Model No.	U16		See Appendix 1 (Hex)
33001	DSP version	U16		(Hex)
33002	HMI version	U16		(Hex)
33003	Protocol version	U16		(Hex)
33004-33019	SN	U16		32 bit ASCII direct display Eg: 33004 = '01' 33005 = '23' Corresponding display: '0123' Ginlong only takes the high 15 bit as effective SN number 33004 Highest, 33019 Lowest.
33020	Initial Startup Setting Flag bit	U16		1---Initial startup setting completed 0---Haven't done initial startup setting Note: If the upper computer received 0,it means the customer haven't done initial startup setting. The APP will enter the section to ask customer do it. For APP point to point setting function
33021	Reserved	U16		
33022	Year	U16		0-99 years
33023	Month	U16		
33024	Day	U16		
33025	Hour	U16		
33026	Minute	U16		
33027	Second	U16		
33028	Reserved	U16		
33029-33030	Total energy generation	U32	1kWh	
33031-33032	Current month energy generation	U32	1kWh	
33033-33034	Last month energy generation	U32	1kWh	
33035	Today energy generation	U16	0.1kWh	
33036	Yesterday energy generation	U16	0.1kWh	
33037-33038	This year energy generation	U32	1kWh	
33039-33040	Last year energy generation	U32	1kWh	

33041	Reserved	U16		
33042	Reserved	U16		
33043	Reserved	U16		
33044	Reserved	U16		
33045	Reserved	U16		
33046	Reserved	U16		
33047	AC output Type	U16		0- Single Phase 1- Three phase four wires 2- Three phase three wires 3- Three phase four wires OR Three phase three wires
33048	DC input Type	U16		0-1 input 1-2 inputs 2-3 inputs 3-4 inputs .....
33049	DC Voltage 1	U16	0.1V	
33050	DC Current 1	U16	0.1A	
33051	DC Voltage 2	U16	0.1V	
33052	DC Current 2	U16	0.1A	
33053	DC Voltage 3	U16	0.1V	
33054	DC Current 3	U16	0.1A	
33055	DC Voltage 4	U16	0.1V	
33056	DC Current 4	U16	0.1A	
33057-33058	Total DC output power	U32	1W	PV Power
33059-33069	Reserved	U16		
33070	Reserved	U16		
33071	DC bus voltage	U16	0.1V	
33072	DC bus half voltage	U16	0.1V	
33073	AB line voltage/A phase voltage	U16	0.1V	
33074	BC line voltage /B phase voltage	U16	0.1V	
33075	CA line voltage /C phase voltage	U16	0.1V	
33076	A phase current	U16	0.1A	
33077	B phase current	U16	0.1A	
33078	C phase current	U16	0.1A	
33079-33080	Active power	S32	1W	

33081-33082	Reactive power	S32	1Var	
33083-33084	Apparent power	S32	1VA	
33085	Reserved	U16		
33086	Reserved	U16		
33087	Reserved	U16		
33088	Reserved	U16		
33089	Reserved	U16		
33090	Reserved	U16		
33091	Standard working modes	U16		Working modes 00---No response mode 01---Volt-watt default 02---Volt-var 03---Fixed power factor 04---Fix reactive power 05---Power-PF 06---Rule21 Volt-watt
33092	Grid Standards	U16		See Appendix 3
33093	Inverter Temperature	S16	0.1°C	
33094	Grid frequency	U16	0.01Hz	
33095	Inverter current status	U16		See Appendix 2
33096	Lead-acid battery temperature	S16	0.1°C	
33097	Reserved	U16		
33098	Reserved	U16		
33099	Reserved	U16		
33100-33101	Limit active power adjustment rated power	S32	1W	
33102-33103	Limit reactive power adjustment rated power	S32	1Var	
33104	Limited power actual value	U16	1%	10000<-->100% Setting range (0-100%) 100%-> Rated power。
33105	PF adjustment actual value	S16	0.01	PF Low: (800<-->0.80, 1000<-->1.00) (-800<-->-0.80, -1000<-->-1.00) (PF 1.00 & -1.00 are the same) Setting range (-0.80---0.80) 15KW and below, no such function

33106	Limited reactive power	S16	1%	Setting range (-6000- +6000) Default: 0 This function is only for Working mode 4
33107	Reserved	U16		
33108	Reserved	U16		
33109	Reserved	U16		
33110	Reserved	U16		
33111	Reserved	U16		
33112	Reserved	U16		
33113	Reserved	U16		
33114	Reserved	U16		
33115	Setting flag bit	U16		See Appendix 8
33116	Fault code 01	U16		See Appendix 5
33117	Fault code02	U16		
33118	Fault code 03	U16		
33119	Fault code 04	U16		
33120	Fault code 05	U16		
33121	Operating status	U16		See Appendix 6
33122	Reserved	U16		
33123	Reserved	U16		
33124	Reserved	U16		
33125	Reserved	U16		
<del>33126-33127</del>	<del>Meter total active energy</del>	<del>U32</del>	<del>1Wh</del>	<del>1&lt;-&gt;1Wh</del>
33128	Meter voltage	U16		10<->1V
33129	Meter current	U16		10<->1A
<del>33130-33131</del>	<del>Meter active power</del>	<del>S32</del>		<del>1&lt;-&gt;1W</del> <del>+: to grid</del> <del>-: from grid</del>
33132	Storage control switching value	U16		See Appendix 7
33133	Battery voltage	U16	0.1V	10<->1V
33134	Battery current	S16	0.1A	10<->1A +: charge -: discharge
33135	Battery current direction	U16		Indicate charge/discharge 0: charge 1: discharge
33136	LLC bus voltage	U16	0.1V	10<->1V
33137	Backup AC voltage (Phase A)	U16	0.1V	10<->1V
33138	Backup AC current	U16	0.1A	10<->1A

	(Phase A)					
33139	Battery capacity SOC	U16		100<-->100%		
33140	Battery health SOH	U16		100<-->100%		
33141	Battery voltage	U16	0.01V	100<-->1V (From BMS)		
33142	Battery current	S16	0.1A	10<-->1A (From BMS)		
33143	Battery charge current limitation	U16	0.1A	10<-->1A (From BMS)		
33144	Battery discharge current limitation	U16	0.1A	10<-->1A (From BMS)		
33145	Battery fault status01	U16		(From BMS)		
					3-5K LV Hybrid	5-10K HV Hybrid
				BIT00	Reserved	Charge overvoltage
				BIT01	Overvoltage PRO	Discharge undervoltage
				BIT02	Undervoltage PRO	Core over temperature
				BIT03	Over temperature PRO	Core under temperature
				BIT04	Under temperature PRO	Charge overcurrent
				BIT05	Over temperature charge PRO	Discharge overcurrent
				BIT06	Under temperature charge PRO	Battery internal COM fail
BIT07	Discharge overcurrent PRO	System reboot				
33146	Battery fault status02	U16		(From BMS)		
					3-5K LV Hybrid	5-10K HV Hybrid
				BIT00	Chargeover currentPRO	Different core
				BIT01	Reserved	System low temperature

						1
				BIT02	Reserved	System low temperature 2
				BIT03	BMS Internal PRO	System high temperature
				BIT04	Unbalanced battery modules	Reserved
				BIT05	Reserved	Reserved
				BIT06	Reserved	Reserved
				BIT07	Reserved	Reserved
33147	Household load power	U16		1<-->1W		
33148	Backup load power	U16		1<-->1W		
33149-33150	Battery power	S32		1<-->1W		
33151-33152	<del>Inverting Power</del> Inverter AC Grid Port Power	S32		1<-->1W + to grid, - From grid		
33153	Backup AC voltage (Phase B)	U16	0.1V	10<-->1V		
33154	Backup AC current (Phase B)	U16	0.1A	10<-->1A		
33155	Backup AC voltage (Phase C)	U16	0.1V	10<-->1V		
33156	Backup AC current (Phase C)	U16	0.1A	10<-->1A		
33157	Inverting Power/Rectifying Power	S16	10W	1<-->10W		
33158	Reserved	U16				
33159	Battery Detected	U16		Only for 1P HV hybrid (Not for APP, only for internal test) 1: Detected 0: Not detected		
33160	Current Battery Model	U16		LV hybrid: 0x0000: no battery model 0x0001: PYLON_LV 0x0002: User define 0x0003: B_BOX_LV BYD		

				HV hybrid: 0x0000: no battery model 0x0100: PYLON_HV 0x0200: User define 0x0300: B_BOX_HV BYD 0x0400: LG_HV LG 0x0500: SOLUNA_HV
33161-33162	Battery total charge energy	U32	1kWh	1<-->1kWh
33163	Today battery charge energy	U16	0.1kWh	10<-->1kWh
33164	Yesterday battery charge energy	U16	0.1kWh	10<-->1kWh
33165-33166	Battery total discharge energy	U32		1<-->1kWh
33167	Today battery discharge energy	U16		10<-->1kWh
33168	Yesterday battery discharge energy	U16		10<-->1kWh
33169-33170	Total energy imported from grid	U32		1<-->1kWh
33171	Today energy imported from grid	U16		10<-->1kWh
33172	Yesterday energy imported from grid	U16		10<-->1kWh
33173-33174	Total energy fed into grid	U32		1<-->1kWh
33175	Today energy fed into grid	U16		10<-->1kWh
33176	Yesterday energy fed into grid	U16		10<-->1kWh
33177-33178	Total load energy consumption	U32		1<-->1kWh Note: House Load+ Backup load
33179	Today load energy consumption	U16		10<-->1kWh Note: House Load+ Backup load
33180	Yesterday energy consumption	U16		10<-->1kWh Note: House Load+ Backup load
33181	Clear energy record status	U16	1%	1<-->1%, Range:0-100%, Default 0%。
33182-33199	Reserved	U16		
33200	Backup circuit enable/disable	U16		0000H--Disable , 0001H--Enable, Default: Enable



33201	Backup circuit Reference voltage	U16	0.1V	10<-->1V, Default: 230V
33202	Backup circuit Reference voltage	U16	0.01Hz	100<-->1Hz, Default:50Hz, Accuracy: 0.1Hz
33203	Battery charge/discharge Enable/Disable	U16		0000H--Disable , 0001H --Enable. Default: Enable
33204	Battery charge/discharge Direction	U16		0000H--Charge , 0001H--Discharge, Default: Charge
33205	Battery charge/discharge Current	U16	0.1A	10<-->1A , Max Charge current is settable, range: 0-70A.; Max Discharge current is settable. Range: 0-70A. Accuracy:1A
33206	Battery Max charge Current	U16	0.1A	10<-->1A, Max 70A, Default: 70A, Accuracy:1A
33207	Battery Max discharge Current	U16	0.1A	10<-->1A, Max 70A, Default:70A, Accuracy:1A
33208	Battery under-voltage Protection	U16	0.1V	10<-->1V; Default: 46; Range: 40—48; HV Series- Default:120; Range 100-999
33209	Battery floating-charge Voltage	U16	0.1V	10<-->1V; Default: 53.5; Range: 50-58 HV Series- Default:550; Range 100-999
33210	Battery equal-charge Voltage	U16	0.1V	10<-->1V; Default: 56.4; Range: 54-60 HV Series- Default:550; Range 100-999
33211	Battery over-voltage Protection	U16	0.1V	10<-->1V; Default: 59.5; Range: 54-62 HV Series- Default:556; Range 100-999
33212	Voltage Droop	U16		0000H--Dsiable, 0001H--Enable, Default:Disable
33213	Over discharge SOC	U16	1%	100<-->100% Range (0-100%) Default: 20%。
33214	Force charge SOC	U16	1%	100<-->100% Range (0-100%) Default: 10%
33215	Reserved	U16		
33216	Reserved	U16		
33217	Reserved	U16		
33218	Reserved	U16		
33219	Reserved	U16		
33220	Reserved	U16		

33221	Italy Singe Self-Test	U16		Value: Start Single Protection Test 00---Null 01---59.S1(253.0V 3000ms) 02---59.S2(264.5V 200ms) 03---27.S1(195.5V 1500ms) 04---27.S2( 34.5V 200ms) 05---81>.S1(50.2Hz 100ms) 06---81<.S1(49.8 Hz 100ms) 07---81>.S2F(51.5Hz 100ms) 08---81<.S2F(47.5 Hz 100ms) 09---81>.S2S(51.5Hz 1000ms) 10---81<.S2S(47.5 Hz 4000ms) <del>Note: The setting has power off saving function only available under Italy standard.</del>
33222	Italy Full Self-test	U16		Value: Start Complete Self Test 1—In Single self-test condition. 2—In Full Self-test condition <del>Note: The setting has power off saving function only available under Italy standard.</del>
33223	59.S1 Voltage	U16	0.1V	10←→1V
33224	59.S1 Time	U16	1ms	1←→1ms
33225	59.S2 Voltage	U16	0.1V	10←→1V
33226	59.S2 Time	U16	1ms	1←→1ms
33227	27.S1 Voltage	U16	0.1V	10←→1V
33228	27.S1 Time	U16	1ms	1←→1ms
33229	27.S2 Voltage	U16	0.1V	10←→1V
33230	27.S2 Time	U16	1ms	1←→1ms
33231	81>.S1 Frequency	U16	0.01Hz	100←→1Hz
33232	81>.S1 Time	U16	1ms	1←→1ms
33233	81<.S1 Frequency	U16	0.01Hz	100←→1Hz
33234	81<.S1 Time	U16	1ms	1←→1ms
33235	81>.S2F Frequency	U16	0.01Hz	100←→1Hz
33236	81>.S2F Time	U16	1ms	1←→1ms
33237	81<.S2F Frequency	U16	0.01Hz	100←→1Hz
33238	81<.S2F Time	U16	1ms	1←→1ms
33239	81>.S2S Frequency	U16	0.01Hz	100←→1Hz
33240	81>.S2S Time	U16	1ms	1←→1ms
33241	81<.S2S Frequency	U16	0.01Hz	100←→1Hz

33242	81<.S2S Time	U16	1ms	1←→1ms
33243	Parallel PV inverter AC current	U16	0.1A	Value=: 10←→1A
33244	Parallel PV inverter AC Voltage	U16	0.1V	Value=: 10←→1V
33245	Parallel PV inverter AC power	U16	1W	Value=: 1←→1W
<del>33246</del>	<del>Parallel PV inverter CT Detect Switch</del>	<del>U16</del>		<del>Value=: 0: OFF 1: ON</del>
33247	EPM Backflow power	S16	100W	Value=: 1←→100W + to grid; - From grid
33248	<del>EPM FailSafe Switch</del>  EPM/FailSafe Switch	U16		Value=: <del>0: FailSafe OFF 1: FailSafe ON(485 detect) 2: FailSafe ON(CT detect+485 detect)</del> ..... BIT00: EPM switch, 0 OFF, 1 ON; BIT01: FailSafe switch, 0 OFF, 1 ON; BIT02-BIT15: Reserved Compatible with LV hybrid display
33249	EPM real time backflow power	S16	100W	Value: 1←→100W
33250	Meter/CT Position	U16		BIT00: Meter in load BIT01: Meter in grid BIT02: CT in grid(Note: AC Couple inverter ONLY, to avoid uploading meter com fail alarm) BIT03: Parallel PV inverter CT detection switch (Note: 1、 If 33250 BIT03=0 and 33245 has value over 500W, it means there is CT connected for parallel PV inverter and power flow exists 2、 If 33250=0, 33245 value needs to be displayed. ) BIT04: EPM Switch (Note: To indicate

				EPM ON/OFF status) BIT05: Failsafe Switch BIT06: Reserved BIT07-BIT15: Reserved
33251	Meter ac voltage A	U16	0.1V	10<-->1V
33252	Meter ac current A	U16	0.01A	100<-->1A
33253	Meter ac voltage B	U16	0.1V	10<-->1V
33254	Meter ac current B	U16	0.01A	100<-->1A
33255	Meter ac voltage C	U16	0.1V	10<-->1V
33256	Meter ac current C	U16	0.01A	100<-->1A
33257	Meter active power A	S32	0.001kW	1000<-->1kW
33259	Meter active power B	S32	0.001kW	1000<-->1kW
33261	Meter active power C	S32	0.001kW	1000<-->1kW
33263	Meter total active power	S32	0.001kW	1000<-->1kW
33265	Meter reactive power A	S32	1Var	1<-->1Var
33267	Meter reactive power B	S32	1Var	1<-->1Var
33269	Meter reactive power C	S32	1Var	1<-->1Var
33271	Meter total reactive power	S32	1Var	1<-->1Var
33273	Meter apparent power A	S32	1VA	1<-->1VA
33275	Meter apparent power B	S32	1VA	1<-->1VA
33277	Meter apparent power C	S32	1VA	1<-->1VA
33279	Meter total apparent power	S32	1VA	1<-->1VA
33281	Meter PF	S16	0.01	100<--> 1.0 -1.0~-0.8 +0.8~+1.0
33282	Meter grid frequency	U16	0.01Hz	100<-->1Hz
33283	Meter total active energy from grid	U32	0.01kWh	100<-->1kWh
33285-33286	Meter total active energy to grid	U32	0.01kW	100<-->1kW

33287-33296	Reserved	U16		
33297	Off-grid DOD	U16	1%	1 <--> 1% 10%-100%
33298	EPS DOD	U16	1%	1 <--> 1% 10%-100%
33299	EPS Switching Time	U16	10ms	1 <--> 10ms, 10~99990ms 0 means EPS parameters invalid
33300	Meter1 Type and location	U16		High byte indicates location 0x0100 Grid 0x0200 Load 0x0300 Grid+PV (Two Meter) Low byte indicates meter type 0x0001 General 1Ph 0x0002 Acrel 3Ph 0x0003 General 3Ph 0x0004 Standard Eastron 1Ph 0x0005 Standard Eastron 3Ph 0x0006 No Meter Mode
33301	Meter2 Type and Location			
33302	Meter2 AC Voltage A	U16	0.1V	10<-->1V
33303	Meter2AC Current A	U16	0.01A	100<-->1A
33304	Meter2 AC Voltage B	U16	0.1V	10<-->1V
33305	Meter2AC Current B	U16	0.01A	100<-->1A
33306	Meter2 AC Voltage C	U16	0.1V	10<-->1V
33307	Meter2AC Current C	U16	0.01A	100<-->1A
33308	Meter2 Active power A	S32	0.001kW	1000<-->1kW
33310	Meter2 Active power B	S32	0.001kW	1000<-->1kW
33312	Meter2 Active power C	S32	0.001kW	1000<-->1kW
33314	Meter2 Total Active power	S32	0.001kW	1000<-->1kW
33316	Meter2 Reactive power A	S32	1Var	1<-->1Var
33318	Meter2 Reactive	S32	1Var	1<-->1Var

	power B			
33320	Meter2 Reactive power C	S32	1Var	1<-->1Var
33322	Meter2 Total Reactive power	S32	1Var	1<-->1Var
33324	Meter2 Apparent Power A	S32	1VA	1<-->1VA
33326	Meter2 Apparent Power B	S32	1VA	1<-->1VA
33328	Meter2 Apparent Power C	S32	1VA	1<-->1VA
33330	Meter2 Total Apparent Power	S32	1VA	1<-->1VA
33332	Meter2 PF	S16		-1.0~-0.8 +0.8~+1.0
33333	Meter2 Grid Frequency	U16	0.01Hz	100<-->1Hz
33334	Meter2 Grid import total energy	U32	0.01kWh	100<-->1kWh
33336	Meter2 Grid export total energy	U32	0.01kW	100<-->1kW
33338	Reserved	U16		

Note: METER SN: Use inverter SN + inverter slave address = meter SN, to identify whether the inverter has a meter or not. Single phase use data of phase A. Meter active power : "+" means power to grid. "-" means power from grid

**5.4. Inverter ON/OFF setting parameter address, corresponding function code is 0x05.** The following table has the same address with the actual address of the message frame. No need extra offset or transform.

Register (Dec)	Meaning	Data Type	Note
05000	ON/OFF setting	U16	1=ON ,0=OFF

**5.5. Inverter setting parameter address, corresponding function code is 0x03、0x06 and 0x10.** The following table has the same address with the actual address of the message frame. No need extra offset or transform.

Register	Meaning	Data Type	Unit	Note
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(Dec)				
43000	Year	U16		00-99 years
43001	Month	U16		
43002	Day	U16		
43003	Hour	U16		
43004	Minute	U16		
43005	Second	U16		
43006	Slave address	U16		1-99
43007	ON/OFF	U16		0xBE-ON 0xDE-OFF
43008	initial startup setting	U16		Initial startup setting saving command: 1---setting write completed。 0---setting write not completed。 The specific setting function is defined by the upper computer, here only to do whether the upper computer completes the initial startup setting saving function。 Use 04 function code 33020 to check as well For APP point to point setting function
43009	Current battery Model	U16		LV hybrid & AC coupled: 0x0000: No battery 0x0001: PYLON_LV 0x0002: User define 0x0003: B_BOX_LV BYD 0x0004: Dyness LV (For AC coupled, it is LG LV bat) 0x0005: PureDrive 0x0006: LG Chem LV LG (For AC coupled, it is Dyness) 0x0007: AoBo LV 0x0008: JiaWei LV 0x0009: WECO LV 0x000A: FreedomWon LV 0x000B: Soluna LV 0x000C: GSL LV 0x000D: Rita LV  0x0064: Lead Acid HV hybrid: 0x0000: No battery 0x0100: PYLON_HV 0x0200: User define 0x0300: B_BOX_HV BYD

				0x0400: LG_HV LG 0x0500: SOLUNA_HV 0x0600: Dyness HV 0x0700: Aoboet HV 0x0800: WECO HV
43010	Overcharge SOC	U16	1%	100<-->100% Range (0-100%) 95% - rated.
43011	Overdischarge SOC	U16	1%	100<-->100% Range (0-100%) 20% - rated.
43012	Max charge current	U16	0.1A	10<-->1A LV Hybrid: 50.0-100.0A Default 62.5A HV Hybrid: 5.0-100.0A Default: 25.0A
43013	Max discharge current	U16	0.1A	10<-->1A LV Hybrid: 50.0-100.0A Default 62.5A HV Hybrid: 5.0-100.0A Default: 25.0A
43014	Charge overvoltage threshold	U16	0.1V	10<-->1V LV Hybrid: 54.0-62.0V Default 59.5V HV Hybrid: 500-999V Default: 556V
43015	dsicharge undervoltage threshold	U16	0.1V	10<-->1V LV Hybrid: 40.0-46.0V Default 46.0V HV Hybrid: 100-999V Default: 120V
43016	Floating charge voltage threshold	U16	0.1V	10<-->1V LV Hybrid: 50.0-60.0V Default 53.5V HV Hybrid: 100-999V Default: 550V
43017	Equalizing charge voltage threshold	U16	0.1V	10<-->1V LV Hybrid: 54.0-60.0V Default 56.5V HV Hybrid: 100-999V Default: 550V
43018	Force Charge SOC	U16	1%	1<-->1% 5% to overdischarge SOC
43019	Rated Capacity	U16	1Ah	1<-->1Ah 50-500
43020	Overdischarge Voltage	U16	0.1V	Only for lead-acid
43021	Forcecharge Voltage	U16	0.1V	OnLy for lead-acid
43022	Lead-acid battery Temperature compensation parameter	U16	1mV/°C	1<-->1mV/°C, Range:0-180mV/°C, Default: 72mV/°C; Only for Lead-acid battery
43023	Ambient temperature setting	U16		1 Normal, 2 Low, 3 High Default 1;



				Only support Lead-acid battery
43024	Battery Reserve Mode SOC	U16	1%	1<-->1% Range: Overdischarge SOC ~100%, default is 80%
43025-43031	Reserved	U16		
43032	Power calibration	U16		1<-->1, Range: 800-1200, Default 1000
43033	Factory setting restore;	U16		1, Restore factory settings; Only single register write
43034	OV-G-V01 For CEI-021, 59.S2	U16	0.1V	10<-->1V Accuracy:0.1V
43035	OV-G-V02	U16	0.1V	10<-->1V Accuracy:0.1V
43036	UN-G-V01 For CEI-021, 27.S1	U16	0.1V	10<-->1V Accuracy:0.1V
43037	UN-G-V02 For CEI-021, 27.S2	U16	0.1V	10<-->1V Accuracy:0.1V
43038	81>S1	U16	0.01Hz	100<-->1Hz, 48-53Hz, Default50.2Hz 43038-43049 Only available when CEI 0-21 is selected
43039	81>S1-T	U16	0.01s	100<-->1S, 0.05-0.5S, Default0.10S
43040	81<S1	U16	0.01Hz	100<-->1Hz, 48-53Hz, Default49.8Hz
43041	81<S1-T	U16	0.01s	100<-->1S, 0.05-0.5S, Default0.10S
43042	81>S2F	U16	0.01Hz	100<-->1Hz, 48-53Hz, Default51.5Hz
43043	81>S2F-T	U16	0.01s	100<-->1S, 0.05-0.5S, Default0.10S
43044	81<S2F	U16	0.01Hz	100<-->1Hz, 45-49Hz, Default47.5Hz
43045	81<S2F-T	U16	0.01s	100<-->1S, 0.05-0.5S, Default0.10S
43046	81>S2S	U16	0.01Hz	100<-->1Hz, 48-53Hz, Default51.5Hz
43047	81>S2S-T	U16	0.01s	100<-->1S, 0.05-5.0S, Default1.0S
43048	81<S2S	U16	0.01Hz	100<-->1Hz, 45-49Hz, Default47.5Hz
43049	81<S2S-T	U16	0.01s	100<-->1S, 0.05-5.0S, Default4.0S
43050	Working Mode Set	U16		Working Mode

				00---No response mode 01---Volt-watt default 02---Volt-var 03---Fixed power factor 04---Fix reactive power 05---Power- F
43051	Limit reactive power setting	S16	0.01% (Actual 1%)	10000<-->100% Range (-6000- +6000) Default: 0 This function is only for mode 4
43052	Limited power setting	U16	0.01% (Actual 1%)	10000<-->100% Range (0-100%) 100% is rated power.
43053	PF setting	S16	0.001 (actual 0.01)	PF: (800<-->0.80, 1000<-->1.00) (-800<-->-0.80, -1000<-->-1.00) (PF 1.00 and -1.00 are the same) Range (-0.80---0.80) 15KW or below , no such function
43054	PF Setting 02	S16	0.001 (Actual 0.01)	PF 02: (800<-->0.80, 1000<-->1.00) (-800<-->-0.80, -1000<-->-1.00) (PF 1.00 and -1.00 are the same) Range (-0.80---0.80) This function is only for mode 3
43055	Clear energy record	U16		1, Clear energy record; Automatically change to 0 after finished Only single register write
43056- 43057	Calibrate total energy	U32	1kWh	
43058- 43059	Calibrate this month energy	U32	1kWh	
43060- 43061	Calibrate last month energy	U32	1kWh	
43062	Calibrate today energy	U16	0.1kW h	
43063	Calibrate yesterday energy	U16	0.1kW h	
43064- 43065	Calibrate this year energy	U32		15K and below, no function
43066- 43067	Calibrate last year energy	U32		15K and below, no function
43068	Grid standard	U16		See appendix 3

43069	Power off saving function	U16	<p>BIT00:—  0—active power control power off not save  1—active power control power off with save  For 3052 register</p> <p>BIT01:—  0—PF control power off not save  1. PF control power off with save  For 3053 register</p> <p>BIT02:—  0—3051 control power off not sav  1. 3051 control power off with save  For 3051 register</p> <p>BIT03:—  0—3054 control power off not save  1—3054 control power off with save  For 3054 register</p> <p>BIT04-15:Reserved</p> <p>Note: When set to 1, the control command should not be frequent, because the FLASH has limited write times. Total, less than 10000 times</p>
43070	Limiting power switch	U16	<p>0xAA enable limit power switch—  0x55disable limit power switch (recover to 100%)(For3052 and 3081 register)</p>
43071	Reactive power adjustment switch	U16	<p>0x55 OFF, PF back to 1, reactive power back to 0;—  0xA1 Reactive power setting enabled, PF back to 1(For register 3051 and 3083)  0xA2 PF 02 setting enabled, reactive power back to 0 (For register 3054)。</p>
43072	LVRT switch	U16	<p>0xAA enable  0x55disable—  Default : disabled</p>
43073	METER/CT Position	U16	<p>BIT00: Meter in load—  BIT01: Meter in grid—  BIT02: CT in grid(Note : AC Couple inverter ONLY, to avoid uploading meter com fail alarm)  BIT03: Parallel PV inverter CT detection switch  (Note: 1. If 33250 BIT03=0 and 33245 has value over 500W, it means there is CT</p>

				<p>connected for parallel PV inverter and power flow exists</p> <p>2、 If 33250=0, 33245 value needs to be displayed.)</p> <p>BIT04: EPM Switch (Note: To indicate EPM ON/OFF status)</p> <p>BIT05: Failsafe Switch 0 OFF, 1 ON</p> <p>BIT06: Reserved</p> <p>BIT07-BIT15: Reserved</p>
43074	Backflow power set	S16	100W	<p>Value=:</p> <p>1←→100W</p> <p>+ to grid;</p> <p>- From grid</p>
43075	<del>EPM</del> FailSafe switch	U16		<p><del>Value=:</del></p> <p><del>0: FailSafe OFF</del></p> <p><del>1: FailSafe ON(485 detect)</del></p> <p><del>2: FailSafe ON(CT detect+485 detect)</del></p> <p><del>.....</del></p>
43076	AFCI Function ON/OFF	U16		<p>1---ON</p> <p>0---OFF</p>
43077	Italy Standard Switching Mode	U16		<p>0: OFF, Default OFF</p> <p>(81&gt;S1—50.2Hz/0.1s-Inverter 81&lt;S1—49.8Hz/0.1s-Inverter)</p> <p>1: Local Control</p> <p>(81&gt;S2—51.5Hz/0.1s-Local 81&lt;S2—47.5Hz/0.1s-Local)</p> <p>2: External Signal</p> <p>(81&gt;S2—51.5Hz/1.0s-External 81&lt;S2—47.5Hz/4.0s-External)</p> <p>Note: The setting has power-off saving function only available under Italy standard.</p>
43078	Italy Single Test	U16		<p>Value: Start Single Protection Test</p> <p>00---Null</p> <p>01---59.S1(253.0V 3000ms)</p> <p>02---59.S2(264.5V 200ms)</p> <p>03---27.S1(195.5V 1500ms)</p> <p>04---27.S2( 34.5V 200ms)</p> <p>05---81&gt;.S1(50.2Hz 100ms)</p> <p>06---81&lt;.S1(49.8 Hz 100ms)</p> <p>07---81&gt;.S2F(51.5Hz 100ms)</p> <p>08---81&lt;.S2F(47.5 Hz 100ms)</p> <p>09---81&gt;.S2S(51.5Hz 1000ms)</p> <p>10---81&lt;.S2S(47.5 Hz 4000ms)</p>

				Note: The setting has power off saving function only available under Italy standard.
43079	Italy Full Test	U16		Value: Start Complete Self Test 0---Full Test stop or not start 2---Full Test start Note: The setting has power off saving function only available under Italy standard.
43080	Battery P <sub>cmax</sub> (%) setting	U16	0.01%	10000<-->100%, Default 100% Only support CEI021 standard, to control the max battery charge power under Over Frequency Derating
43081	<del>Limiting power actual adjustment value</del>	<del>S16</del>	<del>10W</del>	<del>1&lt;--&gt;10W Range: 327680W-327680W</del>
43082	Fault Recovery Grid Voltage Upper limit	U16	0.1V	10<-->1V; Accuracy 0.1V; Default is OV-G-V01, if not required by grid standard, follow the default
43083	Fault Recovery Grid Voltage Lower limit	U16	0.1V	10<-->1V; Accuracy 0.1V; Default is UN-G-V01, if not required by grid standard, follow the default
43084	Fault Recovery Grid Frequency Upper limit	U16	0.01Hz	100<-->1Hz; Accuracy 0.1Hz; Default is OV-G-F01, if not required by grid standard, follow the default
43085	Fault Recovery Grid Frequency Lower limit	U16	0.01Hz	100<-->1Hz; Accuracy 0.1Hz; Default is UN-G-F01, if not required by grid standard, follow the default
43086	Startup Grid Voltage Upper limit	U16	0.1V	10<-->1V; Accuracy 0.1V; Default is 253.0V--- if not required by grid standard, follow the default
43087	Startup Grid Voltage Lower limit	U16	0.1V	10<-->1V; Accuracy 0.1V; Default is 195.5V--- if not required by grid standard, follow the default
43088	Startup Grid Frequency Upper limit	U16	0.01Hz	100<-->1Hz; Accuracy 0.1Hz; Default is 50.1Hz--- if not required by grid standard, follow the default
43089	Startup Grid Frequency Lower limit	U16	0.01Hz	100<-->1Hz; Accuracy 0.1Hz; Default is 49.5Hz--- if not required by grid standard, follow the default
43090	OV-G-V 01 (59.S2 for CEI021)	U16	1V	1<-->1V 1P range: 236-335V default: 254V 3P range: 410-580V default: 440V
43091	OV-G-V-T 01	U16	100ms	1<-->100mS

	(59.S2 Time for CEI021)			Range: 0.10-9.0s default: 1.0s
43092	OV-G-V 02	U16	1V	1<-->1V 1P range: 248-341V default: 265V 3P range: 430-590V default: 460V
43093	OV-G-V-T 02	U16	100ms	1<-->100mS Range: 0.10-1.0s default: 0.2s
43094	UN-G-V 01 (27.S1 for CEI021)	U16	1V	10<-->1V 1P range: 173-236V default: 190V 3P range: 300-410V default: 330V
43095	UN-G-V-T 01 (27.S1 Time for CEI021)	U16	100ms	1<-->100mS Range: 0.10-9.0s default: 1.0s
43096	UN-G-V 02 (27.S2 for CEI021)	U16	1V	1<-->1V 1P range: 132-219V default: 173V 3P range: 230-380V default: 300V
43097	UN-G-V-T 02 (27.S2 Time for CEI021)	U16	100ms	1<-->100mS Range: 0.10-1.0s default: 0.2s
43098	OV-G-F 01	U16	0.1Hz	10<-->1Hz Range: 50.2-53.0Hz default: 51.0Hz Range: 60.2-63.0Hz default: 61.0Hz
43099	OV-G-F-T 01	U16	100ms	1<-->100mS Range: 0.10-9.0s default: 1.0s
43100	OV-G-F 02	U16	0.1Hz	10<-->1Hz Range: 51.0-53.0Hz default: 51.0Hz Range: 61.0-63.0Hz default: 51.0Hz
43101	OV-G-F-T 02	U16	100ms	1<-->100mS Range: 0.10-9.0s default: 0.2s
43102	UN-G-F 01	U16	0.1Hz	10<-->1Hz Range: 47.0-49.5Hz default: 48.0Hz Range: 57.0-59.5Hz default: 48.0Hz
43103	UN-G-F-T 01	U16	100ms	1<-->100mS Range: 0.10-9.0s default: 1.0s
43104	UN-G-F 02	U16	0.1Hz	10<-->1Hz Range: 47.0-49.0Hz default: 47.0Hz Range: 57.0-59.0Hz default: 47.0Hz
43105	UN-G-F-T 02	U16	100ms	1<-->100mS Range: 0.10-9.0s default: 0.2s
43106	Startup time	U16	1s	1<-->1s Range: 10-600s default: 60s
43107	Reconnect time	U16	1s	1<-->1s Range: 10-600s default: 60s
43108	10mins Overvoltage	U16	0.1V	10<-->1V;

	(59.S1 for CEI021)			Range based on standard requirement
43109	Reserved	U16		
43110	Storage control Switch value	U16		See appendix 7
43111	Backup circuit setting	U16		0000H--disable , 0001H--enable, default: enable
43112	Backup reference Voltage setting	U16	0.1V	10<-->1V, default 230V Accuracy 0.1Hz
43113	Backup reference Frequency setting	U16	0.01Hz	100<-->1Hz, default 50Hz, Accuracy 0.1Hz
43114	<del>Battery charge/discharge setting</del>	<del>U16</del>		<del>0000H--disable, 0001H--enable, default: enable</del>
43115	<del>Battery charge/discharge direction</del>	<del>U16</del>		<del>0000H--charge, 0001H--discharge, default:charge</del>
43116	<del>Battery charge/discharge current</del>	<del>U16</del>	<del>0.1A</del>	<del>10&lt;--&gt;1A, Max charge current can be defined by customer, range 0-70A; Max discharge current can be defined by customer, range 0-70A, accuracy 1A</del>
43117	Battery max charge current	U16	0.1A	10<-->1A, Range 30-100A, default 100A accuracy 0.1A
43118	Battery max discharge current	U16	0.1A	10<-->1A, Range 30-100A, default 100A, accuracy 0.1A
43119	Battery undervoltage protection	U16	0.1V	10<-->1V; default: 46; range: 40—48; Protection return diff 2V
43120	Battery floating charge voltage setting	U16	0.1V	10<-->1V; default: 53.5; range: 50-58
43121	Battery equalizing charge voltage setting	U16	0.1V	10<-->1V; default: 56.4; range: 54-60
43122	Battery overvoltage protection	U16	0.1V	10<-->1V; default: 59.5; range: 54-62
43123	Overload Voltage drop setting	U16		0000H--disable , 0001H--enable, default: disable
43124	<del>Hybrid mode select switch</del>	<del>U16</del>		<del>BIT00: Time charging 1 ON 0 OFF BIT01: OFF Grid 1 ON 0 OFF BIT02: Reserve battery 1 ON 0 OFF BIT03-15: Reserved</del>
43125- 43131	Reserved	U16		
43132	Remote Control – Grid Adjustment	U16		0: OFF; 1:ON, rest values OFF. After received ON command, 5mins delay.

				<p>If there is not another ON command received, it will be OFF automatically.</p> <p>When set the function as ON, the “remote control – Force battery charge “function will be OFF.</p>
43133	Remote Control – Active Power	S16	10W	<p>1&lt;-&gt; 10W</p> <p>+: Export to grid;</p> <p>-: Import from grid;</p> <p>Only available when “Remote Control-Grid Adjustment” is ON.</p>
43134	Remote Control – Reactive Power	S16	10Var	<p>1&lt;-&gt; 10Var</p> <p>+: Export to grid;</p> <p>-: Import from grid;</p> <p>Only available when “Remote Control-Grid Adjustment” is ON.</p>
43135	Remote Control – Force Battery Charge	U16		<p>0:OFF; 1:ON</p> <p>Start to use PV to charge the battery;</p> <p>When set the function as ON, the “Remote Control –Grid Adjustment” function will be OFF.</p> <p>43110 BIT05: Allow or not allow using grid power to charge the battery.</p>
43136	Remote Control – Force Battery Charge Power	U16	10W	<p>1&lt;-&gt;10W</p> <p>Only available when “Remote Control-Force Battery Charge” is ON.</p>
43137	Off-grid DOD	U16	1%	<p>1 &lt;-&gt; 1%</p> <p>10%-100%</p>
43138	EPS DOD	U16	1%	<p>1 &lt;-&gt; 1%</p> <p>10%-100%</p>
43139	EPS Switching Time	U16	10ms	<p>1 &lt;-&gt; 10ms, 10~99990ms</p> <p>0 means EPS parameters invalid</p>
43140	Meter1 Type and location	U16		<p>High byte indicates location</p> <p>0x0100 Grid</p> <p>0x0200 Load</p> <p>0x0300 Grid+PV (Two Meter)</p> <p>Low byte indicates meter type</p> <p>0x0001 General 1Ph</p> <p>0x0002 Acrel 3Ph</p> <p>0x0003 General 3Ph</p> <p>0x0004 Standard Eastron 1Ph</p> <p>0x0005 Standard Eastron 3Ph</p>



				0x0006 No Meter Mode
43141	Time-chargeing charge current	U16	0.1A	1<-->0.1A , MAX 70A , default 50A, accuracy 0.1A
43142	Time-chargeing discharge current	U16	0.1A	1<-->0.1A , MAX 70A , default 50A, accuracy 0.1A
43143	Time-chargeing charge start hour	U16	1hour	1<-->1h
43144	Time-chargeing charge start minute	U16	1min	1<-->1m
43145	Time-chargeing charge end hour	U16	1hour	1<-->1h
43146	Time-chargeing charge end minute	U16	1min	1<-->1m
43147	Time-chargeing discharge start hour	U16	1hour	1<-->1h
43148	Time-chargeing discharge start minute	U16	1min	1<-->1m
43149	Time-chargeing discharge end hour	U16	1hour	1<-->1h
43150	Time-chargeing discharge end minute	U16	1min	1<-->1m
43151	Reserved	U16		
43152- 43198	Reserved	U16		
43199	Reserved	U16		
43200	01/06 Working Mode V1Set	U16	0.1V	10<-->1V;
43201	01/06Working Mode V2Set	U16	0.1V	10<-->1V;
43202	01/06Working Mode V3Set	U16	0.1V	10<-->1V;
43203	01/06Working Mode V4Set	U16	0.1V	10<-->1V;
43204	01/06Working Mode P1 (P1% Set)	U16	0.01%	10000<-->100% Range (0-100%) 100% is rated P
43205	01/06Working Mode P2 (P2% Set)	U16	0.01%	10000<-->100% Range (0-100%) 100% is rated P
43206	01/06Working Mode P3 (P3% Set)	U16	0.01%	10000<-->100% Range (0-100%) 100% is rated P

43207	01/06Working Mode P4 (P4% Set)	U16	0.01%	10000<-->100% Range (0-100%) 100% is rated P
43208	02Working Mode V1Set	U16	0.1V	10<-->1V;
43209	02Working Mode V2Set	U16	0.1V	10<-->1V;
43210	02Working Mode V3Set	U16	0.1V	10<-->1V;
43211	02Working Mode V4Set	U16	0.1V	10<-->1V;
43212	02Working Mode LeadingQ (MaxLeadingVar%)	U16	0.01%	10000<-->100% Range: 0---60%; Default:30%
43213	02Working Mode LaggingQ (MaxLaggingVar%)	S16	0.01%	10000<-->100% range: 0--- (-60%); Default:-30%
43214	02 Working Mode Plock-in	U16	1%	1<-->1%, Default 20%, range0~100%;
43215	02 Working Mode Plock-out	U16	1%	1<-->1%, Default 5%, range0~100%;
43216	02Working Mode K Parameter	U16	0.01	100<-->1, Default 0.1 , range (-1.0~+1.0) CEI 0-21 Only
43217	02/03/04/05Working mode Q response 3Tau	U16	0.01s	100<-->1s, Default 10s, range(6~60s)
43218	05Working Mode B Power (Pb% Set)	U16	1%	(10000<-->100%); range: 50---100%; Default:100%
43219	05Working Mode C Power (Pc% Set)	U16	1%	(10000<-->100%); range: 50---100%; Default:100%
43220	05Working Mode C PF (PFcSet)	S16	0.01	range: (-0.90---0.90); Default:-0.95 (800<-->0.80, 1000<-->1.00)
43221	Standard Mode control switch	U16		BIT00, OverVolt Auto PLmt, 0 OFF(Default), 1 ON BIT01-15, Reserved
43222	Power ramp rate limit Wgra	U16	0.01%	100<-->1% Range: 5%---600%; Default:16.67%
43223	EN50549 Fault Trip Restart P_Ramp Rate	U16	0.1%	1000<-->100% Range: 5%---3000%; Default:10%
43224	EN50549 Startup P_Ramp Rate	U16	0.1%	1000<-->100% Range: 5%---3000%; Default:600%

43225	Working mode reset	U16		One reset each time 1, AUS DRM ON; 2, AUS DRM OFF; 3, Working Mode Reset; 4, Ramp rate Reset; 5, Freq derate Reset; 6, 10mins overvoltage rest;
43226	Freq Derate Mode	U16		For CEI 0-21, Default 0x0F
43227	01Mode, Fstop	U16	0.01Hz	100<-->1Hz
43228	01Mode Fstop-charge (Grid charge battery)	U16	0.01Hz	100<-->1Hz
43229- 43234	Reserved			
43235	Grid Voltage compensation Vgrid-A-Zero	S16	0.1V	10<-->1V Range: -5.0V~+5.0V; Accuracy 0.1V; Default 0; For 1ph inverter, phase A is effective
43236	Grid Voltage compensation Vgrid-B-Zero	S16	0.1V	10<-->1V Range: -5.0V~+5.0V; Accuracy 0.1V; Default 0; For 1ph inverter, phase A is effective
43237	Grid Voltage compensation Vgrid-C-Zero	S16	0.1V	10<-->1V Range: -5.0V~+5.0V; Accuracy 0.1V; Default 0; For 1ph inverter, phase A is effective
43238	Grid current sampling middle point compensation Igrid-A-Zero	S16		1<-->1 Range: -10---10; Default 0
43239	Grid current sampling middle point compensation Igrid-B-Zero	S16		1<-->1 Range: -10---10; Default 0
43240	Grid current sampling middle point compensation Igrid-C-Zero	S16		1<-->1 Range: -10---10; Default 0
43241	Grid feedforward parameter VFB-Adj-Scale	U16		1<-->1 Range: 50--90, Default 80

43242	Grid Voltage compensation parameter <del>VgaCompensation</del>	S16		<del>1&lt;--&gt;1</del> Range: <del>10---10</del> ; Default 0
43243	Grid Voltage compensation parameter <del>VgbCompensation</del>	S16		<del>1&lt;--&gt;1</del> Range: <del>10---10</del> ; Default 0
43244	Grid Voltage compensation parameter <del>VgcCompensation</del>	S16		<del>1&lt;--&gt;1</del> Range: <del>10---10</del> ; Default 0
43245	Leakage current protection ILeakLim	U16	1mA	1<-->1mA Range: 50---800mA; Default 240mA
43246	PV iso protection RisoLim	U16	1K	1<-->1K Range: 20k---1000k; Default 200K
43247	LVRT Setting	U16		BIT00,LVRT Enable BIT01,LVRT Var Specification 0 Capacitive, 1 Resistive, Default 0 BIT02,US Rule21 VRT Enable BIT03,US Rule21 FRT Enable BIT04,Brazil LVRT Enable
43248	Const Voltage Mode	U16	0.1V	Constant DC voltage Mode Range 100V---850V, Default 600V
43249	Special Settings	U16		BIT00: MPPT Parallel Function: 0---Individual MPPT Operation(Default) 1---Parallel MPPT Operation  BIT01: IgFollow (Increase the grid OFF judge speed, default Enable for Italy Standard) 0---Disable 1---Enable  BIT02: Relay protection , Relay-Fault-Func. 0 Enable, 1 Disable, Default 0; BIT03: I-leak protection ILeak-Fault Func. 0 Enable, 1 Disable, Default 0; BIT04: PV iso Protection, PV-G-Fault Func.

				BIT05: Grid-interference protection GRID-INTF.02 Func. BIT06: grid current sampling protection IgADCheckPro BIT07: Const Voltage Mode Enable Const Voltage  BIT08~11: Grid filter level 0-7, Default 0 BIT12~15: AfcI Sensitivity 0-7, Default 0
43250-43251	Datalogger SN	U32		Transfer the SN number to Dec and display it
43252	Reserved	U16		Datalogger SN reserved
43253	Reserved	U16		Datalogger SN reserved
43254	Reserved	U16		Datalogger SN reserved
43255-43256	Datalogger IP Address	U32		Transfer the IP address to Dec and display it
43257	Datalogger signal strength	U16		Reserved for wireless devices
43258	Datalogger status word 1	U16		All 0000 = normal operation; BIT00:0---INV&logger COM normal 1--- INV&logger COM fail BIT01: 0---logger& Server COM normal 1--- logger& Server COM fail BIT02: Reserved BIT03-BIT15:Reserved
43259-43300	Reserved	U16		
43301	Internal self-check function ON/OFF	U16		BIT00: Fan Self-check, 0 stop, 1start BIT01-BIT15: Reserved

## 6. Example

000218-Tx:01 04 80 E8 00 0C 59 FB

000219-Rx:01 04 18 00 F8 00 0C 00 0E 00 01 46 46 46 46 46 46 46 46 46 46 46 46 00 85 A4

000230-Tx:01 04 81 5B 00 0A 29 E2

000231-Rx:01 04 14 00 00 00 04 00 00 00 01 00 00 00 04 06 08 00 00 00 00 00 00 EE EB

000242-Tx:01 04 81 05 00 0A 48 30

000243-Rx:01 04 14 00 00 00 71 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 71 21 EE

000324-Tx:01 06 A7 FF 00 BE 1A FE  
 000325-Rx:01 06 A7 FF 00 BE 1A FE  
 000328-Tx:01 10 A7 FF 00 01 02 00 DE E4 CD  
 000329-Rx:01 10 A7 FF 00 01 12 8D  
 000340-Tx:01 10 A7 F8 00 08 10 00 13 00 03 00 14 00 01 00 1B 00 2C 00 01 00 BE 93 A5  
 000341-Rx:01 10 A7 F8 00 08 63 4A  
 000356-Tx:01 05 13 88 00 00 49 64  
 000357-Rx:01 05 13 88 00 00 49 64  
 000366-Tx:01 05 13 88 FF 00 08 94  
 000367-Rx:01 05 13 88 FF 00 08 94  
 01 05 13 88 00 01 88 A4  
 01 85 03 02 91  
 01 05 13 66 00 00 29 51  
 01 85 02 C3 51  
  
 01 01 13 66 00 00 D8 91  
 01 81 01 81 90

000412-Tx:01 06 A7 FF 00 22 1A 97  
 000413-Rx:01 86 03 02 61  
 000436-Tx:01 10 A7 FF 00 01 02 00 22 E4 8C  
 000437-Rx:01 90 03 0C 01

## 7. Appendix

000217-Tx:01 05 13 88 00 00 49 64

### 7.1. Appendix 2:

3044 Register	Status		Display	
	1P 2G	1、30KW series 2、15KW 3P 3、all 4G	1P 2G	1、30KW series 2、15KW 3P 3、all 4G
0000H	Normal operation	waiting	Generating	Waiting
0001H	\	Open operating		OpenRun
0002H	Waiting	Softrun	Waiting	SoftRun
0003H	Initializing	Generating	Initializing	Generating
0004H	\	Bypass inverting Running	\	Standby

0005H	\	Bypass inverting synchronize	\	StandbySynoch
0006H	\	Bypass grid running	\	GridToLoad
000FH	\	Normal running	\	Normal
1004H	Grid Off	\	Grid Off	\
.....	.....	.....	.....	.....
F010H	Grid surge(alarm)		Surge Alarm	
F011H	Fan fault(alarm)		Fan Alarm	
.....	.....	.....	.....	.....
1010H	Grid overvoltage		OV-G-V	
1011H	Grid undervoltage		UN-G-V	
1012H	Grid overfreq		OV-G-F	
1013H	Grid underfreq		UN-G-F	
1014H	Over grid impedance Grid reverse current		<del>G-IMP</del> Reve-Grid	
1015H	No-grid		NO-Grid	
1016H	Unbalanced grid		G-PHASE	
1017H	Grid Frequency Fluctuation		G-F-FLU	
1018H	Grid Over Current		OV-G-I	
1019H	Grid current sampling error		IGFOL-F	
.....	.....	.....	.....	.....
1020H	DC Over Voltage		OV-DC	
1021H	DC Bus Over Voltage		OV-BUS	
1022H	DC Bus Unbalance		UNB-BUS	
1023H	DC Bus Under Voltage		UN-BUS	
1024H	DC Bus Unbalance 2		UNB2-BUS	
1025H	DC(Channel A ) Over Current		OV-DCA-I	
1026H	DC(Channel B ) Over Current		OV-DCB-I	
1027H	DC interference		DC-INTF.	
1028H	DC reverse connection		Reve-DC	
1029H	PV midpoint grounding fault		PvMidIso	
.....	.....	.....	.....	.....
1030H	The Grid Interference Protection		GRID-INTF.	
1031H	The DSP Initial Protection		INI-FAULT	
1032H	Over temperature		OV-TEM	

	protection	
1033H	PV insulation fault	<del>GROUND-FAULT</del> PV ISO-PRO
1034H	Leakage current Protection	<del>Leak-FAULT</del> ILeak-PRO
1035H	Relay Check Protection	<del>Relay-FAULT</del> RelayChk-FAIL
1036H	DSP_B Protection	DSP-B-FAULT
1037H	DC Injection Protection	DCInj-FAULT
1038H	12V Under Voltage Faulty	12Power-FAULT
1039H	Leakage Current Check Protection	ILeak-Check
103AH	Under temperature protection	UN-TEM
.....	.....	.....
1040H	AFCI Check Fault	AFCI-Check
1041H	AFCI Fault	ARC- FAULT
1042H	DSP Chip SRAM Fault	RAM-FAULT
1043H	DSP Chip FLASH Fault	FLASH-FAULT
1044H	DSP Chip PC Pointer Fault	PC-FAULT
1045H	DSP Chip Register Fault	REG-FAULT
1046H	The Grid Interference 02 Protection	GRID-INTF02
1047H	The Grid Current Sampling Error	IG-AD
1048H	IGBT Over Current	IGBT-OV-I
.....	.....	.....
1050H	Grid transient overcurrent	OV-IgTr
1051H	Battery hardware overvoltage fault	OV-Vbatt-H
1052H	LLC hardware overcurrent	OV-ILLC
1053H	Battery overvoltage	OV-Vbatt
1054H	Battery undervoltage	UN-Vbatt
1055H	Battery not connected	NO-Battery
1056H	Backup overvoltage	OV-VBackup
1057H	Backup overload	Over-Load
1058H	DSP Selfcheck error	DspSelfChk
.....	.....	.....
2010H	Fail Safe	Fail Safe
2011H	Meter COM fail	MET_Comm_FAIL
2012H	Battery COM fail	CAN_Comm_FAIL
2014H	DSP COM fail	DSP_Comm_FAIL
2015H	BMS Alarm	Alarm-BMS
2016H	Battery selection not the same	BatName-FAIL



2017H	Alarm2-BMS	Alarm2-BMS
2018H	DRM Connect Fail	DRM_LINK_FAIL
2019H	Meter select fail	MET_SEL_FAIL
...	...	
2020H	Lead-acid battery High temperature	HighTemp.AMB
2021H	Lead-acid battery Low temperature	LowTemp.AMB

## 7.2. Appendix 3:

33092 H	Grid Standard			
	1P (0.7-5K)	3P (6-15K)	3P (20-60K)	1P 4G
01H	G83/2 / G59/3(3.6kW and below use G83; above 3.6kW use G59)	G59/3	G59/3	G59/3
02H	UL-240V(60Hz240 V)	UL1741(60Hz480V) Note:LV(60Hz270V )	UL-480V(60Hz480 V) Note:LV(60Hz270V )	UL-240V
03H	VDE0126	VDE0126	VDE0126	VDE0126
04H	AS4777	AS4777	AS4777	AS4777
05H	AS4777-NQ	AS4777-NQ	AS4777-NQ	AS4777-NQ
06H	CQCA/CQC	CQC(CQC-380V)	CQC-380A	CQCA/CQC
07H	ENEL	ENEL	ENEL	ENEL
08H	UL-208V(60Hz208 V)	UL-380V(60Hz380 V) Note:LV UL-220V(60Hz220 V)	UL-380V(60Hz380 V) Note:LV UL-220V(60Hz220 V)	UL-208V
09H	MEX-CFE	MEX-CFE	MEX-CFE	MEX-CFE
0AH	User-define	User-define	User-define	User-define
0BH	VDE4105	VDE4105	VDE4105	VDE4105
0CH	EN50438DK	EN50438DK	EN50438DK	EN50438DK
0DH	EN50438IE	EN50438IE	EN50438IE	EN50438IE
0EH	EN50438NL	EN50438NL	EN50438NL	EN50438NL
0FH	EN50438T	EN50438T	EN50438T	EN50438T
10H	EN50438L	EN50438L	EN50438L	EN50438L
11H	UL-240V-A	UL-240V-A	UL-480V-A	UL-240V-A
12H	UL-208V-A	UL-208V-A	UL-380V-A	UL-208V-A
13H	BRAZIL	BRAZIL	BRAZIL	BRAZIL

14H	AUS-Q-0.9	AUS-Q-0.9	AUS-Q-0.9	AUS-Q-0.9
15H	AUS-Q-0.8	AUS-Q-0.8	AUS-Q-0.8	AUS-Q-0.8
16H	G83/1	G83/1	G83/1	G83/1
17H	RD1699B	RD1699B	RD1699B	RD1699B
18H	IEC61727	IEC61727	IEC61727	IEC61727
19H	G59/3	GN-380L	GN-380L	G83/1-A
1AH	UL-HECO	GN-HV-L	CQC-480A	CQCB/GNB
1BH	NewZeal	NewZeal	GN-HV-L	CQCC/GNC
1CH	Barbados	G83/2	G59/3-A	NewZeal
1DH	Chile	4105/480	4105/480	G83/2
1EH	France	AS4777_480	AS4777_480	Chile
1FH	CQCB/GNB	N4105-BEL	NewZeal	NRS097
20H	CQCC/GNC		CQC500	Philippin
21H	Philippin		CQC540	N4105-BEL
22H			GN540L	IEC61727L
23H			N4105-BEL	KS1
24H				France
25H				ISONE240
26H				ISONE208
27H				ISONE240A
28H				ISONE208A
29H				GN300V
2AH				MEA(THAILAN D)
2BH				R21P3-240
2CH				R21P3-208
2DH				R21P3-24A
2EH				R21P3-20A
2FH				SRILANKA
30H				PEA(THAILAND )
31H				AS4777_SA
32H				Mala230LV
33H				Indon230V
34H				G98
35H				G99
36H				Generator50
37H				Generator60
38H				TW220(TAIWAN)
39H				TW110(TAIWAN)
3AH				DK230V
3BH				Barbados
3CH				BRAZIL-H

3DH				G99-N
3EH				CEI 0-21
3FH				MEX-220V
40H				MEX220-A
41H				Singapore
42H				AS4777-WA
43H				AS4777-NW
44H				EN50549L
45H				PH-L
46H				C10/11

### 7.3. Appendix 5:

Grid fault status 01:

BIT	Fault status	Status Code
BIT00	No grid	0—No 1—Yes
BIT01	Grid overvoltage	0—No 1—Yes
BIT02	Grid undervoltage	0—No 1—Yes
BIT03	Grid overfreq	0—No 1—Yes
BIT04	Grid underfreq	0—No 1—Yes
BIT05	Unbalanced grid	0—No 1—Yes
BIT06	Gird frequency Fluctuation	0—No 1—Yes
BIT07	Grid reverse current	0—No 1—Yes
BIT08	Grid current tracking error	0—No 1—Yes
BIT09	METER COM Fail	0—No 1—Yes
BIT10	FailSafe	0—No 1—Yes
BIT11	Reserved	0—No 1—Yes
BIT12	Reserved	0—No 1—Yes
BIT13	Reserved	0—No 1—Yes
BIT14	Reserved	0—No 1—Yes
BIT15	Reserved	0—No 1—Yes

Backup load fault status 02:

BIT	Fault status	Status Code
BIT00	Backup overvoltage fault	0—No 1—Yes
BIT01	Backup overload fault	0—No 1—Yes
BIT02	Reserved	0—No 1—Yes
BIT03	Reserved	0—No 1—Yes
BIT04	Reserved	0—No 1—Yes
BIT05	Reserved	0—No 1—Yes
BIT06	Reserved	0—No 1—Yes
BIT07	Reserved	0—No 1—Yes
BIT08	Reserved	0—No 1—Yes

BIT09	Reserved	0—No 1—Yes
BIT10	Reserved	0—No 1—Yes
BIT11	Reserved	0—No 1—Yes
BIT12	Reserved	0—No 1—Yes
BIT13	Reserved	0—No 1—Yes
BIT14	Reserved	0—No 1—Yes
BIT15	Reserved	0—No 1—Yes

Battery fault status 03:

BIT	Fault status	Status Code
BIT00	Battery not connected	0—No 1—Yes
BIT01	Battery overvoltage Check	0—No 1—Yes
BIT02	Battery undervoltage Check	0—No 1—Yes
BIT03	Reserved	0—No 1—Yes
BIT04	Reserved	0—No 1—Yes
BIT05	Reserved	0—No 1—Yes
BIT06	Reserved	0—No 1—Yes
BIT07	Reserved	0—No 1—Yes
BIT08	Reserved	0—No 1—Yes
BIT09	Reserved	0—No 1—Yes
BIT10	Reserved	0—No 1—Yes
BIT11	Reserved	0—No 1—Yes
BIT12	Reserved	0—No 1—Yes
BIT13	Reserved	0—No 1—Yes
BIT14	Reserved	0—No 1—Yes
BIT15	Reserved	0—No 1—Yes

Device fault status 04:

BIT	Fault status	Status Code
BIT00	DC overvoltage	0—No 1—Yes
BIT01	DC Bus overvoltage	0—No 1—Yes
BIT02	DC Bus unbalanced voltage	0—No 1—Yes
BIT03	DC Bus undervoltage	0—No 1—Yes
BIT04	DC Bus unbalanced voltage 2	0—No 1—Yes
BIT05	DC overcurrent on A circuit	0—No 1—Yes
BIT06	DC overcurrent on B circuit	0—No 1—Yes
BIT07	DC input interference	0—No 1—Yes
BIT08	Grid overcurrent	0—No 1—Yes
BIT09	IGBT overcurrent	0—No 1—Yes
BIT10	Grid interference 02	0—No 1—Yes
BIT11	AFCI self-check	0—No 1—Yes
BIT12	Arc fault reserved	0—No 1—Yes
BIT13	Grid current sampling fault	0—No 1—Yes

BIT14	DSP self-check error	0—No 1—Yes
BIT15	Reserved	0—No 1—Yes

Device fault status 05:

BIT	Fault status	Status Code
BIT00	Grid interference	0—No 1—Yes
BIT01	Over dc components	0—No 1—Yes
BIT02	Over temperature Protection	0—No 1—Yes
BIT03	Relay check pro	0—No 1—Yes
BIT04	Under temperature protection	0—No 1—Yes
BIT05	PV insulation fault	0—No 1—Yes
BIT06	12V undervoltage pro	0—No 1—Yes
BIT07	Leak current pro	0—No 1—Yes
BIT08	Leak current self check pro	0—No 1—Yes
BIT09	DSP initial pro	0—No 1—Yes
BIT10	DSP B pro	0—No 1—Yes
BIT11	Battery overvoltage hardware fault	0—No 1—Yes
BIT12	LLC hardware overcurrent	0—No 1—Yes
BIT13	Grid transient overcurrent	0—No 1—Yes
BIT14	CAN COM FAIL	0—No 1—Yes
BIT15	DSP COM FAIL	0—No 1—Yes

#### 7.4. Appendix 6:

Operation Status:

BIT	Status	Code
BIT00	Normal Operation	0—No 1—Yes
BIT01	Initializing	0—No 1—Yes
BIT02	Controlled turning OFF	0—No 1—Yes
BIT03	Fault leads to turning OFF	0—No 1—Yes
BIT04	Stand-by	0—No 1—Yes
BIT05	Limited Operation (Caused by temperature, frequency, etc.)	0—No 1—Yes
BIT06	Limited Operation (Caused by external reason)	0—No 1—Yes
BIT07	Backup overload	0—No 1—Yes
BIT08	Load fault (Is the load normal)	0—No 1—Yes
BIT09	Grid fault (Is the Grid normal)	0—No 1—Yes
BIT10	Battery fault (Is the battery normal)	0—No 1—Yes
BIT11	Reserved	0—No 1—Yes
BIT12	Grid Surge(Warn)	0—No 1—Yes

BIT13	Fan fault(Warn)	0—No 1—Yes
BIT14	Reserved	0—No 1—Yes
BIT15	Reserved	0—No 1—Yes

## 7.5. Appendix 7

Storage control switching:

BIT	Status	Code
BIT00	Max self consumption mode	0—OFF 1—ON
BIT01	Time-charging mode	0—OFF 1—ON
BIT02	OFF-grid mode	0—OFF 1—ON
BIT03	Battery wakeup switch (1—wakeup enable 0—wakeup disable)	0—OFF 1—ON
BIT04	Reserve battery mode (ON/OFF)	0—OFF 1—ON
BIT05	Allow grid to charge the battery	0—Allow 1—Not allow
BIT06	Reserved	0—OFF 1—ON
BIT07	Reserved	0—OFF 1—ON
BIT08	Reserved	0—OFF 1—ON
BIT09	Reserved	0—OFF 1—ON
BIT10	Reserved	0—OFF 1—ON
BIT11	Reserved	0—OFF 1—ON
BIT12	Reserved	0—OFF 1—ON
BIT13	Reserved	0—OFF 1—ON
BIT14	Reserved	0—OFF 1—ON
BIT15	Reserved	0—OFF 1—ON

## 7.6. Appendix 8

Factory setting flag

BIT	Status	Code
BIT00	FLASH read and write timeout	0—No 1—Yes
BIT01	Clear energy flag	0—No 1—Done
BIT02	Reserved	0—No 1—Yes
BIT03	Reserved	0—No 1—Yes
BIT04	Reserved	0—No 1—Yes
BIT05	Reserved	0—No 1—Yes
BIT06	Reserved	0—No 1—Yes
BIT07	Reserved	0—No 1—Yes
BIT08	Reset datalogger flag	0—No 1—Reset
BIT09	Return factory setting of datalogger flag	0—No 1—Recover
BIT10	Reserved	0—No 1—Yes
BIT11	Reserved	0—No 1—Yes

BIT12	Reserved	0—No 1—Yes
BIT13	Reserved	0—No 1—Yes
BIT14	Reserved	0—No 1—Yes
BIT15	Reserved	0—No 1—Yes