

# RS485\_MODBUS Communication Protocol

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## 1. Overview

This protocol adopted MODBUS RTU regulation, is applicable to the communication protocol between Ginlong grid-tied inverter and PC monitoring software. This Protocol can read operational information and control the inverter in real time.

## 2. Physical interface

### 2.1. Adopts RS485 Receiver-Transmitter, Client-Server Model:

----Baud rate: 9600bps  
----Parity checking: None  
---- Data: 8  
---- Stop: 1

### 2.2. Inter-frame interval requirement:

A communication frame interval of 300ms or more (excluding 300ms) is required. The maximum number of data frame bytes is recommended to be 100 (50 register addresses).

## 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 and must match the slave address of the inverter.

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

Function code(Hex)	Name	Register address	Function
02H	Read the state of the switch input	10001-19999	Read the contents of the fault information register
03H	Read the holding registers	40001-49999	Read the setting content of holding registers
04H	Read the input registers	30001-39999	Read the detail information of the inverter
05H	Write a single input	00001-09999	On/Off setting function
06H	Write a single holding registers	40001-49999	Set single-byte functions
10H	Write multiple holding training device	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 follow by low byte.

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

## 4. Error message and data processing

Slave reply (hex):

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

When the inverter communication module detects an error other than the CRC code error, it must send back information to the host. The highest position of the function code is 1, that is, 128 is added to the function code sent by the host.

**Inverter communication module responds to the error code returned:**

0x01 Illegal function code The server does not understand the function code.

0x02 Illegal data address related to request

0x03 Illegal data value related to request

0x04 service failure The inverter communication module cannot receive data failure during execution.

## 5. Detailed protocol description

00001-09999 (0X) register address is writable register type, supports 0x05 function code,  
10001-19999 (1X) register address is read-only register type, supports 0x02 function code,  
30001-39999 (3X) register address is read-only register Type, support 0x04 function code,  
40001-49999 (4X) register address is a readable and writable holding register address, support  
0x03, 0x06 and 0x10 function code.

### 5.1. Reading one or more input states

Correspond to function code 0x02. The addresses in the following table are the same as those in the actual information frame, which means no need of offset or other conversion.

Register address (Decimal)	Means	Remark	Address type
2501	Grid Over Voltage	0: Normal 1: Protect	1X
2502	Grid Under Voltage	0: Normal 1: Protect	1X
2503	Grid Over Frequency	0: Normal 1: Protect	1X
2504	Grid Under Frequency	0: Normal 1: Protect	1X
2505	Reverse power grid	0: Normal 1: Protect	1X
2506	No Grid	0: Normal 1: Protect	1X
2507	Grid Unbalance	0: Normal 1: Protect	1X
2508	Grid Frequency Fluctuation	0: Normal 1: Protect	1X
2509	Grid Over Current	0: Normal 1: Protect	1X
2510	Grid Current Tracking Fault	0: Normal 1: Protect	1X
2511	Reserve	0: Normal 1: Protect	1X

2512	Reserve	0: Normal 1: Protect	1X
2513	Reserve	0: Normal 1: Protect	1X
2514	Reserve	0: Normal 1: Protect	1X
2515	Reserve	0: Normal 1: Protect	1X
2516	Reserve	0: Normal 1: Protect	1X
2517	Reserve	0: Normal 1: Protect	1X
2518	DC Over Voltage	0: Normal 1: Protect	1X
2519	DC Bus Over Voltage	0: Normal 1: Protect	1X
2520	DC Bus Unbalance	0: Normal 1: Protect	1X
2521	DC Bus Under Voltage	0: Normal 1: Protect	1X
2522	DC Bus Unbalance 2	0: Normal 1: Protect	1X
2523	DC(Channel A ) Over Current	0: Normal 1: Protect	1X
2524	DC(Channel B ) Over Current	0: Normal 1: Protect	1X
2525	DC input Interference Protection	0: Normal 1: Protect	1X
2526	DC polarity reverse connection	0: Normal 1: Protect	1X
2527	Reserve	0: Normal 1: Protect	1X
2528	Reserve	0: Normal 1: Protect	1X
2529	Reserve	0: Normal 1: Protect	1X
2530	Reserve	0: Normal 1: Protect	1X
2531	Reserve	0: Normal 1: Protect	1X
2532	Reserve	0: Normal 1: Protect	1X
2533	Reserve	0: Normal 1: Protect	1X
2534	The Grid Interference Protection	0: Normal 1: Protect	1X
2535	The DSP Initial Protection	0: Normal 1: Protect	1X
2536	Over Temperature Protection	0: Normal 1: Protect	1X
2537	PV insulation fault	0: Normal 1: Protect	1X
2538	Leakage Current Protection	0: Normal 1: Protect	1X
2539	Relay Protection	0: Normal 1: Protect	1X
2540	DSP_B Protection	0: Normal 1: Protect	1X
2541	DC Injection Protection	0: Normal 1: Protect	1X
2542	12V Under Voltage Faulty	0: Normal 1: Protect	1X
2543	Leakage Current Check Protection	0: Normal 1: Protect	1X
2544	Under Temperature Protection	0: Normal 1: Protect	1X
2545	Reserve	0: Normal 1: Protect	1X
2546	Reserve	0: Normal 1: Protect	1X
2547	Reserve	0: Normal 1: Protect	1X
2548	Reserve	0: Normal 1: Protect	1X
2549	Reserve	0: Normal 1: Protect	1X
2550	AFCI Check Fault	0: Normal 1: Protect	1X
2551	AFCI Fault	0: Normal 1: Protect	1X
2552	Reserve	0: Normal 1: Protect	1X
2553	Reserve	0: Normal 1: Protect	1X

2554	Reserve	0: Normal 1: Protect	1X
2555	Reserve	0: Normal 1: Protect	1X
2556	The Grid Interference 02 Protection	0: Normal 1: Protect	1X
2557	The Grid Current Sampling Error	0: Normal 1: Protect	1X
2558	IGBT Over Current	0: Normal 1: Protect	1X
2559	Reserve	0: Normal 1: Protect	1X
2560	Reserve	0: Normal 1: Protect	1X
2561	Reserve	0: Normal 1: Protect	1X
2562	Reserve	0: Normal 1: Protect	1X
2563	Reserve	0: Normal 1: Protect	1X
2564	Reserve	0: Normal 1: Protect	1X
2565	Reserve	0: Normal 1: Protect	1X
2566	normal operation	0: Normal 1: Protect	1X
2567	Initial standby	0: Normal 1: Protect	1X
2568	Control shutdown	0: Normal 1: Protect	1X
2569	Failure caused downtime	0: Normal 1: Protect	1X
2570	Standby	0: Normal 1: Protect	1X
2571	Power down operation	0: Normal 1: Protect	1X
2572	Limited power operation	0: Normal 1: Protect	1X
2573	Overload buck	0: Normal 1: Protect	1X
2574	Reserve	0: Normal 1: Protect	1X
2575	Reserve	0: Normal 1: Protect	1X
2576	Reserve	0: Normal 1: Protect	1X
2577	Reserve	0: Normal 1: Protect	1X
2588	Reserve	0: Normal 1: Protect	1X

## 5.2. Definiting the register address of inverter operation information

The function code is 0x04, the register address needs to offset one bit.

**Example:** register address: 3000, the send address is 2999.

Register address ( Decimal )	Name	Data type	Unit	Remark	Address type
3000	Product model	U16			3X
3001	DSP software version	U16		( Hexadecimal display )	3X
3002	LCD software version	U16		( Hexadecimal display )	3X
3003	AC output type	U16		Single phase Three phase four-wire mode Three phase three-wire mode	3X

3004	DC output type	U16		0-1 input 1-2 input 2-3 input 3-4 input	
3005-3006	Active power /Real time power	S32	1W		3X
3007-3008	Total DC output power	U32	1W		3X
3009-3010	Total energy	U32	1kWh		3X
3011-3012	Energy this month	U32	1kWh		3X
3013-3014	Energy last month	U32	1kWh		3X
3015	Energy today	U16	0.1kWh		3X
3016	Energy yesterday	U16	0.1kWh		3X
3017-3018	Energy this year	U32	1kWh	15KW and below, no such function	3X
3019-3020	Energy last year	U16	1kWh	15KW and below, no such function	3X
3021	Reserved	U16			3X
3022	DC voltage 1	U16	0.1V		3X
3023	DC current 1	U16	0.1A		3X
3024	DC voltage 2	U16	0.1V		3X
3025	DC current 2	U16	0.1A		3X
3026	DC voltage 3	U16	0.1V	15KW and below, no such function	3X
3027	DC current 3	U16	0.1A	15KW and below, no such function	3X
3028	DC voltage 4	U16	0.1V	15KW and below, no such function	3X
3029	DC current 4	U16	0.1A	15KW and below, no such function	3X
3030	Reserved	U16			3X
3031	Reserved	U16			3X
3032	DC busbar voltage	U16	0.1V		3X
3033	DC half-busbar voltage	U16	0.1V		3X
3034	AB line voltage / A phase voltage	U16	0.1V	Output type (3003) is 1: output phase voltage 2: Output line voltage	3X
3035	BC line voltage / B phase voltage	U16	0.1V	Output type (3003) is 1: output phase voltage 2: Output line voltage	3X
3036	CA line voltage / C phase voltage	U16	0.1V	Output type (3003) is 1: output phase voltage	3X

				2: Output line voltage 0: Output single-phase voltage	
3037	A phase current	U16	0.1A		3X
3038	B phase current	U16	0.1A		3X
3039	C phase current	U16	0.1A		3X
3040	Reserved	U16			3X
3041	Standard working mode	U16		working mode : 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	3X
3042	Inverter temperature	S16	0.1℃		3X
3043	Grid Frequency	U16	0.01Hz		3X
3044	Inverter status	U16		See Appendix 1	3X
3045-3046	Limited active power adjustment rated power output value	S32	1W		3X
3047-3048	Reactive power regulation rated power output value	S32	1Var		3X
3049	Inverter control word	U16		15KW and below, no such function	3X
3050	Actual value of limited Active power	U16	1%	10000<-->100% Setting range (0-100%) 100% refers to the nominal nominal power.	3X
3051	Actual adjust value of power factor	S16	0.01	Low digits of power factor: (800<-->0.80, 1000<-->1.00) (-800<-->-0.80, -1000<-->-1.00) ( Power factor 1.00 and -1.00 are the same ) Setting range (-0.80--0.80) 15KW and below, no such function	3X
3052	Actual power factor adjustment	S16	0.01	Low digits of power factor : (800<-->0.80,	3X

				1000<-->1.00) (-800<-->-0.80, -1000<-->-1.00) ( Power factor 1.00 and -1.00 are the same ) Setting range (-0.80---0.80) This feature is only for the fixed power factor setting function of standard mode 3.	
3053	Reactive power value	S16	1%	10000<-->100% Setting range (-6000- +6000) default : 0 This function is only for the reactive power setting of standard mode 4.	3X
3054	Standard	U16		See Appendix 2	3X
3055	Power curve number	U16			3X
3056-3057	Reactive power value	S32	1Var	15KW and below, no such function	3X
3058-3059	Apparent power value	S32	1VA	15KW and below, no such function	3X
3060	Real-time power factor	U16	0.001	(1<->0.001 Resolution: Active power divided by apparent power range: 0-1)	3X
3061	Inverter serial number SN_1	U16		Inverter sequence (hexadecimal display) Example: The numerical upload value of 3061 is 0x4321 The numerical upload value of 3062 is 0x8765. The numerical upload value of 3063 is 0xCBA9 The numerical upload value of 3064 is 0x0FED Sn number: 12345679ABCDEF	3X
3062	Inverter serial number SN_2	U16			3X
3063	Inverter serial number SN_3	U16			3X

3064	Inverter serial number SN_4	U16			3X
3065	Reserved	U16			3X
3066	Set flag	U16		See Appendix VIII	3X
3067	error code 01	U16		See Appendix V	3X
3068	error code 02	U16			3X
3069	error code 03	U16			3X
3070	error code 04	U16			3X
3071	error code 05	U16			3X
3072	Working status	U16		See Appendix VI	3X
3073	System time - year	U16		0-99year	3X
3074	System time - month	U16			3X
3075	System time - day	U16			3X
3076	System time-hour	U16			3X
3077	System time-minute	U16			3X
3078	System time - second	U16			3X
3079	Reserved	U16			3X
3080-3081	Electricity meter total active power generation	U32	1Wh	1<-->1Wh	3X
3082	Meter voltage	U16		10<-->1V	3X
3083	Meter current	U16		10<-->1A	3X
3084-3085	Meter active power	S32		1<-->1W Positive: send power to the grid Negative: take power from the grid	3X
3086	Leakage current protection value	U16	1mA	1<-->1mA	3X
3087	Insulation resistance protection value	U16	1kOhm	1<-->1k	3X
3088	Power limit switch operation	U16		BIT00:( 0x55) 1: Represents the limited power limit (restricts power recovery to 100%)); 0: Representative open BIT01: (0xAA) 1: The representative power limit is valid; 0: the power limit is invalid; BIT02-BIT15: Reserved	3X
3089	Reactive power	U16		BIT00:( 0x55)	3X

	switch position operation			1: represents off (power factor recovery 1, reactive power recovery 0); 0: means open. BIT01: (0xA1) 1: indicates that the reactive power ratio setting is valid; 0: indicates that the reactive power ratio setting is invalid; BIT02: (0xA2) 1: indicates that the power factor 02 setting is valid; 0: indicates that the power factor 02 setting is invalid; BIT03-BIT15: Reserved	
3090	Power limit switch	U16		0xAA Enable limit power switch, 0x55 is the power limit switch (restrict power recovery to 100%)	3X
3091	Reactive power switch	U16		0x55 Off, power factor recovery 1, reactive power ratio recovery 0; 0xA1 reactive power ratio setting is valid; The 0xA2 power factor 02 setting is valid.	3X
3141	Reserved	U16			3X
3142-3250	Reserved	U16			3X
3230-3249	Machine serial number (serial number)	U16		ASCII code value literal translation display such as: 3230 = '01' 3231 = '23' Corresponding display: '0123'	
3250	Meter placement	U16		BIT00: Meter is on the load side BIT01: Meter is on the main grid side BIT02: Reserved BIT03: Reserved BIT04: Reserved	3X

				BIT05: Reserved BIT06: Reserved BIT07-BIT15: Reserved	
3251	Meter AC voltage A	U16	0.1V	10<-->1V	3X
3252	Meter AC current A	U16	0.01A	100<-->1A	3X
3253	Meter AC voltage B	U16	0.1V	10<-->1V	3X
3254	Meter AC current B	U16	0.01A	100<-->1A	3X
3255	Meter AC voltage C	U16	0.1V	10<-->1V	3X
3256	Meter AC current C	U16	0.01A	100<-->1A	3X
3257	MeterActive powerA	S32	0.001kW	1000<-->1kW	3X
3259	MeterActive powerB	S32	0.001kW	1000<-->1kW	3X
3261	MeterActive powerC	S32	0.001kW	1000<-->1kW	3X
3263	Meter Total active power	S32	0.001kW	1000<-->1kW	3X
3265	Meter Reactive power A	S32	1Var	1<-->1Var	3X
3267	Meter Reactive power B	S32	1Var	1<-->1Var	3X
3269	Meter Reactive power C	S32	1Var	1<-->1Var	3X
3271	Meter Total reactive power	S32	1Var	1<-->1Var	3X
3273	Meter Apparent power A	S32	1VA	1<-->1VA	3X
3275	Meter Apparent power B	S32	1VA	1<-->1VA	3X
3277	Meter Apparent power C	S32	1VA	1<-->1VA	3X
3279	Meter Apparent power	S32	1VA	1<-->1VA	3X
3281	Meter Power factor	S16		-1.0~-0.8 +0.8~+1.0	3X
3282	Meter Grid frequency	U16	0.01Hz	100<-->1Hz	3X
3283	MeterGrid power total active energy	U32	0.01kWh	100<-->1kWh	3X
3285-3286	MeterGrid power transmission total active energy	U32	0.01kW	100<-->1kW	3X
3287-3297	Reserved	U16			3X
3298	Reserved	U16		Reason for reservation: When expanding more PV voltage and current, the corresponding parameter	3X

				information can be uploaded according to the received command. The lower sixteen bits represent the voltage and the upper sixteen bits represent the current.	
3299	Total PV voltage	U16	0.1V	10<-->1V	3X
3300	Total PV current	S16	0.1A	10<-->1A	3X
3301	PV1 Current	S16	0.1A	10<-->1A	3X
3302	PV2 Current	S16	0.1A	10<-->1A	3X
3303	PV3 Current	S16	0.1A	10<-->1A	3X
3304	PV4 Current	S16	0.1A	10<-->1A	3X
3305	PV5 Current	S16	0.1A	10<-->1A	3X
3306	PV6 Current	S16	0.1A	10<-->1A	3X
3307	PV7 Current	S16	0.1A	10<-->1A	3X
3308	PV8 Current	S16	0.1A	10<-->1A	3X
3309	PV9 Current	S16	0.1A	10<-->1A	3X
3310	PV10 Current	S16	0.1A	10<-->1A	3X
3311	PV11 Current	S16	0.1A	10<-->1A	3X
3312	PV12 Current	S16	0.1A	10<-->1A	3X
3313	PV13 Current	S16	0.1A	10<-->1A	3X
3314	PV14 Current	S16	0.1A	10<-->1A	3X
3315	PV15 Current	S16	0.1A	10<-->1A	3X
3316	PV16 Current	S16	0.1A	10<-->1A	3X
3317	PV17 Current	S16	0.1A	10<-->1A	3X
3318	PV18 Current	S16	0.1A	10<-->1A	3X
3319	PV19 Current	S16	0.1A	10<-->1A	3X
3320	PV20 Current	S16	0.1A	10<-->1A	3X
3321	PV1 Voltage	U16	0.1V	10<-->1V Description: 125K series models have 20 PV currents, 10 PV voltages, and 1 PV voltage corresponds to 2 PV currents.	3X
3322	PV2 Voltage	U16	0.1V	10<-->1V	3X
3323	PV3 Voltage	U16	0.1V	10<-->1V	3X
3324	PV4 Voltage	U16	0.1V	10<-->1V	3X
3325	PV5 Voltage	U16	0.1V	10<-->1V	3X
3326	PV6 Voltage	U16	0.1V	10<-->1V	3X
3327	PV7 Voltage	U16	0.1V	10<-->1V	3X
3328	PV8 Voltage	U16	0.1V	10<-->1V	3X

3329	PV9 Voltage	U16	0.1V	10<-->1V	3X
3330	PV10 Voltage	U16	0.1V	10<-->1V	3X
3331-3340	Reserved	U16			3X
3341	The number of this model IV curve	U16		0---no Iv curve; 1---an Iv curve, 2---two Iv curves..., Current setting up to 30	3X
3342	Current Iv curve No.	U16		0---no Iv curve; 1---an Iv curve, 2---two Iv curves..., Current setting up to 30	3X
3343	PV Voltage1	U16	0.1V	10<-->1V	3X
3344	PV Current1	S16	0.1A	10<-->1A	3X
3345	PV Voltage 2	U16	0.1V	10<-->1V	3X
3346	PV Current 2	S16	0.1A	10<-->1A	3X
3347	PV Voltage 3	U16	0.1V	10<-->1V	3X
3348	PV Current 3	S16	0.1A	10<-->1A	3X
3349	PV Voltage 4	U16	0.1V	10<-->1V	3X
3350	PV Current 4	S16	0.1A	10<-->1A	3X
3351	PV Voltage 5	U16	0.1V	10<-->1V	3X
3352	PV Current 5	S16	0.1A	10<-->1A	3X
3353-3460	.....	...	...	.....	3X
3461	PV Voltage 60	U16	0.1V	10<-->1V	3X
3462	PV Current 60	S16	0.1A	10<-->1A	3X
3463	Reserved	U16			3X
3464	Reserved	U16			3X
3465	Reserved	U16			3X
3466-3999	Reserved	U16			3X

**Note:** The METER (electric meter) SN number uses the SN number of the inverter + the slave address of the inverter to indicate the SN number of the METER, which is used to distinguish whether the device has a meter device. The single-phase machine is based on the data of phase A. The METER active power value is positive for powering the grid, and the negative number is for taking power to the grid.

**PID Analog information, application function code 04:**

Register address (decimal)	meaning	type of data	unit	Remarks	Address type
5000	Inverter operating state	U16		0—Standby 1—Connected to the network 2—Fault 3—Control shutdown	3X

				4—Off-net	
5001	CRC16 check (manufacturer)	U16			3X
5002	DC bus voltage	U16	0.1V		3X
5003	Reserved	U16			3X
5004	Reserved	U16			3X

**Note:** Use the PID module to query this table, and need to query the complete one (5000-5004 simultaneous reading), the reading can not be processed.

### 5.3. Anti-backflow device operation information parameter address definition

The corresponding function code is 0x04. The addresses in the table below are the same as those in the actual information frame and no further offsets or other conversions are required.

Register address (decimal)	meaning	type of data	unit	Remarks	Address type
36000	EPM AC voltageA	U16		10<-->1V	3X
36001	EPM AC currentA	U16		10<-->1A	3X
36002	EPM AC voltageB	U16		10<-->1V	3X
36003	EPM AC current B	U16		10<-->1A	3X
36004	EPM AC voltageC	U16		10<-->1V	3X
36005	EPM AC current C	U16		10<-->1A	3X
36006	EPM_A Phase power	S16		1<-->100W	3X
36007	EPM_B Phase power	S16		1<-->100W	3X
36008	EPM_C Phase power	S16		1<-->100W	3X
36009-36010	EPM_ Total power	S32		1<-->100W <b>Note:</b> The little endian format, the low position is in the front high position.	3X
36011-36012	Inverter total power	S32		1<-->100W <b>Note:</b> The little endian format, the low position is in the front high position.	3X
36013	Inverter MODEL number	U16			3X
36014	EPM device software version number	U16			3X
36015	Percentage of power limit	U16		10000<-->100%	3X

36016	CT current sensor ratio	U16		1<-->100	3X
36017	Return power setting	U16		1<-->100W	3X
36018	Number of inverter settings	U16			3X
36019	Real time clock: year	U16		00-99year	3X
36020	Real time clock: month	U16			3X
36021	Real time clock: day	U16			3X
36022	Real time clock: hour	U16			3X
36023	Real time clock: minute	U16			3X
36024	Real time clock: seconds	U16			3X
36025	FailSafe switch status	U16		0 $\leftrightarrow$ Close 1 $\leftrightarrow$ open, default off After Ver.06 version	3X
36026	Reserved	U16			3X
36027	Reserved	U16			3X
36028	Reserved	U16			3X
36029	Reserved	U16			3X
36030-36049	Machine serial number (serial number)	U16		ASCII code value literal translation display such as: 3031 = '01' 3233 = '23' Corresponding display: '0123' The low register data is displayed first, the high register is displayed after, the last bit is discarded, and the maximum 15 SN number is discarded.	3X
36050	Reserved	U16			3X
36051	Reserved	U16			3X

**Note:** Anti-backflow device, assign address.

#### 5.4. Inverter switch machine setting parameter address definition

Corresponding to function code 0x05. The addresses in the table below are the same as those in the actual information frame and no further offsets or other conversions are required.

Register address (decimal)	meaning	type of data	unit	Remarks
5000	On/off setting	U16	1 means power on, 0 means power off	0X

#### 5.5. The inverter sets the parameter address definition

The corresponding function codes are 0x03, 0x06 and 0x10. The address in the following table is different from the address in the actual information frame and needs to be offset by one bit. For example, the 3000 address offset is 2999:

Register address (decimal)	meaning	type of data	unit	Remarks	Remarks
3007	Power on/off	U16		0xBE- Power on 0xDE- Power off	4X
3051	Reactive power limit value	S16	1%	10000<-->100% Setting range (-6000- +6000) default: 0 This function is only for the reactive power setting of standard mode 4.	4X
3052	Limit power setting value	U16	1%	10000<-->100% Setting range (0-100%) 100% refers to the nominal power.	4X
3053	Power factor setting	S16	0.01	Power factor: (800<-->0.80, 1000<-->1.00) (-800<-->-0.80, -1000<-->-1.00) (Power factor 1.00 and -1.00 are the same) Setting range (-0.80---0.80) 15KW and below, no such function	4X
3068	Standard number	U16		See Appendix 2	4X
3240	IV curve start scan enable setting	U16		1---Start IV curve scan, 0---No IV curve scanning, The default is 0 Description: For the IV curve acquisition requirement, after setting the start IV curve, read the	4X

				3341 register according to the 04 function code. If the number of IV curves is read, the scan IV curve ends, if the number of IV curves is not supervised after 5 minutes. The timeout ends. It was not read three times and the scan was abnormal.	
3241	IV curve starting voltage	U16	0.1V	10<-->1V	4X
3242	IV curve interval voltage	U16	0.1V	10<-->1V	4X
3243	Get the current IV curve No.	U16		Description: Get the current IV curve as needed. Curve data address range: 3341-3462.	4X
3244-3249	Reserved	U16			4X

## 6. Example

**Remark:** The data was sent by minus 1 model when setting and inquiring register address, e.g.: if it is to acquire the data of address 3000, the data sending need to be sent by minus 1(which is 2999).

### 6.1. Acquiring an operation message:

If slave address is 1, and you want to acquire 3X register address type - the data of address 3000:

**Host sending (HEX):**

01 04 0B B7 00 01 83 C8

**Slave responding:**

01 04 02 00 43 F8 C1

The corresponding model is 0x0043, which is the model No. 43 (inverter model)

### 6.2. Acquiring multiple operation message:

If slave address is 1, and you want to acquire 3X register address type - the data of address 3000 - 3003:

**Host sending (HEX):**

01 04 0B B7 00 03 02 09

**Slave responding:**

01 04 06 00 43 02 07 00 02 14 E4

The corresponding model is 0x0043, DSP software version is 0x0207, LCD software version is 0x0002.

### 6.3. Acquiring a setup message

If the slave address is 1, you need to get the 3000 address data of the 4X register address type:

**Host Send (HEX):**

01 03 0B B7 00 01 36 08

**Slave response (HEX):**

01 03 02 00 13 F9 89

Note: The reading year is 0x0013: 19 years

#### 6.4. Acquiring multiple settings information

If the slave address is 1, you need to get the data from the 3000 address to the 3006 address of the 4X register address type:

**Host Send (HEX):**

01 03 0B B7 00 06 77 CA

**Slave response (HEX):**

01 03 0C 00 13 00 02 00 14 00 17 00 16 00 32 91 87

Note: The reading year is 0x0013: 19 years, the month is 0x0002: February, the day is 0x0014: 20th, when it is 0x0017:23, the score is 0x0016: 22 minutes, the seconds are 0x0032: 50 seconds.

#### 6.5. Set a piece of data

If the slave address is 1, you need to set the 3000 address data of the 4X register address type:

**Host Send (HEX):**

01 06 0B B7 00 13 7A 05

**Slave response (HEX):**

01 06 0B B7 00 13 7A 05

Or

**Host Send (HEX):**

01 10 0B B7 00 01 02 00 13 46 DA

**Slave response (HEX):**

01 10 0B B7 00 01 B3 CB

Note: The setting year is 0x0013: 19 years

#### 6.6. Set multiple pieces of data

Assuming the slave address is 1, you need to set the 3066 address of the 4X register address type to 3068 data:

**Host Send (HEX):**

01 10 0B F9 00 03 06 00 00 30 39 00 01 08 85

**Slave response (HEX):**

01 10 0B F9 00 03 52 1D

## 7. Appendix

### 7.1. Appendix 1:

3044	Means		Display	
	2G- Single-Phase	30KW Series 15kW Series All 4G Series	2G- Single-Phase	30KW Series 15kW Series All 4G Series
0000H	Operation OK	Waiting	Generating	Waiting
0001H	Operation OK	Open Run	Generating	OpenRun

0002H	Low Sunlight	Soft Run	Waiting	SoftRun
0003H	At the Initializing	Operation OK	Initializing	Generating
1004H	Control Stop	\	Grid Off	\
.....	.....		.....	
1010H	Grid Over Voltage		OV-G-V	
1011H	Grid Under Voltage		UN-G-V	
1012H	Grid Over Frequency		OV-G-F	
1013H	Grid Under Frequency		UN-G-F	
1014H	Reverse power grid		G-IMP	
1015H	No Grid		NO-Grid	
1016H	Grid Unbalance		G-PHASE	
1017H	Grid Frequency Fluctuation		G-F-FLU	
1018H	Grid Over Current		OV-G-I	
1019H	Grid Current Tracking Fault		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 Over Current		DC-INTF.	
1028H	DC reverse connection		REVE-DC	
.....	.....		.....	
1030H	The Grid Interference Protection		GRID-INTF.	
1031H	The DSP Initial Protection		INI-FAULT	
1032H	Temperature Protection		OV-TEM	
1033H	PV insulation fault		PV ISO-PRO	
1034H	Leakage Current Protection		ILeak-PRO	
1035H	Relay Protection		RelayChk-FAIL	
1036H	DSP_B Protection		DSP-B-FAULT	
1037H	DC Injection Protection		DCInj-FAULT	
1038H	12V Under Voltage Protection		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
.....	.....	.....

## 7.2. Appendix 2:

3054H/3068H	Standard			
	Single-phase (0.7-5K)	Three-phase (6-15K)	Three-phase (20-60K)	Single-phase-4G
01H	G83/2 / G59/3 (G83 for 3.6kW and below; G59 for 3.6kW or more)	G59/3	G59/3	G59/3
02H	UL-240V (60Hz240V)	UL1741 (60Hz480V) Low voltage (60Hz270V)	UL-480V (60Hz480V) Low voltage (60Hz270V)	UL-240V
03H	VDE0126	VDE0126	VDE0126	VDE0126
04H	AS4777	<del>AS4777</del> /AS4777-15	AS4777	<del>AS4777</del> /AS4777-15
05H	AS4777-NQ	<del>AS4777-NQ</del> /AS4777-02	AS4777-NQ	<del>AS4777-NQ</del> /AS4777-02
06H	<del>CQCA</del> /CQC	CQC (CQC-380V)	CQC-380A	<del>CQCA</del> /CQC
07H	ENEL	ENEL	ENEL	ENEL
08H	UL-208V (60Hz208V)	UL-380V (60Hz380V) Low voltage UL-220V (60Hz220V)	UL-380V (60Hz380V) Low voltage UL-220V (60Hz220V)	UL-208V
09H	MEX-CFE	MEX-CFE	MEX-CFE	MEX-CFE
0AH	user-self set	user-self set	user-self set	user-self set
0BH	VDE4105	VDE4105	VDE4105	VDE4105
0CH	EN50438DK	EN50438DK	EN50438DK	EN50438DK
0DH	EN50438IE	EN50438IE	EN50438IE	EN50438IE
0EH	EN50438NL	EN50438NL	EN50438NL	EN50438NL
0FH	EN50438T	<del>EN50438T</del> EN50438SW	<del>EN50438T</del> EN50438SW	<del>EN50438T</del> EN50438SW
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-480V	<del>CQCB</del> /GNB
1BH	NewZeal	NewZeal	GN-HV-L	<del>CQCC</del> /GNC
1CH	Barbados	<del>G83/2</del> G83/3	G59/3-A	NewZeal
1DH	Chile	4105/480	4105/480	<del>G83/2</del> G83/3
1EH	France	AS4777_480	AS4777_480	Chile
1FH	<del>CQCB</del> /GNB	N4105-BEL	NewZeal	NRS097
20H	<del>CQCC</del> /GNC	IEC61727L	CQC500	Philippin
21H	Philippin	KS1 <del>KSC856415</del>	CQC540	N4105-BEL
22H	IEC61727L		GN540L	IEC61727L
23H			N4105-BEL	KS1 <del>KSC856415</del>
24H			CHILE	France
25H			NRS097	ISONE240
26H			GN380L-A	ISONE208
27H			GNHVL-A	ISONE240A
28H			NRS480	ISONE208A
29H			CQC380DZ	GN300V
2AH			GN380DZL	MEA (THAILAND)
2BH			ISONE480	R21P3-240
2CH			ISONE480A	R21P3-208
2DH			KS1 <del>KSC856415</del>	R21P3-24A
2EH			R21P3-480	R21P3-20A
2FH			R21P3-48A	SRILANKA
30H			Philippin	PEA (THAILAND)
31H			France	AS4777_SA
32H			SRILANKA	Mala230LV
33H			THAILANDMEA	Indon230V
34H			THAILANDPEA	G98
35H			4777SA-48 (480)	G99
36H			Mala230LV	Generator50
37H			Mala277LV	Generator60
38H			Mala277MV	TW220 (TAIWAN)
39H			Indon230V	TW110 (TAIWAN)
3AH			DEWA230LV	DK230V
3BH			DEWA277LV	Barbados
3CH			DEWA277MV	BRAZIL-H
3DH			G98	G99-N
3EH			G99	Italy
3FH			BDEW-230V	
40H			BDEW-277V	
41H			Generator50	
42H			Generator60	

43H			4777SA-40 (380)	
44H			KS2	
45H			TW220 (TAIWAN)	
46H			DK277V	
47H			DK230V	
48H			Barbados	
49H			IEC61727L	
4AH			Singapore	
4BH			G99-N	

### 7.3. Appendix 3:

Fault status 01 bit definition:

BIT	Fault status	Status code
BIT00	Grid overvoltage	0—No 1—Yes
BIT01	Grid undervoltage	0—No 1—Yes
BIT02	Grid overfrequency	0—No 1—Yes
BIT03	Grid underfrequency	0—No 1—Yes
BIT04	Reverse power grid	0—No 1—Yes
BIT05	No grid	0—No 1—Yes
BIT06	Grid imbalance	0—No 1—Yes
BIT07	Grid frequency jitter	0—No 1—Yes
BIT08	Grid overcurrent	0—No 1—Yes
BIT09	Grid current tracking fault	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

Fault status 02 bit definition:

BIT	Fault status	Status code
BIT00	DC Over Voltage	0—No 1—Yes
BIT01	DC Bus Over Voltage	0—No 1—Yes
BIT02	DC Bus Unbalance	0—No 1—Yes
BIT03	DC Bus Under Voltage	0—No 1—Yes
BIT04	DC Bus Unbalance 2	0—No 1—Yes
BIT05	DC(Channel A ) Over Current	0—No 1—Yes
BIT06	DC(Channel B ) Over Current	0—No 1—Yes
BIT07	DC input disturbance	0—No 1—Yes
BIT08	DC reverse connection	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

Fault status 03 bit definition:

BIT	Fault status	Status code
BIT00	The Grid Interference Protection	0—No 1—Yes
BIT01	The DSP Initial Protection	0—No 1—Yes
BIT02	Temperature Protection	0—No 1—Yes
BIT03	PV insulation fault	0—No 1—Yes
BIT04	Leakage Current Protection	0—No 1—Yes
BIT05	Relay Protection	0—No 1—Yes
BIT06	DSP_B Protection	0—No 1—Yes
BIT07	DC Injection Protection	0—No 1—Yes
BIT08	12V Under Voltage Protection	0—No 1—Yes
BIT09	Leakage Current Check Protection	0—No 1—Yes
BIT10	Under temperature protection	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

Fault status 04 bit definition:

BIT	Fault status	Status code
BIT00	AFCI Check Fault	0—No 1—Yes
BIT01	AFCI 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	The Grid Interference 02 Protection	0—No 1—Yes
BIT07	Grid current sampling abnormality	0—No 1—Yes
BIT08	IGBT overcurrent	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

## 7.4. Appendix 4:

Working status bit definition:

BIT	Fault status	Status code
BIT00	Normal operation	0—No 1—Yes
BIT01	Initial standby	0—No 1—Yes
BIT02	Control shutdown	0—No 1—Yes
BIT03	Downtime	0—No 1—Yes
BIT04	Standby	0—No 1—Yes
BIT05	Power down operation	0—No 1—Yes
BIT06	Limited power operation	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

## 7.5. Appendix 5

Factory setting flag

BIT	Fault status	Status code
BIT00	FLASH read and write timeout	0—No 1—Yes
BIT01	Clear power generation execution flag	0—No 1—Already executed
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	Collector restart flag	0—No 1—Reset
BIT09	Collector restore factory settings flag	0—No 1—reset
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

