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SAJ Modbus Communication Protocol

1 Introduction

Photovoltaic grid connected inverter communication protocol. Applicable to PLUS R5 R6 C6 inverters only.

2 Communication interface definition

Communication frame adopts MODBUS RTU (Remote Terminal Unit) mode protocol frame, Communication setting parameters are: Data bit 8, stop bit 1, parity none, and flow control none. The communication mode is UART half duplex. At the same time, only one host and slave can send data and the other can receive data.

RS232 factory default: 115200bps.

RS485 the default baud rate: 9600bps.

3 Communication frame definition

Frame structure

Slave address domain	0-247(decimalist) (0 indicates the broadcast address)
Functional domain	0x03: Read multiple parameters 0x10: Write multiple parameters
Data domain	Data domains include address domains and data load domains
CRC domain	16bit CRC checksum

Multiplier: Since MCU does not have a complete floating-point arithmetic unit, integers will be used to replace floating-point arithmetic for calculation and transmission. In order to represent values less than 1, the number of digits after the decimal point is explained by the multiplier. For example, a register is defined as follows:

Address	SIZE(Word)	Register Name	Data Type	Multiple	Units	Attribute	Register description
	1	PV1Volt	UInt16	-1	V	R	PV1 voltage

When the voltage of PV1 is 300.5, the value of the PV1Volt register is 3005.

Attributes: R for read-only, W for write-only.

3.1 Communication frame command and frame description

The CRC check range is **frame address~CRC domain** (excluding CRC domain).

3.1.1 0x03 Read multiple registers

The function code (command) is used to read the contents of a contiguous block in the register.

Request the protocol data unit to specify the start register address and the number of registers.

In the register data of the response, each register data contains two bytes (the binary number is right-aligned on each byte). For each register, the first byte is the high and the second byte is the low.

For example, request to read a register 0x0001-0x0002

Request	(Hex)	Response	(Hex)
Slave address	0A	Slave address	0A
Command	03	Command	03
Register start address high order	00	Number of bytes	04
Register start address low order	01	Register value high order (01)	0F
Register count high order	00	Register value low order (01)	A0
Register count low order	02	Register value high order (02)	01
CRC low order	----	Register value low order (02)	C2
CRC high order	----	CRC low order	----
		CRC high order	----

3.1.2 0x10 Write multiple registers

The function code (command) is used to write a continuous register block.

value of the request write is described in the request data field. Each register divides the data into two bytes.

The normal response returns the function code, the starting address, and the number of registers written.

For example, the number written to register 0x0001 is data 0x1194, and the number written to register 0x0002 is data 0x01CC.

Request	(Hex)	Response	(Hex)
Slave address	0A	Slave address	0A
Command	10	Command	10
Register start address high order	00	Register start address high order	00
Register start address low order	01	Register start address low order	01
Register count high order	00	Register count high order	00
Register count low order	02	Register count low order	02
Number of bytes	04	CRC low order	----

Register value high order (01)	11	CRC high order	---
Register value low order (01)	94		
Register value high order (02)	01		
Register value low order (02)	CC		
CRC low order	---		
CRC high order	---		

3.1.3 Error response frame definition

Once the slave (server) receives the request, there are two types of responses based on the processing result:

- Positive response:

The code of the response function responds to the code of the request function.

- Anomaly response:

In an exception response, the server sets the function code to the highest position 1.

Returns the function code value + 0x80 to the exception code.

Exceptional code:

Error code (Hex)	Description
01	Invalid function code
02	Invalid request address
03	Invalid request data value
04	SERVFAIL
06	Serverbusy
10	Password error

11	Check error
12	Invalid parameter
13	System Lock-In

For example, when the host reads data, the slave receives an abnormal response.

Request	(Hex)	Response	(Hex)
Slave address	0A	Slave address	0A
Command	03	Command	83
Register start address high order	00	Error code	02
Register start address low order	01	CRC low order	---
Register count high order	00	CRC high order	---
Register count low order	02		
CRC low order	---		
CRC high order	---		

4 Inverter data Register definition

4.1 Information Register definition

Addr ess	SIZE(Word)	Register name	Data type	Mult iple	un it	Att rib uti on	Register definition	Note
8F00H	1	Type	UInt16	0		R	DeviceType	
8F01H	1	SubType	UInt16			R	Subclass	Machine power
8F02H	1	CommProVersio n	UInt16	-3		R	Comms Protocol Version	V2.000
8F03H	10	SN	String(20)			R	SerialNumber	Invalid value: 0x00
8F0DH	10	PC	String(20)			R	ProductCode	Invalid value: 0x00
8F17H	1	DV	UInt16	-3		R	Display Software Version	Invalid value: 0xFFFF

8F18H	1	MCV	UInt16	-3		R	Master Ctrl Software Version	无效值: 0xFFFF
8F19H	1	SCV	UInt16	-3		R	Slave Ctrl Software Version	Invalid value: 0xFFFF
8F1AH	1	DispHWVersion	UInt16	-3		R	DispBoardHardware Version	Invalid value: 0xFFFF
8F1BH	1	CtrlHWVersion	UInt16	-3		R	CtrlBoardHardware Version	Invalid value: 0xFFFF
8F1CH	1	PowerHWVersion	UInt16	-3		R	PowerBoardHardware Version	Invalid value: 0xFFFF

4.2 Realtime Data Register definition

4.2.1 PLUS / R5 Real time data

Address	SIZE(Word)	Register Name	Data type	multiple	Unit	Attribution	Register description
0100H	1	MPVMode	UInt16			R	Work modes of the inverter WAIT (Wait) 0x01 NORMAL (Grid-connected) 0x02 FAULT (Fault) 0x03
0101H	6	FaultMSG				R	Inverter error message
0107H	1	PV1Volt	UInt16	-1	V	R	PV1 voltage
0108H	1	PV1Curr	UInt16	-2	A	R	PV1 total current
0109H	1	PV1Power	UInt16	0	W	R	PV1 power
010AH	1	PV2Volt	UInt16	-1	V	R	PV2 voltage
010BH	1	PV2Curr	UInt16	-2	A	R	PV2 total current
010CH	1	PV2Power	UInt16	0	W	R	PV2 power
010DH	1	PV3Volt	UInt16	-1	V	R	PV3 voltage

010EH	1	PV3Curr	UInt16	-2	A	R	PV3 total current
010FH	1	PV3Power	UInt16	0	W	R	PV3 power
0110H	1	BusVolt	UInt16	-1	V	R	BUS voltage
0111H	1	InvTempC	Int16	-1	°C	R	Inverter temperature
0112H	1	GFCI	Int16	0	mA	R	GFCI
0113H	1	Power	UInt16	0	W	R	Total active power output of the inverter
0114H	1	QPower	Int16	0	Var	R	Total output reactive power of the inverter
0115H	1	PF	Int16	-3		R	Inverter total power factor
0116H	1	L1Volt	UInt16	-1	V	R	L1 phase voltage
0117H	1	L1Curr	UInt16	-2	A	R	L1 phase current
0118H	1	L1Freq	UInt16	-2	Hz	R	L1 Phase frequency
0119H	1	L1DCI	Int16	0	mA	R	L1 Phase DC component
011AH	1	L1Power	UInt16	0	W	R	L1 Power
011BH	1	L1PF	Int16	-3		R	L1 Power factor
011CH	1	L2Volt	UInt16	-1	V	R	L2 phase voltage
011DH	1	L2Curr	UInt16	-2	A	R	L2 phase current
011EH	1	L2Freq	UInt16	-2	Hz	R	L2 Phase frequency
011FH	1	L2DCI	Int16	0	mA	R	L2 DC component
0120H	1	L2Power	UInt16	0	W	R	L2 power
0121H	1	L2PF	Int16	-3		R	L2 Power factor
0122H	1	L3Volt	UInt16	-1	V	R	L3 phase voltage
0123H	1	L3Curr	UInt16	-2	A	R	L3 phase current
0124H	1	L3Freq	UInt16	-2	Hz	R	L3 Phase frequency
0125H	1	L3DCI	Int16	0	mA	R	L3 Phase DC component
0126H	1	L3Power	UInt16	0	W	R	L3 power
0127H	1	L3PF	Int16	-3		R	L3 Power factor
0128H	1	IS01	UInt16	0	kΩ	R	PV1+_ISO
0129H	1	IS02	UInt16	0	kΩ	R	PV2+_ISO
012AH	1	IS03	UInt16	0	kΩ	R	PV3+_ISO
012BH	1	IS04	UInt16	0	kΩ	R	PV__ISO
012CH	1	TodayEnergy	UInt16	-2	kWh	R	Daily energy output of the inverter
012DH	2	MonthEnergy	UInt32	-2	kWh	R	Output of the inverter in the current month
012FH	2	YearEnergy	UInt32	-2	kWh	R	Output of the inverter in the current year
0131H	2	TotalEnergy	UInt32	-2	kWh	R	Total power output of the inverter
0133H	1	TodayHour	UInt16	-1	H	R	Daily working hours of the inverter
0134H	2	TotalHour	UInt32	-1	H	R	Total working hours of the inverter

0136H	1	ErrorCount	UInt16	0		R	Number of inverter errors
0137H	4	Time	HEX	0		R	Current time of the inverter

4.2.2 R6 3-15K Real time data

Addresses	SIZE (Word)	Register name	Data type	Multiple	Unit	Attribution	Register description
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4000H	4	Time	HEX	0	R	<p>Current time format of the inverter yyyyMMddHHmmsszz</p> <p>yyyy: Year</p> <p>MM: Month</p> <p>dd: Date</p> <p>HH: Hour (24-hour format)</p> <p>mm: Minute</p> <p>ss: Second</p> <p>zz: Reserved bit</p> <p>2015-1-2 10:11:12</p> <p>The corresponding data is 07DF 01 02 0A 0B 0C 00</p>
4004H	1	MPVMode	Uint16		R	<p>Inverter operating mode</p> <p>0 : Initialize</p> <p>1 : Wait</p> <p>2 : Operate</p> <p>3 : Off-grid mode, energy storage</p> <p>4 : Power grid with load mode, energy storage</p> <p>5 : Fault</p> <p>6 : Upgrade</p> <p>7 : Debug</p> <p>8 : Auto-Check</p> <p>9 : Reset</p>
4005H	2	HFaultMSG	Uint32		R	Displays board/slave error messages
4007H	2	MFaultMSG	Uint32		R	Primary controller

			2				error message
4009H	2	MFaultMSG2	UInt3 2			R	Primary controller error message 2
400BH	2	BMSFaultMSG	UInt3 2			R	BMSerror message
400DH	2	Reserve					Reserve
400FH	1	Error_Count	UInt1 6	0		R	Number of inverter error warning messages
4010H	1	SinkTempC	Int16	-1	℃	R	Radiator temperature
4011H	1	AmbTempC	Int16	-1	℃	R	environment temperature
4012H	1	GFCI	Int16	0	mA	R	Earth Leakage Current
4013H	1	ISO1	UInt1 6	0	kΩ	R	PV1+_ISO
4014H	1	ISO2	UInt1 6	0	kΩ	R	PV2+_ISO
4015H	1	ISO3	UInt1 6	0	kΩ	R	PV3+_ISO
4016H	1	ISO4	UInt1 6	0	kΩ	R	PV__ISO
4017H	1	DRM_HardwareStatus	UInt1 6	0		R	DRM Hardware status bit
4018H	1	DRM_SoftwareStatus	UInt1 6	0		R	DRM Software status bit
4019H	1	ConnTime	UInt1 6	0	S	R	Grid connection countdown
401AH	1	ErrorDataSN	UInt1 6	0		R	Serial number of the fault log area
401BH	1	SettingDataSN	UInt1 6	0		R	Serial number of parameter setting

							area
401CH	1	FCASTriggerFlag	UInt16	0		R	FCAS Trigger flag
401DH	5	Running_data	UInt16	0		R	
4022H	1	SetAppMode	Int16	0		R	Inverter sets the application mode
4023H	1	InvDisPowerSet	Int16	0	W	R	Inverter sets the discharge power
4024H	1	InvChgPowerSet	Int16	0	W	R	Inverter sets the charge power
4025H	1	BatDisCurrSet	Int16	-1	A	R	Inverter sets battery discharge current
4026H	1	BatChgCurrSet	Int16	-1	A	R	Inverter sets battery charge current
4027H	1	BatStatusDisp	UInt16	0		R	Battery operating status
4028H	1	BatProtocolSet	Int16	0		R	Battery protocol
4029H	1	BatChgSocUpLimit	Int16	0	%	R	Battery setted SOC_H
402AH	1	BatDisSocDowLimit	Int16	0	%	R	Battery setted SOC_L
402BH	1	BatDODSet	Int16	0	%	R	Battery setted DOD
402CH	1	BatResSoc	Int16	0	%	R	Set the battery reserved SOC value
402DH	1	BmsChgVoltSet	Int16	-1	V	R	Charging voltage set by BMS
402EH	1	BmsDisPowerSet	Int16	0	A	R	Discharge power set

							by BMS
402FH	1	BmsChgPowerSet	Int16	0	A	R	Charge power set by BMS
4030H	1	MeterModeSet	Int16	0		R	The meter mode setted
4031H	1	RGridVolt	Uint16	-1	V	R	R Phase grid voltage
4032H	1	RGridCurr	Int16	-2	A	R	R Phase grid current
4033H	1	RGridFreq	Uint16	-2	Hz	R	R Phase grid frequency
4034H	1	RGridDCI	Int16	0	mA	R	R Phase grid DC component
4035H	1	RGridPowerWatt	Int16	0	W	R	R Phase grid active power
4036H	1	RGridPowerVA	Uint16	0	W	R	R Phase grid apparent power
4037H	1	RGridPowerPF	Int16	-3		R	R Phase grid power factor
4038H	1	SGridVolt	Uint16	-1	V	R	S Phase grid voltage
4039H	1	SGridCurr	Int16	-2	A	R	S Phase grid current
403AH	1	SGridFreq	Uint16	-2	Hz	R	S Phase grid frequency
403BH	1	SGridDCI	Int16	0	mA	R	S Phase grid DC component
403CH	1	SGridPowerWatt	Int16	0	W	R	S Phase grid active power
403DH	1	SGridPowerVA	Uint16	0	W	R	S Phase grid apparent power
403EH	1	SGridPowerPF	Int16	-3		R	S Phase grid power factor
403FH	1	TGridVolt	Uint16	-1	V	R	T Phase grid voltage
4040H	1	TGridCurr	Int16	-2	A	R	T Phase grid current
4041H	1	TGridFreq	Uint16	-2	Hz	R	T Phase grid frequency
4042H	1	TGridDCI	Int16	0	mA	R	T Phase grid DC component
4043H	1	TGridPowerWatt	Int16	0	W	R	T Phase grid active power
4044H	1	TGridPowerVA	Uint16	0	W	R	T Phase grid apparent power

4045H	1	TGridPowerPF	Int16	-3		R	T Phase grid power factor
4046H	1	RInvVolt	Uint16	-1	V	R	R Phase-inverting voltage
4047H	1	RInvCurr	Int16	-2	A	R	R Phase-inverting current
4048H	1	RInvFreq	Uint16	-2	Hz	R	R Phase-inverting frequency
4049H	1	RInvPowerWatt	Int16	0	W	R	R Phase-inverting active power
404AH	1	RInvPowerVA	Uint16	0	VA	R	R Phase-inverting apparent power
404BH	1	SInvVolt	Uint16	-1	V	R	S Phase-inverting voltage
404CH	1	SInvCurr	Int16	-2	A	R	S Phase-inverting current
404DH	1	SInvFreq	Uint16	-2	Hz	R	S Phase-inverting frequency
404EH	1	SInvPowerWatt	Int16	0	W	R	S Phase-inverting active power
404FH	1	SInvPowerVA	Uint16	0	VA	R	S Phase-inverting apparent power
4050H	1	TInvVolt	Uint16	-1	V	R	T Phase-inverting voltage
4051H	1	TInvCurr	Int16	-2	A	R	T Phase-inverting current
4052H	1	TInvFreq	Uint16	-2	Hz	R	T Phase-inverting frequency
4053H	1	TInvPowerWatt	Int16	0	W	R	T Phase-inverting active power
4054H	1	TInvPowerVA	Uint16	0	VA	R	T Phase-inverting apparent power
4055H	1	ROutVolt	Uint16	-1	V	R	R Phase output voltage
4056H	1	ROutCurr	Uint16	-2	A	R	R Phase output current
4057H	1	ROutFreq	Uint16	-2	Hz	R	R Phase output frequency
4058H	1	ROutDVI	Int16	0	mV	R	R Phase output voltage DC component
4059H	1	ROutPowerWatt	Uint16	0	W	R	R Phase output active power
405AH	1	ROutPowerVA	Uint16	0	VA	R	R Phase output apparent power
405BH	1	SOutVolt	Uint16	-1	V	R	S Phase output

			6				voltage
405CH	1	SOutCurr	Uint1 6	-2	A	R	S Phase output current
405DH	1	SOutFreq	Uint1 6	-2	Hz	R	S Phase output frequency
405EH	1	SOutDVI	Int16	0	mV	R	S Phase output voltage DC component
405FH	1	SOutPowerWatt	Uint1 6	0	W	R	S Phase output active power
4060H	1	SOutPowerVA	Uint1 6	0	VA	R	S Phase output apparent power
4061H	1	TOutVolt	Uint1 6	-1	V	R	T Phase output voltage
4062H	1	TOutCurr	Uint1 6	-2	A	R	T Phase output current
4063H	1	TOutFreq	Uint1 6	-2	Hz	R	T Phase output frequency
4064H	1	TOutDVI	Int16	0	mV	R	T Phase output voltage DC component
4065H	1	TOutPowerWatt	Uint1 6	0	W	R	T Phase output active power
4066H	1	TOutPowerVA	Uint1 6	0	VA	R	T Phase output apparent power
4067H	1	BusVoltMaster	Uint1 6	-1	V	R	Bus master voltage
4068H	1	BusVoltSlave	Uint1 6	-1	V	R	Bus slave voltage
4069H	1	BatVolt	Uint1 6	-1	V	R	Battery voltage
406AH	1	BatCurr	Int16	-2	A	R	Battery current
406BH	1	BatCurr1	Int16	-2	A	R	Battery controller 1 Current
406CH	1	BatCurr2	Int16	-2	A	R	Battery controller 2 Current
406DH	1	BatPower	Int16	0	W	R	Battery power
406EH	1	BatTempC	Int16	-1	℃	R	Battery temperature
406FH	1	BatEnergyPercent	Uint1 6	-2	%	R	Battery energy
4070H	1	Reserve	Uint1 6	0		R	Reserve
4071H	1	PV1Volt	UInt1 6	-1	V	R	PV1 voltage
4072H	1	PV1Curr	UInt1	-2	A	R	PV1 total current

			6				
4073H	1	PV1Power	UInt1 6	0	W	R	PV1 power
4074H	1	PV2Volt	UInt1 6	-1	V	R	PV2 voltage
4075H	1	PV2Curr	UInt1 6	-2	A	R	PV2 total current
4076H	1	PV2Power	UInt1 6	0	W	R	PV2 power
4077H	1	PV3Volt	UInt1 6	-1	V	R	PV3 voltage
4078H	1	PV3Curr	UInt1 6	-2	A	R	PV3 total current
4079H	1	PV3Power	UInt1 6	0	W	R	PV3 power
407AH	1	PV4Volt	UInt1 6	-1	V	R	PV4 voltage
407BH	1	PV4Curr	UInt1 6	-2	A	R	PV4 total current
407CH	1	PV4Power	UInt1 6	0	W	R	PV4 power
407DH	1	PV1StrCurr1	Uint1 6	-2	A	R	PV1 string current1
407EH	1	PV1StrCurr2	Uint1 6	-2	A	R	PV1 string current2
407FH	1	PV1StrCurr3	Uint1 6	-2	A	R	PV1 string current3
4080H	1	PV1StrCurr4	Uint1 6	-2	A	R	PV1 string current14
4081H	1	PV2StrCurr1	Uint1 6	-2	A	R	PV2 string current1
4082H	1	PV2StrCurr2	Uint1 6	-2	A	R	PV2 string current2
4083H	1	PV2StrCurr3	Uint1 6	-2	A	R	PV2 string current3
4084H	1	PV2StrCurr4	Uint1 6	-2	A	R	PV2 string current4
4085H	1	PV3StrCurr1	Uint1 6	-2	A	R	PV3 string current1
4086H	1	PV3StrCurr2	Uint1 6	-2	A	R	PV3 string current2
4087H	1	PV3StrCurr3	Uint1 6	-2	A	R	PV3 string current3
4088H	1	PV3StrCurr4	Uint1 6	-2	A	R	PV3 string current4
4089H	1	PV4StrCurr1	Uint1	-2	A	R	PV4 string

			6				current1
408AH	1	PV4StrCurr2	Uint1 6	-2	A	R	PV4 string current2
408BH	1	PV4StrCurr3	Uint1 6	-2	A	R	PV4 string current3
408CH	1	PV4StrCurr4	Uint1 6	-2	A	R	PV4 string current4
408DH	1	ROnGridOutVolt	Uint1 6	-1	V	R	R Grid-connected side voltage
408EH	1	ROnGridOutCurr	Uint1 6	-2	A	R	R Grid-connected side current
408FH	1	ROnGridOutFreq	Uint1 6	-2	Hz	R	R Grid-connected side frequency
4090H	1	ROnGridOutPowerWatt	Uint1 6	0	W	R	R Grid-connected side active power
4091H	1	SOnGridOutVolt	Uint1 6	-2	A	R	S Grid-connected side voltage
4092H	1	SOnGridOutPowerWatt	Uint1 6	0	W	R	S Grid-connected side active power
4093H	1	TOnGridOutVolt	Uint1 6	-2	A	R	T Grid-connected side voltage
4094H	1	TOnGridOutPowerWatt	Uint1 6	0	W	R	T Grid-connected side active power
4095H	1	PV_direction	Uint1 6	0		R	PV Direction of energy flow
4096H	1	Battery_direction	int16	0		R	Battery direction of energy flow
4097H	1	Grid_direction	int16	0		R	Grid direction of energy flow
4098H	1	OutPut_direction	Uint1 6	0		R	Output to load direction of energy flow
4099H	1	PVConsumpWatt	Int16	0	W	R	The power flowing from PV to the load
409AH	1	GridConsumpWatt	Int16	0	W	R	The power flowing from the grid to the load
409BH	1	GridFeedInPVWatt	Int16	0	W	R	The power flowing from PV to the grid
409CH	1	GridFeedInBatWatt	Int16	0	W	R	The power flowing from the battery to the grid
409DH	1	BatConsumpWatt	Int16	0	W	R	The power flowing from the battery to the load

409EH	1	BatChgPVWatt	Int16	0	W	R	Charging power from PV to the battery
409FH	1	BatChgGridWatt	Int16	0	W	R	Charging power from the grid to the battery
40A0H	1	SysTotalLoadWatt	Int16	0	W	R	Total system load power consumption
40A1H	1	CT_GridPowerWatt	int16	0	W	R	CT Grid active power
40A2H	1	CT_GridPowerVA	int16	0	VA	R	CT Grid apparent power
40A3H	1	CT_PVPowerWatt	int16	0	W	R	CT PV active power
40A4H	1	CT_PVPowerVA	int16	0	VA	R	CT PV apparent power
40A5H	1	TotalPVPower	Int16	0	W	R	PV total power
40A6H	1	TotalBatteryPower	Int16	0	W	R	Battery total power
40A7H	1	TotalGridPowerWatt	Int16	0	W	R	Grid total active power
40A8H	1	TotalGridPowerVA	Int16	0	VA	R	Grid total apparent power
40A9H	1	TotalInvPowerWatt	Int16	0	W	R	Inverter total active power
40AAH	1	TotalInvPowerVA	Int16	0	VA	R	Inverter total apparent power
40ABH	1	BackupTotalLoadPowerWatt	Uint16	0	W	R	Backup total load active power
40ACH	1	BackupTotalLoadPowerVA	Uint16	0	VA	R	Backup total load apparent power
40ADH	1	SysGridPowerWall	Int16	0	W	R	Active power of system grid
40AEH	1	Input_AVG_Power_5Min_Max	Uint16	0		R	Maximum average power input to the inverter (5 minutes)
40AFH	1	Output_AVG_Power_5Min_Max	Uint16	0		R	Maximum average power output of the inverter to the power grid (5 minutes)
40B0H	1	RIntelligentLoadPower	Uint16		W	R	R Phase intelligent load power
40B1H	1	SIntelligentLoadPower	Uint16		W	R	S Phase intelligent load power
40B2H	1	TIntelligentLoadPower	Uint16		W	R	T Phase intelligent

			6				load power
40B3H	9	Reserve	Uint1 6	0		R	Reserve
40BC H	1	Today_Hour	Uint1 6	-1	H	R	PV Daily generating time of grid-connection
40BD H	2	Total_Hour	Uint3 2	-1	H	R	PV Total generating time of grid-connection
40BFH	2	Today_PVEnergy	Uint3 2	-2	Kw h	R	Daily PV generation
40C1H	2	Month_PVEnergy	Uint3 2	-2	Kw h	R	Monthly PV generation
40C3H	2	Year_PVEnergy	Uint3 2	-2	Kw h	R	Yearly PV generation
40C5H	2	Total_PVEnergy	Uint3 2	-2	Kw h	R	Total PV generation
40C7H	2	Today_BatChgEnergy	Uint3 2	-2	Kw h	R	Daily battery charge capacity
40C9H	2	Month_BatChgEnergy	Uint3 2	-2	Kw h	R	Monthly battery charge capacity
40CB H	2	Year_BatChgEnergy	Uint3 2	-2	Kw h	R	Yearly battery charge capacity
40CD H	2	Total_BatChgEnergy	Uint3 2	-2	Kw h	R	Total battery charge capacity
40CFH	2	Today_BatDisEnergy	Uint3 2	-2	Kw h	R	Daily battery discharge capacity
40D1H	2	Month_BatDisEnergy	Uint3 2	-2	kwh	R	Monthly battery discharge capacity
40D3H	2	Year_BatDisEnergy	Uint3 2	-2	Kw h	R	Yearly battery discharge capacity
40D5H	2	Total_BatDisEnergy	Uint3 2	-2	Kw h	R	Total battery discharge capacity
40D7H	2	Today_InvGenEnergy	Uint3 2	-2	Kw h	R	Daily inverter power
40D9H	2	Month_InvGenEnergy	Uint3 2	-2	Kw h	R	Monthly inverter power
40DB H	2	Year_InvGenEnergy	Uint3 2	-2	kwh	R	Yearly inverter power
40DD H	2	Total_InvGenEnergy	Uint3 2	-2	Kw h	R	Total inverter power
40DF H	2	Today_TotalLoadEnergy	Uint3 2	-2	Kw h	R	Total daily load power consumption
40E1H	2	Month_TotalLoadEnergy	Uint3 2	-2	Kw h	R	Total monthly load power consumption

40E3H	2	Year_TotalLoadEnergy	Uint3 2	-2	Kw h	R	Total yearly load power consumption
40E5H	2	Total_TotalLoadEnergy	Uint3 2	-2	Kw h	R	Totally total load power consumption
40E7H	2	Today_BackupLoadEnergy	Uint3 2	-2	Kw h	R	Daily BackUp load power consumption
40E9H	2	Month_BackupLoadEnergy	Uint3 2	-2	Kw h	R	Monthly BackUp load power consumption
40EB H	2	Year_BackupLoadEnergy	Uint3 2	-2	Kw h	R	Yearly BackUp load power consumption
40ED H	2	Total_BackupLoadEnergy	Uint3 2	-2	Kw h	R	Total BackUp load power consumption
40EFH	2	Today_SellEnergy	Uint3 2	-2	kwh	R	Daily system selling power
40F1H	2	Month_SellEnergy	Uint3 2	-2	Kw h	R	Monthly system selling power
40F3H	2	Year_SellEnergy	Uint3 2	-2	Kw h	R	Yearly system selling power
40F5H	2	Total_SellEnergy	Uint3 2	-2	Kw h	R	Total system selling power
40F7H	2	Today_FeedInEnergy	Uint3 2	-2	Kw h	R	Daily system feeds in power
40F9H	2	Month_FeedInEnergy	Uint3 2	-2	Kw h	R	Monthly system feeds in power
40FBH	2	Year_FeedInEnergy	Uint3 2	-2	Kw h	R	Yearly system feeds in power
40FD H	2	Total_FeedInEnergy	Uint3 2	-2	Kw h	R	Total system feeds in power

4.2.3 R6 17-50K and C6 real time data

address	SIZE(Word)	Register name	Date type	Multiple	Unit	Attribution	Register description
6000H	4	Time	HEX	0		R	Current time of the inverter

6004H	2	TotalEnergy	UInt32	-2	kWh	R	Total generation of the inverter
6006H	2	YearEnergy	UInt32	-2	kWh	R	Current year output of the inverter
6008H	2	MonthEnergy	UInt32	-2	kWh	R	Current month output of the inverter
600AH	2	TodayEnergy	UInt32	-2	kWh	R	Current day output of the inverter
600CH	2	TotalHour	UInt32	-1	H	R	Total working hours of the inverter
600EH	1	TodayHour	UInt16	-1	H	R	Daily working hours of the inverter
600FH	1	ErrorCount	UInt16	0		R	Number of errors of inverter
6010H	1	ErrorSN	UInt16	0		R	Historical error fault serial number
6011H	1	SettingDataSN	UInt16	0		R	the serial number of the setting parameter area
6012H	1	Reserved	UInt16	0		R	Reserve
6013H	1	MPVMode	UInt16			R	Inverter operating mode WAIT (wait) 0x01 NORMAL (grid connected) 0x02 FAULT (fault) 0x03
6014H	6	FaultMSG				R	Fault message
601AH	1	ConnTime	UInt16	0	S	R	Inverter countdown
601BH	2	Energy	UInt32	-2	kwh	R	Cumulative value of power generation
601DH	2	Power	UInt32	0	W	R	The inverter outputs active power
601FH	2	QPower	Int32	0	Var	R	The inverter outputs reactive power
6021H	1	PF	Int16	-3		R	Inverter output power factor
6022H	1	L1Volt	UInt16	-1	V	R	L1 phase voltage
6023H	1	L1Curr	UInt16	-2	A	R	L1 phase current
6024H	1	L1Freq	UInt16	-2	Hz	R	L1 phrase frequency
6025H	1	L1DCI	Int16	0	mA	R	L1 phase DC component
6026H	1	L1Power	UInt16	0	W	R	L1 Power
6027H	1	L1PF	Int16	-3		R	L1 Power factor
6028H	1	L2Volt	UInt16	-1	V	R	L2 Phase voltage
6029H	1	L2Curr	UInt16	-2	A	R	L2 Phase current
602AH	1	L2Freq	UInt16	-2	Hz	R	L2 Phase frequency
602BH	1	L2DCI	Int16	0	mA	R	L2 Phase DC component

602CH	1	L2Power	Uint16	0	W	R	L2 Power
602DH	1	L2PF	Int16	-3		R	L2 Power factor
602EH	1	L3Volt	Uint16	-1	V	R	L3 Phase voltage
602FH	1	L3Curr	Uint16	-2	A	R	L3 Phase current
6030H	1	L3Freq	Uint16	-2	Hz	R	L3 Phase frequency
6031H	1	L3DCI	Int16	0	mA	R	L3 Phase DC component
6032H	1	L3Power	Uint16	0	W	R	L3 Power
6033H	1	L3PF	Int16	-3		R	L Power factor
6034H	1	NE_Volt	Uint16	-1	V	R	N-line voltage to earth
6035H	1	GFCI	Int16	0	mA	R	Earth Leakage Current
6036H	1	BusVolt	Uint16	-1	V	R	BUS voltage
6037H	1	BusVolt_M	Uint16	-1	V	R	BUS mid-point voltage
6038H	1	InvTempC_1	Int16	-1	℃	R	Radiator temperature
6039H	1	InvTempC_L1	Int16	-1	℃	R	L1 phase temperature
603AH	1	InvTempC_L2	Int16	-1	℃	R	L2 phase temperature
603BH	1	InvTempC_L3	Int16	-1	℃	R	L3 phase temperature
603CH	1	InvTempC_Cavity	Int16	-1	℃	R	Cavity temperature
603DH	1	PV_TempC_1	Int16	-1	℃	R	The booster module temperature reserved temporarily
603EH	1	PV_TempC_2	Int16	-1	℃	R	
603FH	1	PV_TempC_3	Int16	-1	℃	R	
6040H	1	PV_TempC_4	Int16	-1	℃	R	
6041H	1	ISO1	Uint16	0	kΩ	R	PV1+_ISO
6042H	1	ISO2	Uint16	0	kΩ	R	PV2+_ISO
6043H	1	ISO3	Uint16	0	kΩ	R	PV3+_ISO
6044H	1	ISO4	Uint16	0	kΩ	R	PV__ISO
6045H	1	PV1Volt	Uint16	-1	V	R	PV1 voltage
6046H	1	PV1Curr	Uint16	-2	A	R	PV1 current
6047H	1	PV1Power	Uint16	0	W	R	PV1 power
6048H	1	PV2Volt	Uint16	-1	V	R	PV2 voltage
6049H	1	PV2Curr	Uint16	-2	A	R	PV2 current
604AH	1	PV2Power	Uint16	0	W	R	PV2 power
604BH	1	PV3Volt	Uint16	-1	V	R	PV3 voltage
604CH	1	PV3Curr	Uint16	-2	A	R	PV3 current
604DH	1	PV3Power	Uint16	0	W	R	PV3 power
604EH	1	PV4Volt	Uint16	-1	V	R	PV4 voltage
604FH	1	PV4Curr	Uint16	-2	A	R	PV4 current
6050H	1	PV4Power	Uint16	0	W	R	PV4 power
6051H	1	PV5Volt	Uint16	-1	V	R	PV5 voltage
6052H	1	PV5Curr	Uint16	-2	A	R	PV5 current
6053H	1	PV5Power	Uint16	0	W	R	PV5 power
6054H	1	PV6Volt	Uint16	-1	V	R	PV6 voltage
6055H	1	PV6Curr	Uint16	-2	A	R	PV6 current

6056H	1	PV6Power	Uint16	0	W	R	PV6 power
6057H	1	PV1StrCurr1	Uint16	-2	A	R	PV1 String current 1
6058H	1	PV1StrCurr2	Uint16	-2	A	R	PV1 String current 2
6059H	1	PV2StrCurr1	Uint16	-2	A	R	PV2 String current 1
605AH	1	PV2StrCurr2	Uint16	-2	A	R	PV2 String current 2
605BH	1	PV3StrCurr1	Uint16	-2	A	R	PV3 String current 1
605CH	1	PV3StrCurr2	Uint16	-2	A	R	PV3 String current 2
605DH	1	PV4StrCurr1	Uint16	-2	A	R	PV4 String current 1
605EH	1	PV4StrCurr2	Uint16	-2	A	R	PV4 String current 2
605FH	1	PV5StrCurr1	Uint16	-2	A	R	PV5 String current 1
6060H	1	PV5StrCurr2	Uint16	-2	A	R	PV5 String current 2
6061H	1	PV6StrCurr1	Uint16	-2	A	R	PV6 String current 1
6062H	1	PV6StrCurr2	Uint16	-2	A	R	PV6 String current 2
6063H	1	PV7Volt	Uint16	-1	V	R	PV7 voltage
6064H	1	PV7Curr	Uint16	-2	A	R	PV7 current
6065H	1	PV7Power	Uint16	0	W	R	PV7 power
6066H	1	PV8Volt	Uint16	-1	V	R	PV8 voltage
6067H	1	PV8Curr	Uint16	-2	A	R	PV8 current
6068H	1	PV8Power	Uint16	0	W	R	PV8 power
6069H	1	PV9Volt	Uint16	-1	V	R	PV9 voltage
606AH	1	PV9Curr	Uint16	-2	A	R	PV9 current
606BH	1	PV9Power	Uint16	0	W	R	PV9 power
606CH	1	PV10Volt	Uint16	-1	V	R	PV10 voltage
606DH	1	PV10Curr	Uint16	-2	A	R	PV10 current
606EH	1	PV10Power	Uint16	0	W	R	PV10 power
606FH	1	PV11Volt	Uint16	-1	V	R	PV11 voltage
6070H	1	PV11Curr	Uint16	-2	A	R	PV11 current
6071H	1	PV11Power	Uint16	0	W	R	PV11 power
6072H	1	PV12Volt	Uint16	-1	V	R	PV12 voltage
6073H	1	PV12Curr	Uint16	-2	A	R	PV12 current
6074H	1	PV12Power	Uint16	0	W	R	PV12 power
6075H	1	PV7StrCurr1	Uint16	-2	A	R	PV7 String current 1
6076H	1	PV7StrCurr2	Uint16	-2	A	R	PV7 String current 2
6077H	1	PV8StrCurr1	Uint16	-2	A	R	PV8 String current 1
6078H	1	PV8StrCurr2	Uint16	-2	A	R	PV8 String current 2
6079H	1	PV9StrCurr1	Uint16	-2	A	R	PV9 String current 1
607AH	1	PV9StrCurr2	Uint16	-2	A	R	PV9 String current 2
607BH	1	PV10StrCurr1	Uint16	-2	A	R	PV10 String current 1
607CH	1	PV10StrCurr2	Uint16	-2	A	R	PV10 String current 2
607DH	1	PV11StrCurr1	Uint16	-2	A	R	PV11 String current 1
607EH	1	PV11StrCurr2	Uint16	-2	A	R	PV11 String current 2
607FH	1	PV12StrCurr1	Uint16	-2	A	R	PV12 String current 1
6080H	1	PV12StrCurr2	Uint16	-2	A	R	PV12 String current 2

4.3Setting Data Register definition

4.3.1 PLUS / R5、R6 17-50K and C6 Parameters setting

Address	SIZE(Word)	Register name	Data type	Multiple	unit	Attribution	Register description	Note
1008H	1	SafetyType	UInt16			R/W	Inverter safety number	Refer to the safety table setting
1009H	1	FunMask	UInt16			R/W	Inverter function mask	bit0: RelayCheckEn: Relay detection bit1: ISOCheckEn:ISO check bit2: GFCIDevCheckEn:GFCIDEV check bit3: GFCICheckEn:GFCI check bit4: DCICheckEn:DCI check bit5: DCIAdjustEn::DCI adjust bit6: AntiIslandEn: island check bit7: FancheckEn: Fan check bit8: FreqDeratEn: overfrequency derating bit9: ReactiveEn: reactive power control bit10:GlobalMPPTEn: Global MPPT bit11: ReConnDelayEn: reconnection delay in countdown bit12: PV_ATEModeEn:PV_ATE test mode bit13: NEVolCheckEn: grounding check

								bit14: PowerLimitByVolEn: over-voltage derating bit15: PreINVEN: preinverter Corresponding bit 1: Enabled 0: Closed
1019H	1	ISOLimit	UInt16	0	kΩ	R/W	ISO limit	
101CH	1	PowerLimited	UInt16	-3		R/W	Power limit	Value 0-1100 corresponding to 0-110%
101DH	1	ReactiveMode	UInt16	0		R/W	Reactive power compensation mode	2 is capacitive power factor regulation, 3 is inductive power factor regulation, and 5 is no reactive power mode
101EH	1	ReactiveValue	UInt16	-3		R/W	Reactive power compensation value	Vale 800-1000 corresponding to 0.8-1
1037H	1	PowerAdjCoeff3	UInt16	0	/	R/W	Remote power on/off command	0: power off, 1: power on;
1046H	1	PVInputMode	UInt16	0		R/W	PV input mode	PV independent mode:0x00 PV parallel mode:0x08

4.3.2 R6 3-15K Set parameters

Address	SIZE(Word)	Register name	Data type	Multiple	Unit	Attribution	Register description
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3408H	1	FunMask	UInt16			R/W	<div>Inverter function mask</div> <div>bit0 RelayCheck Relay detection enable bit</div> <div>bit1 ISOCheck ISO Relay detection enable bit</div> <div>bit2 GFCIDevCheck Enable earth leakage current device self-test</div> <div>bit3 GFCICheck Enable earth leakage current device self-test</div> <div>bit4 DciCheck The DC component detection enable bit of power grid current</div> <div>bit5 DciAdjust The DC component control enable bit of power grid current</div> <div>bit6 AntiIsland Active island detection enable bit</div> <div>bit7 FANCheck Fan detection enable bit</div> <div>bit8 PVMode PV tracking enable</div> <div>bit9 DCVCheck The output voltage DC component detection is enabled</div> <div>bit10 GlobalMPPTEn Global scanning</div> <div>bit11 LNPECheck Grid connection detection enable bit</div> <div>bit12 DCVAdjust Output voltage DC component control enable bit</div> <div>bit13 OutInsertCheck The output access detection enabled bit</div> <div>bit14 InvWaveCheck The inverter wave detection enable bit</div> <div>bit15 PvLoadFuncEn PV Independent load enable bit</div> <div>Corresponding bit</div> <div>1: Enable</div> <div>0: Closed</div>
340BH	1	PowerLimited	UInt16	-3		R/W	Power limit

340CH	1	InverterStop	UInt16			R/W	Inverter stop 1: power off, 0: power on;
3410H	1	ISOLimit	UInt16	0	kΩ	R/W	ISO limit
3416H	1	ReactiveMode	UInt16			R/W	Reactive power compensation mode 0 is capacitive regulation(kw), 1 is sensitive regulation(kw) 2 is capacitive power factor adjustment, 3 is sensitive power factor adjustment 4 is voltage reactive power curve, 5 is power factor curve
3417H	1	ReactiveValue	UInt16	-3		R/W	When 3416 address is: 0-1, The register is the reactive power compensation value (range value 0-65535 Var) . When 2-3, The register is power factor PF (range value -0.8-0.99, 1-0.8). When 4-5, The register is the reactive power compensation value
3421H	1	SafetyType	UInt16			R/W	Inverter safety type
343AH	1	PVInputMode	UInt16			R/W	PV input mode PV independent mode: 0x00 PV parallel mode: 0x08

4.4 Special register definition

Address	SIZE(Word)	Register name	Data type	Multiple	Unit	Attribution	Register definition	Note 1
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8014H	1	RS485_DATA_ATT E	UInt 16	0		W	RS485 communi cation baud rate (low) and slave number (high)	Baud rate: 4 is 9600, 5 is 4800, 6 is 2400. (3 kinds in total) The slave number is 1-32
8015H	1	CleanHistoryR ecord	UInt 16			W	Clear histori cal faults	1: Clean historical faults
801BH	1	CleanPower	UInt 16			W	Clear generat ion	1: Clean generation
8020H	4	Time	HEX	0		W	Machine time	Format yyyyMMddHHmmssz z yyyy: year MM: month dd: date HH: hour(24-hour format) mm: minute ss: second zz: reserved bit 2015-1-2 10:11:12 corresponding data is 07DF 01 02 0A 0B 0C 00