Version	Revision date	Revision contents	Modified by
V3. 4	2015-08-06	This version and before, the controller fault information is defined as low 16 bits, and high 16 bits	
		are reserved.	
V3.5	2016-11-09	Changes to the controller fault information is placed in the high 16 bits, and the low 16 bits are reserved.	
V3.6	2017-07-05	<pre>In example 4.7, the temperature reading address 0X0102 changed to 0X0103. In example 4.19, the seventh byte of the message is missing the total number of bytes. New:communication line description.</pre>	
V3. 7	2017-08-09	Add and delete document contents	
V3. 8	2018-11-06	Add PDU_E001H to set the charging current limit value, and the value should be two decimal places.	
V3. 9	2020-4-21	 Correct the description of the high 16 bits and low bits of the controller's fault information Add "2.2" FFH access address expansion instructions Sort out format 	

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1 Interface specification and serial port configuration information

1.1 RS232 interface

(Serial port rate: 9600 Check	k bit: NONH	Data bits: 8bit Stop bit:	11
Controller communic	ation port R.	12 (6-pin)	
	No.	Definition	
	1	Transmitting terminal TX	
	2	Receiving terminal RX	
	3	Power supply grounding/signal grounding	ç.
	4	Power supply grounding/signal grounding	ŗ
	5	Power supply positive	
	6	Power supply positive	

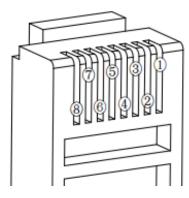
1.2 RS485 interface

RS4	485					
			h	No.	Definition	Parallel operation
	\bigcirc	\bigcirc	\bigcirc	1	12V	
)	\bigcirc	\bigcirc	\bigcirc	2	GND	Black
				3	D-	Yellow
				4	D+	Red
1	2	3	4			

1.3 RS485 interface2

(Serial port rate: 9600 Check bit: NONE Data bits: 8bit Stop bit:

1bit)



\bigcirc	Power supply positive
2	D+
3	D-
4	Power supply grounding/signal grounding
5	NC
6	NC
$\overline{\bigcirc}$	NC
8	NC

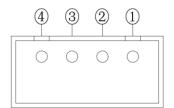
1.4 TTL interface

(Serial port rate: 9600

Data bits:

Check bit: NONE

8bit Stop bit: 1bit)



1	GND
2	Transmitting terminal TX
3	Receiving terminal RX
4	12.8V

2 Communication protocol format and command analysis

2.1 Format

Start character	Address code	Function code	Data	Error check	End character
-----------------	--------------	---------------	------	-------------	---------------

2.2 Descriptions

1)start character: >10ms

2)address code: 1 byte, range: 01H to F7H(decimal 1 to 247), 00His a broadcast address to which all slaves respond but do not return commands.

Remarks:Using FFH as the address access can bypass the local device address with data return. It is generally used as a stand-alone device such as some general monitoring screens, Bluetooth, etc.; FFH address is not suitable for multiple 485 bus access.

3)Function code:1 byte

Command name	Accessed data type	Function code	Error code
Read a single or multiple word register	2 bytes	03H	83H
Write a single word register	2 bytes	06H	86H
Write N word registers in a row	2 bytes	10H	90H
Reset to factory defaults	No accessed data	78H	F8H
Clear history	No accessed data	79H	F9H

4)Data:N bytes

5)Error check:2 bytes, it's the CRC checksum of the address code, function code and each byte of the data.

6)End character:>10ms

Note:

1)The data address and the data itself are 2 bytes, with the high byte sent first and then the low byte; for CRC, the low byte is sent first and the high byte is sent next.

2)The error code is the error response function code returned by the client when there is some error in the frame data sent by the server, error code=function code|80H.

2.3 Notes

1)PDU address: (0000 to 0009)/(000A to 001A)/(0100 to 0122)/(E001 to E02D)/(F000 to F3FF), these address segments are not allowed to cross access and modification in the same command!!!

2)The parameters and options of this paper are for the planning and introduction of all the products of this company, so it does not mean that each product has the functions and operation of the following parameters. Refer to the instruction manual for details.

3)Data below suffixed with an "H" are hexadecimal, and the others are decimal.

2.4 Process flow chart

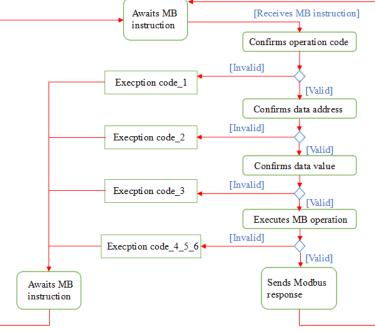
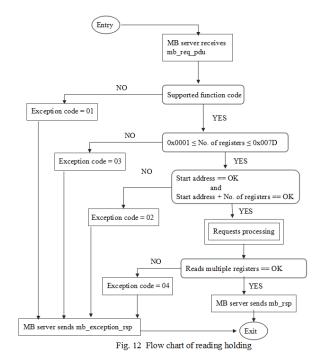


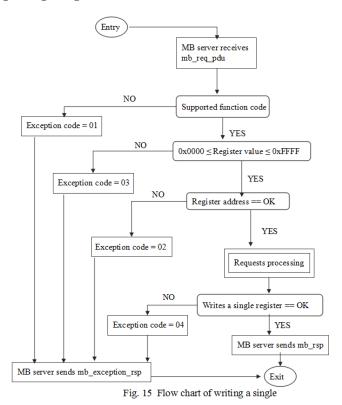
Fig. 8 Modbus process flow chart

1) Exception code descriptions

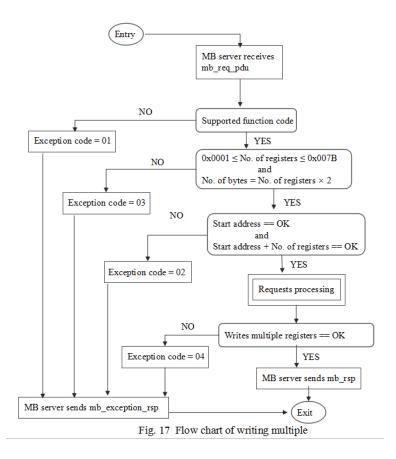
- a、 01H -- Function code not supported
- b、 02H -- PDU start address is not correct or PDU start address + data length
- c、03H -- Data length in reading or writing register is too large
- d、 04H -- Client fails to read or write register
- e, 05H -- Data check code sent by server is not correct
- 2) Flow chart of reading register



3) Flow chart of writing a single register



4) Flow chart of writing N registers in a row



2.5 Example

2.5.1 Read register

Request:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Function code	BYTE	03H
Start address	WORD	0000H~FFFFH
No. of read words	WORD	0001H~007DH
Check code	WORD	CRC checksum of all the above bytes

Normal response:

Description	No. of	Command
	bytes	Command

Device address	BYTE	01H~F7H,FFH
Function code	BYTE	03Н
Data length	BYTE	01H~FAH
Data content	WORD	Data read out (High byte sent first, low byte sent next)
	WORD	Data read out (High byte sent first, low byte sent next)
Check code	WORD	CRC checksum of all the above bytes

Exception response:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Error code	BYTE	83H
Exception code	BYTE	N (N=1, 2, 3, 4)
Check code	WORD	CRC checksum of all the above bytes

2.5.2 Write a single register

Request:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Function		
code	BYTE	06H
Start address	WORD	0000H~FFFFH
Write data in	WORD	0000H~FFFFH
Check code	WORD	CRC checksum of all the above bytes

Normal response:

Description	No. of bytes	Command
Device	BYTE	01H~F7H,FFH
address		
Function code	BYTE	06H
Start address	WORD	0000H~FFFFH
Write data in	WORD	0000H~FFFFH

Check code WORD CRC checksum of all the above byte	5
--	---

Exception response:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Error code	BYTE	86H
Exception code	BYTE	N (N=1, 2, 3, 4)
Check code	WORD	CRC checksum of all the above bytes

2.5.3 Write N registers in a row

Request:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Function code	BYTE	10H
Start address	WORD	0000H~FFFFH
No. of written bytes	WORD	0001H~007DH
No. of written words	BYTE	One time of the No. of bytes
Data content	WORD	Data written in (High byte sent first, low byte sent next)
	WORD	Data written in (High byte sent first, low byte sent next)
Check code	WORD	CRC checksum of all the above bytes

Normal response:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Function code	BYTE	10H
Start address	WORD	0000H~FFFFH
No. of written bytes	WORD	0001H~007DH
Check code	WORD	CRC checksum of all the above bytes

Exception response:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Error code	BYTE	90H
Exception code	BYTE	N (N=1, 2, 3, 4)
Check code	WORD	CRC checksum of all the above bytes

2.5.4 Reset to factory defaults

Request:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Function code	BYTE	78H
Complementary data	WORD	0000Н
Complementary data	WORD	0001H
Check code	WORD	CRC checksum of all the above bytes

Normal response:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Function code	BYTE	78H
Complementary data	WORD	0000Н
Complementary data	WORD	0001H
Check code	WORD	CRC checksum of all the above bytes

Exception response:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Error code	BYTE	F8H

Exception code	BYTE	N (N=1, 2, 3, 4)
Check code	WORD	CRC checksum of all the above bytes

2.5.5 Clear history

Request:

Description	No. of bytes	Command
Device address	BYTE	01H~F7H,FFH
Function code BYTE		79Н
Complementary data	WORD	0000Н
Complementary data	WORD	0001H
Check code	WORD	CRC checksum of all the above bytes

Normal response:

Description	No. of bytes	Command		
Device address	BYTE	01H~F7H,FFH		
Function code	BYTE	79Н		
Complementa ry data	WORD	0000Н		
Complementa ry data	WORD	0001H		
Check code	WORD	CRC checksum of all the above bytes		

Exception response:

Description	No. of bytes	Command			
Device address	BYTE	01H~F7H,FFH			
Error code	BYTE	F9H			
Exception code	BYTE	N (N=1, 2, 3, 4)			
Check code	WORD	CRC checksum of all the above bytes			

3 PDU address distribution table										
Reserved (20 bytes)										
PDU address	Bytes	R/ W	Unit	Description	Data (range)	Analysis	Retur n data	Parse instance (the data below is decimal data)		
0000H~ 0009Н	20	-		Reserved						
				System i	information (34	4 bytes)				
					0CH (decimal 12)	12V				
					18H (decimal 24)	24V				
				(8 higher bits)	24H (decimal 36)	36V	30			
				max. voltage	30H (decimal 48)	48V		Details refer to '4.1'		
				supported by	60H (decimal 96)	96V	1	The maximum support voltage		
				the system		Automatic		of the controller system is 48V		
000AH	2	R	-		FFH (decimal 255)	recognition of				
						system voltage				
					0AH (decimal 10)	10A				
						(8 lower bits)	14H (decimal 20)	20A		Details refer to'4.1' The rated charging current of
						rated charging	1EH (decimal 30)	30A	3C	
			current	2DH (decimal 45)	45A		the controller is 60A			
					3CH (decimal 60)	60A				
					0AH (decimal 10)	10A				
						(8 higher bits)	14H (decimal 20)	20A		The rated discharge current of
				rated discharging	1EH (decimal 30)	30A	14	The rated discharge current of the controller is 20A		
000BH	2	R	-	current	2DH (decimal 45)	45A			the controller is 20A	
					3CH (decimal 60)	60A				
				(8 lower bits)	00 (controller)			Indicates that the product type		
				product type	01 (inverter)		00	is the controller type		
				••				Details refer to'4.2'		
000CH^{\sim}								Need to convert the returned		
0013H	16	R	-	Product model				hexadecimal data into ASCII		
001011								code		
								Details refer to'4.3'		
0014H	4	R	_	Software version			00 01	The software version of the		
0015H					04 00	controller is 01.04.00				
								Details refer to'4.3'		
0016H	4	R	_	Hardware version			00 00	The hardware version of the		
0017H		IX.	R –				05 00	controller is 00.05.00		
0018H				Product serial			10 03	Details refer to'4.4'		
0019H	4	R	-	number			00 64	Product serial number		

							1			
				(8 higher				Indicates that the device		
001AH	DIAH 2	R/W	_	bits)Reserved	$1 \sim 247$		00 01	address of the controller		
001/11	2	1(/ "		(8 lower bits)	1 211		00 01			
				device address				is 1		
	Controller dynamic information (7 bytes)									
				(8 higher						
				bits)Reserved		Current battery		The battery capacity of SOC is		
0100H	2	R	%	(8 lower bits)	0~100	capacity value	00 37	55 %		
				Battery capacity		capacity value		33 70		
				SOC						
010111	2	R	17			Battery	00 7A	The bettern voltage is 12 2V		
0101H	2	ĸ	V	Battery voltage		voltage * 0.1	00 7A	The battery voltage is 12.2V		
010211	2	R		Charging current		Charging	01 OA	The battery charging current is		
0102H	2	ĸ	А	(to battery)		current * 0.01	UT UA	2.66A		
				(8 higher bits)						
				Controller		b7: sign bit;		The controller temperature is		
0103H	2	R	°C	temperature		b0-b6:tempera	1C 19	28°C		
		К	K		(8 lower bits)		ture value		The battery temperature is 25°C	
						Battery temperature				
				Load dc						
0104H	2	R	V	voltage		Load voltage*0.1	00 7A	The load voltage is 12.2V		
				Load dc		Load				
0105H	2	R	Α	current		current*0.01	04 OB	The load current is 10.35A		
				Load dc						
0106H	2	R	W			Actual value	00 7E	The load power is 126W		
Solar par		mation	((h-	power						
Solar pai		mation		Solar panel		Solar panel				
0107H	2	R	V	-		-	00 C8	The solar panel voltage is 20V		
				voltage		voltage * 0.1				
				Solar panel		Solar panel				
0108H	2	R	А	current (to		current * 0.01	01 OA	The solar panel current is 2.66A		
				controller)						
0109H	2	R	W	Charging power		Actual value	00 35	The solar panel charging power is		
010911	_			enanging perior				53W		
Battery i	nformat	tion (2	2 byte	s)	T	-	1			
						0001 to turn on				
010AH	2	R/W		Load On/ Off	0 1	the load,	00 01	Details refer to'4.16'		
010AH 2	2	K/ W	-	command	0 or 1	0000to turn off	00 01	Turn on the load		
						the load				
				Battery's min.		Battery's min.				
010BH	010BH 2	R	R V	voltage of the		voltage of the	00 70	The current day of battery min.		
				current day		current day * 0.1		voltage is 11.2V		
				Battery's max.		Battery's max.				
010CH 2	2	2 R	R V	voltage of the		voltage of the	00 84	The current day of battery max.		
010011	2		К	2 K	ļ	current day		current day * 0.1		voltage is 13.2V
				current uay		current day 0.1				

		1			1								
				Max. charging		lax. charging		The current day of battery max.					
010DH	2	R	А	current of the	cı	urrent of the	00 D8	charging current is 2.16A					
				current day	curr	rent day * 0.01							
				Max.	Ma	Max. discharging							
010EH	2	R	А	Discharging		urrent of the	04 10	The current day of battery max.					
UIUEH	2	ĸ	A	current of the				discharging current is 10.4A					
				current day	curr	rent day * 0.01							
				Max. charging									
010FH	2	R	W	power of the	A	Actual value	00 41	The current day of battery max.					
				current day				charging power is 65W					
			t	Max.									
				discharging				The current day of battery					
0110H	2	R	W	power of the	A	ctual value	00 78	max. discharging power is					
				current day				120W					
				Charging				The current day of battery					
0111H	2	R	AH	amp-hrs of the	A	ctual value	06 08	charging amp-hrs is					
	2			current day				1544AH					
				Discharging				The current day of battery					
0112H	2	R	R	2 R	R	AH	amp-hrs of the	Δ	ctual value	08 10	discharging amp-hrs is		
011211	011211 2				current day		-taur (urue	0010	2064AH				
			-	Power				2001111					
0113H	2	R	W	generation of the	Α.	ctual value	03 DE	The current day of Power					
011311	~	IX.		current day	A		05 DE	generation is 990W					
				Power									
0114H	2	п	D	P	R	R	R	w			ctual value	01 E3	The current day of Power
0114H	2	ĸ	vv	consumption of	A	ciual value	01 E3	consumption is 483W					
				the day									
Historica	l data iı	nforma	tion (22 bytes)									
				Total number									
0115H	2	R	days	of operating			00 08	The system has been running for					
	_			days				eight days					
<u> </u>				Total number									
				of battery				The battery is over-discharges one					
0116H	2	R	-	over-discharg			00 01	time					
				es				time					
				Total number									
01174	0117H 2	R		of battery			00 06	The battery is fully charged 6					
V11/II			К -	-			00 06	times					
				full-charges									
0118H		P		Total charging		. 1 1	0001	The battery of total charging					
0119H	4	R	AH	amp-hrs of the	A	ctual value	0203	amp-hrs is 66051AH					
011711				battery									

				Total									
011AH							0000	The battery of total discharging					
-	4	R	AH	discharging		Actual value	0108						
011BH				amp-hrs of the			0108	amp-hrs is 264AH					
				battery									
011CH	4	D	117	Cumulative			0000	The solar panel of Cumulative					
011DH	4	R	W	power		Actual value	07D0	power generation is 2000W					
-				generation									
011EH		P		Cumulative			0000	The load of Cumulative power					
011FH	4	R	W	power		Actual value	03E8	consumption is 1000W					
				consumption									
Load inf	ormatio	n (2 by	ytes)			1							
						b7: 0 indicates		Indicates that the load is					
			-	Load status		the load is off,		open and the brightness is					
				Loud status		1 indicates the		100%.					
						load is on		((Algorithm: first convert					
					8 higher bits		E4	E4 to binary 11100100, the					
										o inglier ond	b0~b6:	51	high 1 digit is 1 to turn on
			%	Load brightness		brightness		the light, then convert the					
			/0	Loud originations		value		low 7 digits to decimal, the					
						00~64H		current brightness is not					
								adjustable)					
						00H: charging							
						deactivated	-						
					01H: charging								
						activated							
						02H: mppt							
0120H	2	R				charging mode							
						03H:							
						equalizing							
						charging mode	-	The current day of controller is					
			-	Charging state	8 lower bits	04H: boost	02	MPPT charging.					
						charging mode	-						
						05H: floating							
						charging mode	-						
						06H: current							
						limiting							
						(overpower)							
Controlle				•									
0121H	21H Controller failure, alarm information 16 high bits							Details refer to'4.15'					
0122H	Control	ller fa	ilure,	alarm informatio				Details refer to'4.15'					
				Cont II	EEPROM								
				Controller pa	rameter settin	ig (50 bytes)							

E001H	2	W		Set charging current limit (support a part of the controllers)			*0.01 A	Details refer to'4.23'		
Battery p	Battery parameter setting (38 bytes)									
E002H	2	R/W	AH	Nominal battery capacity						
E003H	2	R/W	-	8 higher bits: system voltage setting 8 lower bits: recognized voltage		12: 12V 24: 24V 36: 36V 48: 48V FF: automatic recognition Others:automa tic recognition				
E004H	2	R/W	-	Battery type		0=Self-custom ized, 1=Open, 2=Sealed, 3=Gel, 4=Lithium				
E005H	2	R/W	v	Over-voltage threshold	70~170					
Е006Н	2	R/W	v	Charging voltage limit	70~170					
E007H	2	R/W	v	Equalizing charging voltage	70~170			Details refer to'4.18'		
E008H	2	R/W	v	Boost charging voltage/ overcharge voltage (lithium batteries)	70~170					
Е009Н	2	R/W	V	Floating charging voltage/ overcharge recovery voltage (lithium batteries)	70~170					

House Reve			1							
Image: series of the series										
E00BH 2.2 R.W V. Over-discharge volage 70–170 Image Image E00CH 2.2 R.W V Under-volage waring level 70–170 Image Image E00DH 2.2 R.W V Over-discharge waring level 70–170 Image Image E00DH 2.2 R.W V Over-discharge volage 70–170 Image Image E00EH 2.2 R.W V Over-discharge volage 70–170 Image Image E00EH 2.2 R.W V Over-discharge ind-of-charge sOC 70–170 Image Image E00H1 2.2 R.W N Shigher bits: end-of-discharge sOC 70–170 Image Image E01H1 2.2 R.W Min Equilizing charging image 0~120 Step length 10 Image E01H1 2.2 R.W Min Equilizing charging image 0~255 Oclosed, step length 10 Image E01H1 2.1 R.W Min Reserved Image Over-discharge staterval Over-discharge step length 5 Image E01H1 2.1 R.W Min Reserved Image Image Image	E00AH	2	R/W	V	recovery	70~170				
F00BII 2.2 R.W V.V. recovery voltage 70–170 I.a.I. I.a.I. E00CH 2.2 R.W V. Quer-voltage 70–170 I.a.I. I.a.I. E00EH 2.2 R.W V. Quer-voltage 70–170 I.a.I. I.a.I. E00EH 2.2 R.W V. Discharging voltage 70–170 I.a.I. I.a.I. E00EH 2.2 R.W V. Discharging voltage 70–170 I.a.I. I.a.I. E00EH 2.2 R.W V. Discharging voltage 70–170 I.a.I I.a.I E00EH 2.2 R.W V. Discharging voltage 70–170 I.a.I I.a.I E00EH 2.2 R.W S.S Discharging voltage 70–170 I.a.I I.a.I E01H 2.2 R.W S.S Over-discharge voltage Sole-overset Sole overset					voltage					
Interplation Interplation Interplation Interplation Interplation E00CH 2.2 R/W V Undervotage waning level 7~170 Interplation Interplation E00EH 2.2 R/W V Over-discharge voluge 7~170 Interplation Interplation E00EH 2.2 R/W V Over-discharge initivologe 7~170 Interplation Interplation E00EH 2.2 R/W V Discharging initivologe 7~170 Interplation Interplation F00FH 2.2 R/W V Discharging initivologe 7~170 Interplation Interplation F00FH 2.2 R/W V Discharging initivologe 7~170 Interplation Interplation F00FH 2.2 R/W N Discharging inition 7~170 Interplation Interplation F00FH 2.2 R/W R/W N Discordinging inition delay 7~120 Interplation Interplation F00FH 2.2 R/W N Equalizing inition delay 0~100 Step length 10 Interplation F01H 2.2 R/W N Equalizing initionaling 0~255 Olosed, isp length 1					Over-discharge					
E00CH 2.1 N.W V.V Under-voltage waning level 70~170 I.I.I.I.I.I.I.I.I.I.I.I.I.I.I.I.I.I.I.	E00BH	2	R/W	V	recovery	70~170				
E00CH 2 R/W V warning level warning level 70~170 I and total information informating information information information information inform					voltage					
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E00DH 2 R/W V voltage 70~170 Image Image 1000000000000000000000000000000000000					-			_		
E00EH 2 R/W V Discharging imit voltage 70~170 Image Image Image E00FH 2 R/W X Shigher bits: end-of-charge SOC Image	E00DH	2	R/W	V	_	70~170				
EOOFH 2 RW V Imit voltage 70~170 Imit voltage 70~170 EOOFH 2 RW RW Right bits: end-of-charge SOC Solitistic end-of-discharge SOC Solitistic end-of-discharge sOC Imit voltage Shigher bits: end-of-charge SOC Imit voltage								_		
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Hourse Part Part Part Part Part Part Part Part					-					
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E00FH 2 R/W 2 8 lower bits: end-of-discharg e SOC					end-of-charge					
Image: Problem in the state of the stat	EQUELI	2	D/W		SOC			TT 1' 1		
Image: solution in the solution	LUULU	2	K/ W	-	8 lower bits:			Unrealized		
E010H 2 R/W S Over-discharge ine delay 0~120 Image: Constraint of the delay							end-of-discharg			
E010H 2 R/W S time delay 0~120 Image of the second sec					e SOC					
E010H 2 R/W S time delay 0~120 Image of the second sec					Over-discharge					
E011H 2 R/W Min Equalizing charging time charging time charging time $0\sim300$ Step length 10 Image: Charging time charging char	E010H	2	R/W	S	_	0~120				
E011H 2 R/W Min charging time 0~300 Step length 10 E012H 2 R/W Min Boost charging time 10~300 Step length 10 E013H 2 R/W May Equalizing charging interval 0~255 0:closed, step length 5 1 E014H 2 R/W MV Temperature 0.72 0~255 0:not compensated, step length 1 1 E015H 2 R/W Y Temperature 0.72 0~5 0.not compensated, step length 1 1 E015H 16 - Y Reserved Image: Step length 1 1 Mode setting: C2 compensation V factor 0~5 Image: Step length 1 Image: Step length 1 F015H 16 - Y Reserved Image: Step length 1 Image: Step length 1 Mode setting: C2 Reserved Image: Step length 1 Image: Step length 1 Image: Step length 1 Image: Step length 1 F015H 16 - Image: Step length 1 Image: Step length 1 Image: Step length 1 Image: Step length 1 Image: Step length 1 Image: Step length 1 Image: Step length 1 Image: Step length 1 Image: Step length 2 Image: Step length 2 Image: St					-					
E012H2R/WMinBoost charging time $10 \sim 300$ Step length 10Image: Charging intervalE013H2R/W day Equalizing charging interval $0 \sim 255$ $0:closed, step length 5$ $0:closed, step length 5$ E014H2R/W day $mV/$ Temperature compensation V $0 \sim 5$ $0:not$ compensated, step length 1E015H \sim 16 $ V$ Reserved $0 \sim 5$ $0:not$ compensated, step length 1E015H \sim 16 $ V$ Reserved V Mode setting (2 by-setting) $E01DH$ $ V$ P P E01DH2 RW $ Load$ working modes OOH $Coal is turned onby light control, ofoff of loadDetails refer to'4.19'$	E011H	2	R/W	Min		0~300	Step length 10			
E012H 2 R/W Min ime 10~300 Step length 10 Ime										
E013H 2 R/W day day interval Equalizing charging interval 0~255 0:closed, step length 5 Image: Closed, step length 5 E014H 2 R/W MV/V Temperature COMPONISATION 0~5 Onot compensated, step length 1 Image: Closed, step length 5 E015H 2 R/W V Temperature COMPONISATION 0~5 Onot compensated, step length 1 Image: Closed, step length 1 E015H 16 - V Reserved Image: Closed, step length 1 Image: Closed, step length 1 Image: Closed, step length 1 Mode setting: Closed, E01DH 16 - V Reserved Image: Closed, step length 1 Image: Closed, step length 1 Image: Closed, step length 1 Mode setting: Closed, E01DH 16 - V Reserved Image: Closed, step length 1 Image: Closed, step length 1 Image: Closed, step length 1 For the setting: Closed, Closed, step length 1 - Image: Closed, step length 1 Image: Closed, step length 1 Image: Closed, step length 1 Image: Closed, step length 1 For the setting: Closed, step length 1 - Image: Closed, step length 1 Image: Closed, step length 1 Image: Closed, step length 1 For the setting: Closed, step length 1 - - Image: Closed, step length 1 Image: Closed, step leng	E012H	2	R/W	Min		10~300	Step length 10			
E013H 2 R/W day charging interval 0~255 0:closed, step length 5 E014H 2 A MV Temperature 'C/2 0~50 compensated, step length 1										
E013H 2 R/W day charging interval 0~255 step length 5 E014H 2 R/W Y Temperature Compensation V 0:not compensated, step length 1 E015H 2 R/W Y Temperature factor 0~5 compensated, step length 1 E015H 16 - V Reserved Image: Solution of the set of the s							0:closed,			
Image: Second	E013H	2	R/W	day	charging	0~255				
E014H 2 R/W °C/2 V compensation factor 0~5 compensated, step length 1 Image: Compensated, step length 1 Image: Compensated, step length 1 E015H ~ 16 - Feserved -					interval		step length o			
Image: Note of the set of t				mV/	Temperature		0:not			
E015H \sim 16-ReservedIIIE01CH-IReservedIIIMode setting (2 bytes)III <th< td=""><td>E014H</td><td>2</td><td>R/W</td><td>°C/2</td><td>compensation</td><td>0~5</td><td>compensated,</td><td></td></th<>	E014H	2	R/W	°C/2	compensation	0~5	compensated,			
\sim 16 - If Reserved If If If Bolicity Mode setting (2 bytes) Sole light control, light contr				V	factor		step length 1			
\sim 16 - If Reserved If If If Bolicity Mode setting (2 bytes) Sole light control, light contr	E015H									
E01CH Image: Constraint of the symbol of t		16	-		Reserved					
Mode setting (2 bytes) Sole light Details refer to'4.19' E01DH 2 R/W - Load working modes Load working modes Load is turned on by light control, dight Details refer to'4.19'	E01CH									
E01DH 2 R/W - R/W		ting (2 by	ytes)							
E01DH 2 R/W - Load working modes Load is turned on by light control,							Sole light	Details refer to'4 19'		
E01DH 2 R/W - Load working modes $00H$ control over on/ 1 = 100H contro								Doministerier to 4.17		
E01DH 2 R/W - Load working off of load Load is turned on by light control,						00H				
E01DH 2 R/W - Load working Load is turned on by light control,										
E01DH 2 R/W - modes Load is turned on by light control,					Load working			_		
by light control,	E01DH	2	R/W	-	e		Load is turned on			
01H and goes off after							by light control,			
						01H	and goes off after			
a time delay of 1							a time delay of 1			
hour							hour			

	Load is turned on	
	by light control,	
02H	and goes off after	
	a time delay of 2	
	hours	
	Load is turned on	
	by light control,	
03H	and goes off after	
	a time delay of 3	
	hours	
	Load is turned on	
	by light control,	
04H	and goes off after	
	a time delay of 4	
	hours	
	Load is turned on	
	by light control,	
05H	and goes off after	
0.511	a time delay of 5	
	hours	
	Load is turned on	
06H	by light control,	
UOH	and goes off after	
	a time delay of 6	
	hours	
	Load is turned on	
	by light control,	
07H	and goes off after	
	a time delay of 7	
	hours	
	Load is turned on	
	by light control,	
08H	and goes off after	
	a time delay of 8	
	hours	
	Load is turned on	
	by light control,	
09H	and goes off after	
	a time delay of 9	
	hours	

						Load is turned on	
						by light control,	
					0AH (decimal 10)	and goes off after	
						a time delay of	
						10 hours	
						Load is turned on	-
						by light control,	
					0BH (decimal 11)	and goes off after	
						a time delay of	
						11 hours	
						Load is turned on	-
						by light control,	
					0CH (decimal 12)	and goes off after	
						a time delay of	
						12 hours	
						Load is turned on	-
						by light control,	
					0DH (decimal 13)	and goes off after	
						a time delay of	
						13 hours	
						Load is turned on	-
						by light control,	
					0EH (decimal 14)	and goes off after	
						a time delay of	
						14 hours	
					0FH (decimal 15)	Manual mode	
					10H (decimal 16)	Debugging mode	
					11H (decimal 17)	Normal on mode	
Light co	ontrol set	tting (4 byte	s)			
				Light control	0		
E01EH	2	R/W	Min	delay	0~60		
E01FH	2	R/W	v	Light control	1~40		
LUITII			, v	voltage	1 10		
E020H	2			Reserved			
202011	2	-		Reserved			
E02111		D/11/		Special power	01:1 1:	b3 to b7 not	
E021H	2	R/W	-	1	8 higher bits		

8 higher bits

used

E021H

2

R/W

control

						b1: 1 special power control	Кеер
						function enabled	
						0 special power	
						control function	
						disabled	
						b0: 1 each	
						night on	The position 1 will clear the battery over discharging of
						function	mark once every night, and
						enabled,	(assuming that the battery over
						0 each night	discharging on the same day)at
						on function	least once allow the system
						disabled	open the load on the night.
						b3 to b7 not	Keep
						used	
						b2: no	
						charging	
						below 0 °C	
						(1: enabled, 0:	
					8 lower bits	disabled)	
						b0 to b1:	
						charging method	
						(00: direct	
						charging, 01:	
						PWM	
						charging)	
				Historica	l data record(
							Details refer to'4.10'/'4.20'
F000H							Function code:
~				Historical data			Reading the day data is F000H,
F3FFH	1024	R	-	of the someday			Read the first 3 days data is
							F003H,
							Returns 20 bytes of data block

4 Command parses and paradigms

4.1 Read the voltage and current of the controller system

PDU address	Bytes	R/W	Da	Meaning	
000AH	2	R	8 higher bits: system voltage	0CH (decimal 12) 18H (decimal 24) 24H (decimal 36) 30H (decimal 48) 60H (decimal 96) FFH (decimal 255)	12V 24V 36V 48V 96V Automatic recognition of system
			8 lower bits: system current	0AH (decimal 10) 14H (decimal 20) 1EH (decimal 30) 2DH (decimal 45) 3CH (decimal 60)	voltage 10A 20A 30A 45A 60A

According to "Table 1", the PDU address is known to be 000AH. Read 1 word (2 bytes) To send: 01 03 000A 0001 A408

To receive: 01 03 02 181E 324C

Parsing: high byte 18H indicates the controller's system voltage is 24V, and low byte 1EH indicates the system current is 30A.

4.2 To read the controller's model

The PDU addresses are known to be 000CH to 0013H in sequence and occupy a total of 16 bytes. Assume these addresses store the following data (ASCII) in sequence:

To send: 01 03 000C 0008 840F

To receive: 01 03 10 2020 2020 4D54 3438 3330 2020 2020 2020 EE98

Parsing: this controller's model is MT4830 (the ASCII corresponding to 20H is '', null character data)

4.3 To read the controller's software version and hardware version,

The PDU addresses are known to be 0014H, 0015H, 0016H and 0017H in sequence

To send:01 03 0014 0004 040D

To receive:01 03 08 0003 0201 0001 0203 8A54

Parsing: (the highest byte is not used) 030201H indicates the controller's software version is V03.02.01 (the highest byte is not used) 010203H indicates the controller's hardware version is V01.02.03

4.4. To read the controller's product serial number

The PDU addresses are 0018H and 0019H in sequence as shown in "Table 1" To send: 01 03 0018 0002 440C To receive:01 03 04 0F01 FFFF A957 Parsing: 0F01 FFFFH is the product serial number

4.5 To read battery capacity SOC

The PDU address is known to be 0100H To send: 01 03 0100 0001 85F6 To receive: 01 03 02 0064 B9AF Parsing: the battery capacity SOC is 64H% (decimal 100%)

4.6 To read battery voltage:

Multiply the battery voltage reading by 0.1

The PDU address is known to be 0101H To send: 01 03 0101 0001 D436 To receive: 01 03 02 007B F867 Parsing: formula (battery voltage = battery voltage * 0.1) Battery voltage: (007BH, decimal 123), 007BH * 0.1 = 12.3V

4.7. To read the battery's surface temperature

Controller temperature, and the PDU addresses are known to be 0103

The high 8 bits represent the temperature of the controller, and the lower 8 bits represent the temperature of the battery.

To send: 01 03 0103 0001 75F6

To receive: 01 03 02 1B19 737E

Analytic: 1B19H represent the temperature of the controller is 1BH (27 °C), the surface temperature of the battery for 19H(25 °C)

4.8, To read load voltage, current and power

The PDU addresses are known to be 0104H, 0105H and 0106H in sequence

To send: 01 03 0104 0003 45F6

To receive: 01 03 06 0078 00C8 00F0 00C5

Parsing:

Formula: load voltage = load voltage * 0.1

0078H is the load voltage, so the actual load voltage is: 0078H * 0.1 = 120 * 0.1 = 12.0V

Formula: load current =load current * 0.01

00C8H is the load current, so the actual load current is: 00C8H * 0.01 = 200 * 0.01 = 2.00A

00F0H is the load power (decimal 240W) which can also be calculated via formula: load voltage * load current

4.9, To read solar panel voltage, charging current

Charging power, and the PDU addresses are known to be 0107H, 0108H and 0109H in sequence

To send: 01 03 0107 0003 B5F6

To receive: 0090 0096 00D8 011E

Parsing:

Formula: solar panel voltage = solar panel voltage * 0.1

00AAH is the solar panel voltage reading, so the actual solar panel voltage is: 0090H * 0.1 = 144 * 0.1 = 14.4V

Formula: solar panel charging current = solar panel charging current * 0.01

0096H is solar panel charging current reading, so the actual solar panel charging current is: 0096H * 0.01 = 150 * 0.01 = 1.50A

00D8H is solar panel charging power (decimal 216 W) which can also be calculated via formula: solar panel voltage * solar panel charging current

4.10、 Read historical information of the day

To read the current day's min. battery voltage, max. battery voltage, max. charging current, max. discharging current, max. charging power, max. discharging power, charging amp-hrs, discharging amp-hrs, power generation, power consumption, and the PDU addresses are 010BH to 0114H in sequence as shown in "Table 1"

Reading method 1:

To send: 01 03 010B 0003 75F5

To receive: 01 03 06 0070 0084 00D8 20CD

Parsing: in the returned command

The 4th and 5th bytes 0070H indicate the current day's min. battery voltage: 0070H * 0.1 = 112 * 0.1 = 11.2V

The 6th and 7th bytes 0084H indicate the current day's max. battery voltage: 0084H * 0.1 = 132 * 0.1 =

13.2V

The 8th and 9th bytes 00D8H indicate the current day's max. charging current: 00D8H * 0.01 = 216 * 0.01 = 2.16V

E.g.: to read the controller's charging amp-hrs and discharging amp-hrs on the current day, and the PDU addresses are known to be 0111H and 0112H respectively

To send: 01 03 00111 0002 31D4

To receive: 01 03 04 0608 0810 7D75

Parsing: the 4th and 5th bytes 0608H are the current day's charging amp-hrs (decimal 1544AH);

Parsing: the 6th and 7th bytes 0810H are the current day's discharging amp-hrs (decimal 2064AH) Reading method 2:Pass 01 03 F000 000A F6CD, details refer to' 4.20';

4.11 To read the number of operating days, over-discharges and full-charges

The PDU addresses are 0115H, 0116H and 0117H respectively.

To send: 01 03 0115 0003 15F3

To receive: 01 03 06 0008 0001 0006 1176

Parsing:

The 4th and 5th bytes 0008H are the number of operating days, indicating the system has operated for 8 days.

The 6th and 7th bytes 0001H are the number of over-discharges, indicating th battery has been over-discharged once. The 8th and 9th bytes 0006H are the number of full-charges, indicating the battery has been fully charged for 6 times.

4.12 To read the battery's total charging amp-hrs and discharging amp-hrs,

The PDU addresses are known to be 0118H, 0119H, 011AH and 011BH in sequence

To send: 01 03 0118 0004 C5F2

To receive: 01 03 08 0001 0203 0000 0108 C0A3

Parsing: the 4th to 7th bytes 00010203H are the battery's total charging amp-hrs (decimal 66051AH = 66.051KAH)

The 8th to 11th bytes 00000108H are the battery's total discharging amp-hrs (decimal 264AH = 0.264KAH)

4.13, To read the controller's cumulative power generation and cumulative power

consumption

The PDU addresses are known to be 011CH to 011FH in sequence and occupy a total of 8 bytes.

To send: 01 03 011C 0004 840F

To receive: 01 03 08 0000 07D0 0000 03E8 550C

Parsing: 000007D0H are the controller's cumulative power generation (decimal 2000 kilowatt-hours)

The 8th to 11th bytes 000003E8H are the cumulative power consumption (decimal 1000 kilowatt-hours)

4.14 、 To								read	load																			
status,	PDU address	Bytes	R/W	Item	Va	llue	Meaning	bright	ness																			
and battery				Load status	0 or 1	High	b7:0 indicates the load is off, 1 indicates the load is on	status																				
The PDU known to be				Load brightness	00 to 64H	- byte	b0 to b6: brightness value	addresses 0120H	are																			
							00H: charging deactivated																					
							01H: charging activated																					
	0120H	2	R				02H: mppt charging mode																					
			Battery st											Battery status		Low byte	03H: equalizing charging mode											
							04H: boost charging mode																					
							05H: floating charging mode																					
							06H: constant current (overpower)																					

To send: 01 03 0120 0001 843C

To receive: 01 03 02 E402 7285

Parsing: E4H is (80H | 64H)

The 4th byte b7 being 1 indicates the street light is on, otherwise it's off, and b0 **to** b6 being 64H indicates the street light's brightness is 100%

The 5th byte 02H indicates mppt charging mode is in operation (for parsing of other statuses, refer to "PDU Address Allocation Table")

4.15、 To read faults and warnings

PDU addres s	Bytes	R/ W	Item	byte	Meaning
0121H	2	R	Controller fault and warning information	16 High bit	B31 load open-circuit (street light)B30: induction probe idamaged (street light)B29: capacitor over-voltage (reserved)B28: battery reversely connectedB27 battery low temperature protection (temperature is lower than the lower limit of charging) stop chargingB26:overcharge protection, stop chargingB25:battery low temperature protection (the temperature is lower than the lower discharge limit) prohibit dischargingB24:battery high temperature protection (temperature higher than the upper discharge limit) prohibit dischargingB23: oo battery detected (SLD)B22: power supply status (0
0122H	2	R	Controller fault and warning information	16 Low bit	B15~B13: reserved B12:solar panel reversely connected B11:solar panel working point over-voltage

The PDU addresses are 0121H and 0122H respectively

			B10: (reserved)
		-	B9:photovoltaic input side
			over-voltage
			B8: (reserved)
		-	B7:photovoltaic input
			overpower
			B6:battery high temperature
			protection (temperature higher
			than the upper discharge limit)
		-	prohibit charging
			B5:Controller temperature
		-	too high
			B4:load overpower
		-	or load over-current
			B3:load short circuit
			B2:battery under-voltage
			B1:battery over-voltage
			B0:battery over-discharge

To send: 01 03 0121 0002 95FD

```
To receive: 01 03 04 0000 0021 3A2B
```

Parsing:

The first four or five bytes for the fault information of the Low 16 bit 0201H, b5 for 1, said that the controller temperature is too high, b0 for 1 said the battery over discharge

(for parsing of other fault codes, refer to the "Meaning" column of the "PDU Address Allocation Table")

4.16 To controll on/off the load,

(Remarks: The prerequisite is that E01DH has been set to 15 manual mode, and then the load can be controlled on/off by this command, details refer to '4.19')

Knowing the PDU address is 010AH, you need write on/ off command into this address

To turn on the load:

To send: 01 06 010A 0001 69F4

To receive:01 06 010A 0001 69F4

To turn off the load:

To send: 01 06 010A 0000 A834

To receive:01 06 010A 0000 A834

4.17、 To read street light brightness

The PDU address is known to be 0120H To send: 01 03 0120 0001 843C To receive: 01 03 02 E400 F344 Parsing:

E.g.:

The highest bit is responsible for turning on the street light, and the 7 lower bits of the high byte are for adjusting the brightness value, E4H&7FH = 64H = 100%

4.18 To set charging voltage, discharge and other related parameters

To set over-voltage threshold, charging limit voltage, equalizing charging voltage, boost charging voltage, floating charging voltage, boost charging recovery voltage, over-discharge recovery voltage, over-discharge voltage, boost charging time, equalizing charging interval, temperature compensation factor.

The addresses are known to be E005H to E014H in sequence, and occupy a total of 16 words or 32 bytes.

1) 、 For each setting range, refer to the "Meaning" column of the "PDU Address Allocation Table".

2) The following table sets the project not all controller support modification, and the controller specification is the subject.

Note: a controller, battery type is SLD, when you issued the following orders, can send the command prompt to success. But your controller is not allowed to change, because the battery type is a custom "User" or "LI" lithium-ion batteries to support some parameter modify command, on the other hand is the controller factory setting parameters)

0		
Item to set	Data	Data to send
	processing	Data to send
Over-voltage threshold 17.0V	Multiplied	17.0 * 10 = 170, hexadecimal
	by 10	00AAH
Charging limit voltage 15.5V	Multiplied	15.5 * 10 = 155, hexadecimal
	by 10	009BH
Equalizing charging voltage	Multiplied	14.6 * 10 = 146, hexadecimal
14.6V	by 10	0092H
Boost charging voltage 14.4V	Multiplied	14.4 * 10 = 144, hexadecimal
	by 10	0090H
Floating charging voltage	Multiplied	13.8 * 10 = 138, hexadecimal
13.8V	by 10	008AH
Boost charging recovery	Multiplied	13.2 * 10 = 132, hexadecimal
voltage 13.2V	by 10	0084H
Over-discharge recovery	Multiplied	12.6 * 10 = 126, hexadecimal
voltage 12.6V	by 10	007EH
Under-voltage threshold 17.0	Multiplied	12.0 * 10 = 120, hexadecimal
V	by 10	0078H
Over-discharge voltage 11.0V	Multiplied	11.0 * 10 = 110, hexadecimal
	by 10	006EH
Over-discharge limit voltage	Multiplied	10.5 * 10 = 105, hexadecimal
10.5V	by 10	0069H
End of charge and discharge		100<<8 50, hexadecimal 6432H
capacity 100% 50%		
Over-discharge time delay 5S		Hexadecimal 0005H

Equalizing charging time	003CH
60min	
Boost charging time 60min	003CH
Equalizing charging interval	001EH
30 days	
Temperature compensation	0005H
factor 5 mV/ °C/ 2V	

To send: 01 10 E005 0010 20 00AA 009B 0092 0090 008A 0084 007E 0078 006E 0069 6432 0005 003C 003C 001E 0005 9676

To receive: 01 10 E005 0010 E604

4.19, To set load working mode

The PDU	address is k	nown to	be E01E	ЭН

PDU address	Bytes	R/W	Item	Value	Meaning			
				00H	Sole light control, light control over on/ off of load			
			(01H	Load is turned on by light control, and goes off after a time delay of 1 hours			
			02H	Load is turned on by light control, and goes off after a time delay of 2 hours				
			2 R/W Load working modes	W	03H	Load is turned on by light control, and goes off after a time delay of 3 hours		
E01DH	2	R/W			04H	Load is turned on by light control, and goes off after a time delay of 4 hours		
							05H	Load is turned on by light control, and goes off after a time delay of 5 hours
						06H	Load is turned on by light control, and goes off after a time delay of 6 hours	
						07H	Load is turned on by light control, and goes off after a time delay of 7 hours	
				08H	Load is turned on by light control, and goes off after a time delay of 8 hours			

· · ·		7
	09H	Load is turned on by light control, and goes off after a time delay of 9 hours
	0AH (decimal 10)	Load is turned on by light control, and goes off after a time delay of 10 hours
	0BH (decimal 11)	Load is turned on by light control, and goes off after a time delay of 11 hours
	0CH (decimal 12)	Load is turned on by light control, and goes off after a time delay of 12 hours
	0DH (decimal 13)	Load is turned on by light control, and goes off after a time delay of 13 hours
	0EH (decimal 14)	Load is turned on by light control, and goes off after a time delay of 14 hours
	0FH (decimal 15)	Manual mode
	10H (decimal 16)	Debugging mode
	11H (decimal 17)	Normal on mode

According to the "PDU Address Allocation Table", if "load is turned on by light control, and goes off after a time delay of 8 hours" needs to be set to, send command 0008H

To send: 01 06 E01D 0008 2FCA To receive: 01 06 E01D 0008 2FCA

4.20、 Read historical data

Function code acquisition method: read the historical data from the N day, (F000H \mid N),(N=0~3FFH), Maximum readable 1023 day data.

Read 20 bytes of historical data from the 3 day: F003H = (F000H | 0003H)

To send: 01 03 F003 000A 06CD

The returned data is a 100-day historical data block of 20 bytes, beginning with the fourth byte of each successive byte:the current day's min. battery voltage, max. battery voltage, max. charging current, max. discharging current, max. charging power, max. discharging power, charging amp-hrs, discharging amp-hrs, power generation, power consumption

4.21、 Reset to factory defaults

To send: 01 78 0000 0001 6000 To receive: 01 78 0000 0001 6000 Parsing: 01 is the id number, 78 is the command to reset to factory defaults, and 6000 is for checking.

4.22、Clear history

To send: 01 79 0000 0001 5DC0 To receive: 01 79 0000 0001 5DC0 Parsing: 01 is the id number, 79 is the command to clear history, and 5DC0 is for checking.

4.23 Set the charge current

Example:(Only some products support) Need to set the charging current value 20.00A, retain 2 decimal places, first expand the data by 100 times, 20*100=2000, Get hex 7D0H Send: 01 06 E001 07D0 EC66 Receive: 01 06 E001 07D0 EC66