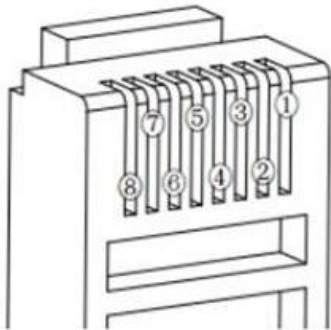# Solar Charger Controller

Modbus Protocol V1.7
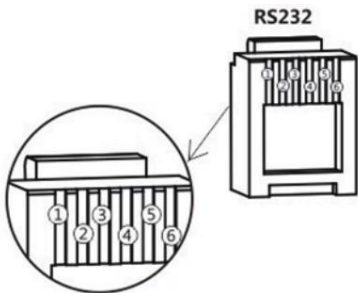
二、Pin Definition:

RJ45	①	+5V（The power supply is positive, and the load capacity is not less than. 200mA）
	②	A (RS485 bus signal)
	③	B (RS485 bus signal)
	④	GND （Power/／communication. ）
	⑤	NC（Idle, no other functions allowed. ）
	⑥	CAN_H（CAN Bus signal. ）
	⑦	NC（Idle, no other functions allowed. ）
	⑧	CAN_L（CAN Bus signal. ）
	Description: - RS485 Initial Baud rate 9600bps. - CAN initial baud rate of 500Kbps. The RS485 and CAN can be merged into one physical interface or separated into two physical interfaces. Products without CAN interface requirements, can ignore CAN pin definitions.	
RJ12	①	TX
	②	RX
	③	Power ground／signal ground.
	④	Power ground／signal ground.
	⑤	The power supply is positive. +12V
	⑥	The power supply is positive. +12V

the Protocol Definition：

1. Format：

Start Character	Address Code (1 BYTE)	Function Code （1BYTE）	Starting Address （2BYTE）	Length of Data （2BYTE）	CRC Check （2BYTE）	End Character

2. Description

1） Start Character：>10ms
2） Address Code：1 Bytes，Range：01H～F7H（DECIMAL 1～247），00H IS THE BROADCAST ADDRESS，ALL MACHINES RESPONSES，HOWEVER，THE COMMAND IS NOT RETURNED
3） Function Code：1 Bytes

Name of Command	Access of Data Type	Function Code	Error Code
Read a single or multiple word register	WORD	03H	83H
Write a single word register	WORD	06H	86H
Write continuous N-word register	WORD	10H	90H
Restore Factory Default	No byte access	78H	F8H
Clear History	No byte access	79H	F9H

4） Start Address：2 Bytes
5） Length of Data：2 Bytes
6） CRC Check：2 Bytes, for address codes, function codes and data bytes. CRC Checksum
7） End Character：
>10ms ATTENTION
：

1） Data address and data are 2 bytes **send high byte before sending low byte and CRC is send to low first send high again。**
2） The error code is an error in the frame data issued by the server, and the error exception answer function is returned by the client ERROR CODE = FUNCTION CODE 80H
3） Exception Code Description

　　a、01H – feature code not supported

　　b、02H -- PDU starting on address is incorrect of the PDU start address and data

　　length is out of range、03H – the data that reads or writes the register is too

　　long

　　d、04H – the client failed to execute a read or

　　write registere、05H – the data checked code

　　issued by the server is incorrect

3. Instance：

(1) Read a single or multiple word register(s):

Request

Description	Data Type	Command
Address Code	BYTE	01H ~ F7H
Function Code	BYTE	03H
Start Address	WORD	0000H ~ FFFFH
Number of Words to Read	WORD	0001H ~ 007DH
CRC Check	WORD	Sum of above bytes

Normal Response

Description	Data Type	Command
Address Code	BYTE	01H ~ F7H
Function Code	BYTE	03H
Data Length	BYTE	01H ~ FAH
Data Content	WORD	Data (high order byte first)
...	WORD	Data (high order byte first)
CRC Check	WORD	Sum of above bytes

Abnormal Response

Description	Data Type	Command
Address	BYTE	01H ~ F7H
Error Code	BYTE	83H
Diagnosis Code	BYTE	N (N=1, 2, 3, 4)
CRC Check	WORD	Sum of above bytes

(2) Write a single word register:

Request

Description	Data Type	Command
Address Code	BYTE	01H ~ F7H
Function Code	BYTE	06H

Start Address	WORD	0000H ~ FFFFH
Word to Write	WORD	0000H ~ FFFFH
CRC Check	WORD	Sum of above bytes

Normal Response

Description	Data Type	Command
Address Code	BYTE	01H ~ F7H
Function Code	BYTE	06H
Start Address	WORD	0000H ~ FFFFH
Word to Write	WORD	0000H ~ FFFFH
CRC Check	WORD	Sum of above bytes

Abnormal Response

Description	Data Type	Command
Address	BYTE	01H ~ F7H
Error Code	BYTE	86H
Diagnosis Code	BYTE	N (N=1, 2, 3, 4)
CRC Check	WORD	Sum of above bytes

(3) Write multiple word register(s):

Request

Description	Data Type	Command
Address Code	BYTE	01H ~ F7H
Function Code	BYTE	10H
Start Address	WORD	0000H ~ FFFFH
Number of Words to Write	WORD	0001H ~ 007DH
Number of Bytes to Write	BYTE	2 x Number of words to write
Data Content	WORD	Data (high order byte first)
...	WORD	Data (high order byte first)
CRC Check	WORD	Sum of above bytes

Normal Response

Description	Data Type	Command
Address Code	BYTE	01H ~ F7H
Function Code	BYTE	10H
Start Address	WORD	0000H ~ FFFFH
Number of Words to Write	WORD	0001H ~ 007DH
CRC Check	WORD	Sum of above bytes

Abnormal Response

Description	Data Type	Command
Address	BYTE	01H ~ F7H
Error Code	BYTE	90H
Diagnosis Code	BYTE	N (N=1, 2, 3, 4)
CRC Check	WORD	Sum of above bytes

(4) Restore Factory Default Settings:

Request

Description	Data Type	Command
Address Code	BYTE	01H ~ F7H
Function Code	BYTE	78H
Supplement Data	WORD	0000H
Supplement Data	WORD	0001H
CRC Check	WORD	Sum of above bytes

Normal Response

Description	Data Type	Command
Address Code	BYTE	01H ~ F7H
Function Code	BYTE	78H
Supplement Data	WORD	0000H
Supplement Data	WORD	0001H
CRC Check	WORD	Sum of above bytes

Abnormal Response

Description	Data Type	Command
Address	BYTE	01H ~ F7H
Error Code	BYTE	F8H
Diagnosis Code	BYTE	N (N=1, 2, 3, 4)
CRC Check	WORD	Sum of above bytes

(5) Restore Factory Default Settings:

Request

Description	Data Type	Command
Address Code	BYTE	01H ~ F7H
Function Code	BYTE	79H
Supplement Data	WORD	0000H
Supplement Data	WORD	0001H
CRC Check	WORD	Sum of above bytes

Normal Response

Description	Data Type	Command
Address Code	BYTE	01H ~ F7H
Function Code	BYTE	79H
Supplement Data	WORD	0000H
Supplement Data	WORD	0001H
CRC Check	WORD	Sum of above bytes

Abnormal Response

Description	Data Type	Command
Address	BYTE	01H ~ F7H
Error Code	BYTE	F9H
Diagnosis Code	BYTE	N (N=1, 2, 3, 4)
CRC Check	WORD	Sum of above bytes

4、PDU Address

The following # are followed by a band, H represents hexadecimal, without H for decimal number.									
	Description	PDU Address	Bytes	Read/Write	Describe	Data (Range_)	Meaning	Unit	Note
System Info	Prod.SystemInfo	0000H ～ 0009H	20	-	Reserved			-	
		000AH	2	R	High 8 bits: The system has the highest support voltage	0CH (decimal 12)	12V	-	The conversion
						18H (decimal 24)	24V		
						24H (decimal 36)	36V		
						30H (decimal 48)	48V		
						60H (decimal 96)	96V		
						FFH (decimal 255)	The system voltage automatically defined		
					Low 8 bits: Rated Charging current	0AH (decimal 10)	10A		
						14H (decimal 20)	20A		
						1EH (decimal 30)	30A		
						2DH (decimal 45)	45A		
						3CH (decimal 60)	60A		
		000BH	2	R	High 8 bits: Rated discharge current	0AH (decimal 10)	10A		
						14H (decimal 20)	20A		
						1EH (decimal 30)	30A		
						2DH (decimal 45)	45A		
						3CH (decimal 60)	60A		
					Low 8 bits: Product type	00(controller)			
		000CH ～ 0013H	16	R	Product model		Data Format ASCII	-	Product SKU

		0014H ～ 0015H	4	R	Software Version		Format XX	–	**Version # of product approved**
		0016H ～ 0017H	4	R	Hardware version		format: xx	–	**Version # of product approved**
		0018H 0019H	4	R	Product serial #			–	
		001AH	2	R/W	Controller, 、 devices address	1～247		–	8 bits low
		001BH	4	R	Version of protocol		format XX		Product recognition

		～ 001CH					Current version：11		Version #
		001DH ～ 001EH	4	R/W	Unique ID Code				Default0xF FFFFFFF
						RAM Informat ion			
C T R L D Y N A M IC I N F O	B a tt e r y a n d l o a d i n f o	0100H	2	R	Battery charged SOC	0～100	Current capacity of battery	%	
		0101H	2	R	Battery Voltage		Battery voltage *0.1	V	
		0102H	2	R	Charging current (flow into battery)		Charging current *0.01	A	
		0103H	2	R	Controller temp		Value of TEMP (b7: symbol bit; b0-b6 temperature value)	℃	
					Battery temp				
		0104H	2	R	Load voltage		Street light voltage *0.1	V	
		0105H	2	R	Load current		Current *0.01	A	
		0106H	2	R	Load power		Actual value	W	
	Solar Panel	0107H	2	R	Solar panel voltage		Solar panel voltage *0.1	V	
		0108H	2	R	solar panel current (flow into controller)		solar panel current*0.01	A	
		0109H	2	R	Charging PWR		Actual value	W	
	LOAD Function	010AH	2	W	Open/turn off light command	0 or 1	1 to turn on light, 0 turn off light	-	
		010BH	2	R	The min. voltage for battery for the day		Min battery voltage *0.1	V	

Hi st or ic al da ta		010CH	2	R	Max battery voltage for day		Max battery voltage *0.1	V	
		010DH	2	R	Charge max current for day		Max charge current*0.01	A	
		010EH	2	R	Max discharged current for day		Max discharged current *0.01	A	
		010FH	2	R	Max charge power for day		Actual value	W	
		0110H	2	R	Min charge power for day		Actual value	W	
		0111H	2	R	# of Amp hours charging		Actual value	AH	
		0112H	2	R	# Ah discharged		Actual value	AH	
		0113H	2	R	Power generation capacity for day		Actual value	Degrees / 1000	
		0114H	2	R	Electricity used same day		Actual value	Degrees/ 1000	
		0115H	2	R	# total running days			days	
		0116H	2	R	Battery is overcharged			-	
		0117H	2	R	Total # of times battery full			-	
		0118H 0119H	4	R	**Total battery charge house**		Actual value	AH	

		011AH 011BH	4	R	Total battery discharge amount			Actual value	AH	
		011CH 011DH	4	R	Cumulative power generation			Actual value	度/1000	
		011EH 011FH	4	R	Accumulated power consumption			Actual value	度/1000	
		0120H	2	R	Street light status	0 or 1	**8 bits high**	b7: 0 indicates streetlight off、 1 streetlight on	–	
					Street light brightness	00～64H		b0～b6: brightness value	%	
					Charging status		低 8 位	00H: charging not on	–	
								01H: start charging		
								02H: mppt charging mode		
								03H: equalization		
								04H: boost charging		
								05H: float charge		
								06H: current limit flow（max power)		
	Controller faults	0121H 0122H	4	R	**Controller failure, alarm info**		**16 bits high**	B31: fan alarm		Example: A corresponding bit of 1 indicates a failure of the corresponding, and a corresponding bit of 0 is a failure for the corresponding item, returning when all are free of failures.
								B30：circuit, charge MOS short circuit		
								B29：Anti-reverse MOS short		
								B28: sun backed		
								B27: solar panel overvoltage		
								B26: PV reverse polarity		
								B25: PV input overload		
								B24: PV Input short		
								B23: PV overpower		
								B22: external temp too hot		
								B21: controller temp too high		
								B20: load power too high Overload overcurrent		
								B19: load short		
								B18: battery undervoltage warning		
								b17: battery undervoltage		

								B16: battery over charge		00000000H
							16 bits lower	B0～b15 keep		

					EEPROM				
Controller parameter setting	Battery parameter set	E001H	2	R/W	Dim command	0000H～0064H (decimal 0～100)	Set streetlight brightness value	%	
		E002H	2	R	Nominal battery capacity			AH	
		E003H	2	R/W	High 8-bit system voltage setting Low 8 Bit: the voltage after recognition		12: 12V; 24: 24V; 36: 36V 48: 48V FF: automatic recognition Other automatic recognition	–	
		E004H	2	R/W	Battery type		Open, sealed, flooded, gel, lithium, user	–	
		E005H	2	R/W	Overvoltage voltage	70～170		V	Set range: (7 to 17) V. Example: The need to set the super. The voltage is. 17.0V and guaranteed. Leave a decimal, Expand the data first. 10 times larger, 17.0V x 10 x 17. 0V, get sixteen. In-system 00AAH, Write the data. Just 0103H.
		E006H	2	R/W	Charge limit voltage	70～170		V	
		E007H	2	R/W	Equalization Voltage	70～170		V	
		E008H	2	R/W	Boost Voltage / Li Boost	70～170		V	
		E009H	2	R/W	Float charge / overcharge return voltage (lithium battery))	70～170		V	

		E00AH	2	R/W	Boost voltage	70～170		V	
		E00BH	2	R/W	Overvoltage return	70～170		V	
		E00CH	2	R/W	Undervoltage warning	70～170		V	
		E00DH	2	R/W	overvoltage	70～170		V	
		E00EH	2	R/W	Discharge limit voltage	70～170		V	
		E00FH	2	R/W	High 8 bits: charge cut off SOC			−	

				LOW 8 BITS: DISCHARGE CUT OFF soc					
		E010H	2	R/W	Over time delay	0~120			S	
		E011H	2	R/W	Equalization time	0～300	Step+10	Min	
		E012H	2	R/W	Boost charge	10～300	Step+10	Min	
		E013H	2	R/W	Equalization interval	0～255	0：关闭，Step+5	day	
		E014H	2	R/W	Temp comp coeff	0～5	0：不补偿，Step+1	mV/℃/2V	
	Load operating time and power setting	E015H	2	R/W	First working time	00H～15H		H	
		E016H	2	R/W	First operating power	0~100		%	
		E017H	2	R/W	Second working time	00H～15H		H	
		E018H	2	R/W	Second operating power	0～100		%	
		E019H	2	R/W	Third working time	00H～15H		H	
		E01AH	2	R/W	Third operating power	0～100		%	
		E01BH	2	R/W	Morning light working hours	00H～15H		H	
		E01CH	2	R/W	Morning light working power	0～100		%	
	Mo de se tt in g	E01DH	2	R/W	Load operating mode	00H	Pure light control, light control on/off load	–	
						01H	Light controlled load closed after 1 hour		
						02H	Light controlled load closed after 2 hours		
						03H	Light controlled load closed after 3 hours		
						04H	Light controlled load closed after 4 hours		
						05H	Light controlled load closed after 5 hours		
						06H	Light controlled load closed after 6 hours		
						07H	Light controlled load closed after 7 hours		
						08H	Light controlled load closed after 8 hours		
						09H	Light controlled load closed after 9 hours		
						0AH (decimal 10)	Light controlled load closed after 10 hours		
						0BH (decimal 11)	Light controlled load closed after 11 hours		

						0CH (decimal 12)	Light controlled load closed after 12 hours		
						0DH (decimal 13)	Light controlled load closed after 13 hours		
						0EH (decimal 14)	Light controlled load closed after 1 hour		
						0FH (decimal 15)	Manual mode		
						10H (decimal 16)	Debug mode		
						11H (decimal 17)	Normal mode		

	Light Control 置	E01EH	2	R/W	Light controlled delay time	0～60		Min	
		E01FH	2	R/W	Optical voltage control	1～40		V	
	LED Power Control	E020H	2	R/W	LED load current settings	N		10mA	(N*10) mA
		E021H	2	R/W	Special Power Control	8 bits high	B3~b7 not used	–	
							b2:1 voltage control charging mode 0 SOC control the charging mode		
							b1:1 turn ON 0 turn OFF		
							b0:1 TURN on lights every night 0 turn off lights every night		
						8 bits low	B3-b7 not used		
							B2: below 0 charging (1: turn on sub-zero Charging function, 0turn off zero charge off function		
							B0-b1: charging method (00: recharge directly, 01: PWM charging method)		
	MES Load operating ti	E022H	2	R/W	Inductive working hours 1	0～15	Step+1	H	
		E023H	2	R/W	Someone senses power 1	0~100	Step+10	%	
		E024H	2	R/W	Unmanned power 1	0~100	Step+10	%	
		E025H	2	R/W	Inductive working hours 2	0～15	Step+1	H	
		E026H	2	R/W	Someone sense power 2	0~100	Step+10	%	
		E027H	2	R/W	Unmanned Power 2	0~100	Step+10	%	
		E028H	2	R/W	Inductive working hours 3	0～15	Step+1	H	
		E029H	2	R/W	Someone sense power 3	0~100	Step+10	%	
		E02AH	2	R/W	Unmanned Power 3	0~100	Step+10	%	

me an d po we r se tt in gs	E02BH	2	R/W	Induction delay time	0~250	Step+10		S	
	E02CH	2	R/W	LED Load current	N			10mA	(N*10) mA
	E02DH	2	R/W	Special power control	高 8 位	B7-B2: not used		–	
						B1: smart power			
						B0: lights on every night			
					低 8 位	B7-B4: type of battery (00: lead acids 01: lithium)			
						B3: charging method (0: PWM charging method			

							1: recharge directly)		
							B2: below 0 charging (0: turn off subzero charge		
							1: turn on subzero charge)		
							B1-B0: system voltage (00:12V battery		
							01:24V battery)		
Set parameters	E02EH	2	R/W	Charge power settings				%	default 0x64
	E02FH	2	R/W	keep					
Historical data records FLASH)									
Historical data	0xF000	2	R	Historical data for the day					The data returned is a block of the data for the number of days the data is to be read the block size is 20 words
	0xF001	2	R	1 data from delay before					