Foshan Jinguangyuan Power Technology Co., Ltd.

controller

MODBUS protocol

Version number: V1.0

2018-08

Revision history:

Version	date	reason
V0.1	2018/10	create documentation

1 Introduction

This document describes that the Modbus protocol of Foshan Jinguangyuan Power Technology is a custom protocol and is suitable for the controller. This agreement refers to

"GBT19582-2008 Industrial Automation Network Specification Based on Modbus Protocol".

2. MODBUS protocol description

2.1 Modbus address rules

Modbus is a master-slave communication mode, the communication is initiated by the master, and the slave corresponding to the address responds. The master has no address, the slave

address range is: 1~247; 0 is the broadcast address. Slave addresses are unique on the Modbus serial bus.

2.2 Modbus protocol frame

Modbus protocol frame is composed of address field, function code, data field and check code.

Table 2.1.1 General Modbus frame

address field	function code	data field	check code

2.3 Transmission mode

2.3.1 Byte format

The byte contains: 1 start bit, 8 data bits (least significant bit is sent first), no parity bit, 1 stop bit, 10 bits in total. Each character or byte is sent in order (left to right): Least Significant Bit

(LSB)...Most Significant Bit (MSB).

Table 2.3.1 Byte order in transfer mode

start bit	data bit								stop bit
1	1	2	3	4	5	6	7	8	1

2.3.2 Message frame

The message frame includes: slave address, function code, control code, data field, checksum.

Table 2.3.2 Message frame

format slave address		function code	control code	data	check
Bytes	1 byte	1 byte	1 byte	N bytes	1 byte

In communication, an idle interval of at least 3.5 character times in length separates message frames. The entire message frame must be sent in a continuous character stream.

If the idle interval between two characters is greater than 1.5 character times, the message frame is considered incomplete and the receiving station should discard the message frame.

Table 2.3.2 Message frame sending sequence

	Modbus message					
start	slave station address function code control code data				check	Finish
ÿ3.5 character time 8 bits 8 bits 8 bits N*8 bits					8 bits	ÿ3.5 character time

2.3.3 Verification

Checksum: All data in the previous data packet except the checksum byte, accumulate and take the low byte.

2.4 Function code

Table 2.5.1 only lists the function codes applied by this protocol

Table 2.4.1 List of function codes

serial number	function code	illustrate	Remark
1	B2H	Read setting parameters	
2	B3H	Read real-time running parameters	

3. Protocol application

The device uses RS232, RS485 as the physical layer interface.

Data signal transmission rate: baud rate: 9600; communication data format: 8, n, 1; checksum: accumulate and take the low byte, and the returned data length of each command is different. ID: 01.

3.1 Host command format

Table 3.1.1 Host command format

serial number (Byte)	Data Name	Numerical Range	Definition	Remarks
0	address	0x01~0xF0	MPPT address	
1	Command type	0XB3	0XB2ÿ Parameter setting command; 0XB3ÿReal time operational data;	
2	Check code	0x01~0xFF 0x01ÿDataÿ		
3	Data1	·	Meaninglessÿfillin0	
4	Data2	·	Meaninglessÿfillin0	
5	Data3	·	Meaninglessÿfillin0	
6	Data4	·	Meaninglessÿfillin0	
7	Check code	0x00~0xFF Byte0+ Byte 1…+ Byte6		Check Sum

3.2 Real-time operation data content

Table 3.2.1 Machine data

No.(Byte)	Data Name Numerical Range		Definition	Remarks
0	address	0x01~0xF0	MPPT address	
1	Command type	0XB3	Query command	
2	Check code	0x01	Data	
3	Operating status	0x00~0xFF	Bit0ÿOperating status	0=Normalÿ1= abnormalÿBattery automatic recognition errorÿ
			Bit1ÿBattery status	0=Normalÿ1= Over discharge protection
			Bit2ÿFan status	0=Normalÿ1= Fan failure
			Bit3ÿTemperature status	0=Normalÿ1= Over temperature protection
			Bit4ÿDC output status	0=Normalÿ1=DC Output short/ Over current protection
			Bit5ÿInternal temperature 1 status	0=Normalÿ1= Fault
			Bit6ÿInternal temperature 2 status 0=Normalÿ1= Fault	
			Bit7ÿExternal temperature 1 status 0=Normalÿ1= Fault	
4	Charging status	0x00~0xFF	Bit 0ÿcharging status 0=stop chargingÿ1=charging	
			Bit 1ÿEqual charge	1effective
			Bit 2ÿtrack	1effective
			Bit 3ÿFloating charge 1effective	
			Bit 4ÿCharging current limit	1effective
			Bit 5ÿCharging derating	1effective
			Bit 6ÿRemote control prohibits charging	1effective
			Bit 7ÿPV Over voltage	1effective

	Control status	0x00~0x07	Bit0ÿCharging output relay	0=closeÿ1=open
			Bit1ÿLoad output	0=closeÿ1=open
			Bit2: fan	0=closeÿ1=open
			Bit3ÿspare	
			Bit4ÿOvercharge protection mark	0=Normalÿ1=Overcharge protection
			Bit5ÿOver voltage protection mark	0=Normalÿ1=Overcharge protection
			Bit6ÿspare	
			Bit7ÿspare	
6	PV voltage		High byte	Take 1 decimal place, such asÿ
7			Low byte	0x0C43=1219ÿmeans PV voltage is 121.9V
8	Battery voltage		High byte	Take 2 decimal place, such asÿ
9			Low byte	0x14FC=5372ÿmeans battery voltage is 53.72V
10	Charge current		High byte	Take 2 decimal place, such as: 0x11E2=4578, means Charge current is 45.78A
11			Low byte	
12	Internal temperature1		High byte	Take 1decimal place, such as: 0x022C=556ÿmeans temperature is 55.6ÿ
13			Low byte	
14	Internal temperature2		High byte	Canceled
15			Low byte	
16	External temperature1		High byte	Format is same with internal temperature1
17			Low byte	
18	Spare			
19	Spare			Don't care
20	Daily power			Power generation data, 4 bytes, high

21	generation			protocol V1.0 byte first, in watts, no Lcd board, this data is invalid
22				
23				
24	Total power			Same as above
25				
26				
27				
28	Spare			Don't care
29	Spare			
30	Spare			
31	Spare			
32	Spare			
33	Spare			
34	Spare			
35	Spare			
36	Check code	0x00~0xFF	Byte0+ Byte 1…+ Byte35	Check Sum