

PBL Series BLDC Driver ModBus Communication

1 Overview

RJ45 terminal is adopted for 485 and CAN ports, and the definition is shown in the following table:

PIN	Signal	description
2	CAN_H	CAN signal high
3	B-	Modbus
6	A+	Modbus
7	CAN_L	CAN signal low
8	GND	GND



Communication transmission is divided into independent information header and transmitted encoded data. The following communication transmission mode definitions are also compatible with ModbusRTU communication protocol:

Baud rate	115200
Start bit	1 bit
Data bit	8 bit
Odd-even bit	1 bit (parity bit)
Stop bit	1 bit
Error checking	CRC (redundant cyclic code)

Each character or byte is sent in this order (from left to right): least significant bit (LSB)
Most significant bit (MSB)

Start	1	2	3	4	5	6	7	8	check	Stop
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RTU mode bit sequence

Initial structure = ≥ 4 bytes of time

Address code = 1 byte

Function code = 1 byte

Data area = n bytes

Error check = 16 bit CRC code

End structure = ≥ 4 bytes of time

Frame description:

Start	Slave address	Function code	Data	CRC	Stop
>4 Character idle time	1 bit	1 bit	1-123 b i t	2 bit	>4 Character idle time

RTU message frame

Address code: the address code is the first byte of communication transmission. This byte indicates that the slave with the address code set by the user will receive the information sent by the host. And each slave has a unique address code, and the response is sent back in start with their respective address codes. The address code sent by the host indicates the address of the slave to be sent, and the address sent by the slave, the code indicates the slave address of the loop back. Note: address “0” is the broadcast address, that is, the address of the communication instruction sent by the host when it is 0, all slaves will receive and respond.

Function code: the second byte of communication transmission. Modbus communication protocol defines function numbers as 1 to 127. The driver uses only part of the function code. The driver responds to the host request as a slave, and the function code sent by the slave is the same as that sent by the slave, and indicates that the slave has responded to the host for operation. If the highest bit of the function code sent by the slave is 1 (for example, the function code is 127), it indicates that the slave does not respond to the operation or sends an error. Data area: the data area is different according to different function codes. The data area can be the actual value, the set point, the address sent by the host to the slave or the slave to the host.

CRC code: two byte error detection code.

2.Function code description

The drive currently only supports some MODBUS function codes

Function code	Description
03H	Read parameters, single or multiple parameters can be read
06H	Modify a single parameter
10H	Modify multiple parameters

2.1 read parameter 03H

explain

ameters, single or multiple parameters can be read

Examples

The slave address is 11H. The start address of the parameter is 006BH and the end address is 006DH. This query has a total of visits, ask multiple parameters.

Communication content sent by host:

	HEX 16
Slave address	11
Function code	03
Parameter address high byte	00
Parameter address low byte	6B
Number of parameters high byte	00
Parameter quantity low byte	03
CRC high byte	76
CRC low byte	87

Communication content replied by slave:

The length of the parameter is 2 bytes. For a single parameter, the high byte data of the parameter is transmitted first and the low word is transmitted later. Between parameters, low address parameters are transmitted first, and high address parameters are transmitted later.

Slave response

	HEX 16
Slave address	11
Function code	03
Number of bytes	6
Data 1 high byte (006BH)	00
Data 1 low byte (006BH)	6B
Data 2 high byte (006CH)	00
Data 2 low byte (006CH)	13
Data 3 high byte (006DH)	00
Data 3 low byte (006DH)	00
CRC high byte	38
CRC low byte	B9

Parameters 006BH to 006DH result

006BH high bit	006BH low bit	006CH high bit	006CH low bit	006DH high bit	

2.2 Modify parameter 06H

explain

Write parameters. Note that the 06H command can only operate parameters, and 10H can set single or multiple parameters.

Examples

The slave address is 11H. The parameter address is 0001H. The parameter content is 0003H.

	HEX 16
Slave address	11
Function code	06
Register address high byte	00
Register address low byte	01
Data 1 high byte	00
Data 1 low byte	01
CRC check high byte	9A
CRC check low byte	9B

Slave response

	HEX 16
Slave address	11
Function code	06
Register address high byte	00
Register address low byte	01
Number of registers high byte	00
Number of registers low byte	01
CRC check high byte	1B
CRC check low byte	5A

2.3 Modify parameter 10H

Explain

Modify multiple parameters

Examples

The slave address is 11H. The start address of the parameter is 0001H and the end address of the parameter is 0002H. Total visits two Parameters. The content of parameter 0001H is 000AH and the content of parameter 0002H is 0102H.

	HEX 16
Slave address	11
Function code	10
Register address high byte	00
Register address low byte	01
Number of registers high byte	00
Number of registers low byte	02
Number of bytes	04
Data 1 high byte	00
Data 1 low byte	0A
Data 2 high byte	01
Data 2 low byte	02
CRC check high byte	C6
CRC check low byte	F0

Slave response

	HEX 16
Slave address	11
Function code	10
Register start address high byte	00
Register start address low byte	01
Number of registers high byte	00
Number of registers low byte	02
CRC check high byte	12
CRC check low byte	98

3.Parameter description

address	description
0	Control command low word BIT0: 0 stop 1 start BIT1: 0 forward 1 reverse
1	Control command high word
2	Motor status low word BIT0: 0 standby 1 run BIT1: 0 forward 1 reverse
3	Motor status high word
4	Alarm status low word
5	Alarm status high word
10	RPM) Actual motor speed (RPM)
11	Bus voltage (V)
12	Analog speed input (MV MV)
20	Hall sensor and bridge arm status, display mode: convert the display value into hexadecimal value and binary value 0 0 0 0 0 0 0 0 0 0 C B A WL WH VL VH UL UH
21	AD channel 0 (analog input original AD value)
22	AD channel 1 (original AD value of V-phase current)
23	AD channel 2 (original AD value of W-phase current)
24	The actual position of the motor is lower by 5 bits
25	The actual position of the motor is higher by 5 bits
26	Command position lower 5 bits
27	Command position higher 5 bits
28	Position error lower 5 bits
29	Position error higher 5 bits

124	Maximum speed
125	Minimum bus voltage
126	Maximum bus voltage
140	Rated current
153	Current loop proportional gain
154	Current loop integral gain
156	The output current of the motor is 6596 / 655, which can limit the output current of the motor; The maximum 65535 is the motor current 4096
176	Low speed detection filtering time MS
177	Low speed deceleration value RPM
186	Rated power
187	Displays the ratio of the average current
188	Bus voltage calculation offset
	Current sampling method:
190	(0) bus current sampling (1) phase current sampling
	Effective level setting in PWM speed regulation mode
195	(0) active low level (1) active high level
200	Display content selection
201	Internal speed
202	Speed command source
	Direction setting
203	0: normal mode 1: reverse direction
	Select start /stop signal source
	0: key control (ENT key controls the start and stop, UP and DOWN keys control the increase and decrease of speed, and RETURN key reverses the moving direction of motor)
	1: External IO control
204	2: Communication command control
205	Motor pole pairs
207	Speed proportional gain
208	Velocity integral gain
209	Acceleration setting, default 1000RPM/S
210	Deceleration setting, default 1000RPM/S
211	Maximum speed of analog input in RPM
214	Restore the default parameters of the system and set them to 1511. It will take effect after power failure.
215	Drive address
219	Display speed filter coefficient

Alarm display	Communication return alarm code	Meaning of alarm code
HE	8	Motor Hall sensor fault alarm
OC	1	Driver over current module alarm
LC	256	Driver over current alarm
HU	16	Driver bus high voltage alarm
ER	1024	Motor locked rotor alarm
OL	2048	Motor overload alarm
OT	8192	Driver overheat alarm
LU	32	Low bus voltage alarm