Peristaltic pump communication protocol

- 1 Interface RS485 interface, Asynchronous half duplex mode Equipment of the initial address 1
- 2 Data format 1 start bit, 8 data bits, 1 stop bit, No parity bit.
- 3 The communication baud rate 9600bps
- 4 Communication protocol MODBUS RTU mode.
- 5 Register description:

Register address	Register function	Register length
0000	Start and stop (read/write)	USHORT（16 bits）
0001	Filling volume (read/write high 16 bits)	FLOAT（high 16 bits）
0002	Filling volume (read/write low 16 bits)	FLOAT（low16 bits）
0003	Stop time （read/write high 16 bits）	FLOAT（high 16 bits）
0004	Stop time（read/write low 16 bits）	FLOAT（low16 bits）
0005	Filling time（read/write high 16 bits）	FLOAT（high 16 bits）
0006	Filling time （read/write low16 bits）	FLOAT（low16 bits）
0007	Filling frequency (read/write)	USHORT（16 bits）
0008	Flow rate (read/write)	FLOAT（high 16 bits）
0009	Flow rate (read/write)	FLOAT（low16 bits）
00010	Pump head（read only）	USHORT（16 bits）
0011	Pump tube（read only）	USHORT（16 bits）
0012	Mode (read only)	USHORT（16 bits）
0013	Direction (read/write)	USHORT（16 bits）
0014	Full speed (read/write)	USHORT（16 bits）
0015	Suction speed (read/write)	USHORT（16 bits）
0016	Suction angle (read/write)	USHORT（16 bits）
0019	External control output settings (read/write)	USHORT（16 bits）
0020	Calibration amount (high 16 bits)	FLOAT（high 16 bits）
0021	Calibration amount (low 16 bits）	FLOAT（low16 bits）
0022	Actual amount（high 16 bits）	FLOAT（high 16 bits）
0023	Actual amount（low16 bits）	FLOAT（low 16 bits）
0252	The current K value（read only）	FLOAT（high 16 bits）
0253	The current K value（read only）	FLOAT（low 16 bits）
0254	485 state， 0 can not be set， 1 can be set, 3 has enabled	USHORT（16 bits）

- 6 Frame format

USHORT Data format

Device address	Function code	Data address		Data（USHORT）		CRC16 proof test value	
	0x06	Data address H	Data address L	Data H	Data L	CRC H	CRC L

FLOAT Data format

Device address	Function code	Data address		The number of registers	The number of byte	Data（FLOAT）				CRC16 proof test value	
	0x10	Data address H	Data address L	0x02	0x04	H1	H2	L1	L2	CRC H	CRC L

Device address：A byte address, 1~31, 0 is the broadcast address.

Function: One byte. 04 for the query operation; and 06 for set operation.

The starting address is: two bytes of address, high in the front, low in the post.

Data: two bytes of data, high in the front, low in the post.

Noted：Enable 485 01 06 00 FE 00 03 A8 3B

Pump head and tube mode cannot be changed through 485. It needs to be calibrated in time once pump head or tubing was displaced. So this should be changed on the spot.

1. Start/Stop

   Data address is 00 00

   Data: 00 01 is start 0000 is stop

   Start: 01 06 00 00 00 01 48 0A

   Stop: 01 06 00 00 00 00 89 CA

2. Set the filling volume

   Data address: Fixed 00 01

   Data： Required liquid filling volume

   For example: Set the filling amount for the address 01 peristaltic pump to 8.9

   01 10 00 01 00 02 04 41 0E 66 66 EC 16

   The EC16 is the CRC16's calculation results.

3. Set the stop time

   Date address: Fixed 00 03

   Data: Set the stop time is 5.6.

   For example: Set the stopping time for the address 01 peristaltic pump to 2

   01 10 00 03 00 02 04 40 B3 33 33 03 78

4. Set the filling time

   Data address fixed 00 05

   Data: Set the needed filling time is 65.9.

   For example: Set the filling time of the peristaltic pump at 01 address to 65.9.

   01 10 00 05 00 02 04 42 83 CC CD 42 95

5. Set the filling number.

   Data address Fixed 00 07

   Data: Filling number

   For example: Set the address 01 peristaltic pump filling 8 times.

   01 06 00 07 00 08 39 CD

6. Set the flow rate

Data address: Fixed 00 08

Data: The value in the flow rate range

For example: Set the flow rate is 2.

01 10 00 08 00 02 04 40 B3 33 33 42 CB

7. Set the direction

Data address: Fixed 00 0D

Data: Set the direction of the pump

For example Set the address 01's pump is left

01 06 00 0D 00 01 D9 C9

For example: Set the address 01's pump is right

01 06 00 0D 00 00 18 09

8. Set the full speed

Data address fixed 00 0E

For example: Set the address 01's pump start full speed.

01 06 00 0E 00 01 D9 C9

For example: Set the address 01's pump stop full speed.

01 06 00 0E 00 00 18 09

9. Set the suction speed

Data address: 00 0F

For example: Set the suction speed is 10 rpm

01 06 00 0F 00 0A 39 CE

10. Set the suction angle

Data address: 00 10

For example: Set the suction angle is 10 degree

01 06 00 10 00 0A 08 08

11. Set the external output

Date address 0013

01 06 00 13 00 0A 08 08

NO	NO	NO	NO	NO	NO	NO	Signal type	Speed	No bottle No work	Direction	Start/stop	0-10 KHz	4-20 mA	0-10V	0-5V

Note: 1 is effective, **when the instruction is issued, device returns response information is as follows (USHORT DATA) respond**

Address 1 byte

Function code 1 byte **0x06**

Register address: 2 bytes 0x0000 to 0xFFFF
Register Value 2 bytes 0x0000 to 0xFFFF
CRC value 2 bytes

(FLOAT DATA) respond

Address 1byte
Can code 1 byte **0x10**
Register address 2 bytes 0x0000 to 0xFFFF
Register Value 2 bytes 0x0002
CRC value 2 bytes

◆ 7 Query parameters

Run parameter transmission frame format

Device address	Function Code	Data address		Data bulk		CRC16 proof test value	
	0x03	Data address H	Data address L	Data H	Data L	CRC H	CRC L

Query parameters, enter the address according to the requirements in 1-255, 0 is the broadcast address. Function code is fixed 0X03.

Query parameters returned a frame format

Device address	Function Code	Returns a count data	Data*2		CRC16 proof test value	
	0x03	a count data	Data H	Data L	CRC H	CRC L

Returns to the data number, shaping for 1 number, and the floating-point types are 2 numbers. For example: Query the filling volume.

Data address：Fixed 00 01, Data 01，means the number of query data

01 03 00 01 00 06 94 08 is to query the 6 pcs 16 bytes data with address start from 0001.

◆ 8 Abnormal response

Frame format

Device address	Function code	Fault code	CRC16 proof test value	
			CRC H	CRC L

Function code: normal response, response function from machine code, function code with the original query. The most high of the function code is 0 (the value below 80H). Abnormal response, from the machine to high function code is set to 1, so that the function of the code value is greater than 80H, higher than normal value of the response. In this way, the host application can identify the abnormal response to the incident; can check the abnormal code data.

◆ Fault code: 01, the function code error. 02, the data address error. 03, the data error. 04, write register failed.

◆ 9 Calibration process, for example:

Suggestions: setting the parameters of the normal operation before correction. If the running time of the normal use was not too long, calibration liquid flow quantity suggest using the

normal operation flow rate. But if it was great error correction, suggest calibrating at least two times.

First step **01 10 00 14 00 02 04 40 C0 00 00 E6 AC** Set up calibration solution at 6ml. (liquid used at normal operation of the normal use)

Second step **01 10 00 16 00 02 04 40 D0 00 00 66 B0** Send the measured liquid 6.5ml to complete the calibration.

10 When set the Pump head/Pump tube/Mode, to send the highest position 1 plus 32768 when the pump is in stopping state, then it can be set successfully. For example, set the pump head for no. 2 order: **01 06 00 0A** 80 **02 49 C9.**

Set the pump tube **01 06 00 0B 80 03 D9 C9.** Set the mode order: **01 06 00 0C 80** 02 **A9 C8.**

In the order when the highest position of the high byte is 1 then it can set the low byte to the required value.

11 External control base pin definition.

2 pin： RS485 interface A.

3 pin： GND.

9 pin： RS485 interface B.

External control plug. Blue line RS485 interface A. Red line RS485 interface B. Black line GND.

When connect with the RS485 converter, to connect the red line and green line of the extro control plug respectively with the corresponding A and B of RS485.

Note: as far as possible in the complete RS485 physical connection, then boot communication.


0~5V
8
0~10khz
7
GND
6
DIRECTION
5
START/
STOP2
4
GND
3
485A
2
GND
1
15
0~10V
14
4~20mA
13
GND
12
ENABLE
11
START/
STOP1
10
GND
9
485B