

Communication protocols nXt pro plus

Internet of Things Communication Protocol

1. Communication interface

- a. RS485,
- b. baud rate 9600bps,
- c. 1 start bit, 8 data bits, no parity, 1 stop bit.

2. Connection configuration

- a. White wire A (RS485+),
- b. Red wire B (RS485-),
- c. Yellow wire is the ground wire.

3. The communication protocol is a subset of the MODBUS protocol.

- a. This machine is a slave, and the communication protocol address is 0x01 (can be set).

4. Communication information:

- a. address code - Function Code - the data segment - CRC checksum, a message is continuously transmitted and received, a character spacing cannot exceed the MS, or that the start or end of a new message and old message. The message body consists of hexadecimal numbers.

5. Data Structure:

- a. integer type - floating point type, in line with IEEE754 standard.
- b. a single or a plurality of registers support simultaneous read.

6. Communication command format:

Host sends query message: readable and writable register.

Offset	value	Comment
0	01	address
1	03	Read register function code
2	addr_H	Register address high
3	addr_L	Register address low
4	num_H	High register number
5	num_L	Low register number
6	CRC_L	CRC check code low bit
7	CRC_H	CRC check code high bit

Slave machine reply message:

Offset	value	Comment
0	01	address
1	03	Read register function code
2	N	Number of bytes
3	data1	Data 1
4	data2	Data 2
5	data3	Data 3
6	data4	Data 4
7 + N - 4	CRC_L	CRC check code low bit
8 + N - 4	CRC_H	CRC check code high bit

Protocol registers address table:

Register address	Register definition	Data length (bytes)	type of data
1	RAM state	2	16 unsigned integer
2	Working power	2	16 unsigned integer
3	F1 starting pressure	4	32 -bit floating point
5	F2 start pressure	4	32 -bit floating point
7	F2 shutdown pressure	4	32 -bit floating point
9	Start pressure difference	4	32 -bit floating point
11	Stop pressure difference	4	32 -bit floating point
13	Water shortage setting	4	32 -bit floating point
15	A pump enable	2	16 unsigned integer
16	B pump enable	2	16 unsigned integer
17	Overload current setting	4	32 -bit floating point
19	No-load current setting	4	32 -bit floating point
twenty one	AB switching time	2	16 unsigned integer
twenty two	Running pump	2	16 unsigned integer
twenty three	Spare pump	2	16 unsigned integer
twenty four	Power on/off state	2	16 unsigned integer
25	Operating mode	2	16 unsigned integer

ost sends query message: read-only register (status)

Offset	value	Comment
0	01	address
1	0 4	Read register function code
2	addr_H	Register address high
3	addr_L	Register address low
4	num_H	High register number
5	num_L	Low register number
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Slave machine reply message :

Offset	value	Comment
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7 + N - 4	CRC_L	CRC check code low bit
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Protocol register address table:

Register address	Register definition	Data length (bytes)	type of data
1	Running clock	2	16 unsigned integer
2	Running status, including pump	2	16 unsigned integer

	running status, alarm status		
3	Pipeline water pressure	4	32 -bit floating point
5	Working current	4	32 -bit floating point
7	5V power supply value	4	32 -bit floating point
9 -18	Reserved	2	
19	equipment name	4	16 unsigned integer
20	Instrument model	4	16 unsigned integer
twenty one	Pump power	2	16 unsigned integer
twenty two	Pump head	2	16 unsigned integer
twenty three	Operating Voltage	2	16 unsigned integer
twenty four	working frequency	2	16 unsigned integer
25	Controller factory number 1	4	32 -bit unsigned integer
27	Controller factory number 2	4	32 -bit unsigned integer
29	Software version	4	32 -bit unsigned integer
31	hardware version	4	32 -bit unsigned integer

Note:

- 1) The register is 16 bits, 16 -bit unsigned integer occupies one register, 32 -bit unsigned integer and floating-point number occupies two registers.
- 2) The relationship between the number of bytes N of the response message and the number of registers num in the query message : $N = \text{num} * 2$, (num > 0).
- 3) Running status, (register address 2) including

uint16_t power_on:1	/*!< bit: 0 switch state */
uint16_t have_FLOW:1	/*!< bit: 1 water flow state */
uint16_t pump_A:1	/*!< bit: Is the 4 A pump running */
uint16_t pump_B:1	/*!< bit: 5 Whether pump B is running */
uint16_t Warning_LOL:1	/*!< bit: 6 alarm status , water shortage */
uint16_t Warning_PE:1	/*!< bit: 7 alarm status , sensor alarm */
uint16_t Warning_UL:1	/*!< bit: 8 alarm state , idling */
uint16_t Warning_OL:1	/*!< bit: 9 alarm status , overload */
uint16_t Warning_OP:1	/*!< bit: 7 alarm status , overvoltage */

- 4) 1: There is an alarm or is running, 0 : No alarm or is not running
- 5) Test software suggestion, Modbus Poll

