SUCH

Product Agreement

Embedded Micro Differential Pressure Transmitter/Controller

Agreement Description (limited to RS485 signal output, the address is 01 by default, and the data is hexadecimal)

Basic technical parameters of transmitter

This protocol complies with the Modbus communication protocol and adopts the subset RTU method in the Modbus protocol RS485 half duplex working mode

a) Output signal: RS485 (distance up to 1000 meters. Can connect up to 32 channels)
b) Standard Modbus RTU protocol (03 function reads data, 06 function writes settings data)
c) Data format: 9600, N, 8,1 (9600bps, no checksum, 8-bit data bits, 1-bit stop)
d) Measurement range: 0-X (MPa, kPa...)
e) Resolution: 0.05%
f) Output data: 0... 2000 (customized for other ranges)
g) Response frequency: ≤ 5Hz
h) Response speed: ≥ 10ms

Modbus RTU Read Data 03 Command Description

	Device address	Function code	Data address	Number of read data	16crc code (low front high rear)
Host command	Address	03	00 00	CN	CRC0 CRC1
	Device address	Function code	Data byte	Sensor data	16crc code (low front high rear)
Host command	Address	03	02*CN	S_HN ,S_LN	CRC0 CRC1

Examples of Communication

Set the communication device address of the 0-1kPa sensor to 01, i.e.
[Address]=01 (Address range 01-254); At this point, CRC0=84 and CRC1=0A.
So the sending and returning data are as follows:
Sent: 01 03 00 00 00 01 84 0A
Return: 01 03 02 AC B9 59
02AC is hexadecimal, converted to decimal as 684;
Data output: 0-2000 corresponds to 0-1kPa, so the current pressure is P=1 * 684/2000=0.342kPa

Calculation formula: (upper range - lower range) ÷ 2000 * current data + lower range = current pressure value

Query example

Reading the current device address can only be completed independently by a single offline sensor
Send FF 03 00 0f 00 01 A1 D7 return FF 03 02 00 01 50 50
Then: the address of this device is 01 (hexadecimal)

Detailed description of Modbus RTU write 06 command

	Device address	Function code	Data address	new address	16crc code (low front high rear)
Host command	Address	06	00 0F	H L	CRC0 CRC1
	Device address	Function code	Data address	new address	16crc code (low front high rear)
Host command	Address	06	00 0F	H L	CRC0 CRC1

Modification example

If the 01 address is changed to 09 address:
Send 01 06 00 0f 00 09 79 CF return 01 06 00 0f 00 09 79 CF
Then the original address 01 is changed to 09 successfully. The modified address can be modified offline or online. After completion, it can work directly without power on again.

Precautions

☞ a) A single RS485 bus must adopt the "hand in hand" bus structure, and do not use star connection or fork connection. The address code is set from near to far, that is, the management computer is connected to controller 1, 2 to 1, 3 to 2, and so on
⚠ Warning!
b) The AC power supplied by the equipment and the chassis must be truly grounded and well grounded. There are triangle sockets on the surface in many places, but they are not grounded at all. Be careful. When the grounding is good, it can ensure that the energy can be released well in coordination with the lightning protection design of the equipment to protect the RS485 bus equipment and related chips from damage when the equipment is subjected to lightning surge impact ☞ static accumulation. If the grounding is not well connected or not connected, do not use the RS485 bus to avoid equipment burning and casualties.
☞ c) Wire must be multi strand shielded twisted pair network cable with wire diameter of more than 0.3 mm2 (multi strand is for standby). PVC pipe shall be applied separately to avoid walking together with strong current to avoid its interference.
☞ d) 485 (A) and 485 (B) must be twisted pair to each other, because 485 communication adopts differential mode communication principle, and twisted pair has good anti-interference performance. It is wrong not to use twisted pair, and other types of cables must be avoided.
☞ e) Serial RS485 converter and reference GND (negative power supply) of all access controllers, and use one or all of the remaining twisted pair network cables for serial GND; The reference ground is not well connected, which also affects the communication time and time. The common mode effect is mainly caused by the high-frequency radiation from distributed capacitors and inductors.
☞ f) The shielding layer of the network communication line is connected to the ground. Attention must be paid to grounding, otherwise the bus is potentially unknown.
☞ g) If multiple slaves or connecting lines are too long and communication is not smooth, 120 ohm matching resistors shall be added between 485 (A) and 485 (B) of a slave at the head end and the end of the 485 bus respectively to improve communication quality. (Must be twisted pair)
h) The transmission rate, the number of load nodes and the transmission distance shall be reasonably arranged to achieve the principle of few remote low-speed nodes and multiple short-range high-speed nodes.
i) Data communication must have verification to protect transmission correctness. Generally, Modbus RTU uses crc-16 verification mode to verify, and the error rate is less than 1/10 billion.
j) If necessary, the isolation type 485 of our company will be selected, and the general price will be higher.