DR3453 Pressure and Temperature Integrated Transmitter

--MODBUS-RTU Communication Protocol

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Overview

This protocol complies with the MODBUS communication protocol, and adopts the subset RTU mode in the MODBUS protocol and RS485 half-duplex working mode.

Serial Data Format:

Serial port settings: none/odd/even parity, 8 bits data, 1 stop bit.
Example: 9600, N, 8, 1 Meaning: 9600bps, no parity, 8 bits data, 1 stop bit.
The serial port baud rate supported by this transmitter is:
1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
CRC check polynomial: 0xA001.
The communication protocol can transmit signed integers and floating-point data.

Communication Format:

1.Signed integer output:
A. Send read command format:

Address	Function Code	Data Start (H)	Data Start (L)	Number of Data (H)	Number of Data (L)	CRC16 (L)	CRC16 (H)
0X01	0X03	0X00	0X00	0X00	0X01	0X84	0X0A

B. Return read data format: example

Address	Function Code	Data length	Data (H)	Data (L)	CRC16 (L)	CRC16 (H)
0X01	0X03	0X02	0X00	0X01	0X79	0X84

2. Write command format (06 function code): example

Address	Function Code	Data Start (H)	Data Start (L)	Data (H)	Data (L)	CRC16 (L)	CRC16 (H)
0X01	0X06	0X00	0X00	0X00	0X02	0X08	0X0B

B. Return read data format: example

Address	Function Code	Data Start (H)	Data Start (L)	Data (H)	Data (L)	CRC16 (L)	CRC16 (H)
0X01	0X06	0X00	0X00	0X00	0X02	0X08	0X0B

3. Abnormal response returned:

Address	Function Code	Error Code	CRC16 (L)	CRC16 (H)
0X01	0X80+ Function Code	0x01 (illegal function) 0x02 (illegal data address) 0x03 (illegal data)		

Integer supported commands and the meaning of commands and data:

Function Code	Data Offset (Decimal)	Number of data	Byte	Data Range	Command Meaning
0x03 Function code to read data					
Integer reading range					
0x03	0	1	2	1-255	Read slave address
0x03	1	1	2	0-1200 1-2400 2-4800 3-9600 4-19200 5-38400 6-57600 7-115200	Baud rate read
0x03	2	1	2	0- NO Parity 1- ODD 2- EVEN	0- no parity 1- odd parity 2- even parity
0x03	3	1	2	0- Kpa 1- Mpa 2- Ma 3- % 4- Inh2o 5- Fth2o 6- MmH2O 7- MmHg 8- PSI 9- Bar 10- Mbar 11- g/cm2 12- Kg/cm2 13- Pa 14- Torr 15- Atm 16- NULL 17- M 18- Cm 19- Mm 20- inHg 21- mHg 22- Mh2O 23- ℃	Pressure unit
0x03	4	1	2	0-#### 1-###.#	The decimal point represents 0-4

				2-##.## 3-#.### 4-#.####	decimal places, and the position of the decimal point can adjust the display resolution.
0X03	5	1	2	0-30	Filter coefficient
0x03	6				
End of the list of integer data need by users					
Floating point reading range					
Function Code (hexadecimal)	Offset Address (decimal)	Word number	Bytes	Data Range	Remarks
0x03	22-23	2	4	4-byte floating point number	Pressure measurement value
0x03	24-25	2	4	4-byte floating point number	Pressure main variable offset value
0x03	26-27	2	4	4-byte floating point number	Low point of pressure transmission range
0x03	28-29	2	4	4-byte floating point number	High point of pressure transmission range
0x03	30-31	2	4	4-byte floating point number	Pressure sensor range low point
0x03	32-33	2	4	4-byte floating point number	Pressure sensor range high point
0x03	38-39	2	4	4-byte floating point number	PT100 temperature measurement value
0x03	42-43	2	4	0-1.00000	Pressure main variable gain coefficient
0x03	166-167	2	4	4-byte floating point number	Zero pressure reset value
0x03	217-218	2	4	4-byte floating point number	Temperature zero offset value
0x03	219-220	2	4	4-byte floating point number	Temperature sensitivity gain value
The above is the range of data read by floating point numbers					

0x06 Function code writing data					
0x06/0x10	0	1	2	1-255	Rewrite the slave address
0x06/0x10	1	1	2	0-1200 1-2400 2-4800 3-9600 4-19200 5-38400 6-57600 7-115200	Modify Baud Rate
0x06/0x10	2	1	2	0- No verification 1- ODD 2- EVEN	Modify communication verification method
0x06/0x10	24-25	2	4	4-byte floating point number	Zero offset value. Pressure output value=calibrated measurement value +zero offset value
0x06/0x10	166-167	2	4	4-byte floating point number	Pressure zero reset value
0x06/0x10	217-218	2	4	4-byte floating point number	Temperature zero offset value
0x06/0x10	219-220	2	4	4-byte floating point number	Temperature sensitivity gain value
Save					
0x06	65535	1	2	0- Save to user area	If this address is set to 0, the data will be saved to the user area after power failure. If the save command is not sent, the modified data will be lost due to power down.
0x06	65533	1	2	Password Service Area	Address, verification, and baud rate modification do not require a password.

					Other data modifications must first be written to this address data 0x1234 before modification is allowed.
0x06	65532	1	2	0- Return to factory calibration status	The user can restore the factory data by writing this address as 0. This is a complete data recovery, and both the user set data and calibration data will be restored to the factory state.

For the transmission of floating-point numbers, please refer to the MODBUS-RTU protocol's provisions on the transmission of multi byte floating point numbers.

Example:

1) Reading pressure command: (hex)
Tx:01 03 00 16 00 02 25 CF
01 slave address, 03 function code, 00 16 offset address, 00 02 number of words read.
Rx:01 03 04 BE 40 E6 12 15 A2
01 slave address, 03 function code, 04 bytes number, BE 40 E6 12 is the floating-point number of IEE754.

2) Read temperature command:
Tx:01 03 00 26 00 02 25 CF

Pay attention to distinguishing the data base in the protocol, such as offset address 22 (decimal), represented by 16 in hexadecimal, and pay attention to distinguishing this difference.