Wireless Modem

User Manual

E820-AIO is the analog signal collection product designed by Ebyte. With RS485 communication network, E820-AIO transmits the analog signal of scattered field data point via AD transformation to master or control remote home site via the PC. Built-in watch dog (0.2s reset), the system won't be halted easily. E820-AIO analog acquisition module features measurement data collection, measured data collection, device switch status collection etc, mainly used for the data collection, controlling and device display of various measurement and control terminal, suitable for the automation and information systems in various industries.
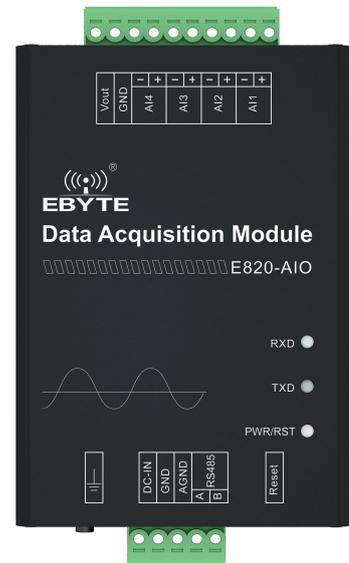
Features

- Wide working temperature range: working at -40℃ ~ +65℃, suitable for harsh working environment.
- Non directional design of input power: This can avoid misconnection and over connection damage, increasing the reliability.
- Modbus protocol: Q&A communication, easy to use and featuring cheap hardware and strong universal property.
- High acquisition accuracy: it's 0.1%FS.
- All aluminum alloy shell: Good EMS performance, compact size, easy installation and good heat dissipation.
- Watch dog: This can conduct the precise time layout. Once any exception occurs, the module will restart in 0.2s and continue to work as previous parameters.

1. Electrical Parameters

1.1 E820-AIO（II-485-4-20）

No	Parameter Name	Parameter value	Description
1	Size	108 * 75 *37mm	Pressing line interface is not included.
2	Average weight	226g	Pressing line interface is not included.
3	Input signal type	0—20mA	Analog signal input range.
4	Acquisition channel	4 channel input	4 channel Single-ended input of analog signal.

5	Acquisition rate	Full channel 10Hz	Acquisition rate for analog signal.
6	Interface	RS485: 1 * 5 * 3.81 mm	Line pressing
7	Supply voltage	5 ~ 36V DC	Note: The module will be destroyed if the voltage is higher than 36V.
8	Working current	12V/50mA	5V/90mA, 12V/50mA, 24V/30mA, 36V/20mA(The over 100mA output current is recommended when the output power is not used).
9	Communication level	RS485	RS485
10	Communication address	1-247	1-247 can be configurable, the default is 1.
11	Acquisition accuracy	0.1%FS	Accuracy of analog signal collection.
12	Baud rate	Default: 9600	It can be configured from 1200~115200.
13	Working temperature	-40℃ ~ +65℃	Industrial grade.
14	Isolation protection	3000vDC	Lightening strike, Surge protection.

1.2 Series products

Model Number	Interface	Signal type	Acquisition accuracy	Analog channel	Protection level VDC	Size
E820-AIO (II-485-4-20)	RS485	0-20mA	0.1%FS	4	3000	82*84.25

1.3 FAQ

| No.	Questions	Description
1	Change baud rate	When using the upper computer, users need to close the upper computer first and reopen after changing the baud rate.
2	Forget the device address	Users can use 03 command to read FF monitoring.

1.4 Notice

No.	Notice	Description

| 1	Communication connection	In connecting with other RS485 device, users need to pay attention to the match of A, B line and add 120R matching resistance.
2	Input voltage	Only DC power supply is available, and the DC input voltage should be 10-28V The device won't work when lower than 10V, while the device will be destroyed when higher than 28V,
3	Output power supply	The positive and negative directions of output power is same with the input power. See more details in Pin definition.
4	Analog input interface	The collection signal is 0-20Ma/0-5V, so user do not input the exceed nominal measured value, or it may cause damage.
5	Waterproof	The device is not waterproof, please do not get the device wet, or it will be damaged.

2. Function Description

2.1 Pin definition
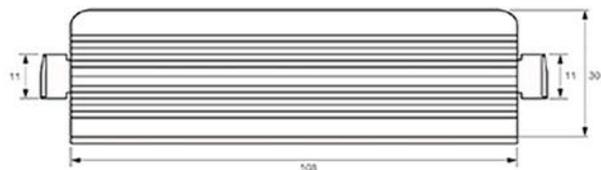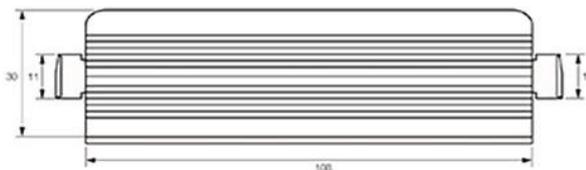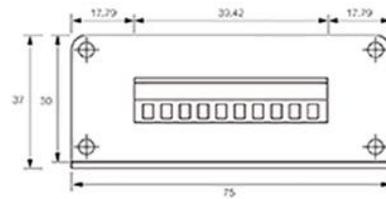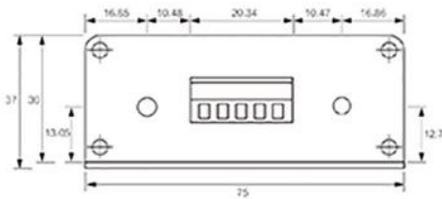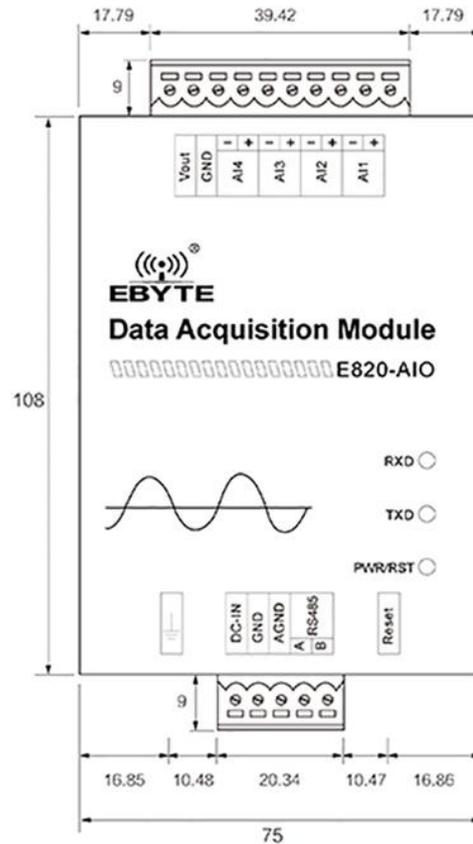
Pin	Definition	Function	Description

1	DC-IN	Pressing line power input positive	Power input, range: DC10-28V. 12V, and 24V are recommended.
2	GND	Pressing line power input negative	Power supply GND.
3	AGND	Communication common ground	When communicating with RS485, the DTU won't be used, while when communicating with RS232, it will be grounded.
4	RS485_A	Interface A of RS-485	Interface A of RS-485 connected to Device A.
5	RS485_B	Interface B of RS-485	Interface B of RS-485 connected to Device B.
6	AI1+	Analog signal input channel 1 positive	Input pin of analog signal forms the input with the GND1 pin.
7	AI1-	Analog signal input channel 1 negative	To be used in pairs with VI1+.
8	AI2+	Analog signal input channel 2 positive	Input pin of analog signal, forms the input with the GND2 pin.
9	AI2-	Analog signal input channel 2 negative	To be used in pairs with VI2+.
10	AI3+	Analog signal input channel 3 positive	Input pin of analog signal, forms the input with the GND3 pin.
11	AI3-	Analog signal input channel 3 negative	To be used in pairs with VI3+.
12	AI4+	Analog signal input channel 4 positive	Input pin of analog signal forms the input with the GND4 pin.
13	AI4-	Analog signal input channel 4 negative	To be used in pairs with VI4+.
14	GND	Power supply output negative	The negative internal of power supply connected to pin 2 GND.
15	Vout	Power supply output positive	Power supply output, the voltage is decided by the pin 1(internal connecting to pin 1).
16	reset	reset	Long press to reset the equipment parameters to factory settings. Reset success L1 and L2 indicator lights flash once
17	Earthing pole	Earthing pole	

2.2 Connection method

2.2.1 RS485 connection method
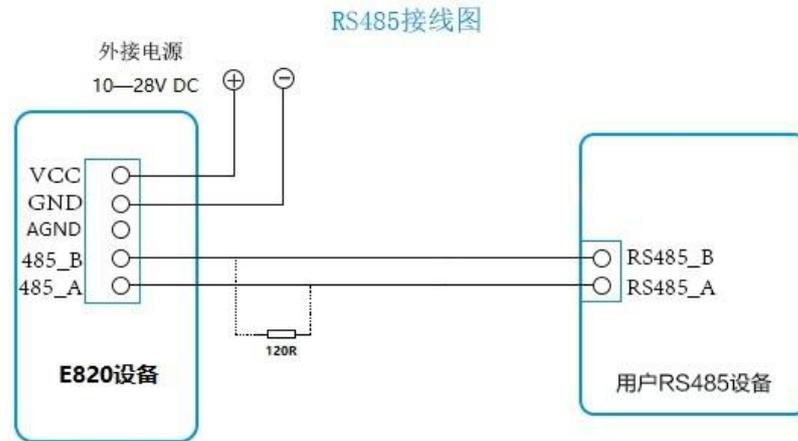
3. Register configuration table

3.1 ModBus address table

40001—40012、40017—40028、40042—40049 is not used in this device.

ModBus register address table				
Address	Byte	variable names	Type	Description
30013	2	AI4 input	Read only	Unit 0.001mA/0.001V
30014	2	AI3 input	Read only	
30015	2	AI2 input	Read only	
30016	2	AI1 input	Read only	
40029	2	reference voltage for channel 1	Read/write	Default 2400, Max. 3300, Min 2000, Unit 0.001V
40030	2	reference voltage for channel 2	Read/write	
40031	2	reference voltage for channel 3	Read/write	
40032	2	reference voltage for channel 4	Read/write	
40033	2	ModBus address	Read/write	1-250 (0xff is the monitoring address)

40034	2	Baud rate	Read/write	see more in baud rate table
40035	2	parity bit	Read/write	see more in parity bit table
40036	2	Lower limit register	Read/write	0-65535 (Lower limit register must be less than the Upper limit register . After the configuration, channel 1-4 will be the range of upper and lower limits.
40037	2	Upper limit register	Read/write	
40038	2	Conversion value for channel 1	Read only	The original data value transformed by the analog quantity of channel 1
40039	2	Conversion value for channel 2	Read only	The original data value transformed by the analog quantity of channel 2
40040	2	Conversion value for channel 3	Read only	The original data value transformed by the analog quantity of channel 3
40041	2	Conversion value for channel 3	Read only	The original data value transformed by the analog quantity of channel 4

3.2 Baud rate code table

Baud rate code table	
0	1200
1	2400
2	4800
3 (default)	9600
4	19200
5	38400
6	57600
7	1152200

3.3 Parity bit code table

Parity bit code table	
0 (default)	No parity
1	Even parity
2	Odd parity

4. Instruction format

4.1 Input "03" to read the command of single register

Users input" 03" to read the command of register value. Below is the command to read the value of baud rate:

01	03	00 21	00 01	D4 00
ModBus Address	To read command	To read the address of register	To read the length of register	CRC parity code

Send above command via the serial assistant to module, then below value will be returned:

01	03	02	00 03	F8 48
ModBus Address	To read command	To read the return bytes	The value of 40034 is 3, which means the baud rate is 9600, see more details in baud rate value table.	CRC parity code

Note: With the known baud rate, to use FF monitoring address can read the unremembered register value,

Such as, send FF 03 00 21 00 01 c1de to read the address of device. CRC parity check code can be calculated by

CRC16 system, the assistant software can be downloaded in official website.

4.2 Input "03" to read the command of multiple registers

Users input" 03" to read the command of register value. Below is the command to read the address of 40034 to 40036:

01	03	00 21	00 03	55 C1
ModBus address	To read command	To read the address of register	To read the length of register	CRC parity code

Send above command via the serial assistant to module, then below value will be returned:

01	03	06	00 03	00 00	00 00	65 75
ModBus address	To read command	To read the return bytes	The value of 40034 is 3, which means the baud rate is 9600, see more details in baud	The value of 40035 is 0, the parity bit of device is no parity, see more details in parity	The value of 40036 is 0	CRC parity code

			rate value table.	check code table.		

4.3 Input "06" to write the command of register

Input "06" to write single command, below is the command to change the baud rate as 19200:

| 01	06	00 21	00 04	D8 03
ModBus address	To write command	Write in 40034 register	The write value of 40034 is 4, the corresponding baud rate is 19200, see more details in baud rate table	CRC parity code

If the revision is successful, module will return 01 06 00 21 00 04 d803.

4.4 Factory default value

Device address	Baud rate	Voltage for reference	Parity check code
40033 address is 1	9600, that is, 40034 address is 3	2400	No parity check: 40035 address is 0

5. Software instructions

5.1.MoBusCRC16 calculator
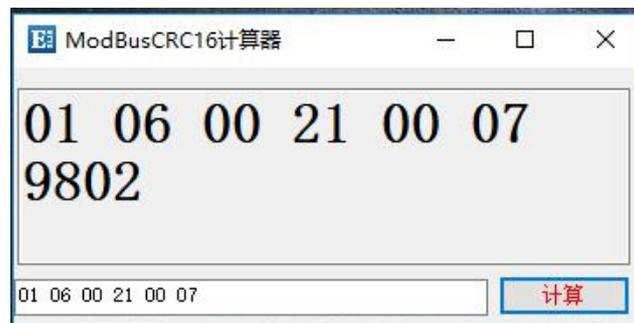
Ebyte will provide the MoBusCRC16 calculator for your convenience, which will automatically add the CRC16 parity check code after the input data. Please pay attention to the format, if it's less than f, then should add 0 in the front, such as 01, 06, and each digit should followed by a blank.

5.2.E820 testing software

In the upper monitor software, the start address of register is set in the address column, the length should be from start address to end address. For example, address is 1, which means to read from 40001. The length of 49 should read 49 registers from 40001-40049. Analog quantity input(1,2,3,4) should be the real current value input by the current channel. Channel (1,2,3,4) conversion value shows that the analog signal of current channel converted to the original value after collection.

6. Important Statement

1. CDEBYTE reserves the right of final interpretation and modification of all the contents in this manual.

2. As the hardware and software products continuously improving, this manual may subject to change without notice, please refer to the latest version.

3. Users who use this product need to pay attention to the product dynamics on the official website so that users can get the latest information of this product in time.

7. About Us

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