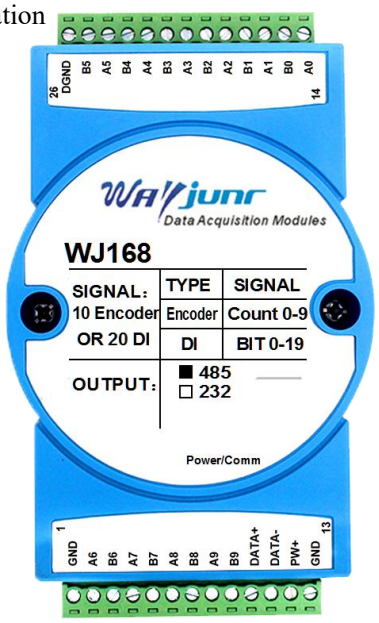
10 encoder pulse counters or 20 DI high-speed counters, Modbus RTU module

WJ168

Product features:

●Encoder count and speed conversion to Modbus RTU protocol
● Supports simultaneous counting of 10 encoders and can recognize forward and reverse rotation
● It can also be set as a 20 channel independent DI high-speed counter
●The encoder count value supports automatic power-off saving
●DI input supports PNP and NPN inputs
●The filtering time can be set when inputting relays and mechanical switches
● Reset and set count values through RS-485/232 interface
●Wide power supply range: 8~32VDC
●High reliability, easy programming, and easy application
●Standard DIN35 rail installation, convenient for centralized wiring
● Users can program module addresses, baud rates, etc
● Dimensions: 120mm x 70mm x 43mm



WJ168

Typical applications:

●Encoder pulse signal measurement
● Flow meter pulse counting or flow measurement
● Counting of products on the production line
● Logistics package quantity counting
● Measurement of proximity switch pulse signal
●The encoder signal is transmitted remotely to the industrial computer
●Intelligent factory and industrial Internet of Things
● Replace PLC to directly transmit data to the control center

Product Overview:

The WJ168 product realizes signal acquisition between sensors and hosts, used to decode encoder signals. The WJ168 series products can be applied to industrial automation control systems, automated machine tools, industrial robots, three coordinate positioning systems, displacement measurement, stroke measurement, angle measurement, speed measurement, flow measurement, product counting, and more.

The product includes signal acquisition, pulse signal capture, signal conversion, and RS-485 serial communication. Each serial port can connect up to 255 WJ168 series modules, and the communication method adopts ASCII code communication protocol or MODBUS RTU communication protocol. The baud rate can be set by code and can be hung on the same RS-485 bus as control modules from other manufacturers, making it easy for computer programming.

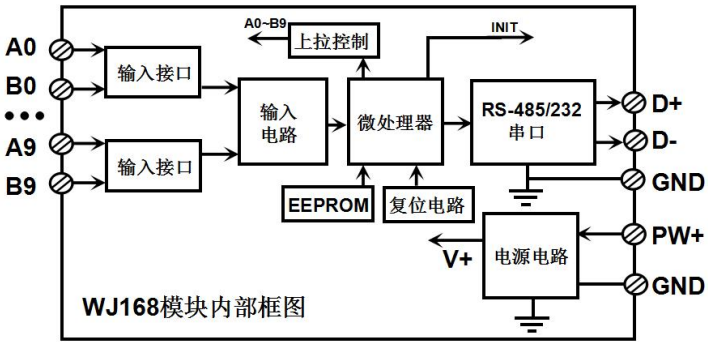


Figure 2 Internal Block Diagram of WJ168 Module

The WJ168 series products are intelligent monitoring and control systems based on microcontrollers. All user set configuration information such as address, baud rate, data format, checksum status, etc. are stored in non-volatile memory EEPROM.

The WJ168 series products are designed and manufactured according to industrial standards, with no isolation between signal inputs/outputs, strong anti-interference ability, and high reliability. The working temperature range is -45 ℃ to+85 ℃.

Function Introduction:

The WJ168 remote I/O module can be used to measure 10 encoder signals, and can also be set as a 20 channel independent counter or DI status measurement.

1. Signal input

10 encoder signal inputs or 20 independent counters, can be connected to dry and wet contacts. Please refer to the wiring diagram for details.

2. Communication Protocol

Communication interface: 1 standard RS-485 communication interface or 1 standard RS-232 communication interface, please specify when ordering and selecting.

Communication Protocol: Supports two protocols, the character protocol defined by the command set and the MODBUS RTU communication protocol. The module automatically recognizes communication protocols and can achieve network communication with various brands of PLCs, RTUs, or computer monitoring systems.

Data format: 10 digits. 1 start bit, 8 data bits, and 1 stop bit. No verification.

The communication address (0-255) and baud rate (2400, 4800, 9600, 19200, 38400, 57600, 115200bps) can be set; The communication network can reach a maximum distance of 1200 meters and is connected through twisted pair shielded cables.

High anti-interference design of communication interface, ± 15KV ESD protection, communication response time less than 100mS.

3. Anti interference

Checksums can be set as needed. There is a transient suppression diode inside the module, which can effectively suppress various surge pulses, protect the module, and the internal digital filter can also effectively suppress power frequency interference from the power grid.

Product selection:

WJ168 - □

└ Communication interface

485: Output as RS-485 interface

232: Output as RS-232 interface

Selection Example 1: Model: **WJ168-232** indicates an output of RS-232 interface

Selection Example 2: Model: **WJ168-485** indicates that the output is RS-485 interface

WJ168 General Parameters:

(Typical @+25 ℃, Vs is 24VDC)

Input type: Encoder AB signal input, 10 channels (A0/B0~A9/B9).

Low level: Input<1V

High level: Input 3.5~30V

The frequency range is 0-10KHz (all channels input simultaneously), and a single channel can support 50KHz input.

Encoder count range -2147483647 ~+2147483647 , automatically saved when powered off

DI counter range 0~4294967295 , automatically saved upon power failure

Input resistance: 30K Ω

Communication: RS-485 or RS-232 standard character protocol and MODBUS RTU communication protocol

Baud rates (2400, 4800, 9600, 19200, 38400, 57600, 115200bps) can be selected by software

The address (0-255) can be selected by software

Communication response time: 100 ms maximum

Working power supply:+8~32VDC wide power supply range, with internal anti reverse and overvoltage protection circuits

Power consumption: less than 1W

Working temperature: -45~+80 ℃

Working humidity: 10~90% (no condensation)

Storage temperature: -45~+80 ℃

Storage humidity: 10~95% (no condensation)

Dimensions: 120mm x 70mm x 43mm

Pin definition:

Pin	name	Description	Pin	name	Description
one	GND	Signal Ground	fourteen	A0	Encoder 0 signal A input terminal
two	A6	Encoder 6 signal A input terminal	fifteen	B0	Encoder 0 signal B input terminal
thre					terminal
fou					terminal
five					terminal
six					terminal
seve					terminal
eigh					terminal
nin					terminal
ten					terminal
eleve					terminal
twel					terminal
thirt n					

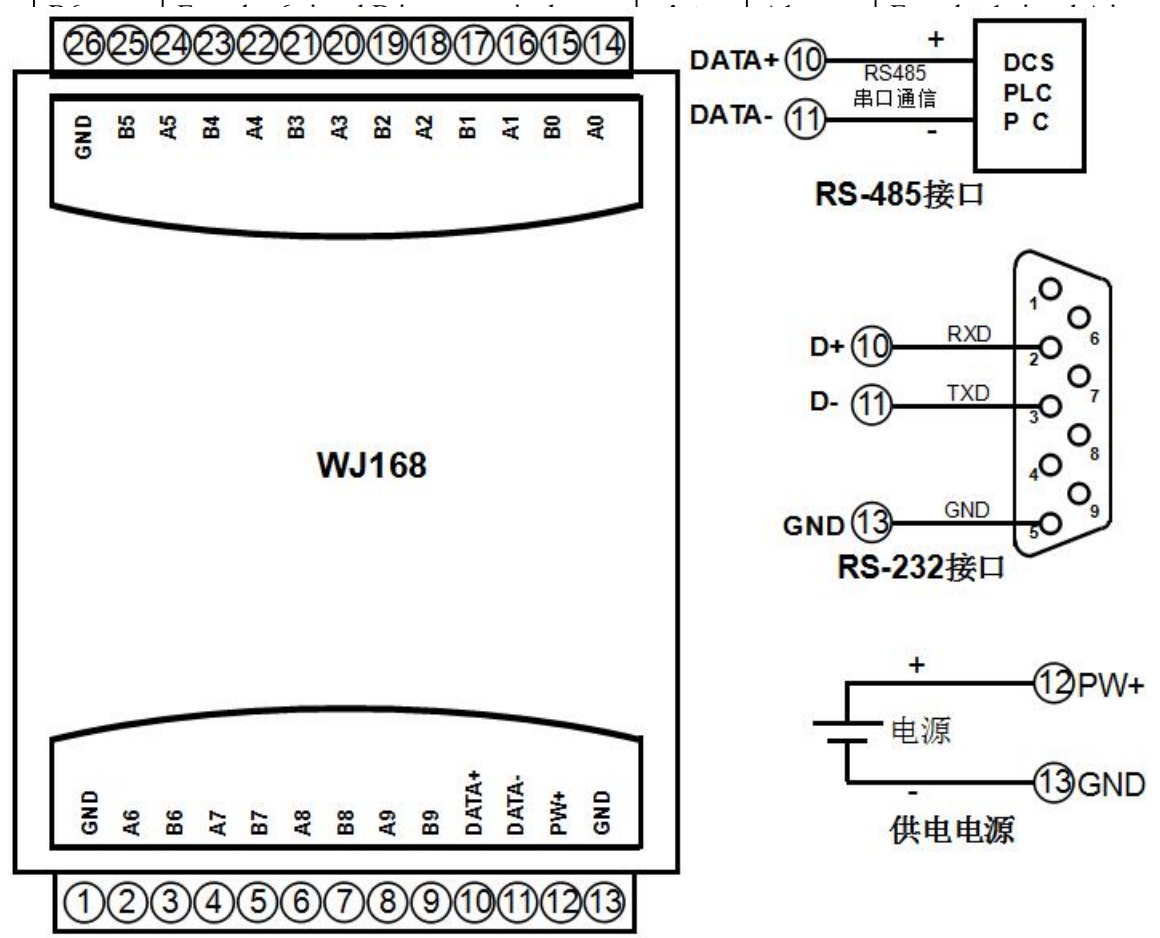
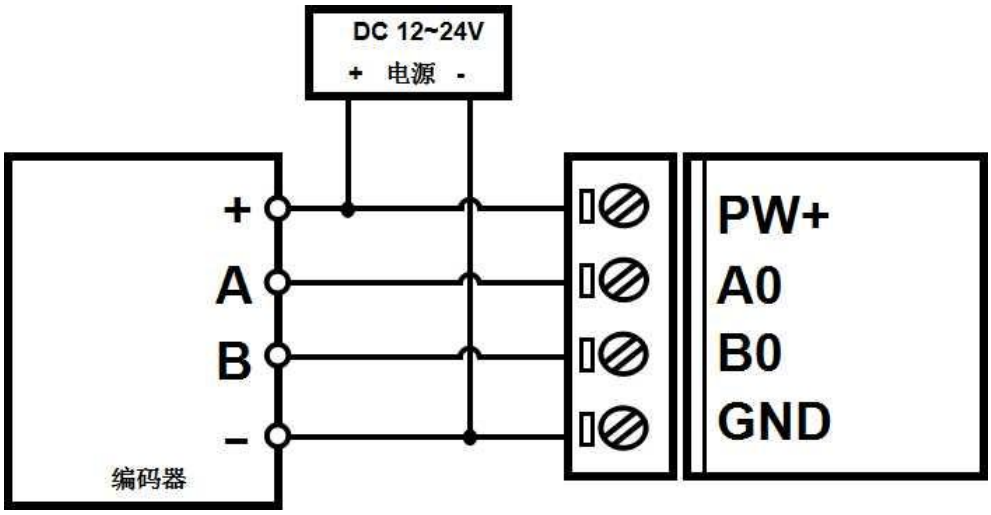


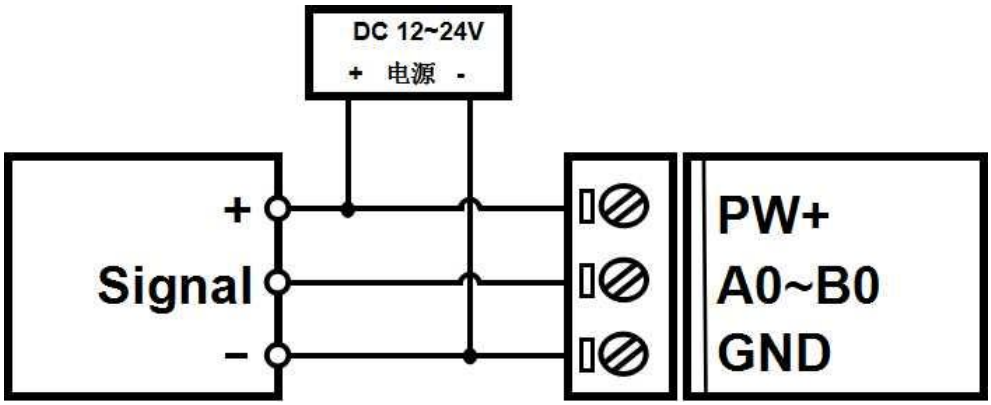
Figure 3 Wiring diagram of WJ168 module

Encoder signal input wiring diagram (working mode 0)



Note: The **factory default is** to **turn off pull-up. If** it **is** an **NPN encoder,** you **need** to **turn on** the **internal pull-up resistor, set** the **40206 register to 1, or send** the **character command $01Q1**. **Other types such as NPN encoders with pull-up resistors, PNP encoders, push-pull encoders, etc. can be used directly. If** you **want** to **turn off** the **internal pull-up resistor, set** the **40206 register to 0, or send** the **character command $01Q0**

DI Counting Input Wiring Diagram (Working Mode 1)



Note 1: The **default working mode** at the **factory is 0.** The **DI count needs** to be **changed to working mode 1** by **issuing** a **command. Method 1: Send** the **command $01311111111 and receive** a **reply! After 01,** it will **take effect 10 seconds after shutdown. Method 2: Modify registers 40001~40010 to 1, and after receiving a reply, shut down for 10 seconds before taking effect.**

Note 2: The **factory default is** to **turn off** the **pull-up** function**. If** it **is** an **NPN sensor, dry contact, or switch input,** the **internal pull-up** resistor **needs** to be **turned on,** and the **40206 register** needs to be **set to 1, or** the **character command $01Q1** needs to be **sent**. **Other sensors such as NPN sensors with pull-up resistors, PNP sensors, push-pull sensors, TTL levels, etc. can be used directly. If** you **want** to **turn off** the **internal pull-up resistor, set** the **40206 register to 0, or send** the **character command $01Q0**

WJ168 Character Protocol Command Set:

The factory initial settings of the module are as follows:

The address code is 01

Baud rate 9600 bps

No verification

If using an RS-485 network, a unique address code must be assigned, with a hexadecimal value between 00 and FF. Since the address codes of new modules are the same, their addresses will conflict with those of other modules. Therefore, when building the system, you must reconfigure the addresses of each WJ168 module. After connecting the power line and RS485 communication line of the WJ168 module, the address of the WJ168 module can be modified through configuration commands. The baud rate and parity check also need to be adjusted according to the user's requirements.

Method to put the module into default state:

The WJ168 module has a special pin labeled as Initiat. Short circuit the Initiat pin to the GND pin, then turn on the power, and the module will enter the default state. In this state, the configuration of the module is as follows:

The address code is 00

Baud rate 9600 bps

No verification

When unsure of the specific configuration of a module, the Initiat pin can also be short circuited to the GND pin, and then the power can be turned on to put the module into default state, and then the module can be reconfigured.

The character protocol command consists of a series of characters, such as the prefix, address ID, and variables.

Note: In some cases, many commands use the same command format. To ensure that the address you are using is correct in a command, if you use the wrong address that represents another module, the command will take effect in that module, resulting in an error.

2. Commands must be entered in uppercase letters.

1. Set the working mode of the encoder

Description: Set the encoder working mode to 0 or 1, default to 0 at the factory. After modifying the working mode, the module must be **restarted** for it to take effect.

Working mode 0: Encoder AB signal input

Working mode 1: Two independent counter inputs

Note: The following command note **(working mode 0)** indicates that the data is only valid when the encoder working mode is 0.

The notation **(working mode 1)** indicates that the data is only valid when the encoder is in working mode 1.

Command format: **$AA3BBBBBBBB** Set the working mode of the encoder. It will take effect after **restarting**.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Response format:**! AA (cr)** indicates successful setting

Parameter description: **BBBBBBBB** represents the working mode of 10 encoder channels, with 10 numbers arranged in the order of encoder 9 to encoder 0,

Value 0: Working mode 0; Value 1: Working mode 1

Application example: User command (character format) **$01311111110000**

Module response (character format)**! 01(cr)**

Explanation: Set encoder 9~encoder 4 to work mode 1, and set encoder 3~encoder 0 to work mode 0

2. Read the working mode of the encoder

Explanation: Read the working mode of the encoder.

Command format: **$AA4** reads the working mode of the encoder.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Response format:**! BBBBBB (cr)** represents the working mode of 10 encoder channels, with 10 numbers arranged in the order of encoder 9 to encoder 0,

Value 0: Working mode 0; Value 1: Working mode 1

Application example: User command (character format) **$014**

Module response (character format)**! 1111110000 (cr)**

Explanation: Encoders 9 to 4 are in working mode 1, while encoders 3 to 0 are in working mode 0

3. Read switch status command

Explanation: Read back the switch status of all encoder input channels from the module.

Command format: **# AA**

Parameter description: # delimiter. Hexadecimal is 23H

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Response format: **BBBB, CCCCCCCC, DDDDDDDD (cr)** command is valid.

? The **01 (cr)** command is invalid or an illegal operation.

Parameter description:>delimiter. Hexadecimal is 3EH

BBBB represents the read encoder input switch status, consisting of 4 numbers, arranged in the order of B9A9 B8A8,

CCCCCCCC represents the read encoder input switch status, consisting of 8 numbers, arranged in the order of B7A7, B6A6, B5A5, B4A4,

DDDDDDDD represents the read encoder input switch status, consisting of 8 numbers, arranged in the order of B3A3, B2A2, B1A1, B0A0,

Value 0: Input low level; Value 1: Input high level

(cr) End symbol, upper computer enter key, hexadecimal is 0DH.

Application example: User command (character format) **# 01**

Module response (character format)**>00000000101000000111 (cr)**

Explanation: The input switch status of the module is **0000**, and the arrangement order is B9A9 B8A8

A8: Low Level B8: Low Level A9: Low Level B9: Low Level

The input switch status of the module is **00001010**, and the arrangement order is B7A7 B6A6 B5A5 B4A4

A4: Low level B4: High level A5: Low level B5: High level

A6: Low level B6: Low level A7: Low level B7: Low level

The input switch status of the module is 00000 111, and the arrangement order is B3A3, B2A2, B1A1, B0A0

A0: High level B0: High level A1: High level B1: Low level

A2: Low Level B2: Low Level A3: Low Level B3: Low Level

4. Read encoder counter **data command (working mode 0)**

Explanation: Reading the data from the encoder counter can read all encoders or a single encoder Indicates forward rotation, '-' indicates reverse rotation.

Command format: **# AA2**

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is

converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

2 represents the command to read encoder 0~encoder 9 counter data.

Response format:+ **AAAAAAAAAA, +AAAAAAAAAA, +AAAAAAAAAA, +AAAAAAAAAA, +AAAAAAAAAA, +AAAAAAAAAA, +AAAAAAAAAA, +AAAAAAAAAA, +AAAAAAAAAA, +AAAAAAAAAA (cr)**

Command format: **# AA2N** Read Channel N Count Value

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

2 Indicates the command to read counter data.

N represents the command to read encoder N counter data.

Response format:+ **AAAAAAAAAA(cr)**

Application Example 1: User Command (Character Format) **# 012**

Module response (character format)+ **0012345678, +0012345678, +0012345678, +0012345678, +0012345678, +0012345678, +0012345678, +0012345678 +0012345678, +0012345678 (cr)**

Explanation: The count values of all encoders are forward rotation+12345678

Application Example 2: User Command (Character Format) **# 0120**

Module response (character format)**- 0012345678(cr)**

Explanation: The count value of encoder 0 is inverted-12345678.

5. Modify the **numerical command of** the **encoder** counter **(working mode 0)**

Explanation: You can modify the value of the encoder counter or reset it to zero to start counting again.

Command format: **$AA1N+AAAAAAAAA** Modify the count value of encoder N, where N is the encoder code and ranges from 0 to 9. Setting N to 'M' means setting the count values of all encoders simultaneously.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Response format:**! AA (cr)** indicates successful setting

Application example 1: User command (character format) **$0113+0000000000**

Module response (character format)**! 01(cr)**

Explanation: Set the count value of encoder 3 to 0.

Application Example 2: User Command (Character Format) **$011M+0000000000**

Module response (character format)**! 01(cr)**

Explanation: Set the count value of all encoders to 0.

Application Example 3: User Command (Character Format) **$011M+000003000**

Module response (character format)**! 01(cr)**

Explanation: Set the count value of all encoders to+3000.

6. Read encoder input frequency command (working mode 0)

Explanation: Reading the frequency of the encoder input can read all encoders or a single encoder Indicates forward rotation, '-' indicates reverse rotation.

Command format: **# AA3**

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with

hexadecimal, it will be 30H and 31H.

3 represents the input frequency command from encoder 0 to encoder 9.

Response format:+ **AAAAAA.AA,+AAAAAA.AA,+AAAAAA.AA,+AAAAAA.AA,+AAAAAA.AA,**
+AAAAAA. AA,+AAAAAA.AA, +AAAAAA.AA, +AAAAAA.AA,+AAAAAA.AA (cr)

Command format: **# AA3N** Read Encoder N Input Frequency

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

3 Indicates the command for reading input frequency.

N represents the input frequency command of the encoder N.

Response format:+ **AAAAAA.AA (cr)**

Application Example 1: User Command (Character Format) **# 013**

Module response (character format)**+ 001000.00,+001000.00,+001000.00,+001000.00,+001000.00,**
+001000.00,+001000.00, +001000.00, +001000.00,+001000.00 (cr)

Explanation: The input frequency value of all encoders is forward rotation+1kHz.

Application Example 2: User Command (Character Format) **# 0130**

Module response (character format)**- 001000.00(cr)**

Explanation: The input frequency value of encoder 0 is reversed to -1kHz.

7. Read encoder input speed command (working mode 0)

Explanation: Reading the input speed of the encoder can read all encoders or a single encoder Indicates forward rotation, '-' indicates reverse rotation.

Command format: **# AA4**

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

4 represents the input speed command from encoder 0 to encoder 9.

Response format:+ **AAAAA,+AAAAA,+AAAAA,+AAAAA,+AAAAA,+AAAAA,+AAAAA,+AAAAA,**
+AAAAA,+AAAAA (cr)

Command format: **# AA8N** Read Encoder N Input Speed

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

4 represents the read input speed command.

N represents the input speed command of encoder N.

Response format:+ **AAAAA (cr)**

Application Example 1: User Command (Character Format) **# 014**

Module response (character format)**+ 01000,+01000,+01000,+01000,+01000,+01000,+01000,+01000,**
+01000,+01000 (cr)

Explanation: The input speed values of all encoders are forward rotation+1000 rotation.

Application Example 2: User Command (Character Format) **# 0140**

Module response (character format)**- 01000(cr)**

Explanation: The input speed value of encoder 0 is reversed to 1000 revolutions per minute.

8. Set the **number of pulses per revolution for** the **encoder (working mode 0)**

Description: Set the number of pulses per revolution for the encoder. Set according to the parameters of the connected encoder, with a factory default value of 1000. The encoder speed can only be read after setting the correct number of pulses.

Command format: **$AA5NAAAA** sets the number of pulses per revolution for the encoder.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

5. Set the number of pulses per revolution command for the encoder.

N encoder code, with values ranging from 0 to 9.

AAAAA represents the number of pulses, such as 1000, 800, or 600.

Response format:**! AA (cr)** indicates successful setting

Application example: User command (character format) **$015100300 (cr)**

Module response (character format)**! 01(cr)**

Explanation: Set the number of pulses per revolution for encoder 1 to 300.

9. Read the **number** of **pulses per revolution of** the **encoder (working mode 0)**

Explanation: Read the number of pulses per revolution for all encoders.

Command format: **$AA6** reads the number of pulses per revolution for all encoders, arranged in order of 0-9.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Response format:**! AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA (cr)** represents the number of pulses per revolution from encoder 0 to encoder 9.

Application example: User command (character format) **$016**

Module response (character format)**! 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000 (cr)**

Explanation: The number of pulses per revolution for all encoders is 1000.

10. Read counter data command (working mode 1)

Explanation: Reading the data of the counter can read all channels or a single channel.

Command format: **# AA5**

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

5 represents the command to read counter data from channel A0 to channel B9. Arrange in order A0, B0,~~~, A9, B9.

Response format:**! AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA, AAAAAA**
AAAA, AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA,
AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA
AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA, AAAAAAAAAA (cr)

Command format: **# AA5N**

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

5 Indicates the command to read counter data.

N represents the command to read channel N counter data. N value: 0123456789ABCDEFGHIJ, corresponding to A0~B9

Response format:**! AAAAAAAAAA(cr)**

Application Example 1: User Command (Character Format) **# 015**

Module response (character format)**! 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678, 0012345678 0012345678, 0012345678, 0012345678, 0012345678 (cr)**

Explanation: The count value for all channels is 12345678.

Application Example 2: User Command (Character Format) **# 015F**

Module response (character format)**! 0012345678(cr)**

Explanation: The count value of channel B7 is 12345678.

11. Modify the **value command of DI counter (working mode 1)**

Explanation: You can modify the value of the DI counter and reset it to zero to start counting again.

Command format: **$AA2N+AAAAAAAAAA** Modify the count value of counter N, where N is the counter code and the value is 0123456789ABCDEF

GHIJ, corresponding to A0~B9, setting N to 'M' means setting the count values for all channels simultaneously.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Response format:**! AA (cr)** indicates successful setting

Application example 1: User command (character format) **$012F+000000000 (cr)**

Module response (character format)**! 01(cr)**

Explanation: Set the count value of channel B7 to 0.

Application example 2: User command (character format) **$012M+000000000 (cr)**

Module response (character format)**! 01(cr)**

Explanation: Set the count value of all channels to 0.

Application example 3: User command (character format) **$012M+000003000 (cr)**

Module response (character format)**! 01(cr)**

Explanation: Set the count value for all channels to+3000.

12. Read input frequency command (working mode 1)

Explanation: The frequency of the input can be read for all channels or for a single channel.

Command format: **# AA6**

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

6 represents the input frequency command for channels A0 to B9.

Response format:**!**

AAAAAA.AA,AAAAAA.AA(cr)

Command format: **# AA6N** read channel N input frequency.

AA module address, with a value range of 00 to FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

6 Indicates the command for reading input frequency.

N represents the frequency command for reading channel N. N value: 0123456789ABCDEFGHIJ, corresponding to A0~B9

Response format:**! AAAAAA.AA (cr)**

Application Example 1: User Command (Character Format) **# 016**

Module response (character format)**! 001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00,001000.00(cr)**

Explanation: The input frequency value for all channels is 1KHz.

Application Example 2: User Command (Character Format) **# 016E**

Module response (character format)**! 001000.00(cr)**

Explanation: The input frequency value of channel A7 is 1KHz.

13. Read DI input speed command (working mode 1)

Explanation: Reading the speed of DI input can read all DIs or a single DI.

Command format: **# 018** Read A0~B7 input speed. Arrange in order A0, B0,~~~, A9, B9.

Response format:**! AAAAA,AAAAA,AAAAA,AAAAA,AAAAA,AAAAA,AAAAA,AAAAA,AAAAA,AAAAA, AAAAA,AAAAA,AAAAA,AAAAA,AAAAA,AAAAA,AAAAA,AAAAA,AAAAA,AAAAA (cr)**

Command format: **# 018N** Read DI channel N Input speed, N value: 0123456789ABCDEFGHIJ, corresponding to A0~B9

Response format:**! AAAAA (cr)**

Application Example 1: User Command (Character Format) **# 018**

Module response (character format)**! 01000,01000,01000,01000,01000,01000,01000,01000,01000,01000,01000 ,01000,01000,01000,01000,01000,01000,01000,01000,01000 (cr)**

Explanation: The input speed value for all DI channels is 1000 revolutions per minute.

Application Example 2: User Command (Character Format) **# 0180**

Module response (character format)**! 01000(cr)**

Explanation: The input speed value of DI0 is 1000 revolutions per minute.

14. Set the **number of pulses per revolution for DI (working mode 1)**

Explanation: Set the number of pulses per revolution for DI. Set according to the parameters of the device connected to DI, with a factory default value of 1000. Only after setting the correct number of pulses can the DI speed be read.

Command format: **$01DWNAAAA** sets the number of pulses per revolution for DI channel N. N value: 0123456789ABCDEFGHIJ, corresponding to A0~B9, **AAAAA** represents the number of pulses, such as 1000800 or 600.

Response format:**! 01 (cr)** indicates successful setting

Application example: User command (character format) **$01DW100300**

Module response (character format)**! 01(cr)**

Explanation: Set the number of pulses per revolution for B0 to 300.

15. Read the **number** of **pulses per revolution of DI (working mode 1)**

Explanation: Read the number of pulses per revolution for all DI channels.

Command format: **$01DR** reads the number of pulses per revolution for all DIs, arranged in the order A0, B0,~~~, A9, B9.

Response format:**! AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA,**

AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA

Represents the number of pulses per revolution for A0, B0,~~~, A9, B9.

Application example: User command (character format) **$01DR**

Module response (character format)**! 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000, 01000 (cr)**

Explanation: The number of pulses per revolution for all DI channels is 1000.

16. Set the **counting method of DI counter (working mode 1)**

Explanation: Set the DI counter to count rising or falling edges. The factory setting is 0000000000000000. Default is rising edge counting

The setting takes effect after the module is **restarted**.

Command format: **$AA7, BBBB, CCCCCCCC, DDDDDDDDDD** Set the counting method of the DI counter.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Response format:**! AA (cr)** indicates successful setting

Parameter description: **BBBB** represents channel status, with 4 numbers arranged in the order of B9A9 B8A8,

CCCCCCCC represents channel status, with 8 numbers arranged in the order of B7A7 B6A6 B5A5 B4A4,

DDDDDDDD represents the channel status, with 8 numbers arranged in the order of B3A3, B2A2, B1A1, B0A0,

Value 0: The rising edge count of the channel; Value 1: The descending edge count of this channel

Application example: User command (character format) **$01711111111000001111**

Module response (character format)**! 01(cr)**

Explanation: Set the falling edge count for channels B9-A6 and the rising edge count for channels B5-A2, Set the falling edge count for channels B1 to A0.

17. Read the **counting method of DI counter (working mode 1)**

Explanation: Read whether the DI counter counts the rising edge or the falling edge.

Command format: **$AA8** reads the counting method of the DI counter.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Response format:**! BBBB, CCCCCCCC, DDDDDDDD (cr)** represent the counting method of the DI counter.

Parameter description: **BBBB** represents channel status, with 4 numbers arranged in the order of B9A9 B8A8,

CCCCCCCC represents channel status, with 8 numbers arranged in the order of B7A7 B6A6 B5A5 B4A4,

DDDDDDDD represents the channel status, with 8 numbers arranged in the order of B3A3, B2A2, B1A1, B0A0,

Value 0: The rising edge count of the channel; Value 1: The descending edge count of this channel

Application example: User command (character format) **$018**

Module response (character format)**! 1111,11110000,00001111 (cr)**

Explanation: B9-A6 channels have falling edge counts, B5-A2 channels have rising edge counts, and B1-A0 channels have falling edge counts.

18. Set the **filtering time for DI (working mode 1)**

Explanation: Set the filtering time for DI. 1 represents 1mS, and the factory default is 0. The photoelectric switch input is set to 0, and it is recommended to set the mechanical switch or relay input to 20~100. The setting will take effect after restarting.

Command format: **$01LWNAAAA** sets the filtering time for DI channel N. N is the counter code, with a value of 0123456789ABCDEFGHIJ, corresponding to A0~B9. Setting N to 'M' means setting the filtering time for all channels simultaneously. **AAAAA** represents filtering time, such as 0, 20, or 50.

Response format:**! 01 (cr)** indicates successful setting

Application example: User command (character format) **$01LW100020**

Module response (character format)**! 01(cr)**

Explanation: Set the filtering time for B0 to 20, which is 20mS.

19. Read the **filtering time of DI (working mode 1)**

Explanation: Read the filtering time of all DI channels.

Command format: **$01LR** reads the filtering time of all DIs, arranged in order A0, B0,~~~, A9, B9.

Response format:**! AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA, AAAAA**

Indicate the filtering time for A0, B0,~~, A9, B9.

Application example: User command (character format) **$01LR**

Module response (character format)**! 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020, 00020 (cr)**

Explanation: The filtering time for all DI channels is 20mS.

20. Set the pull-up switch for DI

Explanation: Set the pull-up switch of DI to the factory default value of 0 (DI turns off the pull-up function).

Command format: **$01QX**

Parameter description: **Q** sets the pull-up switch command for DI.

X 0: DI turns off the pull-up voltage; 1: Connect the pull-up voltage to DI.

Response format:**! 01 (cr)** indicates successful setting

Application example: User command (character format) **$01Q1**

Module response (character format)**! 01(cr)**

Explanation: Set the pull-up voltage for DI connection. When DI is an NPN input, it can be set to turn on the DI pull-up voltage.

21. Set whether the count value will be automatically saved when the power is turned off

Explanation: Set the count values of the encoder and DI to automatically save when powered off. The factory default value is 1 (automatically saved when powered off).

Command format: **$AASW** sets whether the count values of the encoder and DI are automatically saved when powered off.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Is the command to automatically save the count values of the encoder and DI when they are powered off.

W 0: Not automatically saved; 1: Power off automatically saves the count values of the encoder and DI.

Response format:**! AA (cr)** indicates successful setting

Application example: User command (character format) **$01S0**

Module response (character format)**! 01(cr)**

Explanation: Set the encoder and DI to not save the count value, and automatically reset the count after power failure.

22. Configure WJ168 module command

Explanation: Set the address, baud rate, and parity for a WJ168 module. The configuration information is stored in non-volatile memory EEPROM.

Command format:**% AANNTTCCFF**

Parameter description:**%** delimiter.

AA module address, with a value range of 00 to FF (hexadecimal).

NN represents the new module hexadecimal address, with values ranging from 00 to FF.

TT uses hexadecimal to represent type encoding. The WJ168 product must be set to 00.

CC uses hexadecimal to represent baud rate encoding.

Baud rate code	Baud rate
04	2400 baud
05	4800 baud
06	9600 baud
07	19200 baud
08	38400 baud
09	57600 baud

Table 2 Baud rate codes

FF uses 8 bits in hexadecimal to represent parity check.

00: No verification

10: Odd verification

20: Even verification

Response format:**!** The **AA (cr)** command is valid.

? The **AA (cr)** command is invalid or an illegal operation, or a configuration jumper is not installed before changing the baud rate or checksum.

Parameter description:**!** The delimiter indicates that the command is valid.

? The delimiter indicates that the command is invalid.

AA represents the input module address

(cr) End symbol, upper computer enter key, hexadecimal is 0DH.

Other instructions: If you are configuring the module for the first time, AA=00, NN equals the new address.

If the format is incorrect, the communication is incorrect, or the address does not exist, the module will not respond.

Application example: User command**% 0011000600**

Module response**! 11(cr)**

Explanation:**%** delimiter.

00 means that the original address of the WJ168 module you want to configure is 00H.

11 indicates that the new module's hexadecimal address is 11H.

00 type code, WJ168 product must be set to 00.

06 represents a baud rate of 9600 baud.

00 indicates no verification.

23. Read configuration status command

Explanation: Read configuration for a designated WJ168 module.

Command format: **$AA2**

Parameter description: **$**delimiter.

AA module address, with a value range of 00 to FF (hexadecimal).

2 represents the command to read the configuration status

(cr) End symbol, upper computer enter key, hexadecimal is 0DH.

Response format:**!** The **AATTCCFF (cr)** command is valid.

? The **AA (cr)** command is invalid or an illegal operation.

Parameter description:**!** Boundary symbol.

AA represents the input module address.

TT stands for type code.

CC stands for baud rate encoding. See Table 2

FF represents verification

(cr) End symbol, upper computer enter key, hexadecimal is 0DH.

Other instructions: If the format is incorrect, the communication is incorrect, or the address does not exist, the module will not respond.

Application example: User command **$012**

Module response**! 01000600(cr)**

Explanation:**!** Boundary symbol.

01 indicates that the WJ168 module address is 01H.

00 represents the input type code.

06 represents a baud rate of 9600 baud.

00 indicates no verification.

24. Reset all parameters set by the above character commands to factory settings.

Explanation: The parameters set by the above character commands in the module will be reset to factory settings, and the module will automatically restart after completion.

Command format: **$AA900** Set parameters to factory settings.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). The factory address is 01, which is converted to hexadecimal as the ASCII code for each character. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Response format:**! AA (cr)** indicates successful setup, and the module will automatically restart.

Application example: User command (character format) **$01900**

Module response (character format)**! 01(cr)**

Explanation: Parameters are reset to factory settings.

25. Command to restart the module.

Explanation: The module automatically restarts 1 second after receiving the command.

Command format:**% AARSTART** module automatically restarts.

Parameter description: **AA** module address, value range 00~FF (hexadecimal). Factory address is 01, converted to hexadecimal as ASCII for each character

The code. If address 01 is replaced with hexadecimal, it will be 30H and 31H.

Response format:**! AA (cr)** indicates successful setup, and the module will automatically restart.

Application example: User command (character format)**% 01REST**

Module response (character format)**! 01(cr)**

Description: Module restart.

Modbus RTU communication protocol:

The factory initial settings of the module are as follows:

The Modbus address is 01

Baud rate 9600 bps

Data format: 10 digits. 1 start bit, 8 data bits, and 1 stop bit. No verification.

Method to put the module into default state:

There is an Initiate switch located on the side of the WJ168 module. Turn the Initiat switch to the Initiat position, then turn on the power, and the module will enter the default state. In this state, the module temporarily returns to its default state: address 01, baud rate 9600. When unsure of the specific configuration of a module, users can query the address and baud rate registers 40201-40202 to obtain the actual address and baud rate of the module, or modify the address and baud rate as needed.

Note: Please turn the Initiat switch to the NORMAL position during normal use.

Supports Modbus RTU communication protocol, with command format following the standard Modbus RTU communication protocol.

The function codes supported by WJ168 are as follows:

Function code		name	explain
01	Read Coil Status	Read coil status	Starting from address 0x
03	Read Holding Register	Read and hold register	Starting from address 4x
05	Write Single Coil	Write a single coil	Starting from address 0x
06	Write Single Register	Write a single register	Starting from address 4x
fifteen	Write Multiple Coils	Write multiple coils	Starting from address 0x
sixteen	Write Multiple Registers	Write multiple registers	Starting from address 4x

Register Address Description for WJ168

Supports registers with function codes 01, 05, and 15

Address 0X (PLC)	Address (PC, DCS)	Data content	attribute	Data Explanation
00001	0	Counting method of A0	Read/ Write	Counting method for channels A0~B9 (default value is 0) 0 is the rising edge count, 1 is the falling edge count The setting takes effect after the module is restarted. No need to modify normally, just use the default values.
00002	one	Counting method of B0	Read/ Write	
00003	two	Counting method of A1	Read/ Write	
00004	three	Counting method of B1	Read/ Write	
00005	four	A2's counting method	Read/ Write	

00006	five	Counting method of B2	Read/ Write	
00007	six	Counting method of A3	Read/ Write	
00008	seven	B3's counting method	Read/ Write	
00009	eight	Counting method of A4	Read/ Write	
00010	nine	B4's counting method	Read/ Write	
00011	ten	Counting method of A5	Read/ Write	
00012	eleven	Counting method of B5	Read/ Write	
00013	twelve	A6's counting method	Read/ Write	
00014	thirteen	Counting method of B6	Read/ Write	
00015	fourteen	Counting method of A7	Read/ Write	
00016	fifteen	Counting method of B7	Read/ Write	
00017	sixteen	Counting method of A8	Read/ Write	
00018	seventeen	Counting method of B8	Read/ Write	
00019	eighteen	A9's counting method	Read/ Write	
00020	nineteen	B9's counting method	Read/ Write	
00033	thirty-two	A0 input switch quantity	read-only	The level state of the encoder input point 0 represents a low-level input, 1 represents a high-level input
00034	thirty-three	B0 input switch quantity	read-only	
00035	thirty-four	A1 input switch quantity	read-only	
00036	thirty-five	B1 input switch quantity	read-only	
00037	thirty-six	A2 input switch quantity	read-only	
00038	thirty-seven	B2 input switch quantity	read-only	
00039	thirty-eight	A3 input switch quantity	read-only	

00040	thirty-nine	B3 input switch quantity	read-only	
00041	forty	A4 input switch quantity	read-only	
00042	forty-one	B4 input switch quantity	read-only	
00043	forty-two	A5 input switch quantity	read-only	
00044	forty-three	B5 input switch quantity	read-only	
00045	forty-four	A6 input switch quantity	read-only	
00046	forty-five	B6 input switch quantity	read-only	
00047	forty-six	A7 input switch quantity	read-only	
00048	forty-seven	B7 input switch quantity	read-only	
00049	forty-eight	A8 input switch quantity	read-only	
00050	forty-nine	B8 input switch quantity	read-only	
00051	fifty	A9 input switch quantity	read-only	
00052	fifty-one	B9 input switch quantity	read-only	

Supports registers with function codes 03, 06, and 16

Address 4X (PLC)	**Address (PC, DCS)**	**Data content**	**attribute**	**Data Explanation**
forty thousand and one	0	Encoder 0 working mode	Read/ Write	Encoder working mode, integer, 0 or 1, Factory default is 0 (modification requires a **restart** to take effect) **Working mode 0**: Encoder AB signal input **Working mode 1**: Two independent counter inputs The following register note **(working mode 0)** indicates that data is only valid when the encoder working mode is 0. The notation **(working mode 1)** indicates that the data is only valid when the encoder is in working mode 1.
forty thousand and two	one	Encoder 1 working mode	Read/ Write	
forty thousand and three	two	Encoder 2 working mode	Read/ Write	
forty thousand and four	three	Encoder 3 working mode	Read/ Write	
forty thousand and five	four	Encoder 4 working mode	Read/ Write	
forty thousand and six	five	Encoder 5 working mode	Read/ Write	
forty thousand and seven	six	Encoder 6 working mode	Read/ Write	
forty thousand and eight	seven	Encoder 7 working mode	Read/ Write	

forty thousand and nine	eight	Encoder 8 working mode	Read/ Write	
forty thousand and ten	nine	Encoder 9 working mode	Read/ Write	
40011~40012	10~11	Encoder 0 pulse count	Read/ Write	Encoder 0-9 pulse counter **(working mode 0)** The data is a signed long integer, The storage order is CDAB. The hexadecimal format uses two complement for negative numbers, Positive numbers (0x0000000~0x7FFFFFF), Negative numbers (0xFFFFFFFF~0x8000001), Reset the counter and directly write 0 to the corresponding register, Other values can also be written as needed.
40013~40014	12~13	Encoder 1 pulse counting	Read/ Write	
40015~40016	14~15	Encoder 2 pulse counting	Read/ Write	
40017~40018	16~17	Encoder 3 pulse counting	Read/ Write	
40019~40020	18~19	Encoder 4 pulse counting	Read/ Write	
40021~40022	20~21	Encoder 5 pulse counting	Read/ Write	
40023~40024	22~23	Encoder 6 pulse counting	Read/ Write	
40025~40026	24~25	Encoder 7 pulse counting	Read/ Write	
40027~40028	26~27	Encoder 8 pulse counting	Read/ Write	
40029~40030	28~29	Encoder 9 pulse counting	Read/ Write	
forty thousand and thirty-one	thirty	The frequency of encoder 0	read-only	Pulse frequency of encoder **(working mode 0)** Signed integer, positive or negative indicates positive or negative reversal. If you need to read 32-bit floating-point numbers, please read the register 40051~40070.
forty thousand and thirty-two	thirty-one	Frequency of Encoder 1	read-only	
forty thousand and thirty-three	thirty-two	Frequency of Encoder 2	read-only	
forty thousand and thirty-four	thirty-three	The frequency of encoder 3	read-only	
forty thousand and thirty-five	thirty-four	The frequency of encoder 4	read-only	
forty thousand and thirty-six	thirty-five	The frequency of encoder 5	read-only	
forty thousand and thirty-seven	thirty-six	The frequency of encoder 6	read-only	
forty thousand and thirty-eight	thirty-seven	The frequency of encoder 7	read-only	
forty thousand and thirty-nine	thirty-eight	The frequency of encoder 8	read-only	
forty thousand	thirty-nine	The frequency of	read-on	

and forty		encoder 9	ly	
Address 4X (PLC)	**Address (PC, DCS)**	**Data content**	**attribute**	**Data Explanation**
forty thousand and forty-one	forty	Encoder 0's rotational speed	read-only	Encoder speed **(working mode 0)** Signed integer, positive or negative indicates positive or negative reversal. The speed is calculated based on the number of pulses per revolution set in registers 40071~40080.
forty thousand and forty-two	forty-one	Speed of encoder 1	read-only	
forty thousand and forty-three	forty-two	Speed of encoder 2	read-only	
forty thousand and forty-four	forty-three	The speed of encoder 3	read-only	
forty thousand and forty-five	forty-four	The speed of encoder 4	read-only	
forty thousand and forty-six	forty-five	The speed of encoder 5	read-only	
forty thousand and forty-seven	forty-six	The speed of encoder 6	read-only	
forty thousand and forty-eight	forty-seven	The speed of encoder 7	read-only	
forty thousand and forty-nine	forty-eight	The speed of encoder 8	read-only	
forty thousand and fifty	forty-nine	The speed of encoder 9	read-only	
40051~40052	50~51	The frequency of encoder 0	read-only	Pulse frequency of encoder **(working mode 0)** The data is a 32-bit floating-point number, The storage order is CDAB. If the device cannot read floating-point numbers, it can read registers 40031~40040
40053~40054	52~53	Frequency of Encoder 1	read-only	
40055~40056	54~55	Frequency of Encoder 2	read-only	
40057~40058	56~57	The frequency of encoder 3	read-only	
40059~40060	58~59	The frequency of encoder 4	read-only	
40061~40062	60~61	The frequency of encoder 5	read-only	
40063~40064	62~63	The frequency of	read-on	

		encoder 6	ly	
40065~40066	56~57	The frequency of encoder 7	read-only	
40067~40068	58~59	The frequency of encoder 6	read-only	
40069~40070	60~61	The frequency of encoder 7	read-only	
forty thousand and seventy-one	seventy	Encoder 0 pulses per revolution	Read/ Write	Number of pulses per revolution of encoder **(working mode 0)** Unsigned integer (default value at factory is 1000), set according to the number of pulses per revolution of the encoder, and registers 40041~40050 correspond to the channel speed after setting.
forty thousand and seventy-two	seventy-one	Encoder 1 pulse count per revolution	Read/ Write	
forty thousand and seventy-three	seventy-two	Encoder 2, number of pulses per revolution	Read/ Write	
forty thousand and seventy-four	seventy-three	Encoder 3, number of pulses per revolution	Read/ Write	
forty thousand and seventy-five	seventy-four	Encoder 4, number of pulses per revolution	Read/ Write	
forty thousand and seventy-six	seventy-five	Encoder 5, number of pulses per revolution	Read/ Write	
forty thousand and seventy-seven	seventy-six	Encoder 6, number of pulses per revolution	Read/ Write	
forty thousand and seventy-eight	seventy-seven	Encoder 7, number of pulses per revolution	Read/ Write	
forty thousand and seventy-nine	seventy-eight	Encoder 8, number of pulses per revolution	Read/ Write	
forty thousand and eighty	seventy-nine	Encoder 9, number of pulses per revolution	Read/ Write	

Address 4X (PLC)	**Address (PC, DCS)**	**Data content**	**attribute**	**Data Explanation**
40081~40082	80~81	Channel A0 pulse counting	Read/ Write	Channel A0~B9 pulse counter **(working mode 1)** The data is an unsigned long integer, The storage order is CDAB. Hexadecimal format, (0x0000000~0xFFFFFFFF), reset the counter and directly write 0 to the corresponding register, or write other values as needed.
40083~40084	82~83	Channel B0 pulse counting	Read/ Write	
40085~40086	84~85	Channel A1 pulse counting	Read/ Write	
40087~40088	86~87	Channel B1 pulse counting	Read/ Write	
40089~40090	88~89	Channel A2 pulse counting	Read/ Write	
40091~40092	90~91	Channel B2 pulse counting	Read/ Write	
40093~40094	92~93	Channel A3 pulse counting	Read/ Write	
40095~40096	94~95	Channel B3 pulse counting	Read/ Write	
40097~40098	96~97	Channel A4 pulse counting	Read/ Write	
40099~40100	98~99	Channel B4 pulse counting	Read/ Write	
40101~40102	100~101	Channel A5 pulse counting	Read/ Write	
40103~40104	102~103	Channel B5 pulse counting	Read/ Write	
40105~40106	104~105	Channel A6 pulse counting	Read/ Write	
40107~40108	106~107	Channel B6 pulse counting	Read/ Write	
40109~40110	108~109	Channel A7 pulse counting	Read/ Write	
40111~40112	110~111	Channel B7 pulse counting	Read/ Write	
40113~40114	112~113	Channel A8 pulse counting	Read/ Write	
40115~40116	114~115	Channel B8 pulse counting	Read/ Write	
40117~40118	116~117	Channel A9 pulse counting	Read/ Write	
40119~40120	118~119	Channel B9 pulse counting	Read/ Write	
forty thousand one hundred	one hundred and twenty	Frequency of channel A0	read-only	Pulse frequency of channels A0~B9 **(working mode 1)**

and twenty-one				The data is a 16 bit unsigned integer, If you need to read 32-bit floating-point numbers, please read the register 40161~40200.
forty thousand one hundred and twenty-two	one hundred and twenty-one	Frequency of channel B0	read-only	
forty thousand one hundred and twenty-three	one hundred and twenty-two	Frequency of channel A1	read-only	
forty thousand one hundred and twenty-four	one hundred and twenty-three	Frequency of channel B1	read-only	
forty thousand one hundred and twenty-five	one hundred and twenty-four	Frequency of channel A2	read-only	
forty thousand one hundred and twenty-six	one hundred and twenty-five	Frequency of channel B2	read-only	
forty thousand one hundred and twenty-seven	one hundred and twenty-six	Frequency of channel A3	read-only	
forty thousand one hundred and twenty-eight	one hundred and twenty-seven	Frequency of channel B3	read-only	
forty thousand one hundred and twenty-nine	one hundred and twenty-eight	Frequency of channel A4	read-only	
forty thousand one hundred and thirty	one hundred and twenty-nine	Frequency of channel B4	read-only	
forty thousand one hundred and thirty-one	one hundred and thirty	Frequency of channel A5	read-only	
forty thousand one hundred and thirty-two	one hundred and thirty-one	Frequency of channel B5	read-only	
forty thousand one hundred and thirty-three	one hundred and thirty-two	Frequency of channel A6	read-only	
forty thousand	one hundred and	Frequency of channel	read-on	

one hundred and thirty-four	thirty-three	B6	ly	
forty thousand one hundred and thirty-five	one hundred and thirty-four	Frequency of channel A7	read-only	
forty thousand one hundred and thirty-six	one hundred and thirty-five	Frequency of channel B7	read-only	
forty thousand one hundred and thirty-seven	one hundred and thirty-six	Frequency of channel A8	read-only	
forty thousand one hundred and thirty-eight	one hundred and thirty-seven	Frequency of channel B8	read-only	
forty thousand one hundred and thirty-nine	one hundred and thirty-eight	Frequency of channel A9	read-only	
forty thousand one hundred and forty	one hundred and thirty-nine	Frequency of channel B9	read-only	
Address 4X (PLC)	**Address (PC, DCS)**	**Data content**	**attribute**	**Data Explanation**
forty thousand one hundred and forty-one	one hundred and forty	Speed of channel A0	read-only	Speed of channels A0~B9 **(working mode 1)** Signed integer, positive or negative indicates positive or negative reversal. The speed is calculated based on the number of pulses per revolution set in registers 40221~40240.
forty thousand one hundred and forty-two	one hundred and forty-one	Speed of channel B0	read-only	
forty thousand one hundred and forty-three	one hundred and forty-two	Speed of channel A1	read-only	
forty thousand one hundred and forty-four	one hundred and forty-three	Speed of channel B1	read-only	
forty thousand one hundred and forty-five	one hundred and forty-four	Speed of channel A2	read-only	
forty thousand one hundred and forty-six	one hundred and forty-five	Speed of channel B2	read-only	
forty thousand one hundred	one hundred and forty-six	Speed of channel A3	read-only	

and forty-seven				
forty thousand one hundred and forty-eight	one hundred and forty-seven	Speed of channel B3	read-only	
forty thousand one hundred and forty-nine	one hundred and forty-eight	Speed of channel A4	read-only	
forty thousand one hundred and fifty	one hundred and forty-nine	Speed of channel B4	read-only	
forty thousand one hundred and fifty-one	one hundred and fifty	Speed of channel A5	read-only	
forty thousand one hundred and fifty-two	one hundred and fifty-one	Speed of channel B5	read-only	
forty thousand one hundred and fifty-three	one hundred and fifty-two	Speed of channel A6	read-only	
forty thousand one hundred and fifty-four	one hundred and fifty-three	Speed of channel B6	read-only	
forty thousand one hundred and fifty-five	one hundred and fifty-four	Speed of channel A7	read-only	
forty thousand one hundred and fifty-six	one hundred and fifty-five	Speed of channel B7	read-only	
forty thousand one hundred and fifty-seven	one hundred and fifty-six	Speed of channel A8	read-only	
forty thousand one hundred and fifty-eight	one hundred and fifty-seven	Speed of channel B8	read-only	
forty thousand one hundred and fifty-nine	one hundred and fifty-eight	Speed of channel A9	read-only	
forty thousand one hundred and sixty	one hundred and fifty-nine	Speed of channel B9	read-only	
40161~40162	160~161	Frequency of channel A0	read-only	Pulse frequency of the channel **(working mode 1)** The data is a 32-bit floating-point number,
40163~40164	162~163	Frequency of channel	read-on	

		B0	ly	The storage order is CDAB.
40165~40166	164~165	Frequency of channel A1	read-only	If the device cannot read floating-point numbers, it can read registers 40121~40140
40167~40168	166~167	Frequency of channel B1	read-only	
40169~40170	168~169	Frequency of channel A2	read-only	
40171~40172	170~171	Frequency of channel B2	read-only	
40173~40174	172~173	Frequency of channel A3	read-only	
40175~40176	174~175	Frequency of channel B3	read-only	
40177~40178	176~177	Frequency of channel A4	read-only	
40179~40180	178~179	Frequency of channel B4	read-only	
40181~40182	180~181	Frequency of channel A5	read-only	
40183~40184	182~183	Frequency of channel B5	read-only	
40185~40186	184~185	Frequency of channel A6	read-only	
40187~40188	186~187	Frequency of channel B6	read-only	
40189~40190	188~189	Frequency of channel A7	read-only	
40191~40192	190~191	Frequency of channel B7	read-only	
40193~40194	192~193	Frequency of channel A8	read-only	
40195~40196	194~195	Frequency of channel B8	read-only	
40197~40198	196~197	Frequency of channel A9	read-only	
40199~40200	198~199	Frequency of channel B9	read-only	
Address 4X (PLC)	**Address (PC, DCS)**	**Data content**	**attribute**	**Data Explanation**
forty thousand two hundred and one	two hundred	Module address	Read/ Write	Integer, effective after restart, range 0x0000-0x00FF
forty thousand	two hundred and	Baud rate	Read/	Integer, effective after restart, range

two hundred and two	one		Write	0x0004-0x000A 0x0004 = 2400 bps， 0x0005 = 4800 bps， 0x0006 = 9600 bps， 0x0007 = 19200 bps， 0x0008 = 38400 bps， 0x0009 = 57600 bps， 0x000A = 115200bps，
forty thousand two hundred and three	two hundred and two	Parity check	Read/ Write	Integer, takes effect after restart 0: No verification 1: Odd verification 2: Even verification
forty thousand two hundred and five	two hundred and four	Automatic saving of count values	Read/ Write	0: Do not automatically save, power off and reset to zero; 1: Power off automatically saves the count value. (Default value is 1)
forty thousand two hundred and six	two hundred and five	DI's pull-up resistor switch	Read/ Write	0: DI turns off the pull-up voltage; (default value is 0) 1: Connect the pull-up voltage to DI.
Address 4X (PLC)	**Address (PC, DCS)**	**Data content**	**attribute**	**Data Explanation**
forty thousand two hundred and seven	two hundred and six	Count reset register	write	An unsigned integer, default to 0. Modify this register to reset the encoder counter or channel counter. After modification, the

				register will automatically return to 0. Write 10: Set the encoder 0 count value to 0, Write 11: Set the count value of encoder 1 to 0, Write 12: Set the count value of encoder 2 to 0, Write 13: Set the count value of encoder 3 to 0, Write 14: Set the count value of encoder 4 to 0, Write 15: Set the count value of encoder 5 to 0, Write 16: Set the count value of encoder 6 to 0, Write 17: Set the count value of encoder 7 to 0, Write 18: Set the count value of encoder 8 to 0, Write 19: Set the count value of encoder 9 to 0, **Write 20: Set all encoder count values to 0,** Write 30: Set the count value of channel A0 to 0, Write 31: Set the channel B0 count value to 0, Write 32: Set the count value of channel A1 to 0, Write 33: Set the count value of channel B1 to 0, Write 34: Set the count value of channel A2 to 0, Write 35: Set the count value of channel B2 to 0, Write 36: Set the count value of channel A3 to 0, Write 37: Set the count value of channel B3 to 0, Write 38: Set the count value of channel A4 to 0, Write 39: Set the count value of channel B4 to 0, Write 30: Set the count value of channel A5 to 0,

				Write 41: Set the count value of channel B5 to 0, Write 42: Set the count value of channel A6 to 0, Write 43: Set the channel B6 count value to 0, Write 44: Set the count value of channel A7 to 0, Write 45: Set the count value of channel B7 to 0, Write 46: Set the count value of channel A8 to 0, Write 47: Set the count value of channel B8 to 0, Write 48: Set the count value of channel A9 to 0, Write 49: Set the channel B9 count value to 0, **Write 50: Set all channel count values to 0.** Writing other values is invalid.
forty thousand two hundred and nine	two hundred and eight	Parameter reset to factory settings	Read/ Write	If set to FF00, all register parameters of the module will be restored to factory settings, and the module will automatically restart after completion
forty thousand two hundred and ten	two hundred and nine	Restart module	Read/ Write	If set to F0F0, the module will automatically restart after 1 second
forty thousand two hundred and eleven	two hundred and ten	Module Name	read-only	High position: 0x01 Low position: 0x68
Address 4X (PLC)	**Address (PC, DCS)**	**Data content**	**attribute**	**Data Explanation**
forty thousand two hundred and twenty-one	two hundred and twenty	Number of pulses per revolution for channel A0	Read/ Write	The number of pulses per revolution **(working mode 1)** for channels A0~B9 is an unsigned integer (factory default value is 1000), set according to the actual number of pulses per revolution of the input signal. After setting, registers 40141~40160 correspond to the channel speed.
forty thousand two hundred and twenty-two	two hundred and twenty-one	Number of pulses per revolution for channel B0	Read/ Write	
forty thousand two hundred and	two hundred and twenty-two	Number of pulses per revolution for channel A1	Read/ Write	

twenty-three				
forty thousand two hundred and twenty-four	two hundred and twenty-three	Number of pulses per revolution for channel B1	Read/ Write	
forty thousand two hundred and twenty-five	two hundred and twenty-four	Number of pulses per revolution for channel A2	Read/ Write	
forty thousand two hundred and twenty-six	two hundred and twenty-five	Number of pulses per revolution for channel B2	Read/ Write	
forty thousand two hundred and twenty-seven	two hundred and twenty-six	Number of pulses per revolution for channel A3	Read/ Write	
forty thousand two hundred and twenty-eight	two hundred and twenty-seven	Number of pulses per revolution for channel B3	Read/ Write	
forty thousand two hundred and twenty-nine	two hundred and twenty-eight	Number of pulses per revolution for channel A4	Read/ Write	
forty thousand two hundred and thirty	two hundred and twenty-nine	Number of pulses per revolution for channel B4	Read/ Write	
forty thousand two hundred and thirty-one	two hundred and thirty	Number of pulses per revolution for channel A5	Read/ Write	
forty thousand two hundred and thirty-two	two hundred and thirty-one	Number of pulses per revolution for channel B5	Read/ Write	
forty thousand two hundred and thirty-three	two hundred and thirty-two	Number of pulses per revolution for channel A6	Read/ Write	
forty thousand two hundred and thirty-four	two hundred and thirty-three	Number of pulses per revolution for channel B6	Read/ Write	
forty thousand two hundred and thirty-five	two hundred and thirty-four	Number of pulses per revolution for channel A7	Read/ Write	
forty thousand two hundred and thirty-six	two hundred and thirty-five	Number of pulses per revolution for channel B7	Read/ Write	
forty thousand two hundred and thirty-seven	two hundred and thirty-six	Number of pulses per revolution for channel A8	Read/ Write	

forty thousand two hundred and thirty-eight	two hundred and thirty-seven	Number of pulses per revolution for channel B8	Read/ Write	
forty thousand two hundred and thirty-nine	two hundred and thirty-eight	Number of pulses per revolution for channel A9	Read/ Write	
forty thousand two hundred and forty	two hundred and thirty-nine	Number of pulses per revolution for channel B9	Read/ Write	
forty thousand two hundred and forty-one	two hundred and forty	Channel A0 filtering time	Read/ Write	Filtering time of channels A0~B9 **(working mode 1)** Unsigned integer. Each register corresponds to the filtering time of a channel. 1 represents a filtering time of 1mS, the photoelectric switch input is set to 0, and it is recommended to set the mechanical switch or relay input to 20-100. The setting will take effect after restarting.
forty thousand two hundred and forty-two	two hundred and forty-one	Channel B0 filtering time	Read/ Write	
forty thousand two hundred and forty-three	two hundred and forty-two	Channel A1 filtering time	Read/ Write	
forty thousand two hundred and forty-four	two hundred and forty-three	Channel B1 filtering time	Read/ Write	
forty thousand two hundred and forty-five	two hundred and forty-four	Channel A2 filtering time	Read/ Write	
forty thousand two hundred and forty-six	two hundred and forty-five	Channel B2 filtering time	Read/ Write	
forty thousand two hundred and forty-seven	two hundred and forty-six	Channel A3 filtering time	Read/ Write	
forty thousand two hundred and forty-eight	two hundred and forty-seven	Channel B3 filtering time	Read/ Write	
forty thousand two hundred and forty-nine	two hundred and forty-eight	Channel A4 filtering time	Read/ Write	
forty thousand two hundred and fifty	two hundred and forty-nine	Channel B4 filtering time	Read/ Write	
forty thousand two hundred and fifty-one	two hundred and fifty	Channel A5 filtering time	Read/ Write	
forty thousand two hundred	two hundred and fifty-one	Channel B5 filtering time	Read/ Write	

and fifty-two				
forty thousand two hundred and fifty-three	two hundred and fifty-two	Channel A6 filtering time	Read/ Write	
forty thousand two hundred and fifty-four	two hundred and fifty-three	Channel B6 filtering time	Read/ Write	
forty thousand two hundred and fifty-five	two hundred and fifty-four	Channel A7 filtering time	Read/ Write	
forty thousand two hundred and fifty-six	two hundred and fifty-five	Channel B7 filtering time	Read/ Write	
forty thousand two hundred and fifty-seven	two hundred and fifty-six	Channel A8 filtering time	Read/ Write	
forty thousand two hundred and fifty-eight	two hundred and fifty-seven	Channel B8 filtering time	Read/ Write	
forty thousand two hundred and fifty-nine	two hundred and fifty-eight	Channel A9 filtering time	Read/ Write	
forty thousand two hundred and sixty	two hundred and fifty-nine	Channel B9 filtering time	Read/ Write	

Table 5 Modbus Rtu Register Description

Communication example 1: If the module address is 01, send **010300100002C5CE** in hexadecimal to retrieve the data from the register.

01	03	00	ten	00	02	C5	CE
Module address	Read and hold register	Register Address High Bit	Low bit register address	Register quantity high	Low register quantity	CRC check low bit	CRC check high bit

If the module replies: **010304CA90FFFFC476**, the read data is 0xFFFCA90, which is converted to decimal as -13680, indicating that the current count value of encoder 3 is -13680.

01	03	04	CA	ninety	FF	FF	C4	seventy-six
Module address	Read and hold register	The number of bytes in the data	Data 1 high position	Data 1 Low Bit	Data 2 high bit	Data 2 Low Bit	CRC check low bit	CRC check high bit

Communication example 2: If the module address is 01, send **010300200002C5C1** in hexadecimal to retrieve the data from the register.

01	03	00	twenty	00	02	C5	C1
Module address	Read and hold register	Register Address High Bit	Low bit register address	Register quantity high	Low register quantity	CRC check low bit	CRC check high bit

If the module replies: 010304CA90FFFFC476, the read data is 0xFFFCA90, which is converted to decimal as 4294953616 , indicating that the current count value of channel B0 is 4294953616.

01	03	04	CA	ninety	FF	FF	C4	seventy-six
Module address	Read and hold register	The number of bytes in the data	Data 1 high position	Data 1 Low Bit	Data 2 high bit	Data 2 Low Bit	CRC check low bit	CRC check high bit

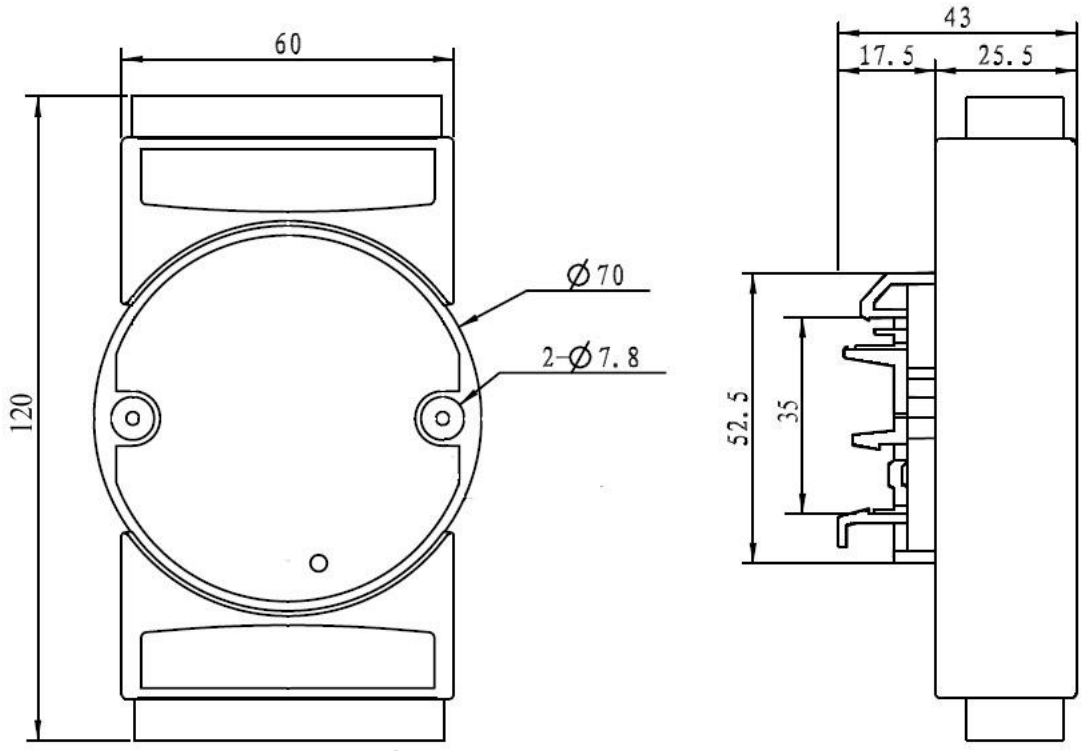
Communication example 3: If the module address is 01, send in hexadecimal: **01060043000AF819**, which means reset the count value of encoder 0.

01	06	00	forty-three	00	0A	F8	nineteen
Module address	Write a single hold register	Register Address High Bit	Low bit register address	data-high	data-low	CRC check low bit	CRC check high bit

If the module replies: 01060043000AF819, it means the setting is successful, and the count value of encoder 0 is changed to 0.

01	06	00	forty-three	00	0A	F8	nineteen
Module address	Write a single hold register	Register Address High Bit	Low bit register address	data-high	data-low	CRC check low bit	CRC check high bit

Dimensions: (Unit: mm)



Can be installed on standard DIN35 rails

guarantee:

Within two years from the date of sale, if the user complies with the storage, transportation, and usage requirements and the product quality is lower than the technical specifications, it can be returned to the factory for free repair. If damage is caused due to violation of operating regulations and requirements, device fees and maintenance fees shall be paid.

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