Encoder pulse counter, angular velocity displacement measurement, Modbus RTU module WJ66

WJ66

Product features:

●Encoders decode and convert to standard Modbus RTU protocol
●Can be used as an encoder counter or speed measurement
● Supports simultaneous counting of 4 encoders and can recognize forward and reverse rotation
●Built in 8 DOs can be used as encoder upper and lower limit alarm outputs
● Power off automatically saves counter data
● Built in DO, each channel can independently output PWM signals
● 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
●Low cost, small volume modular design
● Dimensions: 120mm x 70mm x 43mm

Typical applications:

●Encoder pulse signal measurement
● Displacement or angle measurement
● Motor speed measurement and control
●Replace the meter counter to control multiple devices
●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 WJ66 product realizes signal acquisition between sensors and hosts, used for decoding encoder signals and device control. The WJ66 series products can be applied to industrial automation control systems, automated machine tools, industrial robots, coordinate positioning systems, displacement measurement, stroke measurement, angle measurement, speed measurement, and more, based on the RS-232/485 bus.

The product includes pulse signal capture, signal conversion, and RS-485 serial communication. Each serial port can connect up to 255 WJ66 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.

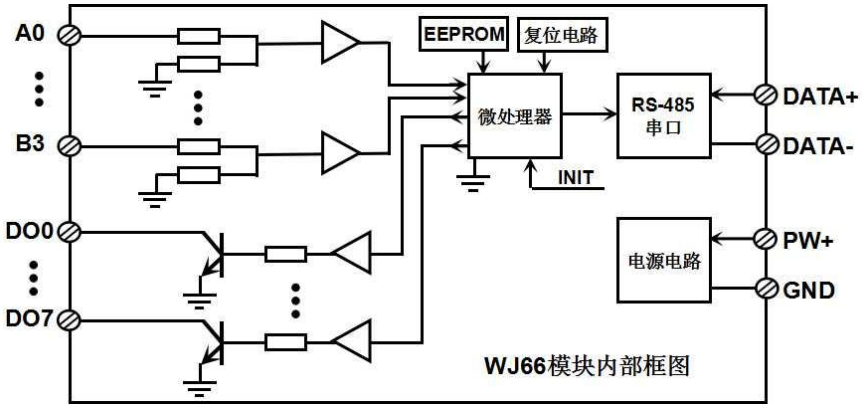


Figure 2 Internal Block Diagram of WJ66 Module

The WJ66 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 WJ66 series products are designed and manufactured according to industrial standards, with strong anti-interference ability and high reliability. The working temperature range is -45 ℃ to+85 ℃.

Function Introduction:

The WJ66 remote I/O module can be used to measure four encoder signals and has eight switch outputs. It can be used as a 4-channel encoder counter or 4-channel speed measurement, and can also output 8-channel PWM signals.

1、 Signal input and output

4-channel encoder signal input, can be connected to dry and wet contacts, please refer to the wiring diagram for details; 8-channel switch signal output with open collector output.

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.

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:

WJ66 - □

└ Communication interface

485: Output as RS-485 interface

232: Output as RS-232 interface

Selection Example 1: Model: **WJ66-232** indicates an output of RS-232 interface

Selection Example 2: Model: **WJ66-485** indicates output as RS-485 interface

WJ66 General Parameters:

(Typical @+25 ℃, Vs is 24VDC)

Input type: Encoder AB signal input, 4-channel (A0/B0~A3/B3).

Low level: Input<1V; High level: Input 3.5~30V

Frequency range 0-50KHz

Counting range -2147483647 ~+2147483647 , automatically saved upon power failure

Input resistance: 30K Ω

Output type: open collector output, voltage 0~30V, maximum load current 30mA, 8 channels (DO0~DO7).

PWM frequency 1~65535Hz, duty cycle 0%~100%

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 0.5W

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	DO7	Channel 7 switch signal output terminal	**eleven**	DO1	Channel 1 switch signal output terminal
two	DO6	Channel 6 switch signal output terminal	**twelve**	DO0	Channel 0 switch signal output terminal
three	DO5	Channel 5 switch signal output terminal	**thirteen**	A0	Encoder 0 signal A input terminal
four	DO4	Channel 4 switch signal output terminal	**fourteen**	B0	Encoder 0 signal B input terminal
five	DO3	Channel 3 switch signal output terminal	**fifteen**	A1	Encoder 1 signal A input terminal
six	DO2	Channel 2 switch signal output terminal	**sixteen**	B1	Encoder 1 signal B input terminal
seven	DATA+	RS-485 signal positive terminal	**seventeen**	A2	Encoder 2 signal A input terminal
eight	DATA-	RS-485 signal negative terminal	**eighteen**	B2	Encoder 2 signal B input terminal
nine	PW+	Positive end of power supply	**nineteen**	A3	Encoder 3 signal A input terminal
ten	GND	Negative terminal of power supply, signal ground	**twenty**	B3	Encoder 3 signal B input terminal

Table 1 Pin Definition

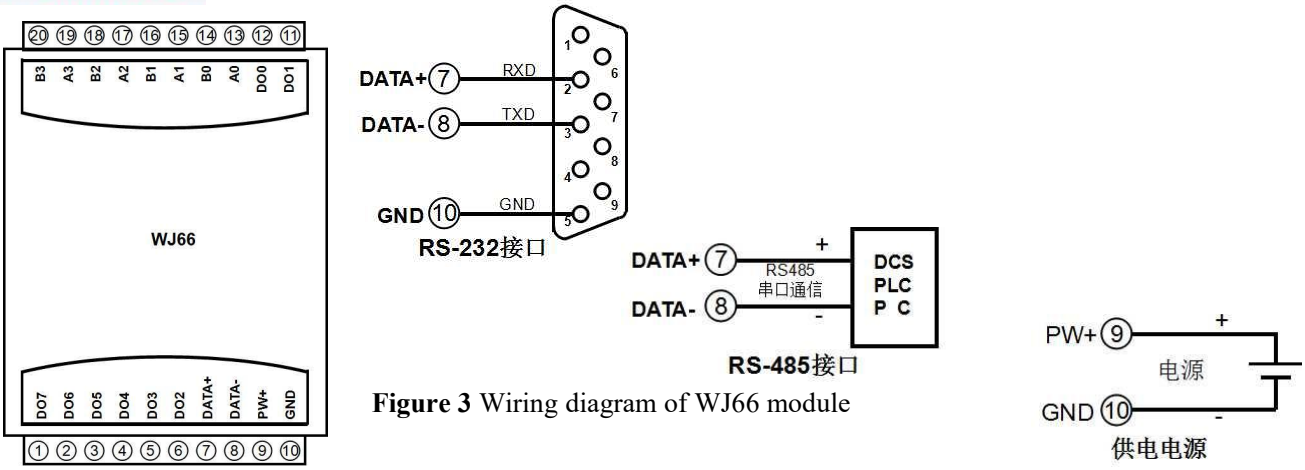
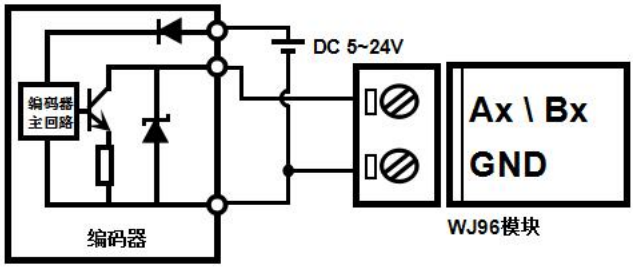
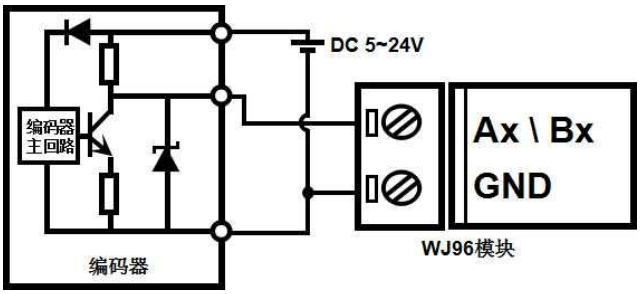
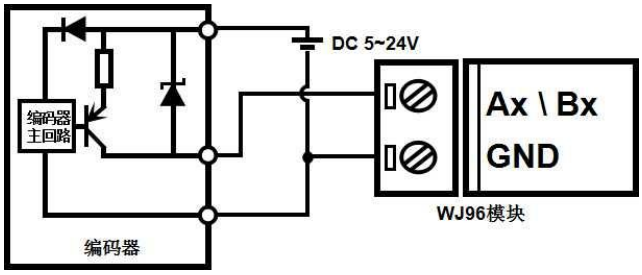
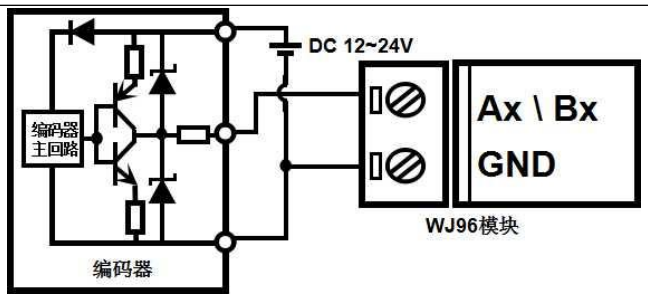


Figure 3 Wiring diagram of WJ66 module

Encoder alarm output port

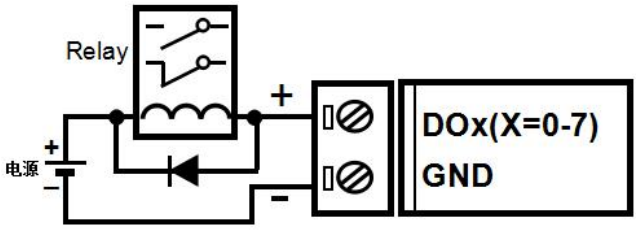
Encoder 0 upper limit alarm output port	DO0
Encoder 1 upper limit alarm output port	DO1
Encoder 2 upper limit alarm output port	DO2
Encoder 3 upper limit alarm output port	DO3
Encoder 0 lower limit alarm output port	DO4
Encoder 1 lower limit alarm output port	DO5
Encoder 2 lower limit alarm output port	DO6
Encoder 3 lower limit alarm output port	DO7

Encoder signal input wiring diagram

NPN encoder	**NPN encoder with pull-up resistor**
	
Need to open the internal pull-up resistor, set the 40082 register to 1, or send the character command $01Q1X	Need to turn off the internal pull-up resistor, set the 40082 register to 0, or send the character command $01Q0X
PNP encoder	**Push-pull encoder**
	
Need to turn off the internal pull-up resistor, set the 40082 register to 0, or send the character command $01Q0X	Need to turn off the internal pull-up resistor, set the 40082 register to 0, or send the character command $01Q0X

Note: The factory default is to turn off the pull-up function

Wiring diagram for switch signal output

Drive Relay	Level output
	
External power supply can be selected from 5~30VDC It can also be a power source that supplies power to the module The working current of the transistor is less than 30mA **Need to turn off the internal pull-up resistor, set the 40083 register to 0, or send the character command $01QX0**	Output high level equal to power supply voltage **Need to open the internal pull-up resistor, set the 40083 register to 1, or send the character command $01QX1.**

Note: The factory default is to turn off the pull-up function

WJ66 Character Protocol Command Set:

The factory initial settings of the module are as follows:

The address code is 01

Baud rate 9600 bps

Prohibition of checksum verification

If using an RS-485 network, a unique address code must be assigned, which is a hexadecimal number between 00 and FF. Since the address codes of new modules are the same, their addresses will conflict with other modules. Therefore, when building the system, you must reconfigure the addresses of each WJ66 module. After connecting the power cord and RS485 communication line of the WJ66 module, the address of the WJ66 module can be modified through configuration commands. The baud rate and checksum status also need to be adjusted according to the user's requirements. Before modifying the baud rate and checksum status, the module must first enter the default state, otherwise it cannot be modified.

Method to put the module into default state:

There is an Initiate switch located on the side of the WJ66 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 configuration of the module is as follows:

The address code is 00

Baud rate 9600 bps

Prohibition of checksum verification

At this point, the baud rate, checksum status, and other parameters of the WJ66 module can be modified through configuration commands. When unsure of the specific configuration of a module, the Initiat switch can also be turned

to the Initiat position to put the module into default mode, and then the module can be reconfigured.

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

The character protocol command consists of a series of characters, such as the prefix, address ID, variables, optional checksum bytes, and a command terminator **(cr)** used to display the command. The host only commands one WJ66 module at a time, except for synchronous commands with wildcard address "* *".

Command format: **(Leading Code) (Addr) (Command) [data] [checksummary] (cr)**

The **leading code** is the first letter in the command. All commands require a command prefix, such as%, $, #, @ Wait. **1-character**

The address code of the **(Addr)** module, if not specified below, ranges from 00 to FF (hexadecimal). **2-character**

(Command) displays command code or variable values. **Variable length**

[data] Some data required for output commands. **Variable length**

The **Checksum** in parentheses is an optional parameter that is only required when checksum is enabled. **2-character**

(cr) is a control code symbol used for recognition, and (cr**)** serves as the carriage return terminator with a value of 0x0D. **1-character**

When checksum is enabled, [Checksum] is required. It occupies 2 characters. Both commands and responses must be accompanied by checksum features. The checksum is used to check all input commands to help you detect errors in host to module commands and module to host responses. The checksum character is placed after the command or response character and before the carriage return.

Calculation method: Two characters, hexadecimal number, which is the sum of the ASCII code values of all the characters previously sent, and then combined with the hexadecimal number 0xFF to obtain the result.

Application example: Prohibit checksum

User command **$002 (cr)**

Module response**! 00020600 (cr)**

Enable checksum

User command **$002B6 (cr)**

Module response**! 00020600 A9 (cr)**

'$' = 0x24 '0' = 0x30 '2' = 0x32

B6=(0x24+0x30+0x30+0x32) AND 0xFF

'**!**' = 0x21 '0' = 0x30 '2' = 0x32 '6' = 0x36

A9=(0x21+0x30+0x30+0x30+0x32+0x30+0x36+0x30+0x30) AND 0xFF

Response to Command:

The response information depends on various commands. The response also consists of several characters, including the initial code, variables, and ending identifier. There are two types of initial codes for response signals, '**!**' Or '**>**' represents a valid command while '**?**' It represents invalidity. By checking the response information, it is possible to monitor whether the command is valid

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.

3. (cr) represents the Enter key on the keyboard, do not write it directly, it should be typed with the Enter key.

1. Read switch status command

Explanation: Read back all output channel switch status, switch reset status, and encoder input channel switch status

from the module.

Command format: **# AA (cr)**

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.

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

Response format:>**AAAAAAAA, BBBBBBB, CCCCCCCC (cr)** command is valid.

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

Parameter description:>delimiter. Hexadecimal is 3EH

AAAAAAAA represents the read output switch status, consisting of 8 numbers arranged in the order of DO7~DO0,

Value 0: Output transistor disconnected; Value 1: Output transistor connected

BBBBBB represents the read reset output switch status, consisting of 8 numbers arranged in the order of DO7~DO0,

Value 0: Output transistor disconnected; Value 1: Output transistor connected

CCCCCCCC 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 (cr)**

Module response (character format)**>00011000000011000000111 (cr)**

Explanation: The module output switch status is 00011000, arranged in the order of DO7~DO0

Channel 0: transistor disconnected Channel 1: transistor disconnected Channel 2: transistor disconnected Channel 3: transistor connected

Channel 4: transistor connected Channel 5: transistor disconnected Channel 6: transistor disconnected Channel 7: transistor disconnected

After resetting the module, the output switch status is 00001010, arranged in the order of DO7~DO0

Channel 0: transistor disconnected Channel 1: transistor connected Channel 2: transistor disconnected Channel 3: transistor connected

Channel 4: transistor disconnection Channel 5: transistor disconnection Channel 6: transistor disconnection Channel 7: transistor disconnection

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

2. Set transistor output command

Description: Set the status of all output channel transistors. The factory setting for all channels is 00000000.

Command format: **# AA1ABCD (cr)**

Parameter description: # delimiter. Hexadecimal is 24H

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.

1 represents setting the transistor output command

AB channel selection, can choose all output channels or a single output channel.

Set output: Setting AB to 00 means setting all output channels. If setting a single channel, character

A must be set to 1, and character B can be set to 0-7, representing 8 transistor DO output channels.
Set reset output: Setting AB to FF means setting the reset output values for all channels. If setting the reset output for a single channel, character A must be set to E, and character B can be set to 0-7, representing 8 transistor DO output channels.

CD output value.

1， If it is set for all channels (AB=00 or AB=FF)
Then there are two hexadecimal numbers, as shown in the figure on the right
C represents channels 7 to 4
D represents channels 3 to 0

C				D			
DO7	DO6	DO5	DO4	DO3	DO2	DO1	DO0

Bit value is 0:
Set the output transistor to disconnect
Bit value is 1:
Set the output transistor to turn on

2， If it is set for a single channel (AB=1X or AB=EX, where X represents the channel to be set), it can only be set to 00 or 01,
00: Set the X-channel output transistor to disconnect
01: Set the X-channel output transistor to turn on

(cr) End symbol, upper computer enter key, hexadecimal is 0DH.
Response format:**!** The **01 (cr)** command is valid.
? The **01 (cr)** command is invalid or an illegal operation.
Application example 1: User command (character format) **# 011000F (cr)**
Module response (character format)**! 01(cr)**
Explanation: Set the output of all channels (AB=00) to 0FH, and convert it to binary to 0000 1111,
So the switch state output by the module is:
Channel 0: transistor connected Channel 1: transistor connected Channel 2: transistor connected Channel 3: transistor connected
Channel 4: transistor disconnection Channel 5: transistor disconnection Channel 6: transistor disconnection Channel 7: transistor disconnection

Application example 2: User command (character format) **# 0111201 (cr)**
Module response (character format)**! 01(cr)**
Explanation: Set the transistor of channel 2 to be connected.
Application Example 3: User Command (Character Format) **# 011FFFF (cr)**
Module response (character format)**! 01(cr)**
Explanation: Set the reset output of all channels (AB=FF) to FFH, which is converted to binary as 1111 1111,
After the module is reset, all channel transistors are turned on.

3. Read encoder counter data command

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 (cr)**
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 3 counter data.

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

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

Command format: **# AA2N (cr)**

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.

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

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

Application example 1: User command (character format) **# 012 (cr)**

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

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

Application example 2: User command (character format) **# 0120 (cr)**

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

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

4. Read input frequency command

Explanation: To read the input frequency, it 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 frequency command input from encoder 0 to encoder 3.

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

Response format:+ **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.

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

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

Application example 1: User command (character format) **# 013 (cr)**

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

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

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

5. Read and output PWM commands

Explanation: Reading the output PWM can read all channels, single channels, and reset PWM values.

Command format: **# AA4 (cr)** Read PWM values for channels 0 to 7

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.

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

Response format:**! AAA.AA, AAA.AA, AAA.AA, AAA.AA, AAA.AA, AAA.AA, AAA.AA, AAA.AA(cr)**

Command format: **# AA4S (cr)** Read Channel 0~Channel 7 Reset PWM Value

Response format:**! AAA.AA, AAA.AA, AAA.AA, AAA.AA, AAA.AA, AAA.AA, AAA.AA, AAA.AA(cr)**

Command format: **# AA4N (cr)** Read PWM value of channel N

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

Command format: **# AA4SN (cr)** Read the reset PWM value of channel N

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

Application example 1: User command (character format) **# 014 (cr)**

Module response (character format)**! 050.00,050.00,050.00,050.00,050.00,050.00,050.00,050.00(cr)**

Explanation: The PWM value for all channels is 50%.

Application example 2: User command (character format) **# 0140 (cr)**

Module response (character format)**! 050.00(cr)**

Explanation: The PWM value for channel 0 is 50%.

6. Set PWM command

Explanation: Setting the output PWM value or resetting the PWM value can only be set for a single channel. The factory setting for all channels is 050.00.

Command format: **# AA5NAAA AA (cr)** sets the PWM value for channel N

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.

N-channel, with a value range of 0-7.

AAA.AA sets the output PWM value within the range of **000.00~100.00**

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

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

Command format: **# 015SNAAA AA (cr)** sets the reset PWM value for channel N

Response format:**! AAcr)** indicates successful setting

Application example 1: User command (character format) **# 0150050.00 (cr)**

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

Explanation: Set the PWM value for channel 0 to 50%.

Application Example 2: User Command (Character Format) **# 015S0050.00 (cr)**

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

Explanation: Set the reset PWM value for channel 0 to 50%.

7. Read the frequency command of PWM

Explanation: Read the output PWM frequency and also read the reset PWM frequency.

Command format: **# AA6 (cr)** Read PWM frequency

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.

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

Response format:**!** AAAAA**, BBBBB (cr)** AAAAA represents the frequency of channels 0-3, BBBBB represents the frequency of channels 4-7

Command format: **# AA6S** read reset PWM value

Response format:**! AAAAA, BBBBB (cr)** AAAAA represents the reset frequency of channels 0-3, BBBBB represents the reset frequency of channels 4-7

Application example 1: User command (character format) **# 016 (cr)**

Module response (character format)**! 01000,02000(cr)**

Explanation: The PWM frequency for channels 0-3 is 1KHz, and the PWM frequency for channels 4-7 is 2KHz.

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

Module response (character format)**! 00100,00200 (cr)**

Explanation: The PWM reset frequency for channels 0-3 is 100Hz, and the PWM reset frequency for channels 4-7 is 200Hz.

8. Set PWM frequency command

Explanation: To set the output PWM frequency or reset PWM frequency, only a single channel can be set. Range 00000~65535, set to 00000 to turn off PWM output and output as switch level output. The factory setting for all channels is 00000.

Command format: **# AA7NAAAA (cr)** N=0 indicates setting the PWM frequency for channels 0-3, and N=1 indicates setting the PWM frequency for channels 4-7.

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.

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

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

Command format: **# AA7SNAAAAA (cr)** N=0 indicates setting the PWM reset frequency for channels 0-3, N=1 indicates setting the PWM reset frequency for channels 4-7.

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

Application example 1: User command (character format) **# 017000100 (cr)**

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

Explanation: Set the PWM frequency of channels 0-3 to 100Hz.

Application example 2: User command (character format) **# 017S100500 (cr)**

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

Explanation: Set the reset PWM frequency for channels 4-7 to 500Hz.

9. Read input speed command

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

Command format: **# AA8**

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.

8 represents the input speed command from encoder 0 to encoder 3.

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

Response format:+ **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.

8 represents the read input speed command.

N represents the input speed command of encoder N.

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

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

Application example 1: User command (character format) **# 018 (cr)**

Module response (character format)**+ 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) **# 0180 (cr)**

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

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

10. Modify the numerical command of the encoder counter

Explanation: You can modify the value of the encoder counter or reset it to zero to start counting again. After modifying the count value, the alarm will be automatically cleared.

Command format: **$AA1N+AAAAAAAAA (cr)** Modify the count value of encoder N. N is the encoder code, and setting N to 'A' means setting the counters 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.

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

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

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

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

Explanation: Set the count value of encoder 3 to 0, and if there is an alarm, it will be automatically cleared.

Application example 2: User command (character format) **$011A+0000000000 (cr)**

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

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

Application example 3: User command (character format) **$011A+0000003000 (cr)**

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

Explanation: Set the count value of all encoders to+3000, and if there is an alarm, it will be automatically cleared.

11. Set PWM output reverse command

Explanation: Set whether the PWM output needs to be inverted between high and low levels before outputting. The factory setting is 00000000.

Command format: **$AA3BBBBBB (cr)** Set whether the PWM output takes the reverse command.

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.

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

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

Parameter description: **BBBBBB** represents the switch state, with 8 numbers arranged in the order of DO7~DO0

Value 0: The PWM output of this channel is normal; Value 1: The PWM of this channel takes the inverse output

Application example: User command (character format) **$013000000 (cr)**

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

Explanation: Set all channel PWM to output normally.

12. Read whether the PWM output takes the reverse command

Explanation: Check if the PWM output is set to reverse.

Command format: **$AA4 (cr)** Read PWM output with reverse command.

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.

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

Response format:**! BBBBBBB (cr)** indicates whether the PWM output is set to reverse

Parameter description: **BBBBBB** represents the switch state, with 8 numbers arranged in the order of DO7~DO0

Value 0: The PWM output of this channel is normal; Value 1: The PWM of this channel takes the inverse output

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

Module response (character format)**! 11111110(cr)**

Explanation: The 0-channel PWM outputs normally, while the 1-7 channel PWM outputs in reverse.

13. Set the number of pulses per revolution for the encoder

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 (cr)** Set 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 3.

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

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

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.

14. Read the number of pulses per revolution of the encoder

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

Command format: **$AA6 (cr)** reads the number of pulses per revolution for all encoders, arranged in order of 0-3.

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.

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

Response format:**! AAAAA, AAAAA, AAAAA, AAAAA (cr)** represents the number of pulses per revolution from encoder 0 to encoder 3.

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

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

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

15. Set the working mode of the encoder

Description: Set the working mode of the encoder.

Command format: **$AA7NAA (cr)** sets 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.

Command **to** set the working mode of the encoder.

N encoder code, with values ranging from 0 to 3.

AA represents the working mode. Range 00~05, **in alarm mode, DO** is **used as** a **switch alarm output and cannot** be **used as** a **PWM output.**

00, default value, normal mode

01, Upper limit alarm mode

02, Lower limit alarm mode

03, both upper and lower limit alarm modes

04, standby mode, temporarily not needed

05, standby mode, temporarily not needed

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

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

Application example: User command (character format) **$017101 (cr)**

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

Explanation: Set encoder 1 to the upper limit alarm mode.

16. Read the working mode of the encoder

Description: Read the working mode of all encoders.

Command format: **$AA8 (cr)** reads the working mode of all encoders, arranged in sequence from 0 to 3.

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.

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

Response format:**! AA, AA, AA, AA (cr)** represent the working modes of encoders 0 to 3.

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

Module response (character format)**! 03, 03, 03, 03 (cr)**

Explanation: All encoders are in alarm mode for both upper and lower limits.

17. Set the upper and lower alarm values for the encoder

Explanation: Set the upper and lower alarm values of the encoder, and activate the alarm according to different working modes.

Command format: **$AASN+AAAAAAAA,+BBBBBBBB (cr)** Set the upper and lower alarm values 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.

S sets the encoder alarm value command.

N encoder code, with values ranging from 0 to 3.

+AAAAAAAAA represents the upper limit alarm value.

+BBBBBBB represents the lower limit alarm value.

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

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

Application example: User command (character format) **$01S0+0123456790, -00000 12345 (cr)**

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

Explanation: Set encoder 0 to have an upper limit alarm value of 1234567890 and a lower limit alarm value of -12345.

18. Set the alarm time for the encoder

Description: Set the alarm time command for the encoder. The alarm time, with a default value of 0, indicates that both the alarm signal and the counter need to be cleared by instructions from the upper computer. If it is any other value, multiplying it by 0.01 seconds will result in the actual duration of the alarm. After reaching the alarm time, the alarm signal will automatically clear and the count value of the encoder will also automatically reset to zero.

Command format: **$AATNAAAAA, BBBBB (cr)** Set the upper and lower alarm times 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.

Set the encoder alarm time command for **T**.

N encoder code, with values ranging from 0 to 3.

AAAAA represents the upper limit alarm time. Range 0~65535.

BBBBB represents the lower limit alarm time. Range 0~65535.

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

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

Application example: User command (character format) **$01T10500002000 (cr)**

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

Explanation: Set encoder 1 to have an upper limit alarm time of 50 seconds and a lower limit alarm time of 20 seconds.

19. Read the upper limit alarm value, lower limit alarm value, and alarm time of the encoder

Description: Read the upper limit alarm value, lower limit alarm value, and alarm time of the specified encoder.

Command format: **$AAR (cr)** reads the alarm time of all encoders, arranged in an upper limit of 0-3 and a lower limit of 0-3.

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.

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

Response format:**+ AAAAAAAAAA, +AAAAAAAAAA, +AAAAAAAAAA, +AAAAAAAAAA, +BBBBBBBBBB, +BBBBBBBBBB, +BBBBBBBBBB, +BBBBBBBBBB, CCCCC, CCCCC, CCCCC, CCCCC, DDDDD, DDDDD, DDDDD, DDDDD(cr)**

+AAAAAAAAA represents the upper limit alarm value of encoder 0~encoder 3

+BBBBBBBB represents the lower limit alarm value of encoder 0~encoder 3

CCCCC represents the upper limit alarm time for encoders 0 to 3.

DDDDD represents the lower limit alarm time of encoders 0 to 3.

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

Module response (character format)**+ 0000012345, +0000012345, +0000012345, +0000012345, -0000002000, -0000002000, -0000002000, -0000002000,03000, 03000, 03000, 03000,03000, 03000, 03000, 03000 (cr)**

Explanation: The upper limit alarm value of all encoders is+12345, and the lower limit alarm value is -2000,

The upper and lower alarm times are both 30 seconds.

20. Set whether the encoder count value is automatically saved when the power is turned off

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

Command format: **$AAXW**

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 value of the **X** encoder when it is powered off.

W 0: Do not automatically save, power off and reset to zero; 1: Power off automatically saves the encoder count value.

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

Application example: User command (character format) **$01X0**

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

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

21. Set the pull-up switches for DI and DO

Description: Set the pull-up switch for DI and DO, with a factory default value of 00 (both DI and DO have the pull-up function turned off).

Command format: **$AAQXY**

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.

Set the pull-up switch command for DI and DO.

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

Y 0: DO turns off the pull-up voltage; 1: Connect the pull-up voltage to DO. X: Keep the original settings.

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

Application example: User command (character format) **$01Q11**

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

Explanation: Set both DI and DO to apply pull-up voltage. When DI is an NPN input, it can be set to turn on the DI pull-up voltage.

When DO requires voltage output, it can be set to turn on the DO pull-up voltage.

22. 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 (cr)** 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.

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

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.

23. Configure WJ66 module command

Explanation: Set the address, baud rate, and checksum status for a WJ66 module. The configuration information is stored in non-volatile memory EEPROM.

Command format:**% AANNTTCCFF (cr)**

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 WJ66 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-bit hexadecimal to represent data format and checksum. Note that from bits2 to bits5, it is not necessary to set it to zero.

Bit7	Bit 6	Bit 5	Bit 4	Bit 3	Bit2	Bit 1	Bit 0

Table 3 Data format, checksum code

Bit7: Reserved bit, must be set to zero

Bit6: checksum status, 0: prohibited; For 1: Allow

Bit5-bit2: No need, it must be set to zero.

Bit1-bit0: Data format bit. 00: Engineering Units

10: Two complement in hexadecimal

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

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 module is reconfigured to change the address, input range, and data format, AA equals the currently configured address, and NN equals the current or new address. If you want to reconfigure the module to change the baud rate or checksum status, you must install a configuration jumper to put the module into the default state. At this time, the module address is 00H, that is, AA=00H, NN is equal to the current or 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 (cr)**

Module response**! 11(cr)**

Explanation:**%** delimiter.

00 means that the original address of the WJ66 module you want to configure is 00H.

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

00 type code, WJ66 product must be set to 00.

06 represents a baud rate of 9600 baud.

00 indicates that the data format is in engineering units and checksum is prohibited.

24. Read configuration status command

Explanation: Read configuration for a specified WJ66 module.

Command format: **$AA2 (cr)**

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 is shown in Table 3

(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 **$302 (cr)**

Module response**! 300F0600(cr)**

Explanation:**!** Boundary symbol.

30 indicates that the WJ66 module address is 30H.

00 represents the input type code.

06 represents a baud rate of 9600 baud.

00 indicates that checksum is prohibited.

Modbus RTU communication protocol:

The factory initial settings of the module are as follows:

The Modbus address is 01

Baud rate 9600 bps

Method to put the module into default state:

There is an Initiate switch located on the side of the WJ66 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 WJ66 are as follows:

Function code		name	explain
01	Read Coil Status	Read coil status	1 represents high level, 0 represents low level.
03	Read Holding Register	Read and hold register	1 represents high level, 0 represents low level.
05	Write Single Coil	Write a single coil	1 indicates that the transistor is conducting, and 0 indicates that the transistor is disconnected.
06	Write Single Register	Write a single register	1 indicates that the transistor is conducting, and 0 indicates that the transistor is disconnected.
fifteen	Write Multiple Coils	Write multiple coils	
sixteen	Write Multiple Registers	Write multiple registers	

Register Address Description for WJ66

Supports registers with function codes 01, 05, and 15

Address 0X (PLC)	Address (PC, DCS)	Data content	attribute	Data Explanation
00001	0	Output switch quantity	Read/ Write	Output status of channels 0~7 0 indicates that the transistor is disconnected, 1 indicates that the transistor is conducting
00002	one	Output switch quantity	Read/ Write	
00003	two	Output switch quantity	Read/ Write	
00004	three	Output switch quantity	Read/ Write	
00005	four	Output switch quantity	Read/ Write	
00006	five	Output switch quantity	Read/ Write	
00007	six	Output switch	Read/	

		quantity	Write	
00008	seven	Output switch quantity	Read/ Write	
00009	eight	Output switch quantity	Read/ Write	Reset output status of channels 0-7 (default value is 0) 0 indicates that the transistor is disconnected after resetting, 1 indicates that the transistor conducts after resetting
00010	nine	Output switch quantity	Read/ Write	
00011	ten	Output switch quantity	Read/ Write	
00012	eleven	Output switch quantity	Read/ Write	
00013	twelve	Output switch quantity	Read/ Write	
00014	thirteen	Output switch quantity	Read/ Write	
00015	fourteen	Output switch quantity	Read/ Write	
00016	fifteen	Output switch quantity	Read/ Write	
00017	sixteen	Channel 0 output inversion	Read/ Write	Channels 0~7, (default value is 0) 0 indicates normal PWM output, 1 represents the output after PWM inversion
00018	seventeen	Channel 1 output is reversed	Read/ Write	
00019	eighteen	Channel 2 output inversion	Read/ Write	
00020	nineteen	Channel 3 output inversion	Read/ Write	
00021	twenty	Channel 4 output inversion	Read/ Write	
00022	twenty-one	Channel 5 output inversion	Read/ Write	
00023	twenty-two	Channel 6 output inversion	Read/ Write	
00024	twenty-three	Channel 7 output inversion	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	read-on	

		quantity	ly	
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	

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	PWM0	Read/ Write	Output channels 0-7, PWM output value, Integer, range 0~10000
forty thousand and two	one	PWM1	Read/ Write	
forty thousand and three	two	PWM2	Read/ Write	
forty thousand and four	three	PWM3	Read/ Write	
forty thousand and five	four	PWM4	Read/ Write	
forty thousand and six	five	PWM5	Read/ Write	
forty thousand and seven	six	PWM6	Read/ Write	
forty thousand and eight	seven	PWM7	Read/ Write	
forty thousand and nine	eight	Channel 0~3 pulse frequency	Read/ Write	Output PWM pulse frequency, (default value is 0) Integer, range 0~65535 Hz Set to 0, indicating switch output Set to 1~65535, indicating PWM output
forty thousand and ten	nine	Channel 4-7 pulse frequency	Read/ Write	
40017~40018	16~17	Encoder 0 count	Read/ Write	Encoder 0-3 counter The data is a signed long integer in hexadecimal format, with negative numbers using two complement,
40019~40020	18~19	Encoder 1 Count	Read/ Write	

40021~40022	20~21	Encoder 2 Count	Read/ Write	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. If there is an alarm, modifying the count value will automatically clear the alarm.
40023~40024	22~23	Encoder 3 Count	Read/ Write	
forty thousand and twenty-seven	twenty-six	Count reset register	Read/ Write	Unsigned integer, default to 0 Modify this register to reset the count value of the encoder. 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 all encoder count values to 0, Writing other values is invalid, do not reset the encoder. If there is an alarm, resetting the count value will automatically clear the alarm.
forty thousand and twenty-nine	twenty-eight	Number of pulses for encoder 0	Read/ Write	Unsigned integer (default value at factory is 1000), set according to the number of pulses per revolution of the encoder, and registers 40101~40104 are the corresponding channel speeds after setting.
forty thousand and thirty	twenty-nine	Pulse count of encoder 1	Read/ Write	
forty thousand and thirty-one	thirty	Pulse count of encoder 2	Read/ Write	
forty thousand and thirty-two	thirty-one	Pulse count of encoder 3	Read/ Write	
forty thousand and thirty-three	thirty-two	Encoder 0 working mode	Read/ Write	Integer, range 0x0000-0x0005 0x0000, default value, normal mode 0x0001, upper limit alarm mode 0x0002, lower limit alarm mode 0x0003, both upper and lower limit alarm modes 0x0004, standby mode, temporarily not needed 0x0005, standby mode, temporarily not
forty thousand and thirty-four	thirty-three	Encoder 1 working mode	Read/ Write	
forty thousand and thirty-five	thirty-four	Encoder 2 working mode	Read/ Write	
forty thousand and thirty-six	thirty-five	Encoder 3 working mode	Read/ Write	

				needed **Note: In alarm mode, DO is used as a switch alarm output and cannot be used as a PWM output.**
Address 4X (PLC)	**Address (PC, DCS)**	**Data content**	**attribute**	**Data Explanation**
40041~40042	40~41	Encoder 0 upper limit value	Read/ Write	Encoder 0-3 upper limit alarm value and lower limit alarm value, The default value is 0. The data is a signed long integer in hexadecimal format, with negative numbers using two complement, Positive numbers (0x0000000~0x7FFFFFF), Negative numbers (0xFFFFFFFF~0x8000001),
40043~40044	42~43	Encoder 1 upper limit value	Read/ Write	
40045~40046	44~45	Encoder 2 upper limit value	Read/ Write	
40047~40048	46~47	Encoder 3 upper limit value	Read/ Write	
40049~40050	48~49	Encoder 0 lower limit value	Read/ Write	
40051~40052	50~51	Encoder 1 lower limit value	Read/ Write	
40053~40054	52~53	Encoder 2 lower limit value	Read/ Write	
40055~40056	54~55	Encoder 3 lower limit value	Read/ Write	
forty thousand and fifty-seven	fifty-six	Encoder 0 upper limit time	Read/ Write	Unsigned integer, range 0x0000-0xFFFF The alarm time, with a default value of 0, indicates that both the alarm signal and the counter need to be cleared by the upper computer by issuing a command to modify the counter. If it is any other value, multiplying it by 0.01 seconds will result in the actual duration of the alarm. After reaching the alarm time, the alarm signal will automatically clear and the count value of the encoder will also automatically reset to zero.
forty thousand and fifty-eight	fifty-seven	Encoder 1 upper limit time	Read/ Write	
forty thousand and fifty-nine	fifty-eight	Encoder 2 upper limit time	Read/ Write	
forty thousand and sixty	fifty-nine	Encoder 3 upper limit time	Read/ Write	
forty thousand and sixty-one	sixty	Encoder 0 lower limit time	Read/ Write	
forty thousand and sixty-two	sixty-one	Encoder 1 lower limit time	Read/ Write	
forty thousand and sixty-three	sixty-two	Encoder 2 lower limit time	Read/ Write	
forty thousand and sixty-four	sixty-three	Encoder 3 lower limit time	Read/ Write	
forty thousand and sixty-five	sixty-four	PWM0 reset output value	Read/ Write	PWM reset output values for channels 0 to 7, (The default value is 5000) Integer, range 0~10000
forty thousand and sixty-six	sixty-five	PWM1 reset output value	Read/ Write	
forty thousand and sixty-seven	sixty-six	PWM2 reset output value	Read/ Write	
forty thousand	sixty-seven	PWM3 reset output	Read/	

and sixty-eight		value	Write	
forty thousand and sixty-nine	sixty-eight	PWM4 reset output value	Read/ Write	
forty thousand and seventy	sixty-nine	PWM5 reset output value	Read/ Write	
forty thousand and seventy-one	seventy	PWM6 reset output value	Read/ Write	
forty thousand and seventy-two	seventy-one	PWM7 reset output value	Read/ Write	
forty thousand and seventy-three	seventy-two	Channel 0~3 frequency reset value	Read/ Write	Pulse frequency reset output value, (default value is 0) Integer, range 0~65535 Hz Set to 0, indicating switch output Set to 1~65535, indicating PWM output
forty thousand and seventy-four	seventy-three	Channel 4-7 frequency reset value	Read/ Write	
forty thousand and eighty-one	eighty	Encoder count value automatically saved	Read/ Write	0: Do not automatically save, power off and reset to zero; 1: Power off automatically saves the encoder count value. (Default value is 1)
forty thousand and eighty-two	eighty-one	DI's pull-up switch	Read/ Write	0: DI turns off the pull-up voltage; (default value is 0) 1: Connect the pull-up voltage to DI.
forty thousand and eighty-three	eighty-two	DO's pull-up switch	Read/ Write	0: DO turns off the pull-up voltage; (default value is 0) 1: Connect the pull-up voltage to DO.
forty thousand and eighty-nine	eighty-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 one hundred and one	one hundred	Encoder 0's rotational speed	read-only	Signed integer, positive or negative indicates positive or negative reversal. The speed is calculated based on the number of pulses set in registers 40029~40032.
forty thousand one hundred and two	one hundred and one	Speed of encoder 1	read-only	
forty thousand one hundred and three	one hundred and two	Speed of encoder 2	read-only	
forty thousand one hundred	one hundred and three	The speed of encoder 3	read-only	

and four				
Address 4X (PLC)	**Address (PC, DCS)**	**Data content**	**attribute**	**Data Explanation**
40129~40130	128~129	The frequency of encoder 0	read-only	32-bit floating-point number, collected frequency. The storage order is CDAB.
40131~40132	130~131	Frequency of Encoder 1	read-only	
40133~40134	132~133	Frequency of Encoder 2	read-only	
40135~40136	134~135	The frequency of encoder 3	read-only	
forty thousand two hundred and one	two hundred	Module address	Read/ Write	Integer, effective after restart, range 0x0000-0x00FF
forty thousand two hundred and two	two hundred and one	Baud rate	Read/ Write	Integer, effective after restart, range 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 eleven	two hundred and ten	Module Name	read-only	High bit: 0x00 Low bit: 0x66

Table 5 Modbus Rtu Register Description

Communication example 1: If the module address is 01, send in hexadecimal: **010300000001840A** to retrieve the data from the register.

01	03	00	00	00	01	eighty-four	0A
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: **0103020333F8A1**, the read data is 0x0333. If it is converted to decimal 819, it means that the PWM output of channel 0 is currently 8.19%.

01	03	02	03	thirty-three	F8	A1
Module address	Read and hold register	The number of bytes in the data	data-high	data-low	CRC check low bit	CRC check high bit

Communication example 2: 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	Read and hold	Register Address	Low bit register	Register quantity	Low register	CRC check low	CRC check high

address	register	High Bit	address	high	quantity	bit	bit

If the module replies: **010304CA90FFFFC476**, the read data is 0XFFFFCA90, which is converted to decimal as -13680, it means that the current count value of encoder 0 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

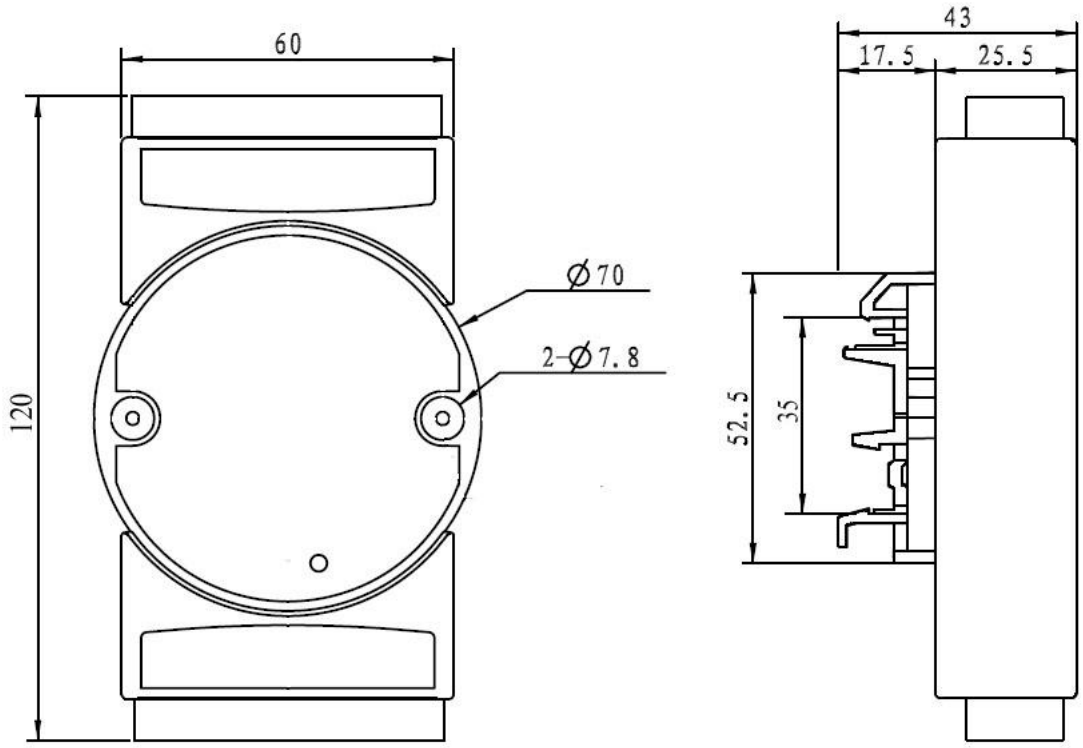
Communication example 3: If the module address is 01, send in hexadecimal: **0106001A000A280A**, which means reset the count value of encoder 0.

01	06	00	1A	00	0A	twenty-eight	0A
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: 0106001A000A280A**, it **means** the **setting** is **successful,** and the **count value of encoder 0** is **changed to 0. If there is** an **alarm**, it **will** be **automatically cleared.**

01	06	00	1A	00	0A	twenty-eight	0A
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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