8-CH 4-20mA analog signal to MODBUS TCP Network Data Acquisition module (WJ80 Series)

Features:

>> Eight channels 4-20mA current/voltage input MODBUS TCP communication protocol
>> Four channels switch input, two channels switch output
>> The built-in web page function can query data through web pages
>> Can set module data through web pages
>> 3000V isolation between signal input and power supply
>> Wide power supply range: 8 ~ 32VDC
>> DIN35 Rail-mounted
>> User can set up module IP address and other parameters on the web page
>> Web login can be set up accounts and passwords, more secure
>> Dimensions: 120 mm x 70 mm x 43mm

Figure 1 WJ80

Applications:

>> Industrial Ethernet analog signal monitoring and control
>> It is used for Internet of things, real-time monitoring network and field equipment communication
>> Intelligent building control, security engineering applications
>> Ethernet industrial automation control system
>> Industrial signal isolation and long-term transmission
>> Equipment operation monitoring
>> Monitoring and control of equipment operation
>> Measurement of sensor signals
>> Internet of things acquisition and recording
>> Internet of things analog signal acquisition

Product Overview:

WAYJUN WJ80 series products are a collection module of Internet of Things and Industrial Ethernet, which realizes transparent data interaction between sensor and network. Can forward the sensor data to the network, or the data from the network to the sensor.

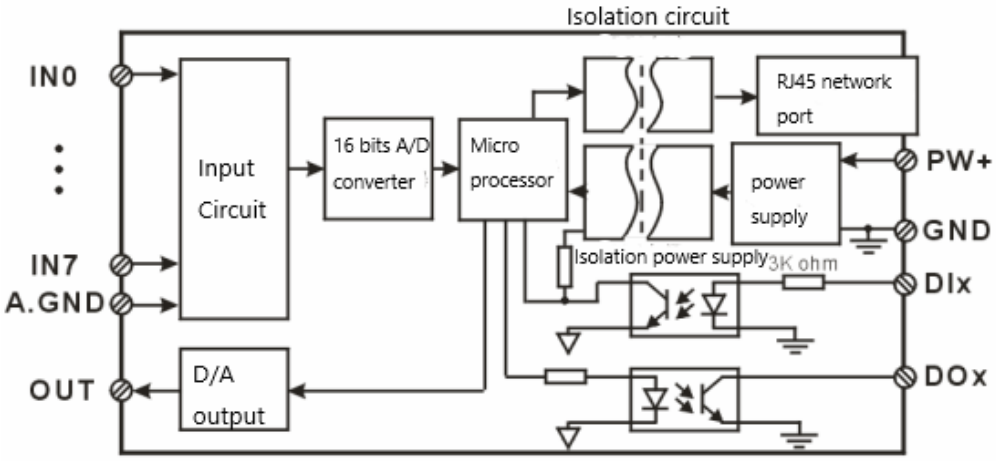


Figure 2: WJ80 Block Diagram

WJ80 series products include power conditioning, analog acquisition and output, switch acquisition, switch output and RJ-45 network interface communication. The communication mode is MODBUS TCP protocol. TCP is a protocol based

on transport layer. It is used widely and reliable for connection. Users can set up module IP address, subnet mask and communication protocol directly on the web page. It can be used to monitor and control the operation of sensor devices.

WJ80 series products are based on SCM's intelligent monitoring and control system, users set IP address, subnet mask and so on configuration information are all stored in nonvolatile memory EEPROM.

WJ80 series products are designed according to industry standard , isolation between analog signal/ digital signal,high anti-interference ability and reliability. Operating temperature range is - 45 ~ +85 °C.

Function Description:

WJ80 remote I/O module can be used to measure eight channels analog signal and four channels switching signal, and there are two channels switching output and one channel 0~4.8V voltage signal output.

1. Analog signal input

16 bits,8 analog signal input. All the products signal input ranges have been calibrated after leaving the factory. When used, users can also program and calibrate by themselves easily. For specific current or voltage input range, please refer to product selection.

2. Switching signal input and output, one channel 0~4.8V voltage signal output

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

One channel 0~4.8V voltage signal output can be used for analog signal control.

3. Communication protocol

Communication interface: RJ-45 network interface. The two indicators on the network port position, the Link light (green light) is on after the network cable is plugged in, and the Data light (yellow light) will flash from time to time.

Communication protocol: Realize industrial Ethernet data exchange by using MODBUS TCP protocol. The control module can also be accessed directly via the web page.

Network cache: 16K Byte (received and sent)

Communication response time: less than 100mS.

3. Anti-jamming

Module has a transient suppression diode inside, which can effectively suppress various surge pulses and protect the module

WJ80 Product Selection:

WJ80 - U(A)□ - RJ45

Communication Interface

Input voltage or current signal

U1:0-5V	**A1:**0-1mA	**RJ45**:output is RJ-45 network interface
U2:0-10V	**A2:**0-10mA	
	A3:0-20mA	
U4:0-2.5V	**A4:**4-20mA	
U8:user-defined	**A8:**user-defined	

Sample 1: part No.:**WJ80-A4-RJ45** means 8-channel 4-20mA signal input,output is RS-232 interface

Sample 2: part No.: **WJ80-U1-RJ45** means 8-channel 0-5V signal input,output is RS-485 interface

WJ80 General Parameters:

(typical @ +25deg.C, Vs to 24VDC)

Analog input: current input / voltage input

Accuracy: 0.1%

Temperature drift: ±50 ppm/deg.C(±100 ppm/deg.C, max)

Input resistance: 100 ohm (4-20mA/0-20mA/0-10mA current input)

2K ohm (0-1mA current input)

> 200K (5V/10V voltage input)

Digital input: 4 channels (DI0~DI3).

Low level: Input < 1V

High level: Input 4 ~ 30V

Input resistance: 3K ohm

Switching output: Open collector output, voltage 0~30V, maximum load current 30mA, 2 channels (DO0~DO1).

Analog output: Voltage is 0 ~ 4.8V, output load > 2K ohms.

Communication: MODBUS TCP communication protocol

Web page: Support web page access module, support web page setting module parameters.

Interface: RJ-45 network interface.

Working power supply: +8 ~ 32VDC wide power supply range, internal anti-reverse and over voltage protection circuit

Power consumption: < 2W

Working temperature: - 45 ~ +80 deg.C

Working humidity: 10 ~ 90% (no condensation)

Storage temperature: - 45 ~ +80 deg.C

Storage humidity: 10 ~ 95% (no condensation)

Isolation withstand voltage: 3000V isolation between the analog signal and the digital signal,the switching signal and the power supply are common ground.

Dimensions: 120 mm x 70 mm x 43mm

WJ80 Factory default parameters:

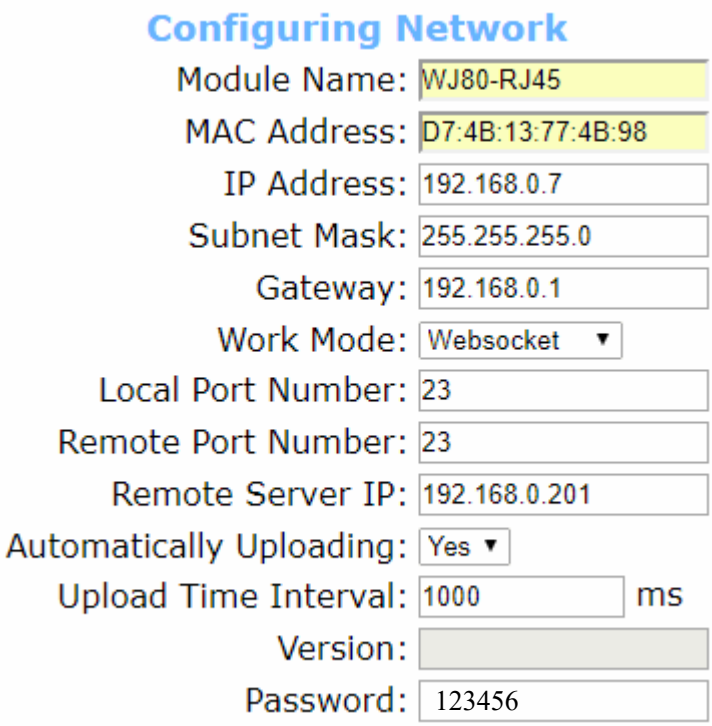


Figure 3:WJ80 Factory default parameters

How to restore factory setting?

1. When module is working, turn the INIT switch to the INIT position and then back to the NORMAL position.
2. Wait 30 seconds, module restored to the factory settings automatically.As shown in Figure 3. The web login password is automatically restored to 123456.

Footprint Function:

PIN	Name	Function	PIN	Name	Function
1	DI0	Channel 0 switch signal input	**12**	IN1	Channel 1 analog signal input+
2	DI1	Channel 1 switch signal input	**13**	IN2	Channel 2 analog signal input+
3	DI2	Channel 2 switch signal input	**14**	IN3	Channel 3 analog signal input+
4	DI3	Channel 3 switch signal input	**15**	IN4	Channel 4 analog signal input+
5	DO0	Channel 0 switch signal output	**16**	IN5	Channel 5 analog signal input+
6	DO1	Channel 1 switch signal output	**17**	IN6	Channel 6 analog signal input+
7	PW+	Power supply +	**18**	IN7	Channel 7 analog signal input+
8	GND	Power supply -,switch signal common ground	**19**	A.GND	Analog signal common ground
9	RJ-45	Network interface	**20**	A.GND	Analog signal common ground
10	A.GND	Analog signal common ground	**21**	OUT	Analog signal output
11	IN0	Channel 0 analog signal output+	**22**	A.GND	Analog signal common ground

Note: same name PIN interior are connected

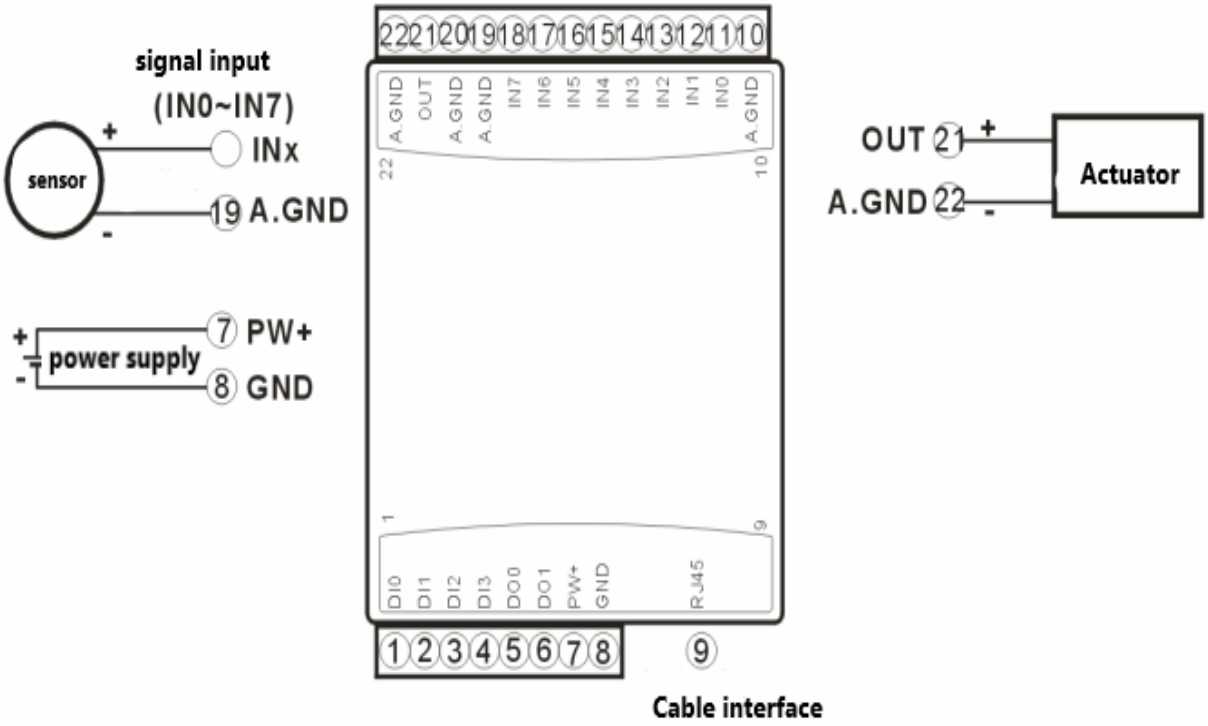
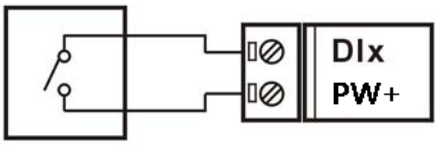
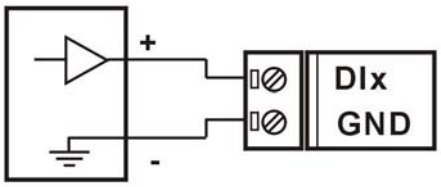
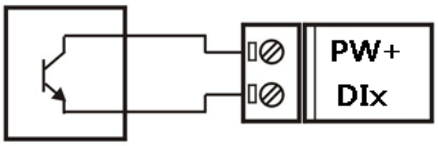
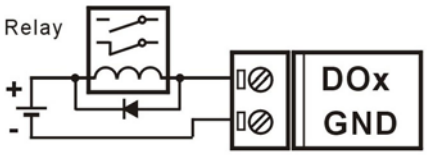
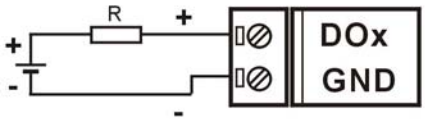


Figure 5: WJ80 wiring diagram

switch signal input wiring diagram

Dry contact input	TTL/CMOS Level, 24V level input
	
Open collector input	
	

switch signal output wiring diagram

Drive Relay	Level Output
	
Optional external power supply :5~30V It also be a power supply to the module Relay operating current is less than 30mA	Optional external power supply :5~30V It also be a power supply to the module Resistance operating current is less than 30mA

MODBUS TCP protocol

(1) MODBUS TCP Data Frame

Transmitting over TCP/IP, supports Ethernet II and 802.3 frame formats. Figure 3, MODBUS TCP Data Frame includes a header, function code and data three parts.

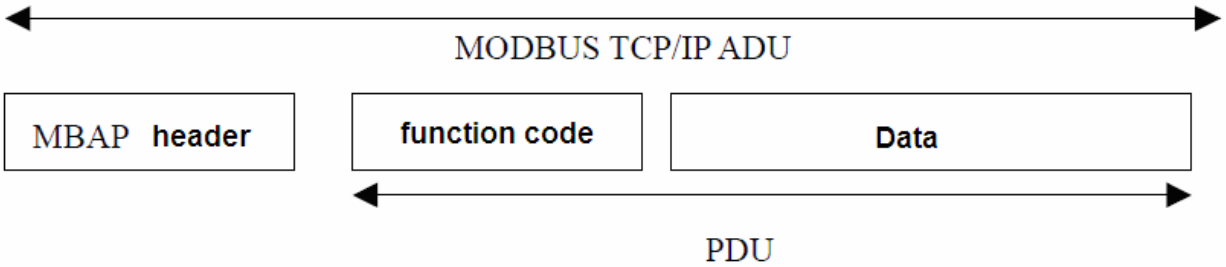


Figure 6: MODBUS request/response over TCP/IP

(2) MBAP Header description:

The length of **MBAP** header (MBAP, MODBUS Application Protocol) is seven Bytes, it is composed of four parts. As shown in Table 1:

Fields	Length（B)	Description
Transaction Identifier	2 Bytes	Identification of a MODBUS Request / Response transaction.
Protocol Identifier	2 Bytes	0=MODBUS protocol
Length	2 Bytes	Number of following bytes
Unit identifier	1 Byte	Identification of a remote slave connected on a serial line or on other buses.

Table 1: MBAP header

(3) MODBUS Function Codes Description

MODBUS function contains three types:

(1) Public function code: Defined function code to ensure uniqueness by MODBUS.org recognized

(2) User-defined function code contains two groups: 65~72 and 100~110, no recognition, but does not guarantee the uniqueness of the code used. If change to the public code, need be required to RFC approved;

(3) Reserved function code for using by certain companies in certain traditional equipment, not as a public purpose.

In a typical public function code, WJ80 series products supports certain function code, as indicated below:

Function Code	Name	Description
01	Read Coil Status	1 means high level, 0 means high level
03	Read Holding Register	1 means high level, 0 means high level
05	Write Single Coil	1 means triode conduction, 0 means triode off
06	Write Single Register	1 means triode conduction, 0 means triode off

(4) Supported Functions Code Description

01 (0x01) Read Coils

This function code is used to read from 1 to 2000 contiguous status of coils in a remote device. The Request PDU specifies the starting address, i.e. the address of the first coil specified, and the number of coils. In the PDU Coils are addressed starting at zero. Therefore coils numbered 1-16 are addressed as 0-15.

The coils in the response message are packed as one coil per bit of the data field. Status is indicated as 1= ON and 0= OFF. The LSB of the first data byte contains the output addressed in the query. The other coils follow toward the high order end of this byte, and from low order to high order in subsequent bytes.

If the returned output quantity is not a multiple of eight, the remaining bits in the final data byte will be padded with zeros (toward the high order end of the byte). The Byte Count field specifies the quantity of complete bytes of data.

Here is an example: function code 01, read 8 channels DI data, register address 00033~00040：

Request			Response		
Field Name		(Hex)	Field Name		(Hex)
MBAP Header	Transaction Identifier	01	MBAP Header	Transaction Identifier	01
		00			00
	Protocol Identifier	00		Protocol Identifier	00
		00			00
	Length	00		Length	00
		06			04
	Unit identifier	01		Unit identifier	01
Function Code		01	Function Code		01
Staring Address Hi		00	Byte Count		01
Staring Address Lo		20	Output status DI7-DI0		00
Quantity of Outputs Hi		00			

Quantity of Outputs Lo	08		

03 (0x03) Read Holding Registers

This function code is used to read the contents of a contiguous block of holding registers in a remote device. The Request PDU specifies the starting register address and the number of registers. In the PDU Registers are addressed starting at zero. Therefore registers numbered 1-16 are addressed as 0-15.

The register data in the response message are packed as two bytes per register, with the binary contents right justified within each byte. For each register, the first byte contains the high order bits and the second contains the low order bits.

Here is an example: function code 03, read 8 channels DI data, register address: 40033

Request			Response		
Field Name		(Hex)	Field Name		(Hex)
MBAP Header	Transaction Identifier	01	MBAP Header	Transaction Identifier	01
		00			00
	Protocol Identifier	00		Protocol Identifier	00
		00			00
	Length	00		Length	00
		06			05
	Unit identifier	01		Unit identifier	01
Function Code		03	Function Code		03
Staring Address Hi		00	Byte Count		02
Staring Address Lo		20	Register value Hi（0x00）		00
No. of Registers Hi		00	Register value Lo（DI7-DI0）		00
No. of Registers Lo		01			

05 (0x05) Write Single Coil

This function code is used to write a single output to either ON or OFF in a remote device. The Request PDU specifies the forced coil address. Coils are addressed starting at zero. Therefore, coil numbered 1 is addressed as 0. The requested ON/OFF state is specified by a constant in the coil value field. A value of 0xFF00 hex requests the coil to be ON. A value of 0x0000 requests the coil to be OFF. All other values are illegal and will not affect the coil.

Correct response and request are the same.

Here is an example: function code 05, set channel DO0 to ON, also as 1, register address: 00001

Request			Response		
Field Name		(Hex)	Field Name		(Hex)
MBAP Header	Transaction Identifier	01	MBAP Header	Transaction Identifier	01
		00			00
	Protocol Identifier	00		Protocol Identifier	00
		00			00
	Length	00		Length	00
		06			06
	Unit identifier	01		Unit identifier	01
Function Code		05	Function Code		05
Output Address Hi		00	Output Address Hi		00
Output Address Lo		00	Output Address Lo		00
Output Value Hi		FF	Output Value Hi		FF
Output Value Lo		00	Output Value Lo		00

06 (0x06) Write Single Register

This function code is used to write a single holding register in a remote device. The Request PDU specifies the address of the register to be written. Registers are addressed starting at zero. Therefore register numbered 1 is addressed as 0.

The normal response is an echo of the request.

Here is an example: function code 06, set channels DO0~DO7, all as 1, Hex is 0xFF, register ddress: 40001

Request			Response		
Field Name		(Hex)	Field Name		(Hex)
MBAP Header	Transaction Identifier	01	MBAP Header	Transaction Identifier	01
		00			00
	Protocol Identifier	00		Protocol Identifier	00
		00			00
	Length	00		Length	00
		06			06
	Unit identifier	01		Unit identifier	01
Function Code		06	Function Code		06
Registers Address Hi		00	Registers Address Hi		00
Registers Address Lo		00	Registers Address Lo		00
Registers Value Hi		00	Registers Value Hi		00
Registers Value Lo		FF	Registers Value Lo		FF

(5) WJ80 Register Address Description

Support function codes 01 and 05

Address 0X（PLC）	Address（PC，DCS）	Data	Property	Data Description
00031	0030	Input Switch	Read only	Level state of the digital input channel 0~3, 1: High level, 0: Low level
00032	0031	Input Switch	Read only	
00033	0032	Input Switch	Read only	
00034	0033	Input Switch	Read only	
00041	0040	Output Switch	Read/write	The output state of channel 0~1, 1 means the transistor is on, 0 means the transistor is off.
00042	0041	Output Switch	Read/write	
00043	0042	Switching power output	Read/write	Power-on and reset output status of channel 0~1.
00044	0043	Switching power output	Read/write	

Support function codes 03 and 06

Address 0X（PLC）	Address（PC，DCS）	Data	Property	Data Description
40001	0000	Input Analog	Read only	Integer, channel 0~7 data, 0x0000-0x7FFF
40002	0001	Input Analog	Read only	
40003	0002	Input Analog	Read only	
40004	0003	Input Analog	Read only	
40005	0004	Input Analog	Read only	
40006	0005	Input Analog	Read only	
40007	0006	Input Analog	Read only	
40008	0007	Input Analog	Read only	
40021	0020	4-20mA special	Read only	Integer, channel 0~7 data, 4mA=0x0000，20mA=0x7FFF
40022	0021	4-20mA special	Read only	
40023	0022	4-20mA special	Read only	
40024	0023	4-20mA special	Read only	
40025	0024	4-20mA special	Read only	
40026	0025	4-20mA special	Read only	
40027	0026	4-20mA special	Read only	
40028	0027	4-20mA special	Read only	
40031	0030	Input Switch	Read only	Integer, the level state of switch input channel 0~3, 1: High level, 0: Low level
40032	0031	Input Switch	Read only	
40033	0032	Input Switch	Read only	
40034	0033	Input Switch	Read only	
40041	0040	Output Switch	Read/write	Integer, the output state of channel 0~1, 1 means the transistor is on, 0 means the transistor is off.
40042	0041	Output Switch	Read/write	
40043	0042	Switching power output	Read/write	Power-on and reset output status of channel 0~1.
40044	0043	Switching power output	Read/write	
Address 0X（PLC）	**Address（PC，DCS）**	**Data**	**Property**	**Data Description**
40051	0050	Analog output	Read/write	Integer, 0 ~ 4800 means 0 ~ 4.8VDC
40052	0051	Analog power output	Read/write	Integer, power-on and reset output voltage values
40061	0060	Input Analog	Read only	Integer, channel 0~7 data, range defined by 40161~40168 registers
40062	0061	Input Analog	Read only	
40063	0062	Input Analog	Read only	
40064	0063	Input Analog	Read only	
40065	0064	Input Analog	Read only	
40066	0065	Input Analog	Read only	
40067	0066	Input Analog	Read only	
40068	0067	Input Analog	Read only	

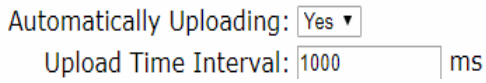
40081 ~ 40088	0080 ~ 0087	User-defined 4-20mA	Read only	Integer, channel 0~7 data, range defined by 40181~40188 registers. When the data is less than 4 mA, it is displayed as 0, and when the data is 20 mA, it is displayed as the set value. The middle is displayed proportionally.
40101	0100	Channel 0 calibration	Read/write	The product has been calibrated at the factory and can be used directly without calibration. If you really need to recalibrate, please check the calibration section and follow the steps.
40102	0101	Channel 1 calibration	Read/write	
40103	0102	Channel 2 calibration	Read/write	
40104	0103	Channel 3 calibration	Read/write	
40105	0104	Channel 4 calibration	Read/write	
40106	0105	Channel 5 calibration	Read/write	
40107	0106	Channel 6 calibration	Read/write	
40108	0107	Channel 7 calibration	Read/write	
40160	0159	Channel 0~7 range	write	Integer, 0x0001-0x7FFF. If the range of all channels is the same, you can set this register. After the setting is completed, the 40161 ~ 40168 registers will be modified to the same value of the current register.
40161	0160	Channel 0 range	Read/write	Integer, 0x0001-0x7FFF, the data of the 40061~40068 register after modification is converted according to this range
40162	0161	Channel 1 range	Read/write	
40163	0162	Channel 2 range	Read/write	
40164	0163	Channel 3 range	Read/write	
40165	0164	Channel 4 range	Read/write	
40166	0165	Channel 5 range	Read/write	
40167	0166	Channel 6 range	Read/write	
40168	0167	Channel 7 range	Read/write	
Address 0X（PLC）	**Address（PC，DCS）**	**Data**	**Property**	**Data Description**
40180	0179	User-defined 4-20mA Channel 0~7 range	write	Integer, 0x0001-0x7FFF, if all channels have the same range, this register can be set. After the setting is completed, the 40181 ~ 40187 registers will be modified once to the same value as the current register.
40181 ~ 40188	0180 ~ 0187	User-defined 4-20mA Channel 0~7 range	Read/write	Integer, 0x0001-0x7FFF, the data of the 40081~40088 register after modification is converted according to this range

40204	0203	Conversion rate	Read/write	Integer, range 0x0000-0x0009, The factory default is 2, please recalibrate the module after modification. 0x0000 = 2.5 SPS，0x0001 = 5 SPS， 0x0002 = 10 SPS， 0x0003 = 20 SPS， 0x0004 = 40 SPS， 0x0005 = 80 SPS， 0x0006 = 160 SPS，0x0007 = 320 SPS， 0x0008 = 500 SPS，0x0009 = 1000 SPS
40211	0210	Module name	Read only	High: 0x00 Low: 0x80
40221	0220	Channel status	Read/write	High: 0x00 Low: channel status (0xFF)

Character protocol Socket communication

In the working mode of Websocket, TCP Server, TCP Client, UDP Mode, etc., the following character protocol communication can be used.

If the auto upload data is set to "Yes" in the configuration settings, In the working mode of Websocket, TCP Server, and TCP Client, The data will be uploaded automatically after the communication connection is successful. UDP Mode does not automatically To upload data, you need to send a command to read the data.



1. Read Measurement Data Command

Description: Returns the all channels analog input measurement and switch state data from the module in the currently configured data format

Command Format：**#00**

Response format:

>(AI data) ,(DI data), (DO data), (DO Reset data), (AO data), (AO Reset data) (cr) the command is valid

?00(cr) the command is invalid or illegal

Parameters: # delimiter character. Hexadecimal 3EH

(AI data) represents AI analog data. The data format can be an engineering unit, a percentage of FSR, and a hexadecimal complement. See section 3 of the command set for details. Hexadecimal is the ASCII code for each character.

(DI data) represents DI switch state. 4 numbers, the order is DI3~DI0. The value is 0: input is low, Value is 1: input is high

(DO data) represents DO switch state. 2 numbers, the order is DI1~DI0.The value is 0: the output transistor is disconnected, value 1: output transistor is conduction

(DO Reset data) represents DO switch state after reset. 2 numbers, the order is DI1~DI0, Value is 0: Output triode is off, value is 1: Output triode is on

(AO data) represents AO analog output value. 4 numbers, range 0000~4800, represents voltage 0~4.8V

(AO Reset data) represents AO analog output value after reset. 4 numbers, range 0000~4800, represents voltage 0~4.8V

(cr) terminating character, carriage return (0Dh)

Other notes: If the format is wrong or the communication is incorrect, the module does not respond.

If a channel has been closed, the read data is displayed as a space character or 0.

Example: Commands (character format) **#00**

>+12.000+16.000+16.000+16.000+16.000+16.000+16.000+18.168,1110,11,00,2000,0000 (cr)

Description: The input on the module is (the data format is the engineering unit):

Channel 0: +1 2.000mA Channel 1: +16.000mA Channel 2: +16.000mA Channel 3: +16.000mA

Channel 4: +16.000mA Channel 5: +16.000mA Channel 6: +16.000mA Channel 7: +18.168mA

DI3, DI2, DI1 are high level, DI0 is low level;

DO1 and DO0 current state: output transistor is turned on, and the transistor is disconnected after DO1 and DO0 are reset.

AO output voltage is 2V, and is 0V after AO reset.

2. Read channel N data command

Description: Returns channel N analog input data from the module in the currently configured data format.

Command Format：**#00N**

Parameters: **N** Channel codes 0 to 7 are AI, 8 is DI, 9 is DO, and A is AO.

Response format: **>(data)(cr)** the command is valid

?00(cr) the command is invalid or illegal or the channel is closed

Parameters: > Delimiter

(data) represents returning the data of channel N. The data format can be an engineering unit, a percentage of FSR, and a hexadecimal complement. See section 3 of the command set for details.

(cr) terminating character, carriage return (0Dh)

Other notes: If the format is wrong or the communication is incorrect, the module does not respond.

Example: Commands (character format) **#000**

(Hexadecimal format) **23303030**

Module response (character format): **>+18.000 (cr)**

(Hexadecimal format) **3E2B31382E3030300D**

Description: The input on the module channel 0 is (the data format is the engineering unit): +18.000mA

3. Set WJ80 Module Command

Description: Set data formats, decimal point, range and channel status for a WJ80 module. counter data is stored in a EEPROM.

Command Format：**$01FDNNNNNABCD**

Parameters: $01 Configuration command 3 initial characters

F Data format

0: Engineering Units

1: % of FSR

2: Twos complement

3: 4mA displays 0 (measurement data is subtracted 4mA automatically and then converted according to range)

D Data decimal point position, value rang is from 1 to 5. Indicates that there are several numbers in front of

the decimal point. For example, 3 means 000.00.

NNNNN represents the data range, value rang is from 00000 to 99999 (decimal). For example, 10000 means the range is 10000.

ABCD Four hexadecimal numbers,

The first number and the second number are both 0

The third number represents 7~4 channels

The fourth number represents the 3~0 channel

Bit value is 0: channel is disabled

Bit value is 1: Enable channel

0	0	0	0	0	0	0	0
A				B			
IN7	IN6	IN5	IN4	IN3	IN2	IN1	IN0
Bit7	Bit 6	Bit 5	Bit 4	Bit 3	Bit2	Bit 1	Bit 0
C				D			

Response format: **!01(cr)** the command is valid

?00(cr) the command is invalid or illegal

Example: Commands **$01022000000FF**

Module response **!01(cr)**

Description: **$01** Configuration command 3 initial characters

0 Engineering Units

2 Indicates that there are 2 numbers before the decimal point

20000 Indicates that the range is 20000

00FF Indicates that the channels are open

4. Read Configuration Status Command

Description: Read configuration for WJ80 module.

Command Format: **$00**

Response format: **!00FDNNNNNABCD (cr)** the command is valid

?00(cr) the command is invalid or illegal

Parameters: **!00** Reply 3 first characters

F Data format

0: Engineering Units

1: % of FSR

2: Twos complement

3: 4mA displays 0 (measurement data is subtracted 4mA automatically and then converted according to range)

D Data decimal point position, value rang is from 1 to 5. Indicates that there are several numbers in front of the decimal point. For example, 3 means 000.00.

NNNNN represents the data range, value rang is from 00000 to 99999 (decimal). For example, 10000 means the range is 10000.

ABCD Four hexadecimal numbers,

The first number and the second number are both 0

The third number represents 7~4 channels

The fourth number represents the 3~0 channel

Bit value is 0: channel is disabled

Bit value is 1: Enable channel

0	0	0	0	0	0	0	0
A				B			
IN7	IN6	IN5	IN4	IN3	IN2	IN1	IN0
Bit7	Bit 6	Bit 5	Bit 4	Bit 3	Bit2	Bit 1	Bit 0
C				D			

(cr) terminating character, carriage return (0Dh)

Other notes: If the format is wrong or the communication is incorrect, the module does not respond.

Example: Commands **$00**

Module response **!00115000000FF (cr)**

Description: **!00** Reply 3 first characters

1 % of FSR

1 Indicates that there is one numbers in front of the decimal point

50000 Indicates that the range is 50000

00FF Indicates that the channels are open

5. Set Module AD Conversion Rate

Description: Sets the AD conversion rate of the module. Among them, channel conversion rate = AD conversion rate / opened channel numbers. The slower the sampling rate, the more accurate the acquired data. Users can adjust it according to their needs. The factory default conversion rate is 20SPS.

Note: Please recalibrate the module after modifying the conversion rate, otherwise the measured data will be biased. It is also possible to indicate the conversion rate when ordering, and we recalibrate at the factory's required conversion rate when the product is shipped.

Command Format: **$03R**

Parameters: **$03** Set the conversion rate command to 3 initial characters

R Conversion rate code, which can be 0~9

Code R	0	1	2	3	4	5	6	7	8	9
Conversion rate	2.5 SPS	5 SPS	10 SPS	20 SPS	40 SPS	80 SPS	160 SPS	320 SPS	500 SPS	1000 SPS

Response format: **!03(cr)** the command is valid

?00(cr) the command is invalid or illegal

Other notes: If the format is wrong or the communication is incorrect, the module does not respond.

Example 1: Commands **$036**

Module response **!03(cr)**

Description: set AD conversion rate is 160SPS.

Example 2: Commands **$035**

Module response **!03(cr)**

Description: set AD conversion rate is 80SPS.

6. Read Module AD Conversion Rate

Description: Read the module AD conversion rate. Among them, channel conversion rate = AD conversion rate / numbers of channel opened. The slower the sampling rate, the more accurate the acquired data.

Command Format: **$02R**

Response format: **!02(cr)** the command is valid

?00(cr) the command is invalid or illegal

Parameters: **R** Conversion rate code, which can be 0~9

Code R	0	1	2	3	4	5	6	7	8	9
Conversion rate	2.5 SPS	5 SPS	10 SPS	20 SPS	40 SPS	80 SPS	160 SPS	320 SPS	500 SPS	1000 SPS

(cr) terminating character, carriage return (0Dh)

Other notes: If the format is wrong or the communication is incorrect, the module does not respond.

Example 1: Commands **$02**
Module response **!026(cr)**
Description: set AD conversion rate is 160SPS.

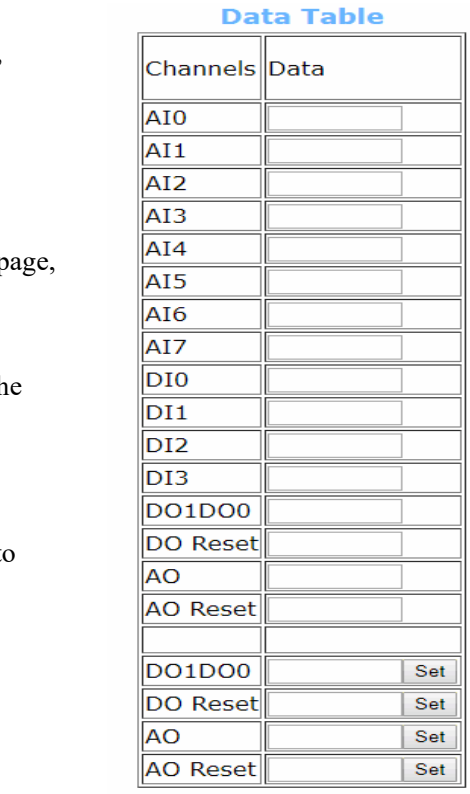
Example 2: Commands **$02**
Module response **!025(cr)**
Description: set AD conversion rate is 80SPS.

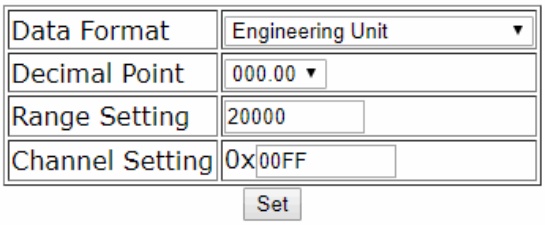
Actions and settings on the webpage

Enter the default module IP in the computer or mobile browser,the default is 192.168.0.7, which can open the module webpage (provided that the computer IP or mobile IP and module are on the same network segment. The login webpage should be based on the IP address of the current module.
Login operation), enter the password, the default is 123456, click "Login",
You can enter the data display interface, there are Chinese and
English switch signs in the upper right corner, click then
you can switch between Chinese and English signs.

1. web page real-time collection:

Since this page uses websocket to realize real-time data collection by webpage, it is recommended to test using Google Chrome or IE10 browser.
After the connection is successful, the web page will automatically update the data (note how the module works, it must be set to "Websocket," and the automatic upload data should be set to "Yes" or you can't get the data), you can also set the AI range through the webpage and other parameters. DO and AO parameters can also be set through the webpage. if your mobile browser supports websocket, you can also use your mobile phone to read data and set parameters.





2.configure network parameters:

(a) module name

The module name defaults is WJ80-RJ45, and user can modify as needed.

(b) MAC address

The MAC address can be changed according to user needs.

(c) IP address

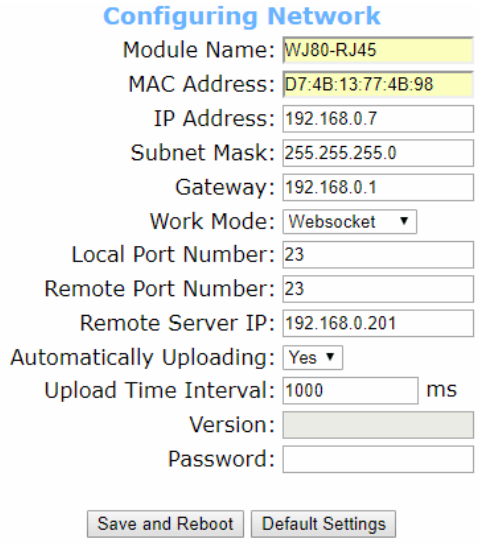
The current module IP address, factory default is: 192.168.0.7, the IP address can be modified.

(c) subnet mask

Used to divide the subnet range size (usually 255.255.255.0), which can be modified by the user.

(d) default gateway

The only way to access the external network (usually fill in the router IP address).



(d) working method

The default is Websocket, which supports up to 6 Websocket communication.

Can be set to TCP Server, TCP Client, UDP Mode, Modbus TCP, etc.

communication method. Up to 6 TCP Servers can be supported in TCP Server mode.

(c) local port

The local port default is 23 and can be modified by the user.

(c) remote port

The working mode is TCP Client, and UDP Mode is filled in according to the actual situation.

(e) remote server address

It is the IP address of the remote server. The working mode is TCP Client, and UDP Mode is filled in according to the actual situation.

(e) automatically upload data

Whether to upload measurement data automatically in Websocket, TCP Server, TCP Client, UDP Mode, etc.

(f) upload time interval

The time interval at which the measurement data is uploaded automatically. The default is to upload data once in 1 second.

(b) version number

The version is incremented from 1.0.

(g) password

Setting parameters must be entered with the correct password to take effect. The password is the web login password,the factory default is 123456.

After the parameters are filled in, click the "Save and Restart" button, the module will save the parameters and restart automatically.

Module Calibration:

We have calibrated the module, the user can use directly.

You can also use the product calibration function to re-calibrate the module. During calibration, the module need to been entered the appropriate signal, different input range needs different input signals.

In order to improve calibration accuracy, it is recommended to calibrate using the following equipment:

1. A stable output, low noise DC voltage / current signal source
2. A five and a half or more high-precision voltage / current measuring instruments to monitor the accuracy of the input signal

Calibration:

1. According to the module input range, connects to the corresponding input signal.

   Which WJ80 module zero calibration is at input 0,full scale calibration is at the input full-scale 100% . For example, input signal is **4-20mA**, when calibrate zero, input **0mA**, when full-scale calibration, input **20mA**.

   input signal is **0-5V**, when calibrate zero, input **0V**, when the full-scale calibration, input **5V**.
2. To WJ80 module input zero signal, usually is **0mA** or **0V**.
3. Until the signal stabilized, MODBUS protocol modify register 40101 (channel 0) to 0xFF00 and the module performs zero calibration. (To calibrate other channels, please modify the corresponding channel register data to 0xFF00).
4. To WJ80 module input 100% of full scale current or voltage signal
5. Until the signal is stable, MODBUS protocol modify register 40101 (channel 0) to 0xFFFF and the module performs zero calibration. (To calibrate other channels, please modify the corresponding channel register data to

0xFFFF).

6. Finished

FAQ about WJ80

1>> Across the network Segment problems

If the communication PC and device IP are not a network segment, and it is in a straight line, or under a sub-router, then they are unable to communicate simply.

Example:

Device IP: 192.168.0.7

Subnet Mask: 255.255.255.0

PC's IP: 192.168.1.100

Subnet Mask: 255.255.255.0

Device IP is 192.168.0.7, then the result could not land equipment page on the PC, also can not ping it.

If you want them to be able to communicate, you need set to 255.255.0.0 about the subnet mask of device/PC and the router, so that we can login module pages.

2>> Device can ping but can not open the page

There may be several causes:

1) The device is set up static IP, but conflicts to the existing device network IP

2) HTTP server port was to be modified (default should be 80)

3) Other reasons

Workaround: Re-set up an unused IP to the device, restore factory settings or input the correct port when open the browser.

3>> every once in a while, dropped reconnection occurs

Every once in a while, dropped reconnection phenomena occur

Cause: The serial server has an IP address conflict with other device

4>> Communication is not normal, not on the network links, or can not search

Currently used computer firewall needs to be closed (in the windows firewall settings)

Three local ports, not conflict, that is, must be set to different values, the default 23, 26, 29

With illegal MAC address, such as all-FF MAC address, there maybe appear unable to connect the target IP address, or MAC address repeat.

Illegal IP address, such as a router and network are not in a network segment, you may not be able to access the Internet.

5>> Find hardware problems

Bad power adapter, or plug connection is undesirable

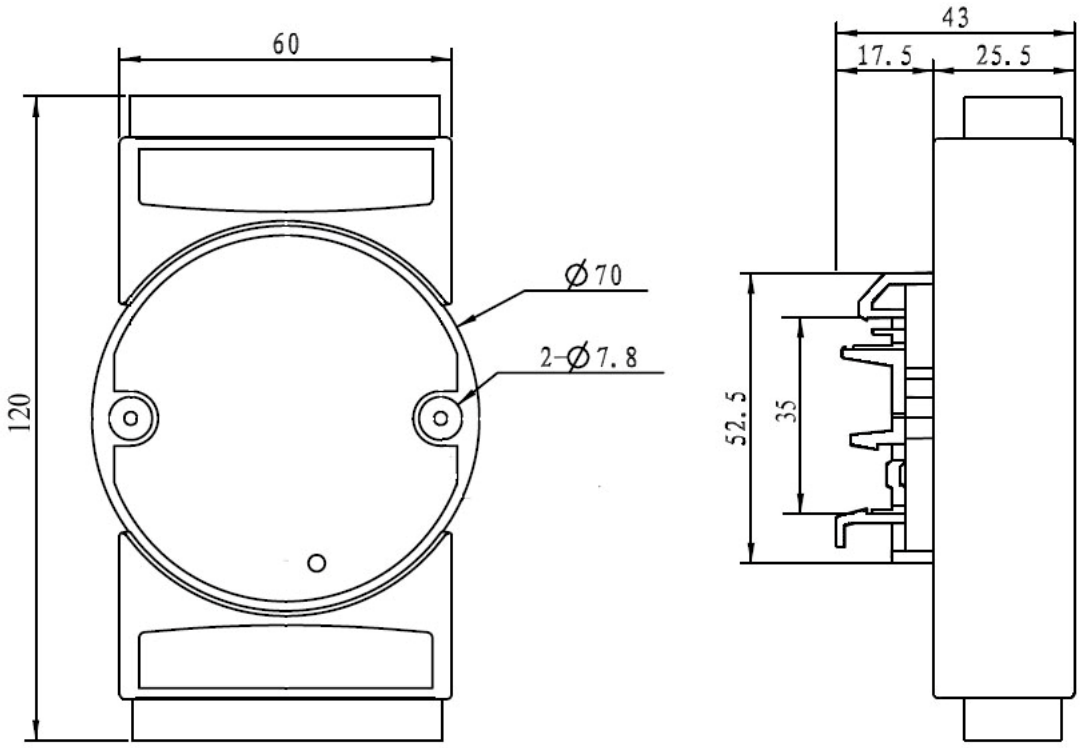
Power light is not on, the LAN light is not bright, that is no power supply or the hardware is broken

Cable or network port hardware issues, view the status of the network port lights

Network interface hardware problems, you can check the network port status, etc., green light should be the long bright, yellow light should be flashing, instead of the long light or long off, otherwise it is a hardware problem

Wrong password, if you forget the password, you can restore the factory configuration (switch to **init**, the device is on 30 seconds, then put on the switch to **normal.** The parameters are shown in Figure 3. Web login password is restored to 123456 automatically)

Size(unit:mm) **DIN35 Rail Mounted**



Warranty

Two years (but violate operating rules and requirements to create damage, clients need pay maintenance costs)

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