

5-CH RTD Temperature Signal to RS485/232 Acquisition Converter

(24Bits A/D Converter, data acquisition)

Features:

- >> Five temperature signal acquisition, isolated converter RS-485/232 output
- >> 24-bit AD converter, testing accuracy>0.05%
- >> 4-wire measurement, long-term compensation, high accuracy
- >> Support RTD broken-wire detection
- >> Programmable PT100 or PT1000 signal input
- >> Can be programmed calibration module precision through RS485/232 interface
- >> 3000VDC Isolation between signal input and signal output
- >> Wide power supply range: 8~32VDC
- >> Supports MODBUS RTU protocol
- >> DIN35 Rail-mounted
- >> Users can set module address, baud rate and so on



Figure 1 WJ25

Typical Application:

- >> Temperature signal measurement/monitoring/control
- >> RS-485 remote I / O, data acquisition
- >> RS-232/485 bus industrial automation control system
- >> Industrial field signal data acquisition and recording
- >> Industrial field signal isolation and long-term transmission
- >> Medical, industrial product development

Product Overview:

WAYJUN WJ25 series products realize the signal acquisition between sensor and host, to measure five channels temperature signal. WJ25 series products can be applied to RS-232/485 bus industrial automation control system, temperature signal measurement, monitoring and control and so on.

Products include power supply isolation, signal isolation, linearization, A/D conversion and RS-485 serial communication. Each serial interface can connect up to 255 pieces WJ25 Series modules, communication using ASCII code or MODBUS RTU communication protocol, and its instruction set compatible with the ADAM modules, baud rate can be set by the code, with other manufacturers control module hang in the same RS-485 bus for easy programming.

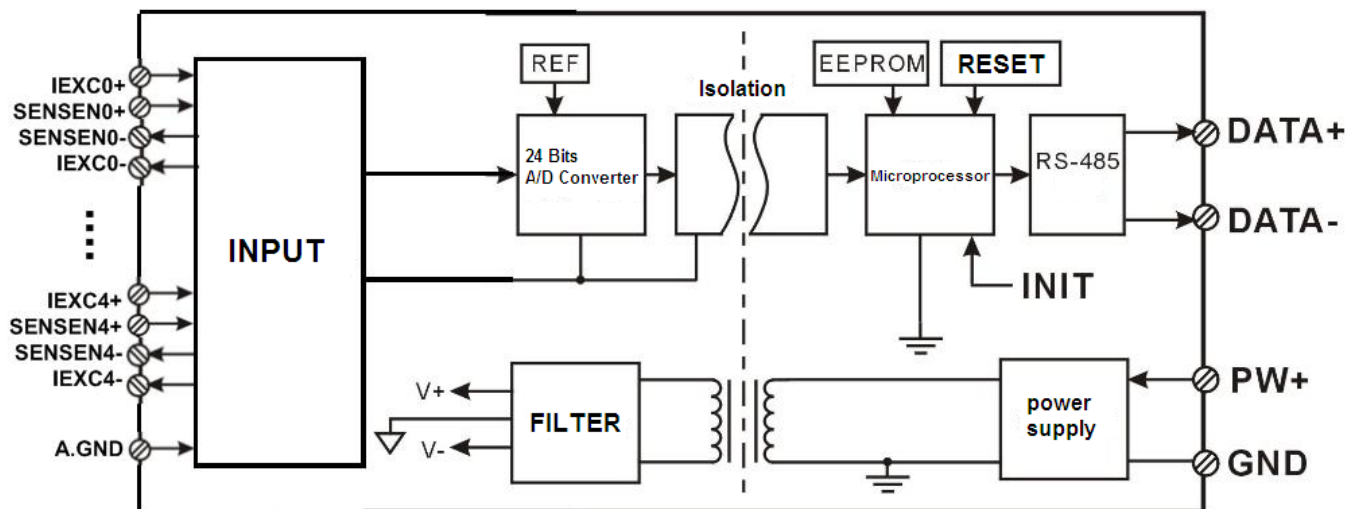


Figure 2 WJ25 Block Diagram

WJ25 series products are based on SCM's intelligent monitoring and control system, users set the calibration value, address, baud rate, data format, checksum status, and configuration information are all stored in nonvolatile memory EEPROM.

WJ25 products are according to industry standard design, isolation between signal input / output, can withstand voltage 3000VDC, high anti-interference ability and reliability. Operating temperature range is - 45 ~ +85 °C.

Function Description:

WJ25 signal isolation acquisition module can be used to measure five channels temperature signal,

1. Temperature signal input

24-Bit acquisition accuracy, 5-CH temperature signal input. All products signal input range have been calibrated. In use, users also can program calibration easily.

2. Communication protocol

Communication Interface: one channel standard RS-485 communication interface, or one standard RS-232 communication interface, specify when ordering.

Communication Protocols: supports two protocols, characters protocol of the command set defined and MODBUS RTU communication protocol. Can be programmed using the kind of communication protocol, can be achieved with PLC, RTU of many Brands or computer monitoring system for network communication.

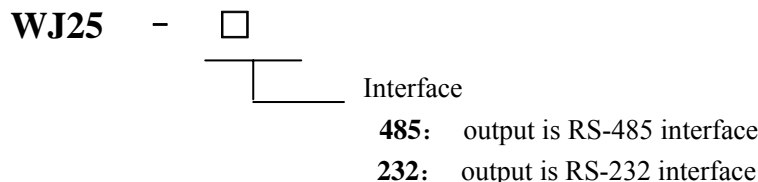
Data Format: 10 Bits. 1 start bit,8 data bits,1 stop bit.

Address: (0 to 255) and baud rate (2400,4800,9600,19200,38400,57600,115200bps) can be set, the most long-distance about communication networks is up to 1200 meters, through the twisted-pair shielded cable. Communication interface of high anti-jamming design, ± 15KV ESD protection, communication response time is less than 100mS.

3. Anti-jamming

According to need to set the checksum. Module internal has transient suppression diodes, can inhibit a variety of surge pulse, protection module, and internal digital filter can also be well suppressed from the grid frequency interference.

Product Selection:



Part No.:**WJ25-485** means RTD temperature signal input, output is RS485 interface

Part No.:**WJ25-232** means RTD temperature signal input, output is RS232 interface

WJ25 General parameters:

(typical @ +25 °C, Vs to 24VDC)

Input type: PT100 input / PT1000 input

Accuracy: 0.05%

Temperature drift: ± 30 ppm / °C (± 50 ppm / °C, maximum)

Input temperature range: (1) PT100,-200~400°C (2) PT100,-200~600°C

(3) PT1000,-200~400°C (4) PT1000,-200~600°C

AD Conversion rate: 5 Sps

Common Mode Rejection (CMR): 120 dB (1kΩ Source Imbalance @ 50/60 Hz)

Normal Mode Rejection (NMR): 60 dB (1kΩ Source Imbalance @ 50/60 Hz)

Input Protection: over-voltage protection, over-current protection

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

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

Address (0 to 255) can be selected via software

Communication Response Time: 100 ms maximum

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

Power Loss: less than 1W

Operating Temperature: - 45 ~ +80 °C

Humidity: 10 ~ 90% (no condensation)

Storage Temperature: - 45 ~ +80 °C

Storage Humidity: 10 ~ 95% (no condensation)

Isolation Voltage: input / output: 3KVDC, 1 minute, leakage current: 1mA

Which output signal and power supply are common ground.

Shock Voltage: 3KVAC, 1.2/50us (peak)

Dimensions: 120 mm x 70 mm x 43mm

Footprint Function:

PIN	Name	Function	PIN	Name	Function
1	IEXC3+	Channel 3 RTD provides a constant current +	14	IEXC0-	Channel 0 RTD provides a constant current -
2	SENSEN3+	Channel 3 RTD voltage signal detection +	15	SENSEN0-	Channel 0 RTD voltage signal detection -
3	SENSEN3-	Channel 3 RTD voltage signal detection -	16	SENSEN0+	Channel 0 RTD voltage signal detection+
4	IEXC3-	Channel 3 RTD provides a constant current-	17	IEXC0+	Channel 0 RTD provides a constant current +
5	IEXC4+	Channel 4 RTD provides a constant current +	18	IEXC1-	Channel 1 RTD provides a constant current-
6	SENSEN4+	Channel 4 RTD voltage signal detection +	19	SENSEN1-	Channel 1 RTD voltage signal detection -
7	SENSEN4-	Channel 4 RTD voltage signal detection -	20	SENSEN1+	Channel 1 RTD voltage signal detection+
8	IEXC4-	Channel 4 RTD provides a constant current -	21	IEXC1+	Channel 1 RTD provides a constant current+
9	NC	No connect	22	IEXC2-	Channel 2 RTD provides a constant current-
10	DATA+	RS-485 signal +	23	SENSEN2-	Channel 2 RTD voltage signal detection -
11	DATA-	RS-485 signal-	24	SENSEN2+	Channel 2 RTD voltage signal detection+
12	PW+	Power supply +	25	IEXC2+	Channel 2 RTD provides a constant current+
13	GND	Power supply-, digital signal output ground	26	A. GND	All channels analog signal shields

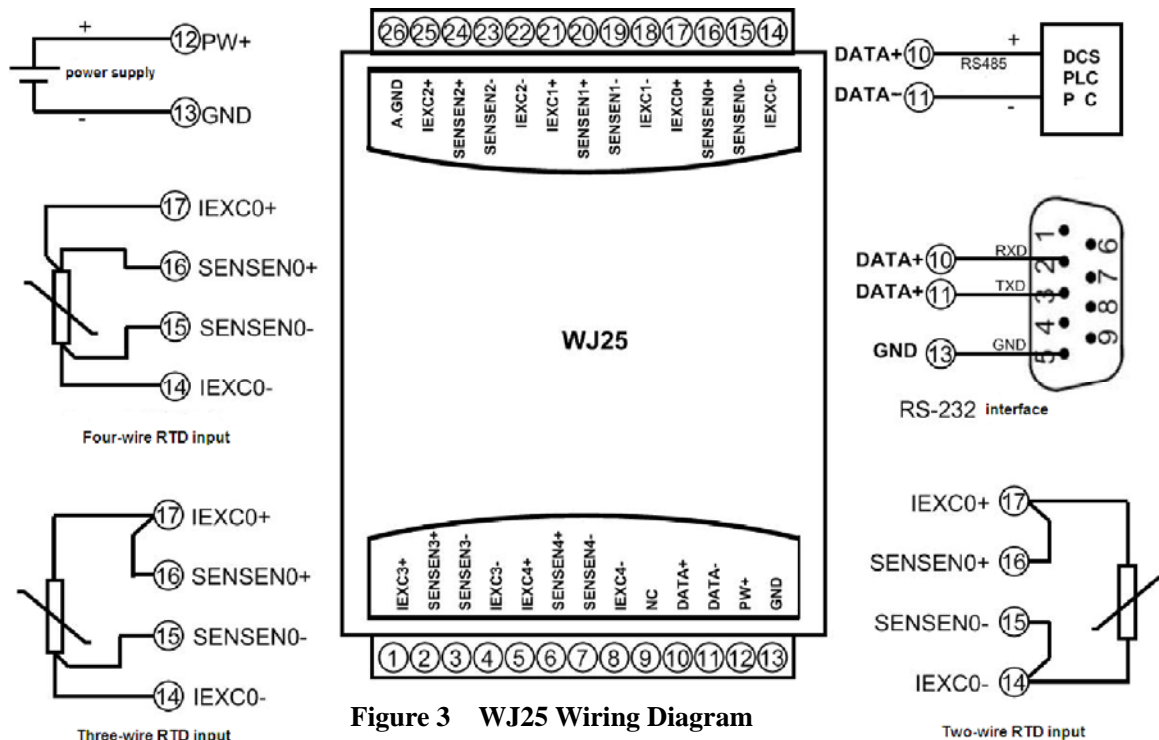


Figure 3 WJ25 Wiring Diagram

Initialization WJ25 modules:

All WJ25 modules, if you use RS-485 network, must be assigned a unique address code, address code value of hexadecimal numbers between 00 and FF. However, all new WJ25 modules uses a factory initial settings, as follows:

- Address code: 01
- Baud rate: 9600 bps
- Checksum is disable

Character Communication Protocol (If you need to set MODBUS RTU communication protocol, please refer to **chapter about MODBUS RTU Communication Protocol**)

As the new module address codes are the same, their address will be contradictory to other modules, so when you set up the system, you must reconfigure each WJ25 module address. WJ25 module can be connected the power cord and RS485 communication lines, through configuration commands to modify the WJ25 module address. Baud rate, parity and status, communication protocols also need to be adjusted according to user requirements. In the modified baud rate, parity and status, communication protocol, you must first enter the module to the default state, or can not be modified.

Let the module into the default state:

WJ25 module has a special INIT pin. Connecting the INIT PIN to ground (GND PIN), then open power, the module into the default state. In this state, the module is configured as follows:

- Address code 00
- 9600 bps baud rate
- Checksum is disable

At this time, via configuration commands you can modify the WJ25 module baud rate, parity, checksum state and other parameters, by setting the module communication protocol command to select the communication protocol. When are not sure a module specific configuration, can also be configured by installing the jumper, so that the module into the default state, then reconfigure the module. If clients need set the module to MODBUS RTU communication protocol, see the MODBUS protocol section for instructions.

Note: In normal use, put the INIT switch to the NORMAL position.

WJ25 character protocol command set:

Order is by a series of characters, such as first code, address ID, variables, an optional checksum byte and a terminator (**cr**) which can show command. In addition to wildcard address “**”synchronization command, the host only commands a WJ25 module once.

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

(Leading code) prefix is the first letter of the command. All commands require a command prefix, such as %, \$, #, @, ... etc.

(Addr) module address code, if not specified below, range is from 00 ~ FF (hexadecimal). **1 - Character**

(Command) shows the command code or variable values. **2 - Character**

[Data] some output command needs data **Variable length**

[Checksum] brackets Checksum (checksum) shows an optional parameter, only the checksum is enabled, need this option. **2 -**

(Cr) a control code character as identify , **(cr)** as a carriage return character, its value is 0x0D. **1 -**

Character

When enabled checksum (checksum), users need [Checksum]. It accounted for 2 - character. Commands and responses must be attached checksum feature. Checksum used to check all input commands to help you find the host to the module command module to the host response to errors and mistakes. Checksum characters placed in command or in

response to the character after the carriage return before.

Calculated as follows: two characters, the hexadecimal number for all issued prior to the ASCII values of and, then with hexadecimal digits 0xFF phase proceeds.

Examples: Disable checksum (checksum)

command: **\$002(cr)**

response: **!00020600 (cr)**

Enable checksum

command: **\$002B6 (cr)**

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

Command response:

Response message depends on a variety of commands. Response also is consists of several characters, includes leading code, variables and end tags. The first code of response signal has two: '!' Or '>' indicates that a valid command and '?' means invalid. By checking the response information, you can monitor whether the command is valid

Note:

1. In some cases, many commands use the same command format. To ensure that you use a command in the address is correct, if you use the wrong address and this address represents another module, then the command will take effect in another module, resulting in an error.
2. the command must be entered in uppercase letters.

1. Read Measurement Data Command

Description: Returns the analog input measurement data from the module in the currently configured data format

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

Parameters: # delimiter character. Hexadecimal 23H

AA module address, range is 00-FF(hexadecimal). Factory address is 01, converted to hexadecimal ASCII code for each character. Such as address 01 into hexadecimal are 30H and 31H.

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

Response : **>(data)(cr)** command is valid.

?AA(cr) invalid command or illegal operation.

Parameter Description: **>** delimiter character

(data) Returns data. The data format is in Engineering Units, Percent of FSR, Two' s complement hexadecimal, Hexadecimal is each character ASCII code .Refer to Chapter 3 Command Set.

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

There is no response if the module is format error or communication error or address does not exist, the module does not respond. If you are using serial communication software, but can not enter the return key characters, please switch to hexadecimal format for communicate

Example: Commands (character format) **#01(cr)**

(Hexadecimal format) **2330310D**

Module response (character format) **>+100.00+200.00+300.00+400.00+500.00 (cr)**

(Hexadecimal format) **3e2b3130302e30302b3230302e30302b3330302e30302b3430302e30302b3530302e30300D**

Description: In the address 01H module, input is (Data format is engineering units):

Channel 0: +100.00deg.C Channel 1: +200.00deg.C Channel 3: +300.00deg.C Channel 4: +500.00deg.C



Input **#01**, then click the Sending Command or hitting the Enter Key, note do not enter(cr),it represents the Enter Key. Upon receiving the data row, it will be displayed **>-199.99+400.00-199.99-199.99 -199.99**

2. Read Channel N Analog Module Data Command

Description: Read back channel N analog input data from the module, as the current data formats

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

Parameters: # delimiter character.

AA module address, range is 00-FF(hexadecimal). Factory address is 01, converted to hexadecimal ASCII code for each character. Such as address 01 into hexadecimal are 30H and 31H.

N channel code 0~F, if hexadecimal: 30H~ 39H, 41H~46H

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

Response : **>(data)(cr)** command is valid.

?AA(cr) invalid command or illegal operation.

Parameters: > delimiter character

(data) Returns data. The data format is in Engineering Units, Percent of FSR, Two' s complement hexadecimal.Refer to Chapter 3 Command Set.

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

There is no response if the module is format error or communication error or address does not exist.

Example: Commands (character format) **#010(cr)**

(Hexadecimal format) **233031300D**

Module response (character format) **>+018.00 (cr)**

(Hexadecimal format) **3E2B3031382E30300D**

At address 01H module, channel 0 input signal is +18.00deg.C (Data format is engineering units)

3. Set WJ25 Module Command

Description: Set address, input ranges, baud rate, data formats, checksum and state for a WJ25 analog input module, counter data are stored in a EEPROM.

Command Format: **%AANNTTCFF(cr)**

Parameter : % delimiter character

AA module address, (range 00-FF) represents the 2-character hexadecimal. Factory address is 01, converted to hexadecimal ASCII code for each character. Such as address 01 into hexadecimal are 30H and 31H.

NN indicates new module hexadecimal address, value NN range is 00~FF. converted to

hexadecimal ASCII code for each character. Such as address 18 into hexadecimal are 31H and 38H.

TT hexadecimal indicates type code.WJ25 must been set 00~03

Type Code	Temperature Range
00	PT100,-200~400℃
01	PT100,-200~600℃
02	PT1000,-200~400℃
03	PT1000,-200~600℃

Table 3 temperature range code

CC Baud Rate code (hexadecimal)

Baud rate code	Baud rate
04	2400 baud
05	4800 baud
06	9600 baud
07	19200 baud
08	38400 baud
09	57600 baud
0A	115200 baud

Table 3 Baud rate code

FF Hexadecimal 8-bit represents the data format, checksum. Note from bits2 to bits5 not be set to zero.

Bit7	Bit 6	Bit 5	Bit 4	Bit 3	Bit2	Bit 1	Bit 0
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Table 3 Data format, checksum and code

Bit7: Reserved bits (must set to 0)

Bit6: checksum states, if 0:Disabled, if 1: Enabled

Bit5-bit2: Not used(must set to 0)

Bit1-bit0: Data Format Bit

00: Engineering Units

01: % of FSR

10: Twos complement hexadecimal

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

Response: !AA(cr) command is valid

?AA(cr) command is invalid or illegal operation, or do not set up line before changing baud rate or checksum

Parameter Description:

! delimiter character which indicates a valid command.

? delimiter character which indicates a invalid command.

AA represents input module address

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

If you configure module for the first time, AA=01H and NN equal to new address. If reconfigure module changing address, input range, data formats, AA equals to present configured address, NN equals to the current or new address. If reconfigure module changing baud rate or checksum state, must set INIT switch to the INIT position, make module into the default mode, module address is 00H, also AA=00H, NN=present or new address.

There is no response if the format error or communication error or address does not exist.

Example: **command** %0111000600(cr)
 response !11(cr)

Description: % delimiter character
 00 indicates you want to configure the WJ25 module original address set to 01H.
 11 indicates new module hexadecimal address is 11H
 00 indicates temperature range PT100, -200~+400 deg.C
 06 indicates baud rate: 9600 baud
 00 indicates data format is Engineering Units, checksum is disabled

4. Read Set Status Command

Description: Read configuration for a specified WJ25 module.

Command Format: \$AA2(cr)

Parameter: \$ delimiter character
 AA module address, (range 00-FF) represents the 2-character hexadecimal
 2 indicates read set state command
 (cr) terminating character, carriage return (0Dh)

Response: !AATTCFF(cr) command is valid
 ?AA(cr) command is invalid or illegal operation
 ! delimiter character
 AA represents input module address
 TT temperature range code, Table 2
 CC Baud rate code, Table 3
 FF Table 4
 (cr) terminating character, carriage return (0Dh)

There is no response if the format error or communication error or address does not exist.

Example: **command** \$302(cr)
 response !300F0600(cr)

! delimiter character
30 indicates WJ25 module address is 30H
00 indicates input type code
06 represents that baud rate is 9600 baud
00 represents that data format is Engineering Units, disable checksum

5. Offset Calibration Command

Description: Calibrate all input module channels offset errors, connect the standard resistor to channel 0 and then send command.

Command Format: \$AA10(cr)

Parameter: \$ delimiter character
 AA module address, (range 00-FF) represents the 2-character hexadecimal
 10 epresents offset calibration command
 (cr) terminating character, carriage return (0Dh)

Response: !AA (cr) command is valid
 ?AA(cr) command is invalid or Illegal operation
 ! delimiter character which indicates a valid command.
 ? delimiter character which indicates a invalid command.

- AA** represents input module address
- (cr)** terminating character, carriage return (0Dh)

Products have been calibrated, user can use them directly. After calibrating offset command, then calibrate gain errors. During calibration, WJ25 modules need to be connected to the input of the appropriate input signal. Different input range requires a different input thermal resistance. (See following Calibration information)

There is no response if the format error or communication error or address does not exist.

Example: command \$0110(cr)
response !01 (cr)

Calibrate module channel 0 offset at address 01H.

6. Gain Calibration Command

Description: Calibrates an analog input module gain, connect the standard resistor to channel 0 and then send command.

Command Format: **\$AA0N(cr)**

Parameter: **\$** delimiter character

- AA** module address, (range 00-FF) represents the 2-character hexadecimal
- 00** represents gain calibration command
- (cr)** terminating character, carriage return (0Dh)

Response: !AA(cr) command is valid

- ?AA(cr)** command is invalid or illegal operation
- !** delimiter character which indicates a valid command.
- ?** delimiter character which indicates a invalid command.
- AA** represents input module address
- (cr)** terminating character, carriage return (0Dh)

Products have been calibrated, user can use them directly. After calibrating offset command, then calibrate gain errors. During calibration, module needs to be connected to the input of the appropriate input signal. Different input range requires a different input thermal resistance. (See following Calibration information)

There is no response if the format error or communication error or address does not exist.

Example: command \$0100(cr)
Response !01 (cr)

Calibrate module gain errors at address 01H.

7. Read Module Name Command

Description: Return a WJ25 module name from the specified analog input module

Command Format: **\$AAM(cr)**

Parameter: **\$** delimiter character

- AA** module address, (range 00-FF) represents the 2-character hexadecimal
- M** represents Read module name command
- (cr)** terminating character, carriage return (0Dh)

Response: !AA(Module Name)(cr) command is valid

- ?AA(cr)** command is invalid or illegal operation
- !** delimiter character which indicates a valid command.
- ?** delimiter character which indicates a invalid command.
- AA** represents input module address
- (Module Name)** module name WJ25
- (cr)** terminating character, carriage return (0Dh)

There is no response if the format error or communication error or address does not exist.

Example: **command** **\$08M(cr)**
 response **!08WJ25(cr)**

Module is WJ25 at address 08H

8. Enable or Disable Channel Command

Description: Send enable or disable module data acquisition channel command to a specified module.

Command Format: **\$AA5AB(cr)**

Parameters: \$ delimiter character

AA module address, (range 00-FF) represents the 2-character hexadecimal

5 enable or disable module data acquisition channel command

AB Two hex: the first one represents Channel 4

the second represents Channel 3 ~ 0

 0: Disable

 1: enable

Bit7	Bit 6	Bit 5	Bit 4	Bit 3	Bit2	Bit 1	Bit 0
X	X	X	IN4	IN3	IN2	IN1	IN0
A				B			

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

Response: **!AA(cr)** command is valid

?AA(cr) command is invalid or illegal operation

! delimiter character which indicates a valid command.

? delimiter character which indicates a invalid command.

AA represents input module address

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

There is no response if the format error or communication error or address does not exist.

Example: command **\$01517(cr)**

response **!01 (cr)**

Description: set channel value: 0x37

 1 is 0001, means enable Channel 4.

 7 is 0111, means enable Channel 2, 1 and 0, disable Channel 3.

9. Read Channel Status Command

Description: Read channel status command to a specified analog input module

Command Format: **\$AA6(cr)**

Parameter: \$ delimiter character

AA module address, (range 00-FF) represents the 2-character hexadecimal

6 read channel status command

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

Response: **!AAAB(cr)** command is valid

?AA(cr) command is invalid or illegal operation

! delimiter character which indicates a valid command.

? delimiter character which indicates a invalid command.

AA represents input module address

AB Two hex: the first represents Channel 4

the second represents Channel 3 ~ 0

 0: Disable

 1: enable

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

There is no response if the format error or communication error or address does not exist.

Example: command \$186 (cr)
response !181F (cr)

Description: The current Channel status value is 0x1F.

0x1F is 0001, 1111 mean all channels are enabled at address 18H.

10. Read channel disconnection detection command

Description: Sending read channel disconnection detection command to a special analog input module

Command Format: \$AAB(cr)

Parameter: \$ delimiter character

AA module address, (range 00-FF) represents the 2-character hexadecimal

B read channel disconnection detection command

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

Response: !AAAB(cr) command is valid

?AA(cr) command is invalid or illegal operation

! delimiter character which indicates a valid command.

? delimiter character which indicates a invalid command.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X	X	X	IN4	IN3	IN2	IN1	IN0
A				B			

AA represents input module address

AB Two hex: the first represents Channel 4

the second represents Channel 3 ~ 0

0: channel is connected

1: channel has been disconnected

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

There is no response if the format error or communication error or address does not exist.

Example: command \$18B (cr)
response !181E (cr)

Description: The current Channel status value is 0x1E.

0x1E is 0001, 1111 mean channel 0 is connected, channels 1~4 are disconnectd at address 18H.

11. Set Communication Protocol Command

Description: Set the module communication protocol to characters protocol or Modbus RTU protocol.

Command Format: \$AAPV(cr)

Parameter: \$ delimiter character

AA module address, (range 00-FF) represents the 2-character hexadecimal

P set communication protocol command

V protocol code, 0 or 1

0: characters protocol

1: Modbus RTU protocol

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

Response: !AA(cr) command is valid

?AA(cr) command is invalid or illegal operation

! delimiter character which indicates a valid command.

- ? delimiter character which indicates a invalid command.
- AA represents input module address
- (cr) terminating character, carriage return (0Dh)

There is no response if the format error or communication error or address does not exist.

Set command protocol must be effective by default.

Example 1: **command** **\$00P1(cr)**
 response **!00 (cr)**

Set protocol command to Modbus RTU

Example 2: **command** **\$00P0(cr)**
 response **!00 (cr)**

Set protocol command to characters protocol

Input Ranges& Data Formats

WJ25 uses three data formats: 00: Engineering Units
 01: % of FSR
 10: Twos complement hexadecimal

Input Range	Data Format	+F.S	ZERO	-F.S	Displayed Resolution
PT100,-200~400°C	Engineering Units	+400.00	±00.00	-200.00	0.01°C
	% of FSR	+100.00	±000.00	-050.00	0.01%
	Twos complement hexadecimal	7FFFFFFF	000000	C00000	1LSB
PT100,-200~600°C	Engineering Units	+600.00	±000.00	-200.00	0.01°C
	% of FSR	+100.00	±000.00	-033.33	0.01%
	Twos complement hexadecimal	7FFFFFFF	000000	D55555	1LSB
PT1000,-200~400°C	Engineering Units	+400.00	±0.0000	-200.00	0.01°C
	% of FSR	+100.00	±000.00	-050.00	0.01%
	Twos complement hexadecimal	7FFFFFFF	000000	C00000	1LSB
PT1000,-200~600°C	Engineering Units	+600.00	±000.00	-200.00	0.01°C
	% of FSR	+100.00	±000.00	-033.33	0.01%
	Twos complement hexadecimal	7FFFFFFF	000000	D55555	1LSB

Table 4 Input Range and Data Format

Example:

1. Input Range is PT100,-200~400 deg.C, Input is 400 deg.C:

- Command **#010(cr)**
- Engineering Units Response **>+400.00(cr)**
- Percent of FSR Response **>+100.00(cr)**
- Twos complement Response **>7FFFFFFF (cr)**
- Twos complement Response **>4CCCCC(cr)**

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:

A high-precision resistance box, can be accurate to 0.01 ohm.

Calibration:

1. According to the module input range, connects to the corresponding input signal.
2. To WJ25 module channel 0 input 0 ohm resistance.
3. Until the signal stabilized, send the offset calibration \$ **AA10** command to WJ25 module.
4. To WJ25 module channel 0 input 100% of full scale resistance signal
 - If PT100, full scale 400 deg.C, adjust resistance to 247.092 ohms.
 - If PT100, full scale 600 deg.C, adjust resistance to 313.708 ohms.
5. Until the signal is stable, send the gain calibration \$ **AA00** command to WJ25 module.
6. Finished

Modbus RTU communication protocol:

Module default protocol is character communications protocol. If you need to set the module to Modbus RTU protocol, please follow these settings:

1. Put INIT switch to INIT position.
2. Connect the power cord and the communication interface cable.
3. Turn on the power, the module enters the default state automatically, address 00, baud rate 9600.
4. Wait 5s, module is initialization.
5. Send the command \$**00P1(cr)**, check the response, if is **!00 (cr)**, set successfully.
6. Turn off the power, INIT switch to the NORMAL position.
7. The module has been set to the Modbus RTU protocol mode successfully.



Appears **!00** in the received data, set successfully.

If as the above figure, did not respond or respond incorrectly, it indicates setting unsuccessful. Please turn off the power and check all wiring and INIT switch, then turn on the power testing.

Modbus RTU function code:

The module supports Modbus RTU communication protocol function code 03 (read hold register) and function code 06 (set a single register), the command format according to the standard Modbus RTU communication protocol.

The correspondence between the MODBUS protocol range and the data high 16 bits

Input Range	Register Address	+F.S	ZERO	-F.S
PT100,-200~400℃	40001~40005	0x7FFF	0x0000	0xC000
PT1000,-200~400℃	40011~40015	0x0FA0 (4000)	0x0000	0xF830 (-2000)
PT100,-200~600℃	40001~40005	0x7FFF	0x0000	0xD555
PT1000,-200~600℃	40011~40015	0x1770 (6000)	0x0000	0xF830 (-2000)

Register Description: (Common applications reading high 16-bit data to meet the accuracy requirements)

Address 4X (PLC)	Address (PC, DCS)	Data	Property	Data Explanation
40001	0000	Input Analog Signal	Read Only	Channel 0 Data High 16
40002	0001	Input Analog Signal	Read Only	Channel 1 Data High 16
40003	0002	Input Analog Signal	Read Only	Channel 2 Data High 16
40004	0003	Input Analog Signal	Read Only	Channel 3 Data High 16
40005	0004	Input Analog Signal	Read Only	Channel 4 Data High 16
40011	0010	Input Analog Signal	Read Only	Channel 0 temperature, signed integer, divided by 10 equals the actual temperature
40012	0011	Input Analog Signal	Read Only	Channel 1 temperature, signed integer, divided by 10 equals the actual temperature
40013	0012	Input Analog Signal	Read Only	Channel 2 temperature, signed integer, divided by 10 equals the actual temperature
40014	0013	Input Analog Signal	Read Only	Channel 3 temperature, signed integer, divided by 10 equals the actual temperature
40015	0014	Input Analog Signal	Read Only	Channel 4 temperature, signed integer, divided by 10 equals the actual temperature
40021	0020	Input Analog Signal	Read Only	Channel 0 Data Low 8
40022	0021	Input Analog Signal	Read Only	Channel 0 Data Low 8
40023	0022	Input Analog Signal	Read Only	Channel 0 Data Low 8
40024	0023	Input Analog Signal	Read Only	Channel 0 Data Low 8
40025	0024	Input Analog Signal	Read Only	Channel 0 Data Low 8

40211	0210	Module Name	Read Only	High:0x00 Low:0x29
40221	0220	Channel status	Read/Write	0x1F as bit corresponding channel 4 ~ 0
40222	0221	Type Code	Read/Write	0x00 ~ 0x03 corresponds to a different input type
40223	0222	disconnected detection	Read Only	0x1F as Bit corresponding channel 4 ~ 0.0: Normal, 1: disconnected

Table 5 Modbus RTU register description

Example 1:

If the module address is 01,hexadecimal sent: **01030000001840A**,to get the data register data 40001.

01	03	00	00	00	01	84	0A
Module address	Read holding register	Register address High	Register address low	Register quantity high	Register quantity low	CRC check low	CRC check high

If module reply: **010302199973BE** read data: 0x1999,if the type code is 00 (Pt100, -200~400℃) ,conversion $0x1999 * 20mA / 0x7FFF = 4mA$. That indicates the input channel 0 temperature is 80 deg.C.

01	03	02	19	99	BE	73
Module address	Read holding register	Data Bytes	Data High	Data Lower	CRC check low	CRC check high

Example 2:

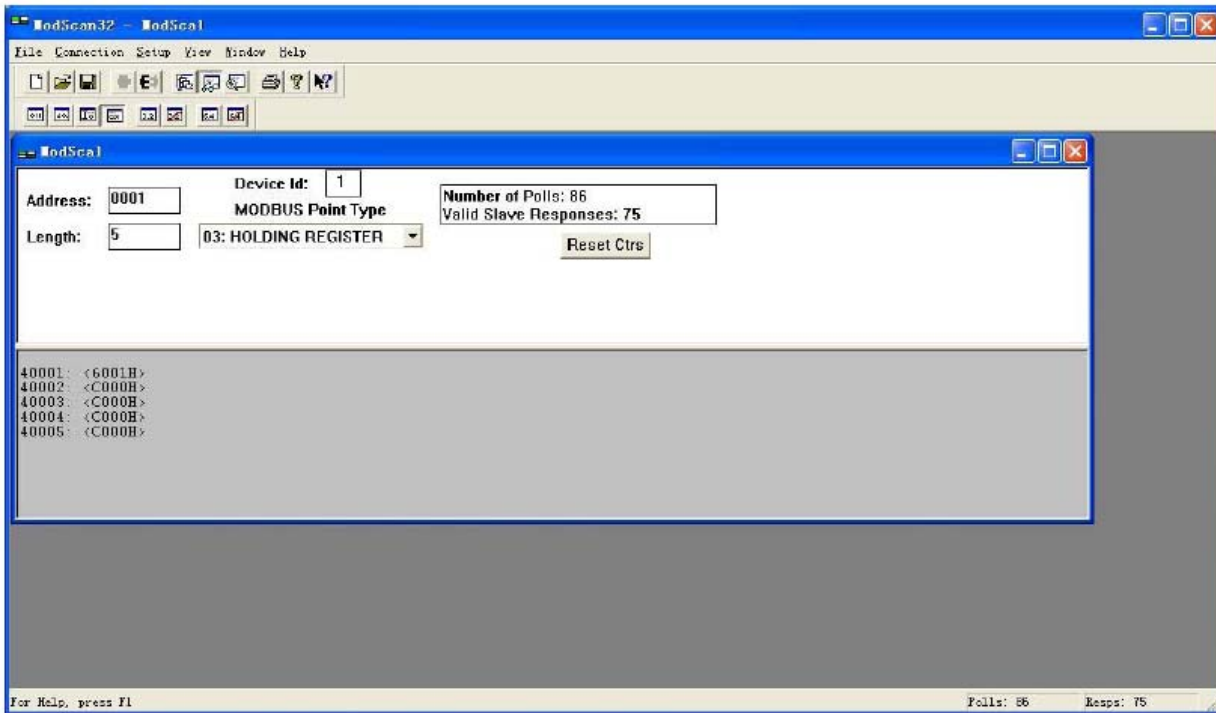
If the module address is 01,hexadecimal sent: **0103000A0001A408**,to get the data register data 40011.

01	03	00	0A	00	01	A4	08
Module address	Read holding register	Register address High	Register address low	Register quantity high	Register quantity low	CRC check low	CRC check high

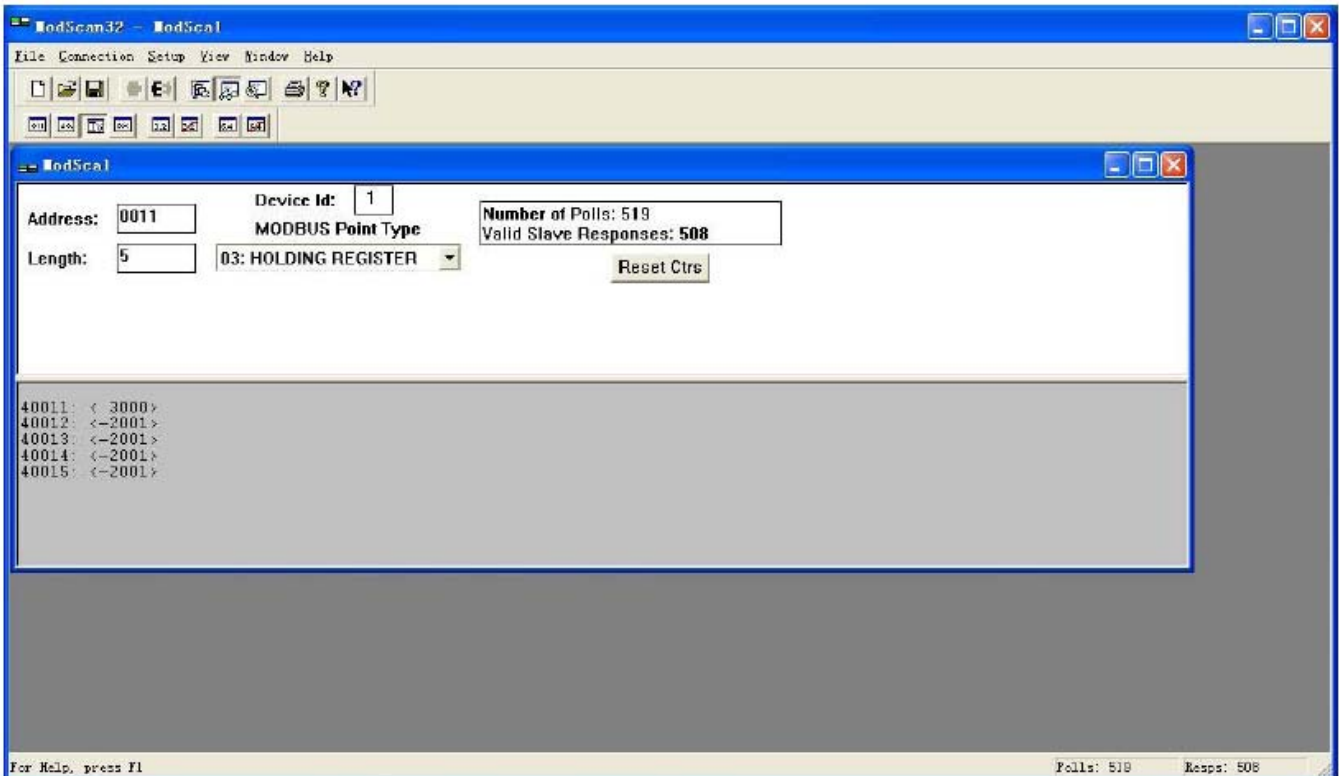
If module reply: **0103020BB8BF06** read data: 0x0BB8, Converted to 10 into the 3000, and then divided by 10, that now the channel 0 input temperature is 300.0 deg.C.

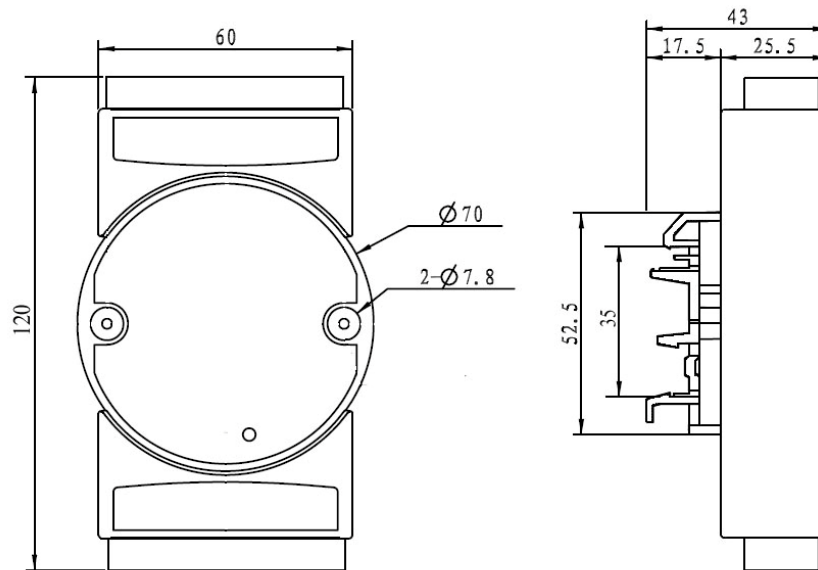
01	03	02	19	99	BF	06
Module address	Read holding register	Data Bytes	Data High	Data Lower	CRC check low	CRC check high

Read register address 40001 ~ 40005 data example, channel 0 temperature is 300 deg.C, other channels are disconnect



Read register address 40011~40015 data example, channel 0 temperature is 300 deg.C, other channels are disconnect



**Warranty**

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

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