

JSY-MK-218 DC 8-channel metering module

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1. Product introduction

1.1、 Introduction

JSY-MK-218 DC 8-channel metering module is a multi-channel DC parameter measurement product that can complete electrical energy collection, measurement and data transmission . It can accurately measure 8- channel DC voltage, current , power, electricity and other electrical parameters , providing 1-way RS-485 communication interface , MODBUS-RTU protocol, with excellent cost performance.

JSY-MK-218 DC 8-channel metering module can be widely used in energy-saving renovation , electric power, communications, railways, transportation, environmental protection, petrochemical, steel and other industries to monitor the current and power consumption of DC equipment .

1.2、 Features

- 1.2.1. Collect 8 channels of DC parameters, including voltage, current, power, electric energy and other electrical parameters.

- 1.2.2. Adopt special measurement chip, effective value measurement method, high measurement accuracy.
- 1.2.3. With 1 RS-485 communication interface.
- 1.2.4. The communication protocol adopts standard Modbus-RTU, which has good compatibility and facilitates programming.
- 1.2.5. RS-485 communication interface with ESD protection circuit .
- 1.2.6. Wide operating voltage DC9~50V.
- 1.2.7. High isolation voltage, withstand voltage up to DC1000V.

1.3、 Technical Parameters

1.3.1 8 DC inputs

- 1) Voltage range: 0~ 350V . (can be customized)
- 2) Current range: 8 A per channel . (can be customized)
- 3) Signal processing: using special measurement chip, 24 -bit AD sampling.
- 4) Overload capacity: 1.2 times the range is sustainable. instantaneous (<20mS) current is 5 times, voltage is 1.2 times the range without damage.
- 5) Input impedance: voltage channel >1 kΩ /V. current channel ≤ 10mΩ .

1.3.2 Communication Interface

- 1) Interface type: 1-way RS-485 interface.
- 2) Communication protocol: MODBUS-RTU protocol.
- 3) Data format: can be set by software, "n,8,1" , "e,8,1" , "o,8,1" , "n , 8,2" .
- 4) The baud rate of the RS-485 communication interface can be set to 9600 bps , 19200bps, 38400bps . the default baud rate is 9600bps , and the default communication format is "8,n,1".

1.3.3 Measurement output data

For multiple electrical parameters such as voltage, current, power, and electric energy, see the Mdobus data register list.

1.3.4 measurement accuracy

Voltage , current , power : ± 1.0 % . active electricity level 1 .

1.3.5 isolation

RS-485 interface, isolated from the power supply and each power supply under

test. isolation withstand voltage 1000VDC.

1.3.6 power supply

- 1) DC9~50V wide range power supply .
- 2) Typical power consumption: 165mA (12V).

1.3.7 working environment

- 1) Working temperature: -20~+70℃ . Storage temperature: -40~+85℃ .
- 2) Relative humidity: 5~ 75 % , no condensation (at 40 ℃) .
- 3) Altitude: 0~3000 meters.
- 4) Environment: No explosive, corrosive gases and conductive dust, no significant shaking, vibration and impact.

1.3.8 Temperature drift: ≤100ppm/ ℃ .

1.3.9 Installation method: 35mm guide rail installation or screw fixed installation, the screw hole spacing is 135x70mm.

2. Application

2.1、 Appearance and installation

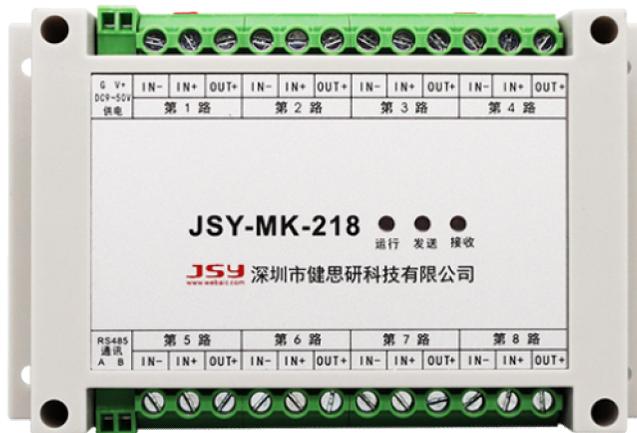


Figure 2.1 Overall dimensions (145x90x40mm)

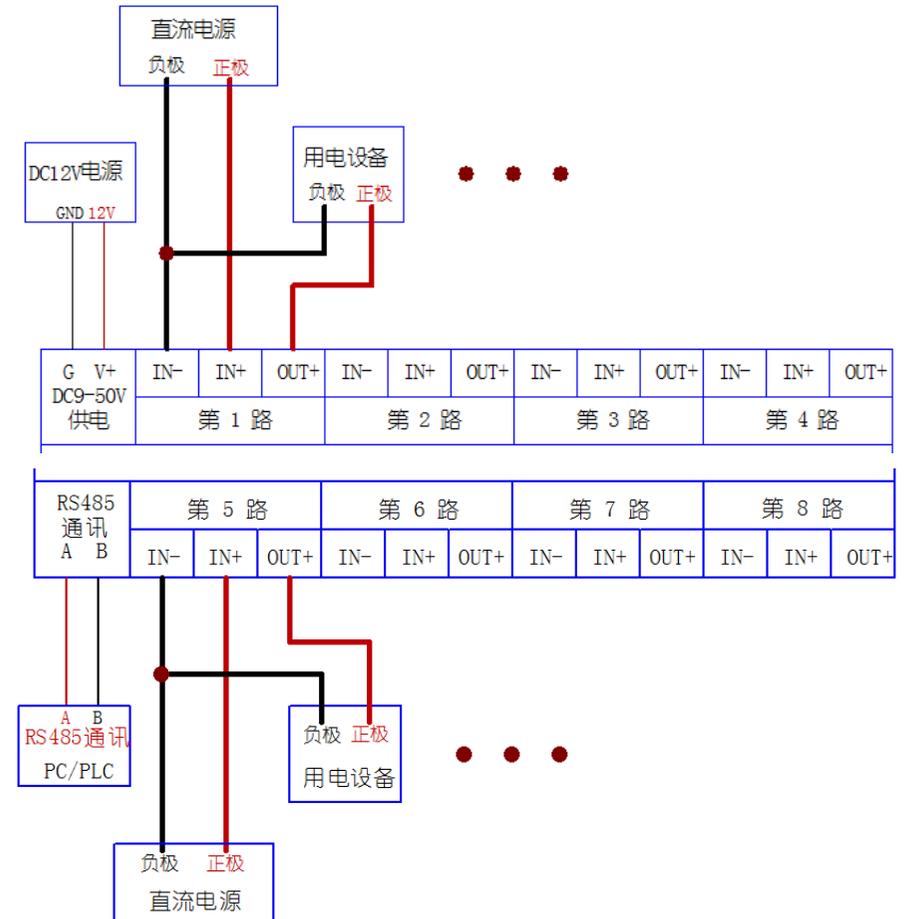
2.2、 Interface definition

2.2.1 G (ground/negative pole) and V+ (positive pole) are the DC power supply input ports of the module, DC9~50V .

2.2.2 IN- (negative input of the power supply under test), IN+ (positive input of the power supply under test), OUT+ (positive output of the power supply under test).

2.2.3 RS485 communication A is connected to positive and B is connected to negative.

2.2.4 The wiring diagram is as follows.



2.3、 Application Notes

Please refer to the above diagram for correct wiring according to product specifications and models. Make sure to disconnect all signal sources before wiring to avoid danger and damage to the equipment. After checking to confirm that the wiring is correct, turn on the power and test.

After the power is turned on, the running indicator light is always on, the receiving indicator light flashes when receiving data, and the sending indicator light flashes when the module sends data.

When the products leave the factory, they are set to the default configuration: address No. 1, baud rate 9600bps, data format 8, N, 1 data update rate is 1000ms, and transformation ratio is 1.

You can use the JSY-MK-218 test software we provide to change the settings of product parameters and general testing of the product.

2.4、 RS-485 communication connection

The host generally only has an RS - 232 interface. At this time, it can be connected to the 485 network through an RS - 232/ RS- 485 converter. It is recommended to use an isolated 485 converter to improve the reliability of the system.

The A+ terminals of all devices on a bus are connected in parallel, and the B- terminals are connected in parallel. They cannot be connected in reverse. Up to 255 network instruments can be connected to one line at the same time. Each network instrument can set its communication address. The communication connection should use With shielded twisted pair, the wire diameter is not less than 0.5mm². When wiring, communication lines should be kept away from strong current cables or other strong electric field environments .

RS - 485 communication lines should use shielded twisted pairs. the communication distance of 485 can be up to 1200 meters. When there are many RS485 devices connected to a bus , or when a higher baud rate is used, the communication distance will be shortened accordingly. You can use 485 repeater for expansion.

RS - 485 networking has a variety of topologies, and generally uses linear connection, that is, starting from the upper host, multiple devices are connected to the network one by one from near to far. A terminal matching resistor of 120 ~ 300 Ω /0.25 watt can be connected at the farthest end (it depends on the specific communication quality, that is, it

does not need to be installed when the communication is very good).

2.5、 Electric energy measurement function

Can provide voltage, current, power, active energy and other parameters for each channel.

The electricity data is a 4-byte unsigned number. It will not overflow for 10 consecutive years and the data will be saved when the power is turned off.

三、 Protocol

四、 3.1 The product adopts MODBUS-RTU communication protocol

3.1.1 Function code 0x03: Read multiple registers

Example: The host wants to read 2 slave register data with address 01 and start address 0048H.

Host sends: 01 03 00 48 00 02 CRC

Address function code starting address data length CRC code

Slave response: 01 03 04 12 45 56 68 CRC

Address function code returns the number of bytes Register data 1 Register data 2 CRC code

3.1.2 Function code 0x10: Write single or multiple registers

Example: The host wants to save 0000,0000 to the slave register with addresses 000C, 000D (slave address code is 0x01)

Host sends: 01 10 00 0C 00 02 04 00 00 00 00 F3 FA

Address function code starting address number of write registers byte count saved data 1 2 CRC code

Slave response: 01 10 00 0C 00 02 81 CB

Address function code starting address write register number CRC code

3.1.3 illustrate:

The register in the MODBUS-RTU communication protocol refers to 16 bits (ie 2 bytes), and the high-order bit is first.

When setting parameters, be careful not to write illegal data (that is, data values that exceed the data range limit).

The error code format returned by the slave is as follows:

Address code: 1 byte

Function code: 1 byte (the highest bit is 1)

Error code: 1 byte

CRC: 2 bytes

The response returns the following error code:

81: Illegal function code, that is, the received function code module does not support it.

82: Reading or writing illegal data address, that is, the data location exceeds the readable or writable address range of the module.

83: Illegal data value, that is, the data value sent by the module received by the host exceeds the data range of the corresponding address.

3.2 Valid registers are as follows:

Register address	illustrate
0000H (read only)	Model, value is 0218H,
0001H (read only)	Program Version
0002H (read only)	Voltage range: value is 250, representing 250V
0003H (read only)	Current range: a value of 10 0 represents 10 A
0004H (readable and writable)	The default value is 0106H. the default address is 01H, and the default format is 8, N, 1, 9600bps Description: The 8-bit high byte is the address, 1~255. 0 is the broadcast address. The lower four bits of the low byte are the baud rate, 6-9600bps, 7-19200bps, 8-38400bps

0040H (read only)	No. 1 voltage, unsigned number, value = DATA/100, unit V
00 41 H (read only)	Current No. 1, unsigned number, value = DATA/1000, unit A
00 42 H (read only)	Channel 1 active power, unsigned number, value = DATA , unit is W
00 43 ~00 44 H (read and write)	Total active energy of channel 1, unsigned number, value = DATA/100, unit is kWh
0045H (read only)	No. 2 voltage, unsigned number, value = DATA/100, unit V
00 4 6H (read only)	The 2nd current, unsigned number, value = DATA/1000, unit A
00 4 7H (read only)	Channel 2 active power, unsigned number, value = DATA , unit is W
00 4 8~00 4 9H (read and write)	Total active energy of channel 2, unsigned number, value = DATA/100, unit is kWh
004AH (read only)	No. 3 voltage, unsigned number, value = DATA/100, unit V
00 4 BH (read only)	The 3rd current, unsigned number, value=DATA/1000, unit A
004CH (read only)	Channel 3 active power, unsigned number, value = DATA , unit is W
00 4 D~00 4 EH (read and write)	Total active energy of channel 2, unsigned number, value = DATA/100, unit is kWh
004FH (read only)	No. 4 voltage, unsigned number, value = DATA/100, unit V
0050H (read only)	The 4th channel current, unsigned number, value = DATA/1000, unit A
0051H (read only)	Channel 4 active power, unsigned number, value = DATA , unit is W
0052~0053H (read and write)	Total active energy of channel 4, unsigned number, value = DATA/100, unit is kWh
0054H (read only)	No. 5 voltage, unsigned number, value = DATA/100, unit V
0055H (read only)	The 5th channel current, unsigned number, value = DATA/1000,

	unit A
0056H (read only)	Channel 5 active power, unsigned number, value = DATA , unit is W
0057~0058H (read and write)	The total active energy of channel 5, unsigned number, value = DATA/100, unit is kWh
0059H (read only)	No. 6 voltage, unsigned number, value = DATA/100, unit V
005AH (read only)	No. 6 current, unsigned number, value = DATA/1000, unit A
005BH (read only)	Channel 6 active power, unsigned number, value = DATA , unit is W
005C~005DH (read and write)	The total active energy of channel 6, unsigned number, value = DATA/100, unit is kWh
005EH (read only)	No. 7 voltage, unsigned number, value = DATA/100, unit V
005FH (read only)	No. 7 current, unsigned number, value = DATA/1000, unit A
0060H (read only)	Channel 7 active power, unsigned number, value = DATA , unit is W
0061~0062H (read and write)	The total active energy of channel 7, unsigned number, value = DATA/100, unit is kWh
0063H (read only)	No. 8 voltage, unsigned number, value = DATA/100, unit V
0064H (read only)	The 8th channel current, unsigned number, value = DATA/1000, unit A
0065H (read only)	Channel 8 active power, unsigned number, value = DATA , unit is W
0066~0067H (read and write)	The total active energy of channel 8, unsigned number, value = DATA/100, unit is kWh
0068H (read only)	Total current of 8 channels, unsigned number, value = DATA/1000, unit A
0069H (read only)	Total active power of 8 channels, unsigned number, value =

	DATA , unit is W
006A~006BH (read and write)	8 channels of total active energy, unsigned number, value = DATA/100, unit is kWh

For example: Address module No. 1 can send instructions: 01 03 00 40 00 2C 45 C3, and copy back all electrical parameters from 0040H to 006BH at one time .

In order to facilitate classification and reading of data, voltage, current, power, and electric energy data are collected. The data content is the same as the shunt data.

0070H (read only)	No. 1 voltage, unsigned number, value = DATA/100, unit V
0071H (read only)	No. 2 voltage, unsigned number, value = DATA/100, unit V
0072H (read only)	No. 3 voltage, unsigned number, value = DATA/100, unit V
0073H (read only)	No. 4 voltage, unsigned number, value = DATA/100, unit V
0074H (read only)	No. 5 voltage, unsigned number, value = DATA/100, unit V
0075H (read only)	No. 6 voltage, unsigned number, value = DATA/100, unit V
0076H (read only)	No. 7 voltage, unsigned number, value = DATA/100, unit V
0077H (read only)	No. 8 voltage, unsigned number, value = DATA/100, unit V
0078H (read only)	Current No. 1, unsigned number, value = DATA/1000, unit A
0079H (read only)	The 2nd current, unsigned number, value = DATA/1000, unit A
007AH (read only)	The 3rd current, unsigned number, value=DATA/1000, unit A
007BH (read only)	The 4th channel current, unsigned number, value = DATA/1000, unit A
007CH (read only)	The 5th channel current, unsigned number, value = DATA/1000, unit A
007DH (read only)	No. 6 current, unsigned number, value = DATA/1000, unit A
007EH (read only)	No. 7 current, unsigned number, value = DATA/1000, unit A
007FH (read only)	The 8th channel current, unsigned number, value = DATA/1000, unit A
0080H (read only)	Channel 1 active power, unsigned number, value = DATA , unit is W
0081H (read only)	Channel 2 active power, unsigned number, value = DATA , unit is

	W
0082H (read only)	Channel 3 active power, unsigned number, value = DATA , unit is W
0083H (read only)	Channel 4 active power, unsigned number, value = DATA , unit is W
0084H (read only)	Channel 1 active power, unsigned number, value = DATA , unit is W
0085H (read only)	Channel 2 active power, unsigned number, value = DATA , unit is W
0086H (read only)	Channel 3 active power, unsigned number, value = DATA , unit is W
0087H (read only)	Channel 4 active power, unsigned number, value = DATA , unit is W
0088~0089H (read and write)	The total active energy of channel 1, unsigned number, value = DATA/100, unit is kWh
008A~008BH (read and write)	Total active energy of channel 2, unsigned number, value = DATA/100, unit is kWh
008C~008DH (read and write)	Total active energy of channel 3, unsigned number, value = DATA/100, unit is kWh
008E~008FH (read and write)	Total active energy of channel 4, unsigned number, value = DATA/100, unit is kWh
0090~0091H (read and write)	The total active energy of channel 5, unsigned number, value = DATA/100, unit is kWh
0092~0093H (read and write)	The total active energy of channel 6, unsigned number, value = DATA/100, unit is kWh
0094~0095H (read and write)	The total active energy of channel 7, unsigned number, value = DATA/100, unit is kWh
0096~0097H (read and write)	The total active energy of channel 8, unsigned number, value = DATA/100, unit is kWh

This instrument provides a serial asynchronous half-duplex RS485 communication interface, using the standard MODBUS-RTU protocol, and various data information can be transmitted on the communication line. Up to 255 network instruments can be connected to one line at the same time. Each network instrument can set its communication address. The communication connection should use a shielded twisted pair with a copper mesh, and the wire diameter should not be less than 0.5mm^2 . When wiring, communication lines should be kept away from strong current cables or other strong electric field environments.

The MODBUS protocol adopts the master-slave response communication connection method on one communication line. First, the signal from the host computer is addressed to a terminal device (slave) with a unique address. Then, the response signal from the terminal device is transmitted to the host in the opposite direction, that is, the signal is transmitted along a separate communication line. All communication data streams are transmitted in opposite directions (half-duplex operating mode). The MODBUS protocol only allows communication between the host (PC, PLC, etc.) and terminal devices, but does not allow data exchange between independent terminal devices. In this way, each terminal device will not occupy the communication line when they are initialized, but is limited to responding. Query signal arriving at this machine.

Host query: The query message frame includes device address, function code, data information code, and check code. The address code indicates the slave device to be selected. the function code tells the selected slave device what function it wants to perform. For example, function code 03 or 04 requires the slave device to read registers and return their contents. the data segment contains the requirements of the slave device. Any additional information that performs functions. The check code is used to verify the correctness of a frame of information. The slave device provides a method to verify whether the message content is correct. It uses the calibration rule of CRC16.

4. Precautions

- 1) Pay attention to the power supply information on the product label. Do not connect the wrong power supply level and polarity of the product, otherwise the product may be damaged.
- 2) Please refer to the diagram for correct wiring according to product specifications and models. Make sure to disconnect all signal sources and power before wiring to avoid danger and damage to the equipment. After checking to confirm that the wiring is correct, turn on the power and test.
- 3) When using the product in an environment with strong electromagnetic interference, please pay attention to the shielding of the input and output signal lines.
- 4) When installed in a centralized manner, the minimum installation interval should not be less than 10mm.
- 5) Please do not damage or modify the product's label or logo, and do not disassemble or modify the product, otherwise our company will no longer provide "three guarantees" (guaranteed replacement, guaranteed return, and guaranteed repair) service for the product.

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