JSY-MK-193 dual channel metering module

1. Product introduction

1.1、 Introduction

JSY-MK-193 dual channel metering module is an AC electrical parameter measurement product that can complete electric energy acquisition, measurement and data transmission. It can accurately and separately measure the AC voltage, current, power, power factor, frequency, electricity and other electrical parameters of each channel. It can be used as 2 single-phase modules, providing 1-channel RS-485 communication interface, MODBUS-RTU protocol, and has excellent cost performance.

The JSY-MK-193 metering module can be widely used in energy-saving transformation, electric power, communications, railways, transportation, environmental protection, petrochemical, steel and other industries, used to monitor AC equipment current and power consumption.

1.2、 Functional features

1.2.1. Collect 2 channel AC electrical parameters, including voltage, current, power, power factor, frequency, electric energy and other electrical parameters;

1.2.2. Using special measurement chip, effective value measurement method, high measurement accuracy;

1.2.3. With 1 channel RS-485 communication interface;

1.2.4. The communication protocol adopts standard Modbus-RTU, which has good compatibility and is convenient for programming;

1.2.5. ESD protection circuit with RS-485 communication interface;

1.2.6. Wide working voltage 9~30VDC.

1.2.7. High isolation voltage, withstand voltage up to DC2000V;

1.2.8. It can be equipped with different specifications of single-turn core PCB fixed or open transformer, convenient and easy to use;

1.3、 Technical parameters

1.3.1 Single-phase AC input

1) Voltage range: 100V, 220V and other optional;
2) Current range: 5A, 50A, 100A and other optional; External external opening current transformer model optional;
3) Signal processing: Using dedicated measurement chip, 24 AD sampling;
4) Overload capacity: 1.2 times the range is sustainable; Instantaneous (<20mS) current 5 times, voltage 1.2 times the range is not damaged;
5) Input impedance: voltage channel> 1 kΩ/V;

1.3.2 Communication Interface

1) Interface type: 1 channel RS-485 interface;
2) Communication protocol: MODBUS-RTU;

3) Data format: "n,8,1", "e,8,1", "o,8,1", "n,8,2";

4) Communication rate: the baud rate of RS-485 communication interface can be set to 1200,2400,4800,9600,19200,38400bps. The baud rate defaults to 9600bps;

1.3.3 Measurement output data

Voltage, current, power, electric energy, power factor, frequency and other electrical parameters. See Modbus data register list;

1.3.4 Measurement accuracy

Voltage, current and power: ± 1.0%; active power energy level 1

1.3.5 Isolation

RS-485 interface is isolated from voltage input and current input; isolation withstand voltage 2000VDC;

1.3.6 Power

1) 9~30VDC;

2) Typical power consumption: < 80mA;

1.3.7 Working environment

1) Working temperature: -30 ~ +70 ℃; Storage temperature: -40 ~ +85 ℃;

2) Relative humidity: 5 ~ 95%, no condensation (at 40 ℃);

3) Altitude: 0~3000 meters;

4) Environment: no explosion, corrosive gas and conductive dust, no significant shaking, vibration and impact of the place;

1.3.8 Temperature drift: < 100ppm/ ℃;

1.3.9 Installation method: screw fixed installation ,hole distance is 102*65.5MM

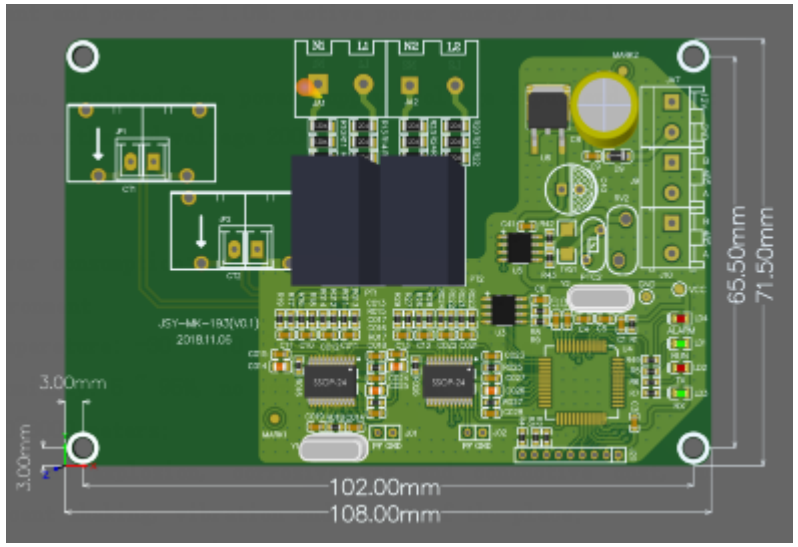


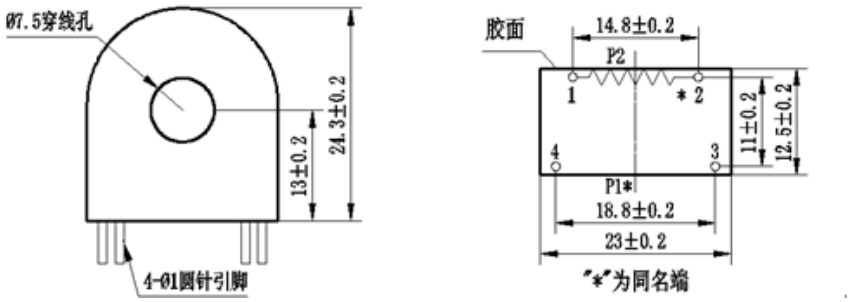
Figure 2.1 Outline and Dimension (Unit: mm)

Outline drawing of current transformer

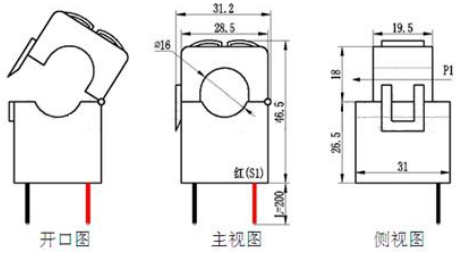
2. application

2.1、Appearance and installation

current transformer appearance and size chart:



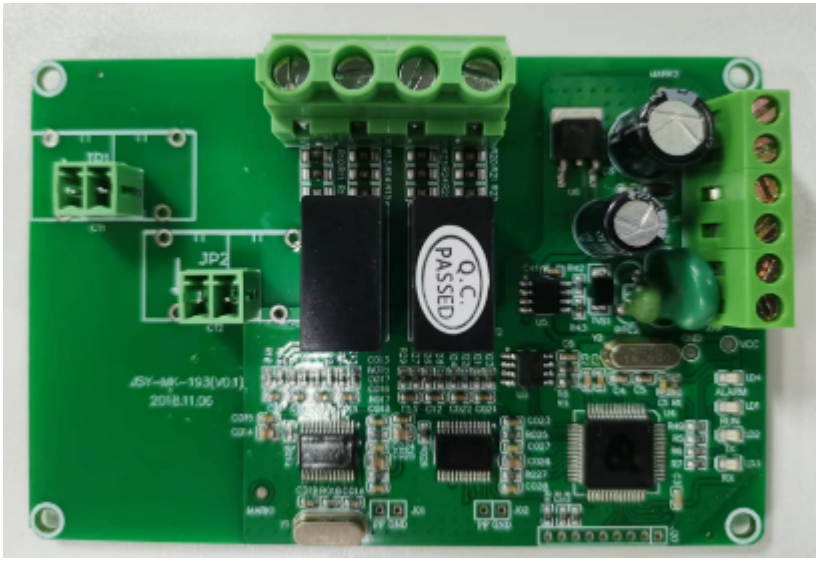
Outline and size of 50A Through-core Current Transformer



Outline and Size of 100A Open Type Current Transformer

2.2、Interface Definition

Mark	Characteristic	Function description
CT1	Current sample	First channel
CT2	Current sample	Second channel
N1	Voltage sample	Connect first channel neutral wire
L1	Voltage sample	Connect first channel live wire
N2	Voltage sample	Connect second channel neutral wire
L2	Voltage sample	Connect second channel live wire
12V	DC+	Power supply:+9V~30V
GND	DC-	Power supply ground
A	Communication interface	Connect 485A
B	Communication interface	Connect 485B



2.2.1 The working power supply of the module can be selected, DC 9-30V

2.2.2 This product defaults to a fixed transformer. Large current (according to current intensity) can be customized. External transformer is required.

2.2.3 RS-485 communication interfaces are wiring sockets, Those two sets of wiring ports are equivalent.

2.2.4 Two sets of voltage input ports can be connected to different voltage inputs,It can also be connected to the same voltage input.

2.3、Application Description

Please refer to the above figure for correct wiring according to the product specification and model. Make sure to disconnect all signal sources before wiring to avoid danger and damage to equipment. After checking and confirming that the wiring is correct, turn on the power for testing.

After the power is turned on, the power indicator LD1 is always on, the

indicator LD3 will flash when receiving data, and the indicator LD2 will flash when the module sends data.

When the product leaves the factory, it is set to the default configuration: address 1, baud rate 9600bps, data format 8,N,1;

You can change the set product parameters and the general test of the product through our JSY-MK-193 series product testing software.

2.4、RS-485 communication connection

The host generally only has RS-232 interface, at this time can be connected to the 485 network through the 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 equipment on a bus are connected in parallel, and the B- terminals are connected in parallel, and cannot be connected in reverse. Up to 255 network meters can be connected on a line at the same time. Each network meter can set its communication address. The communication connection shall use shielded twisted pair with a wire diameter of not less than 0.5mm ^{2}. When wiring, the communication line should be kept away from strong electric cables or other strong electric field environment.

RS-485 communication lines should use shielded twisted pair; 485 communication distance of up to 1200 meters, when a bus connected to a lot of RS485 equipment, or use a higher baud rate when the communication distance will be shortened accordingly, at this time can be extended using 485 repeater.

RS-485 networking has a variety of topologies, and linear connections are generally used, I .e. multiple devices are connected to the network one by one from near and far from the upper host. A terminal matching resistor of 120~300 Ω/0.25W can be connected at the farthest end (it depends on the specific communication quality, I .e. it is not necessary to install it when the communication is good).

2.5、Electric energy metering function

It can provide each voltage, current, power, power factor, frequency, active energy, carbon emissions and other parameters;

The data of the power degree is an unsigned number of 4 bytes, which will not overflow for 10 consecutive years, and the data will be saved after power failure.

3. List of registers of JSY-MK-193 Modbus

Registers are used to MODBUS-RTU communication protocols. Valid registers are as follows:

register address	Description
0000H (Read Only)	Model number, value 0193H,
0001H (Read Only)	Reserved
0002H (Read Only)	Voltage range: value of 250, representing 250V
0003H (Read Only)	Current range: value is 500, representing 50A
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 bits of the high byte are the address, 1~255;0 is the broadcast address; The low 4 bits of the low byte is the baud rate, 3-1200bps,4-2400bps,5-4800bps,6-9600bps,7-19200bps,8-38400bps
0100H (Read Only)	1st channel voltage, unsigned data, value = DATA/100（V）
0101H (Read Only)	1st channel current, unsigned data, value = DATA/100（A）
0102H (Read Only)	1st channel active power, unsigned data, value = DATA（W）
0103H (Read Only)	1st channel power direct, unsigned data, 0000(positive), 0001(negative)
0104～0105H (Read and write)	1st channel positive active energy, unsigned data, value = DATA/100(kWh)
0106～0107H (Read and write)	1st channel negative active energy, unsigned data, value = DATA/100(kWh)
0108H (Read Only)	1st channel power factor, unsigned data, value = DATA/1000
0109H (Read Only)	1st channel frequency, unsigned data, value = DATA/100(Hz)
010AH (Read	2nd channel voltage, unsigned data, value = DATA/100（V）

Only)	
010BH (Read Only)	2nd channel current, unsigned data, value = DATA/100（A）
010CH (Read Only)	2nd channel active power, unsigned data, value = DATA（W）
010DH (Read Only)	2nd channel power direct, unsigned data, 0000(positive), 0001(negative)
010E ~ 010FH (Read and write)	2nd channel positive active energy, unsigned data, value = DATA/100(kWh)
0110 ~ 0111H (Read and write)	2nd channel negative active energy, unsigned data, value = DATA/100(kWh)
01128H (Read Only)	2nd channel power factor, unsigned data, value = DATA/1000
0113H (Read Only)	2nd channel frequency, unsigned data, value = DATA/100(Hz)

4. MODBUS Communication Protocol

MODBUS-RTU Protocol Communication Example and Error Description

4.1 Function Code 0x03: Read Multiple Register

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

Host Sent:

01 03 00 48 00 02 CRC

address function code start address data length CRC code

slave response:

01 03 04 12 45 56 68 CRC

Address Function Code Return Bytes Register Data 1 Register Data 2 CRC Code

4.2 function code 0x10: write multiple register

Example: The host should save 0000 and 0000 to the slave register with address 000C,000D (the slave address code is 0x 01)

Host Sent:

01 10 00 0C 00 02 04 00 00 00 00 F3 FA

Address function code start address write register number byte count save data 1 2 CRC code

slave response:

01 10 00 0C 00 02 81 CB

Address function code start address write register number CRC code

4.3. Description:

The register in the MODBUS-RTU communication protocol refers to 16 bits (2 bytes), and the high bits preceded.

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

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

Address code: 1 byte

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

Error code: 1 byte

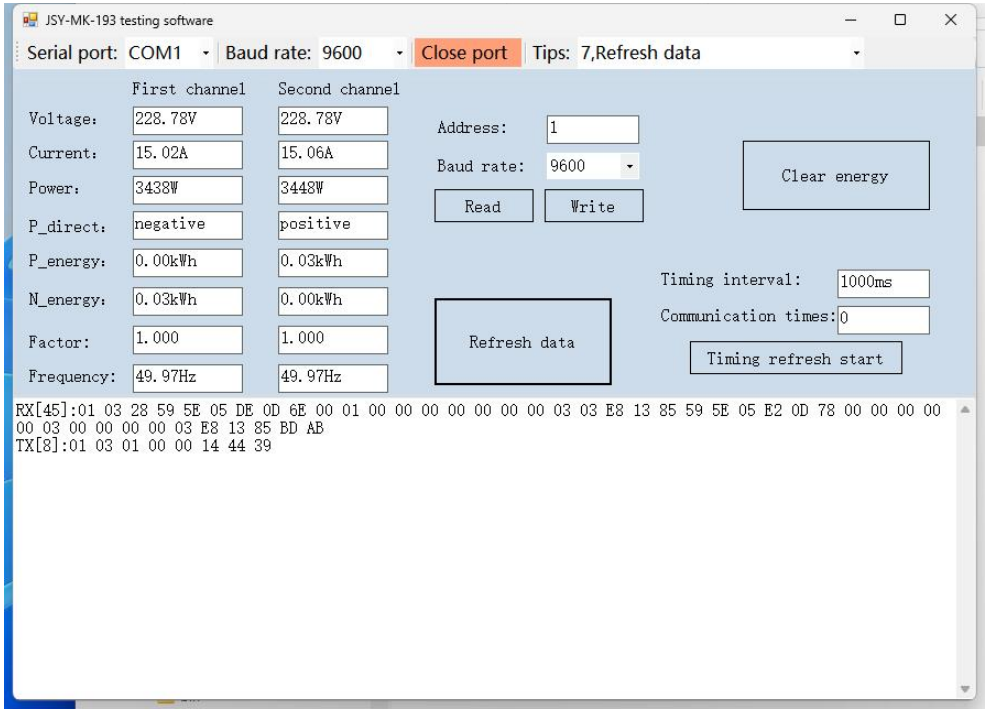
CRC: 2 bytes

The response returns the following error code:

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

82: Read or write 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 host received by the module exceeds the data range of the corresponding address.



5. considerations

1) Pay attention to the auxiliary power information on the product label. The auxiliary power level and polarity of the product cannot be connected incorrectly, otherwise the product may be damaged.
2) Please refer to the figure for correct wiring according to the product specification and model. Make sure to disconnect all signal sources and power supplies before wiring to avoid danger and damage to equipment. After checking and confirming that the wiring is correct, turn on the power for testing.
3) The voltage circuit or the secondary circuit of PT shall not be short-circuited.
4) When there is current on the primary side of CT, the secondary circuit of CT is strictly prohibited to open circuit; it is strictly prohibited to wire or unplug the terminal;
5) When the product is used in an environment with strong electromagnetic interference, please pay attention to the shielding of the input and output signal lines.
6) When centralized installation, the minimum installation interval shall not be less than 10mm.
7) Do not damage or modify the label and logo of the product, do not disassemble or modify the product, otherwise the company will no longer provide "three guarantees" (replacement, return, repair) service for the product.