Single channel digital weighing module

V2.1

Instruction Manual

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# 1 Summary

## 1.1 Product introduction

Thank you for choosing our products. Before using this product, please read this manual carefully to make this product work to the maximum extent.

This product uses 24 bit ∑-△ADC chip,and the analog signal of bridge load cell is converted into digital signal. Suitable for 18-30vdc power supply system.24 V power supply is recommended.

This product also has the function of sensor circuit detection, that is, when the sensor is not connected or the sensor is faulty (including the wiring falling off, etc.), the corresponding alarm will be given [effective when only one sensor is connected to each channel].

**Product features：**

1. It can prevent RFI / EMI interference and has strong EMC characteristics;
2. 18-30v DC supply;
3. High speed 24 bit ∑-△ADC sampling, more than 500Hz sampling, control output and sampling interval synchronization;
4. Complete sensor fault detection function, such as signal overrun, module sampling fault, sensor line connection fault, etc;
5. Complete communication interface，Standard RS 232 and 485;

## 1.2 Safety tips

1. The instrument has anti-interference design. Be sure to ground the instrument reliably and separate it from the AC power supply ground wire;
2. Do not use in flammable gas environment;
3. Avoid direct sunlight;
4. The communication station is recommended to use the same 24 V power supply as the module, otherwise the communication connection needs to be transmitted through the isolation module [for example, the PLC is AC220 V, and the communication isolation module needs to be added between PLC and this module].

## 1.3 Technical parameters and dimensions

|  |  |
| --- | --- |
| **Measurement signal** | -20mV~20mV，Each can drive 6 load cells with 350 ohm |
| **Sampling frequency** | 500Hz |
| **Accuracy** | III Level |
| **Resolution** | 1/500000 |
| **Communication** | rs 232,rs 485 |
| **Nonlinearity** | 0.005%FS |
| **Power** | 10-30VDC（Sensor voltage 5V） |
| **Weight** | About 0.2kg |
| **Dimensions** | 100\*64\*24 mm |
| **Power waste** | < 3W |
| **Temperature** | -20~+65℃ |

## 1.4 I/O

Explain

1：DC+、DC- to connect the DC power, and 24 V DC is recommended；

2：E+、E-、S+、S- E+、E-、S+、S- are loadcell interface，The shielding wire can be directly connected to the transmitter shell for grounding;

3：A、B is 485 interface； RX、TX、GND is 232 interface；

# 2 Supplementary notes

## 2.1 modbus Communication protocol

The default set is 19200,1 start bit，8 data bit，1 stop bit，none[9600,8,N,1]，All the parameters are 32-bit data

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Default(Range) | Describe | Address |
| Weigh |  | Write 0:Zero；Write other values,means input the weight on scale. If the weight is 2 decimal points and the weight is 10.00, write 1000. | 1 |
| AD |  |  | 7 |
| Other state |  | AD fault。0,1bit，The excitation line may break；2 bit，overflow,Maybe the sensor is broken or the signal wire is broken；3 bit，Module error. | 11 |
| Zero | 0(0-999999) | Saved zero AD values. | 1005 |
| Coefficient | 1000(1-999999) | Coefficient formed at full calibration. | 1007 |
| Filter | 16(0-19) | The larger the value is, the better the filtering effect is, but the weight display lags behind. | 1013 |
| Division | 0[0~5] | 0:1 1:2 2:5 3:10 4: 20 5:50 | 1017 |
| Dyn.Range | 0.01(0.00-99.99) | When this value is greater than 0, it starts to judge whether it is stable. | 1019 |
| Dyn.Time | 0.30(0.00-9.99) | During this time, if the weight change is within the stable range, it will be stable. | 1021 |
| Creep Range | 0.00(0.00-99.99) | When this value is greater than 0, creep correction is carried out. | 1023 |
| Creep Time | 10.00(0.00-99.99) | In this time, the weight change is in the Creep Range and is stable, so the creep correction is carried out. | 1025 |
| Zero Range | 0.00(0.00-99.99) | When the value is greater than 0, the auto zero operation is performed. | 1027 |
| Zero Time | 1.00(0.00-9.99) | During this time, if the weight is within the range and is stable all the time, it will be automatically set to zero. Continuous stability is set to zero only once. | 1029 |
| Address | 1(0-128) |  | 1031 |
| Baud of 232 | 1(0-4) | 0:9600 1:19200 2:38400 3:57600 4:115200 | 1033 |
| Check of 232 | 0(0-2) | 0:None 1:Even 2:Odd  | 1035 |
| Function of 232 | 0(0-9) | 0:RTU 1:Send Other：Unused  | 1037 |
| Order of 232 | 0(0-3) | 0:1234 1:2143 2:3412 34321 | 1039 |
| Baud of 485 | 1(0-4) | 0:9600 1:19200 2:38400 3:57600 3:115200 | 1041 |
| Check of 485 | 0(0-2) | 0:None 1:Even 2:Odd  | 1043 |
| Function of 485 | 0(0-9) | 0:RTU 1:Send 2：TCP(Valid with Ethernet module) Other：Unused  | 1045 |
| Order of 485 | 0(0-3) | 0:1234 1:2143 2:3412 34321 | 1047 |
| Active sending interval | 200(1-1000) | Unit is ms | 1049 |

## 2.2 MODBUS RTU Communication examples

The address of the company adopts Siemens system address description rules, and the actual instruction is sent. The instruction is hexadecimal, and the address needs to be reduced by 1.

**Master to slave read data operation**
The host reads 32 bits of register 1，the order is：
    01             03             00 00           00 02          C4 0B
  Slave    Function number   Data address   Data number    CRC check
Then the MCU receives the data, calculates CRC according to the data, and judges whether the data is correct, if the data is correct，The back data order like this：
    01         03             04             00 01 E2 40          E2 A3
Slave    Function number Data number    data     CRC Check

The four hex data are converted to decimal , which is 123456.

**Master to slave write data operation**

The host write 32 bits of register 1，the order is

Write the weight 123456，the order is：
    01          10        00 00      00 02       04   00 01 E2 40  EB 3F
 Slave    Function No.  Data Addr.  Reg.No.  Char No.   Data   CRC Check

Do Zero，the order is：
    01          10       00 00         00 02       04   00 00 00 00  F3 AF
 Back：

01          10        00 00         00 02         41 C8
Slave    Function No.  Data Addr.  Reg.No.     CRC Check

**Modbus RTU CRC check code calculation method**

//modbus CRC16

publicvoid CRC16Calc(byte[] dataBuff, int dataLen)

{

int CRCResult = 0xFFFF;

if (dataLen < 2)

{

   return;

}

for (int i = 0; i < (dataLen - 2); i++)

{

    CRCResult = CRCResult ^ dataBuff[i];

for (int j = 0; j < 8; j++)

{

if ((CRCResult & 1) == 1)

CRCResult = (CRCResult >> 1) ^ 0xA001;

else CRCResult >>= 1;

}

}

dataBuff[dataLen - 1] =Convert.ToByte(CRCResult >> 8);

dataBuff[dataLen - 2] =Convert.ToByte(CRCResult & 0xff);

}