

4-channel guideway weighing control 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 Σ - Δ ADC chip, and the analog signal of bridge load cell is converted into digital signal. It has 4 channels.

Suitable for 21-26vdc power supply system. 24 V power supply is recommended.

Product features:

1. It can prevent RFI / EMI interference and has strong EMC characteristics;
2. 21-26v DC supply;
3. High speed 24 bit Σ - Δ ADC sampling, more than 500Hz sampling;
4. Complete communication interface , Standard RS 232 and 485. Optional CAN, etc.

1.2 Safety tips



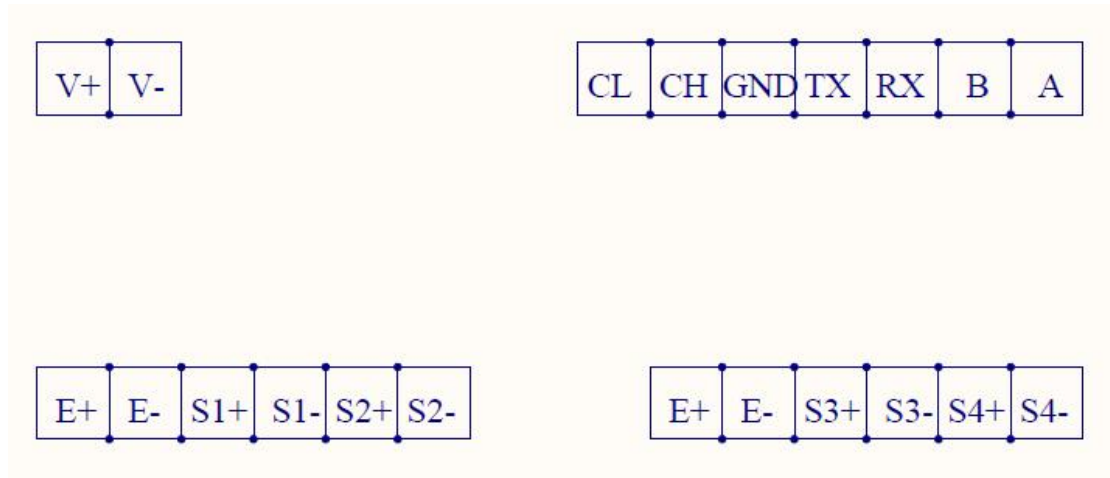
1. The instrument has anti-interference design. Be sure to ground the instrument reliably and separate it from the AC power supply ground wire;

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	4 channel with $-20\text{mV}\sim 20\text{mV}$, Each can drive 4 load cells with 350 ohm
Sampling frequency	500Hz
Accuracy	III level
Resolution	1/500000
Communication	rs 232,rs 485.Optional with Ethernet or other module
Nonlinearity	0.005%FS
Power	21-26V DC.Sensor voltage 5V.
Weight	About 0.1kg
Dimensions	92*72*59
Power waste	< 5W
Temperature	$-20\sim +65^{\circ}\text{C}$

1.4 I/O



Explain

- 1: V + and V - to connect the DC power, and 24 V DC is recommended;
- 2: E+, E-, are loadcell's power, S1+, S1-, S2+, S2-, S3+, S3-, S4+, S4-, are loadcell's signal;
- 3: A / B is 485 interface; GND、TX、RX is 232 interface; CL and CH for CAN interface;
- 4: Loadcell's shielded reliably grounded;


2 Operation method


2.1 Key and display area definition





The main screen shows the weight value. 4-channel cycle switching display. The value after CH01 is the weight of channel 1, and the value after CH02 is the weight of channel 2, and so on.

For 4 keys:    

: Enter the menu / return to the previous level. Long press on the main screen, enter the password to unlock.





: The menu screen is changing menu options; the parameter screen is modifying, and the cursor is moving;




: The menu screen is to change the menu options; the parameter screen is to modify and increase the value;

: Confirm this operation.



2.2 Parameter display and setting

Before inputting parameters, press  in the main screen, input the password 123;

Press  in the main screen to enter parameter setting screen, 01-set is displayed(System parameter), Press  , can switch the display 02—Un(Unused)、03-CAL(System operation)、04-INF(System information). Press  can enter the corresponding parameter table. then ,

press  can switch display other parameters. Press , enter parameter modification status or next level display. Press  more than 3 seconds, You can directly exit to the weight display interface.

2.2.1 01-SEt System parameter



Press  in the main screen, 01-set is displayed, press , Enter the system parameter display, The parameters included are shown in the following table:


Display	Definition	Default(Range)	Describe	REG
01-000	decimal point	2(0-4)		1001
01-001	Zero 1	0(0-999999)	Saved zero AD values.	1003
01-002	Zero 2			1005
01-003	Zero 3			1007
01-004	Zero 4			1009
01-005	Coefficient 1	1000(1-999999)	Coefficient formed at full calibration.	1011
01-006	Coefficient 2			1013
01-007	Coefficient 3			1015
01-008	Coefficient 4			1017
01-009	Filter	16(0-19)	The larger the value is, the better the filtering effect is, but the weight display lags behind.	1019
01-010	Division	0(0-5)	0:1 1:2 2:5 3:10 4:20 5:50。	1021
01-011	Dyn.Range	0.01(0.00-99.99)	When this value is greater than 0, it starts to judge whether it is stable.	1023
01-012	Dyn.Time	0.30(0.00-9.99)	During this time, if the weight change is within the stable range, it will be stable.	1025
01-013	Creep Range	0.00(0.00-99.99)	When this value is greater than 0, creep correction is carried out.	1027
01-014	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.	1029
01-015	Zero Range	0.00(0.00-99.99)	When the value is greater than 0, the auto zero operation is performed.	1031
01-016	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.	1033
01-017	Address	1(0-128)		1035

01-018	Baud of 232	1(0-4)	0:9600 1:19200 2:38400 3:57600 4:115200	1037
01-019	Check of 232	0(0-2)	0:None 1:Even 2:Odd	1039
01-020	Function of 232	0(0-9)	0:RTU 1:Send Other: Unused	1041
01-021	Order of 232	0(0-3)	0:1234 1:2143 2:3412 34321	1043
01-022	Baud of 485	1(0-4)	0:9600 1:19200 2:38400 3:57600 3:115200	1045
01-023	Check of 485	0(0-2)	0:None 1:Even 2:Odd	1047
01-024	Function of 485	0(0-9)	0:RTU 1:Send 2: TCP(Valid with Ethernet module) Other: Unused	1049
01-025	Order of 485	0(0-3)	0:1234 1:2143 2:3412 34321	1051
others			Unused	



2.2.2 02-Un Unused


2.2.3 03-CAL System operation



Press  in the main screen, 01-set is displayed, press   switch display to 03-CAL,

Press  enter the function operation of the module , For example, zero calibration, full calibration, etc. The operations included are shown in the following table:





Display	Functions	Describe
03-000	Zero 1	Zero calibration for 1-4 channel
03-001	Zero 2	
03-002	Zero 2	
03-003	Zero 4	
03-004	Full 1	full calibration for 1-4 channel
03-005	Full 2	
03-006	Full 3	
03-007	Full 4	

Zero: When 03-000 is displayed, press , display AD values, Press  again, Show 3 seconds countdown, the end of timing, automatically save zero, and return to 03-000

Full: When 03-004 is displayed, Put the weight on the weighing table first, then press , Input

the weight, press , the weight will display. if the AD have some error, it will display Err. Then press , Show 3 seconds countdown, the end of timing, automatically save zero, and return to 03-004.


2.2.4 04-INF System information



Press  in the main screen, 01-set is displayed, press   switch display to 04-INF, Press  enter the function operation of the module:

Display	Functions	Describe
04-000	Version	Query version, instrument error and other information
04-001	Password	Set password, restore default, etc
04-002	Test	Factory test and related factory operation





Version: For manufacturer's use only

Password: 04-001 is displayed, press , press   can switch display “01-PASS”, “02-DEF”, “03-FAC”.

“01-PASS” is displayed, press , can change the password. Input the old password first, then input the new password.

“02-DEF” is displayed, press , then select Yes, Press  again, will default.

“03-FAC” is displayed, For manufacturer's use only.

Test: 04-002 is displayed, press , press   can switch display “CH01”, “CH02”, “CH03”, “CH04”. press  to view the corresponding AD value.

3 Supplementary notes

3.1 modbus Communication protocol

The default set is 19200,1 start bit, 8 data bit, 1 stop bit, none.All data is 32 bit.

Name	Default(Range)	Describe	Address
Weight 1		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
Weight 2			3
Weight 3			5
Weight 4			7
AD 1			9
AD 2			11
AD 3			13
AD 4			15
Other state 1		AD fault. 2 bit, overflow,Maybe the sensor is broken or the signal wire is broken; 3 bit, Module error.	17
Other state 2			19
Other state 3			21
Other state 4			23

3.2 Other communications

3.2.1 Active sending protocol

START	[+/-]	DATA	DEC[0-3]	XOR	END
0x02	0x2B/0x2D	6 chars	0x30-0x33	2 chars	0xFF

1:The data is transmitted in ASCII code. For example, if 1234 is displayed, hexadecimal 30 31 32 33 34 will be passed.

2:The XOR operation is performed on all data[not contain a start character] before the XOR check bit, and can get a byte of data, Then the byte is converted into two ASCII codes. For example, the computed check is 0x4a, and the corresponding hexadecimal ASCII is 34 41.

3:4-channel data, symbols and data, a total of four frames, each frame contains seven bytes of data, which are symbol + data;

3.3 Other functions

If you need the function of CAN, please contact the manufacturer in advance. The configuration and testing tools of Ethernet can be obtained from the manufacturer.

3.4 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
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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

public void 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);

}
```