

*Simple weighing controller
with embedded installation*

V2. 2

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 also have 2 DI and 2 Relay out, and one 0-10V output, In addition to the weighing signal transmission function, it can also output the upper and lower limit alarm.

Suitable for 21-26vdc 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. 21-26v DC supply;
3. High speed 24 bit $\Sigma - \Delta$ 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.Optional Ethernet,0-10V out 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	-20mV~20mV, Each can drive 6 load cells with 350 ohm
Sampling frequency	500Hz
Accuracy	III level
Resolution	1/500000
DI/DO	2 DI, Low level active;2 DO for relay
Communication	rs 232,rs 485.Optional with Ethernet or 0-10V
Nonlinearity	0.005%FS
Power	21-26V DC.Sensor voltage 5V.
Weight	About 0.2kg
Dimensions	96*48*70
Power waste	< 5W
Temperature	-20~+65°C

1.4 I/O

U P	POWER		SENSOR				RS232 + DA			
	V +	V -	E +	E -	S +	S -	T X	R X	G	D A
D O W N	K2		K1		I 2	I 1	R N	R P	T N	T P
	DO (NO)				DI		NET/RS485			

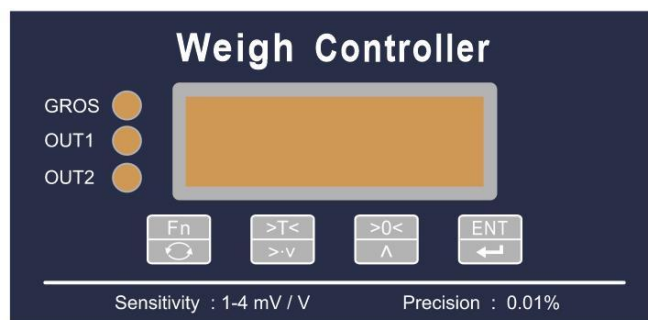
Explain

- 1: V+、V- to connect the DC power, and 24 V DC is recommended;
- 2: E+、E-、S+、S- are loadcell interface;
- 3: G、TX、RX is 232 interface; DA is 0-10V out, for G active;
- 4: K1、K2 is relay out, I1-I2 is DI terminal, for V- active;
- 5: TP、TN、RP、RN is expansion module interface, standard 485 interface, TN is 485A,


TP is 485B。


2 Operation method


2.1 Key and display area definition



For 4 keys:    

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


: The weighing screen long press for 3 seconds is tare ;the menu screen is to change the menu options; the parameter screen is modifying, and the cursor is moving.




: The weighing screen long press for 3 seconds is zero; the menu screen is to change the menu options; the parameter screen is to modify and increase the value;

: The weighing screen press can switch net and gross. Confirm this operation.




GROS On, Gross ; GROS off, net; GROS Flash fast (about 5 times in 1 second), abnormal;
GROS Slow flashing (about 2 times in 1 second), Peak display (02-004 set to 1, 2)

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—APP (Application parameters)、

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	Range	100.00(0-9999.99)	If the weight is greater than this value, it indicates OL	1003
01-002	Zero	0(0-999999)	Saved zero AD values.	1005
01-003	Coefficient	1000(1-999999)	Coefficient formed at full calibration.	1007
01-004	Unused	2(0-3)		1009
01-005	Unused	0(0-0)		1011
01-006	Filter	16(0-19)	The larger the value is, the better the filtering effect is, but the weight display lags behind.	1013
01-007	Unused	0.10(0-9.99)		1015
01-008	Division	0(0-5)	0:1 1:2 2:5 3:10 4:20 5:50。	1017
01-009	Dyn.Range	0.01(0.00-99.99)	When this value is greater than 0, it starts to judge whether it is stable.	1019
01-010	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
01-011	Creep Range	0.00(0.00-9999.99)	When this value is greater than 0, creep correction is carried out.	1023
01-012	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
01-013	Zero Range	0.00(0.00-9999.99)	When the value is greater than 0, the auto zero operation is performed.	1027
01-014	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
01-015	Address	1(0-128)		1031
01-016	Baud of 232	1(0-4)	0:9600 1:19200 2:38400 3:57600	1033

			4:115200	
01-017	Check of 232	0(0-2)	0:None 1:Even 2:Odd	1035
01-018	Function of 232	0(0-9)	0:RTU 1:Send Other: Unused	1037
01-019	Order of 232	0(0-3)	0:1234 1:2143 2:3412 34321	1039
01-020	Baud of 485	1(0-4)	0:9600 1:19200 2:38400 3:57600 3:115200	1041
01-021	Check of 485	0(0-2)	0:None 1:Even 2:Odd	1043
01-022	Function of 485	0(0-9)	0:RTU 1:Send 2: TCP(Valid with Ethernet module) Other: Unused	1045
01-023	Order of 485	0(0-3)	0:1234 1:2143 2:3412 34321	1047
01-024	Active sending interval	200(1-1000)	Unit is ms	1049
01-025	Unused	0(0-12)		1051
01-026	I1 Functions	0(0-29)	0:none; 1: Start Peak; 2: Stop Peak; 3: Zero	1053
01-027	I2 Functions	0(0-29)	Other: Unused	1055
01-028	Unused	0(0-29)		1057
01-029	o1 Functions	0(0-59)	1: W>S1 2:W<=S1 3:W>S2 4:W<=S2	1059
01-030	o2 Functions	0(0-59)	5:W>S2 且 W<=S1 6:W<=Z	1061
01-031	Unused	0(0-59)	7: P>S1 8:P<=S1 9:P>S2 10:P<=S2	1063
01-032	Unused	0(0-59)	11:P>S2 and P<=S1 12:Peak detection in progress	1065
01-033	Unused	0(0-59)	13:AD Error	1067
01-034	Unused	0(0-59)	Other: Unused	1069
01-035	Unused	0(0-59)		1071
01-036	AO Functions	0(0-9)	0:Forward 0-10V 1: Bidirectional 0 ~ 10V 2:Forward 4-20mA 3: Bidirectional 4 ~ 20mA	1073
01-037	Hand zero/tare range	0.00(0.00-9999.99)	When this value is greater than 0 and the absolute gross weight is less than this range, hand zero / tare operation is allowed.	1075
01-038	power on zero range	0.00(0.00-9999.99)	When this value is greater than 0 and the absolute gross weight is less than this range, power on and set to zero	1077
01-039	power on zero time	9(0-99)s	After power on and after this time, if the absolute weight is within the range of power on zero, it will be set to zero once.	1079

Notice 1: W is the Real time weight ,P is Peak value, S1 is the parameter 02-000,S2 is the parameter 02-001,Z is the Null value for 02-002.

2.2.2 02-APP Application parameters





Press  in the main screen, 01-set is displayed, press   switch display to 02-APP, press , enter application parameter display, the parameters included are shown in the following table:

Display	Definition	Default(Range)	Describe	REG
02-000	Set Point 1	400.00(-9999.99-9999.99)		1101
02-001	Set Point 2	400.00(-9999.99-9999.99)		1103
02-002	Null	10.00(0.00-9999.99)	rigger point of automatic peak triggering	1105
02-003	Minimum time of peak detection	0.20(0.00-9.99)	Minimum time of peak detection	1107
02-004	Application	0(0-9)	0:Real time value 1: Auto peak 2: Hand peak	1109



Notice




- 1: When 02-004 is set to peak value, the module display area is displayed as peak value
- 2: All the above parameters are 32-bit integer data
- 3 : In principle, do not operate communication related parameters through communication







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	
03-001	Full	
03-002	Sectional adjustment	

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 03-001 is displayed, Put the weight on the weighing table first, then press , Input the weight, press , the weight will display. If the AD has some error, it will display Err. Then press , Show 3 seconds countdown, the end of timing, automatically save zero, and return to 03-001.



Sectional adjustment: When 03-002 is displayed, press , You can choose 0 or 1. If choice 0, press , the original weight value is displayed. According to the actual needs, record the weight points that need to be adjusted in sections from small to large. Then press  to back 03-002, press  again, choice 1, press , Pr--xx is displayed, indicates that the original weight value is entered; co--xx is displayed, indicates that the adjustment factor is entered. xx indicates the point number of the correction, can press  to change it. Adjustment factor = actual weight / original weight, 4 decimal points are reserved for calculation.


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 AD、“dI-xxx”、“do-x”、“--Ao--”、“Errxxx”。

“dI-xxx” is DI state, xxx is I1, I2 state;

“do- x” is D0 state, press , can make x change, 1-2 means o1-o2, 0, no output.

“--Ao--” is A0 zero / full setting, press . “Z xxx” input zero, press  to save it, “F xxx” input full, After adjustment can press  to save. When adjusting the value, the multimeter can be used to measure whether the output voltage value is correct.

“Errxxx” It’s a sensor error query, A non-zero indicates a sensor error. Bit0, bit1, Sensor excitation disconnection; bit2, overflow, At this time, the signal line may be broken or the sensor may be faulty; bit3, Sampling module fault;

3 Supplementary notes

3.1 modbus Communication protocol

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

Name	Type	Describe	Address
Gross weight	32 bit integer	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
Net weight	32 bit integer		3
Tare weight	32 bit integer		5
AD value	32 bit integer		7
DI/DO state	32 bit integer	0-1 bit is DI state, 3-4 bit is DO state	9
Other state	32 bit integer	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

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.

3.3 Other functions

If you need the function of Ethernet network, please contact the manufacturer in advance.

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
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);

}
```