

**CD200**  
**Digital weighing controller**

**User manual**

CD200.00.07/2019.04

*LONGTEC*

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Process Weighing Expert



## Instructions and precautions:

- 1) Before using for the first time, please read this manual in detail, and use many difficult questions on the spot. The answers can be found in this manual;
- 2) Before use, please check if other accessories of the weighing system match or not;
- 3) Avoid being exposed in direct sun shine, splashing of water and physical shocks;
- 4) It was tested by EMC, having the strong anti-interference ability. However, the analogue output of load cells and in/output of RS232/RS485 is very sensitive to electronic noise, so forbid connecting these signal cores with the power lines together, or the meter will be disturbed. Meanwhile, keep these signal wires away from meters and other equipments' AC power. And shorten the length of signal wires or coaxial cables at the same time;
- 5) Equip with the installation and repairing tools as possible: the mini-type minus screw driver, digital multimeter, load cell simulator (mV signal generator);
- 6) Avoid being exposed to direct sun shine, an abrupt change of temperature and vibration;
- 7) The meter is in the best working state When temperature is approximate 20°C or 68°F and relative humidity is about 50%;
- 8) When installing, ground the PE end of the CD200 through the power cord and ensure good connection. It is forbidden to connect the ground wire of CD200 with the ground wire of other equipment;
- 9) The ultimate accuracy of the weighing system is determined by the selection of load cells, installation, weight, signal connection, power etc together, not just by one of them.;
- 10) The shielded wire of load cell and signal wires or impulsive wires can't compose a circuit, otherwise the input signal of the meter will not be stable.
- 11) The PE grounding terminal of the instrument must be grounded reliably, otherwise the data of the instrument may be unstable.

Note: The company reserves the right to modify and improve this product, so technical improvements without extra notice.



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# 1. General Instruction

## 1.1 CD200 product introduction

### 1.1.1 Instrument basic principle

The CD200 digital weighing controller provides a precision bridge source for a plurality of sensors (up to 4 channels) that make up a scale, and accepts the output signal of the sensor. and calculate the weight value through the internal collection process and algorithm processing; and several sensors that make up the scale monitoring to detect load cell faults in time.

## 1.2 Main specification

### 1.2.1 General Specifications

- |                            |   |
|----------------------------|---|
| 1. Power supply            | : DC 24V (18V~36V)  |
| 2. Power consumption       | : ≤ 7 W   |
| 3. Operating temperature   | : -5°C ~to 65°C (23°F ~137°F)   |
| 4. Humidity                | : ≤ 90% relative humidity (no condensation)   |
| 5. Weight                  | : 320g  |
| 6. Communication interface | : two-way communication, the first optional way RS-485/CAN, the second fixed way RS-485 |
| 7. Communication protocol  | : CANopen, modbus-rtu   |
| 8. Number of channels      | : 4 independent channels  |
| 9. Number of load cells    | : Up to 4 350Ω load cells   |

## 1.2.2 Analog

- |                                  |  |
|----------------------------------|--|
| 1. Load cell type                | : All kinds of resistance strain gauge force and weighing load cell                |
| 2. Load cell input voltage       | : 5V   |
| 3. Load cell sensitivity         | : 0.5~3.5mv/v  |
| 4. Instrument sensitivity        | : 0.25 $\mu$ V/D~100 $\mu$ V/D   |
| 5. Input resistance              | : The resistance between each terminal can't be less than 100M $\Omega$ at DC 500V |
| 6. Zero voltage adjustment       | : 0.05~0.9*Max Mv Figure   |
| 7. Effective input voltage range | : 0.05mV~17.5mV  |
| 8. Temperature coefficient       | : $\leq$ (0.0008% of the reading +0.3 division) / $^{\circ}$ C                     |
| 9. Non-linear deviation          | : $\leq$ 0.005% of F.S   |
| 10. Sampling way                 | : Delta-sigma  |
| 11. Sampling speed               | : Max. 200 times per second  |
| 12. Internal resolution          | : 1/16,000,000   |

## 1.2.3 Digital

- |                           |   |
|---------------------------|---|
| 1. CPU                    | : 32-bit ARM chip   |
| 2. Digital display        | : 4 lines of LCD display, the first 3 lines display weight, menu and other content, the 4th line displays alarm signal.                       |
| 3. Indicator              | : A total of 10 LED indicators, the role of operation, dynamic, alarm, TCP, 485, 485 / CAN indicator and 4 load cells status alarm indicator. |
| 4. Alarm                  | : The alarm indicator flashes, and the fourth line alarm shows the specific content.  |
| 5. Display scale division | : 1, 2, 5, 10, 20, 50   |
| 6. Decimals               | : Weight data can be set to up to 4 decimals  |



## 2 Appearance size and wiring

### 2.1 Panel diagram and dimension diagram

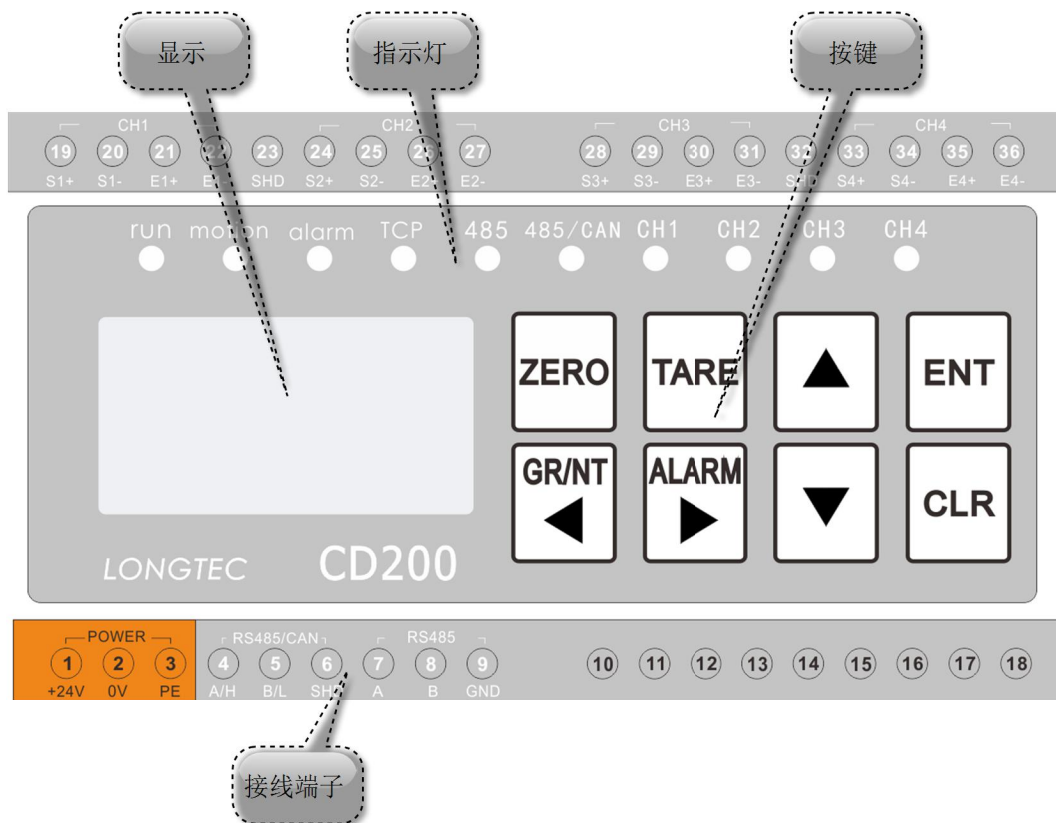


Diagram 2.1 CD200 panel introduction

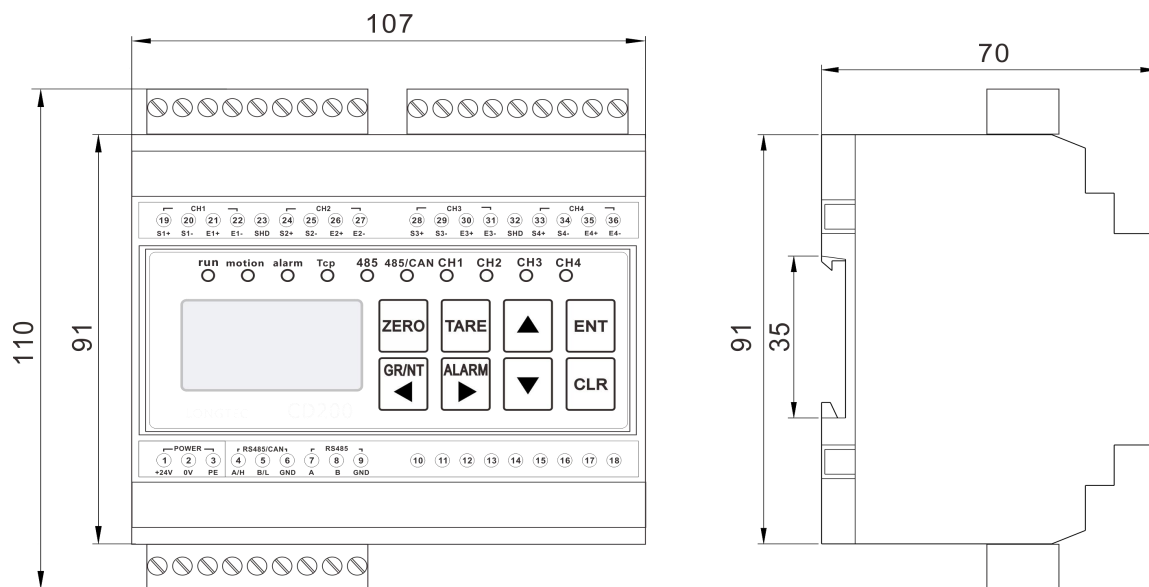


Diagram 2.2 CD200 Size

## 2.2 Wiring instructions

Wire terminal	Definition	description
Communication Power Supply interface	+24V	DC24V working power supply positive
	0V	DC24V working power supply negative
	PE	The protection of the module, for ground or Control cabinet shell, not connected to GND
	A/H	Com1: A terminal of RS485 or H terminal of CAN
	B/L	Com1: B terminal of RS485 or L terminal of CAN
	GND	Com: Ground of RS485 or CAN interface, cannot be connected to PE
	A	Com2: A of RS485
	B	Com2: B of RS485
	GND	Com2: RS485 ground, can not be connected to PE
CH1、CH2 terminal block	S1+	Channel 1 load cell signal input +
	S1-	Channel 1 load cell signal input -
	E1+	Channel 1 load cell excitation voltage output +
	E1-	Channel 1 load cell excitation voltage output -
	SHD	Channel 1 channel 2 load cell shared shielded line interface
	S2+	Channel 2 load cell signal input +
	S2-	Channel 2 load cell signal input -
	E2+	Channel 2 load cell excitation voltage output +
	E2-	Channel 2 load cell excitation voltage output -
CH3、CH4 terminal block	S3+	Channel 3 load cell signal input +
	S3-	Channel 3 load cell signal input -
	E3+	Channel 3 load cell excitation voltage output +
	E3-	Channel 3 load cell excitation voltage output -
	SHD	Channel 3 channel 4 load cell shared shielded line interface
	S4+	Channel 4 load cell signal input +
	S4-	Channel 4 load cell signal input -
	E4+	Channel 4 load cell excitation voltage output +
	E4-	Channel 4 load cell excitation voltage output -

Table 2.1 CD200wire connection table

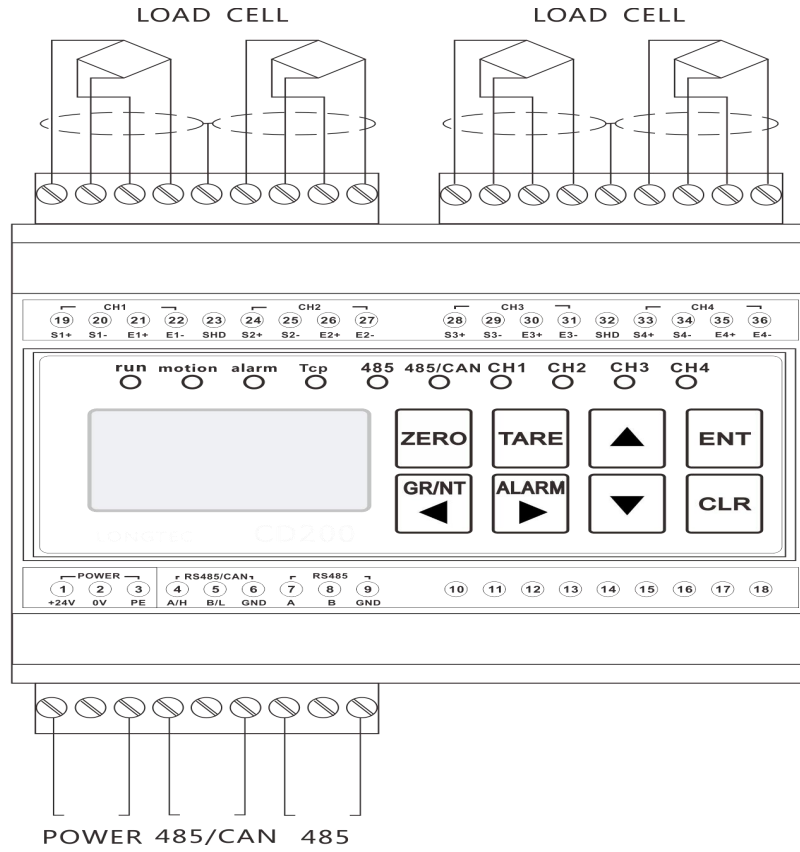


Diagram 2.3 CD200 wire connection diagram

## 3 Function Description

### 3.1 System structure

The load cell is directly connected to the terminal of the CD200 without passing through the junction box. The user selects the number of load cells according to the actual situation and supports up to 4 load cells. The specific structure is as follows:

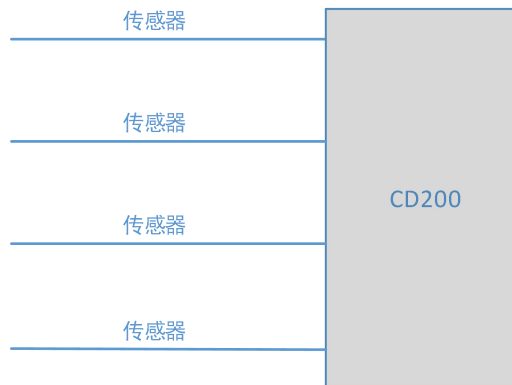


Diagram 3.1 load cell connection structure

### 3.2 Function

- ◆ 4 independent weighing channels for weight signal acquisition and processing.
- ◆ Real-time monitoring of the status of 4 load cells and alarm.
- ◆ Real-time monitoring of 4 channels weight signals, timely issuing eccentric overload alarm.
- ◆ High-precision software angular adjustment function.
- ◆ Meanwhile provide counterpoise calibration and free counterpoise calibration function.
- ◆ Provide two communication interfaces.

### 3.3 Feature

- ◆ Directly connect 4 load cells to the meter and form a scale;
- ◆ The same scale no longer requires the same load cell parameters, which is convenient for load cell replacement after hitch.
- ◆ Each load cell's signal line is disconnected/short-circuited, the excitation line is shorted, and the signal is too large or too small to be monitored.
- ◆ Directly adjust the weight weight coefficient of each channel to achieve high-precision software angular difference adjustment.
- ◆ Two-way communication, the first RS485 or CAN, the second is RS485.
- ◆ Individually check the bearing situation of each channel and discover individual weight anomalies

and eccentricity problems in time.

### 3.4 Indicator description

There are 10 status indicators on the display panel, which indicate the following statuses:

indicator	Indicator on	Indicator off	Indicator twinkle
run	*	*	*
motion	Weight dynamics	Stable weight	
alarm	*	No alarm information	Alarm information
TCP	*	*	*
485	Com2 Normal communication	Com2 No data transmission	*
485/CAN	Com1 Normal communication	Com1 No data transmission	*
CH1	1#The load cell works properly	*	1#load cell failure
CH2	2#The load cell works properly	*	2#load cell failure
CH3	3#The load cell works properly	*	3#load cell failure
CH4	4#The load cell works properly	*	4#load cell failure

Note: \* indicates that this status is not available or is not enabled.





### 3.5 Key Description

The meter has two rows of 8 buttons, the position and function are as follows:

The first row is from left to right: ZERO、TARE、▲、ENT Four buttons,

The second row is from left to right: GR/NT、ALARM、▼、CLR Four buttons.

Panel button	Function Description	Description
ZERO	Zero	1. Short press to zero, display weight switch to gross weight
TARE	Tare	1. Short press to tare, weight display to switch to net weight
▲	Pgup	1. Select the previous menu item 2. Data increment when entering data
ENT	confirmation	1. confirmation key

	Shift left	1. Gross weight or net weight conversion in weighing state. 2. Left shift key when entering data.
	Shift right	1. Right shift key when entering data.
	Down	1. Select the next menu item. 2. Data decrement key when entering data.
	Cancel	1. Return to previous menu or cancel current operation.

### 3.6 Display description

毛重:	1500kg
1#毛重:	420kg
2#毛重:	760kg
2#信号过大	

Picture 3.3 Meter display interface example diagram

The display is a 4-row LCD Chinese display. In the weighing state, the first row fixedly displays the weight value of the scale (gross weight value or net weight value), the second and third rows display the weight data of each load cell, and the fourth row is used as alarm. The second and third rows can be cyclically switched by the up and down keys as follows:

Weighing interface display content	Display description
Blank />0<	Display when the gross weight returns to zero>0<, Other times, blanks are not displayed.
1#NT/GR 2#NT/GR	Net weight/gross weight of load cells No. 1 and No. 2, Press the GR/NT button on the standby interface to switch the gross weight and net weight.
3#NT/GR 4#NT/GR	Net weight/gross weight of load cells No. 3 and No. 4, Press the GR/NT button on the standby interface to switch the gross weight and net weight.
1#mV Value 2#mV Value	The mV value of the No. 1 and No. 2 load cells.
3#mV Value 4#mV Value	The mV value of the No. 3 and No. 4 load cells.

## 4 Operation instructions

### 4.1 First time use

Since the number of load cells of different user scales is different, it is necessary to configure the number of sensors of the scale and the channel to be used according to the actual situation; after the scale is configured, the scale needs to be first calibrated to realize the weight transfer function of the meter.

#### 4.1.1 Configuration scale

According to the wiring comparison table in Section 2.2, complete the wiring of the load cell, communication and power supply, and confirm that the wiring is correct before power-on. The scale is configured according to the actual scale. Now the scale of three load cells is taken as an example to illustrate the configuration process:

1、 According to the following operation to enter the C5 weighing platform configuration menu;



2、 Press the ENT key to enter the C5 scale configuration menu to start the specific configuration;

1) Select the number of load cells by the up and down keys, press the ENT key to proceed to the next step.

a 传感器个数：  
3  
范围：1-4

2) Select the channel number used by load cell No. 1 by the up and down keys, and press the ENT key to proceed to the next step.

b 1#接入通道号：  
CH1  
查看1#与仪表接线

3) Select the channel number used by the No. 2 sensor by the up and down keys, and press the ENT key to proceed to the next step.

c 2#接入通道号：  
CH2  
查看2#与仪表接线

4) Select the channel number used by sensor No. 3 by the up and down keys, and press ENT to confirm

d 3#接入通道号：  
CH3  
查看3#与仪表接线

- 5) Complete the scale configuration and return to the C5 menu

配置成功  
正在返回 ...

Note: The load cell number is defined by the user. It is recommended to name the load cell connected to n (1~4) channel as n (1~4) sensor, so that the channel number is the same as the load cell number and it is not easy to be confused.

## 4.1.2 First calibration

Due to the different scales of different users, different actual range, division value, decimal place, it is necessary to perform complete calibration. After the first calibration, the parameters such as range, decimal place and division value are determined. Therefore, the calibration process can be simplified during normal production and use C0 shortcut calibration directly. Here, Take the decimal code is 1 bit, the scale interval is 1, the maximum range is 200.0, and the weight is 100.0 as an example to illustrate the weight calibration process.

- 1、 Press the following operation to enter the C5 scale configuration menu;



- 2、 Press the ENT key to enter the C2 weight calibration menu to start physical calibration (automatically exit when the sensor is faulty);

- 1) Select the decimal length by using the up and down keys, and press the ENT key to proceed to the next step.

a 小数位长度：  
1:1位小数  
范围：0-4

- 2) Select the minimum scale interval by pressing the up and down keys, and press the ENT key to proceed to the next step.

b 最小分度间距：  
0:1d  
范围：0-5

- 3) Input the maximum range value of the scale by using the up, down, left and right keys, and press the ENT key to proceed to the next step.

c 最大量程：  
200.0  
范围:大于100分度



- 4) Input the sensitivity of each load cell (recommended to use the corrected sensitivity, see the precautions for the correction formula)

- ① Input the sensitivity of load cell No. 1 by the up, down, left and right keys, and press ENT to proceed to the next step.

d 1#传感器灵敏度:  
2.0010  
范围:0.3-3.5mV/V

- ② Input the sensitivity of load cell No. 2 by the up, down, left and right keys, and press ENT to proceed to the next step.

e 2#传感器灵敏度:  
1.9980  
范围:0.3-3.5mV/V

- ③ Input the sensitivity of load cell No. 3 by the up, down, left and right keys, and press ENT to proceed to the next step.

f 3#传感器灵敏度:  
2.0020  
范围:0.3-3.5mV/V

- 5) Input the range of each load cell

- ① Input the No. 1 load cell range by the up, down, left and right keys (refer to the load cell manual or nameplate), press the ENT key to proceed to the next step.

h 1#传感器量程:  
50.0  
范围:参照铭牌

- ② Input the No. 2 load cell range by the up, down, left and right keys (refer to the load cell manual or nameplate), press the ENT key to proceed to the next step.

i 2#传感器量程:  
50.0  
范围:参照铭牌

- ③ Input the No. 1 load cell range by the up, down, left and right keys (refer to the load cell manual or nameplate), press the ENT key to proceed to the next step.

j 3#传感器量程:  
50.0  
范围:参照铭牌

- 6) Press the ENT key to start zero calibration (push down to zero calibration)

L 零点标定:

下翻跳过

- 7) Display the mV value of each load cell at the zero point, press the ENT key to complete the zero calibration and enter the physical calibration.

1#	1.3996mV
2#	1.4110mV
3#	1.4062mV

- 8) Place the counterpoise of the known weight on the scale. After the scale is stable, input the weight of the counterpoise and press the ENT key to complete the weight calibration.

m 输入实物重量:	100.0
原重:	121.3

- 9) Wait for the automatic return to the previous menu after the calibration is completed.

压码标定完成

Note:

Corrected coefficient = gravity acceleration g in actual use / gravity acceleration of load cell at factory

Corrected sensitivity = sensitivity \* Corrected coefficient,

Only when the sensitivity of the sensor is correctly input, the sensor signal is too large, so it can alarm and work normally.

## 4.2 Common operation

### 4.2.1 Zero

When on the weighing interface, and the current display weight is gross, press **ZERO** The zero operation is executed. After the execution is successful, the display status is still the gross weight state.

Gross weight	=	0
Tare	=	Original tare (No change)
Net weight	=	-Original tare

Note: When the operation fails, please confirm: whether the current display status is gross or not, and whether the weight is within the zero range; if the current display status is net weight, you can pass **GR/NT** Key to gross weight state

## 4.2.1 Tare

When on the weighing interface, press TARE Key to perform a tare operation, The tare range is fixed to 80% of the maximum range, and the state is switched to the net weight state after tare is completed.

Tare = Original Gross weight  
 Net weight = 0  
 Gross Weight = Original Gross weight(No change)

## 4.2.2 Calibration

Calibration is carried out during normal production. Since the scale has set parameters such as decimal place, scale interval, sensitivity and range at the initial calibration time, it is not necessary to use complete weight calibration for each calibration. The operation is complicated and unnecessary. Simplify the operation steps by quick calibration, the specific steps are as follows:

### ➤ Zero Calibration

- 1、 Follow the steps below to enter the K0 zero calibration menu.



- 2、 Turn up and select "Yes" and press ENT to start zero calibration.

零点标定：  
是  
 注意:需秤台平稳

- 3、 Display the mV value of each load cell at zero point, press ENT key to complete zero point.

1#      1.3996mV  
 2#      1.4110mV  
 3#      1.4062mV

- 4、 Zero calibration is completed, waiting for automatic return to the previous menu.

零点标定完成  
 正在返回 ...

### ➤ Weight calibration

Follow the steps below to enter the K2 weight calibration menu.



- 1、 Place the counterpoise of the known weight on the scale. After the scale is stable, input the weight of the counterpoise and press the ENT key to complete the weight calibration.

请输入实物重量:	100.0
原重:	121.3

- 2、 The weight calibration is completed, waiting for the automatic return to the upper menu.

压码 标定完成
正在返回 ...

### ➤ Free weight calibration

- 1、 The accuracy of the free weight calibration is affected by factors such as latitude, humidity, temperature, mechanical structure, etc. It is recommended to use the weight calibration as possible, and the free weight calibration is also divided into complete free weight calibration (C1) and fast free weight calibration. (K1), the calibration process of the complete free weight calibration is similar to the complete weight calibration. It is not described here. For the detailed process, refer to the first calibration process of this manual. The detailed process of fast free weight calibration is as follows:

Follow the steps below to enter the K1 free weight calibration menu.



- 2、 Pgup to Select "Yes" and press ENT to start free weight calibration.

免码 标定:	是
--------	---

- 3、 Free weight calibration is completed, waiting for automatic return to the previous menu.

免码 标定完成
正在返回 ...

Note: The free weight is different from the weight calibration. You must input the actual accurate sensitivity and range value of the corresponding load cell (see the load cell manual or nameplate). For the scale with large weighing error after free weight calibration, It is recommended to adjust the scale with the “C3B weight correction coefficient” parameter, and the final weight value is proportional to the coefficient.

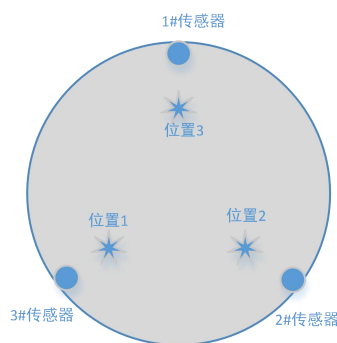
## 4.2.3 Software angular adjustment

When the same weight is placed in different positions on the scale, there is a non-negligible difference in the weight value obtained by the meter, indicating that there is an angular difference between the scale and the angular difference adjustment is required. The total weight of the scale can be regarded as calculated by the following formula.

**Total weight = 1# load cell load bearing \*K1 + 2# load cell load bearing \*K2 + 3# load cell load bearing \*K3 + 4# load cell load bearing \*K4**

K1, k2, k3, and k4 are the load-bearing adjustment coefficients of four load cells respectively. The default value is 1. Therefore, the adjustment of the load-bearing value of each load cell can be realized by adjusting the size of the coefficient, thereby realizing the angular difference adjustment function.

The automatic angular difference adjustment is a method of accurately calculating the k1, k2, k3, and k4 coefficients by software to realize the angular difference adjustment function. The following is an example of a three-scale scale:

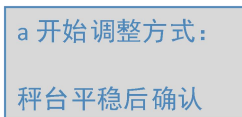


Scale picture

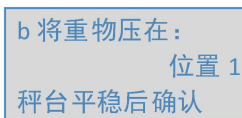
1、 Follow the steps below to enter the C4 angle adjustment menu;



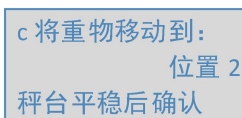
2、 Press the ENT key to enter the C4 angular difference adjustment menu. When the scale is stable, press the ENT key to start the automatic angular difference adjustment.



3、 In a certain position on the scale (in theory, any position can be used. In order to improve the accuracy, it is recommended that the selected position is near the center point of the scale near the force receiving point of the scale. As shown in the schematic diagram of the scale, here is the position 1 as an example. ) Place a heavy object. After the scale is stable, press the ENT key to proceed to the next step.



4、 Move the weight position (move to position 2), press the ENT key to proceed to the next step after the scale is stable.



5、 Move the weight position (move to position 3), press the ENT key to proceed to the next step after the scale is stable.

d 将重物移动到：  
位置 3  
秤台平稳后确认

- 6、 Automatic angular difference adjustment is completed, waiting for automatic return to the upper menu.

自动角差调整完成

Precautions:


Regarding the position where the weight are placed, theoretically any different positions can be used. In order to improve the accuracy, it is recommended to place the weight at a certain position between the force receiving point of the load cell and the center point of the scale; the selected position should not be too close. Should be scattered as much as possible in different positions on the scale;

The data of the weight can be unknown, but it is recommended that the actual data of the weight is close to the actual weighing range to improve the accuracy; the number of selected points is the same as the number of load cells; the automatic angular difference adjustment function is not affected by the calibration method of the scale, that is, automatic angle adjustment function can be used for both the weight calibration scale and the free weight calibration scale.

### 4.3 Communication

The user sets the communication parameters according to the communication way (Com1, Com2) and hardware interface (CAN, RS485) selected by the user to the corresponding menu. Since the hardware interface of Com1 is fixed to one of CAN or RS485, the user automatically ignores the parameters corresponding to the unequipped interface. The menu "P3 Com1 parameter" is used to configure the communication parameters of the Com1 way, and the menu "P4 Com2 parameter" is used to configure the communication parameters of the Com2 way. For details, please refer to the section on the menu in the subsequent chapters of the manual.

## 5 Meter menu

The user presses  on the weighing interface to enter the menu.

### 5.1 CD200 Weighing display controller system setting menu

After entering the menu, you can use the up and down keys to switch to the next menu, press the CLR key to return to the weighing interface, press the ENT key and enter the password to enter the selected menu.

	First level menu	Description
1	P parameter settings	Parameter setting menu, you need to enter the correct password to enter. After entering the password correctly, no password is required to enter the menu within 1 minute.
2	C System calibration	This menu requires an administrator password. The system check function menu is mainly used for instrument field calibration and factory calibration. It includes parameters for meter zero and span calibration, and calibration parameter setting menu.
3	T test	For factory or field testing, a password is required.
4	S Safety management	The Security Management menu has the ability to set operator and administrator passwords and restore factory settings. The administrator has the highest password level, can change and set all the parameters in the menu, and can set the operator's password. The operator can only view and change some of the parameters and cannot change the administrator's password.
5	H auxiliary function	Help description: display version, meter number information, etc.

### 5.2 P Parameter setting menu

After entering the correct password, entering the menu within one minute no longer requires a password. (factory operator password 1, administrator password 2)

First level menu	Second level menu	annotation
1 P Parameter setting	P0 Common parameter	Common parameter setting
	P1 Weight parameter	Weight limit setting
	P2 Communication parameter	Com1 and Com2 Common Communication parameter
	P3 Com1 Parameter	Com1 (CAN/485) Parameter setting
	P4 Com2 Parameter	Com2 (485) Parameter setting

	P5 PDO address mapping	CANopen PDO data source settings in the protocol
--	------------------------	--

## 5.2.1 P0 Common parameter

Third level menu	Parameter range	Parameter Description	default value
P00 unit	0-2	0:Kg; 1:t; 2:g; Units are only used for display, and weight conversion is not performed when switching units.	0
P01 Weighing filter level	0-9	The larger the value of this parameter is, the more stable the weight data is, but the slower the response, the smaller the value, the more unstable the weight data, but the faster the response.	5
P02 Zero range	0-80%	0%: Zero function is turned off; 1 – 80%: Zero range is the percentage of the maximum range。	20%
P03 Boot zero	0-20	0 : No startup clearing. 1~20 : After the power-on delay is n seconds, the zero operation is performed. (within the zero range)	0
P04 AD Sampling frequency	0-3	0:25Hz; 1:50 Hz; 2:100 Hz; 3:200 Hz;	2
P05Dynamic detection range	0-10 Minimum division	0 : Turn off dynamic detection, 1-10d: Stability range; If the weight value changes within 1 second beyond the dynamic detection range, the scale is dynamic.	2d
P06 Zero tracking range	0-10 Minimum division	0: Turn off zero tracking, 1-10d:Zero tracking range; In the gross weight state, the gross weight automatically becomes 0 when the gross weight value is within the zero tracking range.	0
P07 Display refresh frequency	1-20Hz	Main interface weight data refresh frequency	5Hz
P08 language	0-1	0: Chinese 1: English	0

## 5.2.2 P1 Weight parameter

The hysteresis value is set to prevent the alarm state from being repeatedly set and reset when the weight value is just at the alarm critical point. The alarm state is set when the limit is exceeded and reset when the hysteresis value is subtracted below the limit.

Third menu	Parameter range	Parameter description	Default
------------	-----------------	-----------------------	---------



			value
P10 Weight comparison type	0-2	Which weight data to choose for comparison: 0:Gross weight; 1:Net weight;2:Display weight	0
P11 High High weight limit	0: shut down Other: less than or equal to the maximum range value, more than the high limit;	High and High Weight Limit, Over this Value High and High Weight Limit Alarm	0
P12 High Weight Limit	0: shut down Other: less than the high and high limits, more than the lower limit;	Over Weight High Limit, weight high limit alarm	0
P13 Weight low Limit	0: shut down Others: less than the high limit value, more than the low low limit value;	Weight low limit value, less than this value, low weight limit alarm	0
P14 Weight low low Limit	0: shut down Others: less than the low limit value;	Weight Low Low Limit Value, Less than this Value Weight Low Low Limit Alarm	0
P15 High High -limit hysteresis	0-1000 Minimum division	The high and high limit alarms are reset when the weight is less than the high and high limits minus the high and high hysteresis values.	0
P16 High -limit hysteresis	0-1000 Minimum division	The high weight alarm is reset when the weight is less than the high limit minus the high hysteresis value.	0
P17 low -limit hysteresis	0-1000 Minimum division	The low weight alarm is reset when the weight is greater than the low limit plus the low hysteresis value.	0
P18 low low -limit hysteresis	0-1000 Minimum division	The low and low limit alarms are reset when the weight is greater than the low and low limits plus the low and low hysteresis values.	0

### 5.2.3 P2 Communication parameter

This parameter belongs to the shared parameter of the two-way communication and works for both communication.

Third menu	Parameter range	Parameter description	Default value
P20 Data Format	0-1	Byte Sequence of Communication Sending Data:	0

		0: Small end (low word in front); 1: Big end (high word in front);	
P21 load cell data	0-7	The method by which each sensor is subjected to weight: (Communication read address 40005~40012/42001~42012 content) 0:Net weight; 1:Gross weight; 2:Tare; 3:Mv Value; 4:display weight;	4

## 5.2.4 P3 Com1 Parameter

Com1 CAN/RS485 optional, Users should pay attention to when choosing and purchasing; The following parameters are valid only for com1.

Third menu	Parameter range	Parameter description	Default value
P30 Com1 address	1-127	CAN/MODBUS address	1
P31 MODBUS baud rate	0-5	0:4800; 1:9600; 2:19200; 3:38400; 4:57600; 5:115200; (For COM1 port, RS485)	1
P32 MODBUS Data bits	8 bit	Read-only (for COM1 port RS485)	
P33 MODBUS Stop bit	0-3	0: 0.5 bit; 1:1 bit; 2: 1.5 bit; 3: 2 bit; (For COM1 port, RS485)	1
P34 MODBUS check bit	0-2	0: odd parity; 1: even parity; 2: no parity (Applicable when the com1 port is RS485)	2
P35 CANbaud rate	0-7	0:1000k; 1:800k; 2:500k; 3:250k; 4:125k; 5:50k; 6:20k; 7:10k; (Applicable when the com1 port is CAN)	3
P36 PDO1 period of transmission	1-8	PDO data transmission period, the unit time period is determined by the sampling frequency, and 0 means that the PDO is turned off. (Applicable when the com1 port is CAN)	1
P37 PDO2 period of transmission	0-32767		0
P38 PDO3 period of transmission	0-32767		0
P39 PDO4 period of transmission	0-32767		0

## 5.2.5 P4 Com2 Parameter

The Com2 port is fixed to the RS485 interface; the following parameters are valid only for com2.

Third menu	Parameter range	Parameter description	Default value
P40 Com2 address	1-127	MODBUS address	1
P41 Com2 protocol choice	Read only	Currently only supports MODBUS	0
P42 Com2 baud rate	0-5	0:4800; 1:9600; 2:19200;	1

		3:38400; 4:57600; 5:115200;	
P43 Com2 Data bit	8 bit	Only read	
P44 Com2 Stop bit	0-3	0:0.5 bit; 1:1 bit; 2:1.5 bit; 3:2 bit;	1
P45 Com2 Check bit	0-2	0: odd parity; 1: even parity; 2: no parity	2

## 5.2.6 P5 PDO Address mapping

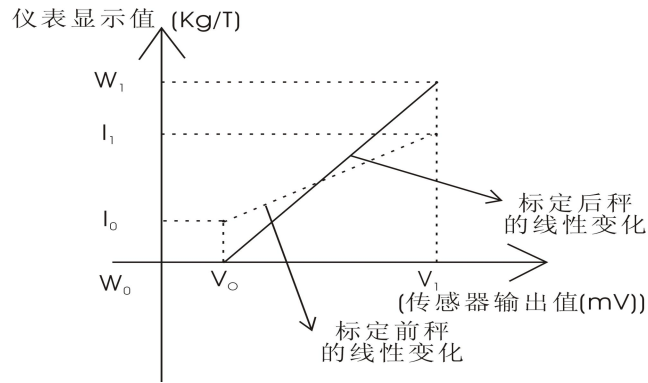
The CANopen protocol has a PDO function that can send the meter's data timing to the CANopen master station (such as the MC700). The meter is equipped with 4 PDOs. Each PDO packet can carry 4 16-bit data. The following table indicates that the PDO packet is What data consists of.

Third menu	Parameter range	Parameter description	Default value
P50 PDO1 address 1	0-2400	When using CAN communication, this address determines which data the PDO periodically sends to the primary station; the address uses an absolute address, for example, 5 refers to the ModBus address 40005, that is, the CANopen address 0x3104;	1
P51 PDO1 address 2	0-2400		2
P52 PDO1 address 3	0-2400		3
P53 PDO1 address 4	0-2400		4
P54 PDO2 address 1	0-2400		5
P55 PDO2 address 2	0-2400		6
P56 PDO2 address 3	0-2400		7
P57 PDO2 address 4	0-2400		8
P58 PDO3 address 1	0-2400		9
P59 PDO3 address 2	0-2400		10
P5A PDO3 address 3	0-2400		11
P5B PDO3 address 4	0-2400		12
P5C PDO4 address 1	0-2400		13
P5D PDO4 address 2	0-2400		14
P5E PDO4 address 3	0-2400		15
P5F PDO4 address 4	0-2400		16

## 5.3 C System calibration menu

### 5.3.1 The meaning of instrument calibration

As a processor for the weight signal (mV), the meter is required to correlate the mV signal sent from the sensor with the standard weight value. This requires calibration. The calibration is divided into zero point and weighing distance calibration. The weighing distance calibration can be one point or multiple points. The weighing distance of the instrument can be calibrated by one or two points.



$V_0$ : The load cell output signal when weighing the system empty scale.

$V_1$ : The load cell output signal when the scale body is loaded to a certain weight.

$I_0$ : Uncalibrated,  $V_0$  is input to the display value of the meter.

$I_1$ : Uncalibrated,  $V_1$  is input to the display value of the meter.

$W_0$ : After calibration,  $V_0$  is input to the display value of the meter. (ie zero point).

$W_1$ : After calibration,  $V_1$  is input to the displayed value of the meter. (weighing interval or loading the corresponding standard value).

Calibration notice:

- ①  $W_1$  is not less than 100 display interval
- ② Resolution: 0.25uV/d or more
- ③ Common resistance strain load cell output signal range is about 0~15mV
- ④ CD200 Load cell input signal must be met:  $0.05\text{mV} \leq V_0 \leq 10.05\text{mV}$ ,  $V_0 < V_1 \leq 12.5\text{mV}$

### 5.3.2 Calibration menu

The instrument provides two calibration methods: weight calibration and weight-free calibration; the weight calibration is implemented in the C0 menu and the C2 menu; the weight-free calibration can be implemented in the C0 menu and the C1 menu.

First menu	Second menu	annotation
C System calibration	C0 Quick calibration	Quick calibration without changing parameters
	C1 free weight calibration	No need to weight calibration, only modify the parameters for calibration
	C2 weight calibration	Modify the calibration parameters and take the weight to calibrate
	C3 Calibration parameter	Directly modify the parameters after calibration
	C4 Angle adjustment	Adjustable when there is angular difference, unnecessary adjustment when there is no angle difference
	C5 load cell configuration	Configure the number of load cells or when the connected interface changes

### 5.3.3 C0 Quick Calibration

If the user does not need to modify parameters such as decimal places, index values, and sensitivity, this calibration method can be used. This calibration method is a simplified operation of the normal calibration step. Refer to the operation procedure of 4.2.2 for specific steps.

Third menu	Operation description
K0 Zero Calibration	Do not modify parameters, direct zero calibration
K1 Free-weight Calibration	Do not modify parameters, direct Free-weight Calibration
K2 weight Calibration	Enter the physical weight directly without modifying the parameters.
K3Reset angle difference adjustment coefficient	The recovery angle difference adjustment coefficient is the default value, that is, the angular difference adjustment is not performed.

### 5.3.4 C1 Free-weight Calibration (No need to press the weight)

This method is a complete free-weight calibration operation and is recommended for first-time calibration and low accuracy requirements. Refer to the operation procedure of 4.1.2 for specific steps.

Third menu	Parameter range	Parameter description	Default value
a Decimal digit length	0~4 decimal	0 decimal、1 decimal、2 decimal、3 decimal、4 decimal	1 decimal
b Minimum scale division	0~5	1d、2d、5d、10d、20d、50d	1d
C Maximum range setting	100-999999	Maximum range of scale	3000
d 1#Sensitivity	0.5-3.5mv/v	Consistent with load cell specifications or nameplate values	2.0000
e 2#Sensitivity	0.5-3.5 mv/v	Consistent with load cell specifications or nameplate values	2.0000
F 3#Sensitivity	0.5-3.5 mv/v	Consistent with load cell specifications or nameplate values	2.0000
g 4#Sensitivity	0.5-3.5 mv/v	Consistent with load cell specifications or nameplate values	2.0000
h 1#Range	More than 0	Consistent with load cell specifications or nameplate values	1000
i 2#Range	More than 0	Consistent with load cell specifications or nameplate values	1000
j 3#Range	More than 0	Consistent with load cell specifications	1000

		or nameplate values	
k 4#Range	More than 0	Consistent with load cell specifications or nameplate values	1000
L Zero Calibration			

### 5.3.5 C2 Weight Calibration (Need weight)

This method is a complete weight calibration operation, and the operation is more complicated. It is recommended to use the calibration for the first time. It is recommended to use the quick calibration to simplify the calibration process without changing the parameters. The specific steps refer to the operation procedure of the first calibration in 4.1.2.

Third menu	Parameter range	Parameter	Default value
a Decimal length	0~4	0: 0 decimal; 1: 1 decima; 2: 2 decima; 3: 3 decima; 4: 4 decima	0
b Minimum scale division	0~5	0: 1d ; 1: 2d; 2: 5d ; 3: 10d ; 4: 20d; 5: 50d ;	0
c Maximum range setting	100-999999	Maximum range of scale	3000
d 1# sensitivity	0.5-3.5mv/v	Consistent with load cell specifications or nameplate values	2.0000
e 2# sensitivity	0.5-3.5 mv/v	Consistent with load cell specifications or nameplate values	2.0000
f 3# sensitivity	0.5-3.5 mv/v	Consistent with load cell specifications or nameplate values	2.0000
g 4# sensitivity	0.5-3.5 mv/v	Consistent with load cell specifications or nameplate values	2.0000
h 1# Range	More than 0	Consistent with load cell specifications or nameplate values	1000
i 2# Range	More than 0	Consistent with load cell specifications or nameplate values	1000
j 3# Range	More than 0	Consistent with load cell specifications or nameplate values	1000
k 4# Range	More than 0	Consistent with load cell specifications or nameplate values	1000
L zero calibration			
m Physical calibration	More than 100 degrees	counterpoise weight	

### 5.3.6 C3 Calibration parameter

The user can modify the following calibration parameters separately, and the user does not need to recalibrate

after the modification. Modifying the decimal and index values does not change the calibration parameters, ie it does not change the weight value.

Third menu	Parameter range	Parameter	Default value
C30 Decimal number setting	0~4 decimal	0: 0 decimal; 1: 1 decimal; 2: 2 decimal; 3: 3 decimal; 4: 4 decimal	0
C31 Minimum scale division	0~5	0: 1d 1: 2d 2: 5d 3: 10d 4: 20d 5: 50d	0:1d
C32 Maximum range setting	100-1000000	Over this range alarm	3000
C33 Weight Correction Coefficient	0.1-10	Weight calibration modifies this parameter	1.0

### 5.3.7 C4 Angle adjustment

When the same weight is placed in different positions on the scale, there is a non-negligible difference in the weight value obtained by the meter, indicating that there is an angular difference in the scale and the angular difference adjustment is required. The total weight of the scale can be regarded as calculated by the following formula

$$\text{Total weight} = 1\# \text{ load cell load bearing} * K1 + 2\# \text{ load cell load bearing} * K2 + 3\# \text{ load cell load bearing} * K3 + 4\# \text{ load cell load bearing} * K4$$

K1, k2, k3, and k4 are the angular difference adjustment coefficients of the four load cell respectively. The default value is 1. Therefore, the adjustment of the load-bearing values of each load cell can be realized by adjusting the size of the coefficient, thereby realizing the angular difference adjustment function.

#### Automatic angular adjustment:

The method of pressing the weight at different positions of the scale realizes the automatic angular difference adjustment, and the operation is simple, and the operation can be performed once according to the manual steps, thereby solving the problem that the traditional junction box sensor mode angular adjustment operation is complicated and the precision is low. For details, see 4.2.3 Software Angle Difference Adjustment.

Third menu	Operation description
a Start angle adjustment	The scale is stable and uncompressed
b Confirm No 1 position	Put the weight on the scale, wait until the scale is stable, press to confirm
c Confirm No 2 position	Move the weight position, wait for the scale to be stable, press confirm
d Confirm No 3 position	Move the weight position, wait for the scale to be stable, press confirm
e Confirm No 4 position	Move the weight position, wait for the scale to be stable, press confirm

position	
----------	--

### 5.3.8 C5 scale configuration

Since the number of load cells of different scale is different, the user needs to configure the number of sensors of the scale and the channel used according to the actual situation; the factory default configuration is that the scale is composed of 4 load cells, and the 1# load cells is connected with CH1, 2# load cells connection. CH2, 3# load cells is connected to CH3, and 4# load cell is connected to CH4. For details, see 4.1.1 Operation of the scale configuration.

Third menu	Operation description
a load cell number	Number of sensors used in the scale (1-4)
B 1#connection interface	1#The interface to which the load cell is connected (1-4)
c 2#connection interface	2#The interface to which the load cell is connected (1-4)
d 3#connection interface	3#The interface to which the load cell is connected (1-4)
e 4#connection interface	4#The interface to which the load cell is connected (1-4)

Suggestion: 1#Load cell connect CH1、2#Load cell connect CH2、3#Load cell connect CH3、4#Load cell connect CH4;

### 5.4 T Test menu

The test mode is convenient for the debugger and the user to test the quality of each port of the instrument. When using the test mode, please ensure that all output of the meter is disconnected from the external device!

You must enter the correct password before entering this test menu to test, otherwise you will not be able to enter the lower menu of the test menu.

Test Content	Test description
T0 Key test	Press different buttons, the corresponding button name is displayed on the display, press the exit button to exit;
T1 Indicator test	All indicators flash at the same time, press the exit button to exit;
T2 Screen dead point	The display area is all white, observe whether there is a dead point, press the exit key to exit;

### 5.5 S Security management menu

The CD200 weighing controller has two levels of passwords for the user to use, namely the operator password and the administrator password. The administrator password can be entered and all parameter values in the meter can be set. The operator password can only be changed in the parameter settings menu. Enter this menu to enter the administrator password;

The specific menu of security management parameter settings is shown in the following table:



Second menu	Content	
S0 Operator password management	After entering a new password when changing the password, you need to click the ENT key and enter it again. Then click ENT to display OK, indicating the completion of the entire administrator password change process.	Factory password is 1
S1 Administrator password management	After entering a new password when changing the password, you need to click the ENT key and enter it again. Then click ENT to display OK, indicating the completion of the entire administrator password change process.	Factory password is 1
S2 Restore factory settings	Restore the default settings at factory	Administrator password required
S3 Restart instrument	Quickly restart the meter without forced power to restart	Administrator password required

## 5.6H Accessibility menu

Accessibility is mainly used to view version and configuration information;

First menu	Second menu	Content	Description
H Auxiliary function	H0 Instrument number	Instrument Internal Number	read-only
	H1 version number	Software Version Number	read-only
	H2 load cell number	Number of load cell that make up the scale	read-only

## 6 Explanation and solution of errors and alarms

### 6.1. Calibration error

Once the calibration error is detected during the calibration process, the calibration process is immediately interrupted, so the calibration error alarm will only prompt the first detected calibration error;

Error number	Description
3 Zero millivolt value is too large	The mV value of the load cell corresponding to the channel is too large; the placed weight is too heavy or the sensitivity is set to be smaller than the actual value.
4 Weight value is negative	In the calibration of weight, the weight value after weight is less than 0.
7 Input weight is too small	When the weight is calibrated, the input weight is less than 100 minimum degrees (including the negative number of communication calibration input).
8 Sensitivity beyond range	The sensitivity of the load cell is outside the range of 0.5-3.5 mV/V.
9 Calibration accuracy is too high	The accuracy is too high, exceeding the allowable range; check that the sensitivity and range of the load cell are set correctly; reduce the decimal length or increase the minimum division value.
10 Calibration accuracy is too low	The accuracy is too low, exceeding the allowable range; check that the sensitivity and range of the load cell are set correctly, increase the decimal length or decrease the minimum division value.
13 Angle difference adjustment failed	It is usually caused by the fact that the weight is not moved when the adjustment is made automatically.

### 6.2. system error

A system error is an error alarm that occurs because some parameters exceed the limit set by the user.

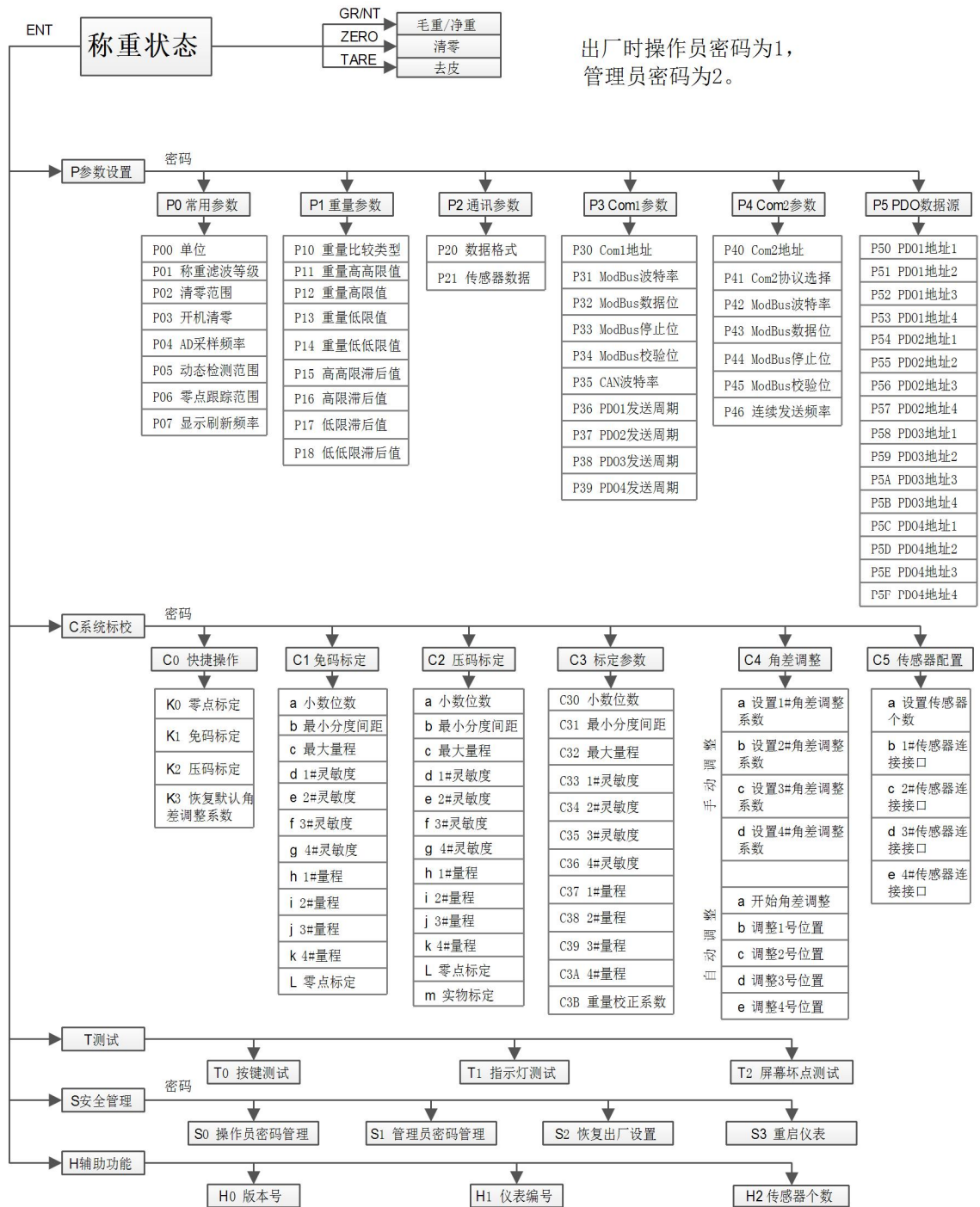
Error	Description
E0 Overrange	Weight value is more than the maximum range value
E1 weight High and high limit alarm	Alarm when the weight value is more than the high and high limits
E2 weight high limit alarm	Alarm when the weight value is more than the high limit
E3 weight Low alarm	Alarm when the weight value is less than the low limit
E4 weight Low and low alarm	Alarm when the weight value is less than the low and low limit

### 6.3. Load cell error

**Load cell** error is an error caused by the system due to wiring, overload, sensor damage, etc.

symbol	Description and treatment
Short-circuit the excitation line	Cause: The excitation line is shorted. Please check the load cell excitation line wiring.
Signal line disconnection	Cause: The load cell is not connected or the signal cable is disconnected. Check the load cell signal cable wiring.
Exdisconnect Sig short circuit/reverse connection	Cause: The signal line is shorted/reverse, or the excitation line is disconnected. Check the signal line and the excitation line.
AD stop working	Cause: The AD cannot collect data. Please power off and restart the instrument.
Signal too large	Cause: If the signal is too large, please check if the overload, eccentric load or load cell is damaged. If the load cell sensitivity setting value is smaller than the actual value, it will cause a false alarm.

# Appendix I: Function diagram



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