Weighing Indicator

XK3101-T5

User Manual

May 2010 version

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1 Product Structure

1.1 General description

Using 24-bit high-precision ADC conversion chip, DC 12 ~ 24V power supply, panel mounting, simple, compact, easy to install, suitable for fixed electronic platform scales.

1. 2 Main Specification

Display: 6 bits LED display, with 0.56 inch.

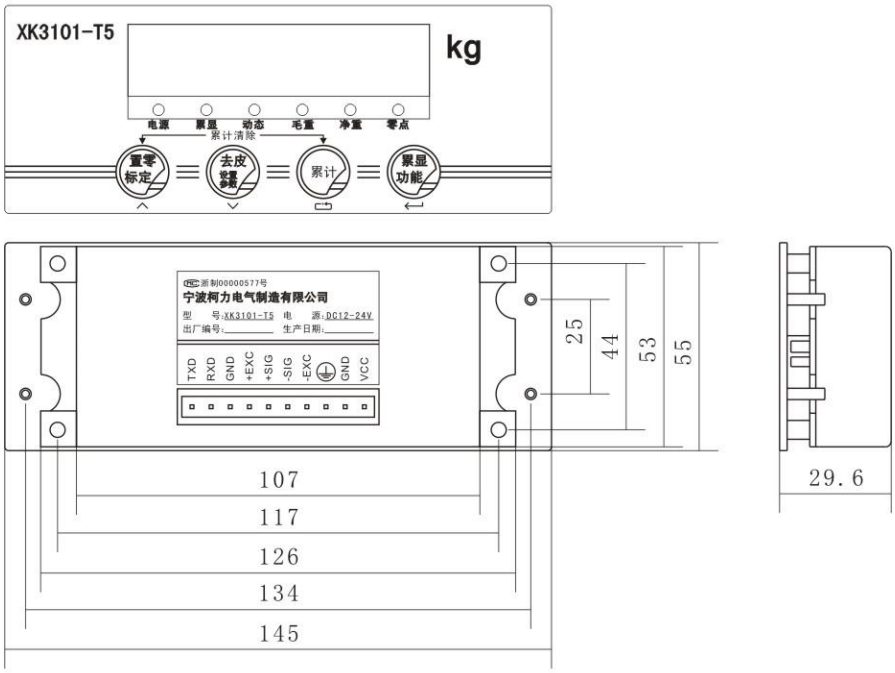
Keyboard: 置零/标定 , 去皮/设置参数 , 累计 , 累显/功能

Full-duplex RS232C serial interfaces with 12-24V DVC power supply

The weight can be accumulated to display.

Three types of calibration which are: by weight, parameter settings, input the Scale's parameters.

1. 3 Dimension



It's requires to open holes on the panel of cabinet when install it, dimension is 53mm×126mm, the depth of control cabinet should not be less than 55mm.

2 Technical Specification.

Power: DVC12-24V, Consume: ≦3 tiles.

Excitation: 5V DC, ≥60mA (drive 4pcs load cell with 350 ohms each)

ADC conversion speed: 7.5/15/25/50Hz

ADC differentiate rate:24bits.

Zero signal Input range: ±5mV

The minimum display division: 1uV/d

Division range: 0.001～50kg

Environment condition

Working temperature: 0℃～40℃, Humidity: 10～90% RH

Storage temperature: -10℃～60℃, Humidity: 10～90% RH

Indicator requires good ground lead, and can not use the same power supply with motor, AC contactor, heater and other settings that easily cause power noise!

3 Instruction

3.1 Display

The indicator for 6 bits LED with details as below:

Cursor	Function
Zero	This cursor is lighting when the gross weight between zero±1/4d
Gross	This cursor is lighting when the scale display gross weight
Net	This cursor is lighting when the scale display net weight
Dynamic	This cursor is lighting when the scale is unstable
Setting	This cursor is lighting when display the sum up
Power	Power supply lighting

3.2 Key-press Explaination

XK3101T4 weighing indicator has four keys with the details as below:

Keys	Functions
置零 / 标定	**Zero Set** Stable weight and allows clean zero range to press this key to be setting Zero, or else have error prompt. To key in digital is plus“1”.
去皮 / 设置参数	Under the status of gross weight and the weight is stable, press this key will temporary save the weighing as tare weight, indicator display net weight as zero
累计	Acumulation For parameter selection or the digital shift.
累显 / 功能	Look over accumulation value, for confirm key.
置零 / 标定 + 累计	To be used at the same time for clean accumulation value**.**

3. 3 Basic operation

3.3.1 **Power on**

Indicator will do a series of self-checking when it is power on, if everything is normal, it will return to normal displaying state. If there is any mistake during self-checking, please refer to error sign table.

3.3.2 **Zero Setting**

If empty scale does not show zero value while weighing, press key Zero. You can not finish resetting under conditions as follows:

※ Indication over reset range(reset range is set up under set mode), the error symbol is"_no_"

※ Scale is in dynamic state, the error symbol is "E--2"

※ Indicator under net weight state, the error symbol is "E-2"

3.3.3 **Tare**

It can save present weight as tare weight when the indicator displays gross weight, the indicator displays net weight at same time. You can not finish taring under following situations:

※ Scale is in dynamic state, the error symbol is "E--2";

※ When gross weight is minus, the error symbol is "E--2";

3.3.4 **Clear Tare weight**

Press 'Tare Cleaning' when indicator show net weight, then it will show gross weight and lighting up.

3.3.5 **Accumulation**

Stable weight to press [累计], the indicator display the accumulation's times "t_XXXX" firstly, then have total weight. after two seconds return back the weighing status.

When indicator's weight go back Zero to be the second time accumulated, except with the same weight.

Unstable weighing or less than zero can't to accumulated, the indicator error prompt "E--8".

When the accumulation times more than 9999 or the accumulation value more than 999999, the indicator error prompt "E--9"

3.3.6 **Look over accumulation value.**

Press [累显 功能], the indicator display the accumulation's times "t_XXXX" firstly, after two seconds return back the weighing status.

The accumulation value for Zero to press [累显 功能], the indicator prompt "-no-".

3.3.7 **Clean accumulation value**

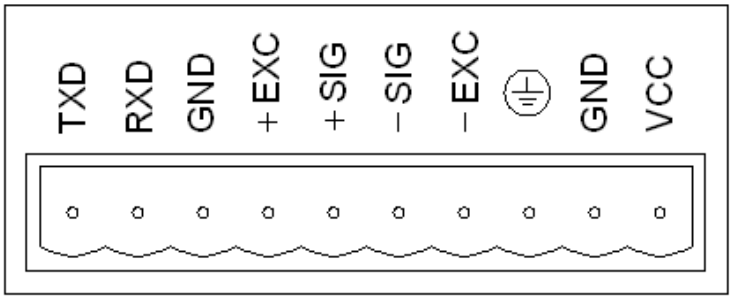
Press [置零 标定] and [累计] at the same time, the indicator display "CLrACC", then press [累显 功能] to

clean the accumulation value or press any key go back weight status.
When power off the accumulation time and value to be auto-cleaning.

4 Installation and Debugging

4.1 Electric connection

Sketch For terminals on back side



4.1.1 Serial Interface

Mark	Signal
TXD	**TXD**
RXD	**RXD**
GND	**GND**

4.1.2 Analaog Load Cell Connection

This indicator can drive 4pcs analog load cells with 350 ohms each.

Definitions for pins:

Mark	Signal
+ EXC	**Excitation +**
+SIG	**Signal +**
-SIG	**Signal -**
- EXC	**Excitation -**

If using 4-core signal wire, it`s must make + SEN and +Exc be short-circuit, -SEN and –Exc be short-circuit.

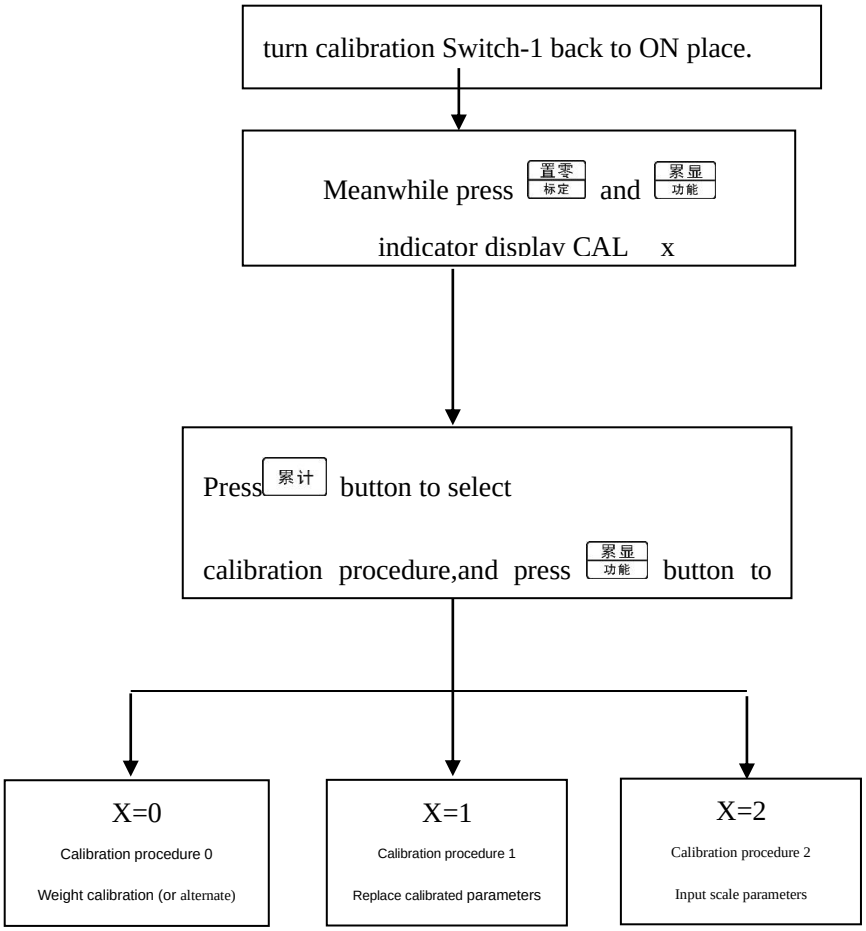
4.1.3 Power Supply.

Mark	Signal
⏚	**GROUND**
GND	**GND**
VCC	**VCC**

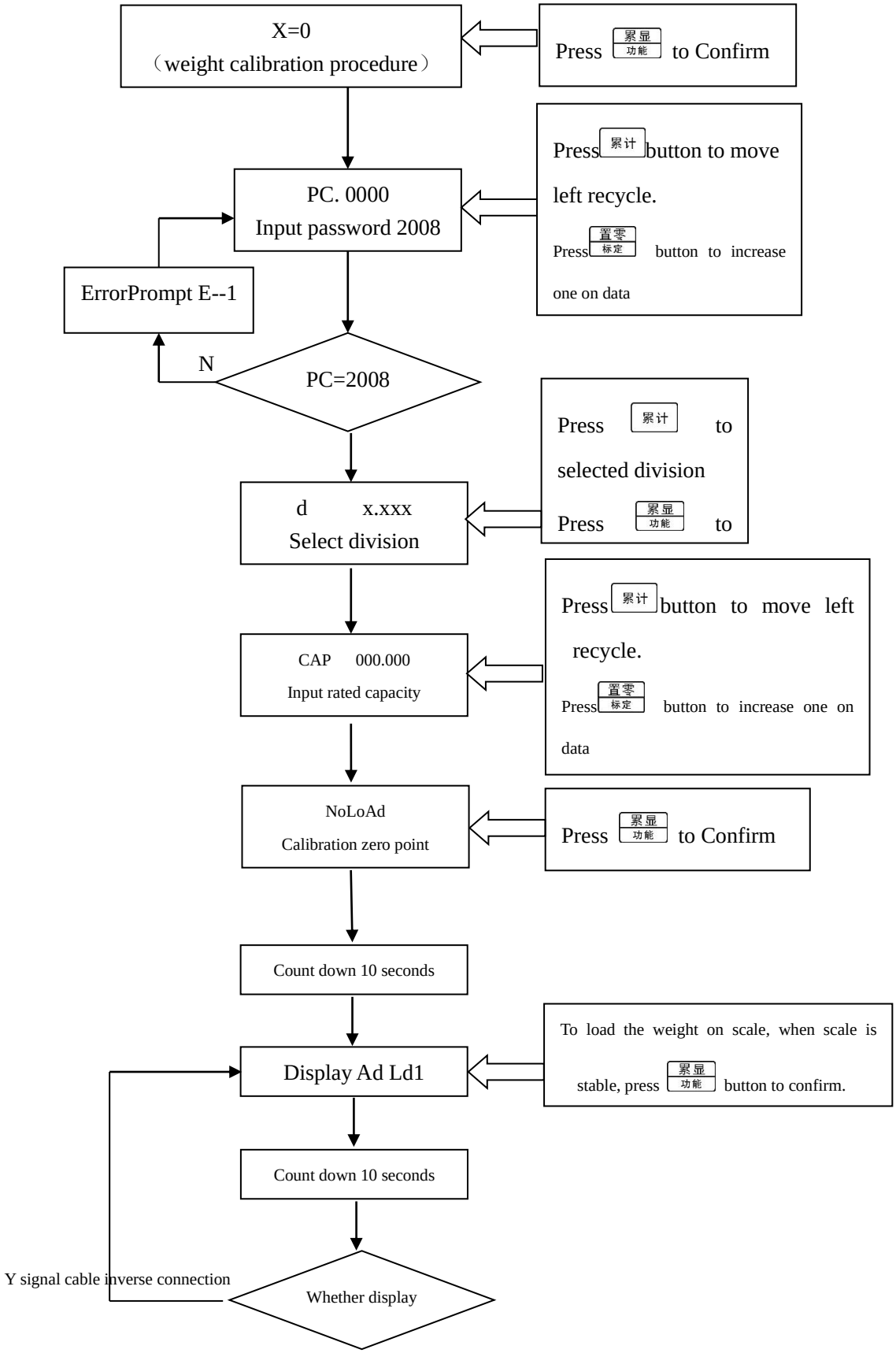
4. 2 Scale calibration

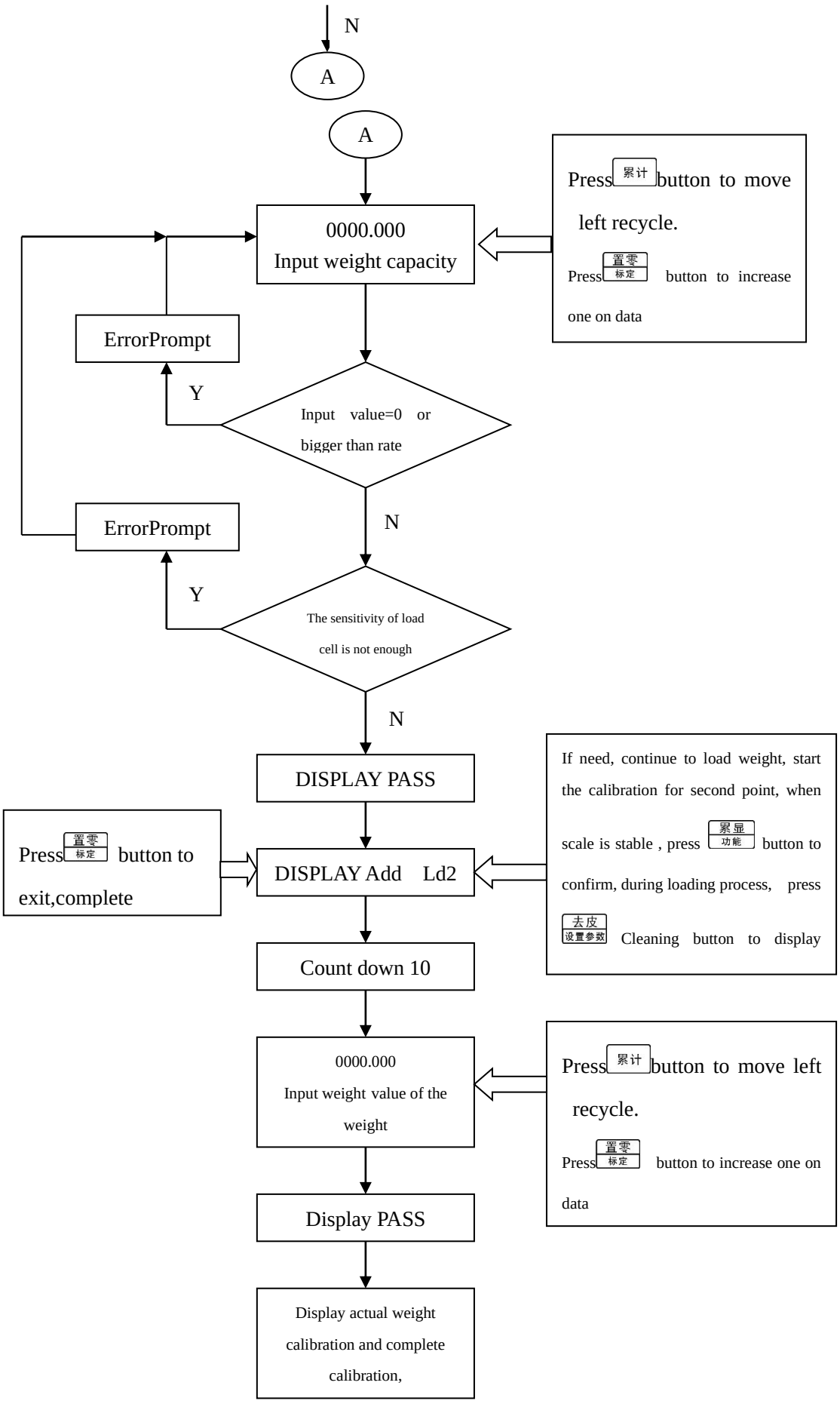
New installed or maintained scale shall be calibrated before using, indicator has three kinds of calibration procedures, they are weight (or alternate) calibration、replace calibrated parameters and input scale parameters three methods. Weight (or alternate) calibration is recommended for new installed scales, if loading weight (or alternate) on spot is not convenient, can use the other two calibration methods, but please note, their calibration error usually is bigger than weight (or alternate) calibration.

4.2.1 Scale Calibration Flow Chart.

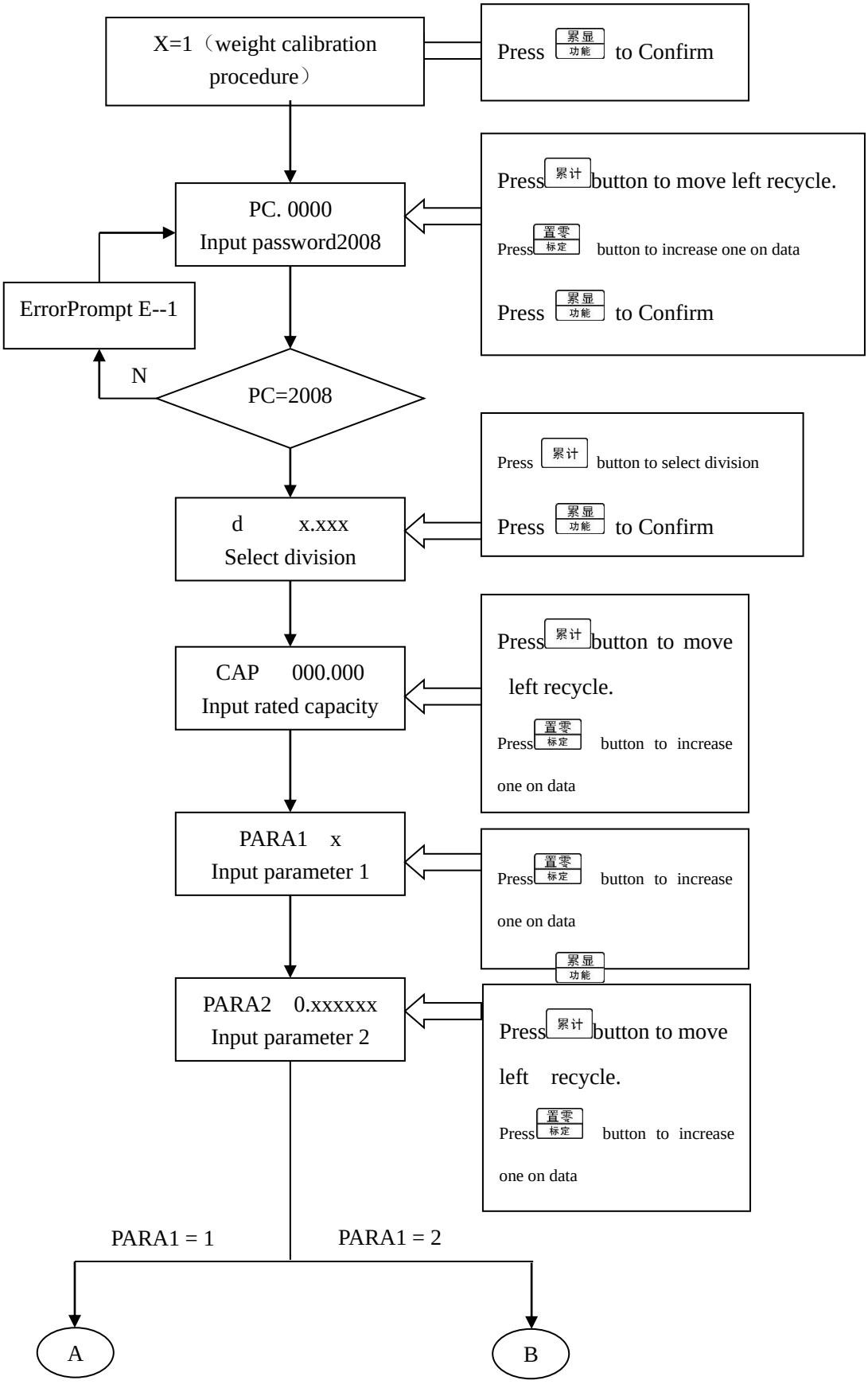


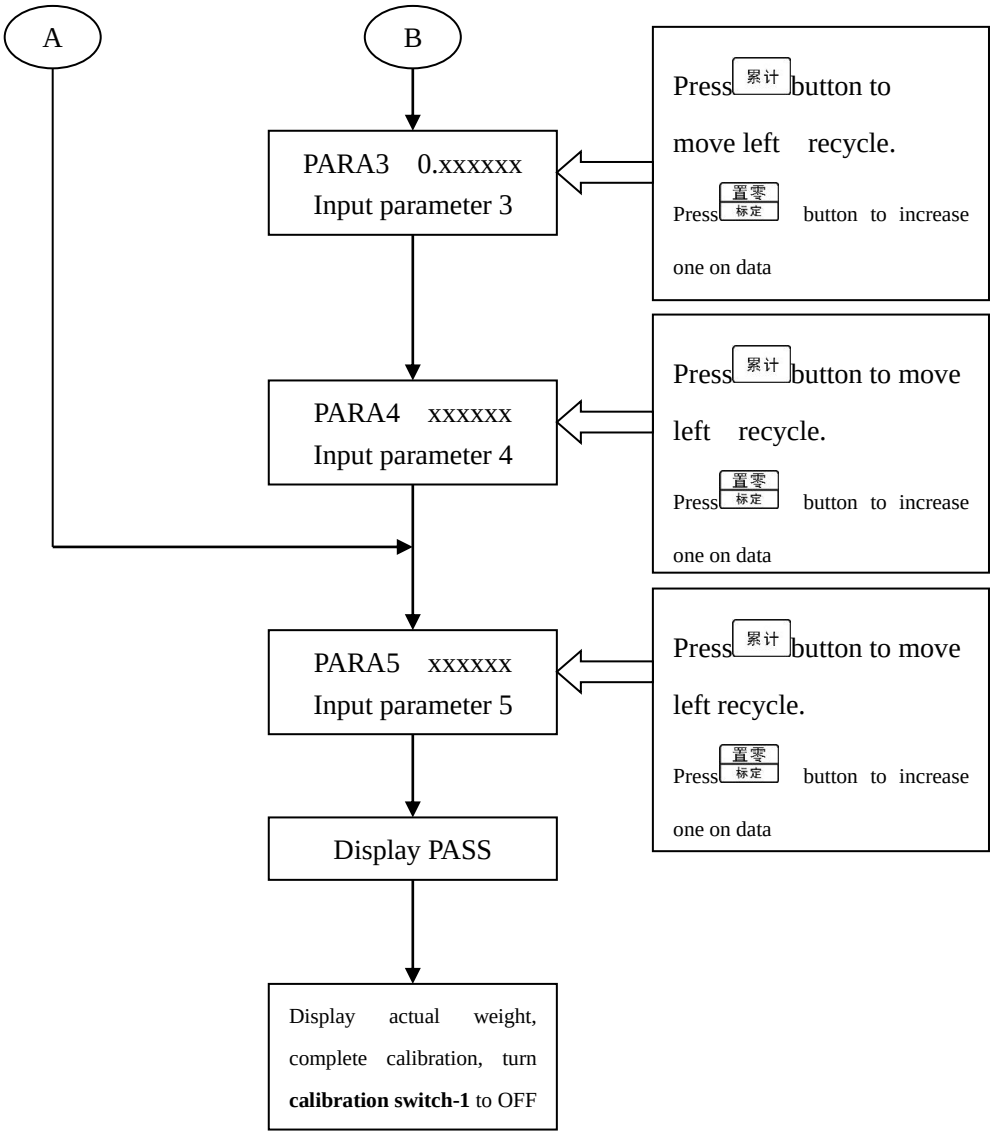
4.2.2 Calibration procedure 0: weight calibration(or Alternate)



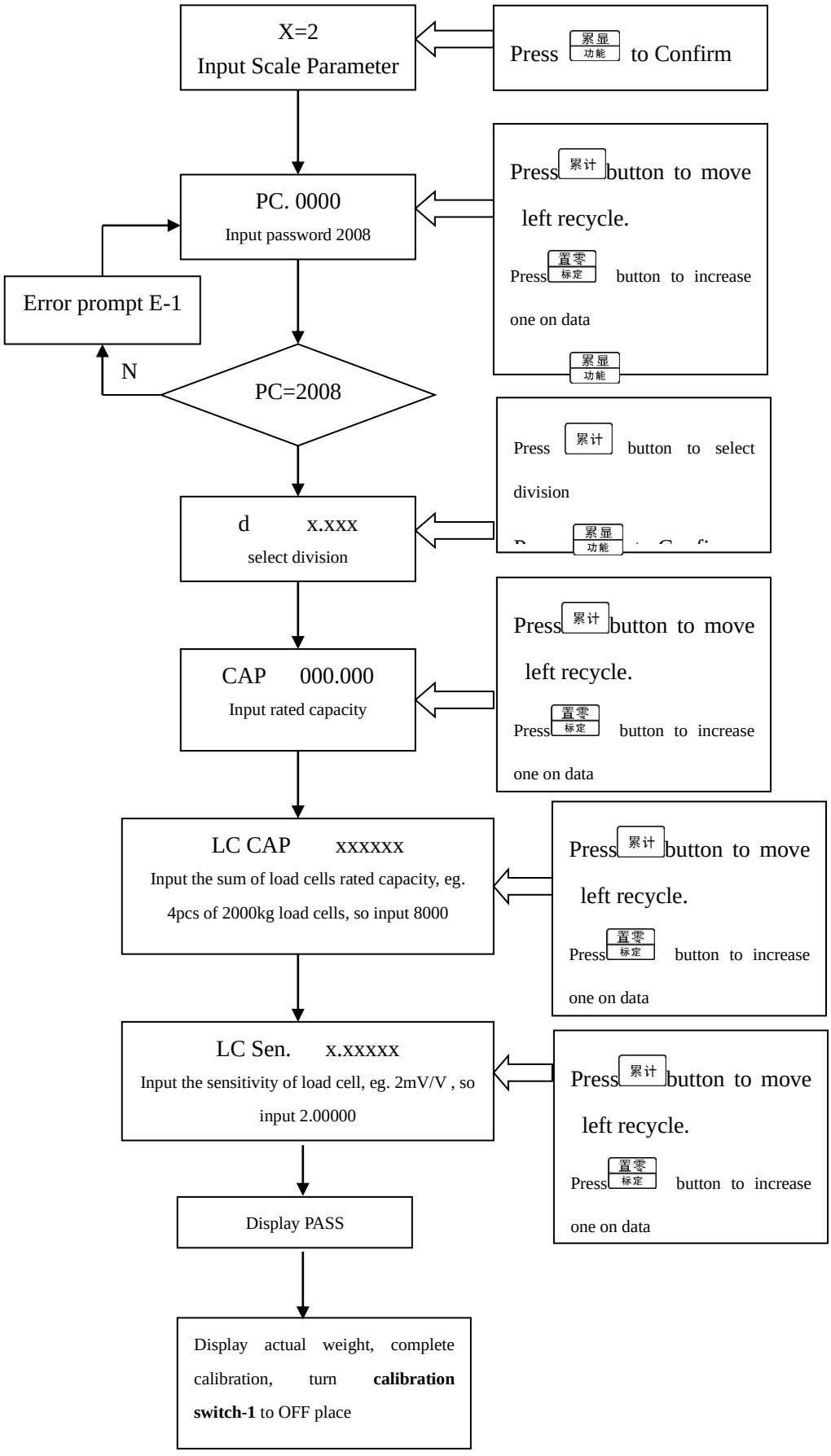

N
A
A
0000.000
Input weight capacity
Press 累计 button to move left recycle.
Press 置零 标定 button to increase one on data
ErrorPrompt
Y
Input value=0 or bigger than rate
N
ErrorPrompt
Y
The sensitivity of load cell is not enough
N
DISPLAY PASS
Press 置零 标定 button to exit,complete
DISPLAY Add Ld2
If need, continue to load weight, start the calibration for second point, when scale is stable , press 累显 功能 button to confirm, during loading process, press 去皮 设置参数 Cleaning button to display
Count down 10
0000.000
Input weight value of the weight
Press 累计 button to move left recycle.
Press 置零 标定 button to increase one on data
Display PASS
Display actual weight calibration and complete calibration,

4.2.3 Calibration procedure1: replace calibrated parameter




A
B
PARA3 0.xxxxxx
Input parameter 3
Press 累计 button to move left recycle.
Press 置零 标定 button to increase one on data
PARA4 xxxxxx
Input parameter 4
Press 累计 button to move left recycle.
Press 置零 标定 button to increase one on data
PARA5 xxxxxx
Input parameter 5
Press 累计 button to move left recycle.
Press 置零 标定 button to increase one on data
Display PASS
Display actual weight, complete calibration, turn **calibration switch-1** to OFF

4.2.4 Calibration procedure 2：Input Scale Parameter



4.2.5 Special explanation for calibration procedure

If separately calibrate zero point, may select weight calibration procedure, when display Add Ld1, press Zero button to exit.

If use input scale parameter calibration procedure to calibrate, scale self-weight can be to clear by separately calibrating zero point; or use input calibrated parameter procedure to modify PARA5, modify zero point by manual. This method might need many times modification to meet the requirement, observe the displaying value after each modification, when weight is close to zero, press Zero button to clear the scale self-weight.

After finishing calibration, turn calibration Switch-1 back to OFF place.

4.2.6 Look over Calibration Parameter

After each calibration, may get into parameter group GROUP 1 to look over and record in enclosed form for future review.

The method:

a. at the same time press 累显 功能 and 去皮 设置参数 button, indicator display GROUP 1

b. press 累显 功能 button, display PARA1 x，x is equal to 1 or 2

c. press 累显 功能 button, display PARA2, then display its parameter value X.XXXXXXX

d. press 累显 功能 button, display PARA3, then display its parameter value X.XXXXXX

e. press 累显 功能 button, display PARA4, then display its parameter value XXXXXXX

f. press 累显 功能 button, display PARA5, then display its parameter value XXXXXXX

g. press 累显 功能 button, display PARA6, then display its parameter value XX

h. press 累显 功能 button, display PARA7, then display its parameter value XX

i. press 累显 功能 button, display PARA8, then display its parameter value XX

The meanings of related parameter

PARA1：1 means one time loading calibration，2 means twice loading calibration PARA2：calibrated coefficient of first section

PARA3：calibrated coefficient of second section

PARA4：ISN of first loading point

PARA5：ISN at Zero point

The PARA6~8 are internal parameter, when PARA1=1, PARA3 and PARA4 are meaningless.

5 **Parameter setting**

Parameter setting includes the following: GROUP2(using environment parameter) 、

GROUP3(serial communication parameter).

The functions of related button when setting parameters are shown as following:_置零/标定: exit button, back to upper parameter setting;

累计 : select parameter list

累显/功能 : confirm the inputted data

Press 去皮/设置参数 and 累显/功能 button at the same time, get into parameter setting. Press 累计 button to select parameter group, press 累显/功能 button to get into related parameter group.

5. 1 Using environment parameter（GROUP2）

[GROUP 2]

21 select ADC convert speed rate(Hz)

[21 x]

x＝7.5\15\25\50；

22 button to get rid of tare

[22 x]

x＝0 forbid；

x＝1 allow , the range of getting rid of tare is 100%FS;

23 button to clear

[23 x]

x=0 forbid；

x=4 zero setting range is ±4%FS

x=10 zero setting range is ±10%FS

x=20 zero setting range is ±20%FS

24 automatic zero tracking range setting

[24 x]

x=0 forbid；

x=0.5 automatic zero tracking 0.5d/sec

x=1 automatic zero tracking 1d/sec

x=3 automatic zero tracking 3d/sec

25 dynamic checking

[25 x]

x＝0 dynamic checking is forbidden

x＝1 allow, the sensitivity of dynamic checking is 0.5d

x＝2 allow, the sensitivity of dynamic checking is 1d

x＝3 allow, the sensitivity of dynamic checking is 3d

26 digital filter option

[26 x]

x=0~7；

the number stands for filter intensity, the bigger the value is , the stronger the filtering ability is , so related stable time also become longer.

27 automatic clear zero range when turning on

[27 x]

x=0 forbid

x=4 range ±4%FS

x=10 range ±10%FS

x=20 range ±20%FS

5.2 Serial communication parameter（GROUP3）

[GROUP 3]

31 baud rate

[31] select baud rate

Optional baud rate：1200，2400，4800，9600 ；

6 Communication Protocol

The indicator's serial communication protocol has Full-duplex RS232 interfaces.

When power on going to be serial transmit the weighing data(ASCII), also take over long distance controll command with the baud rate 1200/2400/4800/9600(optionals) which 1 start bit, 8 digita bits,1 stop bit and NON verify.

The indicator's dipslay weight same as the data and each group of data included 8 frames.The first frame is star frame"＝"，high digit invalid zero to fill with "0".

If displays minus value that the data high digital transmit"－".

Initial character	Symbol	Weight					
=	0 Or One	High digital					Low digital

For example:

Indicator display:"12345"，Serial port transmit the date "＝0012345"

Initial character	Symbol	Weight					
=	0	0	1	2	3	4	5

Indicator display:"12345"，Serial port transmit the date "＝01234.5"

Initial character	Symbol	Weight					
=	0	1	2	3	4	.	5

Indicator display:“12345”，Serial port transmit the date“＝－1234.5”

Initial character	Symbol	Weight					
=	—	1	2	3	4	.	5

Commands:

.Zero

Command: 0x02 0x06 0x00 0x0A 0x00 0x01 0x68 0x3B

Execute correct and return：0x02 0x06 0x00 0x0A 0x00 0x01 0x68 0x3B

.Tare

Command: 0x02 0x06 0x00 0x0A 0x00 0x02 0x28 0x3A

Execute correct and return：0x02 0x06 0x00 0x0A 0x00 0x02 0x28 0x3A

.Clean Tare

Command: 0x02 0x06 0x00 0x0A 0x00 0x04 0xA8 0x38

Execute correct and return：0x02 0x06 0x00 0x0A 0x00 0x04 0xA8 0x38

.Reading the weight.

Command: 0x02 0x03 0x00 0x00 0x00 0x02 0xC4 0x38

Execute correct and return：0x02 0x03 0x04 0xXX 0xXX 0xXX 0xXX 0x(crc16H) 0x(crc16L)

Explains:

0xXX 0xXX 0xXX 0xXX

Means: The indicator display the weight for floating point numbers.

0x(crc16H) 0x(crc16L) Means: CRC verify byte.

.Series transmit

Command: 0x02 0x06 0x00 0x0A **0x00 0x08 0xA8 0x3D**

Return back：0x02 0x06 0x00 0x0A **0x00 0x08 0xA8 0x3D**

Explains: The indicator return back the correct data that means series transmits startly.

.Allows calibration command.

Command: 0x02 0x06 0x00 0x0A ***0x00 0x10 0xA8 0x37***

Return back：0x02 0x06 0x00 0x0A ***0x00 0x10 0xA8 0x37***

The indicator calibration when respond the date.

Explain: The PCB boards have calibration switch which to be calibrated by ON.

.Turn off the display’s command.

Command: 0x02 0x06 0x00 0x0A ***0x00 0x20 0xA8 0x23***

Return back：0x02 0x06 0x00 0x0A ***0x00 0x20 0xA8 0x23***

.Turn on the display’s command.

Command: 0x02 0x06 0x00 0x0A ***0x00 0x40 0xA8 0x0B***

Return back：0x02 0x06 0x00 0x0A ***0x00 0x40 0xA8 0x0B***

7 Malfunction information and settlement

7.1 Error indicator symbol

Item	Display	Possible reason	Solution
1	**E - - 1**	Calibration code error	
2	**E - - 2**	Wrong operation as: Forbidden clear zero or dynamic tare function or tare function forbidden status to press TARE button.	
3	**E - - 5**	Signal wire cable wrong connect	Check load cell cable, this symbol display only under calibration process.
4	**E - - 6**	Load cell sensitivity is not enough	Check load cell selection whether reasonable and the shield wire connect or not.
5	**E - - 7**	Data input error.	This symbol is only appeared only under calibration, input value mare than 0 and less than rating capacity.
6	**- n o-**	Exceed zero clearance range.	
7	**o v e r**	Over load	
8	ADC-Err	Modulus conversion parts malfunction	Change Mainboard.

7.2 Other possible malfunction phenomena

(1) Display weighing result none disciplinarian enlarging or lessening.

Reason analysis

a. Load cell cable fall off or broken, check the cable emphases.

b. Serious electromagnetism interfere around, or hi-power frequency conversion equipment influence.

(2) The weighing result is twinkling in a range.

Possible reason

a. Junction box or indicator is affected with damp.

b. Scale body shake (not stable).

c. Load cell sensitivity on the low side

(3) Buzzer noise when power on, but no display.

Possible reason:

a. Display module malfunction.

b. Cable between the mainboard and display module broken or poor wire connection.

(4) Weighing result display correct, but button no reaction.

Possible reason:

Cable between button and display module (press button examination and display module together) broken or poor wire connection.

(5) No result after indicator power on.

Possible reason:

a. Power cable broken or poor wire connection.

b. Power board fuse broken.

(6) Bad parameter display of weighing linearity, repeatance, indicator no return to zero.

Possible reason:

a. Corner difference without adjustment.

b. Friction exists between scale body and position limited unit.

8 Daily cleaning and maintenance

Soft cotton with neuter scour scrub away indicator housing. Forbidden use industrial impregnant clean keyboard button or screen board or jet the impregnant directly to the indicator. Suggest professional person inspect and make recorder in fixed period.

Appendix A Calibration Parameters Record List

Date		**Date**	
Operator		Operator	
Check		Check	
Calibration Process	□Weight Calibrate □Parameter input □Scale parameter	Calibrate Process	□Weight Calibrate □Parameter input □Scale parameter
PARA1		**PARA1**	
PARA2		**PARA2**	
PARA3		**PARA3**	
PARA4		**PARA4**	
PARA5		**PARA5**	
PARA6		**PARA6**	
PARA7		**PARA7**	
PARA8		**PARA8**	

Appendix B Default Parameter before Leaving Factory

Group2	Application environment	Default parameter
2.1	ADC conversion rate	7.5
2.2	Tare operation	1 permission
2.3	Range of zero clearance by keying	4%
2.4	Auto zero following	0.5d
2.5	Dynamic Inspection	3d
2.6	Digital filtering	2
2.7	Range of auto zero clearance after start	4%
Group 3		
3.1	Baud rate	9600

Press 

to Confirm