XK3190-DS1

Weighing indicator

Calibration and testing manual

2006.9

Shanghai Yaohua Weighing System Company

CONTENT

Note: some contents in chapter 1. and chapter 2. are same with the operation manual

Dear users:

Please read the manual carefully before use the indicator.
Please ensure a safe power grounding to guarantee the safety during operation!

XK3190--DS1

Chapter 1. Technical parameter

1、Model：　XK3190-DS1

2、Signal interface：

Interface method：　RS485（2 line or 4 line）
Transmission distance：　≤1000 meter
Transmission speed：　≤19200 baud
Signal power：　DC12V，≤400mA
Digital interface capability：　≤16pcs digital load cell or digital module（note 1-1）

3、Display：　7 bit VFD，7status signal

4、Keypad

Digit key　0 ~ 9
Function key　25（10 keys are compound with digit keys）

5、Clock：　able to display year/month/date/hour/minute/second
Precision：±5s/24h，not to be influenced by power disable

6、Scoreboard display interface

Transmission method　serial transmmion method, 20mA current loop
Transmission format　11 Binary Transfers（please refer to chapter 2 for connecting to scoreboard）
Transmission baud rate　600
Transmission distance　≤2000m

7、Serial communication interface

Transmission method　RS232/RS422（optional）
Baud rate　600/1200/2400/4800 selectable
Transmission data format　1 start bit，8 data bit（ASCII code），1 stop bit
Transmission distance　RS232　≤30m；RS422　≤1200m

8、Print interface

1）build-in printer optional（stylus print or thermal）
2）with standard parallel printer interface, able to connect ESPON LQ-300K(＋)、KX-P1131、KX-P1121etc. printer

9、Data storage

Able to save 1500 vehicle tare weight, 201 cargo numberand cargo name, 100 customer number and customer name, 100 digit or text notes,1501 weighing records.

10、Operation enviorenment

power　AC 220V（-15% ~ +10%）50Hz（±2%）
operation temperature　0℃ ~ 40℃
storage temperature　-25℃ ~ 55℃
comparative humidity　≤85%RH
warm up time　≤30 minute
fuse　0.5A

11、Dimension 316×250×170

12、Weight 3.5kg

Chapter 2. installation

connect to digital load cell

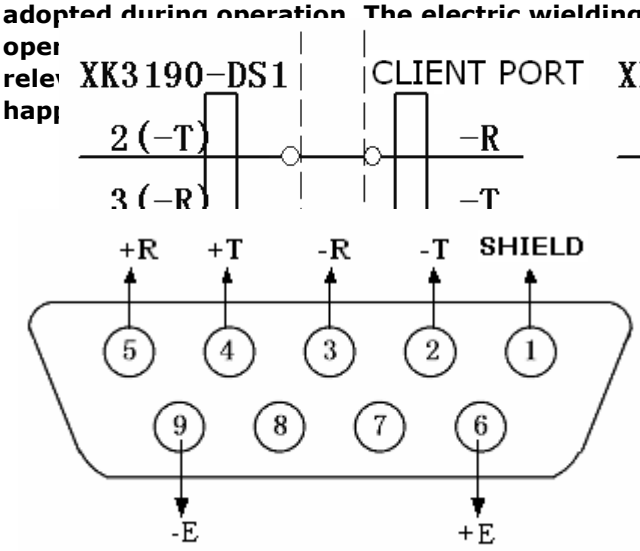
XK3190-DS1 is digital weighing indicator, it can only be connected to digital load cell, please kindly note the load cell mentioned in the following text represents digital load cell.

1、the indicator connect to load cell through 9 pin connector. Picture 2-1 indicat the signification of each pin

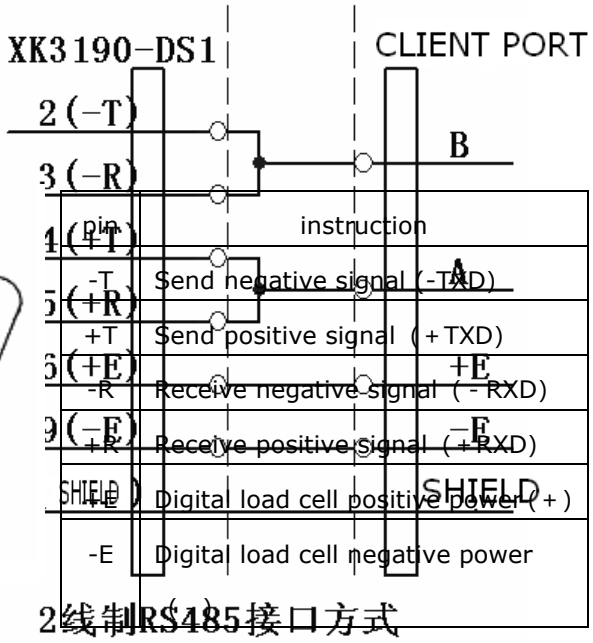
2、the load cell connector can use 4 wire RS485 connecting method, or 2 wire RS485 connecting method, please short connect pin-2 (- T) with pin-3(- R) for B use when adopt 2 wire connecting method, short connect pin 4 and pin 5 for A use. Please refer to picture 2-2 for the connection detail

▲! Indicator must be reliably connected to load cell and shielded-cable of load cell must be reliably connected to ground. It is not allowed to insert or pull out the plug when the indicator is power on in order to protect the indicator and load cell from the static.

▲! Load cell and indicator are static sensitive devices; anti-static measures must be adopted during operation. The electric wielding operation and other strong electric oper rele happ

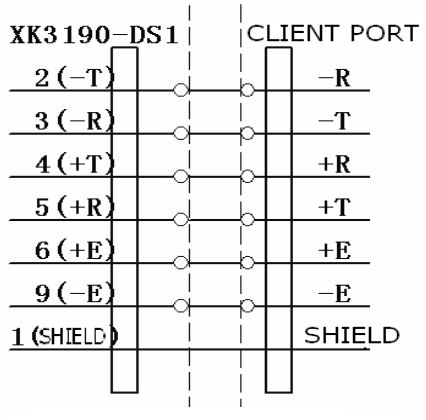


4线制RS485接口方式

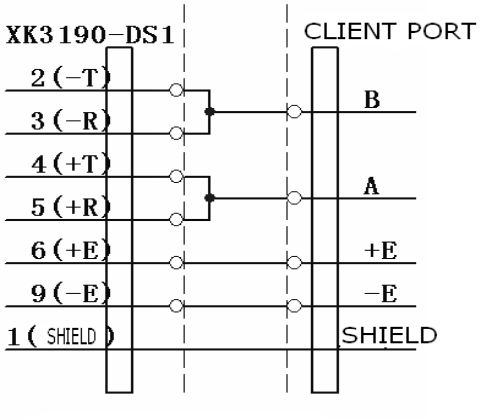


pin	instruction
-T	Send negative signal (-TXD)
+T	Send positive signal (+TXD)
-R	Receive negative signal (-RXD)
+R	Receive positive signal (+RXD)
+E	Digital load cell positive power (+)
-E	Digital load cell negative power

2线制RS485接口方式



4 WIRE CONNECTION WAY FOR RS485



2 WIRE CONNECTION WAY FOR RS485

(2-2) 4 wire RS485 and 2 wire RS485 interface method

Chapter 3. testing

Connect the load cell with indicator, warm up for 15~30 minutes, then switch the calibration button upward, and teseting according to the following steps

section 1. connection setting of indicator and load cell

1. manual setting of the digital load cell

the digital load cell setting includes: load cell type setting, quantity setting, load cell address position setting. The specific operation is instructed in the diagram 3-1-1.

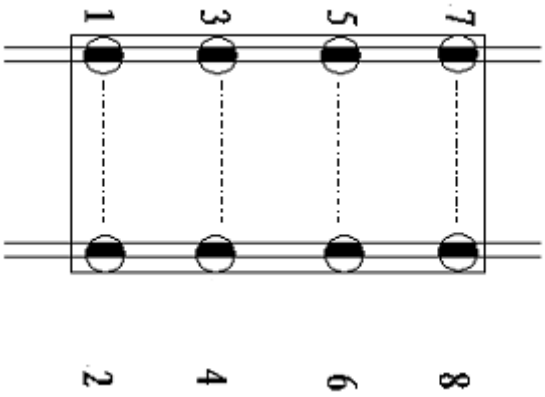
Diagram 3-1-1

step	operation	display	instruction
1	Switch the calibration button upward,press 【Parameter】 press【5】 press【Input】	PSt 00 PSt 05	select parameter/function sort number 5, enter digital load cell setting program
2	press【888888】 press【Input】	c000000 c888888	input calibration password Initial password is'888888'（can be changed,check section 4） example 888888（Note:3-1-1）
3	press【Input】	PS 00	**input parameter number** 00 load cell type 01 load cell quantity 02 ～ 17：set load cell number
4 00 parameter	press【1】 press【Input】	dtP ** dtP 01	**load cell type setting**（parameter range0～15）： 1=HBM digital load cell（AD104－R5） 3=jin yi digital load cell（DMP100R10） 0、2、4～15：spare model number Display load cell type,input new digital load cell type example：1
5	press【0】 press【Input】	trA * trA 0	**Railway scale mode selection：（note 3-1-2）** trA＝0 normal truck scale mode trA＝1 railway scale mode example：0
6 02 parameter	press【16】 press【Input】	dno ** dno 16	**Lod cell quantity setting**（parameter range：1～16）： Display load cell quantity,input new parameter example：16
Appoint load cell address on each position（note3-1-3）			
7 03 parameter	Load cell address of current position known, press【2】 press【input】	d01 ** d01 02	**Input load cell address of position1：** Display original load cell addressof this position,appoint new load cell.

			（Note 3-1-4） example：on position 1, the load cell address is 02, then input 2
8 04 parameter	ad cell address of current position known,press【3】 press【input】	d02 ** d02 03	**Input load cell address of position 2** Display original load cell address of this position,appoint new load cell. example：load cell address of current position 2 is known as 03,then input 3
……	Same operation with above	d** ** d** **	**Input load cell address of position**：display original load cell address of this position, appoint new load cell.**
9 18 paramter （note 3-1-5）	press【12】 press【input】	d16 ** d16 12	**Input load cell address of position 16：** Display original load cell address of this position,appoint new load cell. example：the load cell address of current position 16 is known as 12, then input 12
10		Weighing mode	Digital load cell setting finished

Note 3-1-1：when the calibration password is correct, then it will go to the next step,if not correct it will go back to weighing mode, the initial password is "888888", please refer to "section 4: password management" for the information of changing password。

Note 3-1-2：Please select railway scale mode when the DS1 apply to a digital railway scale. The angle error adjustment of the railway scale depends on the angle group(the angle group is 2 angle position which the axle is) of the single train axle.The angle position should be on the parallel line of the axle (please refer to the broken line in picture 3-1). Angle 1 and angle 2 composed a angle group, angle 3 and angle 4 composed a angle group, same with angle 5 and angle 6, angle 7 and angle 8, adjust the angle erroe according to the angle group.

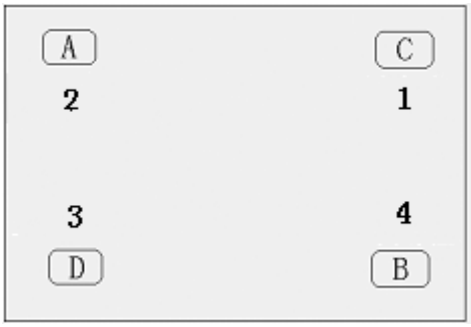


Note 3-1-3：angle position is the support point, which is the load cell install position. Appoint the load cell address of each angle position actually is "telling" the indicator the load cell communication address of each angle. Before the operation, the user must know the load cell communication address of each angle, or have set the load cell communication address of each angle. Appoint the load cell communication address is for the easy test of the indicator and scale in later operation.

Note 3-1-4：the "d" in display "d** **" is the angle serial number the indicator fixed, the latter "**" means the load cell communication address of the current angle position. For example, "d01 02" means the communication address of load cell on the angle position 1 is 2.**

Note 3-1-5：when the load cells are less than 16, after the actual operation of the load cell on all angle position are appointed, then the operation is finished. Press【weigh】key to exit. Other angle position without load cell is meaningless, no need to set them or you can set them as "99".

example 1：there are 4 HBM digital load cell A(communication address 1), B(communication address 3), C(communication address 5), D(communication address 4), the install position is like the picture shows, then start the manual setting of the load cell.



Setting method: 4 HBM digital load cell, according to picture 3-1-1, we can know that the type parameter dtP=1, dno=4; you can set the angle position according to your habit(clockwise or anticlockwise). In this example, we set the right upper corner(load cell C install position) as number 1 angle position, then appoint load cell A,D,B install position anticlockwisely as angle position 2,3,4(it is better to mark this on the scale or load cell for a easier operation later). After these operation, you can start to operate the indicator for the setting. Main parameter: **dtP = 1； dno = 4； d01 = 05； d02 = 01； d03 = 04； d04 = 03。**

Operation method：

a) Switch the calibration button upward on the calibration position

b) According to the picture 3-1-1 to enter the load cell setting：

Press 【Parameter】→press【5】→press【Input】→enter calibration password→press【Input】.

c) operation 2，input load cell type(dtP parameter)：**press【1】→press【Input】**，load cell type setting finished.

d) operation 3，set the load cell number(dno parameter)：**press【4】→press【Input】.**

e) operation 4，appoint the load cell address of number 1 angle position(d01 paramter)：**press【5】→press【Input】.**

f) operation 5，appoint the load cell address of number 2 angle position(d02 parameter)：**press【1】→press【Input】.**

g) operation 6，appoint the load cell address of number 3 angle position(d03 paramter)：**press【4】→press【Input】.**

h) operation 7，appoint the load cell address of number 4 angle position(d04 paramter)：**press【3】→press【Input】.**

i) press【Weigh】 to exit

2. check and set the load cell address

This function is for checking and setting the communication address of the load cell. Note: you have to finish the setting of load cell type, then you can start checking and setting the load cell address. Otherwise the operation is disabled(indicator display "Erd 00", means did not find the appointed load cell). Also, **before the operation, the indicator can only connect to a one load cell, other load cell must be disconnected with the indicator,** otherwise the operation is unable to carry out, indicator will display "Erd **", means did not find the

appointed load cell). This means the indicator find more than 1 load cell; for example, if the indicator connect to 3 load cells, then the indicator display “Erd 03”. Please refer to picture 3-1-2 for the checking and setting method of the load cell communication address.

Picture 3-1-2

step	operation	display	instruction
1	Switch the calibration button upward on the calibration position press【F1】 press【888888】 press【Input】	c000000 c888888	Enter function setting, input calibration password Initial password is“888888”（can be managed, pls refer to section 4） For examples 888888（note 3-1-1）
2	press【Input】	FUnc 0	Function setting option
3	press【Weigh】or press【2】 press【Input】	------- about 5 sec od ** od 02	Start scan Display the current load cell address, enter new communication address to set, press【Weigh】to exit For example: 2
4	press【Weigh】	d******	Display current load cell inner code,you can check if there is any change of the load cell number to check the setting result. If there is change then the setting if succeeded.
5	Setting finished	******	Weighing mode

3. digital load cell auto setting

XK3190-DS1 is able to automatically finish the setting of load cell type, number and auto set the load cell address of each angle position. Before the auto-setting, we must ensure all the communication addresses of the connected load cells are exclusive. Otherwise, we need to reset the communication address.

Table 3-1-3

Step	Operate	Display	Note
1	Open the calibration switch. Press【F1】 Press【888888】 Press【Input】	c000000 c888888	Enter function setting mode, and input the calibration password. Default password is“888888”（See section 4 for the password changing） （Note 3-1-1）
2	Press【1】 Press【Input】	FUnc 0 FUnc 1	Function selecting
3	Press【Weigh】or Press【1】 Press【Input】	AtScn * …… SurE 0 SurE 1	Scan the load cells. When scanning is over, input “1” to confirm. (Press【Input】will quit, and return to the weighing mode. For example：1（confirm）

4	Press【Input】	dtP **	Display the load cell type （Note 3-1-6）
5	Press【Input】	trA 0	Weighing mode：（Note 3-1-2） Default “trA”＝0
5	Press【Input】	dno **	Scanned load cell quantity （Note 3-1-7）
6	Press【Input】	d01 **	The load cell’s address in the 1st angle position
7	Press【Input】	d02 **	The load cell’s address in the 2nd angle position
……		d** **	The load cell’s address in the ** angle position(Note 3-1-8)
8	Press【Input】	d16 **	The load cell’s address in the 16th angle position
9		Weighing Mode	

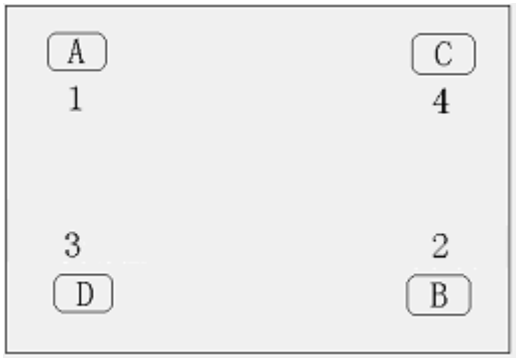
Note 3-1-6： In steps 4～8, These parameter scanned also can be changed manually.

Note 3-1-7： If the addresses are not exclusive, the load cell quantity scanned will be wrong.

Note 3-1-8： If the current angle position is not exist, load cell’s address will be displayed“99”

Example 2： Auto-setting

1、 Open the calibration switch.
2、 Enter the function selecting mode：Press【F1】→Press【888888】→Press【Input】.
3、 Choose the auto-setting mode：Press【1】→Press【Input】
4、 Confirm the scanning result：When the indicator displays “SurE 0”→Press【1】→Press【input】.
5、 Finish the setting, and check the parameters.



Then we will see, 1st angle position is load cell “A”（Address is 1）. 2nd angle position is load cell “B”（Address is 3）. 3th angle position is load cell “D”（Address is 4）. 4th angle position is load cell “C”（Address is 5）. Now we can tell, when the auto-setting is finished, the address of the load cells in every angle position is just the same as the communication addresses, from the small to the big.

4、Check the inner code of the load cell

Check the inner code of the load cells one by one in order to examin and adjust the scale.We can also use this method to check the angle position or the communication address of a certain load cell.

Table 3-1-4

Step	Operate	Display	Note
1	Press【Test】 Press【888888】 Press【Input】	c000000 c888888	Input the calibration password Defaulted “888888” （Note 3-1-1）
2	Press【Input】	tESt 0	Function selecting： 0 = Check the inner code of the load cells
3	Press【2】 Press【Input】	dd 01 dd 02	The angle position to be checked. Defaulted angle position 1 For example：Check the 2nd position
4	Press【Input】	d*****	Display the inner code we are checking. If no load cell is installed at this position, indicator will display: 【d ---- 】
5	Press【Input】	dd 03	Continue to next angle position. Press【Input】to check or choose a angle position as step 3. Otherwise, press【Weigh】to quit For example：Check the 3th angle position.
6	Press【Input】	d*****	Display the inner code we’re checking. If no load cell is installed at this position, indicator will display:： 【d ---- 】
……	……	……	……
5		Weighing Mode	Finish checking for every load cell

5、Angle adjustment

We can do the angle adjustment both automatically and manually. Before the adjustment, the calibration switch must be open. **Note: Angle adjustment function is only valid when at least two load cells are installed.** At auto-adjustment mode, if the load cells installed are less than 2 pieces, indicator will display “**Err 11**”.

At rail weighing mode, the indicator will also display “**Err 11**” if the quantity of the installed load cells is an odd number. If we choose the auto-adjustment for the rail weighing mode, we can only do the adjustment by the angle groups, but not by a single load cell.

1、Manual adjustment

Before we do the adjustment manually, we should figure out the angle adjustment parameter. With this method, we can also check the angle adjustment parameter of every angle position.

Table 3-1-5

Step	Operate	Display	Note
1	Press【Parameter】 Press【5】 Press【Input】	PSt 00 PSt 06	Select the function code 5, and enter the load cell setting mode.

2	Press【888888】 Press【Input】	c000000 c888888	Input the calibration password：Defaulted “888888” （Note 3-1-1）
3	Press【Input】	P6 00	**Angel positions**：00 ～ 15 corresponds 1～16 angle position For example：Start with the 1st angle position.
4 00 parameter	Press【12345】 Press【Input】	0.****** 0.012345	**Set the adjustment parameter for the 1st angle position:** Displays the old parameter, we input the new parameter directly and Press【Input】to continue （Note 3-1-9） For example：0.12345
5 01 parameter	Press【12345】 Press【Input】	1.****** 1.012345	**Set the adjustment parameter for the 2nd angle position:** Displays the old parameter, we input the new parameter directly and Press【Input】to continue For example：0.12345
……	Press【******】 Press【Input】	*.****** *.*******	**Set the adjustment parameter for the 3th ~ 15th angle position:** （Note 3-1-10）
6 15 parameter	Press【12345】 Press【Input】	F.****** F0.12345	**Set the adjustment parameter for the 16th angle position:** Displays the old parameter, we input the new parameter directly and Press【Input】to continue For example：0.12345
7		Weighing mode	

Note 3-1-9：After we do the auto-setting of load cells, all the angle adjustment parameter will be reset to the default value “1.00000”.

Note 3-1-10：When the load cells installed are less than 16 pieces, we can simply press 【Weigh】to quit after we finish the adjustment for every load cells installed.

2、Auto adjustment

When we are sure that the platform and the load cells are correctly installed and setted, the angles can be adjusted automatically. **Note**: at **rail weighing mode**, we adjust the angle by **angle group**, but not a single load cell or angle. This means we only need to add **load 4 times** to finish the adjustment for a rail weighing scale which is **with 8 load cells**

Table 3-1-6

Step	Operate	Display	Note
1	Open the calibration switch Press【F1】 Press【888888】 Press【Input】	c000000 c888888	Input the calibration password Defaulted “888888” （Note 3-1-1）

2	Press【2】 Press【Input】	FUnc 0 FUnc 2	**Function selecting：** 2—auto adjustment
3	Add load at the 1st angle/angle group position. When the scale is stable, press【Input】	dcr 01	To collect data from the the 1st angle/angle group position. **Note，The "1st angle position" here does not mean the angle position 1#, but any angle position we start with (Note 3-1-2）**
4		do 10 …… do 00	Data collecting …… Collecting done（Note 3-1-11）
5	Move the same load to the 2nd angle /angle group position. When the scale is stable, press【Input】	dcr 02	To collect data from the the 1st angle/angle group position. **Note：If here we find mistakes in last angle /angle group data collecting, We can press【Roll】to return to step3 of last angle/angle group position, and redo the data collecting**
6		do 10 …… do 00	Data collecting …… Collecting done
……	……	……	……
7	Move the same load to **th angle/ angle group position. When the scale is stable, press【Input】	dcr **	To collect data from the the **th angle/angle group position. （Note 3-1-12）
8		do 10 …… do 00	Data collecting …… Collecting done
……	……	……	……
9	Move the same load to 16th angle/ angle group position. When the scale is stable, press【Input】	dcr 16	To collect data from the the 16th angle/angle group position. 。
10		do 10 …… do 00	Data collecting …… Collecting done
11	Auto-adjustment done	*****	Weighing mode

Note 3-1-11：When the data is collecting, the scale must be stable.

Note 3-1-12：When the load cells installed are less than 16 pieces, the indicator will end the adjustment when the data is collected from every the load cells.

Section 2 Calibration

XK3190-DS1 offers two kinds of calibration methods: continuous calibration and separate calibration. Continuous calibration belongs to XK3190 series indicator traditional calibration mode, that is, from the beginning to the end to set the parameters, individual parameter can't be set individually. But separate calibration is parameter selective calibration mode, user can individually calibration some parameters, such as individual zero calibration, individual linear calibration, etc.

3.2.1. Separate calibration

Firstly is to finish calibration parameter setting, well set calibration parameters (No need to set on "system modification coefficient" or "division switch"), then proceed with zero and full capacity calibration.

1) Calibration parameter setting:

Under situation of turning the calibration switch to top, you can do the operation as per followed table:

Step	Operation	Display	Note
1	Press【SET】 Press【INPUT】	PSt 00	Select parameter/function type no.: 00, enter into calibration parameter setting process
2	Press【888888】 Press【INPUT】	c000000 c888888	Input calibration code The previous code out of factory is"888888" (Calibration code can be changed, refer to chapter 4)
3	Press【INPUT】	P0 00	Input parameter no. 00 division 01 decimal 02 system parameter 03 filter intensity 04 full capacity 05 system modification coefficient 06 auto division switch point 1 07 auto division switch point 2
4 00 parameter	Press【10】 Press【INPUT】	E *** E 010	Input division 1/2/5/10/20/50/100 selectable ie: 10
5 01 parameter	Press【0】 Press【INPUT】	dc * dc 0	Input decimal digits（0-4） ie: 0（no decimal）
6 02 parameter	Press【124】 Press【INPUT】	PnVwxyz Pn00124	Input system parameter V：using condition W：zero tracking speed X：zero tracking range Y：manual zero range Z：tuning-on zero range ie: 00124
7 03 parameter	Press【1】	FLt *	Digit filter intensity（0-4） The larger the digit is, the stronger filter

	Press【INPUT】	FLt 1	intensity is, the display is more stable, but with quite slow reaction. ie: 1
8 04 parameter	Press【30000】	F****** F030000	Input full capacity (full capacity can be exceed by adding 9 divisions) (table 1) ie: 30000
9 05 parameter	Press【100000】 Press【INPUT】	E****** E1.00000	system modification coefficient （table 2） ie:1.00000
10 06 parameter	Press【0】 Press【INPUT】	n****** n000000	division switch point 1 （table 3） ie:000000（do not use division switch function）
11 07 parameter	Press【0】 Press【INPUT】	H****** H000000	division switch point （table 4） ie:000000 (do not use division switch 2 function）
12		Weighing mode	Calibration parameter setting ends

Pn parameter setting methoud:

Refer to following tables (table 1, 2, 3, 4) for Pn parameter datas and parameter range:

Table 1

V	0	1
Using situation	Non-trading scale	Trading scale

Table 2

W	0	1	2	3
Zero tracking speed	0.4second	0.3second	0.2second	0.1second

The above listed time is needed time for modifying 0.05e (1 inner code).

Table 3

X	0	1	2	3	4	5	6	7	8	9
Zero tracking range	No tracking	0.5e	1.0e	1.5e	2.0e	2.5e	3.0e	3.5e	4.0e	4.5e

Table 4

Y	1	2	3	4	5
Zero range by "zero key"	2%F.S	4%F.S	10%F.S	20%F.S	100%F.S

Table 5

Z	1	2	3	4	5
Turning-on zero range	2%F.S	4%F.S	10%F.S	20%F.S	100%F.S

Note:

Table 1: If full capacity is more than 65000, then division must be set ≥5, otherwise indicator will automatically select division as 5.

Table 2: System modification coefficient is system calibration parameter, please don't modify it casually, otherwise it will affect weighing accuracy. (Each time after finishing calibration, this parameter will automatically change to 1.0000). ****This parameter can't be set before calibration****

Table 3: This indicator has the function for three different division switch. Step 10-- "06 parameter" –"n" is the division switch point for low division. When weight is less than the set weight, division (exception 1) will automatically switch down (eg. 2 is switched to 1, 5 is switched to 2, 10 is switched to 5). Step 11-- "07 parameter"- "H" is the division switch point for high division. When weight is more than the set weight,

division (exception 100) will automatically switch up (eg. 1 is switched to 2, 2 is switched to 5, 5 is switched to 10). If switch point "n" or "H" is set as 0, no use for the corresponding switch functions. "n" and "H" will go back to "0" after calibration on division, zero or full capacity. So, Highly suggest doing setting on these two parameters after finishing all the calibration work.

2). Zero calibration

Press 【Cal】key, indicator will display 【c 000000】, input calibration code and then press【Tare】, indicator display【noloAd】, zero confirmation, no goods on scale, waiting for stable light on then press【input】, finish zero calibration. (This calibrated zero point will be used for zero range judgement when turning on the indicator, which won't be involved in calculation for calibration coefficient.

3). Full capacity

Firstly, confirm there's no goods on scale, indicator display G.W. as 0, turning the calibration switch to top of the calibration place then press 【cal】key, indicator display 【c 000000】, input calibration code then press【zero】key. Indicator display【AloAd 1】, which means full capacity confirmed (at first adding point). Now put goods (Goods weight should more than 1/3 full capacity), input goods actual weight, waiting for stable light on, then press 【Input】, finish full capacity calibration.

4). Non-linearity modification calibration

For example, after making calibration by 1/3 full capacity, weighing operation is under normal condition under 2/3 full capacity, but when the weighing is near to the full capacity, the weight data warps a bit. At this moment, user can use non-linearity modification calibration to well modify the full capacity. Method is as follows:

--Don't need to remove weights, calibration switch is turned to top to calibration place, and do following steps:

Note:

! Non-linearity modification point must be larger than the weight of former neighboring calibration point (about above 1/6 of the full capacity)

! After making new calibration on full capacity, non-linearity modification fails.

! Non-linearity modification makes sense only for good repeatable system.

Table 1:

Step	Operation	Display	Note

1	Press【Cal】		turning the calibration switch to top calibration place
2	Press【……】 Press【Inspect】	c000000 c888888	Input calibration code Original code"888888" Code can be modified, for code modification, please refer to chapter 4—calibration code modification
3	Press【20000】 Press【INPUT】	AdLoAd2 20000	Put weights (weights must be larger than weight during AloAd1), waiting for the stable light on, then input actual weights value, eg: 20000.
4	Press【INPUT】 ……	A****** C****** ……	Display calibration parameter, don't modify, if need for further checking, please press【INPUT】, further display and operation are as same as table2 steps 12~16.
5	Press【Weigh】to return back to calibration mode	******	Return back to weighing mode.

3.2.2. Continuous calibration

Table 2:

Step	Operation	Display	Note
1	Press【Cal】		turning the calibration switch to top calibration place
2	Press【……】 Press【INPUT】	c000000 c******	Input calibration code Original code"888888" Code can be modified, for code modification, please refer to chapter 4—calibration code modification
3	Press【 1 0 】 Press【INPUT】	E*** E 010	Input division 1/2/5/10/20/50/100 selectable ie: 10
4	Press【 0 】 Press【INPUT】	dc * dc 0	Input decimal digits（0-4） ie: 0（no decimal）
5	Press【124】 Press【INPUT】	【Pn VWXYZ】 Pn00124	Input system parameter V：using condition W：zero tracking speed X：zero tracking range Y：manual zero range Z：tuning-on zero range ie: 00124
6	Press【1】 Press【INPUT】	FLt * FLt 1	Digit filter intensity（0-4） The larger the digit is, the stronger filter intensity is, the display is more stable, but with quite slow reaction. ie: 1

7	Press【50000】 Press【INPUT】	F****** F050000	Input full capacity; if need calibration, after pressing F number, repress【INPUT】; if directly press【INPUT】, then directly switched to Step 11. If press【WEIGH】, then return back to weighing mode. Note: Adding 9 division on full capacity is the system overload warning point). Eg: 50000
8	Press【INPUT】	noLoAd	Zero confirmation, there's no goods on the scale, waiting for the stable indication light on, then press 【INPUT】
9	Press【10000】 or Press【INSPECT】	AdLoAd1 10000	Put weights on the scale and waiting for the stale light on, then input actual weight of the weights, eg: 10000 Note: If need non-linearity modification (multi-calibration) , then press 【INSPECT】, enter into step 10; if no need for non-linearity (one-point calibration),press【INPUT】to enter into step 12.
10	Press【20000】 Press【INPUT】 or Press 【INSPECT】	AdLoAd2 20000	Add weights (weights value must be larger than AloAd1) and waiting for the stable light on, input actual weight value of the weights, eg:20000. At this moment, if press 【←】, it will go back to former modification point.
……	Press【******】 Press【INPUT】 or Press【INSPECT】	AdLoAd* ******	Do calibration on 2,3,4 point, add weights (must be larger than the neighbouring former weights value), waiting for the stable light on, then input actual weights value. If need non-linearity modification, press【INPUT】 enter into step 12 At this moment, if press 【←】, it will go back to former modification point.
11	Press【30000】 Press【INPUT】	AdLoAd5 30000	dd weights (weights value must be larger than AloAd1) and waiting for the stable light on, input actual weight value of the weights, eg:30000.

12	Press【INPUT】 …… …… …… …… …… …… …… …… …… …… …… …… …… ……	A****** L****** LH **** b****** o****** oH **** c****** t****** tH **** d****** U****** 【UH **.** 】 【E ****** 】 【y ****** 】 【yH **.** 】	Display calibration parameter, don't make modification; if no need to look up, press【WEIGH】 to exit weighing mode Instruction: A zero AD code L、LH first-part calibration rate b first-part dividing point AD code; o、oH second-part calibration rate C second-part dividing point AD code; t、tH third-part calibration rate d third-part dividing point AD code; U、UH fourth-part calibration rate E fourth-part dividing point AD code; y、yH fifth-part calibration rate Note: The dividing AD code which haven't done non-linearity modification are digit 999999. eg: if only did one-point calibration, then b、C、d、E are all 999999, which means this indicator has only been made with single-point calibration, the
13	Press【1】 Press【INPUT】	Adr ** Adr 01	Communication Address (01 ~ 26) eg: 1
14	Press【1】 Press【INPUT】	bt * bt 1	Parallel communication baud rate setting (0 ~ 4) Parameter meaning: 0: 600; 1: 1200; 2: 2400 3: 4800; 4: 9600
15	Press【0】 Press【INPUT】	tF * tF 0	Parallel communication mode: 0—Continuous sending 1—Command sending 2—Old D2+ continuous sending 3—D2+300t continuous sending Eg: 0
16		Weighing	Calibration ends

Note 1:

In step 9, press【INSPECT】can realize non-linearity modification, maximum can have 5 added points. If in step 9, press【INPUT】 is one-point calibration. In future, if need for non-linearity modification, user can realize it through non-linearity modification calibration method. For detailed operation, please refer to《Separated calibration - 〈4、non-linearity modification calibration〉》

Note 2:

After calibration adjustment, user can print the relative calibration parameters for saving in case of unexpected situation. (Operation method: press【REPORT】, input【8】【0】, then press 【INPUT】).When doing re-input, please firstly input F value and press twice 【WEIGH】, then press input. On inputing A、L、LH、b、o、oH、C、t、tH、d、U、

UH、E、y、yH parameters, you must input them at one time.

After calibration, please dial the calibration switch below to the non-calibration place.

Note 3:

Under step 8,9,10, when pressing 【WEIGH】 means no carry-out for this step, directly transfer to next step. For other steps, if press 【WEIGH】means exit calibration and return back to weighing model.

Note 4:

Under use, communication address 1～26 is replaced by A～Z ASCII for indicator and PC communication. In communication command, the sending communication address is the corresponding A～Z ASCII. The parameters in step 13,14,15 can also be set up individually. For detailed operation, please refer to Chapter 3)

Chart

C (Adr=)	Address Code			C (Adr=)	Corresponding ASCII		
	Add. code	ACSII			Add. code	ACSII	
		DEC	HEX			DEC	HEX
01	A	41	65	14	N	4E	78
02	B	42	66	15	O	4F	79
03	C	43	67	16	P	50	80
04	D	44	68	17	Q	51	81
05	E	45	69	18	R	52	82
06	F	46	70	19	S	53	83
07	G	47	71	20	T	54	84
08	H	48	72	21	U	55	85
09	I	49	73	22	V	56	86
10	J	4A	74	23	W	57	87
11	K	4B	75	24	X	58	88
12	L	4C	76	25	Y	59	89
13	M	4D	77	26	Z	5A	90

Section 3 correction of calibration error

After finish the calibration, if we find out that the loaded weight is different than the input ted weight so that the weighing lack of accuracy, we can use two method to adjust：

（1）re-weigh the full capacity：no need to unload the weight, repeat the same calibration for the full capacity is ok.

（2）Manually caculate and amend the system adjustment coefficient：Just caculate the coefficient according to the following format, then input it according to table 3.31, you can finish the calibration error adjustment.

$$\text{System CoefficnetE} = \frac{\text{Actual weight}}{\text{Display value}}$$

Example1： one scale actual weight is 29500kg，Input weight is 30000kg（just means we calibrate the weight 29500kg in to 30000 kg），this result in a big mistake of the weighing effect.

Amend the coefficient to adjust the mistake：

1) Calculate the coefficient：

$$E=\frac{29500}{30000}=0.98333$$

2) Input the coefficient according to table 3-3-1:

Table: 3-3-1

Step	Operation	Display	Note
1	Press【Parameter】 Press【Input】	PSt 00	Upward the switch to the calibration position
2	Press【888888】 Press【Input】	c000000 c888888	Input the password Example:888888(Note 3-1-1)
3	Press【5】 Press【Input】	P0 00 P0 05	Input Coefficient code 05 to set the main calibration coefficient example: 05
4	Press【98333】 Press【Input】	E 1.00000 E0.98333	Input the caculated main calibration coefficient For example: 0.98333
5	Press【Weigh】	n*******	Quit after finish the input
6		Weighing mode	

Section 4. password Management

Password management includes three parts:

◆Encrypt operation

◆Password change

◆Password unlock

3.4.1 Encrypt operation and Password change

Password change is for calibration and encrypt. The default password for calibration and other function is "888888", user could change any other password except "000000", operation is as followed table:

step	Operation	Display	Note
1	Press [parameter] Press [20] Press [input]	PSt 00 PSt 20	Input parameter type 20 for change for calibration password
2	Press [input]	o000000 o888888	Input old calibration password 888888

3	Press [1111] Pres [input]	【UP WXYZ】 UP 1111	Input value for encrypt parameter[8]
4	Press [123456] Press [input]	n000000 n123456	Input new password,password can be any no. except 000000
5	Press [123456] Press [input]	r000000 r123456	Reconfirm
6		PASS	Weighing status

!Be sure to keep the calibration password you set. Lost of calibration password will lend no way to calibrate. When the calibration is lost, you could solve as followed:

3.4.2 Password unlock：

◆Step 1, get a temporary unlock code

step	Operation	Display	Note
1	Press [parameter] Press [22] Press [input]	PSt 00 PSt 22	Input parameter type 22 for unlock code view
2	Press [input]	r******	Write down this code
3		Weighing status	

◆Step 2, Forward this code this sales staff, then sales staff could offer you a temporary password with the code you offer

◆Step 3,Calibrate or change the password again with the temporary password.

Chaptor 4 Other operations

4.1 Time Power off

4.1.1 How to set probational days of using

Step	Operation	Display	Note

[8] Four bits for WXYZ,each bit is defined as followed:
W:Test function encypt 0 no 1 yes
X:Parameter setting encrypt 0 no 1 yes
Y:Record delete encrypt 0 no 1 yes
Z: Record check encrypt 0 no 1 yes
Encrypt means before these test, need password or not, password is the same for above 4 and calibration operation

1	Turn the calibration switch to top, Press[parameter] Press [22] Press[Input]	PSt 00 PSt 21	Choose 21 to enter into setting of probational days of using
2	Press [888888] Press[Input]	c000000 c888888	Input old calibration password 888888
3	Press [30] Press[Input]	dAY *** dAY 030	Input probational days 30
4		Weighing status	Setting Finished

4.1.2 Relief and changing method of Time powering off：

1. When using days is more than the setting probational days, Indicator will display 【Err 26】, It can not weigh but all keys still can work. The probational days will reduce day by day by using days and become 0 at this time.
2. If you want to cancel the Time powering off, just set the probational days to 999.
3. You can set the quantity of probational days as you like either before power off or after.

4.2 System testing

XK3190 - DS1 has the function of self-testing for load cell and the indicator which can be convenient to find out the solving method of malfunction.

4.2.1 Check the over loading record

Step	Operation	Display	Note
1	Press 【 test→ 】 Press【888888】 Press 【input】	c000000 c888888	Input the password Original password is "888888"
2	Press 【1】 Press 【input】	tESt 0 tESt 1	Choose the type of testing： Check the over loading record
3	Press 【input】	no 01	Display the serial No. of recorded
4	Press 【input】	d**.**.**	Display the date of over loading
5	Press 【input】	t**.**.**	Display the time of over loading
6	Press 【input】	o******	Display the weight of over loading
7	Press 【input】	no 02	Display the next record
……	……	……	……
8	Press 【input】	End	Display of record is over

4.2.2 Testing of printing with Micro-printer

Step	Operation	Display	Note
1	Press【 test→ 】 Press【888888】 Press 【input】	c000000 c888888	Input the password Original password is "888888"
2	Press 【2】 Press 【input】	tESt 0 tESt 2	Choose the type of testing: Testing of printing with Micro-printer
3	Press 【input】	Prnt	Print the testing paper of micro-printer

4.2.3 Testing of E²PROM（AT24256）

Step	Operation	Display	Note
1	Press【 test→ 】 Press【888888】 Press 【input】	c000000 c888888	Input the password Original password is "888888"
2	Press 【3】 Press 【input】	tESt 0 tESt 3	Choose the type of testing: Testing of E²PROM（AT24256）
3	Press 【4256】 Press 【input】	EE 0000 EE 4256	Input the password 4256 of testing of E²PROM
4		tEE 000	Testing start
5		tEE 001	In testing, pls wait.
……		……	……
……		tEE 127	Testing finished
……		PASS （Err ***）	The chip is very well if display "PASS" The chip is broken if display"ERR ***"
……			Back to weighing status after waiting for 5 second. Testing finished.

4.2.4 Check the verifying code of indicator program

Step	Operation	Display	Note
1	Press【 test→ 】 Press【888888】 Press 【input】	c000000 c888888	Input the password Original password is "888888"
2	Press 【4】 Press 【input】	tESt 0 tESt 4	Choose the type of testing: Check the verifying code of indicator program
3	Press 【input】	Pc ****	Display verifying code of the indicator program
4	Press 【input】	******	Display revised code
5		Weighing mode	Back to weighing status. Testing finished

Chapter 5 Examples on the Installation & Test

Example 1: **The installation of the truck scales which using 8 pcs HBM load cells**

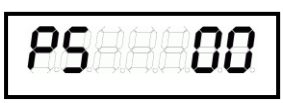
A、Prerаration: We can check the baud rate, the filter intensity and scan the load cells address by the software which's combined with the HBM load cell. We set the baud rate to be "9600" and the filter intensity at least 0.5Hz. Take note of the addresses of the load cells. Then we can start the installation. If we don't have PC or the HBM software, but we know the baud rate of the load cell, we can also adjust the load cells as follow steps. Because we can not change the filter intensity of the load cells by the indicator, we can only set the filter intensity of the indicator to be zero when we feel the load cells react slowly.

1、 Set the load cell type:

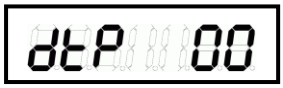
Open the calibration switch, turn on the power. Press【Parameter】key when the self-inspection is over. The indicator displays:

Press【5】for the load cell setting. Press【Input】to confirm.

Indicator displays:



Press【Input】to confirm, and enter the load cell type setting mode. Indicator displays:



If it's the HBM's load cell, we input"1" and press【Input】to confirm.

Press【Weigh】to quite.

2、 Check the address of the load cells：

Connect the load cell with the indicator (See Chapter2). Open the calibration switch, and turn on the power. Wait until the self-inspection is over

Note: The connection between load cells and the indicator must be right. Otherwise, the load cells or the indicator may broke.

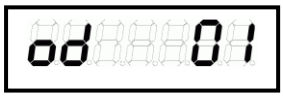
Press【F1】, the indicator displays：

Input the calibration password, for example "888888". Press【Input】to confirm.

The indicator displays:

Press【Input】to check the address a single load cell.

The indicator displays the address of the laod cell. For example, if the address is 1, the indicator displays:



If we want to change the address for the load cell，just input the new address, and press【Input】 to confirm. The the indicator displays the innwe code of the load cell：

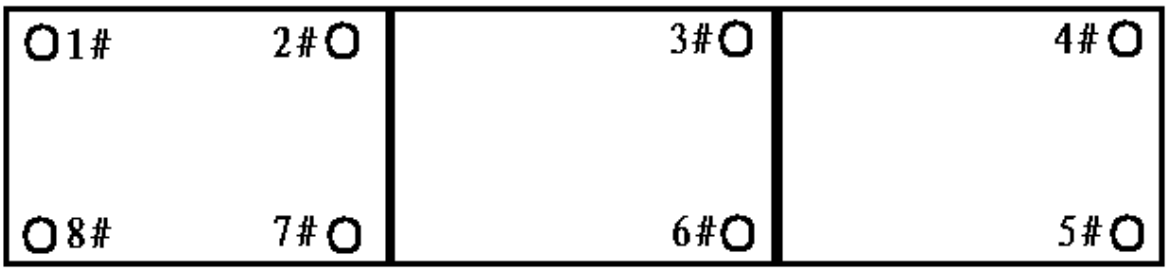
Here we can press the load cell. If the inner code changes, the load cell address is right. We take a note of the address, and mark the address on the load cell.

Change another load cell, and repeat the above steps until every load cell's address is noted.

Note: Every load cell must have an exclusive address.

B. Installation of the platform and the laod cells

1. Before the installation, make sure the platform is horizontal, and the foundation is strong enough.
2. Put the platform with the load cells on the foundation. Make sure every load cell is in the correct position to ensure an equal pressure. Here we should take down the locations of the load cells and make marks on the platform.. Besides, we'd better to install the load cells orderly by the address. As the below illustration:



a) Connect the 8 load cells to the junction box in parallel mode, and connect the junction box with the indicator. Pay attention to the connection, wrong connection may cause damage to both load cells and the indicator.

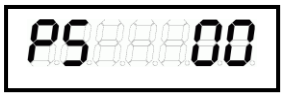
b) **Load cell setting**: Make sure the connection is correct, and turn on the indicator. If the load cel's setting is not right, the indicator will display "Err 41" after self-inspection. We can set the load cells in the two ways below:

1)Manual setting:

a) Turn on the calibration switch of the indicator, press【Parameter】. Indicator displays:

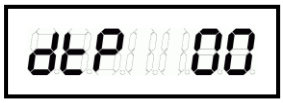
Type in the calibration password, such as the default password "888888". Press 【Input】to confirm.

b)Indicator enters the function selecting mode, and displays:



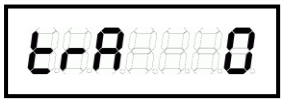
Press【Input】to confirm

c)Indicator enters load cell type selecting mode, and displays:



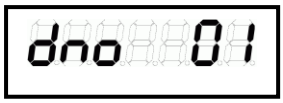
When we connect HBM load cell, we shoud type in"1", and press【Input】to confirm

d)Indicator enters working mode selection, and displays:



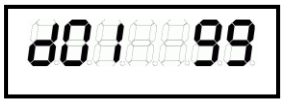
We just press【Input】to confirm as the truck scale indicator

e)Indicator enters the load cell quantity setting mode, and displays:



When we connect 8 load cells，we type in"8", and press【Input】to confirm.

f)Indicator enters the address setting for the 1st angle position load cell, and displays:



If indicator displays"99", it means no load cell at this angle position. Suppose we set the first angle position to be 1#（Communication address is 1）, we type in "1", and press【Input】to confirm.

g) Set the 2nd angle position. Indicator displays:

Suppose we set the 2nd angle position to be 2#（Communication address is 2）, wetypein"2", and press【Input】to confirm.

h) Repeat Step"g", and finish the setting for 3# to 8#.

2)Auto-setting:

a) Turn on the calibration switch of the indicator, and press【F1】.Indicator displays:

Type in the calibration password, such as the default password "888888". Press【Input】to confirm.

b) Indicator enters operation function selecting mode, and display:

Type in"1" (Selecting the auto setting mode) , press【Input】to confirm

c)Indicator display:

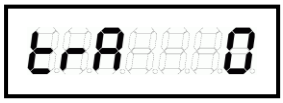
……

The indicator begins to scan. After confirmed the load cell brand, load cell quantity, and the load cell address of every angle position,

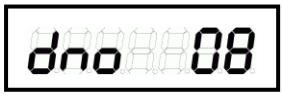
indicator displays::

Type in"1"to confirm, and then the indicator will display the scan result: Load cell type: 01 (HBM)

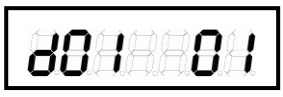
Press【Input】. The indicator will display the working mode(The default working mode is truck scale indicator)



Press【Input】. The indicator will display the load cell quantity：08（8 load cells）



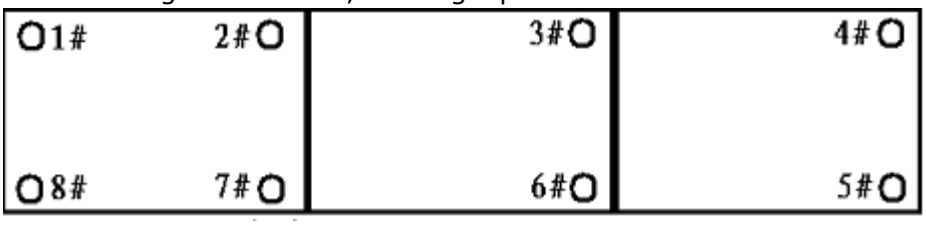
Press【Input】. The indicator will display the address of the 1st angle position：1#(communication address 01）



Press【Input】to check the address of the other angle positions：2#（communication address 02），3#（communication address 03 ） …… 8#(communication 08)：

If the parameter displayed is different with the actual ones. For example, the quantity of the load cells is not correctly displayed on the indicator. Then we need check the load cells connection.

If the settings are correct, the angle positions should be like：



5-2

c)Press【Weigh】to return to the weighing mode. There should be a stable result on the indicator, and when we add load, the displayed weight should change correspondingly. If the displayed weight is not stable or displays"Err 4*", There might be problem with the load cell parameter setting.We should recheck and modify the parameters. When everything is settled, we should save the parameters for backup.

d)Check the settings by the inner code of the load cells

①First we do a simple calibration (see Chapter 3〈Calibration〉) . Then we drive the full load truck onto the scale to test if the foundation is solid, and stable. Then we check if the scale returns zero when no load on. If not, we need recheck the foundation and the installation of the load cells.

②Check the inner code when no load on the scale. Take table 5-2 for example, a good installation would meet all the three conditions below：

1) The inner code of 1# and 8# should be similar. The same also goes for 2# and 7#, 3# and 6#, 4# and 5# (The inner code difference should be within 20%. The smaller, the better)

2) The inner code of 1#, 4#, 5#, and 8# should be similar. And the inner code of 2#, 3#, 6# and 7# should be similar.

3) The inner code of 2#, 3#, 6#, and 7# should be around as much as twice than the inner code of 1#, 4#, 5# and 8#.

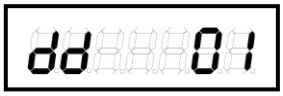
Ortherwise, the platform or the load cells may be not plain, and the pressure is not equivalent. We should recheck, and modify.

Operation：

a) Press【Test】. Indicator displays:

Press【Input】 to choose to check the inner code.

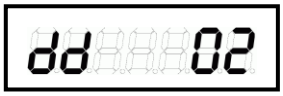
b) Indicator displays the angle position we check. The default position is angle position 1:



Press【input】to ckech the inner code of the load cell at position 1:

Record this figure, and press【Input】to continue with the next position.

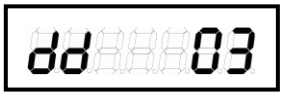
c) Indicator displays the angle position we check: Position 2



Press【Input】to ckech the inner code of the load cell at position 2

Record this figure, and press【Input】to continue with the next position.

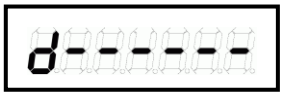
d) Indicator displays the angle position we check: Position 3



Press【Input】to ckech the inner code of the load cell at position 2:

Record this figure, and press【Input】to continue with the next position

e) Press【Input】to continue the check, and record all the result. If any load cell's inner code is changing very fast, or the indicator displays as below. Then this load cell has connection problem.



f) If all the connections and are done. We can check the scale according to the three principles we mentioned above. For example: 1#: 67890; 2#: 125680; 3#: 134754; 4#: 70230; 5#: 65423; 6#: 130982; 7#: 12890; 8#: 60642. Then we know the scale is plain and the load cells are well installed.

3. Angles adjustment:

We can start the angles adjustment after we confirm the scale is plain, and the load cells are well installed. We have two methods to do the angle adjustment:

A.Manual adjustment:

a) Press【Parameter】, when indicator displays"PSt 00", we type in"28", and Press

【Input】to confirm. Then the indicator will display the inner code.

Note: This inner code is not one certain load cell's inner code, but the inner code of the whole weight.

b) Add one load (1/3～1/10 of the F.S.) on the 8 angle positions one by one, and record the result.

c) Figure out the adjustment parameter as the formular below:

$$\text{Adjustment Parameter} = 1 - \frac{\frac{\text{Actual Weight}}{d} \times 20 - \text{Inner Code}}{\frac{\text{Actual Weight}}{d} \times 1.5}$$

Example: We use 10t load, and set the division to be 20kg. The result from the 8 angles is below:

1#: 10025, 2#: 10010, 3#: 9990, 4#: 9995, 5#: 10009

6#: 9992, 7#: 10014, 8#: 9989

Then we figure out the parameter adjustment (save 5 decimals) :

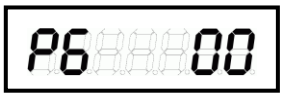
1#: 0.99833 , 2#: 0.99933 , 3#: 1.00067 , 4#: 1.00033

5#: 0.99940 , 6#: 1.00053 , 7#: 0.99907 , 8#: 1.00073

d)Type in the adjustment parameter:

⑴Press【Parameter】, When the indicator displays"PSt 00", type in "28". Press 【Input】to confirm.Then the indicator will display the inner code.

⑵Press【Parameter】, When the indicator displays"PSt 00", type in "6". Press 【Input】. Indicator displays:



Press【Input】to confirm

⑶Indicator displays:

Type in the adjustment parameter for the angle position1: Type in"99833", and Press【Input】to confirm.

Indicator displays:

Then we input the adjustment for the angle position2: Type in"99933", and Press 【Input】to confirm

⑷Set the adjustment parameter for angle position 3# to 8# like the step (3)

⑸When all the adjustment parameters are set, press【Weigh】to quit, and the indicator returns to the inner code display mode. Add the load to every angle

position again. If the difference between the displayed inner code and the standard inner code is less than 5, we can finish the angle adjustment.

Note: Standard inner code

$$\text{Standard inner code} = \frac{\text{Actual Weight} \times 20}{d}$$

For example, when we are using 10t load, then the standard inner code should be: 10000×20÷20＝10000

B.Auto adjustment:

Press【Parameter】, when indicator displays"PSt 00", we type in"28", and Press【Input】to confirm. Then the indicator will display the inner code.

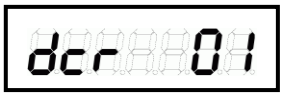
Note:This inner code is not one certain load cell's inner code, but the inner code of the whole weight.

Chose a certain angle position,such as 1#. Add weight onto this angle (1/3～1/10 F.S.) . Press【F1】. When indicator diaplays"c000000", type in the calibration password, and press【Input】to confirm

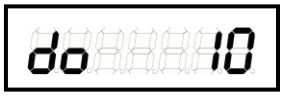
a) Indicator displays:

Press"2", choose the auto adjustment mode, and press【Input】to confirm.

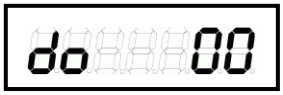
b) Indicator displays:



When the scale is stable, Press【Input】to confirm. Then the indicator will collect the result and start the countdown:

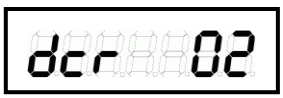


……

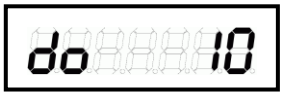


When countdown is over, the indicator will continue with the next angle position automatically.

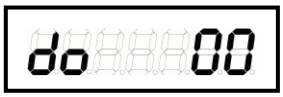
c) Indicator displays:



Add weight onto 2# angle position. When the scale is stable, Press【Input】to confirm. Then the indicator will collect the result and start the countdown:



……



When countdown is over, the indicator will continue with the next angle position automatically.

d) Add weight on every angle position one by one, and read the inner code. If the difference between the displayed inner code and the standard inner code is within 5, we can finish the angle adjustment. Otherwise, we can ajdust the problemed angle manually.

Note: When the indicator starts the countdown and begins collecting the result, the load on the scale must be stable. Otherwise, we need to do the adjustment for this angle position again (See 3-1-5 of this manual)

4. Calibration: See the 3 Chapter of this manual.

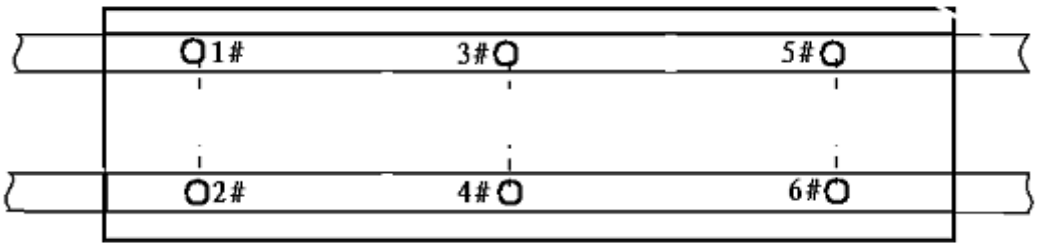
5.

Example 2: The installation and adjustment of the truck scale with 6 pcs HBM load cells.

A、Preparation: The same as example 1

B、The installation of the platform and the load cells:

a) The installation is similar with Example 1. In order to a convenient adjustment, we suggest such load cells collocation:



5-3

b) When we set the parameters for the load cells, set "1" for parameter "trA" which means rail weighing mode. Other settings are the same as Example 1.

C、Angle adjustment:

When at the rail weighing mode, we adjust the angle by group. Take 5-3 load cells collocation for example, 1# and 2# is a group, 3# and 4# is a group, 5# and 6# is a group. The adjustment method is similar to Example 1.

Note: At rail weighing mode, the adjustment parameter is also cauculated by the the errors of one group of angles. This means the adjustment parameter of 1# and 2#, 3# and 4#, 5# and 6# should be the same. When we do the auto-adjustment, we only need to test on the 3 angle groups, not on every load cells.

D、Calibration. See Chapter 3, section 2.