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Service manual
Counting scales

KERN CXB

Version 1.3
4/2009
GB

CXB-SH-e-0913

GB

KERN CXB

Version 1.3 4/2009

Service manual

Counting scales

Table of Contents

1 Basic information

Grundlegende Hinweise

The device must be repaired only by trained specialist staff or personnel with professional formation (such as a repair-specialist accredited by law concerning verification).

The service manual is obligatory for repair work.

After repair, original conditions of the device have to be restored.

Only original spare parts should be used.

Instructions about conformity-evaluated scales:

Repair must be carried only at 100% compliance with the type approval.
A violation of this specification will result in a loss of the type approval!

After successful repair the balance will have to be reverified before it can be used again in a statutorily regulated field.

Das Gerät darf nur von geschultem oder beruflich ausgebildetem Fachpersonal (z. B. eichrechtlich anerkannter Instandsetzer) repariert werden.

Die Serviceanleitung ist bindend für Reparaturen.

Das Gerät muss nach erfolgter Reparatur wieder in den Originalzustand zurückversetzt werden.

Es dürfen nur Originalersatzteile verwendet werden.

Hinweis zu konformitätsbewerteten Waagen:

Reparatur darf nur in 100% -iger Übereinstimmung mit der Bauartzulassung erfolgen. Ein Verstoß gegen diese Vorgabe führt zum Erlöschen der Bauartzulassung!

Nach erfolgreicher Reparatur muss eine Nacheichung erfolgen, um die Waage wieder im gesetzlich geregelten Bereich verwenden zu können.

2 Introduction

1. There are 3 ways to rectify the linearity for setting the temperature calibration, which can make the scale more accurate.
   ❶ Inside air temperature (normal temperature)
   ❷ High temperature
   ❸ Low temperature
   ♦ It is adequate to only do the inside air temperature calibration. Upon the customer's request, we also offer the high temperature and low temperature calibration as well.
2. Sampling speed is also depended on the user's need (01~05).
3. Linearity calibration, capacity setting and temperature calibration can be set separately.
4. Weighing unit: **g** or **kg** (depending on model)
5. Tare range is full range tare.

3 General Information

1. The newly manufactured scale without passing the calibration and setting process will automatically enter the linearity calibration mode. After the linearity calibration procedure is done, the program will automatically enter the Specification Setting Mode.

2. **Zero Range**
   The internal value should be in between 120,000~250,000 with the platter on and without any load (check → see chapter 10 "Spec. calibration")

3. **Maximum Capacity**
   The internal value should be over 300,000 when the scale is fully loaded.

4. When rubbing the tetragon, the inaccuracy value should be smaller than 10 divisions.

5. Tare range is full range tare.

4 Error messages

Non-approval models:

E1 ⇒ ZERO over 300,000 internal value.

E2 ⇒ ZERO below 10,000 internal value.

Approval models:

E1 ⇒ ZERO over the zero position in weight calibration + 10% of full scale.

E2 ⇒ ZERO over the zero position in weight calibration - 10% of full scale.

All models:

E4 ⇒ ZERO is unstable.

E5 ⇒ Turning on machine core value is under 0.

E6 ⇒ Core value is over 250,000.

E7 ⇒ Core value is below 120,000.

- - OL - ⇒ The weighing range is exceeded.

NOTES:

- **Non-approval models (CXB)**: After E1, E2 or E4 is displayed press 

to continue.
- **Approval models (CXB-M)**: After E1, E2 or E4 appear, set the jumper SWA1 on main board to “ADJ” position and press 

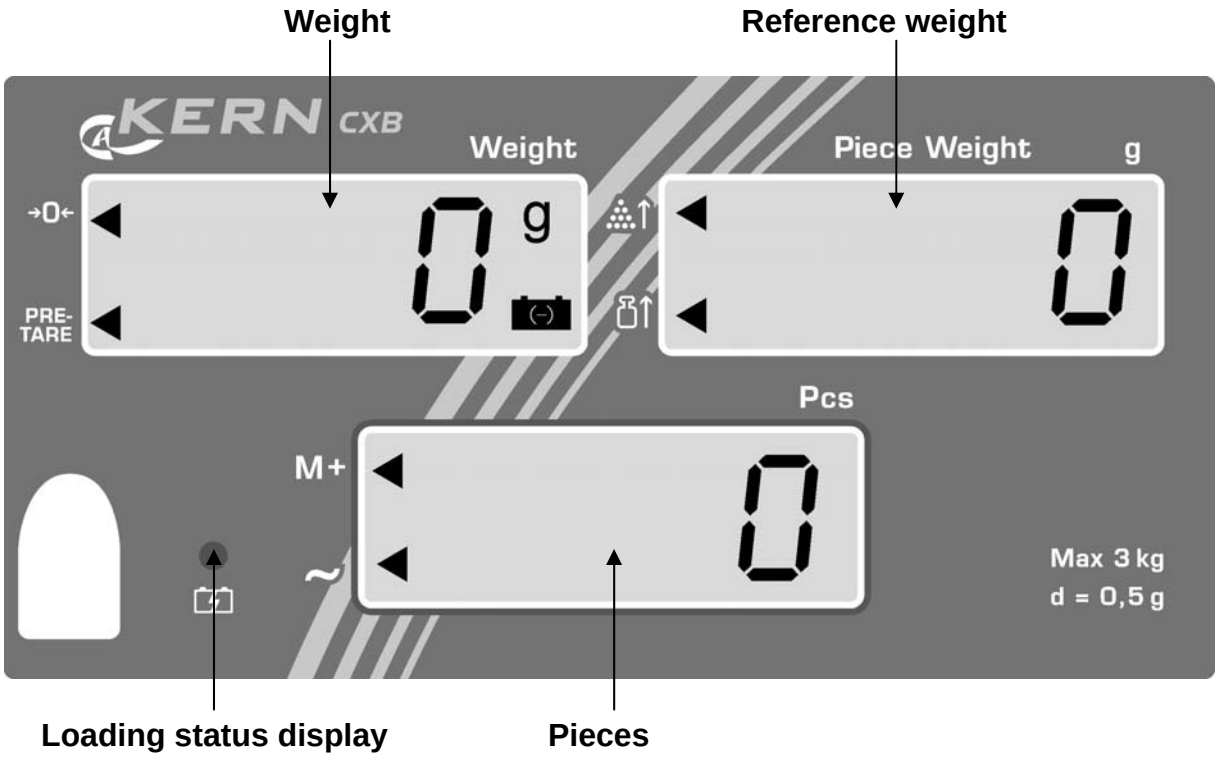
to return the counting mode.

  Then press  +

+ 

at the same time followed by pressing  to access calibration (see chap. 7.3).

5 Explanation of display



5.1 Symbol indicator “◀”

Display weight

Here, the weight of your goods is displayed.

Overlay ◀ indicates:

→0←	Zeroing display
PRE-TARE	Tare in memory
	Battery very low

Display reference weight

The reference weight of a sample is shown here. This value is either entered by user of calculated by balance.

Overlay ◀ indicates:

	Placed number of pieces insufficient for reference calculation
	Placed reference weight insufficient for reference calculation

Display quantity

Here, all the parts placed on balance are immediately displayed by number.

Overlay ◀ indicates:

M+	Data in summation memory
	Stability display

Battery charge status display

red	Battery is almost discharged
green	Battery is completely discharged

6 Explanation of keyboard

Choice	Function
1 - 9	• Number keys
CE	• Delete key
	• Call counting with tolerance control
	• Store reference weights in memory • Call stored reference weights
M+	• Addition in total memory • Call up total memory
MC	• Delete summation memory
REF	• Enter reference weight through weighing • Display reference weight stored last • Enter target number of pieces
REF	• Numeric entry reference weight • Display reference weight stored last • Enter target weight
→0←	• Zeroing key • Back to weighing mode
(PRE-) TARE	• Taring key • Enter numerical tare

7 External calibration

7.1 Calibration of non-approval models (CXB)

- ♦ Before calibrating, adjust the mini jumper SWA1 to “ADJ” position (see chap. 8)
- ♦ Observe stable environmental conditions. A warming up time of 30 minutes is required for stabilization.

Operation
Ensure that there are no objects on the weighing plate.    Press the · key and keep it pressed down whilst simultaneously operating the key
Weight value of calibration weight is flashing on display. However, you may enter a value of your choice via the number keys. * 
Carefully place calibration weight in the centre of the weighing plate. Calibration will be carried out automatically after dead stop control. Remove calibration weight during count down to zero. The balance returns automatically into weighing mode. An error message will appear on the display should a calibration error occur or should the calibration weight be incorrect. Turn balance off, then restart it and repeat the calibration process.

* The calibration should be made with the recommended calibration weight (see chap. 1 "Technical data" in the operating manual).

Note
Use the CE key to exit calibration mode. The balance returns to weighing mode.

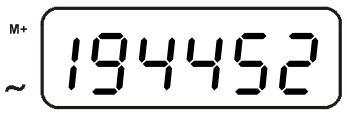
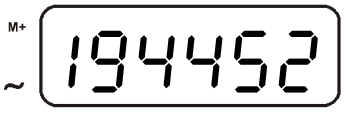
7.2 Back to the original value of calibration
(only non-approval models)

❶ Press and hold CE key followed by pressing key until the scale is counting backward to zero, then release it.

❷ The scale will show the original value, which is the value setting at the factory.

7.3 Calibration of approval models (CXB-M)

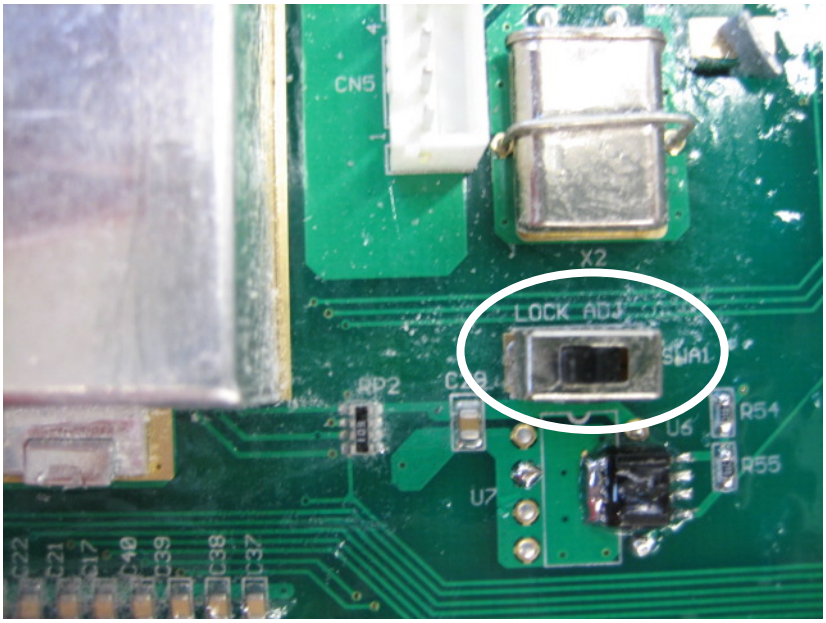
- ♦ Before calibrating, adjust the mini jumper SWA1 to “ADJ” position (see chap. 8)
- ♦ Observe stable environmental conditions. A warming up time of 30 minutes is required for stabilization.

Operation		
Ensure that there are no objects on the weighing plate. ⇨ Press  + **1** + **5** keys ⇨ Press  key		
The display shows:		
		 (Example)
⇨ Press  key		
The display shows:		
 (Example)		
Weight value of calibration weight is flashing on display.		
⇨ Carefully place calibration weight in the centre of the weighing plate.		
⇨ Press  key		
Calibration will be carried out automatically after dead stop control. ⇨ Remove calibration weight during count down to zero. The balance returns automatically into weighing mode. An error message will appear on the display should a calibration error occur or should the calibration weight be incorrect. Turn balance off, then restart it and repeat the calibration process.		

* The calibration should be made with the recommended calibration weight (see chap. 1 "Technical data" in the operating manual).

8 Service mode access

- Access to the service mode is controlled by jumper SWA1 on the main PCB. The jumper has two positions LOCK, which prevents access to the service mode and ADJ, which allows access to the calibration and configuration routines.
- SWA 1 jumper is located adjacent to the RF screening cover of the main PCB.



- Place your balance upside down and remove seal/cap. For calibration and configuration routines the jumper “SWA1” must be set to position “ADJ”.

Sealing mark / unlocking switch

Position of unlocking switch	**Status**
To the right	Unlock the balance for calibration process (ADJ)
To the left	Verification position - calibration locked (LOCK)

9 Linearity calibration

♦ **Before calibrating, please adjust the mini jumper SWA1 to "ADJ" position.**

♦ **After finish the calibration, please re-adjust the mini jumper SWA1 to "LOCK" position.**

⊙ **Divide the capacity into 5 sections before linearity calibration.**

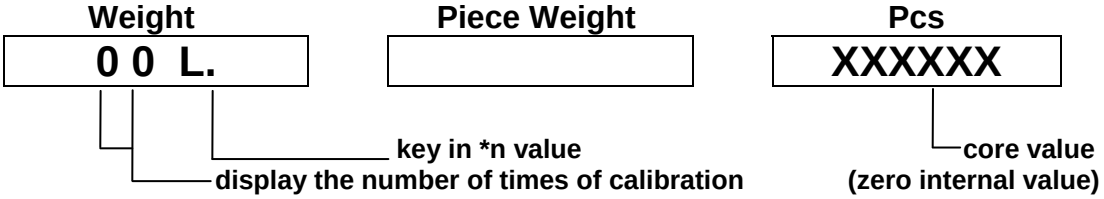
E.g. CXB 30K2 (capacity = 30kg)

Divide it into 5 phases: 3kg, 6kg, 12kg, 12kg, 3kg

(The total calibrated weight should be between **1.1~1.25 times** of the capacity weight. E.g.: 3kg + 6kg + 12kg + 12kg + 3kg = 36kg are 1.2 times of 30kg)

❶ Turn on the machine, after the scale resets back to zero,

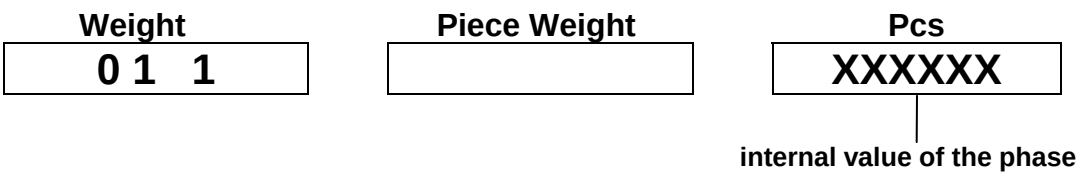
then press key + [1] key + [6] key (at the same time) to enter the linearity calibration mode. (Please press [9] key to pass over this linearity calibration mode.)



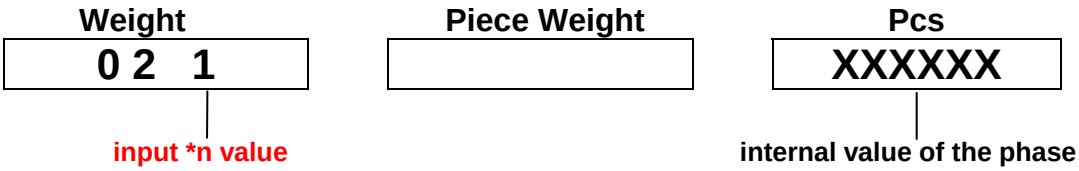
♦ *n = the calibrated value of phase X / the calibrated value of 1st phase
[*n = multiplier (2,3,4…) of 1st calibration weight / 1st phase]

♦ *n ⇒ must be an integral

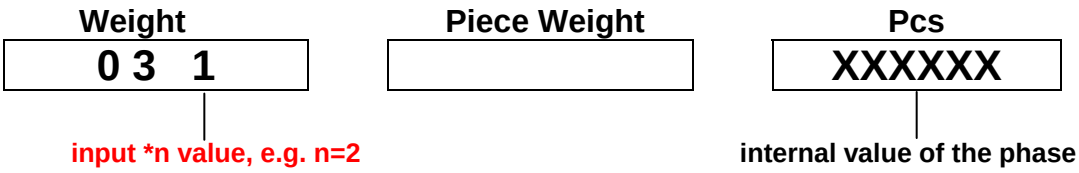
❷ Press [.] key



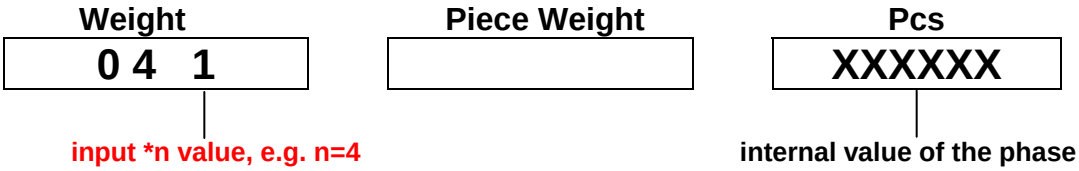
❸ Put the 1st weight mass (e.g. weight mass=3kg, *n=1), then press [.] key



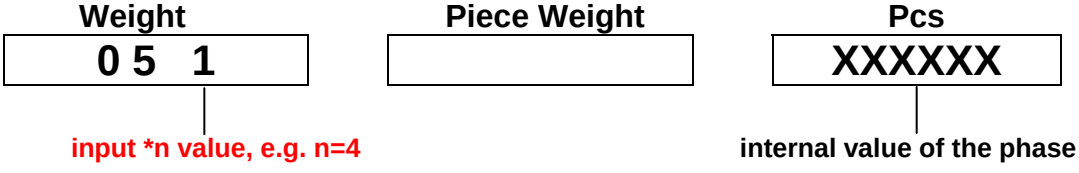
❹ Add the 2nd weight mass (e.g. 6kg, in sum 9kg) and input *n value (e.g. *n=2), then press [.] key



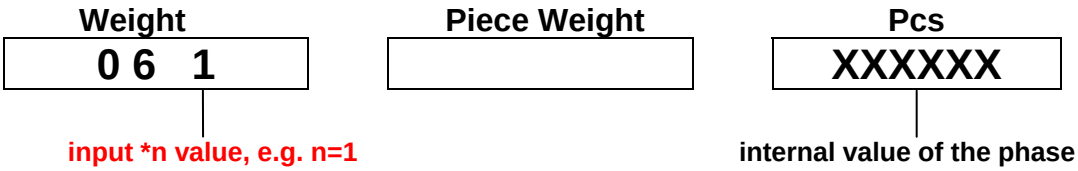
❺ Add the 3rd weight mass (e.g. 12kg, in sum 21kg) and input *n value (e.g. *n=4), then press [.] key



❻ Add the 4th weight mass (e.g. 12kg, in sum 33kg) and input *n value (e.g. *n=4), then press [.] key



❼ Add the 5th weight mass (e.g. 3kg, in sum 36kg) and input *n value (e.g. *n=1), then press [.] key



input *n value, e.g. n=1

internal value of the phase

❽ Press key (“CONFIRM” key), the buzzer beeps once

❾ Remove all the weight mass, the scale will reset back to zero automatically, then the procedures finished.

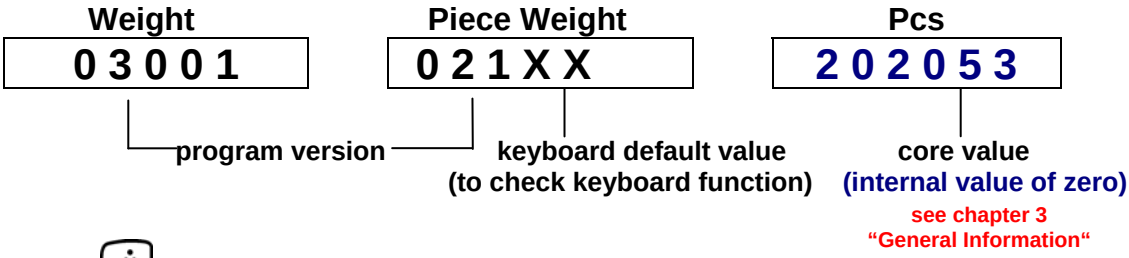
10 Spec. calibration

♦ **Before calibrating, please adjust the mini jumper SWA1 to "ADJ" position.**

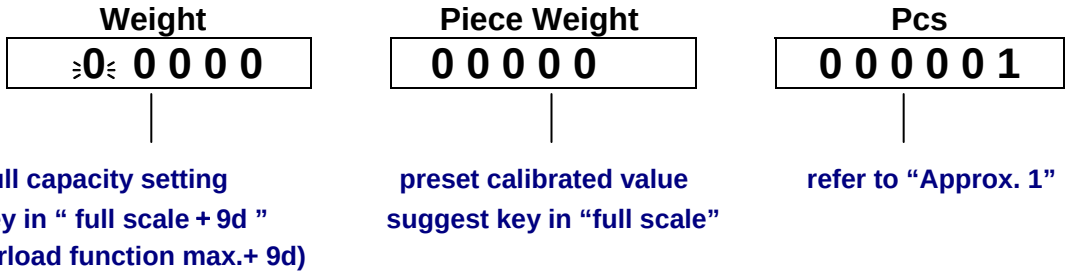
♦ **After finish the calibration, please re-adjust the mini jumper SWA1 to "LOCK" position.**

❶ Turn on the machine, after the scale resets back to zero,

then press [⏻] key + [1] key + [7] key (at the same time) to enter the spec. calibration mode.



❷ Press [→0←] key



Approx. 1: **0 0 0 0 0 1**
a b c d e

a ⇒ input the division [1] **= e.g. 1g / 10g** [2] **= e.g. 0,2g / 2g** [5] **= e.g. 0,5g / 5g**

b ⇒ input the decimal point [0] **= e.g. 1g** [1] **= e.g. 0,2g**
[2] **= e.g. 0,01kg** [3] **= e.g. 0,001kg**

c ⇒ input the unit of the unit weight 0, 1, 2, 8, 9 (full capacity are 10^n of division)
[0] = 10^0 (x 1) » CXB 15K1 / CXB 30K2
1 = 10^1 (x 10)
2 = 10^2 (x 100)
8 = 10^{-2} (x 0.01)
[9] = 10^{-1} (x 0.1) » CXB 3K0.2 / CXB 6K0.5

Example: CXB 3K0.2 **a**= [2.]
value of **a** x 10^n = Readout → 2 x 10^{-1} = 0,2g → **c**= 9

d ⇒ define the keyboard function of [⏻] **;** [kg/lb] **;** [PST CE] keys **(use always [1])**
0 = PST CE, unit weight in kg
[1] **= 10 preset, unit weight in kg** (OIML approval model)
2 = kg/lb (1st unit = kg, 2nd unit = lb)
3 = 10 preset, kg/lb (1st unit kg, 2nd unit lb)
4 = PST CE, lb unit only
5 = 10 preset, lb unit only
6 = lb/kg (1st unit lb, 2nd unit kg)
7 = 10 preset, lb/kg (1st unit lb, 2nd unit kg)

e ⇒ different versions of models setting
0 = Non-approval model (External calibration is applicable)
1 = OIML approval model (The display resolution should be set at 1/3000, External calibration is NOT applicable)
4 = Non-approval model (External calibration is NOT applicable)

❸ After input spec., press  key (not necessary to put the weight mass on the platter, the calibrated weight value is the reference for the temperature calibration procedure).

♦ The scale will be self-tested and reset back to zero.

Press  key + **1** key + **5** key, then press  key to enter the temperature calibration mode (see chapter 11).

NOTES:

(1) The last number of full capacity value must be variable number, can be fixed “0”.

(2) The digit and location of preset calibrated value, refer to the location of capacity digit.

(3) Input capacity + 9d in order to run 9 times overload function.

(4) If max. number of digit is “0”, please input “0”.

(5) Reference values for capacity setting see chapter 10.1.

10.1 Reference values for capacity setting

⚠ Weighing unit – **g** –

	Weight	Piece Weight	Pcs
CXB 3K0.2	3 0 0 1 8	3 0 0 0 0	2 1 9 1 0 (1)
CXB 6K0.5	6 0 0 4 5	6 0 0 0 0	5 1 9 1 0 (1)
CXB 15K1	1 5 0 0 9	1 5 0 0 0	1 0 0 1 0 (1)
CXB 30K2	3 0 0 1 8	3 0 0 0 0	2 0 0 1 0 (1)
CXB 3K1M	3 0 0 1 8	3 0 0 0 0	1 0 0 1 1 (1)
CXB 6K2M	6 0 0 4 5	6 0 0 0 0	2 0 0 1 1 (1)

⚠ Weighing unit – **kg** –

	Weight	Piece Weight	Pcs
CXB 15K1	1 5 0 0 9	1 5 0 0 0	1 3 0 1 0 (1)
CXB 30K2	3 0 0 1 8	3 0 0 0 0	2 3 0 1 0 (1)
CXB 3K1M	0 3 0 0 9	0 3 0 0 0	1 3 0 1 1 (1)
CXB 6K2M	0 6 0 1 8	0 6 0 0 0	2 3 0 1 1 (1)
CXB 15K5M	1 5 0 4 5	1 5 0 0 0	5 3 0 1 1 (1)
CXB 30K10M	0 3 0 0 9	0 3 0 0 0	1 2 0 1 1 (1)

11 Temperature calibration

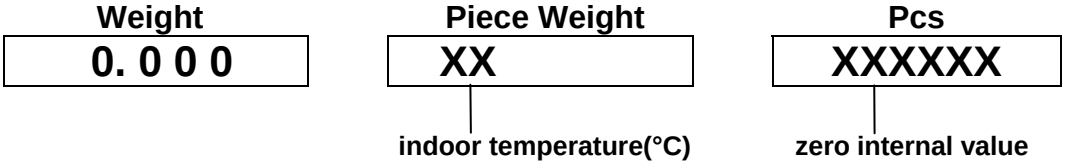
♦ Before calibrating, please adjust the mini jumper SWA1 to "ADJ" position.

♦ After finish the calibration, please re-adjust the mini jumper SWA1 to "LOCK" position.

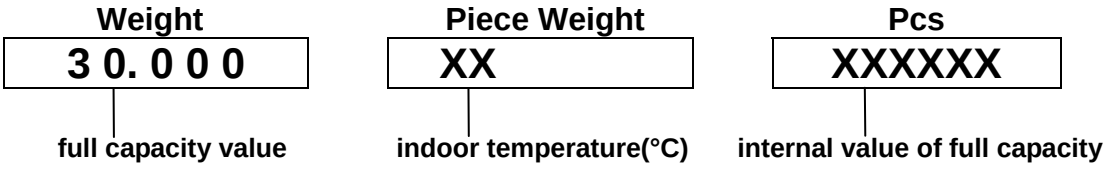
11.1 Indoor air (normal) temperature calibration

❶ * The scale will be self-tested and reset back to zero.

Press key + [1] key + [5] key, then press key to enter the temperature calibration mode.



❷ No weight on the platter, press [.] key to calibrate zero.



❸ Put the full capacity weight on the platter, press [.] key to calibrate full capacity value.

❹ After scale is stable, it will reset back to zero automatically (remove the weight mass from the platter before it resets back to zero), then the procedures finished. Put the weight mass on the platter again to check if the display shows the accurate weight. If it's correct, turn off the power, then re-adjust the mini jumper SWA1 to "LOCK" position.

NOTES:

(1) The procedures are for the scale without the temperature IC or for the scale in the normal temperature environment.

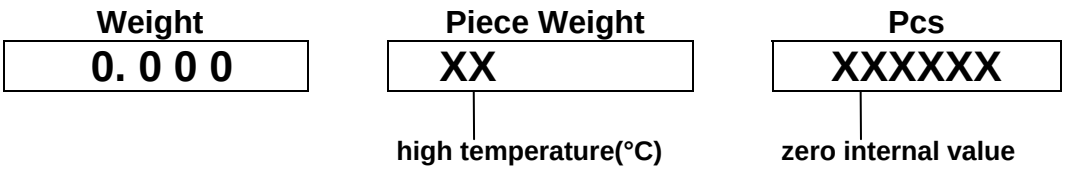
(2) To achieve the accuracy of the scale, please run the high temperature and low temperature calibration procedures.

(3) The procedures for high temperature and low temperature are totally reversed.

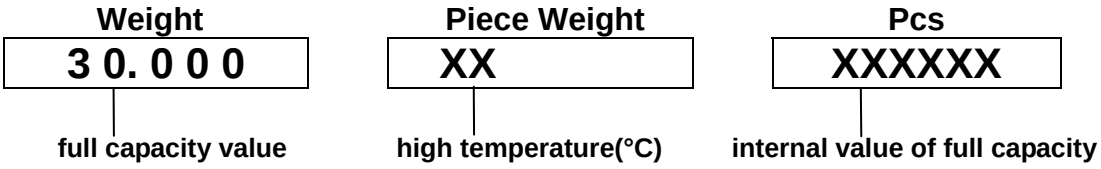
11.2 High temperature calibration

⇒ scales must be in the temperature lab chamber

❶ Press key + 1 key + 5 key, then press key to enter the temperature calibration mode



❷ No weight on the platter, press . key to calibrate zero



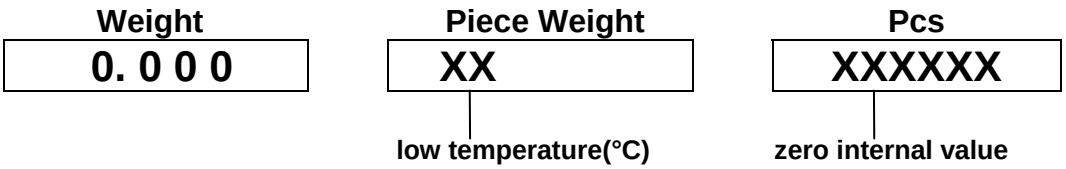
❸ Put the full capacity weight on the platter, press . key to calibrate full capacity value.

❹ After scale is stable, it will reset back to zero automatically (remove the weight mass from the platter before it resets back to zero), then the procedures finished. Put the weight mass on the platter again to check if the display showing the accurate weight. If it's correct, turn off the power, then re-adjust the mini jumper SWA1 to "LOCK" position.

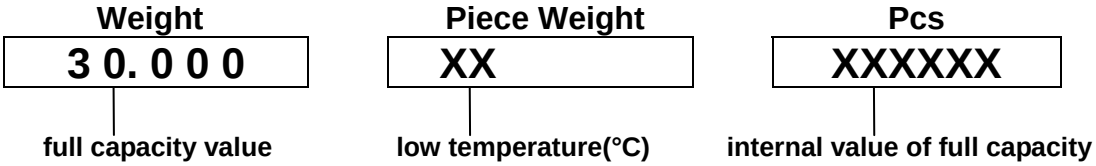
11.3 Low temperature calibration

⇒ scales must be in the control room of low temperature

❶ Press key + 1 key + 5 key, then press key to enter the temperature calibration mode



❷ No weight on the platter, press . key to calibrate zero

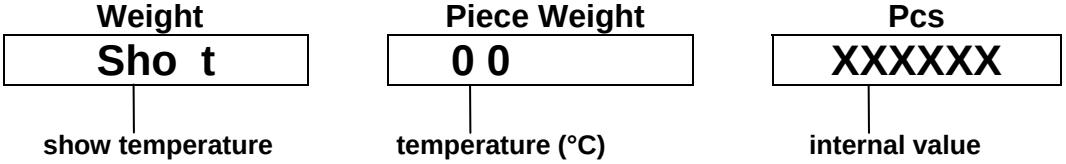


❸ Put the full capacity weight on the platter, press . key to calibrate full capacity value.

❹ After scale is stable, it will reset back to zero automatically (remove the weight mass from the platter before it resets back to zero), then the procedures finished. Put the weight mass on the platter again to check if the display showing the accurate weight. If it's correct, turn off the power, then re-adjust the mini jumper SWA1 to "LOCK" position.

11.4 Check / Delete temperature calibration data

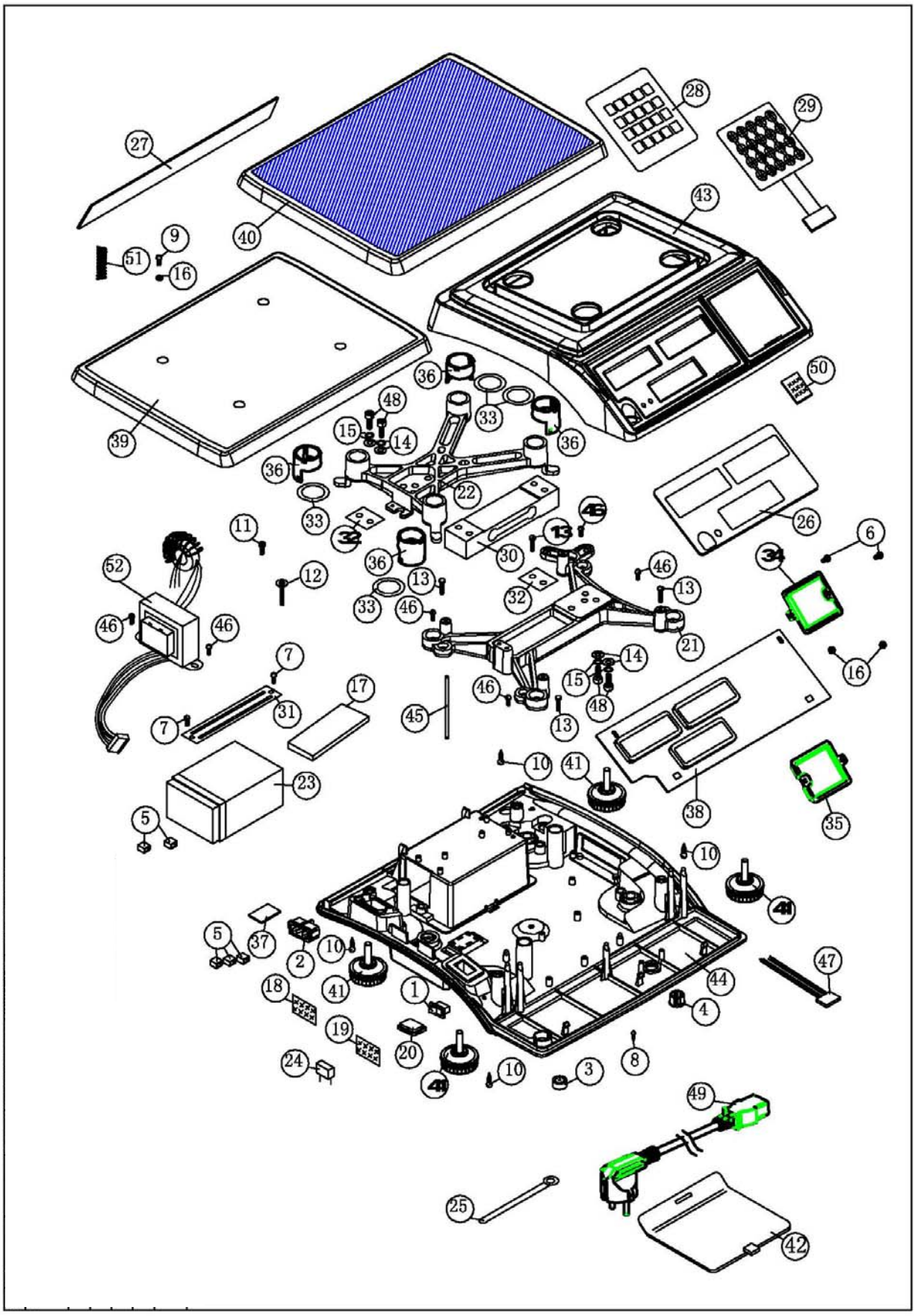
❶ Press key + 1 key + 5 key



❷ Press 2 or 8 key to check the temperature calibration data.

❸ Press 2 or 8 key to select the desirable data, and double-press . key to delete it.

12 Spare parts



No.	Description	Q'ty
1	Switch on/off (2 pin)	1
2	Power socket	1
3	Level	1
4	Buckle plug (HP-13)	1
5	Terminal Cover (male)	5
6	Round head screw M3*6	2
7	Round head screw M4*6	2
8	Round head screw TP2 3*8	1
9	Flat head screw M3*10	1
10	Round head screwTP2 4*16	4
11	Hexagon screw M4*12	1
12	Round head screw M4*25 W/10	1
13	Hexagon screw M4*16	4
14	Washer 6*13	4
15	1/4 spring washer	4
16	Nut 3*6	3
17	Battery Cap Foam	1
18	Power nameplate 230V AC	1
19	Power sticker	1
20	Dust cover	1
21	FD aluminum support	1
22	FD aluminum bracket	1
23	Battery 6V/4AH	1
24	X2 capacitor 0.1μF/275V(P=15)	1
25	Wire Fixer	1
26	Front panel	1
27	Rear panel	1
28	Keypad	1
29	Keypad circuit	1
30	Load cell	1
31	9501 battery fixer	1
32	AE washer 2.0mm	2
33	FD Pad for Cockroach Filter Cap	4
34	9910 Upper noise Filter Cap t=0.8mm	1
35	9910 Lower Noise Filter Cap t=0.8mm	1
36	FD Anti-cockroach plastic	4
37	Waterproof rubber 27*18*1mm	1
38	Main board	1
39	FD plastic pan	1
40	FD stainless steel pan	1
41	Adjust feet	4
42	Battery cover (blue)	1

43	Upper housing	1
44	Lower housing	1
45	AE Sealing	1
46	Round head screw M4*8	6
47	Multi wire 150mm	1
48	Alloy hexagon screw M6*16	4
49	Power cable	1
50	Capacity sticker	1
51	Spring	1
52	Transformer 115/230V-10V	1