

Instruction Manual

LD Series Multi-function Electronic Balance

Content

- 1. Introduction**
- 2. The structure of balance**
 - a. The external view of balance**
 - b. The front screen view of balance**
 - c. Display**
- 3. LD Series Electronic Balance's environmental requirements and specifications**
 - 3.1 Environmental requirements**
 - 3.2 Specifications**
- 4. Operation**
 - 4.1 Preparation**
 - 4.2 Calibration procedure**
 - 4.3 Weighing unit exchange**
 - 4.4 Weighing**
 - 4.4.1 General weighing mode**
 - 4.4.2 Weighing with container**
 - 4.4.3 Incremental quantity weighing**
 - 4.4.3.1 Fractionated incremental quantity weighing**
 - 4.4.3.2 Decremental quantity weighing**
 - 4.4.4 Weight difference weighing**
 - 4.4.5 Piece counting mode**
 - 4.4.6 Percentage weighing mode**
 - 4.4.7 Hanger for below-balance weighing (Optional choice)**
- 5. Parameter setting**
 - 5.1 Parameter setting table**
 - 5.2 Parameter setting adjusting method**
- 6. RS232 Interface**
 - 6.1 Transmission form: asynchronous transmission**
 - 6.2 Data output mode**
 - 6.3 Data output format**
 - 6.4 How judge stable output or unstable output**
 - 6.5 Command control**
 - 6.6 Connection of balance and external device**
- 7. Care and Maintenance**
- 8. Servicing**
- 9. Packing list**

1. Introduction

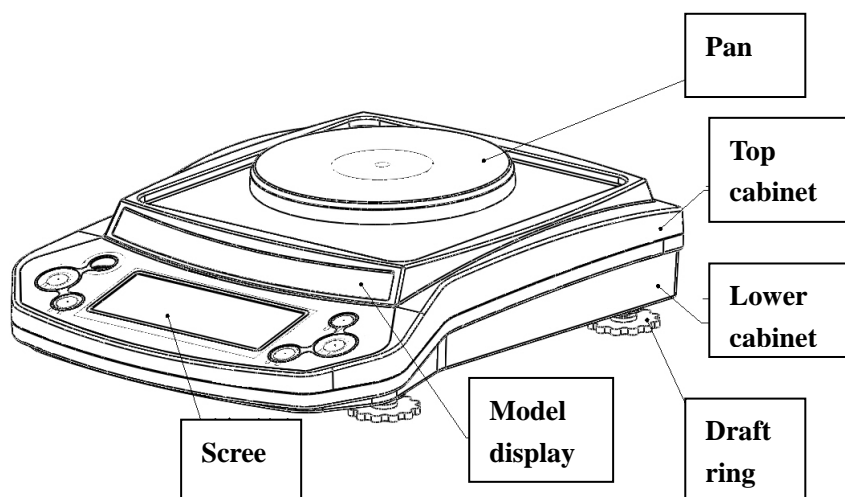
This manual is taking LD5100-1 as an example to explain how to use the balance.

The features:

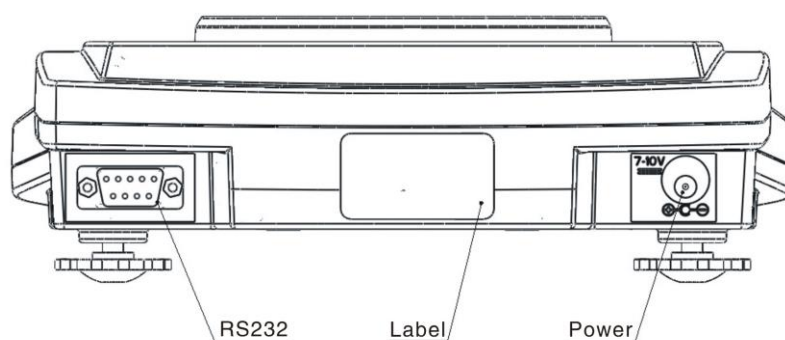
- Super large LCD screen display, it is clear and easy to be read
- Fast weighing, the speed of weighing is from 10 times to 30 or 40 times faster than general mechanical balance
- It is easy to operate, weigh directly
- High intelligence: within the weighing range you can tare, zero clearing and accumulated weighing; over loading display and fault alarm
- Built-in hanger for below-balance weighing (Optional choice)
- In order to print the weighing data off through the printer or input the data to computer or other external devices, the comparator has RS-232 interface.

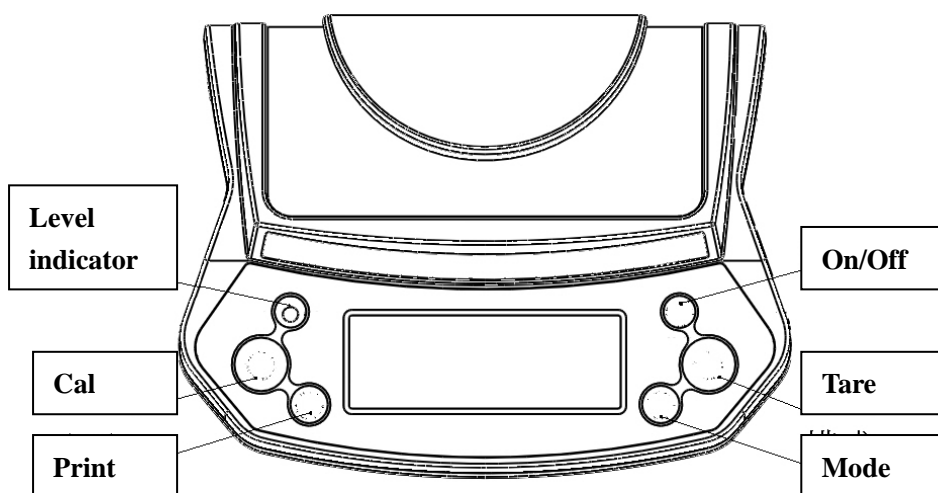
2. The structure of balance

a) The external view of balance



b) The front screen view of balance





c) Display

No	Display sign	Meaning
1	g	gram
2	ct	carat
3	lb	pound
4	oz	ounce
5	piece counting mode
6	%	percentage mode
7	O	stable indicator
8	--End--	calibration is ended
9	Err--0	when calibration is "0" error
10	Err--1	Full capacity calibration error
11	E	over the capacity
12	-E	underload
13	balance is processing data
14	CAL	Calibration sign

NOTE: If CAL displays on the above left of the screen, you have to check whether some other object is on the pan. If yes, please take it off and turn off the balance and then turn on the balance again. If no, you have to calibrate the balance.

3. LD Series Electronic Balance's environmental requirements and specifications

3.1 Environmental requirements

- Put the balance on a stable and fixed operating platform
- The operating platform should not be affected by excessive air flow caused by open window or a door
- The operating platform should not be affected by vibration. Four corners of the room are affected by vibration very little, perfect for setting up the operating

platform; do not put the balance in direct sunshine

- Do not put the balance near heater or air conditioner
- Do not put the balance in areas where the danger of explosion exists
- Do not put the balance under raining or use water to clean, if there is water on the balance you should use dry cloth to dry, when the balance are not working properly, you should send it to repair
- Do not beat or strike or press the balance very hard
- Do not let tiny little object go inside the balance
- The best operating temperature $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$

3.2 Specifications

Resolution ratio: 0.1g series					
Model	LD1100-1	LD2100-1	LD3100-1	LD5100-1	LD6100-1
Capacity	1100g	2100g	3100g	5100g	6100g
Calibration weight	1000g	2000g	3000g	5000g	5000g
Readability	0.1g				
Repeatability	±0.2g				
Linearity	±0.2g				
Stabilization time	About 2s				
Working temperature	5℃~40℃				
Dimension	275x230x85mm (length x width x height)				
Pan size	160 x 160 x 8mm				
Balance weight	1.5kg				
Adaptor	DC6V 30mA				
Resolution ratio: 1g series					
Model	LD1100x1	LD2100x1	LD3100x1	LD5100x1	LD6100x1
Capacity	1100g	2100g	3100g	5100g	6100g
Calibration weight	1000g	2000g	3000g	5000g	5000g
Readability	1g				
Repeatability	±2g				
Linearity	±2g				
Stabilization time	About 3s				
Working temperature	5℃~40℃				
Dimension	275x230x85mm (length x width x height)				
Pan size	160 x 160 x 8mm				
Balance weight	1.5kg				
Adaptor	DC6V 30mA				
Resolution ratio: 0.01g series					
Model	LD110-2	LD210-2	LD310-2	LD510-2	LD610-2
Capacity	110g	210g	310g	510g	610g
Calibration weight	100g	200g	300g	500g	500g
Readability	0.01g				

Repeatability	±0.02g				
Linearity	±0.02g				
Stabilization time	About 3s				
Working temperature	5°C~40°C				
Dimension	275*230*85 mm				
Pan size	φ 122*9.5mm				
Balance Weight	≅ 1.2 kg				
Adaptor	DC6V 300mA				
Resolution ratio: 0.1g series					
Model	LD110-1	LD210-1	LD310-1	LD510-1	LD610-1
Capacity	110g	210g	310g	510g	610g
Calibration weight	100g	200g	300g	500g	500g
Readability	0.1g				
Repeatability	±0.2g				
Linearity	±0.2g				
Stabilization time	About 3s				
Working temperature	5°C-40°C				
Dimension	275*230*85 mm				
Pan size	φ 122*9.5mm				
Balance Weight	≅ 1.2 kg				
Adaptor	DC6V 300mA				

4. Operation

4.1 Preparation

Before using the balance, it should be placed on a stable and fixed operating platform. Level the balance by turning the adjusting feet, checking the level indicator on the balance, until the bubble appears in the center of the circle.

4.2 Calibration procedure (Example: LD5100-1)

Weight selection:

Item no.	LD1100-1	LD2100-1	LD3100-1	LD5100-1	LD6100-1
Cal. weights	1000g	2000g	3000g	5000g	5000g

Note:if the capacity is for example LD510-2,weight selection as below:

Item no.	LD210-2	LD310-2	LD510-2	LD610-2
Cal. weights	200g	300g	500g	500g

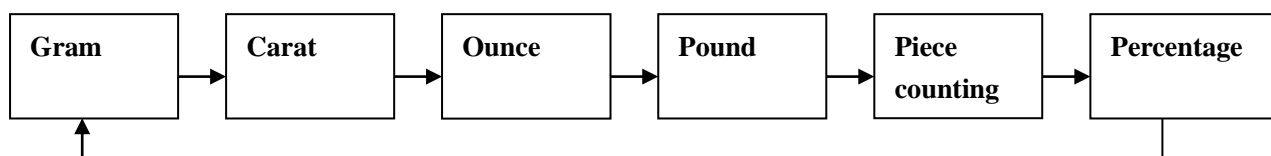
- Plug in and pre-warm the balance at least 10 minutes
- Press CAL key to calibrate
- “C5000” is displayed
- Put the external calibration weight (5kg) on the pan carefully
- Press TARE key, wait the balance to collect data, after collecting data the value of external calibration weight is displayed (C5000 is flashing), “-End” is displayed, 5000.0g should be displayed; if the displayed value is not correct, you need to calibrate the balance again; take the weight off and repeat the procedure until displayed value is correct
- Take the weight off
- “0.0” is displayed

The balance is able to be used.

4.3 Weighing unit exchange

There are 4 types of weighing units and 2 types of weighing modes available to choose, if you want more options you can contact inform the manufacture. Press MODE key to change from one to another, every time you press MODE key, one type of weighing unit or one type of weighing mode is displayed

4 types of weighing units and 2 types of weighing modes are displayed in order



Weighing units conversion

Sign	Name	Conversion
g	Gram	1g
oz	Ounce	28.3495231g
dwt	Penny weight	1.55517384g
GN	Grain	0.06479891g
lb	Pound	453.7205g
ct	Carat	0.2g
kg	kilogram	1000g
tr	Tola (India)	11.6638038g
tb	Tael (Taiwan)	37.5g
tl	Tael (HK)	37.794g

4.4 Weighing

4.4.1 General weighing mode

- No-load on the pan

- Press TARE key
- “0.0” is displayed
- Put the object on the pan
- When stable indicator “O” is displayed, read weighing value
- Remove the object, “0.0g” is displayed

4.4.2 Weighing with container

When the object is liquid or powder, you need to put the object in the container to weigh.

- Put the container on the pan first
- The weight of container is displayed
- Press TARE key to take the weight of container off, “0.0g” is displayed
- Put the object in the container
- when stable indicator “O” is displayed, read the value

4.4.3 Incremental quantity weighing

It is for weighing two or more than two types of objects’ weights before mixing together.

4.4.3.1 Fractionated incremental quantity weighing

- Put an empty container on the pan
- The weight of container is displayed
- Press TARE key to take the weight of container off, “0.0” is displayed
- Put the first type of object in the container
- Stop adding the object when displayed value is required value
- Press TARE key to take the displayed value off, “0.0” is displayed
- Put the second type of object in the container, the second type of object’s weight is displayed, stop adding the object when displayed value is required value
- Continue doing the procedure until all the objects are weighted
- After the last type of object is weighted, press TARE key again, “0.0” is displayed; remove all the objects, negative value of all the objects is displayed

4.4.3.2 Decremental quantity weighing

- Put the container with object on the pan
- Total weight is displayed
- Press TARE key to take the total weight off
- “0.0” is displayed
- Take the object out from container, displayed value is taken object’s negative value. Stop removing the object until displayed value is required value

4.4.4 Weight difference weighing

- Put the reference weight or sample on the pan
- The value of reference weight or sample is displayed
- Press TARE key to take displayed value off
- “0.0” is displayed


- Remove reference weight or sample
- The negative value of reference weight or sample is displayed
- Put the contrast weight or sample on the pan
- The weight difference between contrast weight or sample and reference weight or sample is displayed

4.4.5 Piece counting mode ()

This mode is for weighing standard objects (the objects have same weight) such as medicine tablet, electronic parts or paper. The theory of piece counting is that put certain (10 for example) quantity of objects on the pan, the value of all objects displayed (100g), balance's software can calculate each unit's value, each unit's value (10g) will be saved. When you put the objects that each of them has similar weight (10g) on the pan, according to saved unit's value (10g) the balance can calculate how many pieces of objects are on the pan.

Procedure (Take C1-0 as an example)

Under general weighing mode

- Press TARE key, "0.0g" is displayed
- Press MODE key to chose piece counting mode ()
- Put 10 samples on the pan
- Press CAL key, "SEL..." is displayed first, then "10" (10 pieces) is displayed
- Remove all the samples, "0" (0 piece) is displayed
- Put some objects on the pan
- The quantity of objects is displayed

Note: the readability of piece counting mode cannot be smaller than balance's division value

You can change number of samples among 10, 20, 50, 100 and 1000 by changing parameter setting C1-0, C1-1, C1-2, C1-3, C1-4

4.4.6 Percentage weighing mode

Procedure

Under general weighing mode

- Press TARE key, "0.0g" is displayed
- Press MODE key to chose percentage weighing mode (%)
- Put the reference weight or sample on the pan
- Press CAL key, "100.00" is displayed
- Remove reference weight or sample, "0.00" (0.00%) is displayed
- Put the contrast weight or sample on the pan
- The percentage of the contrast weight and reference weight is displayed

Note: the readability of percentage weighing mode cannot be smaller than balance's division value

4.4.7 Hanger for below-balance weighing (Optional choice)

The balance has built-in hanger for below-balance weighing. If user need this weighing mode, please contact manufacture.

Preparation:

- Remove plastic cover under the balance
- There is hanger for below-balance weighing with a hole
- Thread a fine line through the hole on the hanger
- Put the balance on a operating platform which has a hole
- Make sure the hanger and the hole on the platform are matching
- Let the fine line go through the hole on the platform
- Tie the other side of fine line with a plate shape container

Note: to avoid excessive air's affection, you can use a transparent windshield to cover the hanger

5. Parameter setting

5.1 Parameter setting table

Function	Setting	Meaning
C1 : Set the basic number of samples for piece counting	C1-0	10
	C1-1	20
	C1-2	50
	C1-3	100
	C1-4	1000
C2 : Background light control	C2-0	Auto
	C2-1	Always On
	C2-2	Always Off
C3 : “0” point minimum display value	C3-0	No “0” point tracking status
	C3-1	1d
	C3-2	2d
	C3-3	3d
	C3-4	4d
	C3-5	5d
C4: Serial baud rate	C4-0	2400bps
	C4-1	1200bps
	C4-2	4800bps
	C4-3	9600bps
C5 : Data output mode	C5-0	On zero stable
	C5-1	On stable
	C5-2	On command or print key
	C5-3	Continuous
C6: Key tone	C6-0	Yes
	C6-1	No

C7: Anti-interference	C7-0	Level 0
	C7-1	Level 1
	C7-2	Level 2

Factory default settings are C3-3, C5-2, C7-1, the other settings are 0

5.2 Parameter setting adjusting method:

Keep pressing MODE key, after about 3 seconds all LCD segments are displayed, release MODE key and press MODE key again, “Cx-y” is displayed, x can be 1-7; y can be 0-5, then use MODE key to change x’s value; use PRINT key to change y’s value. After setting all the parameters, press TARE key to save the settings and go back to weighing status.

6. RS232 Interface

6.1 Transmission form: asynchronous transmission

Baud rate: see 5.1 C4 parameter setting

Start bit: 1

Data bit: 8

Parity: none

Stop bit: 1

6.2 Data output mode

See 5.1 C4 parameter setting

- On zero stable output: “0.0000g” is displayed, put object on the balance, When displayed value is stable, a group of data will be transferred out
- Stable output: when weighing value is stable (stable indicator displayed), a group of data will be transferred out
- Command control output: PRINT key and command P<CR> <LF> are print control commands, when the balance receive the command, a group of data will be transferred out
- Continuous output: every 0.3 sec a group of data will be transferred out
- PRINT key output mode: only when you press PRINT key, a group of data will be transferred out. Parameter setting is C5-2

6.3 Data output format:

FXXXXXXX.XKKK<CR> <LF>

F: sign bit “+” or “-”

X: 0—9 weighing data

..: decimal point

K: Reserving three sign of weighing unit, right align, if there is not three sign space will fill in the room

<CR>: ENTER

<LF>: LINEFEED

For example, if the value is +5000.0g, after the transmission it will be +0005000.0g<CR><LF>

6.4 How judge stable output or unstable output

When it is unstable output, KKK are space; when it is stable output, there will be information sent out

6.5 Command control

This type of control mode can be used to control balance's [On/Off] key, TARE key, weighing unit and weighing mode's transformation, from external devices' commands.

① <O> <CR> <LF> [On/Off] command. It has the same function as comparator's [On/Off] key (4F 0D 0A);

② <T> <CR> <LF> TARE command. It has the same function as comparator's TARE key (54 0D 0A);

③ <C> <CR> <LF> CAL command. It has the same function as comparator's CAL key (43 0D 0A);

④ <M> <CR> <LF> Mode transformation command. It has the same function as comparator's MODE key (4D 0D 0A);

⑤ <P> <CR> <LF> Print command. It has the same function as balance's PRINT key. As long as the balance receive this command, a group of data will be transferred out (50 0D 0A).

Note: every time the balance receive a right command, it will respond the command and send the command back to external devices to indicate that the balance has received a right command from external devices.

6.6 Connection of balance and external device

Balance	Computer	Balance	Series interface printer
9 pins	9 holes	9 pins	25 pins
2 ——— 2		2 ——— 2	
3 ——— 3		3 ——— 3	
5 ——— 5		5 ——— 7	

NOTE: the length of data line should not be more than 15 meters

7. Care and Maintenance

- Do not use a sharp or rough object (such as pencil or ball pen etc.) to poke the keys
- Do not let any object fall on the pan, otherwise the weighing system will be damaged
- Do not expose the balance in high temperature or mill dust environment for a long time
- Keep the balance clean and dry

Cleaning

- Unplug the AC adaptor before cleaning
- Do not use any aggressive cleaning agent (such as solvent). Use a piece of wet smooth and soft cloth with some mild detergent (such as soap) to clean
- Make sure no liquid or other tiny insects enter into the balance

7. Servicing

The warranty is 1(one) year after date of sales. Free service and replacement can be offered with the warranty period by offering servicing card and commercial invoice. The condition below can not be offered this service:

1. The product is not in warranty period.
2. The product is damaged by user after checking.
3. The damage is caused by operation that is not referred in the instruction .
4. The damage is caused by radioactivity and corrosive environment.
5. If the user take the balance apart without Keli servicer's guild.

8. Packing list

No.	Content	Quantity
1	Main body of the balance	1 pcs
2	Pan	1 pcs
3	External Adapter	1 pcs
4	Instruction Manual	1 pcs
5	Warranty Card	1 pcs
6	Certificate of Inspection	1pcs

说明书印刷要求

一、印刷要求

序号	项目	选项	
1	印刷尺寸	<input checked="" type="checkbox"/> A5	<input type="checkbox"/> A4
2	封面封底纸张	<input checked="" type="checkbox"/> 70g 进口双胶纸	<input type="checkbox"/> 200g 进口双胶纸
3	封面封底颜色	<input checked="" type="checkbox"/> 黑色	<input type="checkbox"/> 彩色
4	封面封底留白	<input checked="" type="checkbox"/> 不要求	<input type="checkbox"/> 是
5	内页纸张	<input checked="" type="checkbox"/> 70g 进口双胶纸	<input type="checkbox"/> 80g 进口双胶纸
6	内页颜色	<input checked="" type="checkbox"/> 黑色	<input type="checkbox"/> 彩色
7	装订方式	<input checked="" type="checkbox"/> 骑马钉	<input type="checkbox"/> 胶装

注：此页不印刷