ESK SERIES

ELECTRONIC BALANCE
A Ⅱ
INSTRUCTION MANUAL

CONTENTS

1. brief introduction

The instruction manual describes the installation instructions, operation methods and care and maintenance etc..

Please read the instruction manual carefully before using it.

1.1 matters needing attention

A. The manual takes **ES20K-1D** for example
B. To make sure that the balance can provide a more accurate result before using the balance, plug in and preheat the balance at least for 30 minutes.
C. Put the balance on a stable and flat platform.
D. Be sure to adjust the balance to the level condition when using it.
E. When weighing the heavy object, you have to handle it gently to avoid the strike on the pan. Otherwise it will lead to the problem of the mechanical system homing of the balance.
F. When weighing the liquid, you have to do it carefully to avoid the liquid flowing into the inside of the balance.
G. After the operation, please cover it with the dust cover to avoid the dust.

1.2 balance's features

A. Multiple weighing units and the made units for the customers
B. counting weighing
The different counting cardinal number can be selected for the counting calibration. It supports the percentage weighing.
C. Standard RS232 interface, it is easier for the user to connect the balance to a printer or computer or other external device.

D. Support the PRINT key to control the data output and command to control the data output for the convenience of the data collection of the external device.

E． Easy to operate and read results from a clear big LCD with a white back-ground light;

1.3 technical parameters

Specification

Model	ES10K-1D	ES20K-1D	ES30K-1D	ES50K-15D	ES60Kx1D
Capacity	10kg	20kg	30kg	50kg	60kg
Readability	0.1g	0.1g	0.1g	0.5g	1g
Repeatability	±0.2g	±0.2g	±0.2g	±1g	±2g
Linearity	±0.2g	±0.2g	±0.2g	±1g	±2g
Four-Corner Error	±0.2g	±0.2g	±0.2g	±1g	±2g
Pan Size	340X300mm				
Operation Temperature	5ºC~40ºC				
Chamber Size	314x460x164(WxLxH)mm				
Dimension	660x560x370 (LxWxH)mm				
Net Weight	About 18.5kg				
Gross Weight	About 21.5kg				
Power Supply	DC110V/220V -15%---+10% 50/60Hz				
Power	15VA				

testing conditions: 20℃(room temperature),the environment without air flow, dry and dust.2. Installation

2. Installation

2.1 installation detailed list

serial No.	content	quantity
1	balance body	1 piece
2	pan	1 个 piece
3	pan support	1 个 piece

2.2 installation environment

The balance can get the reliable weighing result in the common environment of the laboratory and workshop. It can improve the work efficiency and boost the accuracy of the weighing result in the proper environment.

A. Put the balance on a stable and flat

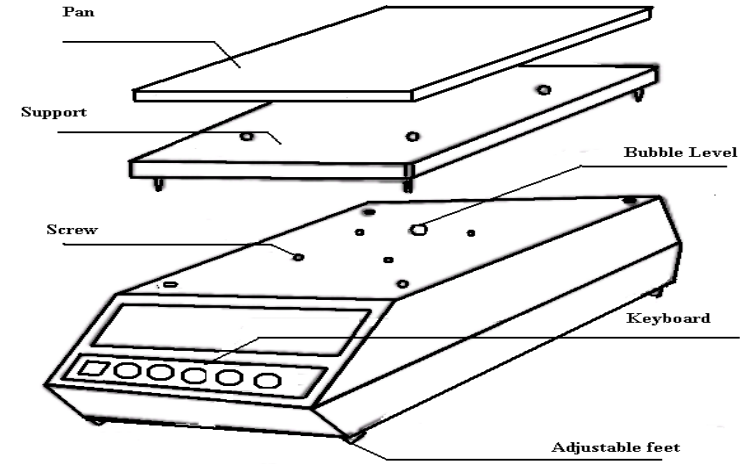
Platform

B. Do not put the balance:

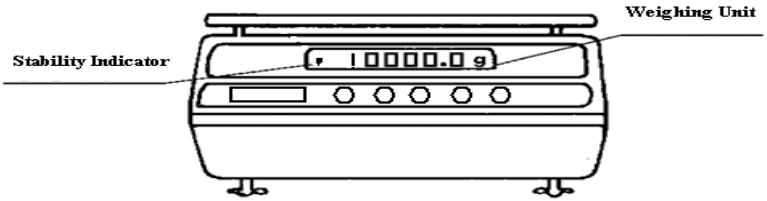
*In a place with too much dust;
*In direct sunshine;
*In a place with temperature extreme;
*In a place with excessive air flow;
*Near electromagnetic field;
*In a place with excessive moisture;
*In a place with temperature difference fluctuation.

C. The best settlement site should be in a sheltered corner, on the stable marble platform and far away from door, window, radiator and the air outlet of the air conditioning equipment.

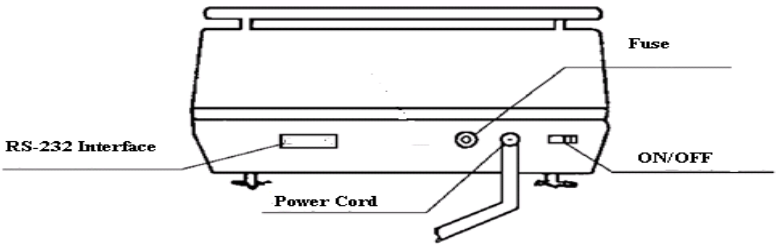
2.3 external schematic diagram and parts names



ESK Series Electronic Balance



ESK Series _Front Panel



ESK Series _Rear Panel

2.4 transportation locking mechanism

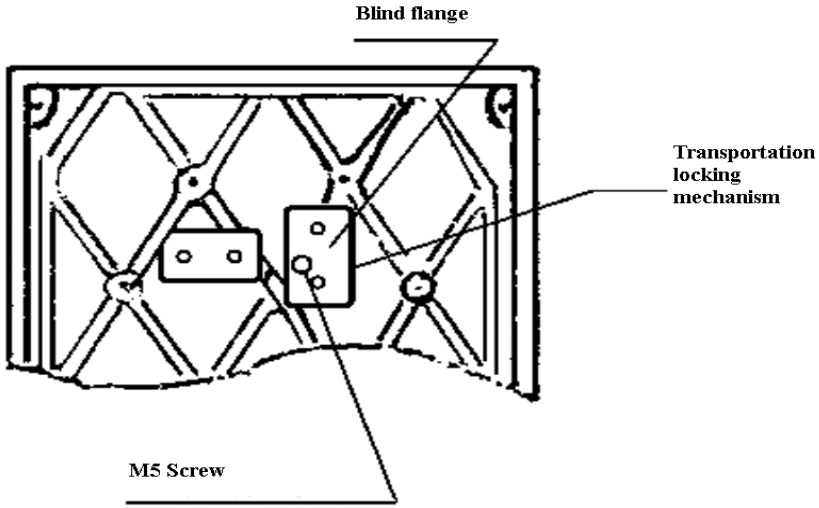
Setting up the balance

• Remove the “transportation locking mechanism” on the bottom of the drain pan of the balance. During the writing process, do remember take off two screws “M3” on the blind flange. And then remove the screw “M5” (when removing, use average speed to avoid damage of the key components). Next, replace the “transportation locking mechanism” by screw up the screws “M3”.

• Adjust the adjustable foot until the bubble appears in the center circle of the indicator.

• Place the support and the pan on the pallet axis of the main body of the balance.

• Connect the AC adapter with 220V AC supply.



2.5 connecting power source

Be sure that the input voltage range of the transformer is suited to the used service voltage.

3. application

3.1 Specifications

ct	**carat**
lb	**pound**
oz	**ounce**
∴	**piece counting mode**
%	**percentage mode**
ct	**carat**
lb	**pound**
○	**stable indicator**
CAL--0	**when calibration is “0”**
CAL—F	**load the calibration weight**
-End-	**calibration is ended**
Err--0	**when calibration is “0” error**
Err--1	**calibration error**
E	**over the capacity**
—E	**under the readability**
……..	**balance is processing data**

3.2 basic weighing

A. preparation procedure

a. The balance should be reheated for 30 minutes at least after each time of the power-on for the best weighing result.

b. Keep the pan clean. Press ON/OFF key and it will display **0.0g**.

c. Calibrate the balance (refer to the calibration section)
d. If need to use other unit, or other weighing method, press [MODE] key to adjust the display data to other units or the data of other weighing method. The triangle symbol below the display screen indicates the other units or other weighing method.
B. weighing procedure
a. Put the object on the center of the pan lightly. The triangle symbol above " stabilization" on the display overlay represents the stable symbol. When it's kept unchanged after the stable symbol displayed, it means that the data stabilized and after then it will read the data.
b. Take out the object. After the balance returns to the zero and it displays **0.0g** and stabilizes, you can proceed with the next weighing.

3.3 container weighing

A. Put the container on the pan
B. After the stable indicator displayed, press TARE key. After then it will display **0.0g.**
C. Put the object in the container
D. After the stable indicator displays, read the weight of object.

3.4 counting weighing。

A. Select the samples quantity according to the system parameters table.
B. Press TARE key. After the balance stabilizes it will display **0.0g.**
C. Press MODE key to adjust the balance to the counting mode status.
D. Put the object on the center of the pan..
E. Press CAL key and the balance system will sample according to **C1** parameter.
F. After the sampling, the balance will display the sample weight according to **C1** parameter. Take out the sample. After the balance returns to zero and stabilizes the user can proceed with the operation of the counting weighing.

Note. The readability of the sample quantity shouldn't be less than the minimum resolution.

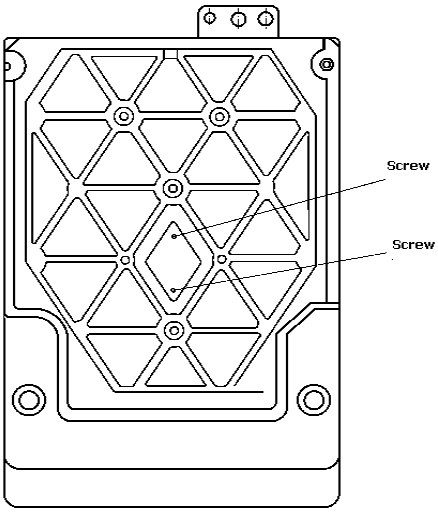
3.5 percentage weighing

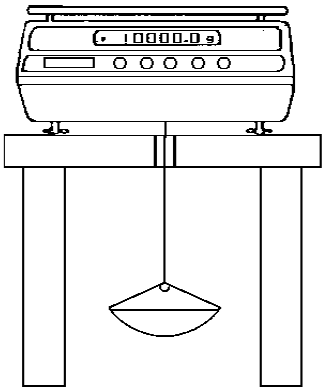
A. Press TARE key. After the balance stabilizes it will display **0.0g.**
B. Press MODE key to adjust the balance to the percentage weighing status.
C. Put the object on the center of the pan.
D. Press CAL key， the balance system will take the sample as the reference object which is **100.00% basic value**.
E. After the sampling, the balance will display **100.00%**. Take out the sample. After the balance returns to zero and stabilizes the user can proceed with the operation of the percentage weighing.

Note: The readability of the sample quantity shouldn't be less than the minimum resolution.

3.5 Below Weighing (Optional)

The ESK series multifunctional balances are equipped with a built-in underhook for below weighing. Common applications for below weighing including density determination and weighing some magnetic material. If there is a requirement, the user could apply from the factory.





- Remove 2 screws on the rhombic cover under the balance

- Remove the cover, you could find the underhood weighing device
- Hang a fine thread through the hole
- Place the balance on a table with a hole in it and let the thread pass through the hole.
- Suspend a dish – like container on the other end of the thread.

4. parameters setting and command control

4.1 parameters setting

A. Press ON/OFF key, the balance will be in Shutdown status.
B. It will display Shutdown symbol
C. Press PRINT key twice continuously and it will display "**Cx-y**".
D. Press MODE key to change C parameters.
E. Press PRINT key to change y value of the function No.
F. After all the parameters were set, press TARE key and it will be in stand-by status and store the current set parameters. Press ON/OFF key again the balance will be in a certain condition of the function of the new setup parameter.

Parameter Setting Table

Cx	Cx—y	significance
C1:auto calibration	*C1—0	This model has no such function
	C1—1	
C2：counting weighing mode/data selection of basic sample	*C2—0	quantity: 10 as basic sample quantity
	C2—1	quantity: 20 as basic sample quantity
	C2—2	quantity: 50 as basic sample quantity
	C2—3	quantity: 100 as basic sample quantity
	C2—4	quantity: 1000 as basic sample quantity

C3：zero tracking	C3—0	no zero tracking status
	*C3—1	zero tracking
	C3—2	no use for the user
C4：selection of serial port baud rate	*C4—0	2400bps
	C4—1	1200bps
	C4—2	4800bps
	C4—3	9600bps
C5：selection of data output mode	C5—0	stable output of back-to-zero
	C5—1	stable output
	*C5—2	command control output
	C5—3	continuous output
C6：key sound	*C6—0	no
	C6—1	yes
C7：anti-interference extent	C7—0	sensitiveness
	*C7—1	low
	C7—2	medium
	C7—3	high
C8：subtitle display power on	*C8—0	yes
	C8—1	no
C9：BackLight Control	*C9—0	On
	C9—1	Off
	C9—2	reserve
#C10：check-weighing measuring	*C10—0	Alarm within the set interval check-weighing including the limiting value
	C10—1	Alarm without the set interval check-weighing including the limiting value
#C11：selection of weighing status	*C11—0	standard weighing
	#C11—1	density weighing
	#C11—2	statistics weighing
#C12:sampled data of animal weighing	*C12—0	100
	C12—1	200
	C12—2	300

Note:

* is the factory setting

#: reserving function according to the user request

*: default status set at the factory

4.2 command control

The balance can be connected with the peripherals via serial port communication line to receive the command from the peripherals and execute the similar key operation according to the command.

After the balance receives the command, it will post back the received command to the external device at once and inform the external device of the successful response command. If the wrong command posts back the “Err”to the external device, it means what the external device received is the illegal command.

Effective command as follows

A. O ＜CR＞＜LF＞ ON/OFF command.
   The function is the same as the function of **ON/OFF** key on the overlay（4F 0D 0A)；
B. T ＜CR＞＜LF＞ TARE command.
   The function is the same as the function of **TARE** key on the overlay（54 0D 0A)；
C. C ＜CR＞＜LF＞CAL command。
   The function is the same as the function of **CAL** key on the overlay（43 0D 0A)；
D. M ＜CR＞＜LF＞MODE command
   The function is the same as the function of **MODE** key on the overlay （4D 0D 0A)；
E. P ＜CR＞＜LF＞PRINT command
   The function is the same as the function of **PRINT** key on the overlay. If only the balance receives this command, it will output a group of current important data to the external device （50 0D 0A).

＜CR＞＜LF＞the significance as follows

＜CR＞：carriage return（0D）

＜LF＞：line break（0A）

5. calibration operation

5.1 calibration reason

The balance is designed and manufactured based on the "electromagnetic force equilibrium principle" .Among of the numerous factors which has an effect on the precision, the earth gravity effect is the most prominent. The different areas and different earth gravity will cause the measuring error. In this case the balance should be calibrated to eliminate these errors.
After the use for long time, there will be subtle error caused by the temperature, humidity, placing and operation. So the balance must be recalibrated and adjust its level.
If you use the new balance or after changing the locating place of the balance, you have to adjust the level and recalibrate it.

5.2 calibration procedure

Calibration operation as follows: (COMPAX II as the example)

A. Empty the pan and then it will display **0.0g**.
B. Press CAL key.
C. When it displays "**CAL 0**" press TARE key.
D. When "**CAL- - 0**" flashes the system will be waiting for the data sampling and then it will display "**CAL F**"
   Load lightly the **20kg** standard weight on the center of the pan.
E. Press TARE key. When "**CAL F**"flashes the system will be waiting for the data sampling and then it will display"-End-"
F. After about 2 seconds it will display "**20000.0**".
G. Take away the weight.
H. It will display "0.0".

Note: During the calibration, if it displays"Err-1", it means that the balance can't be calibrated because of the calibration weight with big error. Please select the proper weight to do it. After then, if it still displays "Err-1", please contact our company for the solution.

6. RS232 interface

During the user operates the balance, sometimes the user will print out the weighing data via printer or input it into the computer or other external devices.

In order to meet the user's requirement, we installed RS232C or USB-B data communication interface on **COMPAX** series electronic balances with the multi-function and high precision.

Among them, RS232C is the standard equipped interface. USB-B can be installed as the user requests.

6.1 technical parameters

baud rate: 1200，2400，4800，9600

data bits: 8

check bit: no

stop bit: 1

start bit: 1

output code: ASCII code

Data output format: FXXXX.XXXXKKK＜CR＞ ＜LF＞

Significance as below

"F"：sign bit "+"or"-"

"X"：0-9 weight data

"."： decimal point

"K"：reserved three-digit weighing units symbol with right alignment.
If it's short of three-digit weighing units, we can supplement it with blank.

<CR>：carriage return

<LF>：line break

The data format which the value of the quantity data (+10000.0g) goes through the serial port is +0010000.0g<CR><LF>.

The judgment method of stable data output and unstable data output: When the data output of the unstable weight "KKK", the non-unit bit indicating bit in the data string, is the blank. When the stable data out puts it will out put the unit information.

The other data output format can be programmed as the user's requests.

6 .2 output mode

A. the stable output mode of back-to-zero

In the stable output mode of zero, the pan must be unloaded when weighing the sample each time. After it displays the stable zero value, put the sample on the pan. When the displayed value becomes stable, it will out put a group of data. The parameter is set as **C5-0.**

B. the stable output mode

In the stable output mode, the data output doesn't depend on any other condition. When the weighing value becomes stable (It will display the stable symbol.) it will out put a group of data. In this mode, it can out put its own weight of the sample which has been tared. And also it can out put the total weight value together with the tare weight or the cumulative weight of the sample. The parameter is set as **C5-1.**

C. The continuous output

In the continuous output mode, the balance transmits the weight data to the external device every **0.3s.** The parameter is set as **C5-3**.

D. printing key output mode/command control output

In the printing key out mode, only when pressing PRINT key or the balance receives the printing command from the external device it can out put a group of current weighing data. The parameter is set as **C5-2**.

6.3 connecting with external device

electronic balance	computer	electronic balance	printer with serial port
9 pins	**9 holes**	**9 pins**	**25 pins**
2----------2		**2----------3**	
3---------- 3		**3----------2**	
5----------5		**5----------7**	

The connection diagram of the electronic balance with the computer and printer

7. care and maintenance

A. The user should often calibrate the balance to be sure that its sensitivity is in the best condition.

B. Don't touch the key using the pointed stuff or the shaggy stuff like the stick (something like the pencil, ball-point pen).

C. Avoid the object falling down on the pan from the highs so as not to damage the weighing mechanism.

D. Avoid the balance exposing to the high temperature or dust for a long time.

E. Keep the balance chamber clean. If some stuff fell inside, you have to clear it away on time.

F. After each use of the balance, it's better to cover it to avoid the dust incursion.

G. For long time if you don't use the balance, it's better to store it for the moment.

H. If the balance broke down, you have to examine and repair it on time. It's not allowed to use it with the faults.

I. Avoid using overloaded operations so as not to damage the balance.

J. Keep the balance clean and dry.

matters needing attention when cleaning

A. Pull out the power line before cleaning;

B. Don’t use corrosive cleanser (like solvent). You can use a piece of wet cloth with the neutral detergent (soap) to clean it.
C. Avoid the water or other liquid splashing into the inside of the balance.
D. Wipe dry the balance with dried, soft cloth after cleaning.

8. failures and solution

Problem	Causation	Solution
Nothing displayed	● No power ● The fuse is damaged ●AC/DC main transformer is damaged	● Change the fuse ● Replace main transformer ● After the replacement, it is broken again, send it to the repairing department
Displayed value is unstable	● Bad working environment ● There is an object or a crash between the pan and the shell ● Unstable power supply, exceed the limit value ● The weighing object is unstable (volatilize or absorbing moisture)	● Improve working condition to avoid vibration or breeze ● Move the object, rotating the pan to avoid the crash ● External connect 220V AC supply stabilizer.
There is a big difference between the actual value and the weighing value	● The balance is not calibrated ● the balance was not tarred before weighing ● The balance is not properly leveled.	● Calibrate the balance ● Press TARE to return to zero ● Level the balance by adjusting the adjustable feet.

9. guarantee repair

Warranty period; 1 year
Except of one of the items below
1. Warranty period expired.
2. The balancer was damaged because of the user’s fault.
3. The balance was damaged because the user operated it not according to the instruction manual.
4. The balance was damaged by reason of exposing to the environment with the radioactive and corrosive materials.
5. The balance was damaged caused by the unauthorized disassembly or repair by other maintenance personals not appointed by our company.