U.S. SOLID

Analytical Balance

INSTRUCTION MANUAL

This manual should be made available to all users of this equipment. For best results, and for maximum durability of the equipment, carefully read and follow all instructions.

I. Table of Content

I. Getting Started

Thank you for choosing U.S. Solid's Analytical Balance. We hope you enjoy your purchase. Please maintain the equipment according to all instructions within the manual.

This product was developed according to CE marking regulations while emphasizing aesthetics and safety for the user. It has ISO certification, specifically ISO 9001.The high quality of the product, coupled with proper user care, should allow you to enjoy it for years.

Improper use of this equipment can cause accidents, including but not limited to: electric discharges, circuit breaker malfunctions, fire, etc. Please read the maintenance section, where this is explained more fully.

FOR BEST RESULTS AND LONGEVITY IN PRODUCT EFFICACY, READ THROUGH THIS MANUAL THOROUGHLY BEFORE USING THE PRODUCT

Please bear in mind the following:

•This manual should be kept with the analytical balance, so it is available to all users.

•Be careful when handling the balance. Avoid any sudden movements when in its vicinity. Be sure to not drop the balance, nor drop any heavy/sharp objects on it. Keep liquids away from the balance to avoid spills.

•Never take apart the balance to try and fix yourself. This could ruin the entire balance, and voids the product warranty. There is also risk of injury when disassembling the balance.

•To prevent fire and electrical issues, avoid dusty or overly dry environments. In case of electrical issue or fire, unplug the balance immediately.

•During setup, installation, and use, contact your wholesaler with any questions that arise.

•This equipment is protected under the Warranties and Consumer Good Regulation (10/2003).

•Overhaul is not covered by the equipment warranty.

•Changes made to the product by non-certified individuals will result in a loss of the product warranty.

•Accessories, including their loss, are not covered by the product warranty, nor does the warrant cover piece's deterioration over the course of time.

ALWAYS MAKE SURE YOU CALIBRATE YOUR SCALE BEFORE USING, AND NEVER TOUCH THE INCLUDED WEIGHT WITH YOUR SKIN!

II. Specifications

Analytical balances offer fast and accurate measurements of mass, using a high precision electromagnetic force balance sensor.

0.1 mg Technical Parameters

MODEL	USS-DBS72-1.2	USS-DBS72-2.2	USS-DBS72-3.2	USS-DBS72-1.2-IC	USS-DBS72-2.2-IC	USS-DBS72-3.2-IC
Max Capacity	120g	220g	320g	120g	220g	320g
Calibration	External			Internal		
Min. Capacity	10 mg					
Readability	0.0001g					
Repeatability	±0.0002g					
Linearity	±0.0003g					
Stabilization time	≤3 Seconds					
Operating Temperature	15° C- 30° C, with fluctuations of <2°C/Hour					
	59° F- 86° F with fluctuations of <3.6° F/ Hour					
Relative Humidity	40%-80%					
Pan Size	90 mm					
Interface	RS232					
Total Dimensions	320*210*320(L*W*H) mm					
Net Weight	7.2 kg					
Power	AC110V-240V 50Hz/60Hz, DC9V-2A by using the universal adapter					

0.001 g Technical Parameters

MODEL	USS-DBS73-1.2	USS-DBS73-2.2	USS-DBS73-3.2	USS-DBS73-5.2	USS-DBS73-10	USS-DBS73-1.2-IC	USS-DBS73-2.2-IC	USS-DBS73-3.2-IC	USS-DBS73-5.2-IC	USS-DBS73-10-IC
Max Capacity	120g	220g	320g	520g	1000g	120g	220g	320g	520g	1000g
Calibration	External					Internal				
Min. Capacity	20 mg									
Readability	0.001g									
Repeatability	±0.002g									
Linearity	±0.003g									
Stabilization time	≤3 Seconds									
Operating Temperature	15° C- 30° C, with fluctuations of <2°C/Hour									
	59° F- 86° F with fluctuations of <3.6° F/ Hour									
Relative Humidity	40%-80%									
Pan Size	90 mm									
Interface	RS232									
Total Dimensions	320*210*320(L*W*H) mm									
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III. Panel Description

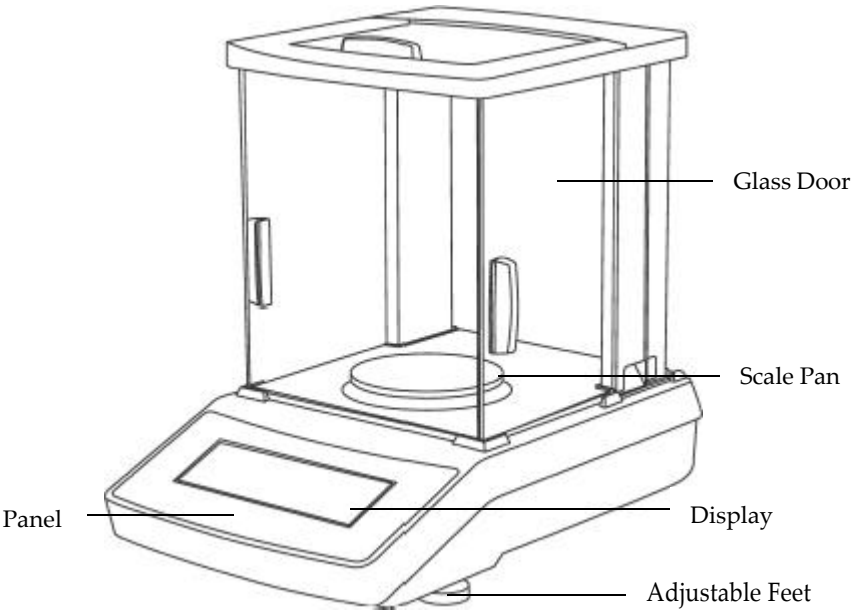
Panel Explanations

1.TARE: Tare the balance
2.PRINT Key: Enter key, function key
3.ON: Turn on the balance
4.CAL: Calibration key
5.OFF: Turn off the balance

FEATURES

Electromagnetic force compensation technology
Backlit LCD display
Glass draftshield with sliding doors
Height-adjustable feet
RS232 interface
Full capacity taring
Overload protection
Four different units of measure: g, mg, ct, oz
Piece counting function

IV. General Structure



V. Installation

Choosing the installation location

When analytical balances are used in routine lab or industrial measurement environments, the weighing speed will be much quicker, and the results more accurate. The location should meet the following conditions:

1.Work room should be clean and dry

2.Balance should be placed on a solid, stable, plain flat surface

3.Avoid locations in which the balance could be exposed to any of the following:

a.Airflow from air conditioners, fans, doors, or windows

b.Vibrations from surrounding or nearby equipment

c.Direct sunlight or radiation

d.Electromagnetic waves or fields

4.Do not use the balance anywhere exposed to explosive, combustible, or corrosive gases.

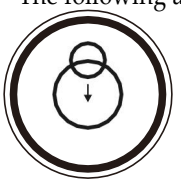
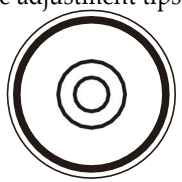
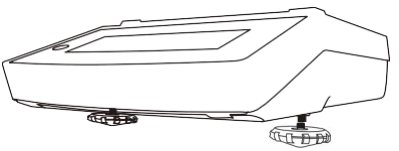
5.Do not use the balance in areas with high humidity or high levels of dust
6.When moving from a cooler to a warmer place, the accuracy and reliability of the scale will be influenced by the moisture condensation inside the balance. In order to eliminate this influence, it is best to leave the scale unplugged in its new location for at least two hours before next use.
7.Avoid extreme temperatures or exposure to direct sunlight or air conditioners. Ideal working temperatures are between 15°C and 30°C (59 and 86°F) with temperature fluctuations of less than 2°C (3.6 °F) per hour.
8.Keep the balance clean.
9.Do not leave material on the balance when not in use.
10.Always use the correct power supply and voltage with the balance; the balance is supplied with a power adapter 110-220 V/50-60 Hz.

Unpacking and inspection
Check that all of the items indicated below are included in the package and that nothing has been damaged:
•Balance
•Pan
•Power Cable (AC Adapter)
•Calibration Weight (Only included in External Calibration Model)
In case the balance or any component is damaged during transport, contact us immediately in order to process claims within the proper time frame.

VI. Using the Balance

Level adjustment
Once the balance is placed at its location, check the bubble level; if bubble is not well-centered, turn the adjustable feet so the bubble moves to the center and the balance is properly leveled.

The following are the adjustment tips:

When the bubble is right above the center： rotate the two leveling feet clockwise.
When the bubble is right below the center： rotate two leveling feet counterclockwise.
When the bubble is to the left of the center: rotate the left leveling foot counterclockwise and rotate the right leveling foot clockwise.
When the bubble is to the right of the center: rotate the right leveling foot counterclockwise and rotate the left leveling foot clockwise.

Start

1.Connect the balance to the power supply and press ON key on the panel
2.When the balance turns on, wait 30 minutes for the necessary warm up time for better performance and stability for the balance.
3.Once warm up time has passed, it is recommended that the balance be calibrated.
4.After calibration, the balance will enter weighing mode
5.To turn the balance off, press the OFF key on the panel and the display will shut off. If the balance will be unused for an extended period of time, disconnect it from the power supply.
6.When the operating temperature changes, put the balance in the new place for two hours in the "power on" state to make the balance comply with the new temperature.
7. If the number on display is not stable at first boot, and this occurred at the operating temperature, you can press the "TARE" button repeatedly and lay aside for 30 minutes.

Calibration

To get accurate weighing results, the balance should be calibrated before the usage scenarios below.
1. Before first use.
2. Balance power off for a long time or power error.
3. After changing the operating environment.
4. Regularly in weighing procedure.

Standard Calibration

1. Press the "ON" key, and the display will show 0.0000g.
2. Press "CAL" to enter the calibration mode; the value of the necessary weight

will flash on the display, e.g. “CAL-200”.
3. Put the calibration weight on the pan; to complete this step, open the glass door, put the weight on the pan, and close the door again. Wait about 10 seconds until the value of the calibration weight stops flashing and is fixed on the display (e.g., 100.0000 g, depending on the model).
4. Remove the weight from the pan. To do this, open the glass door, remove the weight from the pan, and close the door again.
5. The balance will enter weighing mode and display 0.0000g.

Internal calibration balance, with internal calibration weights built-in. After the machine is turned on and the balance displays 0.0000g, simply press the “CAL” button and wait for the value to jump to 0.0000g to complete the calibration.

Linear Calibration

1.Plug in and wait more than 30 minutes to warm up the balance.
2. Press and click ”ON." When it shows ”SET-C" on the display, release ”ON," then press “CAL” and hold down for longer than three seconds, release “CAL,” and it will enter linearity calibration mode.
3. It will show “LIN--0” at first, then “LIN-X00,” please put on a X00 F1 weight on the pan. When it is steady, remove the weight, and it will show “LIN---X00” (X00 means the number. Whatever the number displayed, please put the appropriate weight on the pan.)
4. Remove the weight from the pan. To do this, open the glass door, remove the weight from the pan, and close the door again.
5. The balance will enter weighing mode and display 0.0000g.

Tare Function

1.Put the receptacle on the weighing pan; its weight will be displayed
2.Press TARE key and the reading on the display will automatically be set to 0.000g or 0.0000g; tare is complete
3.If the receptacle is removed from the pan, the corresponding weight, with negative value will be displayed.
4.Press the TARE key again and the value on display will be set to zero again

Weighing Unit Selection

Long Press PRINT key to select the desired weighing unit from g, oz, ct and mg.
Note:The default weighing unit is g.

Piece Counting Function

1.Press and click the ON key until 'Set-0' is displayed.
2.Press PRINT key to select the reference number of pieces (COU-10, COU-25, COU-50).
3. Press the "TARE" key to save and exit the setup.
4. Press and hold "PRINT" when the display shows "0 PCS" release the button.
5. Put the corresponding number of pieces on the pan, press the ON button. Wait until the correct number of pieces is displayed based on your selection in Step 2.
6. Remove the pieces from the pan and the balance is ready to be used in piece counting mode.

Note: In counting mode, the weight of the pieces must be even and the weight of an individual piece should not be less than the readability of the balance.

Long press the "PRINT" button to return to weighing mode.

Percentage Function

1.Press and hold the "PRINT" button under the weighing interface. When the display shows"0.00%," release the "PRINT" button.
2.Put the desired reference material on the pan (e.g., 100g weight), and press the "ON" button to save the sample weight; the display shows "100.00%".
3.Remove the reference material from the pan, and place the contrast material (e.g., 50g weight). The display will show the percentage of the sample compared to the reference weight (e.g., "50.00%").
You don't need re-sampling if you use the same contrast a second time.

Density Determination (need gravity kit, prepare it yourself) —— density weighing setting

1.Press and hold the "ON" button. The balance enters into the main menu mode. When the display shows "SET-d," release the button.
2.Press and hold "PRINT", the balance enters into the density weighing setting, and the display shows "-dEn-*-." Press and hold "PRINT" to choose one of the following:
"-dEn-0-" close density weighing
"-dEn-1-" open solid density weighing
3.Press "TARE" to save and exit the setup. The display shows W1 in the right

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corner.

Solid Density Determination(dEn-1-)
1.Set up the auxiliary liquid density value.
2.Press and hold the “ON” button under the density determination mode, and the balance enters the main menu mode. When the display shows “SET-d,” release the “ON” button.
3.Press and hold the “CAL” button, and enter into the auxiliary liquid density value setting.
Press and hold the “CAL” button to increase, and press and hold the "PRINT" button to decrease.
4.Press “TARE” to save the density value and exit the setup.
5.The display shows W1. Put the sample on the pan in the air (e.g., screw sample).
6.Press and hold the "PRINT" button, and the display will show W2.
7.Weighing the sample in liquid - 2. Press and hold the “PRINT” button to collect the data.
8.The display will show the density result (W1\W2 are not displayed).
9.Press and hold the “ON” button to exit the density result.
10.Press and hold the “ON” button. When the display shows “SET-d,” release the “ON” button. Press and hold the “PRINT” button to choose“-dEn-0-.” Close the density weighing mode.
11.Press “TARE” to exit density determination and enter weighing mode.

VII. Internal Setting

Sensitivity Settings
The sensitivity settings are as follows:
- ASD-0 Maximum Sensitivity (Use in ideal conditions)
- ASD-1 High Sensitivity
- ASD-2 Common Sensitivity
- ASD-3 Low Sensitivity (Use in poor conditions)

To change the sensitivity on the balance:

1. Press and hold the ON button
2. Release when 'SET-A' is displayed
3. Press and hold the PRINT button until the desired sensitivity is displayed
4. Press the TARE button to return to weighing

Weighing Speed Settings(balance's internal calculating time)
The weight settings are as follows:
- INT-0 Fastest
- INT-1 Fast
- INT-2 Common
- INT-3 Slowest

To change the weight speed on the balance:
1. Press and hold the ON button
2. Release when 'SET-1'is displayed
3. Press and hold the PRINT button until the desired speed is displayed
4. Press the TARE button to return to weighing

NOTE: The factory default weighing speed is "-INT-2-" and the factory default setting sensitivity is "-ASD-3-". These settings are suitable for most working environments. Higher speeds and sensitivity levels require a more controlled environment. Please consult with us before making any adjustments.

Data Output Settings
The data output settings are as follows:
- PRT-0 Must press the PRINT button to output data
- PRT-1 Interval 0.5 seconds continuous output
- PRT-2 Interval 1 seconds continuous output
- PRT-3 Interval 2 seconds continuous output
- PRT-4 Interval 3 seconds continuous output

To change the data output settings on the balance:
1. Press and hold the ON button
2. Release when 'SET-P' is displayed
3. Press and hold the PRINT button until the desired output rate is

displayed
4. Press the TARE button to save and return to weighing mode

Baud Rate Settings

The Baud Rate settings are as follows:

• F-1200 • F-2400 • F-4800 • F-9600

To change the baud rate on the balance:

1. Press and hold the ON button
2. Release when 'SET-F' is displayed
3. Press and hold the PRINT button until the desired rate is displayed
4. Press the TARE button to save and return to weighing mode

RS232 Interface

Connection Type	Balance (9 pins)	PC/Printer (9 pins)
RXD (Input)	2	2
TXD (Output)	3	4
GND (Ground)	5	5

• The default Baud Rate is 1200 bps
• The data format is: 10 bits; 0 as start bit, 1 as stop bit, 8 digits (ASCII code)
• No odd and even numbers adjustments
• Data output is in continuous mode by default, the data output mode can be changed (see data output setting)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
+ or -	Data	Data	Data	Data	Data or Dot	Data or Dot	Data	Data	Data	Unit	Unit	Unit	RETURN	Line Feed

VIII. Maintenance and Cleaning

To get the best results and for product longevity, be sure to follow the suggestions below.
Note:All of the suggestions and guide lines mentioned below and throughout this manual will only be effective with continuous and careful maintenance of the equipment.

- Follow all processes outlined in the manual.
- Make the manual available to all users of the equipment .
- Prevent the balance from any sudden movements or falls, as well as from direct sunlight or air flow. The balance is a precision instrument and must be handled carefully.
- Balance must be plugged into a grounded electrical outlet and the socket should be easily accessible to unplug in case of emergency .
- Never unplug the balance by pulling on the wire, do so from the base.
- Never use the balance in a wedged-in location, such as a shelf.
- Never use other objects such as pens, pencils, etc. to press the buttons on the control panel; use only your fingers.
- Never place anything on the pan heavier than the maximum capacity of the balance, or the sensor could be damaged.
- Do not submerge the balance, nor spill any liquids on it.
- When the balance will be unused for a long period of time, lock the rechargeable battery.
- If any liquid does come into contact with the electrical parts of the balance, immediately disconnect it and send it in for service to be checked and adjusted if necessary.
- Always use only original components and supplies. Other devices and parts may appear similar, but can damage the equipment.

Cleaning

- Never use scourers or substances that can grate to clean metallic parts. This include, but is not limited to, stainless steel, aluminum, coatings, etc.. These can damage the balance and lead to early erosion of effectiveness of the balance.
- Use a lint-free cloth, dampened with soapy water, that does not contain any abrasive surfaces, nor corrosive materials.

ATTENTION!! If equipment is not properly cleaned and cared for, technical service will be unable to fix or repair

Troubleshooting Guide

Problem	Cause	Solution
Display not working	No power supply	Plug in the adapter
	Fuse Damaged	Replace fuse
	Damaged Transformer	Replace the power transformer. If problem persists, send to Technical Services for repair.
Unstable Display	Poor working conditions	Seek somewhere with less vibration and/or airflow
	Wind or drafts affecting readings	Check to make sure draft shield is closed tightly
	Scale pan unsteady	Remove the pan and clean the surface of the balance well, making sure there are no lingering items
	Power exceeds permissible value	Connect balance to power supply 110-220 V AC
Displayed mass is not the same as true mass	Balance has not been calibrated	Double check calibration, internal and/or external
	Receptacle not being considered	Make sure the receptacle has been tared out
	Uneven surface	Make sure balance is on a flat, even surface

Note:According to the applicable legislation regarding"Non-automatic Weighing instruments"in which balances are included, by means of write dating from the 22nd of October, 1994 (BOE 1/3rd/95), these balances must
not be used for:

- Commercial transactions
- Calculating taxes, tariffs, rates, indemnities, and other similar canons
- Judicial surveys
- Pharmaceutical medicine preparations, as well as analysis made in medical or pharmaceutical laboratories
- Determining the price or total amount in sale price or in prepackaged preparations

Instructions on environmental protection:

At the end of its life cycle, please do not dispose of this equipment by throwing it in the usual garbage. Instead, hand it over at a collection point for the recycling of electrical and electronic appliances. It does not contain dangerous nor toxic products for humans, but inadequate disposal could still damage the environment. The materials are recyclable as mentioned. By recycling material or through other forms or re-purposing old appliances, you are making an important contribution to the protection of our environment. Please inquire with your local community authorities for the proper disposal location.