U.S. SOLID

Instruction Manual

USS-DBS101

Semi-Micro Analytical Balance

Manual No.10169

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Introduction

Thank you for choosing the U.S. Solid USS-DBS101 Semi-micro Analytical Balance.

The U.S. Solid USS-DBS101 Semi-micro Analytical Balance is precise and reliable. It provides a high level of operating convenience and response sensitivity to facilitate determination of the weight of your samples. U.S. Solid's dedicated customer service staff are available to answer any inquiries regarding applications and accessories.

Please read the manual completely and follow the usage instructions before installation and operation as this will help you to make full use of the functions and performance of the USS-DBS101 Analytical Balance.

1.1 Safety Precautions

The U.S. Solid USS-DBS101 Semi-micro Analytical Balance qualifies as state-of-the-art technology and complies with all recognized safety rules. Improper use or handling, however, can result in damage and/or injury. Please follow the precautions below to ensure safe and trouble-free operation of your balance.

- The balance has a 3-pin power socket equipped with a ground terminal. To prevent electric shock and to maintain

stability in operation of the balance, be sure to ground the balance.

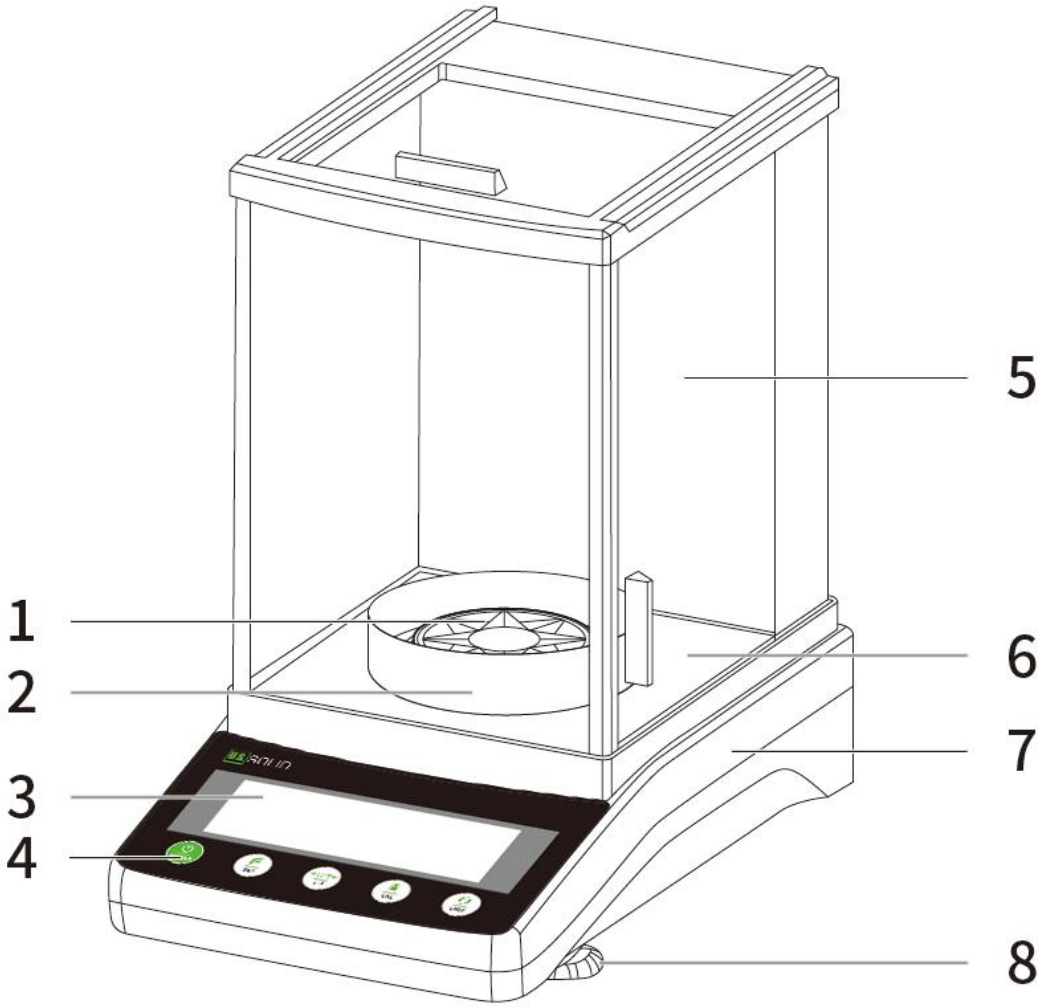
- Avoid getting the balance wet as it is not water resistant. Any leakage of liquid into the balance may damage the balance or cause an electric shock to the user.

- Use a power source (voltage, frequency, outlet type) adapted to the specification of the balance. If excessive voltage is used, the balance may overheat and be damaged or cause a fire.

- Operate the balance on a stable, rigid and flat table.
- Handle the balance carefully. It is a precision device, subjecting it to impact may result in a malfunction.
- If the device is not be used for a long period of time, the power should be turned off and disconnect the power cable.
- Do not disassemble, remodel or repair this product or accessories.

Design and Function

2.1 Components



1: Weighing Pan

2: Draft Shield

3: Display Panel

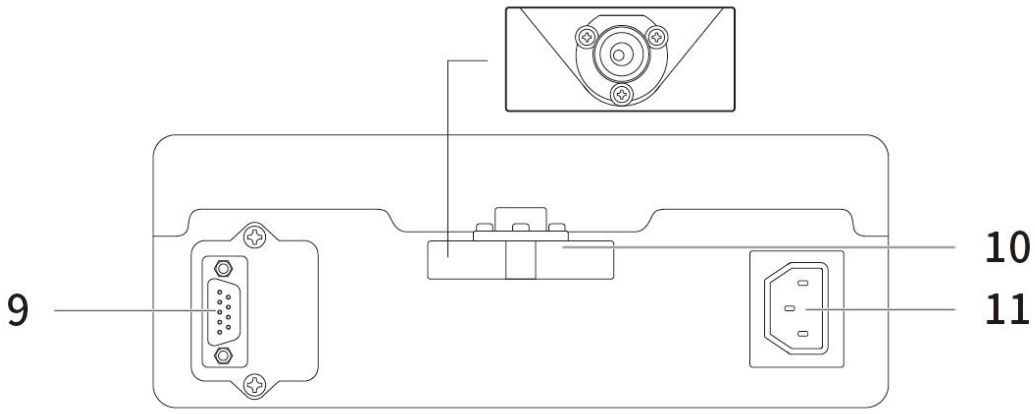
4: Keyboard

5: Glass Door

6: Handle

7: Balance Main Body

8: Leveling Foot



9: RS-232 Outlet

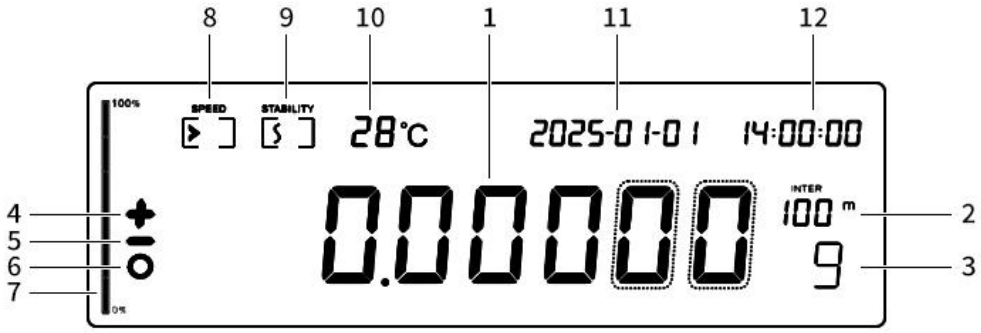
10: Level Bubble

11: Power Inlet

2.2 Keyboard

Key	Description
POWER	Turn the power on or off
	Exit
SET	Enter settings and functions selection
	Switch up
→0/T←	Tare/Zero the balance
	Confirm selection
CAL	Performs calibration procedure
	Switch down
UNIT	Switch between units

2.3 Display Panel



No.	Description
1	Weight value
2	Weight unit
3	Automatic calibration time interval
4	Indicates positive values
5	Indicates negative values
6	Stabilization indicator
7	Capacity utilization ratio
8	Display speed
9	Degree of stability
10	Ambient Temperature
11	Date
12	Time

Installation

3.1 Unpacking and Delivery Inspection

The USS-DBS101 Semi-micro Analytical Balance is a precision instrument. Unpack the balance carefully and check the delivered items for completeness.

The following accessories are part of the standard equipment for your new USS-DBS101 Analytical Balance:

· 1 Balance Main Body

· 1 Weighing Pan

· 1 Draft Shield

· 1 Power Cable

· 1 Instruction Manual

· 1 Quality Certification

Check the instrument for damage in transit. Immediately inform the U.S. Solid customer service if you have any complaints or parts are missing.

3.2 Selecting the Location

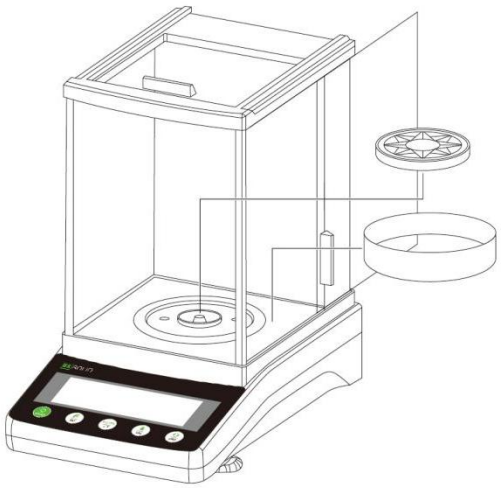
Measurement performance of your balance depends largely on the surrounding environments.

Please follow these guidelines to make sure the proper environmental conditions are met:

- Select a firm, horizontal location that is free from vibrations.
- Make sure that the ambient temperature is between 5°C and 30°C, the relative humidity is around 50% and that non-condensing conditions are met.
- Avoid direct sunlight and ensure that there are not any excessive temperature fluctuations.
- Ensure the balance is places a sufficient distance from heat-sensitive materials in the vicinity of the instrument.
- Avoid the effects of air currents from air conditioners, ventilators, open doors, or windows.
- Keep away from objects or equipment that are magnetic or capable of generating magnetic fields.
- Surroundings should be as free from dust as possible.

3.3 Installing Components

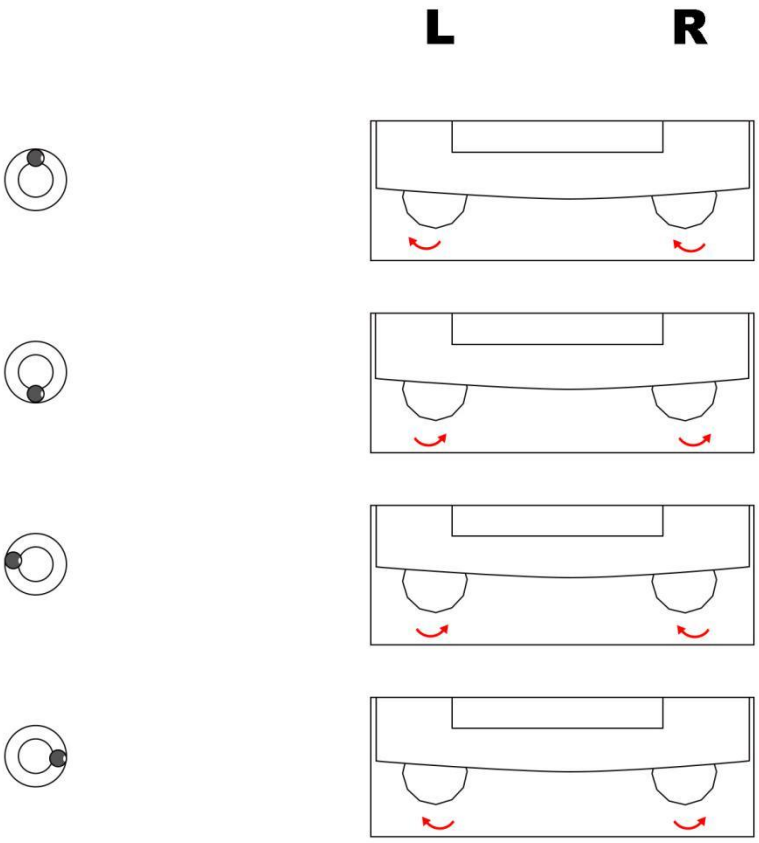
1. Place the balance main body on the installing location.
2. Push the side glass door open.
3. Gently attach the pan on the center axis of the weighing chamber.
4. Place the draft shield on the outside of the pan.
5. Push the side glass door close.



3.4 Leveling the Balance

Accurate horizontal positioning necessary for repeatable measurements and exact results. To compensate for small irregularities or tilts at this location, the instrument needs to be leveled.

Adjust the leveling feet of the analytical balance until the air bubble in the indicator is centered. The level indicator is located under the cover towards the rear of the analytical balance.



Position of air bubble	Adjustment method
up	Turn both feet clockwise
down	Turn both feet counterclockwise
Left	Turn left foot counterclockwise, right foot clockwise
Right	Turn left foot clockwise, right foot counterclockwise

3.5 Connecting the Power

Warning:

- To prevent electric shock, be sure to use the 3-pin power cord with equipment grounding connector.
- Check to make sure the voltage indicated on the analytical balance data label matches the local line voltage. Do not connect the balance to the power source if it does not match.

Connecting a power cable:

a. Insert the female end of the power cord into the power inlet located at the rear of the main unit.

b. Plug the male end of the power cord into the outlet.

Note:

To obtain accurate results, the analytical balance must be warmed up for at least eight hour each time it is connected to an AC power source. Only after this length of time will the balance reach the required operating temperature.

Settings

4.1 Display Speed

If the operating environment meets the requirements, the display speed of the balance can be adjusted to reduce the time required for the balance to stabilize, thereby improving work efficiency.

Icons				
Description	Highest speed	High speed	Normal speed	Low speed

Depending on the environment in which the instrument is used, carefully select the display speed to avoid instability that might be caused by excessive speed.

1. Press and hold the "SET" button until you hear two beeps to access the menu;
2. Press "CAL" to navigate to the "SPEED" option, then press "O/T" to enter the display speed settings;

3. Press "SET" to cycle through speed options. Press "O/T" to confirm

your selection;

4. Once confirmed, the system will return to the main weighing interface.

4.2 Stability

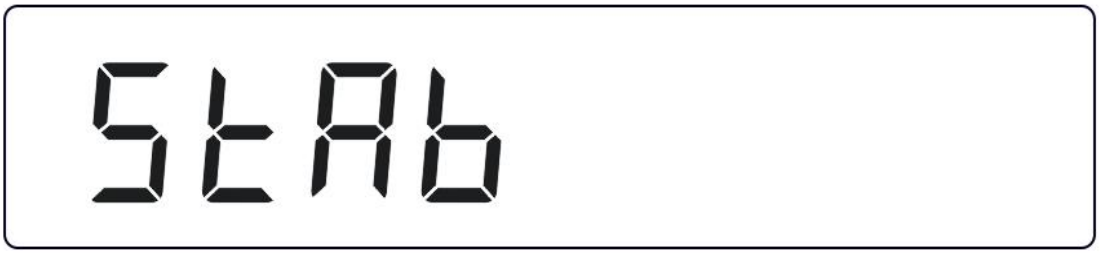
According to different operating environments, the balance is kept in a relatively stable state by adjusting its stability.

It is recommended that the balance be adjusted appropriately in an environment that guarantees its normal operation.

Icons	[ ]	[S]	[SS]	[SSS]
Description	Lowest stability	Low stability	Normal stability	High stability

1. Press and hold the "SET" button until you hear two beeps to access the menu;

2. Press "CAL" to navigate to the "STAB" option, then press "O/T" to enter the stability settings;



3. Press "SET" to cycle through stability options. Press "O/T" to confirm your selection;

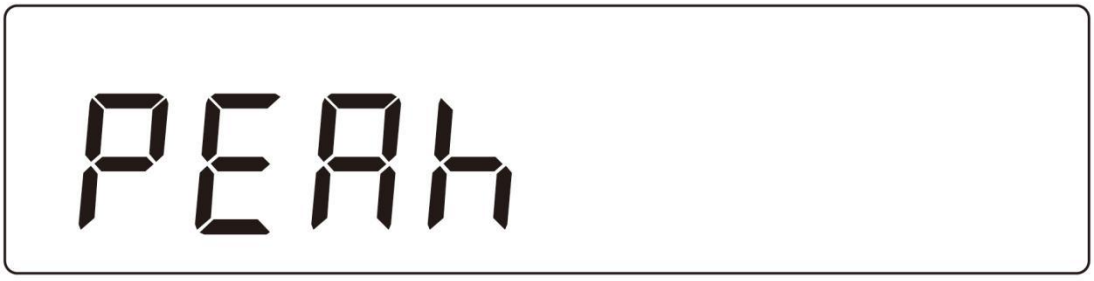
4. Once confirmed, the system will return to the main weighing interface.

4.3 Peak Hold

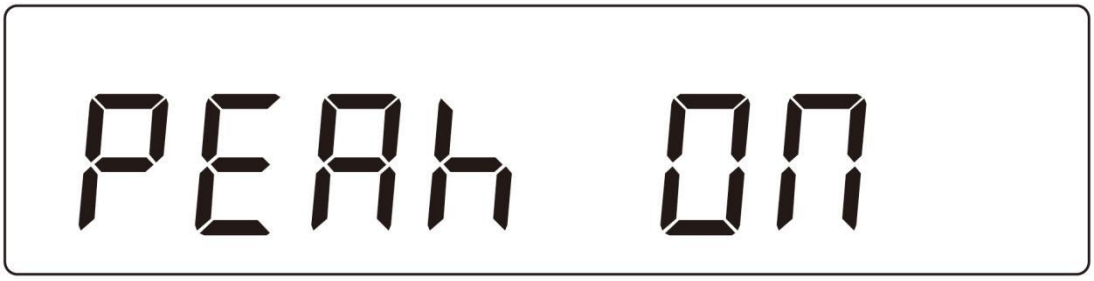
The peak hold function on an analytical balance is used to capture and display the maximum weight during measurement.

1. Press and hold the "SET" button until you hear two beeps to access the menu;

2. Press "CAL" to navigate to the "PEAK" option, then press "O/T" to enter the peak hold settings;



3. Press the "SET" button to toggle between "PEAK OFF" and "PEAK ON" to disable or enable the peak hold function;



4. Press "O/T" to confirm your selection and return to the weighing interface.

4.4 Zero Tracking Adjustment

The zero-tracking function on an analytical balance automatically adjusts the zero point to ensure accurate measurements. Its main uses are:

Eliminate drift - Compensates for minor changes caused by environmental factors or residue.

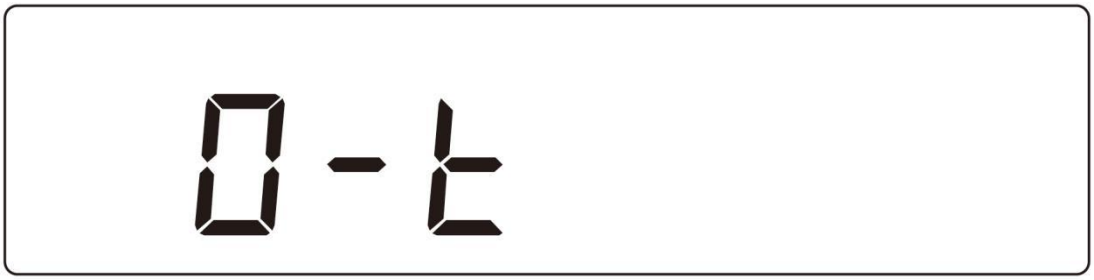
Improve precision - Maintains accuracy over long measurements or high-precision tasks.

Simplify operation - No need for manual zero adjustments.

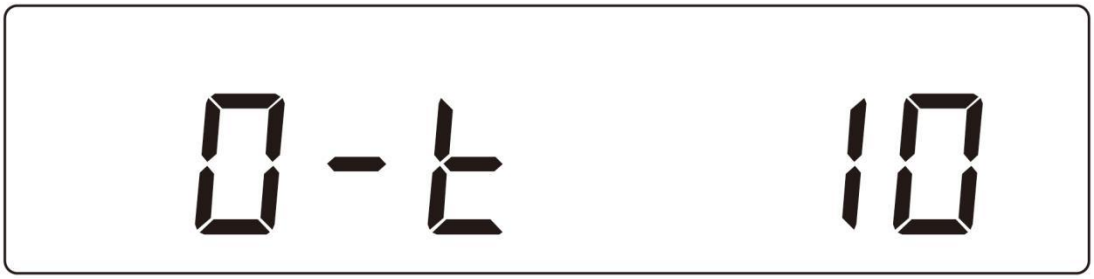
Adapt to dynamic conditions - Ensures reliable measurements in unstable environments.

1. Press and hold the "SET" button until you hear two beeps to access the menu;
2. Press "CAL" to navigate to the "0-t" option, then press "O/T" to enter

the zero tracking adjustment;



3. Press the "SET" button to cycle through the options: "0-t OFF," "0-t 10," "0-t 20," "0-t 30," "0-t 40," and "0-t 50," which correspond to setting the zero tracking to none, 1 mg, 2 mg, 3 mg, 4 mg, and 5 mg, respectively;



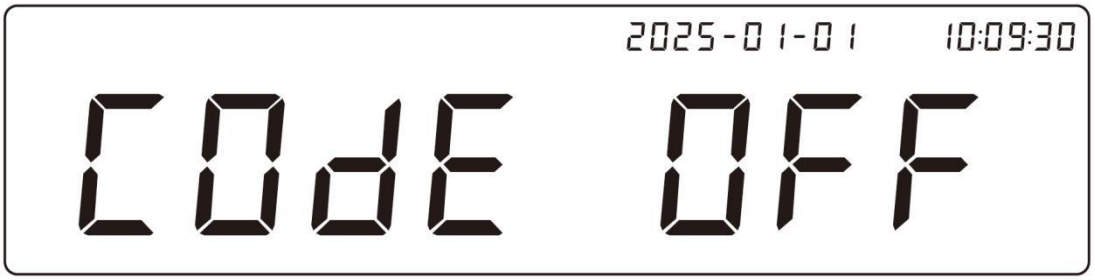
4. Press "O/T" to confirm your selection and return to the weighing interface.

4.5 Date and Time

1. Press and hold the "SET" button until you hear two beeps to access the menu;

2. Press "CAL" to navigate to the "STAB" option, then press "O/T" to enter the date and time settings;

3. To activate the date and time setting mode, enter the password by pressing "SET" twice, "CAL" twice, and "O/T" twice in sequence;



4. Use "SET" to increase the year or "CAL" to decrease it, and press "O/T" to proceed to the month setting;

5. Similarly, press "SET" to increase the month or "CAL" to decrease it, and press "O/T" to move to the day setting;

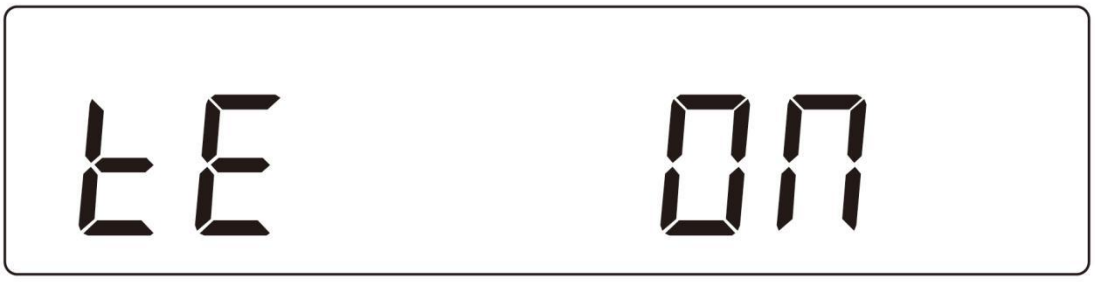
6. Follow the same process to adjust the day, hour, and minute in order;

7. Finally, press "O/T" to exit the settings and return to the weighing interface.

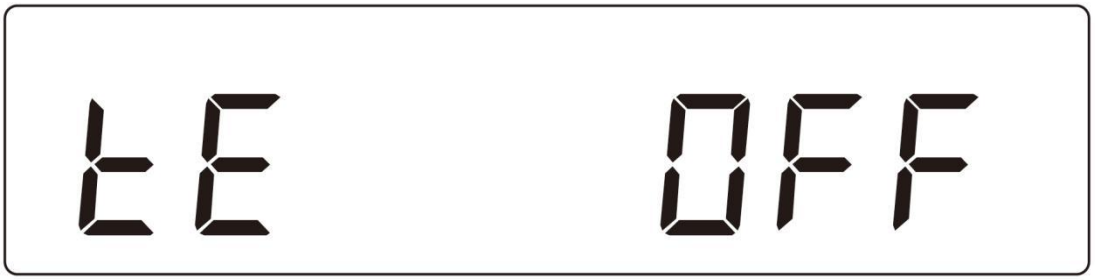
4.6 Temperature

1. Press and hold the "SET" button until you hear two beeps to access the menu;

2. Press "CAL" to navigate to the "TE ON" option, then press "O/T" to enter the temperature settings;



3. Press the "SET" button to toggle between "TE ON" and "TE OFF" to enable or disable the temperature display;

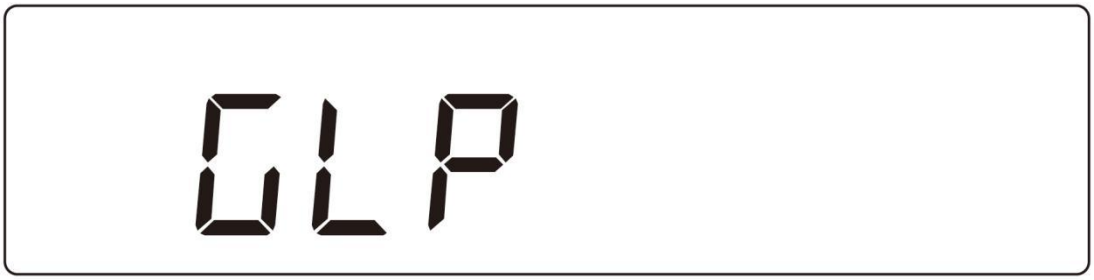


4. Press "O/T" to confirm your selection and return to the weighing interface.

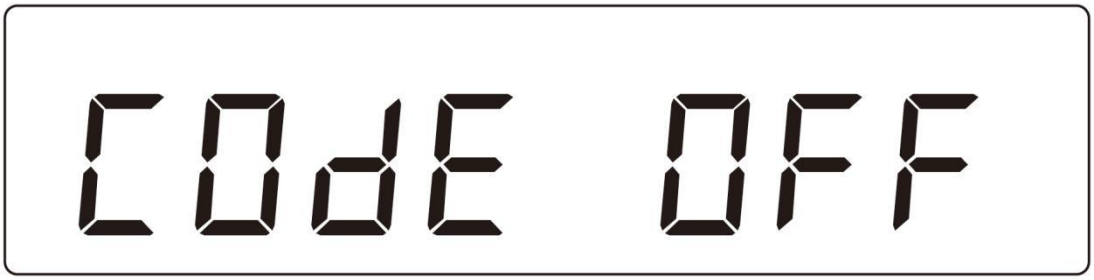
4.7 GLP Setting

1. Press and hold the "SET" button until you hear two beeps to access the menu;

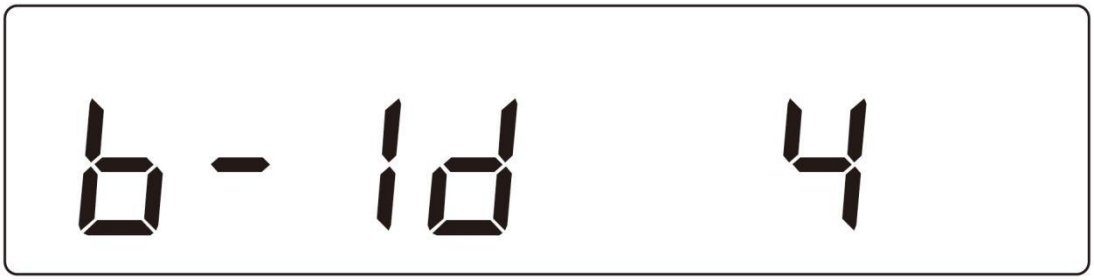
2. Press "CAL" to navigate to the "GLP" option, then press "O/T" to enter the GLP settings;



3. To activate the GLP setting mode, enter the password by pressing "SET" twice, "CAL" twice, and "O/T" twice in sequence;

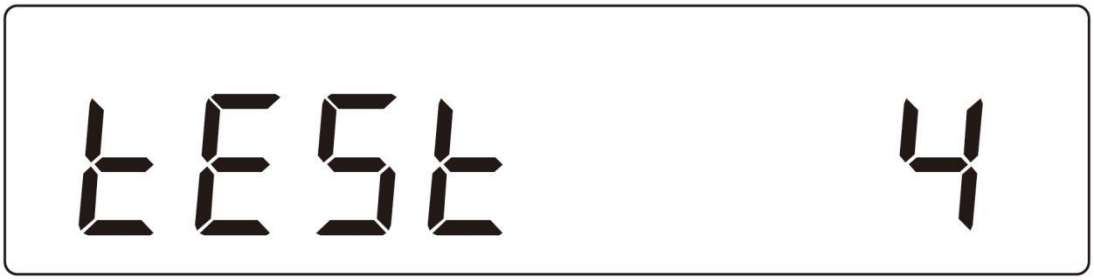


4. Adjust the device number by pressing "SET" to increase or "CAL" to decrease, ranging from "b-id 1" to "b-id 200";



5. Press "O/T" to confirm and proceed to the personnel number setting;

6. Adjust the personnel number by pressing "SET" to increase or "CAL" to decrease, ranging from "test 1" to "test 200";

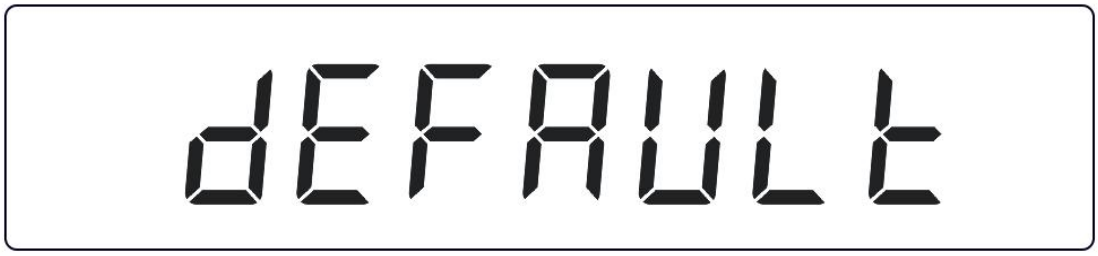


7. Press "O/T" to confirm and return to the weighing interface.

4.8 Restore Factory Defaults

If the balance is improperly set or operated, all settings can be restored to factory defaults, which will ensure that the balance is suitable for most operating habits and environments. When the balance is found to be abnormal and unstable, the stability of the balance can also be adjusted by restoring the factory settings.

1. Press and hold the "SET" button until you hear two beeps to access the menu;



2. Press "CAL" to navigate to the "default" option;
3. Press "O/T" to restore the factory default settings;
4. The system will then return to the splash screen, indicating that the factory defaults have been restored.

* The setting is only applicable to situations where settings are confusing due to incorrect operation. Factory defaults should NOT be performed frequently.

Calibration

Calibration is a necessary step to assure the analytical balance will accurately weigh the sample.

Perform calibration operations in the following situations:

- Changes in the location of use (including moving in the same room).
- Changes in ambient conditions.
- Prior to each use.

The balance must be fully warmed up for one hour to stabilize the weighing before calibration.

5.1 One-touch Internal Calibration

1. Press "O/T" to zero the balance while in the weighing state;
2. Press the "CAL" button; when "CAL--0" appears, it serves as a reminder to remove any samples from the weighing pan;
3. The display will then flash "CAL-----";
4. Next, "---------" will be displayed as the balance automatically performs calibration;
5. Once calibration is complete, the balance will return to the weighing interface and display "0.00000 g".

5.2 Timing Automatic Calibration

1. Press and hold the "SET" button until you hear two beeps to access the menu;

2. Press "CAL" to navigate to the "AUTOCAL" option, then press "O/T" to enter the timing automatic-calibration settings;

3. Press "SET" to select a time interval from "OFF," "10 min," "30 min," and "60 min";

4. Press "O/T" to confirm your selection. The balance will automatically calibrate at the selected time interval.

5.3 External Calibration

1. Press "TARE" to zero the balance in the weighing state;
2. Press and hold the "SET" button until you hear two beeps to access the menu;
3. Use the "CAL" button to navigate to the "E-CAL" option, then press "O/T" to initiate the external calibration procedure;

4. The display will show "CAL--0," reminding you to remove any samples from the pan;
5. The display will then flash "CAL--50";
6. Place the 50 g calibration weight on the weighing pan;
7. The display will show "--------" as the balance performs calibration.
8. External calibration is complete when "50.00000 g" is displayed.
9. Remove the calibration weight.

Weighing and Applications

6.1 Weighing

Note: Please warm up for 8 hours and calibrate before using.

Weighing a Sample Directly:

1. Press "O/T" to zero the balance when no sample is placed (no-load state);
2. Open the glass door of the weighing chamber, place the sample on the weighing pan, and close the glass door;
3. Wait for the display to stabilize. A stability mark ("O" in the bottom-left corner of the screen) will appear to indicate a stable state;
4. Record the displayed value.

Weighing a Sample in a Container:

1. Open the glass door, place the empty container on the weighing pan, and close the glass door;
2. Wait for the display to stabilize. Once the stability mark appears, press "O/T" to tare the container. The display will reset to zero;
3. Open the glass door, add the sample(s) to the container, and close the glass door;
4. After the display stabilizes, record the value shown.

6.2 Unit of Weight

The USS-DBS101 Semi-micro Analytical Balance has multiple sets of weight units including g, mg, ct ,oz. The unit selection function can be used to meet the unit requirements in various usage situations.

1. Press the "UNIT" button to select your desired unit of measurement;
2. Press "O/T" to zero the display and begin weighing your sample.

To avoid the deviation of the weighing record caused by unit misreading, please ensure that the selected unit is the one required.

6.3 Counting Function

The U.S. Solid USS-DBS101 Semi-micro Analytical Balance has a built-in counting function that meets various industrial counting requirements, especially the counting function for small components.

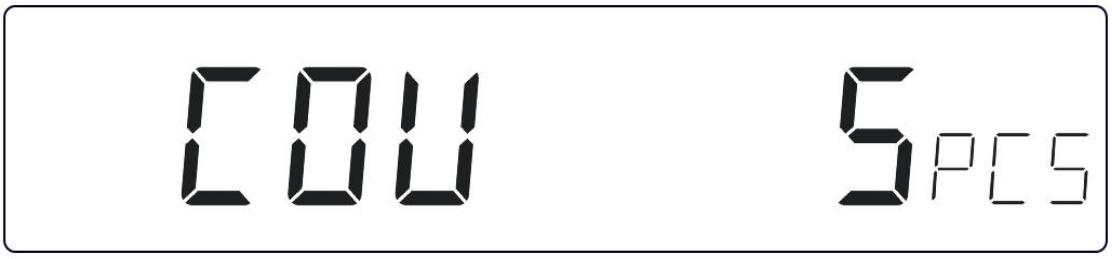
To ensure the accuracy of the counting function for small components, it is necessary to ensure that the weight of all samples is consistent, and that the weight of a single object is ≥0.5 mg.

1. Press and hold the "SET" button until you hear two beeps to access

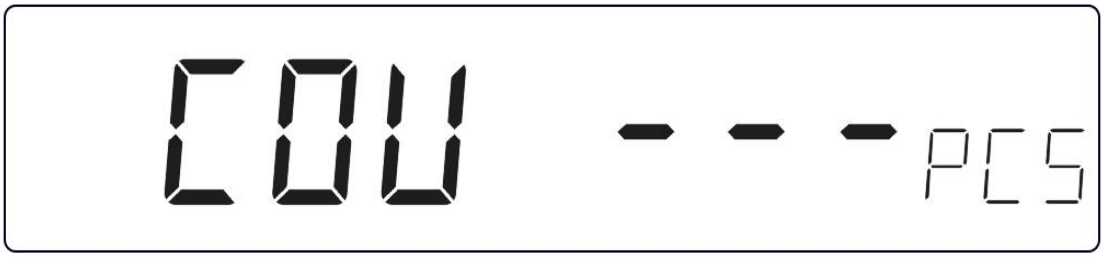
the menu;

2. Press "CAL" to navigate to the "COU" option, then press "O/T" to enter the counting function;

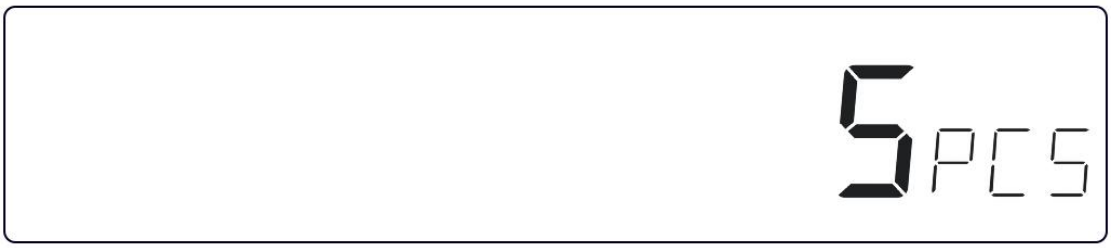
3. Use the "SET" button to adjust the sample quantity, ranging from 5 Pcs to 200 Pcs, and place the corresponding number of samples on the weighing pan;



5. Press "O/T," and the display will show "COU---PCS";



6. Once "COU---PCS" disappears, you can place the samples to begin piece-counting;



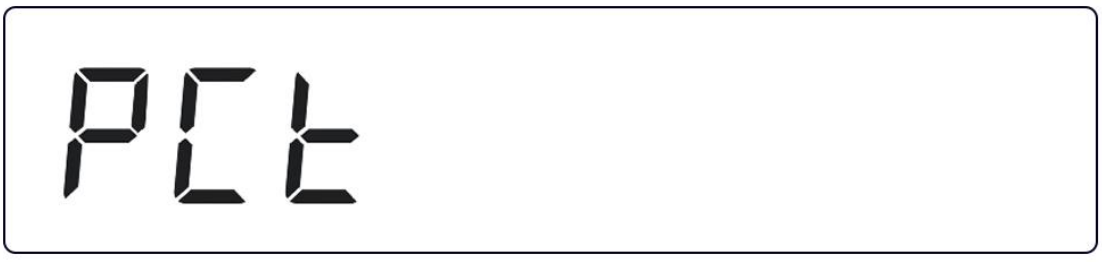
7. After completing the counting process, press the "SET" button to display "ESC," then press "O/T" to exit counting mode and return to the weighing interface.

6.4 Percent Weighing

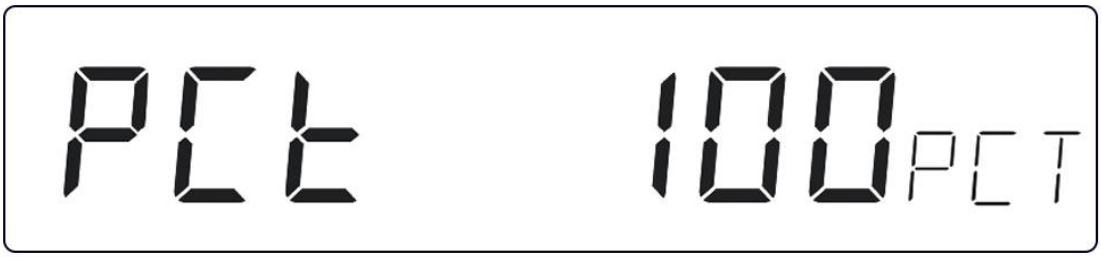
The U.S. Solid USS-DBS101 Semi-micro Analytical Balance has a built-in percent weighing function.

1. Press and hold the "SET" button until you hear two beeps to access the menu;

2. Press "CAL" to navigate to the "PCT" option;



3. Press "O/T" to enter the percent weighing function, the display will show "PCT 100";



4. Place the reference item on the weighing pan and press "O/T" to confirm;

5. The display will show "PCT ---," indicating that the percent weighing mode is active. The default display will be "100 PCT";

6. Remove the reference item and place the sample to be measured on the pan to determine its percentage relative to the reference;

7. Once completed, press the "SET" button to display "ESC," then press "O/T" to exit the percent weighing mode and return to the weighing interface.

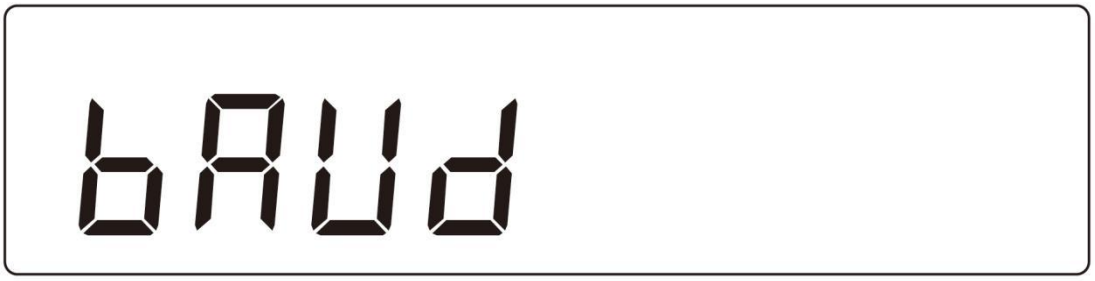
6.5 Data Output

The basic steps for data output are divided into three main parts. The first step is to set the baud rate of the balance. Then, use the RS232 cable to connect the balance to the computer/printer respectively. Open the software on the computer and select the corresponding port and baud rate. The third step is to set the output mode on the balance and then start the output.

Baud Rate Setting

1. Press and hold the "SET" button until you hear two beeps to access the menu;

2. Press "CAL" to navigate to the "BAUD" option, then press "O/T" to enter the baud rate setting;



3. Press “SET” to switch baud rate from 1200, 2400, 4800, 9600, 19200 and 38400;

Connection Setup

This balance supports communication via a 9-pin RS232 serial cable, with the following pin configuration:

2 × RXD (Receive Data - Input)

3 × TXD (Transmit Data - Output)

5 × GND (Ground)

Connect the 9-pin RS232 end to the balance and the USB end to a computer or printer.

Output Mode Selection

1. Press and hold the "SET" button until you hear two beeps to access

the menu;

2. Press "CAL" to navigate to the "PRINT" option, then press "O/T" to enter the data output settings;

3. Press "SET" to cycle through the following output modes:

ONCE: Manual Single Output: Press "SET" to send data once (triggered manually).

CO-R: Continuous Raw Output: Automatically transmits real-time data continuously (including unstable readings).

CO-S: Continuous Stable Output: Automatically transmits only stable readings in real time.

GLPONCE: GLP-Compliant Single Output: Press "SET" to send a single reading with user ID (for audit trails).

GLP: GLP-Compliant Calibration Output: Press "SET" to send a single reading with calibration details (meets GLP documentation standards).

4. Press “O/T” to confirm selection and exit.

Maintenance

7.1 Precautions

The U.S. Solid USS-DBS101 Semi-micro Analytical Balance is a precision mechatronics intelligent measuring instrument, which must be carefully maintained and treated.

1. Do not use sharp objects (such as pens) to click the button, use only your fingers.
2. To avoid damage to the weighing system, do not let the object fall from the height onto the weighing pan.
3. Do not expose the balance to high humidity or dusty conditions for an extended period of time.
4. When the balance is not to be used for a long time, cover it with to prevent dust from entering.
5. When weighing powder and fine particles should be done with a suitable container to prevent dust and particles from falling into the load cell below the weighing pan.
6. Wear a glove when calibrating with the calibration weight. Do not touch the calibration weight directly with your hand.
7. Keep the balance clean and dry.

7.2 Cleaning

- Turn off the power switch and remove power cord during maintenance.
- Make sure that no dust or liquid enters the balance housing.
- Do not use any aggressive cleaning agents (solvents, abrasive cleaning agents, etc.) or organic solvents to clean the balance.

Clean the balance using a piece of lint-free cloth which has been wet with a mild detergent (soap) only.

Removing the sliding glass doors for cleaning:

1. Remove the pan and anti-draft ring from the weighing chamber.
2. Unscrew and remove the inside knob on the glass door.
3. Slide the glass door out backwards.

7.3 Disposal

Disposal of equipment and packaging must be carried out by the operator in accordance with relevant laws of the country or region in which the equipment is to be used.

Troubleshooting

8.1 Troubleshooting

Problem: Display remains off after switching on.

Possible causes:

- Power cord is not connected
- Power line fuse blown
- Power transformer damaged
- Instrument faulty

Problem: Weight display is constantly changing or unstable.

Possible causes:

- The sample pan is in contact with the draft shield or heating chamber
- Glass draft shield is not closed
- Test bench vibration
- Electromagnetic field interference
- Power supply instability

Problem: Displayed value and actual weight are not consistent.

Possible causes:

- Not calibrated before weighing
- Not returned to zero before weighing
- Balance not leveled well

8.2 Error Code

Error code display	Description
Err.	Calibration operation error
Err. 1	Counting setting error
Err. 2	The weighing pan is not placed correctly
Err. 3	Sample weight exceeds the capacity
Err. 4	Automatic calibration motor failure
Err. 5	Percentage setting error

Technical Data

Model	101-61
Capacity	61 g
Min. Weight	0.001 g
Readability	0.01 mg
Repeatability	±0.0001 g
Linearity deviation	±0.0001 g
Stabilization time	6 - 8 Seconds
Operating temperature	15℃ - 35℃ (59℉ - 95℉)
Calibration	Internal Automatic Calibration
Pan size	Φ80 mm
Interface	RS232
Power	110-240V 50/60Hz AC
Dimensions	340*215*350 mm (13.39*8.47*13.78 inches)
Net weight	6.5 kg (14.4 lbs)

Contact

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