Precision Balance

W3200 Series

Operating Manual

Version 11-2-21

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1. INTRODUCTION

To ensure proper operation performance from of your Accuris Precision balance, please read this manual in its entirety before use.

Accuris balances have been designed and developed with our scientific customers' requirements in mind. The Precision Balance range incorporates gold-plated ceramic capacitance technology, combined with mechanical engineering and software to provide the following features:

- Easy Operation.
- Easy to read, large LCD screen with a white backlight;
- Rapid weighing speed 10 times faster than mechanical balances;
- Capability to tare up to the maximum capacity of the balance；
- Multiple weighing modes:
    1) Standard weighing
    2) Piece counting
    3) Percentage weighing
    4) Inspection mode
- Choice of weighing units: grams, carats, or ounces.
- RS-232 interface for connecting a peripheral device such as a computer or a printer;
- Alarm to indicate malfunction
- Easy, in-lab calibration
- Bottom hook weighing (used for density measurement)

2. INSTALLATION

2-1 Unpacking

CAUTION: Always handle your Accuris balance with care. The internal, electromechanical components have been assembled and adjusted at our factory to ensure accurate performance, but mishandling and physical shock can damage the internal mechanisms.

Carefully remove the balance from the carton and then remove the foam protective pieces. Check the balance to make sure there has not been any damage during shipping. Check the contents of the package to make sure you have received all of the parts:

Packing List

No.	Item	Quantity
1	Precision Balance Unit	1
2	Weigh Pan (top)	1
3	Pan Support (bottom)	1
4	AC power adapter	1
5	Operating Manual	1

IMPORTANT: It is recommended to save the cartons and packing materials for storing and transporting the balance or returning it for any required servicing.

2-2 Specifications

Model	W3200-120	W3200-320	W3200-500	W3200-1200	W3200-3200	W3200-5K
Capacity	**120g**	**320g**	**500g**	**1200g**	**3200g**	**5,000g**
Calibration	External					
Readability	0.001g			0.01g		
Repeatability (S.D.)	0.002g			0.02g		
Linearity (+/-)	0.002g			0.02g		
Stabilization time	Approx. 2 sec.					
Operating temperature	10℃—30℃					
Pan size	11.5cm / 4.5 in.			16cm / 6.3in		
Draft Shield	Yes, 3-door glass enclosure			No		
Dimensions (W x H x D)	20.5 x 35 x 30.5 cm / 8 x 13.75 x 12 in			20.5 x 35 x 8 cm / 8 x 13.75 x 3.1 in		
Power	AC 110 to 230V, 50/60 Hz					

2-3 Environmental Requirements

Your Accuris balance is a precision instrument, and requires an environment which is free from excessive air flow, dust, corrosive elements, vibration and temperature or humidity extremes.

An unsuitable environment will adversely affect the performance of your balance.

- The area and environment where your balance is used should be kept clean and dry at all times;
- The optimal operating temperature is 20℃ (68℉) and 50% relative humidity;
- Always use a stable AC power source that meets the input specifications of the AC/DC power adapter.
- Do not situate the balance:
  - In direct sunshine;
  - Next to windows or doors where there can be excessive air movement or rapid temperature fluctuations;
  - Near a heater or air conditioner;
  - Near vibrating, rotating or reciprocating equipment;
  - Near magnetic field or equipment that generates a magnetic field;
  - On an unstable surface;
  - In areas where there are corrosive vapors;

2-4 Setting up your Balance

CAUTION: Always allow the balance to warm up in its ambient environment for 2 hours prior to use.

If the balance is moved from a cold environment to a warmer environment, condensation may form on the internal components and external surfaces of the balance and this can cause operating and performance problems.

1. Place the balance on a stable and level surface;
2. 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;
3. Carefully place the pan support and the pan into position on the weighing mechanism. These parts should be carefully put into place, no downward force is required;
4. Plug the AC adaptor in to a suitable electrical outlet and into the back of the balance.

CAUTION: Never place any samples or weight on the weigh pan that exceeds the maximum capacity of the balance. Doing so can cause damage to the internal weighing mechanism and this damage is not covered by the warranty.

3. OPERATING YOUR BALANCE

3-1 Display and Control Panel

DISPLAY SYMBOLS

g	Grams
ct	Carats
oz	Ounce
Inspect	Inspection mode
PCS	Units shown in # of pieces
COUNT	Pieces Counting Mode
%	Percent deviation
OK	Indicates the weight is stable
+	positive indicator
−	negative indicator

3-2 Basic weighing

- Press the power key, the balance will turn on and display 0.00g
- Place a weigh boat or weighing container on the weighing pan
- Press the TARE key and wait for the display to show 0.00g
- Place the sample onto the container (close the draft shield doors if included on your balance)
- The display will stabilize (OK is displayed) and the weight will be displayed
- Repeat the steps to weigh the next sample

3-3 Count weighing

This function is used to determine a total number of pieces of similar weights. A known number of pieces is weighed as a reference, and the average weight of each piece is automatically calculated. An unknown quantity of pieces can then be calculated.

1. Place an empty container on the weighing pan.
2. Press the TARE key, the balance will display 0.0000g.
3. Press "Count/Enter" key, repeat to choose the known reference # of pieces (example 10 pieces)
4. Place the known # of pieces onto the weigh pan.
5. Press "METRIC" key, and the reference number will be displayed along with "PCS"
6. Remove the reference quantity and the display will show 0 PCS.
7. Now you can add to the pan an unknown quantity and the quantity will be calculated.

Press the METRIC key to change out of the counting mode.

3-4 Percent Deviation

This mode is used to calculate the percentage of weight a sample varies from a reference weight.

1. Empty the weigh pan;
2. Press the TARE key to zero the display; "0.00 g" will be displayed
3. Place the reference weight onto the weigh pan, and close the doors;
4. Press the PERCENT key. 100% will be displayed;
5. Remove the reference weight from the weigh pan;
6. Place an object to be compared to the reference weight onto the weigh pan and close the draft shield doors.
7. A percentage value of the deviation between reference and the sample will be displayed.

3-5 Inspect Mode

The Inspect mode is available to determine if a weighed object is within a pre-set range.
Display will signal: LOW or HIGH (with warning sound of buzzer) or OK to indicate the results.

1) Press the MENU key, and then use the TARE key to scroll through options until "InSPCT" is displayed.
2) Press "COUNT/ENTER" to choose Inspect mode.
3) "SET HI" is displayed, press COUNT/ENTER key.
4) Press COUNT/ENTER to set position of the decimal point. Press TARE key to move the decimal point, press COUNT/ENTER to confirm choice.
5) Set the value of the High limit: press COUNT/ENTER to increase the value, press TARE to decrease the value.
6) Press MENU and then COUNT/ENTER to confirm the High limit set point.
7) Press TARE to switch to SET LO, then press the COUNT/ENTER key.
8) Press TARE to move the decimal point, press COUNT/ENTER to confirm choice.

9) Set the value of the Low limit: Press COUNT/ENTER to increase the value, press TARE to decrease the value.
10) Press MENU and then COUNT/ENTER to confirm the Low limit set point.
11) No warning setup: no warning when there is no loading on the balance or the weight is lower than the lowest weight limit.
Press Menu key, press Tare key repeatedly until it reads "InSPCT". Press Count/Enter key, the display reads 'SET HI', press Tare key repeatedly until it reads 'nOnrES', press Count/Enter, the display reads "0" (the initialization value which indicates no warning when the real weight is lower than 0% of the lowest weight). Press Count/Enter to increase the value, while press Tare key to decrease the value. Choose the disired value, press Menu key then the desired value glitters. Press Count/Enter key to confirm, the display reads "SET HI".
12) Enabling Inspection Mode: Press Tare key repeatedly until the display reads "EnAbLE", press Count/Enter key to confirm;
13) To Disable Inspection Mode: Press Tare key repeatedly until the display reads "dISAbL", press Count/Enter key to confirm, the balance returns to weighing mode.
14) Checking the highest and the lowest weight limits:
    a) Press Menu key, the display reads "PrINT", press Tare key repeatedly until it reads "InSPCT".
    b) Press Count/Enter key, the display reads "SET HI".
    c) Press Count/Enter key, the displays reads the highest weight limit.
    d) Press Tare key, the display returns to reads "SET HI".
    e) Press Tare key, the display reads "SET LO", press Count/Enter key, the display reads the lowest weight limit.

Notice:
- To leave the menu setup anytime during the operation, press Tare key until the display reads "ESC", press Count/Enter to confirm.
- To clear the highest and the lowest weight limits, press Tare key repeatedly until the display reads "CLEAr", press Count/Enter key, then the limits value both return to zero.
- After any modification of the highest and the lowest weight limits, the balance needs to enter the Inspect mode again. Follow the steps enable inspect mode.
- The highest and the lowest weight limits will be saved in the balance. There is no need to
    o to set up the limits for the next start-up of the balance.

4. CALIBRATION

Background

Among the various factors that may affect the accuracy of the balance, gravitational force is the most significant. In different geographical areas on the earth, gravitational force varies, and a balance should be calibrated in its installed location.

Accuris Precision Balances can be calibrated in the lab using known reference weight.

4-1 Manual Calibration

Plug in and pre-warm your balance at least 30 minutes before performing a the calibration procedure

- Press the Power button to turn on the balance
- Press the TARE key and the display should show 0.00 g
- Press the CAL key, and the maximum capacity of the balance will be displayed (for example 500 g)
- Pressing the TARE key will scroll through different calibration weight options. Choose the appropriate value for the calibration weight that is available. The following chart shows the calibration weight options for the different models in the W3200 series:

Model Number	Calibration Weigh Options in Software
W3200-120	120g, 100g
W3200-320	300g, 200g, 100g
W3200-500	500g, 200g, 100g
W3200-1200	1200g, 1000g, 500g
W3200-3200	3000g, 2000g, 1000g
W3200-5000	5000g, 2500g, 2000g, 1000g

- Place the calibration weight on the pan, and press the CAL key. The display will read: CAL - - - during the calibration process.
- When the calibration is finished, the display will read the value of the calibration weight,
- Remove the calibration weight and the display should return to 0.00 g.
- Calibration is complete.

5. USER SET UPS

General Key Functions in User Setups
Press MENU key to enter setup program.
Press TARE key to choose the item to be set up, then press COUNT/ENTER to confirm.
To exit the setup program, press the TARE key repeatedly until "ESC" is displayed, then press COUNT/ENTER to confirm.

Print Setups
There are three print types,
        STABLE Print: print a stable reading when it is attained.
        INSTANT Print: print immediately after the print key is pressed.
        INTERVAL Print: print at predetermined time intervals.
The number of line feeds can also be set for label printing.
    Note
    The print function is separate from the line feed setup, i.e., set the print function first then

re-enter the print MENU to program the number of line feeds.

To set the print key function, use the following procedure:
1. Print Menu: the balance reads "PrInT".
2. Press the COUNT/ENTER key, the balance reads "STAbLE", which indicates stable print as the default.
3. Press the TARE key to choose the print type and press COUNT/ENTER to confirm.
4. Press the TARE key until it reads "InTEr", press COUNT/ENTER, and "0 SEC" is displayed. Press TARE repeatedly to see the predetermined time interval and press

COUNT/ENTER to confirm. "0 SEC" indicates continuous print.
5. Print COUNT/ENTER key to return to weighing mode.
6. After entering print setup menu, press TARE key repeatedly to choose line feed setup "LinEFd".
7. Press TARE key repeatedly to see the predetermined line feeds (1-18). Choose the proper line feeds, press the COUNT/ENTER key to return.

Baud Rate Setup

1．Press the MENU key.
2．Press the TARE key, until "bAud" is displayed.
3．Press the COUNT/ENTER key, the balance reads "300".
4．Press the TARE key repeatedly, the balance displays the other buad rates. Choose the proper rate and press COUNT/ENTER to confirm. The balance reads "ParITy" and begins parity check.
5．The balance reads "nOnE" (no check) for the first.
6．Press the TARE key, it reads the check type, "Odd" indicates odd check and "EvEn" indicates even check.
7．Choose the proper check type and press COUNT/ENTER to confirm, the balance now returns to weighing mode.

Enabling Units of Measure

The units function can be programmed to turn certain weighing units on or off. To enable or disable certain units of measure, perform the following procedure.

1．Press MENU key, the display reads "PrInT".
2．Press TARE key repeatedly until it reads "unIT".
3．Press COUNT/ENTER key, the display reads "g yes" which means g available for use. Press COUNT/ENTER to confirm. To disable g as the unit, press Tare key, the display reads "g no", press COUNT/ENTER key to confirm.
4．Follow the steps above to enable or disable Oz, Ct or dwt as the unit of measure.

Restoring the Factory Default Setup

This step resets the factory defaults.

1．Press the Menu key, the display reads "PrInT".
2．Press Tare key repeatedly until it reads "InITIA".
3．Press Count/Enter key to confirm, the display reads "BUSY" and then returns to weighing mode. Factory default setup is finished.

Backlight Setup

1．Press MENU key, the display reads "PrInT".
2．Press TARE key repeatedly until it reads "bLgHT", press COUNT/ENTER to confirm, the display reads "1 nIn" which indicates the backlight will be off in 1 minute.
3．Press TARE key repeatedly to choose the desired time, 1、2、3、5、10、15、30、60 (min. are available to choose).
4．Press COUNT/ENTER key to confirm and the balance returns to weighing mode.

6. Additional Functions

Bottom Hook Weighing
There is a receptical on the bottom of the balance for a weighing hook.
1. Open the bottom cover of the balance
    i.   Important Notice: Lay the balance on its side to open the bottom cover, do not turn the balance upside down.
2. Gently screw the hook clockwise into the bottom tapped hole.
3. Attach the sample object to the bottom hook with a line – a suspension line, for example. If necessary, set a safety guard to avoid air current.

7. Communication with a Computer

The basic keyboard functions can be accessed via the RS232 interface. The following commands are available:

U：Unit ········ units conversion
T：Tare ········ deduct the tare weight
C：Cal ········ calibration with external standard weight
P：Print ········ print function
%：% ········ percent function
：# ········ instant print
M：Count········ counting function

When a balance is connected to a computer, it is suggested that immediate print (#) be used. In response to this command the balance will transmit whatever number or message appears on the balance display.
The string format output is shown below:
A B C D E F G H I J K L M
A：   +/-   signs field; usually no display as a space when it is a positve number, - is displayed when it is a negative number.
B~G：   number and decimal field; spaces are used when there are less than six digits.
H~I：   spaces field
J：   unit field; it describes the units of the number being transmitted. Your balance will transmit G for grams, O for ounces, C for carats.
K：   stable character; it corresponds to the "OK" indicator on the display. S means the reading is stable, space means the reading is not stable.
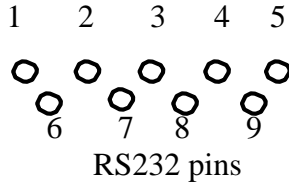L：   return character
M：   line feeds character; it indicates the line feeds.

7-1 The RS232 Interface Hardware:

This balance adopts the transmit and receive lines of standard RS232.

The data format is   1 start bit

                8 data bits include parity

                1 stop bit

The instruction to connect the balance to external device is as follows,

```
        1    2    3    4    5
        O    O    O    O    O
          O    O    O    O
          6    7    8    9
            RS232 pins
```

PIN   DESCRIPTION

2：TXD---- scale transmits data

3：RXD---- scale receives data

5：GRD---- signal ground

   Notice:

- o　"handshake" signals, such as "clear to send" (CTS) are not used. The peripheral must have a minimum buffer (15 characters).
- o　It is suggested that the maximum recommended cable length is 15 meters; the load impedance of the device connected should be between 3000 and 7000 ohms with no more than 2500 pf shunt capacitance.

8. TROUBLE SHOOTING

Problem	Possible Cause	Solution
No Display	• No power • AC/DC Power Adapter not functioning, or incorrect specifications	• Plug in the AC/DC adapter • Replace the adapter • Contact the Service Department
Displayed weight value is unstable	• Unsuitable environment • Draft shield door is not closed properly • There is an object under the weigh pan • Unstable power supply exceeds the limit • The object weighed is	• Install the balance in a suitable location, avoid vibration, air movement, temperature fluctuations • Close the door properly • Remove any objects or materials that may obstruct the pan

	unstable (evaporation or absorption of moisture)	
Weighing value is not accurate	• The balance is not calibrated • The display is not tared before weighing • The balance is not properly leveled	• Calibrate the balance • Press TARE key to zero the display • Level the balance by turning the adjusting feet

8. CARE AND MAINTENANCE

The Accuris Balances are high precision instruments that must be handled carefully and properly maintained.

• Do not use sharp objects（such as a pen or pencil) on the keypad.
• Do not let objects fall on the weighing pan, otherwise the weighing system can be damaged;
• Do not expose the balance to high temperatures or dust;
• Do not disassemble the balance without proper training or instructions;
• It is recommended to cover the balance when not in use;
• Keep the balance clean and dry.

8-1 Cleaning

• Unplug the AC adapter before cleaning;
• Do not use any aggressive cleaning agents such as solvents or alcohols;
• Use a damp, soft cloth with mild detergent such as soap;
• Do not allow any liquids to enter the balance;
• After cleaning, wipe dry the balance with a piece of soft and dry cloth.