VWR B-Series Balances

Operation Manual

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* Factory Default Setting

Congratulations and thank you for selecting a VWR B-Series Balance, we appreciate your business. Your balance was designed and manufactured to give you years of service.

SAFETY PRECAUTIONS

- **Check the instrument for any visible signs of damage before you apply power.**
- **Ensure the power supply is compatible with your instrument AND the local line voltage.**
- **Do NOT operate in Hazardous Locations. Check with your Safety Officer with any questions or concerns.**
- **Make sure no liquid enters the housing. Use a damp cloth to clean the instrument.**
- **Do not locate in areas where corrosive gases are present.**
- **Avoid exceeding/overloading the weigh capacity or dropping samples on to the weigh pan. Weight overload and shock may damage the instrument and void the warranty**
- **Connect only accessories and options that are optimally designed for use with your balance. The operator shall be responsible for any modifications to the equipment and for any connection of cables, power supplies or peripheral equipment that are not compatible with VWR B-SERIES Series Balances.**
- **Unplug the balance from AC power before you connect or disconnect a peripheral device (Printer or PC) to or from the interface port**
- **The only way to completely turn off the electrical source completely is disconnect the power cord.**

If there is any indication that safe operation of the balance is no longer warranted:
- **Turn off the power and disconnect the equipment from AC power immediately.**
- **Lock the equipment in a secure place to ensure that it cannot be used for the time being.**
- **Notify the nearest Service Center. A trained service technician must perform repair work.**

GETTING STARTED

Check the contents of your shipping carton for the following:
- VWR B-Series Balance
- Weigh Pan
- Pan Support (VWR-64B, 124B, 214B, 203B, 403B, 503B, 4002B & 5002B)
- Draft Ring (VWR-64B, 124B, 214B, 203B, 403B & 503B)
- Dust Guard (VWR-64B, 124B, 214B, 203B, 403B & 503B
- Operation Manual
- Power Supply

Please read your operation manual and follow the instructions for installing your balance. Please keep your packaging for future transport and remember to return your Warranty Card.

INSTALLATION & SETUP

- **Choose a location that is free from the influences of the following:**

- Drafts: Fans, Heat/Air Duct, Doorways or High Traffic Areas.
- Vibrations.
- Extreme Temperature Fluctuations: Sunlight, Ovens, or Environments with Wide Temperature Variations.
- Voltage Fluctuations. Do Not Share Current with Other Instruments that Draw Voltage in an Inconsistent Manner such as Fluorescent Lights, Centrifuges and the like.

- Place Instrument on a Level, Rigid Surface.

- Level the Instrument.

- Allow 60 Minutes for Warm-up.

- Calibrate. All B-Series are calibrated at the factory prior to shipment. Transportation of the instrument plus the differences in barometric pressure, humidity and ambient temperate conditions require calibration at the point of use. Calibrate regularly, at least once a week, to ensure accurate weighing results.
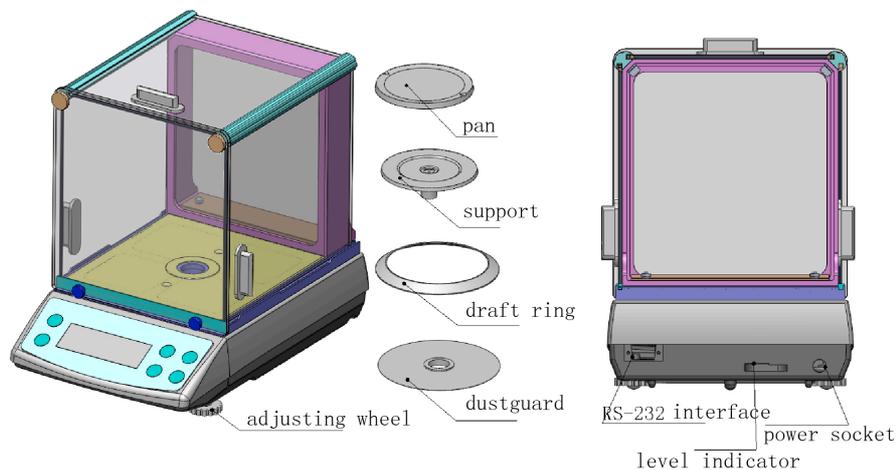
Place components inside the chamber in the following order
(Models VWR-64B, 124B, 214B, 203B, 403B & 503B)

- Dust Guard
- Draft Ring
- Pan Support
- Weighing Pan

Place weigh pan on balance (**Models VWR-4002B & B-5002B)**

AC POWER CONNECTION

- When connecting power use the original AC adapter supplied with the balance. Using an unapproved power supply may damage the instrument and void the warranty.
- Ensure the power supply is compatible with your instrument AND the local line voltage.
- Connect the plug to the instrument.
- Connect adapter to the power outlet.
- Original Power Supply:

  Input: 100-240VAC, 50-60Hz, 0.6A

  Output: 15VDC, 1A

  Polarity: Inside = -, Outside = +

Antitheft Locking Device

To protect against theft place a cable through the built-in security device located on the back of the balance next to the leveling bubble and connected to a fixed point, secure with a lock.

Leveling the Balance

A slight unevenness in a balance will result in an inaccurate measurement. For accurate calibration and weighing results level the balance at installation and any time the instrument is moved to a new location.

Only the 2 front feet are adjusted to level all B-Series balances. Turn the 2 front feet as shown in the diagram until the level bubble (located on the back of the balance) is centered within the circle of the level indicator.
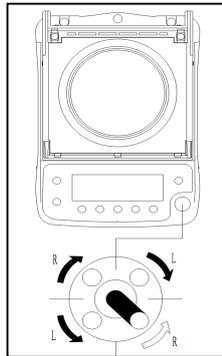
△ **In most cases leveling the balance will require several adjustment steps.**

CALIBRATION

Calibration is required at installation (see Installation & Set-up) and at regular intervals thereafter. Calibrate if the balance is moved to a new location.

1. Allow a 60-minute warm-up period.
2. Press Tare to zero the balance (0.0000g) – if required.
3. Remove all items from weigh pan.
4. Ensure that you are in the gram (g) weigh mode.
5. Press CAL Key once. The preprogrammed calibration weight value for the balance will appears on the display, ie: 100.00 (VWR-124B) and "flash". Place the appropriate calibration weight (gram) for your balance (see chart below) within 2 Seconds.
8. When calibration is complete the balance will beep and display Cal-End and then return to the weigh mode.
   Calibrate on a regular basis, we recommend once a week, or more.

If the above conditions are not met an error message will appear on the display. See Error Messages and Troubleshooting Guide, page 11.

Calibration Weight Values*

VWR-64B	50g ASTM Class 1
VWR-124B	100g ASTM Class 1
VWR-214B	200g ASTM Class 1
VWR-203B	200g ASTM Class 1
VWR-403B	200g ASTM Class 1
VWR-503B	500g ASTM Class 1
VWR-4002B	2000g ASTM Class 1
VWR-5002B	5000g ASTM Class 1

* Class 1 or Better

TARE FUNCTION

TARE is defined as net weight. Should you wish to use a beaker, flask or some other container for your sample simply place the container on the weigh pan and press the TARE KEY once. Please note that any container that is "tared" will decrease the remaining capacity available on the balance by the weight of the container. If you do not use a container for weighing verify the reading is "0" before placing a sample on the weigh pan. If not, press TARE KEY to display "0".

Good Weighing Technique

Working with precision balances requires a steady hand and an even, uninterrupted technique. Use forceps or other suitable utensils to place the sample (and sample container) on the weigh pan as fingers are hygroscopic.

If the balance has been idle and the draft chamber doors closed for an extended period, perform a number of test measurements before you begin weighing to allow the atmospheric conditions (temperature, RH and barometric pressure) inside the weighing chamber adjust to the ambient temperature outside the chamber. Rapid changes in atmospheric conditions will have an adverse effect on the weighing result. A series of test measurements will also help develop a smooth working rhythm. Ensure the sample and container have acclimated to the ambient temperature of the instrument in use. Place the sample gently on the weighing pan, in the center.

Use the smallest sample container possible to reduce the influence of laminar air movement. When working with aqueous solutions select a sample container with a small opening to minimize the effect of evaporation. Cover the container opening when working with light volatiles.

Static electricity may have an adverse effect on weighing results such as drift and non-repeatability. When working with samples or containers with low conductivity properties such as powers you can optimize the performance of the balance by:

- ✓ Shield the Sample from the Weigh Pan (Metal Container and /or Foil)
- ✓ Use Anti-static Device (Brush or Ionizer)
- ✓ Increased Ambient Humidity Levels
- ✓ Anti-static Weigh Containers

Avoid weighing magnetically charged (ferrous) materials such as ion, nickel and ion. To minimize the effects (non-repeatability) of ferrous material:

- ✓ Demagnetize the Sample
- ✓ Increase the Distance of the Sample from the Weigh Pan
- ✓ Use Below Pan Weighing (Weigh-below) Procedure

A good working knowledge of the effects from the various environmental conditions, sample matrices, container profiles and weighing technique is paramount for high precisions weighing. Preventative measures to minimize the effects of these conditions will provide you with optimal weighing results from your balance.

DISPLAY OVERVIEW
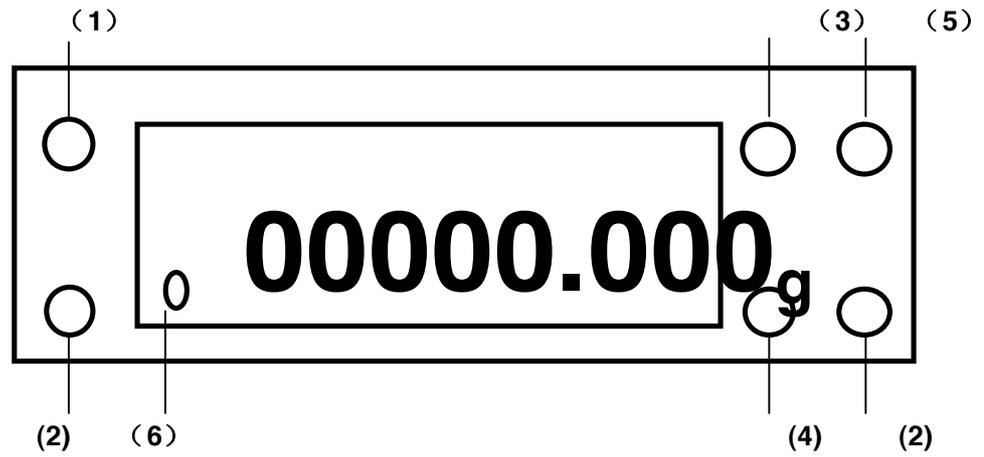
Key Pad #	Function
1	On / Off Key
2	Tare Keys (Right & Left Sides)
3	Calibration Key
4	Mode Key:
	g, lb, oz, ct, mg or kg, ozt, dwt, gn, Percent (%), Count & Animal Weigh, Milligram (mg) Mode (0.01mg, 0.1mg & 0.001g Models) Kilogram (kg) Mode Key (0.01g Models)
5	Print (Data Send) Key
6	Stability Indicator

PROGRAMMING INSTRUCTIONS

The B-Series offers several Weigh Modes, Balance Settings and Interface Options. Weigh Modes include Gram (g) Milligram (mg) / Kilogram (kg) and Percent Weighing. The B-Series also offers adjustable settings for Auto Zero, Baud Rates, Print (data send) Commands, Electronic Filtering and Audible Key Tone functions.

To access the Weigh Modes simply Press Mode Key to scroll between g, lb, oz, ct, mg or kg, ozt, dwt, gn, Parts Counting, Percent Weighing (%) and Animal Weigh appears in the display. Please see Display / Keypad Diagram. To access and adjust the Program Settings of your choice, please following the instructions listed below:

Step	Display
1. Press On / Off Key **to Turn Balance Off.**	**Blank** (w Stand-by Power Indicator On)
2. Press Print Key **Twice.**	**C1 - - 0**
3. To "advance" to the next Program Setting or Interface Option Press Print Key**.**	**C2 - - 0, C3 - - 0, C4 - - 0, etc.**
4. To "adjust" a Program Settings or Interface Option Press Mode Key (Example: Auto Zero)	**C3 - - 0, C3 - - 1, C3 - - 2, etc.**
5. To Save Programming Settings Press ON / Off Key	**Blank** (w Stand-by Power Indicator On)
6. Press On / Off Key **to Turn Balance On and Return to the Weigh Mode.**	**0.0000**

WEIGHING PROGRAMS

1) Basic Weighing Mode (g, mg/kg)

Once installation and calibration have been completed the B-Series is ready to weigh. Simply place a sample on your weigh pan and the result will appear on the display. Response (stabilization) time on the B-Series is 3 seconds, average (5 Seconds on B-25). When the balance has reached stability icon will appear on the left hand side of the display. Gram (g) is the factory default setting. To select another unit of measure, Press the Mode Key until the desired mode of measurement (g, lb, oz, ct, mg or kg, ozt, dwt, gn) appears in the display.

2) Percent Weighing Mode

Percent Weighing mode allows the user to obtain values in a percentage that are proportional to an initial reference weight. To activate the Percent Weighing function simply Press the Mode Key until the mode indicator Percent (%) appears on the display. Once you have selected the Percent Weighing Mode place the reference sample on the weigh pan and Press CAL Key to assign the reference sample a value of 100%. If you would like to use a sample container, remove the reference sample, place the container on the balance and Press Tare Key. Place your sample into the container) and the percentage value will appear on the display. Example 50%.

3) Parts Counting Mode

In addition to weighing samples, B-Series balances have the ability to "count" parts. For the best results please ensure that you have selected a balance with the proper resolution for your smallest part and that the parts are approximately equal in weight. For example, if you wish to count 500 parts at a time that weigh 0.001g per part you should use a balance with 0.001g (or greater) resolution. In addition, you should select the highest level of Initial Sample Size (i.e.: 100) to ensure an accurate average piece weight as a reference. The factor default setting for Initial Sample Size is Ten.

There are five Initial Sample Setting Option (see below). Follow the Programming Instructions listed above to adjust the Initialize Size that is appropriate to your sample. Once you have selected the Initial Sample Size Press the Mode Key until the COUNT appears on the display. Place the reference pieces on the weigh pan and Press CAL Key to assign the reference sample a value of your parts. If you would like to use a sample container, remove the reference sample, place the container on the balance and Press Tare Key. Place your parts into the container and the number of parts (count) value will appear on the display.   Example 100.

Sample Size Settings

Ten (10)	C2 - - 0
Twenty (20)	C2 - - 1
Fifty (50)	C2 - - 2
One Hundred (100)	C2 - - 3
One Thousand (1000)	C2 - - 4

BALANCE SETTING PROGRAMS

1) Ambient Condition (Electronic Filtering) Setting

All B-Series have an adjustable Ambient Condition (electronic filter) setting. This feature allows you to adjust the balance to optimize performance in less-than-idea environments. For most   applications and environments the factory default setting (C7 - - 1) should provide optimal performance (stability and speed of response). If your environment is not ideal for good weighing performance you may improve the performance by adjusting the Electronic Filter Setting that is better suited for your environment. If adjustment to the electronic filtering does not improve the performance of your balance (stability & response time) you should move the instrument to a location better suited to precision weighing (see Installation & Set-up, page 2 and Good Weighing   Technique, page 5).

Electronic Filter Settings

No Filtering – Very Stable Environment	C7 - - 0
Limited Filtering – Good Environment	C7 - - 1*
Moderate Filtering - Poor Environment	C7 - - 2
Strong Filtering – Very Poor Environment	C8 - - 3

2) Auto Zero Setting

B-Series come with an adjustable Auto Zero Setting. The Factory Default Setting is C3 - - 5, 5   Counts / Divisions. However, you may adjust the counts / divisions or deactivate the Auto Zero Function by simply entering the programming code listed below following the Program Instructions provided on   page 7.

Auto Zero Settings

Auto Zero, 0 Divisions (Off)	C3 - - 0
Auto Zero, 1 Division	C3 - - 1*
Auto Zero, 2 Divisions	C3 - - 2
Auto Zero, 3 Divisions	C3 - - 3
Auto Zero, 4 Divisions	C3 - - 4
Auto Zero, 5 Divisions	C3 - - 5*

3) Audible Key Tone Setting

B-Series come with an adjustable Audible Key Tone Setting. The factory default setting is on. However, you may enable the Audible Key Tone by following the Programming Instructions listed on page 7.

Audible Key Tone Settings

Always Off	C6 - - 0
Always On	C6 - - 1*

DATA INTERFACE SETTINGS

All B-Balances come with RS232 interface connection. To adjust the Data Interface Settings (Baud Rate, parity & Print Command) enter the appropriate programming codes listed on page 13 using the programming instructions provided on page 7. Please note that Data Collection Software is required to collect weighing data sent from the balance. Contact you dealer for information on printers and data collection software.

General Specifications:

Interface:	Serial
Operation:	Asynchronous, Full Duplex
Standard:	RS232
Handshake:	CTS = Clear to Send
	DTR = Data Terminal Ready
Character Coding:	8-bit ASCII
Character Format:	1 Start Bit
	7-bit ASCII
Parity:	None
	1 Stop Bit
Data Output Format; Balance:	16 Characters
Data Bits：	7-bit ASCII
Synchronization:	1 Start Bit; 1 Stop Bit
Display:	Stable + 10.0000 g
	Unstable 10.0001 kg

Connector: DB9

BALANCE		PC
TXD 2-------------------------------------	2	RXD
RXD 3-------------------------------------	3	TXD
SG 5---------------------------------------	5	SG

Baud Rate

2400 Baud*	C4 - - 0
1200 Baud	C4 - - 1
4800 Baud	C4 - - 2
9600 Baud	C4 - - 3

Print/Send Data

Manual, At Zero with Stability	C5 - - 0
Manual with Stability	C5 - - 1
Manual with Stability*	C5 - - 2
Continuous (0.3 Seconds) without Stability	C5 - - 3

PROGRAMMING MENU CODES – QUICK REFERENCE GUIDE

Code	Function
C1	Parts Counting
C1 - - 0*	Sample Size = 10
C1 - - 1	Sample Size = 20
C1 - - 2	Sample Size = 50
C1 - - 3	Sample Size = 100
C1 - - 4	Sample Size = 1000
C2	Reserved – No Function
C3	Auto Zero
C3 - - 0	Auto Zero Off
C3 - - 1	1 Count / Division
C3 - - 2	2 Counts / Divisions
C3 - - 3	3 Counts/ Divisions
C3 - - 4	4 Counts / Divisions
C3 - - 5*	5 Counts/ Divisions
C4	Baud Rate
C4 - - 0*	2400 bps
C4 - - 1	1200 bps
C4 - - 2	2800 bps
C4 - - 3	9600 bps
C5	Print (Data Send)
C5 - - 0	Automatic at Zero w Stability
C5 - - 1	Automatic at Stability
C5 - - 2*	Manual at Stability
C5 - - 3	Continuous
C6	Audible Key Tone
C6 - - 0	Off
C6 - - 1*	On
C7	Ambient Condition (Electronic Filtering)
C7 - - 0	No Filter -Very Stable Environment
C7 - - 1*	Limited Filter - Good Environment
C7 - - 2	Moderate Filter - Poor Environment
C7 - - 3	Strong Filter - Very Poor Environment

See Pages 2; Installation & Set-up and Good Weighing Technique before adjusting the electronic filter settings.

C8	Model Information at Power ON
C8 - - 0	On
C8 - - 1	Off
C8 - - 2	Standby

* Factory Default Setting

CARE & MAINTENANCE

- ✓ Unplug the instrument from the power source – wall outlet.
- ✓ Wear appropriate safety protection.
- ✓ Clean inside hood when appropriate. A damp cloth is recommend for basic cleaning. Do not use solvents on the instrument housing, sub-pan, keypad, power cord and power jack.
- ✓ Make sure no liquid enters the instrument housing.
- ✓ Handle with care to avoid damage to the weigh cell.
- ✓ Consult with your safety offer with any questions or concerns.

ERROR MESSAGS & TROUBLESHOOTING GUIDE

Error codes appear on the display for 2 seconds. The program then returns automatically to the weighing mode.

Display	Cause	Solution
No Segments on the Display	No AC Power	Check the AC Power Supply
	The Power Supply is not Plugged into the Balance	Plug in the Power Supply
	Blown Fuse	Replace Fuse
E _ _ _ _	The Weight Value Exceeds the Capacity of the Balance	Remove Load from the Weigh Pan
- E _ _ _ _ (Under Load Indicator)	Improper Assembly of Weigh Pan and Sub Pan Assembly	Remove Weigh Pan, Sub Pan and Reassemble
Err - - 0 & Err - - 1	Calibration Failure	Environmental Factors Causing Unstable Conditions. Move to a More Suitable Location (see pages 2 and 5) Inappropriate Calibration Weight. Initiate Calibration Procedure with Correct Calibration Weight

SERVICE AND TECHNICAL SUPPORT

If you have ANY questions or require technical, application or service support please contact VWR Balance Technical Support at 1-844-724-2100.

Please note that VWR International, LLC and affiliates will not take back any instrument that has been exposed to biological or hazardous material contamination for replacement, credit, repair or disposal.

DISPOSAL

Please consider the environment when disposing of your instrument and the packing material. Please recycle all environmentally friendly waste. Please contact your local government agency, facilities manager or a commercial disposal operator on the proper disposal of the instrument and power supply.

CE Compliance & Marking

This instrument complies with European Standards and EC Directives:

Electromagnetic Compatibility (EMC) Council Directive 89/336/EEC

Applicable European Standards:

Limitation of Emissions in accordance with standard EN 61326-1 Class B for residential areas.

72/23/EEC "Electrical Equipment Design within Certain Voltage Limits"

Applicable European Standards:

EN 60950

Safety Requirements for electrical equipment for measurement, control and laboratory use Part1: General requirements.

Note:

Modification of this instrument in any manner is the sole responsibility of the owner/operator. In addition to voiding the warranty, the owner/operator is responsible to check and if necessary correct any modifications required in accordance to the standards listed above for immunity to interference. Operating standards for this instrument are available upon request.

SPECIFICATIONS

Model	Capacity	Readability	Repeatability (s)	Linearity	Tare Range	VWR Cat. No.
VWR-64B	60g	0.1mg	0.1mg	0.2mg	0 to 60g	10204-972
VWR-124B	120g	0.1mg	0.1mg	0.2mg	0 to 110g	10204-974
VWR-214B	210g	0.1mg	0.1mg	0.2mg	0 to 210g	10204-976
VWR-203B	200g	0.001g	0.001g	0.002g	0 to 200g	10204-978
VWR-403B	400g	0.001g	0.001g	0.002g	0 to 400g	10205-028
VWR-503B	500g	0.001g	0.001g	0.002g	0 to 5-0g	10205-030
VWR-4002B	4000g	0.01g	0.01g	0.02g	0 to 4000g	10205-032
VWR-5002B	5000g	0.01g	0.01g	0.02g	0 to 5000g	10205-034

Common Specifications:

Pan Size:

        VWR-64B, 124B, 214B, 203B, 403B & 503B   90mm (3.5in)

        VWR-4002B & 5002B   160mm (6.3in)

Stabilization Time: 3 Seconds (average)

Operating Temperature: 5°-40°C (41°-104°F)

Power Requirements:

        Input   100-240VAC, 50-60 Hz, 0.6A

        Output   15DC, 1.0A

Polarity: Inside = Negative (-) Outside = Positive (+)

Unit Dimensions: (L x W x H)

        VWR-64B, 124B, 214B, 203B, 403B & 503B   335 x 213.5 x 293mm (13.2 x 8.4 x 11.5in)

        VWR-4002B & 5002B   335 x 213.5 x 94.5mm (13 x 8.4 x 3.7in)

Internal Chamber Dimensions:

        VWR-64B, 124B, 214B, 203B, 403B & 503B   175 x 180 x 185mm (6.9 x 7.1 x 7.3in)

Height Above Weigh Pan:

        VWR-64B, 124B, 214B, 203B, 403B & 503B   180mm (7.1in)
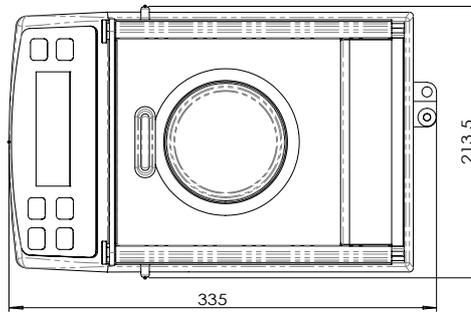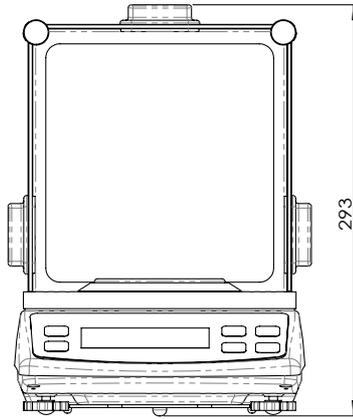
Net Weight:

        VWR-64B, 124B, 214B, 203B, 403B & 503B   6.7kg (14.8lb)
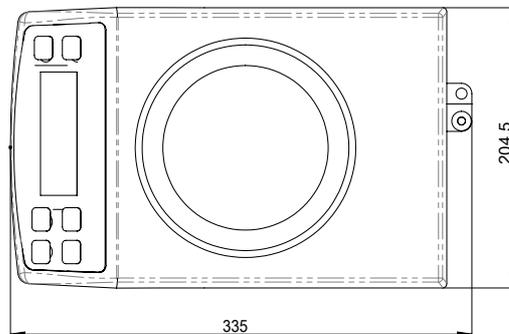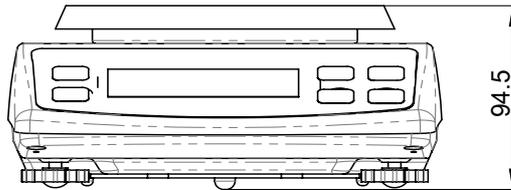
        VWR-4002B & 5002B   5kg (11lb)

INSTRUMENT DIAGRAMS

VWR-64B, 124B, 214B, 203B, 403B & 503B

293

213.5

335

VWR-4002B & 5002B

94.5

204.5

335

The status of the information and specifications in this manual is indicated by the date given below. VWR International, LLC reserves the right to make changes to any or all of the specifications, features or design of the instruments at any time and without notice.

Date: March 2015, VWR International, LLC
Revision A

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