VWR-A Series Balances

Operation Manual

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Congratulations and thank you for selecting a VWR-A 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 SSA 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 outlet 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-225AC	**VWR-164AC, 224AC & 314AC**
Draft Chamber Floor	Draft Chamber Floor
Spill Ring	Spill Ring
Solid Weigh Pan	Solid Weigh Pan
Gridded Weigh Pan	
Draft Ring	Draft Ring
Operation Manual	Operation Manual
Power Supply	Power Supply

VWR-363AC	**VWR-4502AC, 6002AC**
Weigh Pan	Weigh Pan
Square Draft Shield	
Operation Manual	Operation Manual
Power Supply	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.
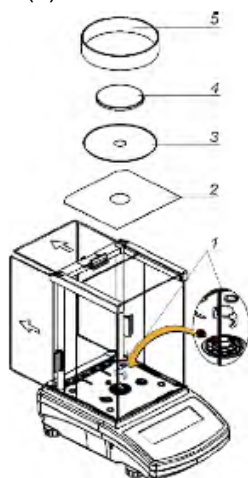
INSTALLATION & SETUP

- 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.

- Locate in an Environment with a Temperature range from 10°C to 40°C
- Place Instrument on a Level, Rigid Surface.
- Level the Instrument.
- Allow 4 Hours Warm-up on the VWR-225DC & 2 Hours on the VWR-164C, 224C & 314C.
- Calibrate. All VWR-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 to ensure accurate weighing results.

Place components inside the chamber in the following order:

VWR- 225AC	**VWR-164AC, 224AC & 314AC**
Draft Ring (5)	Draft Ring (5)
Weigh Pan (4)	Weigh Pan (4)
Draft Ring (3)	Spill Ring (3)
Draft Chamber Floor (2)	Draft Chamber Floor (2)
Weigh Pan (1)	Weigh Pan (1)

housing.
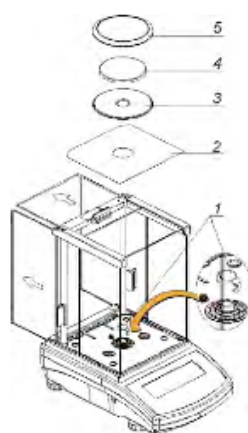
VWR- 363AC   **VWR-4502 & 6002AC**

Square Draft Shield (3)

Weigh Pan (2)   Weigh Pan (2)

Pan Receiver (1)   Pan Receiver (1)

rubber bumpers (1),

mass spring on one of the rubber bumpers

- assemble the weighing pan (2) on the
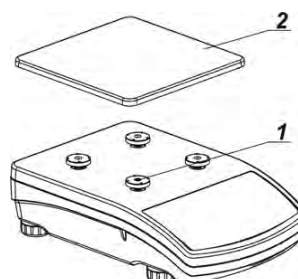
AC POWER CONNECTION

- 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, 1.0A

    Output: 15VDC, 2.0A

    Polarity: Inside = **+**, Outside = **-**

ANTITHEFT DEVICE

To protect against theft place a cable through the built-in security device located on the back of the balance below 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.
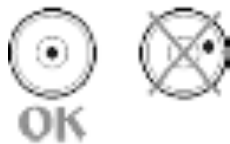
△ In most cases leveling the balance will require several adjustment steps.

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.

At the beginning of a weighing procedure load the balance with a sample weigh close to capacity of the balance. Place all samples in the center of the weigh pan. Use the smallest sample container possible to reduce the influence of laminar air movement. Do not drop samples on to the pan and avoid side loading to avoid damaging the weighing mechanism. Mechanical damage to the balance is not covered under warranty.

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. Place samples directly on to the weigh pan.

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 / KEYBOARD OVERVIEW

ON/OFF button enables switching on and off balance's

ON/OFF button enables switching on and off balance's
F9 button of the computer keyboard.

On/Off Key: Press to Turns On and Off the Display Only. With the display off the balance remains in a stand-by mode. To completely turn off the balance, disconnect AC Power Supply.

Direct access to data stored in a databese: user, product,
F11

Function button, which enables quick entering the settings
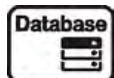
Database Key: Press to Access Stored Weighing Data, User Into, Product Information and Tare Weight Storage.
F11

sends current display status to a peripheral device (PRINT) or accepts selected value of a parameter or function (ENTER).

Function Key: Press to Access Weighing Data, User Into, Product Information and Tare Weight Storage.

sends current display status to a peripheral device (PRINT) or accepts selected value of a parameter or function (ENTER).
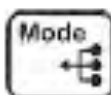
Mode Key: Press to Access the Working Mode.

ion button of immediate initiating the
F6

units/ Escape Key: Press to Access for the Weigh Mode Options. Escape Key (One Level Per) working in Setup or Mode Functions.

ion button of immediate initiating the
F6

Print/Enter Key: Press to Send Weight Data to a Peripheral Device or to Accept a Parameter or Function Setting.

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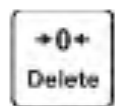
Zero/Delete Key: Press to Zero (setting the zero point) the Balance or Delete a Value Entered.
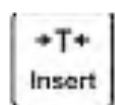
Tare Key: Press to Enter Tare / Container Weight Value.
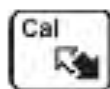
Cal Key: Press to Manually Initiate Internal Calibration & Adjustment Process.

Setup Key: Press to Access the Main Menu.

F1, F2, F3 & F4 Navigation Keys: Press to Move within the Balance Menus or for Changing a Parameter Value or Setting.

CALIBRATION & ADJUSTMENT

To ensure the highest level of weighing performance, calibration and adjustment is required at installation and at regular intervals thereafter. Calibrate the balance when:

- The balance is moved to a new location
- Long periods between weighing procedures occur.
- If the ambient temperature changes more than 3°C

The SSA Series offers a variety of options for Calibration & Adjustment:

Internal Automatic Calibration & Adjustment
Activated automatically with Temperature Change (3°C) and/or Time (programmable) Change

Internal Manual Calibration & Adjustment
Activated by press the CAL Key

External Manual Calibration & Adjustment
Using External Calibration Weight (Not less than 30% of Capacity) with Certificate of Calibration

Internal Calibration & Adjustment (Setup Key - Code P1.1)
Imitates the Internal Calibration and Adjustment Procedure. Internal Calibration & Adjustment procedure may also be activated at anytime by manually pressing the CAL Key.

External Calibration & Adjustment (Setup Key - Code P1.2)
This feature allows the user to program a "known value" of a mass standard into the balance for the Adjustment procedure.   The "known value" will remain in memory for subsequent calibration and adjustment procedures.
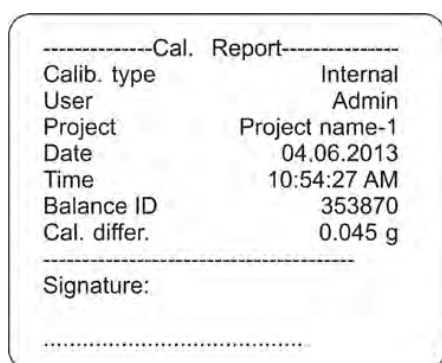
User Calibration & Adjustment (Setup Key - Code P1.3)
Adjustment procedure using an external weight at mass in the weigh range., not lower than 30% of capacity.

Calibration Test (Setup Key - Code P1.4)
Compares the result of the internal automatic adjustment with the value of internal weight saved in memory with the results shown on the display.   If the balance is connected to a printer or computer via the RS232 port the results will be printer.   Press the Units/ESC (Escape) to return to the previous menu.

```
--------------Cal.  Report---------------
Calib. type              Internal
User                       Admin
Project             Project name-1
Date                    04.06.2013
Time                 10:54:27 AM
Balance ID              353870
Cal. differ.             0.045 g
-------------------------------------------
Signature:

......................................
```

Temperature Activated (Setup Key - Code P1.5)
When the VWR-Series balance detects a temperature change greater than 3°C the thermometer icon will appear on the display. The user has a two-minute interval to complete the weighing process. After the two-minute interval the balance will begin a 30 second count down procedure before initiating the calibration and adjustment procedure.   During the count down period you may press the Escape Key to delay the count down procedure for five minutes. The count down procedure may be delayed multiple times but this may lead to error in the weighing process.

CALIBRATION & ADJUSTMENT (cont.)

Time Activated (Setup Key - Code P1.6)

The VWR-Series balance maybe programmed to initiate the calibration & adjustment procedure with a change in time programmable in one-hour increments up to 12 hours maximum.

The Temperature and Time calibration & adjustment activation features may be engaged simultaneously. The balance will activate the calibration & adjustment feature with temperature or time change, which ever occurs first.

WEIGHING UNITS

The VWR-Series offers 17 units of measurement along with two "user defined" modes. The user-defined modes allow the operator to multiply the actual weight value by defined value programmed into the balance. Weighing Units are accessed by pressing the Units Key:

g = gram	tlc = (Chinese)
mg = milligram	mom = mommies
ct = carat	gr = grain
lb = avoirdupois pound	ti =moles
oz = avoirdupois ounce	n = newton
ozT = troy ounce	bah = baht
dwt = pennyweight	tola = tola
tlh = tola (Hong Kong)	u1 = user defined #1
tls = tola (Singapore)	u2 – user defined #2
tlt = tola (Taiwain)	

Weigh units may also be activated – deactivated in the Setup Programing Function (Setup Key – Code P2.2.4.1.1). Use the Up/Down arrow keys to select YES or No.

APPLICATION MODES

The VWR-Series offers eleven Application Modes. Application Modes listed below are accessed by pressing the Mode Key:

Weighing (F1)	Counting Pieces (F2)
Check Weighing (F3)	Dosing (F4)
Deviations / % (F5)	Solids / Density (F6)
Liquids / Density (F7)	Animal Weigh / Dynamic Weigh (F8)
Statistics (F9)	Totalizing (F10)
Peak Hold (F11)	

APPLICATION MODE SET-UP

All Application Modes may be Activated or Deactivate in the Setup Mode. Press the Setup Key and scroll to the Application that you would like to activate or deactivate. Press the Up/Down Arrow Keys to select YES or NO.

Weighing (Setup Key – Code P2.1.1)   **Counting Pieces** (Setup Key – Code P2.1.2)
Check Weighing (Setup Key – Code P2.1.3)   **Dosing** (Setup Key – Code P2.1.4)
Deviations / % (Setup Key – Code P2.1.5)   **Solids / Density** (Setup Key – Code P2.1.6)
Liquids / Density (Setup Key – Code P2.1.7)   **Animal Weigh / Dynamic Weigh** (Setup Key – Code
P2.1.8) **Statistics** (Setup Key – Code P2.1.9)   **Totalizing** (Setup Key – Code P2.1.10)
Peak Hold (Setup Key – Code P2.1.11)

APPLICATION MODE OPERATION

Basic Weighing (F1)

Basic weighing mode – available in 17 units of measure. See Weighing Units page 7.

Counting Pieces (Mode Key - F2)

Scroll to the F2 Mode, Press Enter Key, 0 pcs and SAMPLE 1.0000 will appear on the display. Press F2 Key 10 (blinking) will appear on the display along with SAMPLE QUANTITY.   Press Up/Down Arrow Key to scroll through preset sample quantity sizes (10, 20, 50 & 100).   There is also a user defined sample size display as 0000. Press Enter Key and use Up/Down and Right/Left Arrow Keys to program a custom sample size number. Press Enter to accept and return to the main display. Press UNITS/ESC Key to Enter the Counting Pieces Function.   If you would like to use a container for your samples place the container on the weigh pan and Press T/INSERT Key, NET will appear on the display.

Check Weighing (Mode Key – F3)

Scroll to the F3 Mode, Press Enter Key, MIN 100.000 (minimum weight) will appear on the display. Press Up/Down Arrow Key to set a minimum weight value. Press Enter Key, MAX 100.000 (maximum weight) will appear on the display. Press Up/Down Arrow Key to set a maximum weight value. Press Enter to accept and return to the main display. If you would like to use a container for your sample place the container on the weigh pan and Press T/INSERT Key, NET will appear on the display. In the Checking Weighing mode MIN will appear when the sample is under the minimum weight value, MAX will appear when the sample is above the maximum weight value and OK will appear with the sample is between the minimum and maximum weight values.

Dosing (Mode Key – F4)

Scroll to the F4 Mode, Press Enter Key followed by the F2 Key, SAMPLE 1000.000 (blinking) will appear on the display. Press Up/Down and Right/Left Arrow Keys to program the dose weight value. Press Enter Key, TOLERANCE 000.000 (blinking) will appear on the display. Press Up/Down and Right/Left Arrow Keys to program the dosing tolerance. Press Enter to accept and return to the main display. If you would like to use a container for your samples place the container on the weigh pan and Press T/INSERT Key, NET will appear on the display.

Deviations / % (Mode Key - F5)

Scroll to the F5 Mode, Press Enter Key, 0.0000 % and SAMPLE 1.0000 will appear on the display. Press F2 Key PUT 100 will appear on the display.   Place the reference mass on the weigh pan and Press Enter Key. The reference Sample Weight value will appear on the bottom of the display along with the % Icon.

Solids / Density Determination (Mode Key - F6)

The Density of Solids may be calculated using one of three methods (Products):

In (Distilled) WATER
In ETHANOL (100% Spirits, +/- 0.1% at 20°C)
OTHER (another liquid with a known density)

Press Mode Key and scroll to the F6 Mode, Press Enter Key PRODUCT will appear on the display. Press F2 Key and use Up/Down Arrow Key to scroll between WATER, ETHANOL and OTHER.   Press Enter Key and 25.0 TEMP (flashing) will appear of the display.   Press Up/Down Arrow Keys to program the appropriate temperature of the liquid. When selecting the OTHER method you will need to program in the sample Temperature and Density. Press Enter Key, 0.0000 and LIQUID DENS will appear on the display. Press Up/Down Arrow Keys to program the know density of the liquid. Press Enter Key to save and exit to the Density (Solids) Calculation Mode.

Liquids/Density Determination (Mode Key - F7)

The Density of Liquids may be calculated using the sinker method.   The volume of the sinker is listed on the sinker hanger and must be programmed into the balance prior to calculating the density of liquids.

Press Mode Key and scroll to the F8 Mode, Press Enter Key PRODUCT will appear on the display. Press F2 Key SINKER will appear of the display.   Press Up/Down Arrow Keys to input Memory, Temperature and Density. Press Enter Key to save and exit to the Density (Solids) Calculation Mode.

Once you have completed the programming for the Density Mode (Solids or Liquids) simply weigh the sample IN AIR (Press the Enter Key after stable weight reading) and IN LIQUID AIR (Press the Enter Key after stable weight reading) the balance calculates the density of the sample that appears on the display as RESULT. When using Density Mode simply Press the Escape Key to begin another mixture. To Print a Report, Press the Enter Key.

Example of a report:

```
--------------Solids  Dens---------------
Date                     27.08.2013
Time                       13:34:50
Balance ID                32100000
User                          ADMIN
Liquid                        Water
Temp.                       23.0 °C
Liquid Dens        0.99756 g/cm3
In Air                      5.0363 g
In Liquid                  2.4489 g
Density              1.941722 g/cm3
-----------------------------------------
Signature

...........................................
```

Animal Weigh/Dynamic Weigh (Mode Key - F8)

The Animal Weigh/Dynamic Weigh Mode may be used to determine the weight of live animals or when working in less-than-ideal environmental conditions. In the Animal Weigh Mode the balance calculates the average weight value over a number of readings taken over a time period.   The mean average is designated as stable readout on the weight display.

Press Mode Key and scroll to the F8 Mode, Press Enter Key, the ANIMAL WEIGH ICON will appear on the display. Place Sample Container on the weigh pan and Press Tare Key.   Place sample in container and Press F2 Key, DETERMINATION appear on the display.   When the Animal Weigh program is complete, RESULT and the mean average will appear on the display.

Animal Weigh Mode may be adjusted to an AUTOSTART model – no need to press the F2 Key.   This feature automatically starts the weighing (DETERMINATION) process once an active sample is placed into the container on the weigh pan. Press the Setup Key and Scroll to P2.9.7. Press Enter Key and use Up/Down Arrow Key to select YES or No.

When using the Animal Weigh/Dynamic Weigh Mode simply Press the Escape Key to begin another test.

Statistics (Mode Key - F9)
The VWR-Series balance will store 999 samples in memory and calculate the Statistical Data:

$\qquad$ N $\qquad$ (Number of Samples)

$\qquad$ SUM $\qquad$ (Total Weight of Samples)

$\qquad$ AVG(Average Weight of Samples)

$\qquad$ MIN (Minimum Sample Weight)

$\qquad$ MAX $\qquad$ (Maximum Sample Weight)

$\qquad$ SDV(Standard Deviation)

$\qquad$ DIF (Difference Between MIN and MAX)

$\qquad$ Standard Deviation)

$\qquad$ RDV(Coefficient of Variation)

Press Mode Key and scroll to the F9 Mode. Press Enter Key to activate Statistic Mode, N 0 will appear on the bottom of the display. To store sample value in memory, press the Enter Key when the weight value has reached stability. N1, etc. will appear on the display.

To RE ON Key, RESULT will appear on the display. Press F2 Key followe statistical data. To print press the Enter Key when PRINT appears.

Example of a report:

```
-------------- Statistics --------------
N                              9
Sum                    455.600 g
Avg                    50.6222 g
Min                     49.939 g
Max                     51.380 g
Dif                      1.441 g
Sdv                    0.39605 g
Rdv                       0.78 %
-------------------------------------
```

To DELETE the Statistical Data Press the FUNCTION Key, RESULT will appear on the display. Press F1 Key END will appear on the display. Press F2 Key and the number of samples (i.e. N 9) will appear on the display. Press UNITS/ESC Key, all Statistical Data will be deleted from memory and you'll return to the main display.

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Totalizing (Mode Key - F10)
The Totalizing Mode allows the user to weigh individual sample ingredients of a mixture and calculate the total weight of the mixture. Up to 30 ingredients may be used in one mixture.

Press Mode Key and scroll to the F10 Mode. Press Enter Key to activate Totalizing Mode, N 0 S will appear on the bottom of the display. Place the sample container on the when pan and Press the Tare Key. Please the first sample into the container. To store sample value in memory, press the Enter Key. When the weight value has reached stability. N 1 S: VALUE OF SAMPLE STORED will appear on the display. When you have completed the mixture Press the F2 Key. The Total Value of all ingredients will appear on the display along with RESULT.

Totalizing (cont.)

When using the Totalizing Mode simply Press the Escape Key to begin another mixture. To Print a Report of the Mixture complete with each sample value, Press the Enter Key.

Example of a report:

```
-------------- Totalising -------------
1.                    38.000   g
2.                   100.000   g
3.                    50.000   g
4.                    10.000   g
5.                   125.000   g
6.                    15.100   g
7.                   148.000   g
8.                     6.000   g
9.                    41.000   g
10.                   15.000   g
-------------------------------------
Total                548.100   g
Tare                 100.000   g
-------------------------------------
```

Peak Hold (Mode Key - F11)

The Peak Hold Mode allows the user to establish and HOLD on the balance weight display the largest (PEAK) weight of similar packages during a check weighing process. Press Mode Key and scroll to the F11 Mode. Press Enter Key to activate Peak Hold Mode, NET will appear on the bottom of the display. Place the largest sample package on the weigh pan.   When the balance reaches stability, the value of the sample will be locked on the man display and Max will appear on the top of the display. Other packages may now be compared to the Peak Hold value using the NET Weigh Value as shown on the bottom of the display. Should a subsequent package exceed the value of the current Peak Value the new value will be stored on the display as the Peak Value. To delete the stored Peak Value Press the Units/Escape Key.

You may also program a Peak Hold threshold into the balance. Press the Setup Key and Scroll to P2.12.5, Press Enter Key and use Up/Down Arrow Keys to program (in grams) the threshold tolerance.   Press Enter to save.

AMBIENT CONDITION SETTINGS (FILTER, RESULTS & STABILITY)

The VWR-Series offers two adjustable settings (Filter & Stability) to optimize the weighing performance in various environmental conditions. To optimize the weighing performance of your balance we recommend use it in an environment that is free from drafts, vibrations and changes in temperature**.**

- 130 **Filter Settings:**

(Set-up Key – Code P2.2.1.1)

Very Slow

Slow

Normal

Fast

Results Settings:

(Set-up Key – Code P2.2.1.2)

Reliable

Fast/Reliable

Fast

Stability Settings:

(Set-up Key – Code P2.2.1.5)

Unstable

Stable

AMBIENT CONDITION SETTINGS (cont.)

In less than ideal conditions a Filter setting of Slow combined with a Results Setting of Reliable and a Stability Setting of Unstable will optimize the weighing performance.   In good weighing environments a combination of a Fast Filter Setting, Fast Result Settings and Stable Stability Setting will offer the faster weighing results. In most cases the factory settings (Normal Filter, Stable Stability and Fast & Reliable Results) will provide good weighing results.   You may have to experiment with various Filter, Stability and Results settings to optimize the performance of the balance in your environment. If you are unable to achieve good weighing results move the balance to a more suitable environment for weighing, see Installation & Setup, page 2.

AUTO ZERO FUNCTION (Setup Key - Code P2.2.1.3)

The VWR-Series offers an adjustable (Yes or No) Auto Zero Function.   Enabled the Auto Zero Function will automatically zero the balance any time it is within the auto zero tolerance (3 counts).

LAST DIGIT DISPLAY (Setup Key - Code P2.2.1.4)

The VWR-Series offers three settings for the Last Digit Display function:

> Always
> Never
> When Stable

The factory default setting is Always. However, should you wish to disable the last digit, select Never. If you prefer the last digit to appear when the balance reaches a stable reading select When Stable.

TARE WEIGHT – MANUAL ENTRY

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 -T- (TARE)/INSERT KEY once. The weight of the tared container will be stored in memory and displayed on the bottom of the display. To delete the Tare Weight Value from the memory/display remove all samples and containers from the weigh pan and Press the -0- Key. 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 -0-/DELETE KEY to display "0".

AUTO TARE FUNCTION (Setup Key - Code P2.2.2)

The VWR-Series offers an Auto Zero Function (Yes or No). This feature is designed to speed up the net weighing process when measuring numerous samples that required containers or weigh boats (powders or liquid). When using this feature make sure the weigh pan is empty and the balance is at zero weigh value. Place weigh boat or sample container on weigh pan.

When the balance reaches stability the balance will automatically Tare and Net will be displayed in the upper left corner of the display.   Place your sample into the container and the Net weight of the sample will be displayed.   Remove the sample container and the balance will return to Zero and delete the stored tare weight from memory.   You may weigh another sample using the Auto Tare Function.

BALANCE PARAMETERS (Setup Code P6)

Press Setup Key and scroll to the P6. Press Enter Key, followed by Up/Down Arrow Keys to Scroll through:

Language (Setup Key – Code P6.1) **Access Level** (Setup Key – Code P6.2)

Key Sound (Setup Key – Code P6.3) **Backlight** (Setup Key – Code P6.4)

Date (Setup Key – Code P6.5) **Time** (Setup Key – Code P6.6)

Date Format (Setup Key – Code P6.7) **Time Format** (Setup Key – Code P6.8)

GLP Autotest (Setup Key – Code P6.9) **Print Format** (Setup Key – Code P6.10)

The GLP Autotest function is designed to assess the balance's weighing performance.

GLP Autotest Procedure:

Loading the Internal Weight (twice) to verify the maximum capacity setting

Loading the Internal Weight (ten times) to calculate weighing performance.

GLP Autotest Report:

Example of a report:

```
.................................................
--------- Autotest GLP: Report ---------
Balance type          PS 3000.R2
Balance ID              400010
User                     Admin
Software rev.           v.0.4.9
Date                   2013.07.16
Time                    09:17:16
---------------------------------------
Number of measurements    10
Reading unit         0.001/0.01 g
Internal weight mass   1402.094 g
Filter                  Normal
Value release      Fast &Reliable
---------------------------------------
Deviation for Max.       -0.118 g
Repeatability            0.0088 g
Signature


           .......................................
```

BALANCE INFORMATION (Setup Mode P7)

Press Setup Key and scroll to the P7. Press Enter Key, followed by Up/Down Arrow Keys to Scroll through:

Balance (Setup Key – Code P7.1) **Type** (Setup Key – Code P7.2)

Software Version (Setup Key – Code P7.3) **Temperature** (Setup Key – Code P7.4)

Setup Print* (Setup Key – Code P7.5)

Once the Setup Print Code is selected the setting are sent to printer.

DATABASE PARAMETERS

The VWR-Series includes Three Databases that can be edited (USERS, PRODUCTS AND TARE WEIGHT) along with Two Databases (WEIGH AND ALIBI) that are permanently stored in memory.

The following information may be programmed into the Database Parameters:

- **Users: 100**
- **Products: 1,000**
- **Tare Weight Values: 100**
- **Weight Values: 10,000**
- **Alibi Memory: 100,000**

DATABASE PARAMETERS (cont.)
Users – 100 (Database Key – Code 64.1)

To add a new User, User Code, Password, Access Level and Language scroll to Database Level 64.1.1 and Press T/Insert Key, ADD NEW RECORDS appears on the display. Press the Enter Key, NAME NEW appears on the display. Press Enter Key and NEW appears on the display. Use the Up/Down Arrow Keys to add a new user name. Follow the Codes listed below using the Up/Down Arrow Key to modify the User Profile. Press Enter to Accept after entering data after enter data for each parameter.

      NAME (Database Key – Code 64.1.1.1): 30 Characters

      USER CODE (Database Key – Code 64.1.1.2) 8 "Numerical" Characters

      PASSWORD (Database Key – Code 64.1.1.3) 8 "Numerical" Characters

      ACCCESS (Database Key – Code 64.1.1.4) User, Advanced and Administrator

        User Level: Reading, Balance Parameters (Except Date & Time), Database (Preview Only)

        Advance Level: Editing Permission for Reading, Working Modes, Balance Parameters (Except Date & Time), Communication Settings and External Devices

        Administrator: All User Parameters, Functions and Editing Databases.

      LANGUAGE (Setup Key – Code 64.1.1.5) Any
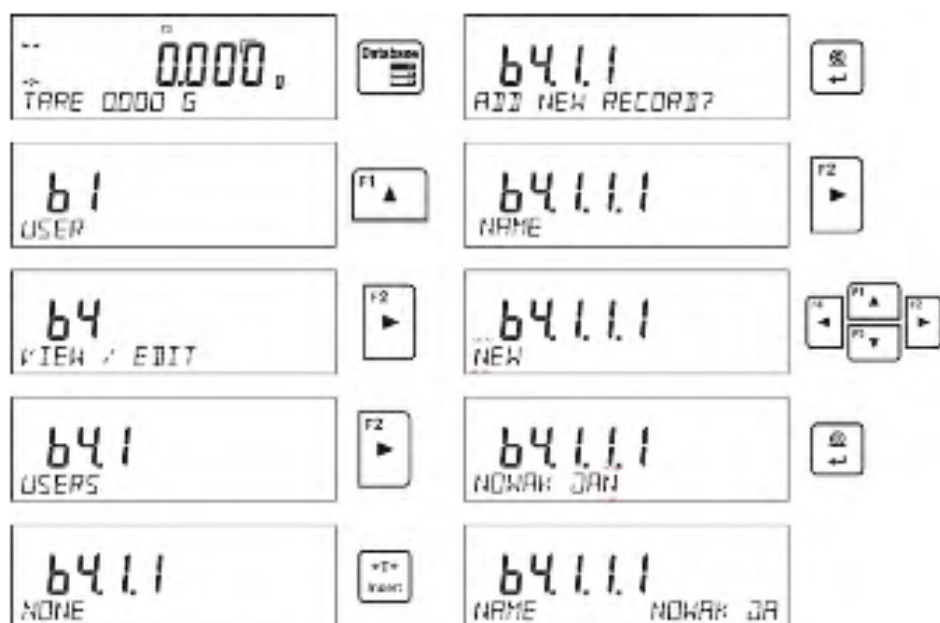
Products – 1000 (Database Key – Code 64.2)

To add a new Product Name, Product Code, EAN, Mass, Tare Weight, Minimum Sample Weight, Maximum Sample Weight and Sample Weight Tolerance scroll to Database Level 64.2.1 and Press T/Insert Key, ADD NEW RECORDS appears on the display. Press the Enter Key, NAME NEW appears on the display. Press Enter Key and NEW appears on the display. Use the Up/Down Arrow Keys to add a new Product Name. Follow the Codes listed below using the Up/Down Arrow Key to modify the Product Profile. Press Enter to Accept after entering data for each parameter.

      PRODUCT NAME (Database Key – Code 64.2.1.1) 30 Characters

      PRODUCT CODE (Database Key – Code 64.2.1.2) 8 "Numerical" Characters

      EAN (Database Key – Code 64.2.1.3)

      MASS (Database Key – Code 64.2.1.4)

      TARE (Database Key – Code 64.2.1.5)

      MIN (Database Key – Code 64.2.1.6) Minimum Sample Weight

      MAX (Database Key – Code 64.2.1.7) Maximum Sample Weight

      TOLERANCE (Database Key – Code 64.2.1.8) Sample Weight Tolerance

DATABASE PARAMETERS (cont.)

Tare Weight Storage & Recall – 100 (Database Key – Code 64.3)

To add a new Tare Weight Container Name and Value scroll to Database Level 64.3.1.1 and Press T/Insert Key, NAME NEW appears on the display. Press Enter Key and NEW appears on the display. Use the Up/Down Arrow Keys to assign a name /value to the container. Use the Codes listed below using the Up/Down Arrow Keys . Press Enter to Accept after entering data for each parameter.

> **CONTAINER NAME (Database Key – Code 64.3.1.1)**
> **TARE VALUE (Database Key – Code 64.3.1.2)**

To recall a tare weight value Press the Database Key and use the Up/Down Arrow Key to scroll to 63, Press Enter Key, 63.1 appears on the display. Use the Up/Down Arrow Key to scroll to the appropriate Tare Weight Value, i.e. 63.1, 63.2 – up to 63.100. Press Enter Key to recall the stored Tare Weight Value.

Weigh Data (Database Key – Code 64.4)

VWR-Series stores up 1000 measurements in a non-editable database whenever the Print/Edit Key is activated (manually or automatically). Data is stored in a loop and as such sample 1001 will replace sample number 1 and so forth.

To view stored Weigh Data scroll to Setup Level 64.4.1 Press Enter Key. Press UP/Down Arrow Keys to select a sample number (i.e. 64.4.1 thru 64.4.310 = 310 stored samples). Press Enter Key followed by UP/Down Arrow Keys to view:

> **DATE (Database Key – Code 64.4.1.1)** Sample Number 1
> **TIME (Database Key – Code 64.4.1.2)** Sample Number 1
> **RESULT (Database Key – Code 64.4.1.3)** Sample Number 1
> **TARE (Database Key – Code 64.4.1.4)** Sample Number 1
> **PRODUCT (Database Key – Code 64.4.1.5)** Sample Number 1
> **USER (Database Key – Code 64.4.1.6)** Sample Number 1
> **MODE (Database Key – Code 64.4.1.17)** Sample Number 1
> **VARIABLE 1 (Database Key – Code 64.4.1.8)** Sample Number 1
> **VARIABLE 2 (Database Key – Code 64.4.1.9)** Sample Number 1
> **PRINT/SEND (Database Key – Code 64.4.1.10)**

Alibi (Setup Key – Code 64.5)

VWR-Series are equipped with Alibi memory that stores up 100,000 measurements in a non-editable database whenever the Print/Edit Key is activated (manually or automatically). Data is stored in a loop and as such sample 100,001 will replace sample number 1 and so forth.

To view stored Alibi Data scroll to Setup Level 64.5.1 Press Enter Key. Press UP/Down Arrow Keys to select a sample number (i.e. 64.5.1 thru 64.5.310 = 310 stored samples). Press Enter Key followed by UP/Down Arrow Keys to view:

> **DATE (Database Key – Code 64.5.1.1)** Sample Number 1
> **TIME (Database Key – Code 64.5.1.2)** Sample Number 1
> **RESULT (Database Key – Code 64.5.1.3)** Sample Number 1
> **TARE (Database Key – Code 64.5.1.4)** Sample Number 1
> **USER (Database Key – Code 64.5.1.5)** Sample Number 1
> **PRODUCT (Database Key – Code 64.5.1.6)** Sample Number 1
> **PRINT (Database Key – Code 64.4.1.7)**

COMMUNICATION SETTINGS (Setup Mode P3)

VWR-Series are equipped with two RS232 Ports (COM 1 & COM 2), two USB Ports (Type A & Type B) and Wi Fi.   The Parameters for the USB Ports are not configurable.   USB Type A Port is designed for connection to a Keyboard, Bar Code Reader or USB Flash Drive. USB Port Type B is designed for connection to a printer or computer.

To configure the RS232 Port Settings scroll to Setup Level P3, Press Enter Key, P3.1 COM 1 appears on the display. Use the Up/Down Arrow keys to Keys to select COM 1 (P3.1) or Com 2 (P3.2). Press Enter Key followed by UP/Down Arrow Keys to view:

> **BAUD RATE (Setup Key – P3.1.1 or P3.2.1)**
>> Press Enter Key, Use Up/Down Arrow Key to Select
>> 2400, 4800, 9600, 19200, 38400, 57600 or 115,200 Baud – Press Enter to Accept
> **PARITY (Setup Key – P3.1.2 or P3.2.2)**
>> Press Enter Key, Use Up/Down Arrow Key to Select
>> None, Even or Odd – Press Enter to Accept

To configure the Wi Fi Port Settings scroll to Setup Level P3, Press Enter Key, P3.1 COM 1 appears on the display. Use the Up/Down Arrow keys to Keys to select WIFI (P3.3) Press Enter Key followed by UP/Down Arrow Keys to view/program:

> **Status (Setup Key – P3.3.1)**
> **Select WIFI (Setup Key – P3.3.2)**
> **WIFI Set (Setup Key – P3.3.3)**
>> **Name (Setup Key – P3.3.3.1)**
>> **Password (Setup Key – P3.3.3.2)**
>> **Channel (Setup Key – P3.3.3.3)**
>> **IP Address (Setup Key – P3.3.4)**
>> **Mask (Setup Key – P3.3.5) Default = 255.255.000.000**
>> **Gate (Setup Key – P3.3.3.6) Default 10.10.8.244**
>> **Port (Setup Key – P3.3.3.7) Default 4000**
>> **Mac Address (Setup Key – P3.3.3.8)**
> **WIFI Startup (Setup Key – P3.3.4)**

After entering the parameters settings one of the following three STATUS messages will appear on the display:

> **CONNECT:**   Balance is connected to the wireless network. A pictogram will also appear on the display.
> **CONNECTIVITY:** Balance is attempting to connect to the wireless network.
> **NONE:**   Balance is not connected to the wireless network.

DEVICE SETTINGS (Setup Mode P4)

VWR-Series RS232 Ports (COM 1 & COM 2) can be configured to send data to a printer and computer, to add a second display module, keypad or configure a bar code reader.

To configure the Device Settings scroll to Setup Level P4, Press Enter Key, P4.1 Computer appears on the display. Use the Up/Down Arrow keys to Keys to view:

COMPUTER (Setup Key – P4.1)
PRINTER (Setup Key – P4.2)
BAR CODE READER (Setup Key – P4.3)
ADDITION DISPLAY (Setup Key – P4.4)
EXTRA BUTTONS (Setup Key – P4.5)

PRINTOUTS (Setup Mode P5)

VWR-Series Printouts can be configured to include the following data. To configure the Printout Settings scroll to Setup Level P5, Press Enter Key, P5.1 Cal Report appears on the display. Use the Up/Down Arrow keys to Keys to view:

CAL REPORT (Setup Key – P5.1) Press Enter Key, Use Up/Down Arrow Key to Select
Project Name (P5.1.1)
Calibration Type (P5.1.2)
User (P5.1.3)
Project (P5.1.4)
Date (P5.1.5)
Time (P5.1.6)
Balance ID (P5.1.7)
Calibration Difference (P5.1.8)
Dashes (P5.1.9)
Signature (P5.1.10)

HEADER (Setup Key – P5.2)
Project Name (P5.2.1)
Calibration Type (P5.2.2)
User (P5.2.3)
Project (P5.2.4)
Date (P5.2.5)
Time (P5.2.6)
Balance ID (P5.2.7)
Calibration Difference (P5.1.8)
Dashes (P5.2.9)
Signature (P5.2.10)

PRINTOUTS (cont.)

USER (Setup Key – P5.3)

Date (P5.3.1)

Time (P5.3.2)

User (P5.3.3)

Product (P5.3.4)

Variable 1 (P5.3.5)

Variable 2 (P5.3.6)

Tare (P5.3.7)

Gross (P5.3.8)

Current Resolution (P5.3.9)

Calibration Report (P5.3.10)

Standard Printout (P5.3.11)

FOOTER (Setup Key – P5.4)

Working Mode (P5.4.1)

Date (P5.4.2)

Time (P5.4.3)

Scale/Balance Type (P5.4.4)

User (P5.4.6)

Product (P5.4.7)

Variable 1 (P5.4.8)

Variable 2 (P5.4.9)

Dashes (P5.4.10)

Blank Line (P5.4.11)

Calibration Report (P5.4.12)

Signature (P5.5.13)

Standard Printout (P5.4.14)

NON-STANDARD PRINTOUTS (Setup Key – P5.5 thru P5.8)

VWR-Series offer four Non-standard Printouts and may include:

- Variables in the Working Modes
- Permanent Text in the User Menu (Use Capitals)
- 160 Characters in a Single Line

VARIABLES (Setup Key – P5.9 & P5.10)

VWR-Series offer Variable in all modes with the same values:

- %% = Print Out of a % Character
- %V = Current NET Mass in the Current Unit
- %N = Net Mass In the Current Unit
- %G = Gross Mass In the Current Unit
- %T = Tare Mass In the Current Unit
- %D = Current date
- %T = Current Time
- %I = Balance ID
- %R = Program Number
- %P = Project Number
- %U = User Number
- %F = Function (Working Mode)
- %C = Date and Time of last Calibration Adjustment

DATABASE IMPORT / EXPORT (Setup Mode P8)
Database Import / Export
VWR-Series balances allow you to Import and Export to a Flash Drive via the USB 1 Port on the back of the balance.   Scroll to Setup Level P8 or insert a flash drive into the USB 1 port, IEI IMPORT / EXPORT appears on the display. Press the Enter Key, Export (IE1) appears on the display. Press the Up/Down Arrow key to access the Import (IE2) data option. Press Enter Key followed by UP/Down Arrow   Keys to view the following:

ALL DATABASES (IE1.1 – Export or IE2.1 - Import)
USERS (IE1.2 – Export or IE2.2 - Import)
PRODUCTS (IE1.3 – Export or IE2.3 - Import)
TARE (IE1.4 – Export or IE2.4 - Import)
WEIGH DATA (IE1.5 – Export or IE2.5 - Import)
ALIBI (IE1.6 – Export or IE2.6 - Import)
PARAMETERS (IE1.7 – Export or IE2.7 - Import)

PERIPHERAL DEVICES
Peripheral devices connected to the balance via the USB or RS232 Ports must be power in such a manner that prevents the occurrence of different potentials in the cables. Communication parameters (Baud Rate & Parity) of the balance and external device must correspond to one another.

Print/Send Commands:
- Manual: On Pressing the Print/Enter Key
- Automatic: Upon Reaching a Stable Weighing Result
- Continuously: Continuous

Stability Criteria:
- Stable: Upon Reaching a Stable Weighing Result
- Unstable: Immediate Transmission of Weigh Value

DATA FORMAT
Data format sent from the balance to a peripheral device, 18 Characters:

1	2	3	4 - 12	13	14 - 16	17	18
stability marker	space	character	Mass	space	unit	CR	LF

- Stability Marker: [Space] When Stable
                              [?] When Unstable
                              [∧] Sample Exceeds Maximum Weight +
                              [∨] Sample Exceeds Maximum Weight –
- Character: [Space] – For Positive Value or [-] For Negative Value
- Mass: 9 Characters, Aligned to the Right
- Unit: 3 Characters, Aligned to the Left

DATA FORMAT (cont.)

Data format sent from the balance to a peripheral device, 22 Characters:

1 – 3	4	5	6	7	8 – 16	17	18 - 20	21	22
Command	space	stability marker	space	character	Mass	space	unit	CR	LF

- Command: 1 ÷ 3 Characters
- Stability Marker: [Space] When Unstable
  [?] When Unstable
  [∧] Sample Exceeds Maximum Weight +
  [∨] Sample Exceeds Maximum Weight –
- Character: [Space] – For Positive Value or [-] For Negative Value
- Mass: 9 Characters, Aligned to the Right
- Unit: 3 Characters, Aligned to the Left

COMMUNICATION PROTOCOL

A character based communication protocol can be used to establish communication between the SSA Series balance and peripheral devices. Commands are sent from the peripheral device and specific responses are sent from the balance on the receipt of each command.

Command	Description
Z	Zero Balance
T	Tare Balance
OT	Send Tare Value
UT	Set Tare value
S	Send Stable Measurement In Basic Measuring Unit
SI	Immediately Send Stable Measurement In Basic Measuring Unit
SU	Send Stable Measurement In Current Measuring Unit
SUI	Immediately Send Stable Measurement In Current Measuring Unit
C1	Activate Continuous Transmissions in Basic Measuring Unit
C0	De-activate Continuous Transmissions in Basic Measuring Unit
CU1	Activate Continuous Transmissions in Current Measuring Unit
CU0	De-activate Continuous Transmissions in Current Measuring Unit
PC	Send All Implemented Commands

Each command must end In CRLF characters.

| Command Response	Description
XX_A CR LF	Command Understood and In Progress
XX_D CR LF	Command Carried Out (Appears after XX-A Command)
XX_I CR LF	Command Understood But Not Accessible at This Time
XX_ ∧ CR LF	Command Understood But Max Range is Exceeded
XX_ ∨ CR LF	Command Understood But Min Range is Exceeded
XX_OK CR LF	Command Carried Out
ES_CR LF	Command Not Recognized
XX_E CR LF	Time Limit Exceeded While Waiting for a Stable Measurement Result

CABLE PINOUT DIAGRAM

Cable: balance – computer (RS232)


Cable: balance – printer KAFKA
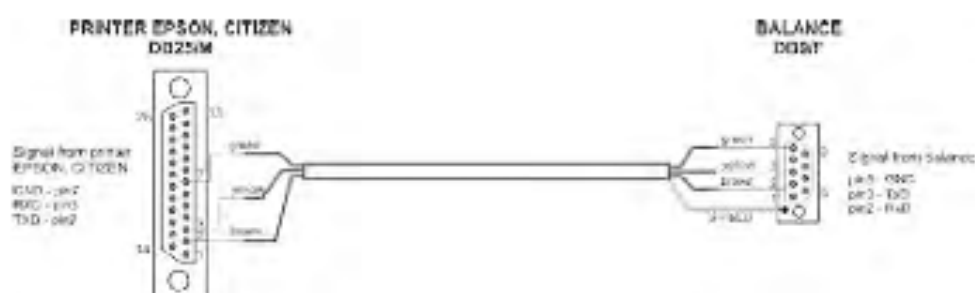
BELOW BALANCE WEIGHING

SSA Series balances come with built-in hook for below balance weighing applications. To use this device the balance must be placed in a position that allows access to the hook and the ability to hang samples from the device. Please follow all instructions listed in the Installation & Set-up Section, page 2. When using the below balance device do turn or twist the hook as such movements may cause damage to the balance.
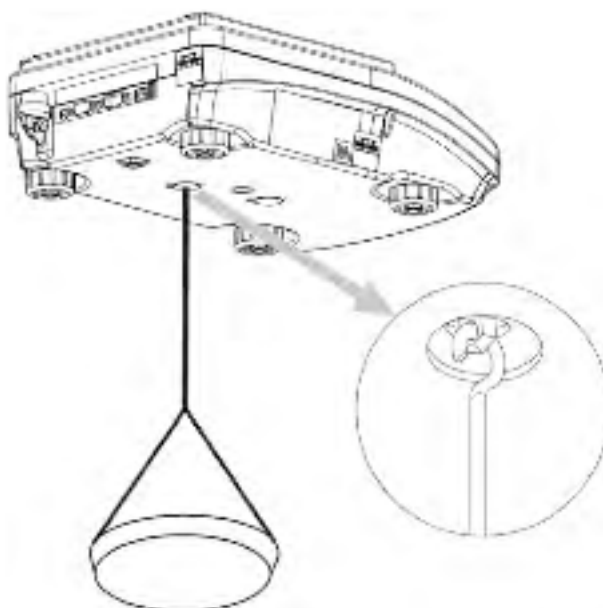
SERVICE AND TECHNICAL SUPPORT

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

Please note that VWR 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.

TECHNICAL SPECIFICATIONS

	VWR-225AC	VWR-164AC	VWR-224AC	VWR-314AC
Capacity (Max)	60g / 220g	160g	220g	310g
Capacity (Min)	1mg	10mg	10mg	10mg
Readability	0.01mg / 0.1mg	0.1mg	0.1mg	0.1mg
Repeatability (s)	0.03mg / 0.1mg	0.1mg	0.1mg	0.1mg
Linearity	0.07mg/0.2mg	0.2mg	0.2mg	0.2mg
Tare Range	0 to 220g	0 to 160g	0 to 220g	0 to 310g
Pan Size	70mm	85mm	85mm	85mm
Sensitivity Drift:	1ppm/°C from 10°C to 40°C	1ppm/°C from 10°C to 40°C	1ppm/°C from 10°C to 40°C	1ppm/°C from 10°C to 40°C
Stabilization Time (Ave)	6/3.5 Sec	3.5 Sec	3.5 Sec	3.5 Sec
Net Weight (kg)	5.6	5.6	5.6	5.6
VWR Cat. No.	10205-026	10204-960	10204-962	10204-964

	VWR-363AC	VWR-4502AC	VWR-6002AC
Capacity (Max)	360g	4500g	6000g
Capacity (Min)	20mg	500mg	500mg
Readability	0.001g	0.01g	0.01g
Repeatability	0.001g	0.01g	0.01g
Linearity	0.002g	0.02g	0.02g
Tare Range	0 to 360g	0 – 4500g	0 – 6000g
Pan Size (mm)	128 x 128	195 x 195	195 x 195
Sensitivity Drift:	2ppm/°C from 10°C to 40°C	2ppm/°C from 10°C to 40°C	2ppm/°C from 10°C to 40°C
Stabilization Time (Ave)	2 Sec	1.5 Sec	1.5 Sec
Net Weight (kg)	3.5	3.6	3.6
VWR Cat. No	10204-966	10204-968	10204-970

Common Specifications:

Operating Temperature: 10°C to 40°C (50°F-104°F)

Power Requirements:
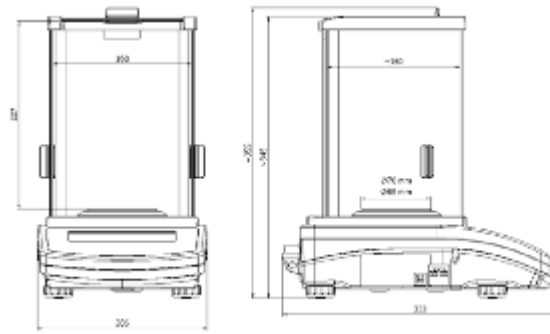
  Input: 100- 240VAC, 50-60 Hz, 1.0A

  Output: 15DC, 2.0A

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

INSTRUMENT DIMENSIONS & DIAGRAM

Models: VWR-225AC, VWR-164AC, VWR-224AC & WVR-314AC

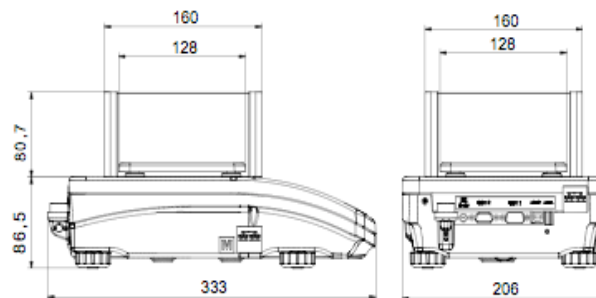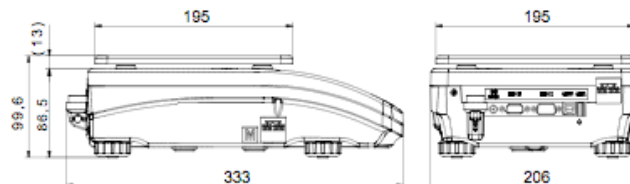|	
Unit Dimension (L x W x H)	333 x 206 x 355mm
	(13.11 x 8.11 x 13.98in)
Internal Draft Chamber (L x W x H):	160 x 168 x 230mm
	(6.3 x 6.61 x 9.05in)
Height Above Weigh Pan:	227mm (8.94in)

Model: VWR-363AC

Unit Dimension (L x W x H)	333 x 206 x 167.2mm
	(13.11 x 8.11 x 13.98in)
Draft Chamber (L x W x H):	160 x 160mm
	(6.3 x 6.3in)

Models: VWR-363AC

Unit Dimension (L x W x H)	333 x 206 x 99.6mm
	(13.11 x 8.11 x 3.92in)

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: November 2014, VWR International, LLC
Revision A

VWR *We Enable Science* ®

1.800.932.5000

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