

User Manual

VWR B2 SERIES BALANCES

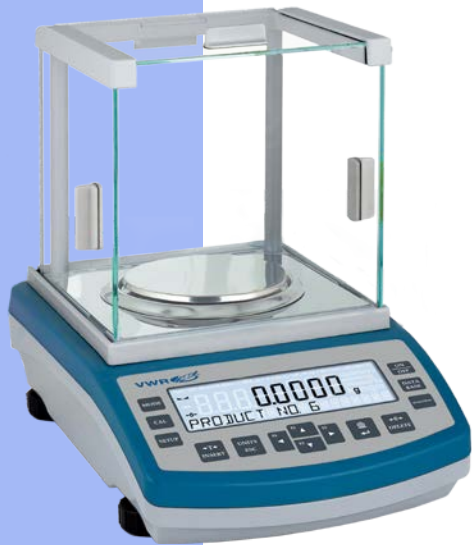


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1. GENERAL INFORMATION

1.1. INTENDED USE

B2 series balances are designed to provide accurate measurement of weighed loads, performed under laboratory conditions. It is intended for application as a non-automatic weighing instrument only, i.e. the material to be weighed is manually and carefully placed in the center of the weighing pan. Weighing result should be read only after stable reading has been obtained.

1.2. INAPPROPRIATE USE

Do not use the balance for a dynamic weighing. Even if small quantities of weighed material are added or removed from the weighing pan of the instrument, the reading should be taken only after stabilization of the measurement results. Do not place any magnetic materials on the weighing pan, as this can cause damage to the measuring system of the instrument.

Be sure to avoid impact shock and overloading the balance in excess of the prescribed maximum measuring range (max capacity), minus any possible tare weight that has been applied.

Never use the balance in an environment where explosion is possible. This balance has not been adjusted for operation in explosive areas.

There must not be any modification made to the balance.

1.3. WARRANTY

Warranty is invalid for the following:

- non-observation of the guidelines of this user manual,
- use of the balance other than specified in this manual,
- alteration to or opening of the device,
- overloading of the measuring instrument.

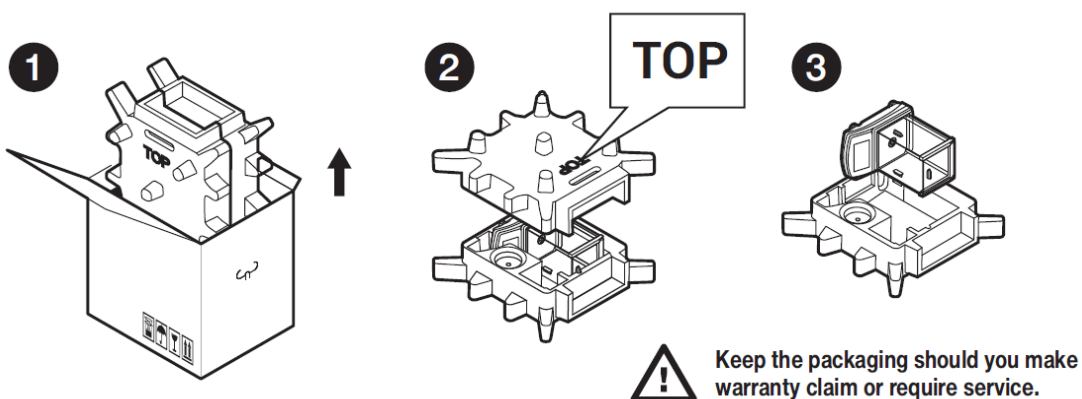
2. UNPACKING AND INSTALLATION

2.1. STANDARD DELIVERY COMPONENTS LIST

- Balance and components shown in Section 2.4 depending on balance model
- Warranty Card
- User Manual

2.2. UNPACKING

To unpack the system, follow the diagram below-



2.3. PLACE OF USE AND ASSEMBLY

- The balance should be stored and used in locations free of vibrations and shakes, free of air movement and dust.
- Ambient air temperature should not exceed the range of: +10 °C ÷ +40 °C.
- Ambient relative humidity should not exceed 80%.
- During balance operation, ambient temperature in the weighing room should not change rapidly.
- The balance should be located on a stable wall console desk or a stable working table which is not affected by vibrations and distant from heat sources.
- Take special precaution when weighing magnetic objects, as part of the balance is a strong magnet. Should such loads be weighed, use under-pan weighing option, which removes the weighed load from area influenced by the balance's magnet. The hook for under-pan weighing is installed in balance's base.
- Keep all package element should your device be transported in the future. Remember that only original packaging can be used for shipping purposes. Prior to packing, uncouple any cables, remove any separable components (weighing pan, shields, inserts). Pack the device components into an original packaging. The original packaging protects the equipment against potential damage during transportation.

2.4. BALANCE ASSEMBLY

Model: VWR-64B2, VWR-124B2, VWR-214B2

Components-



Balance
x 1



Weighing pan
x 1



Draft shield
x 1



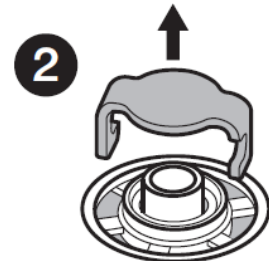
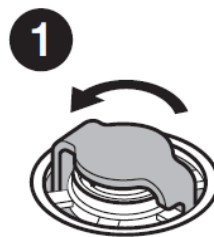
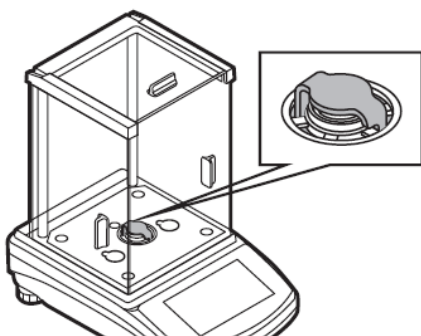
Bottom insert
x 1



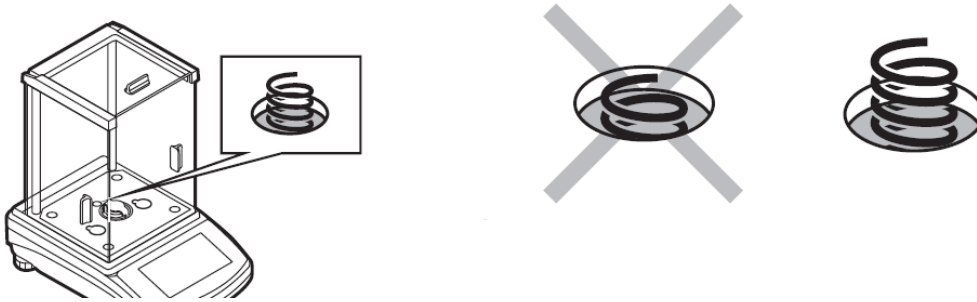
Power adapter
x 1

Installation-

- 1) Remove the transport lock— gently press the transport lock and turn it accordingly to <OPEN>, keep the transport lock should your balance be transported in the future.

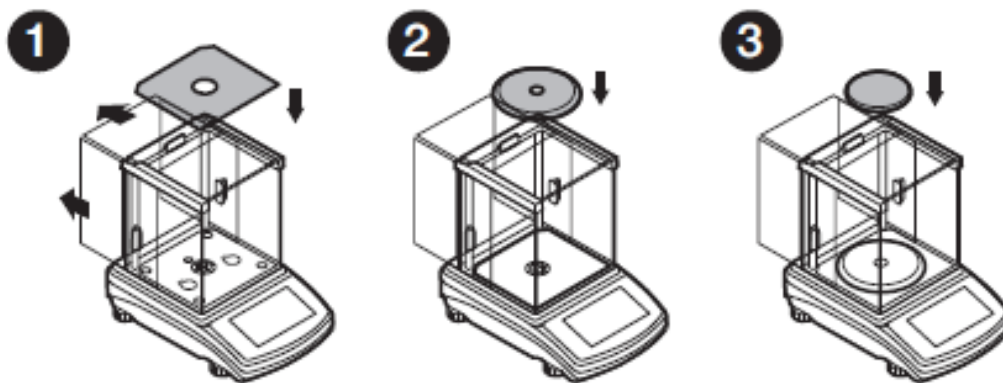


2) Check grounding spring to insure it is in the appropriate location. Make sure that the grounding spring juts slightly out of the hole.



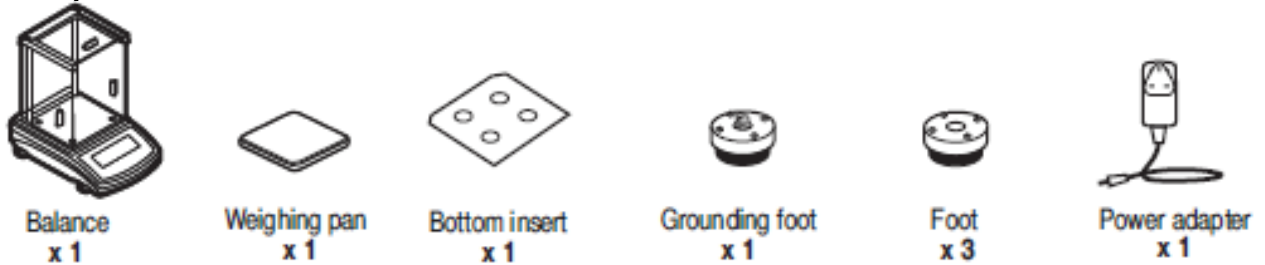
3) Install components following diagram below:

- i. Bottom insert
- ii. Centering ring [embossment side up]
- iii. Weighing pan



Model: VWR-203B2, VWR-403B2, VWR-503B2

Components:



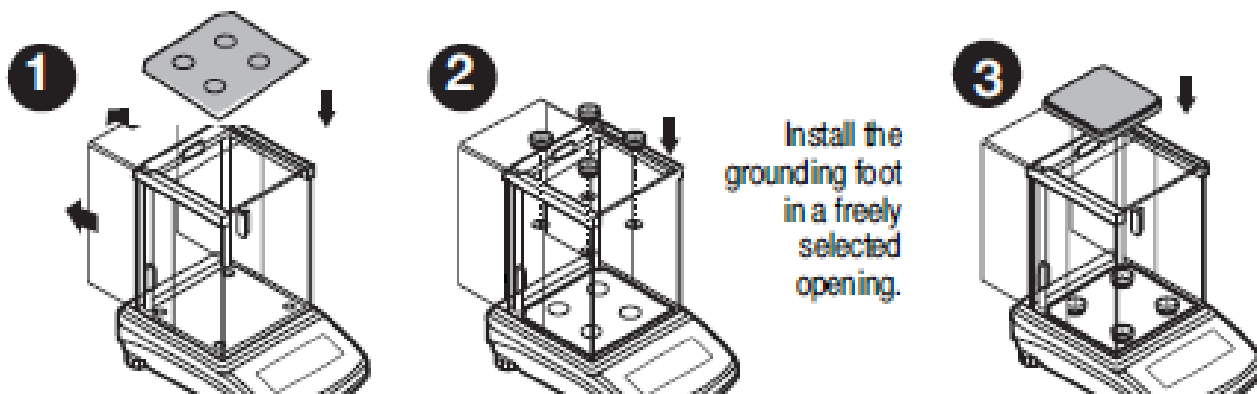
Installation:

1) Check that the grounding spring is in the correct location, the spring juts slightly out of the hole.



2) Install components following the diagram below:

- i. Bottom Insert
- ii. Rubber feet (grounding foot can be in any location on the balance)
- iii. Weighing pan



Model: VWR-4002B2, VWR-5002B2

Components:



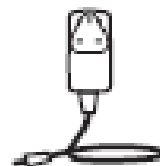
Balance
x1



Weighing pan x1



Draft shield
x1

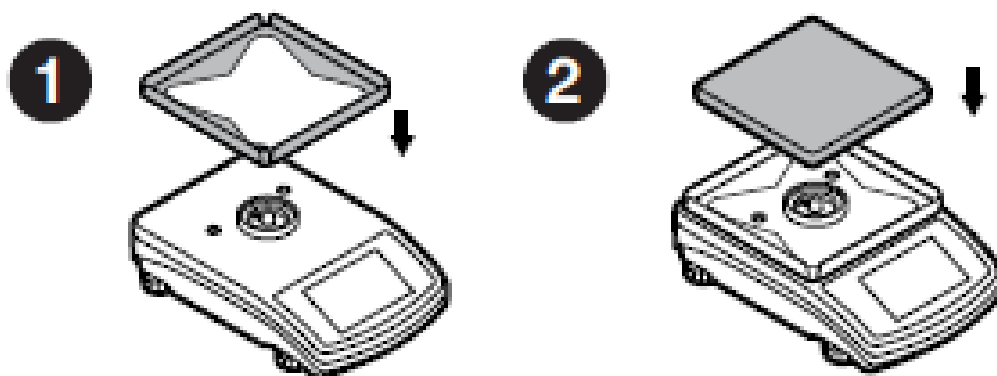


Power adapter
x 1

Installation:

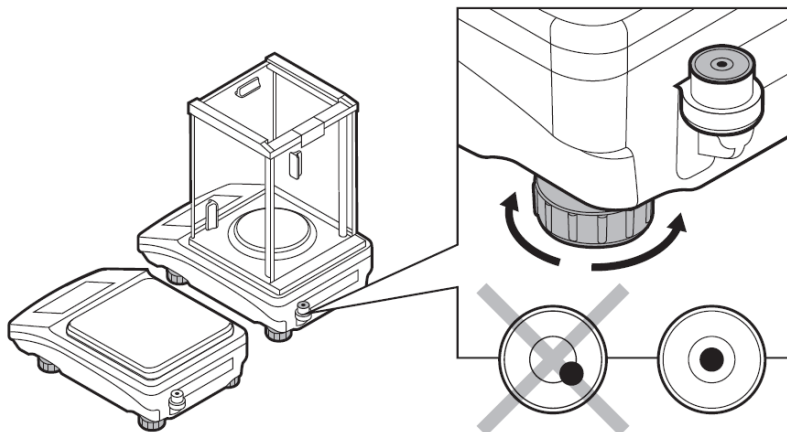
1) Install components following the diagram below:

- i. Draft Shield
- ii. Weighing pan



2.5. BALANCE LEVELING

It is necessary to level the balance prior to plugging it in. To level the balance, turn its feet until the air bubble is in the center position.

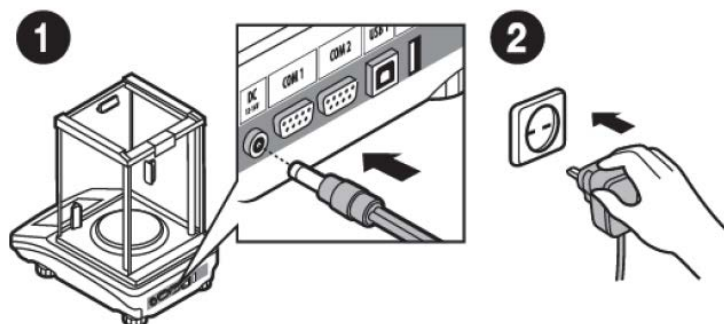


The balance should firmly rest on a surface, each of the feet must be supported.

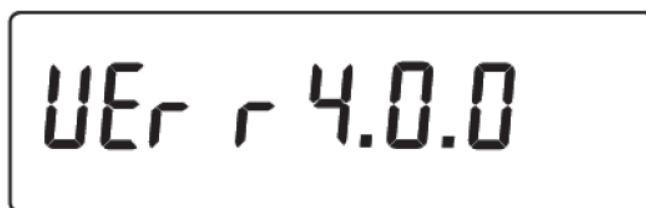
2.6. POWERING THE DEVICE

Balance can be connected to the mains only with a power adapter that comes standard with the particular model. Nominal power supply of the power adapter (specified on the power adapter data plate) should be compatible to the power from the mains.


Plug the balance to the mains – connect the power adapter to the socket, next connect its connector to port located at the back of the balance housing.



Test of the display unit takes place right after connecting the balance to the power, all the elements and pictograms are backlit for a short time. Next, the name and the program number appears (please note, software version number may be different than what appears below)



The indication then goes to ZERO (displayed reading unit depends on the balance). If the indication

is different than zero, please press  button.

3.KEYBOARD – BUTTON FUNCTIONS



	Press to switch the balance ON/OFF. If switched off, balance components other than the display are powered, and balance is in stand-by mode.
	Press to access data stored in a database: user, product, tare.
	Press to enter directly the active working mode settings.
	Press to select working mode. <i>F5 button of the computer keyboard.</i>
	Press to change measuring units.
	PRINT/ENTER button Press to send measurement to a printer or a computer (PRINT). Press to confirm selected parameter value or function (ENTER).
	Press to Zero the balance
	Press to Tare the balance
	Press to start adjustment / calibration process immediately.
	Press to enter the main menu of a balance.
	Press to operate balance menu or change parameter value.

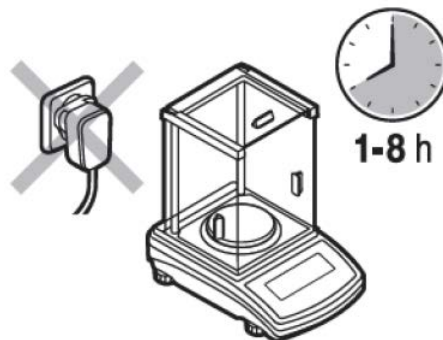
4. START-UP

When plugged to mains, the balance displays program name and number, next it proceeds to the weighing mode.

4.1. TEMPERATURE STABILIZATION PERIOD

Before start of measuring processes, it is necessary to wait until the balance reaches thermal stabilization.

For balances that were stored in much lower temperatures before plugging to mains (e.g. during winter period), thermal stabilization period shall take at least 4 hours for balances with $d=0.001g$ and $d=0.01g$ balances, and 8 hours for balances with $d=0.1mg$ balances. During the thermal stabilization, the indications on the display panel can change.



It is recommended that ambient temperature changes at place of use were insignificant (slow to change).

4.2. USER MENU

Menu is divided into 9 basic function groups. Each group has an individual name starting with a capital letter, **P**.

P1 CALIBRATION

P1.1	EXT. CALIB.		[external adjustment]
P1.2	USER CALIBRATION		[user adjustment]

P2 WORKING MODES

P2.1	ACCESSIBILITY		[settings for the accessibility of individual modes while working with the balance]
P2.2	WEIGHING		[setting for the function weighing]
P2.3	COUNTING PCS		[settings for the function counting pieces]
P2.4	DEVIATIONS		[settings for the function deviations % against the mass of the standard]
P2.5	DENS. OF SOLIDS		[settings for determining density of solids]
P2.6	DENS OF LIQUIDS		[settings for determining density of liquids]
P2.7	ANIMAL WEIGHING		[settings for the function animal weighing]

P3 COMMUNICATION

P3.1	COM1		[transmission parameters port COM 1]
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P4 DEVICES

P4.1	COMPUTER		[PC connection port]
P4.2	PRINTER		[printer connection port]

P5 PRINTOUT

P5.1	CAL. REPORT	[contents of the adjustment report]
P5.2	HEADER	[contents of the header printout]
P5.3	GLP PRNT.	[contents of the weighing result prnt.]
P5.4	FOOTER	[contents of the footer printout]
P5.5	NSD.PRN.1	[project of non-standard printout 1]
P5.6	NSD.PRN.2	[project of non-standard printout 2]
P5.7	NSD.PRN.3	[project of non-standard printout 3]
P5.8	NSD.PRN.4	[project of non-standard printout 4]
P5.9	VARIABLE1	[project of variable 1]
P5.10	VARIABLE2	[project of variable 2]
P5.11	SEPARATOR DOT	[choose . or , to separate digit readout]

P6 OTHER

P6.1	LANGUAGE	[menu language]
P6.2	KEY SOUND	[key sound]
P6.3	BACKLIGHT	[display backlight level]
P6.4	STAND-BY MODE	[backlight turn-off time interval]
P6.5	AUTO SWITCH OFF	[display turn-off time interval]
P6.6	DATE	[date settings]
P6.7	TIME	[time settings]
P6.8	DATE FORM.	[date format]
P6.9	TIME FORM.	[time format]
P6.10	RESTORE USER DEFAULTS	[return to factory default settings]

P7 INFO

P7.1	BALANCE ID	[balance serial number]
P7.2	SCALE TYPE	
P7.3	SOFT.VER.	
P7.4	ID PROD	
P7.5	TEMP.	
P7.6	SETUP PRNT.	[print balance setup]

P8 UNITS

P8.1	ACCESSIBILITY	[declaration of units to be available for balance operation]
P8.2	START UNIT	[selection of a start unit, unit active on balance start-up]
P8.3	USER UNIT U1	[parameter defining user's unit 1]
P8.4	USER UNIT U2	[parameter defining user's unit 2]




CAUTION!

Balance memory modifications will be saved upon abandoning the menu (on return to weighing). Press ESC button several times.

5. BALANCE OPERATION – GENERAL INFORMATION

5.1. BALANCE ZEROING


Zeroing is a function allowing to zero the mass on the indication. To perform this function, press  button. Mass indication of zero value shall be displayed together with precise zero ± 0 and stability markers $\blacktriangle\blacktriangleleft$.

The zeroing process is an equivalent for determining new zero point, recognized by the balance as precise zero. Zeroing is possible only for stable status of display indication.

! CAUTION

Zeroing the display indication is possible only within $\pm 2\%$ range of instrument's maximum capacity. If the zeroed value is above $\pm 2\%$ of the maximum capacity, then the balance indicates a respective -Err2- error message.

5.2. BALANCE TARING

Taring is a function allowing to determine net weight of a measured object. To determine the net weight of the object, place object's container (packaging) on the weighing pan, and on stabilization of measurement result press  key. The display indicates mass equaling zero and symbols: **Net** and $\blacktriangle\blacktriangleleft$. On taking off the weighed load and its packaging from the weighing pan, the display indicates sum of total tared mass with a minus sign.

The balance allows the user tare value to a database-stored product. Using this option, the software automatically uploads data on tare value for a particular product upon its selection from the database.


! CAUTION

Taring negative values is impossible. On taring negative values the balance responds with an error message,- Err3 -. In such case, zero balance indication and repeat taring procedure.

5.2.1. MANUAL TARE DETERMINATION

This option allows for the setting of a tare value through a manual input of the value.

Procedure:

- Press quick access key F2, to which **<ENTER TARE>** option has been assigned.
- Wait for a respective window to open.
- Use the arrow buttons to enter the tare value and press  button,
- The balance returns to the weighing mode, and the display indicates entered tare value with minus “-” sign.

5.2.2. DELETING TARE


Entered tare value can be deleted by pressing  button on the overlay or by entering tare value of 0.000g (see description above)

5.3. UNITS

UNITS parameter group enables the user to change availability of mass units (the change can be performed in-course of balance operation), and to define two custom units, thus positively effecting comfort and speed of operation. It is possible to change unit to other than unit [g] during weighing process or during operation of other modes. Working modes *Parts Counting* and *Percent Weighing* are exceptions.

5.4. TEMPORARY MEASURING UNIT


Function enables selecting a measuring unit which is to be indicated next to mass reading during the operation. The set measuring unit will be in use from the moment of its activation until its change or switching the balance off and on.

Each pressing of the  button results with change of the measuring unit.

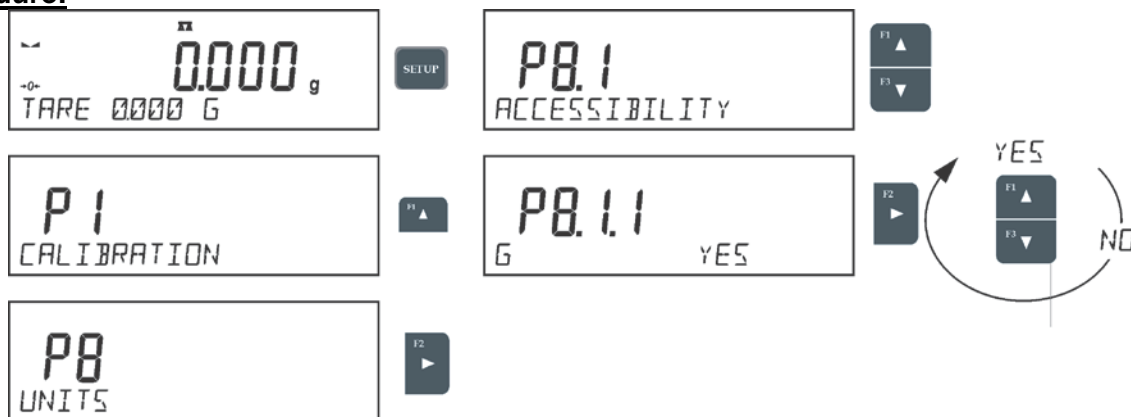
Options:

- [g], [mg], [kg], [ct], [lb], [oz], [ozt], [dwt], [tlh], [tls], [tlt], [tlc], [mom], [gr], [ti], [N]

5.5. UNITS ACCESSIBILITY

By pressing button , the user may declare units to be available for selection of temporary unit. Units with parameter value set to <YES> are available for selection in specified operating modes.

Procedure:

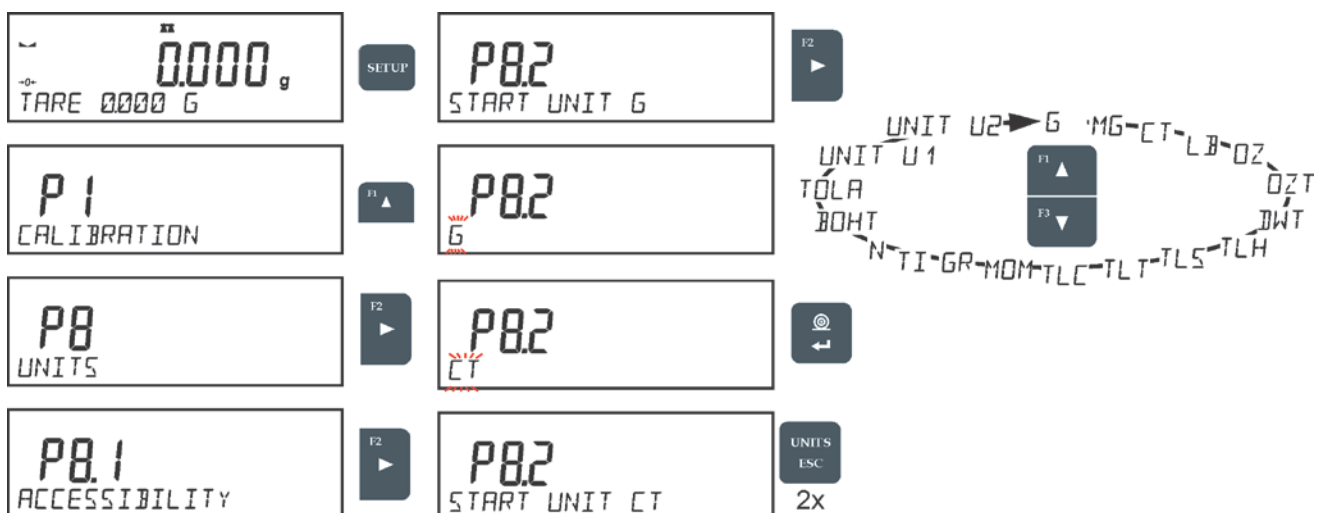


5.6. START UNIT SELECTION

Upon selection of start unit, the balance activates with the specified unit for these modes where change of the unit is possible.

Ability of selecting a given unit depends on the balance status, i.e. if the balance is verified or not.

Procedure:

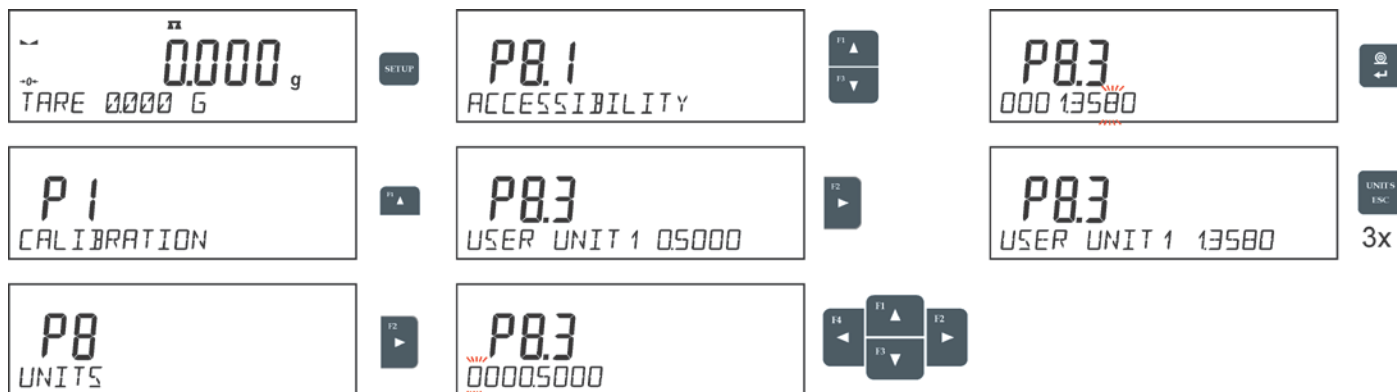


5.7. CUSTOM UNIT

You can declare two custom units. The custom unit is a result of indication multiplied by a specified coefficient.

The units are displayed as **[u1]** – user unit 1, and **[u2]** – user unit 2.

Procedure:



6. WORKING MODES- GENERAL INFORMATION

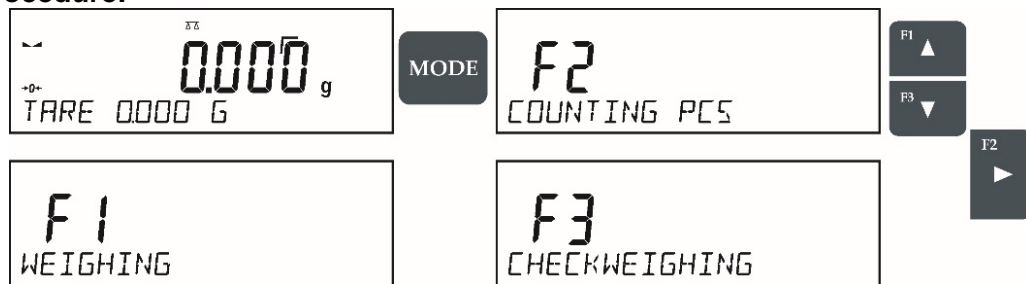
The balance features the following working modes:

	<p>Weighing Means of operation: weight of a load is determined through an indirect measurement. A balance measures gravitational force which attracts the load. An obtained result is processed to a digital format and displayed in a form of measurement result.</p>
	<p>Parts Counting Means of operation: based on a determined mass of a single part it is possible to count another part, if the mass of the single part is determined with sufficient accuracy, and that the following parts are equal in mass.</p>
	<p>Deviations % (Percent Weighing) Means of operation: control of percent ratio of a sample in relation to a standard (reference). Obtained data provides percent ratio on how test sample differs from the accepted standard (reference).</p>
	<p>Density of solids Means of operation: based on Archimedes principle, a balance determines density of solids. The mode requires an optional density determination kit.</p>
	<p>Density of liquids Means of operation: based on Archimedes principle, a balance determines density of liquids. The mode requires an optional density determination kit.</p>
	<p>Animal Weighing Means of operation: mass measurement takes place with application of filters dampening animal moves on a weighing pan, thus enabling obtaining a correct measurement result.</p>

6.1. RUNNING WORKING MODE

In order to run a particular mode press button, and select the mode from the list.

Procedure:



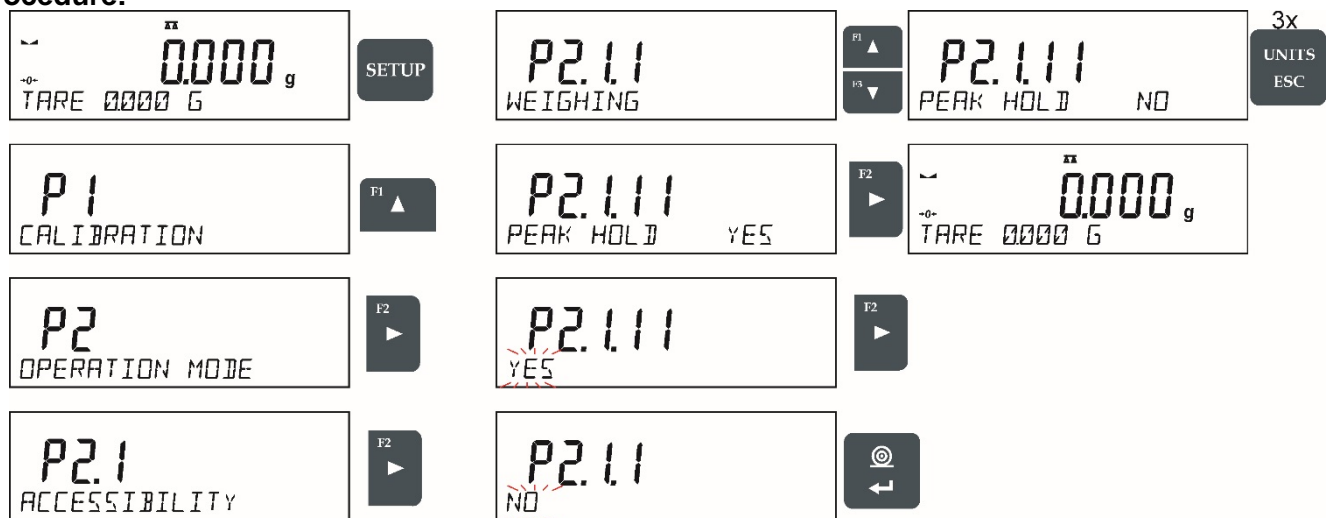
CAUTION!

Upon restart, the balance is launched with the most recently operated working mode. For settings of this function read later sections of this user manual.

6.2. WORKING MODE ACCESSIBILITY

User's have the availability to declare which working modes are to be accessible. You can deactivate working that are not used in course of balance operation, to do it, change the accessibility value to <NO> for a particular parameter.

Procedure:



6.3. WORKING MODE PROFILE

To simplify balance operation, there are 4 profiles in the software. The profiles are selected and saved so that the weighings for respective requirements and conditions are optimized. Profile settings apply to settings for specific working mode.




These are the following profiles:

- **User** - the basic profile for which filter settings are selected in a way enabling fast and precise weighing
- **Fast** - profile enabling weighing of any mass regardless of the working mode. When running the balance for the first time, this profile is started automatically. For this profile the parameters are selected in a way enabling obtaining the measurement result as fast as it is possible
- **Fast dosing** – the profile is dedicated for fast dosing.
- **Precision** – the profile is dedicated for precise dosing of any mass regardless of the working mode. For this profile the weighing process takes the most time, but the result is the most accurate and precise

Caution: You can modify all settings of User profile. Settings of other profiles (Fast, Fast dosing and Precision) can be modified only to a limited extend.

Name of currently selected profile is displayed in the bottom line. The profile can be selected individually for working mode. The balance saves the last used profile in each working mode (with your modifications) and starts operation with that profile selected.

Procedure:

- Press  button, utilize navigation keys to reach reach <Profil> and press  button
- Utilize navigation keys to reach proper profile, select profile by pressing  button
- The balance returns to main screen and operates in accordance with set profile.



6.4. WORKING MODE SETTINGS- READING

The software allows setup of operating parameters (filters, value release, and autozero function, last digit, and other setting) separately for each working mode. Only for **User** profile can you modify all settings. For other profiles (**Fast, Fast dosing, Precision**) filter and value release parameters are default and cannot be modified.

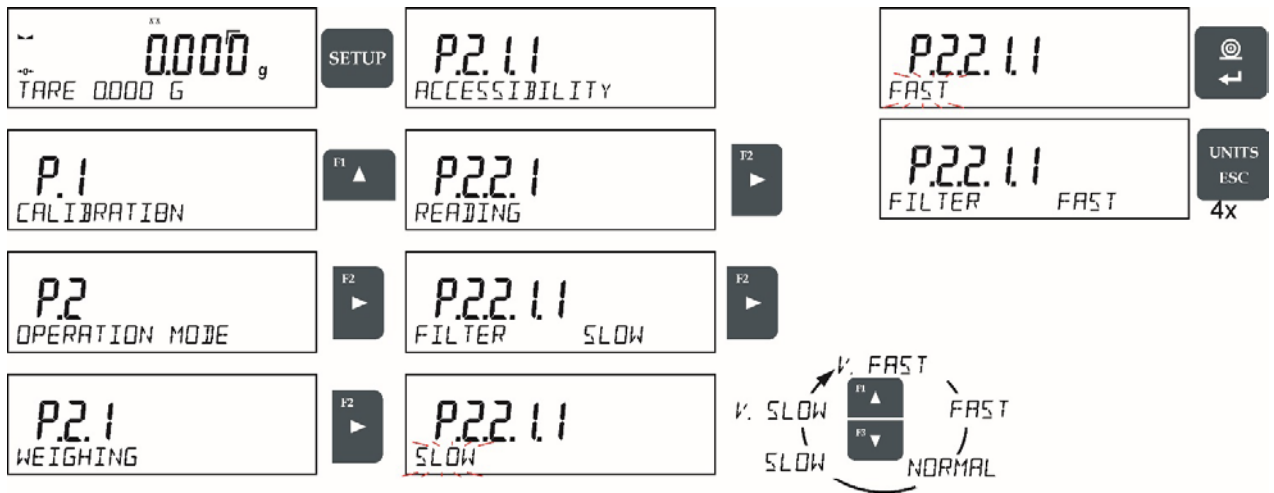
It enables customizing the instrument and utilizing its properties depending on your needs and expectations, or on specific requirements for selected working mode (e/g/ DOSING); as a result the device operation is quick and easy.

6.4.1. FILTER LEVEL SETTING

Filter level setting (function unavailable for the following profiles: Fast, Fast dosing, Precision)

Filter settings calibration depends on the working environment. For the best possible conditions the filter can work in a very fast mode (V.FAST value for Filter parameter); however, if the conditions are poor (shakes, drafts), the filter should be set to slow or very slow option (SLOW or V. SLOW value for Filter parameter). The effectiveness of the filter is different throughout the weighing range. The filter works slower when “approaching” the weighed mass, it works more intensively for weighed mass within the set range of the filter (the parameter for setting filter range is accessible only from the service menu – the user does not have any access to it).

Depending on the filter, the weighing time is shorter (V.FAST and FAST) or longer (SLOW and V. SLOW).

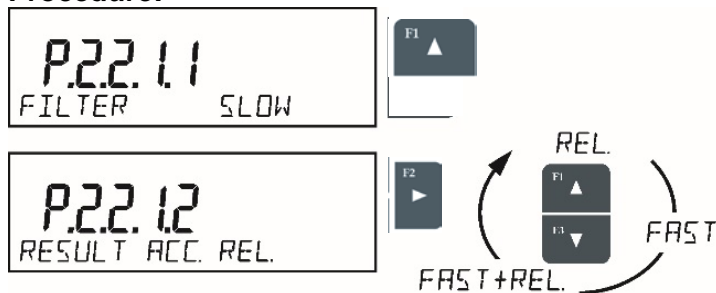


6.4.2. VALUE RELEASE

Value release setting (function unavailable for the following profiles: Fast, Fast dosing, Precision)

Since ambient conditions at a workplace vary, it is necessary to determine the value release parameter that are best for your working environment, parameter options are: **<FAST.+REL.>**, **<FAST>** or **<RELIABLE>**. Depending on the selected option, weighing time is either shorter or longer.

Procedure:

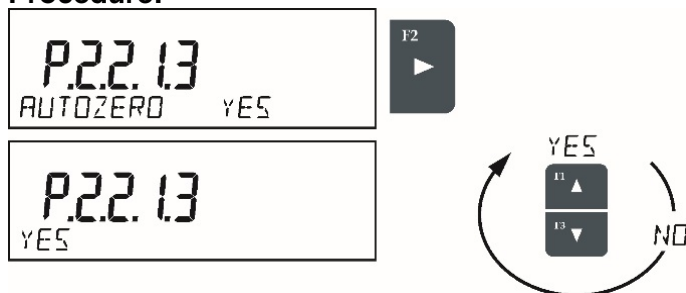


6.4.3. AUTOZERO

The balance features an autozero function (Auto). This function automatically controls and corrects the zero reading. When Autozero is enabled, it compares balance readings at declared time interval e.g. 1s, if weighing pan is unloaded and display indication is close to zero. If results vary less than declared AUTOZERO range e.g. one division, balance zeroes automatically, marker of stable measurement result \blacktriangleleft , and precise zero marker $\rightarrow 0 \leftarrow$ are displayed.

If AUTOZERO function is enabled, then each weighing process starts from precise zero point. There are, however, some instances when this function can be a disturbing factor for the measuring process; e.g. very slow placing of a load on the weighing pan (load adding). Here, zero reading correction can also correct the actual reading of loaded mass.

Procedure:

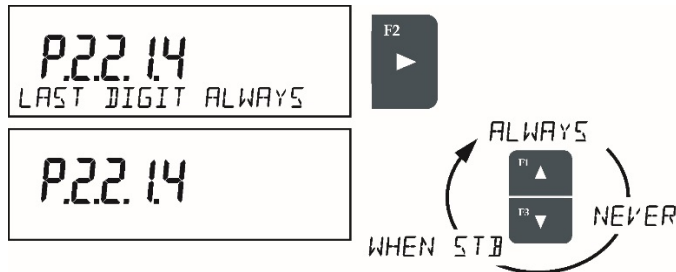


6.4.4. LAST DIGIT DISPLAY

Function enables displaying the last digit of decimal place for a weighing result. There are three available options:

- <ALWAYS> all digits visible
- <NEVER> last digit is not displayed
- <WHEN STB> last digit is displayed only for a stable weighing result

Procedure:



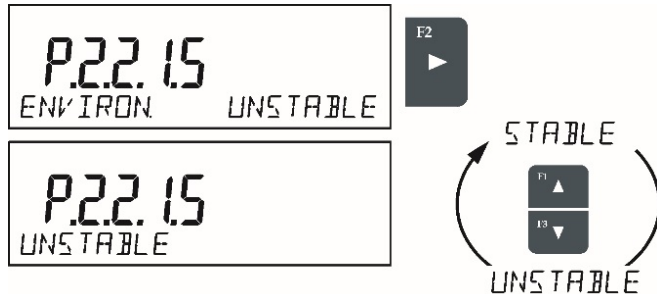
6.4.5. BALANCE AMBIENT CONDITIONS

Parameter relating to ambient and environmental conditions in which the balance operates.

There are two options: <STABLE> and <UNSTABLE>.

- Selecting <STABLE> mode makes the balance work much faster, i.e. weighing takes much less time than for <UNSTABLE> mode.
- If the ambient conditions are unstable it is recommended to use UNSTABLE mode. By default, the parameter is set to <STABLE> option.

Procedure:



6.5. WORKING MODE SETTINGS- AUTOTARE

Autotare is used for quick determination of net weight for loads with different tare values, wherein they are measured one after another.

When the function is active (<AUTOTARE> parameter set to <YES> option), the operating process takes the following steps.

Procedure:

- Make sure that the weighing pan is empty and press button responsible for zeroing.
- Put product packaging on a weighing pan.
- After measurement stabilization, automatic taring of the packaging mass takes place (Net marker then appears in the upper part of the display).
- Place product to be weighed into the packaging.
- The display shows net weight of the product.
- Remove the product together with the packaging from the weigh pan.

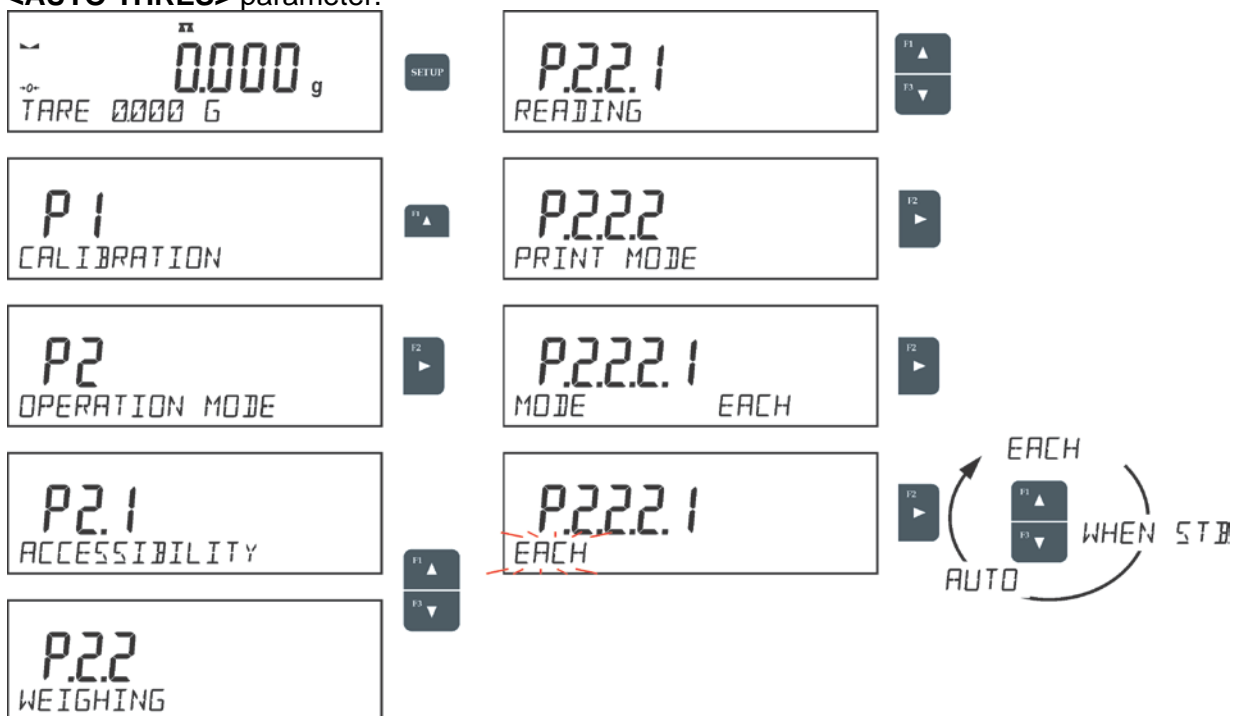
- The balance removes the tare value (packaging weight recorded during the first step of the operating process) after the gross weight value (set in <AUTO THRES> parameter) has been exceeded.
- Place packaging of the next product on the weighing pan, automatic taring of the packaging weight proceeds after measurement stabilization (Net marker appears in the top section of the display);
- Place next product that is to be packed.

For correct operation of the balance with AUTOTARE function, it is necessary to adjust the threshold value.


<AUTO THRES> parameter is connected with the following functions:

- automatic tare
- automatic operation




No automatic taring takes place as long as the gross weight value stays within the range set in <AUTO THRES> parameter.



6.6. WORKING MODE SETTINGS- PRINT MODE

Function designed to enable print mode setting, it activates  key.

Print mode options:

- <WHEN STAB>, for this option stable measurement result, along with the settings for parameter <GLP PRINTOUT>, is sent to the printer port. On pressing  key, when the result is not stable (no  marker on a display), the balance software sends the measurement result to the port after reaching stability for the measurement.
- <EACH>, for this option every single pressing of  button results with sending the measurement indication to the printer port along with the settings for <GLP PRINTOUT> parameter. Every single indication is sent (stable and unstable). For unstable indication <?> character appears at the beginning of the printing frame. **This function applies to non-verified balances exclusively.**

- <AUTO> - select this option to enable automatic printing of measurements. If this option has been selected, remember to set <AUTO THRES> parameter to suit your needs.
- <AUTO+INT.> select this option to start automatic printout and record of indications in Weighings database and Alibi database, carried out in a cyclic manner in a specified time interval. The interval is set in minutes, in parameter P2.2.3.3 <AUTO INT.>. Interval range is 1-9999 min.




For automatic operation with interval it is necessary to specify interval value in [min].

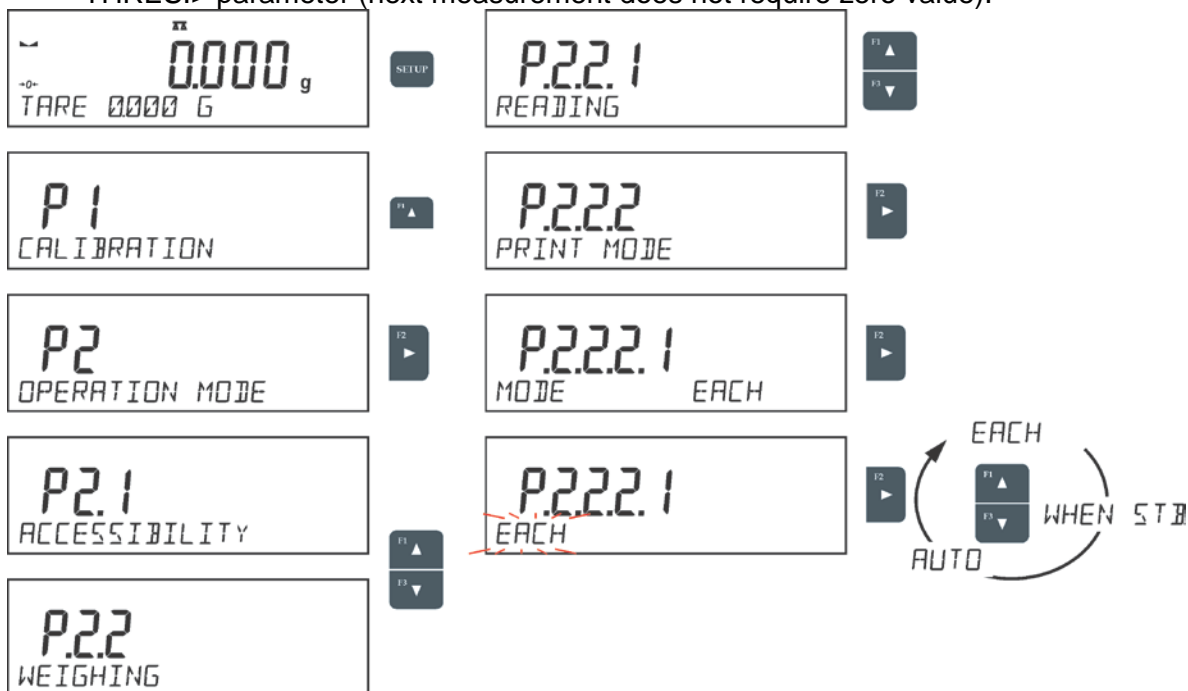
CAUTION!

Each result is printed and recorded (stable and unstable). Automatic operation with interval starts at the moment of switching the function on and it lasts until it is switched off. On switching the function of auto print with interval, PRINT button becomes inoperative (no indication is printed when pressed).

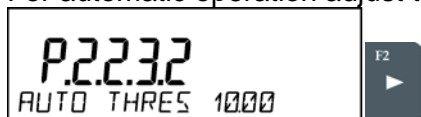
Automatic operation procedure:



- Press  button to zero the balance (marker of stable measurement  and zero marker  are shown on a display).
- Deposit load, the balance sends the first stable measurement to the printer port.
- Remove the load from the pan.
- The next measurement is possible when the indication is lower than the set value of <AUTO THRES.> parameter (next measurement does not require zero value).

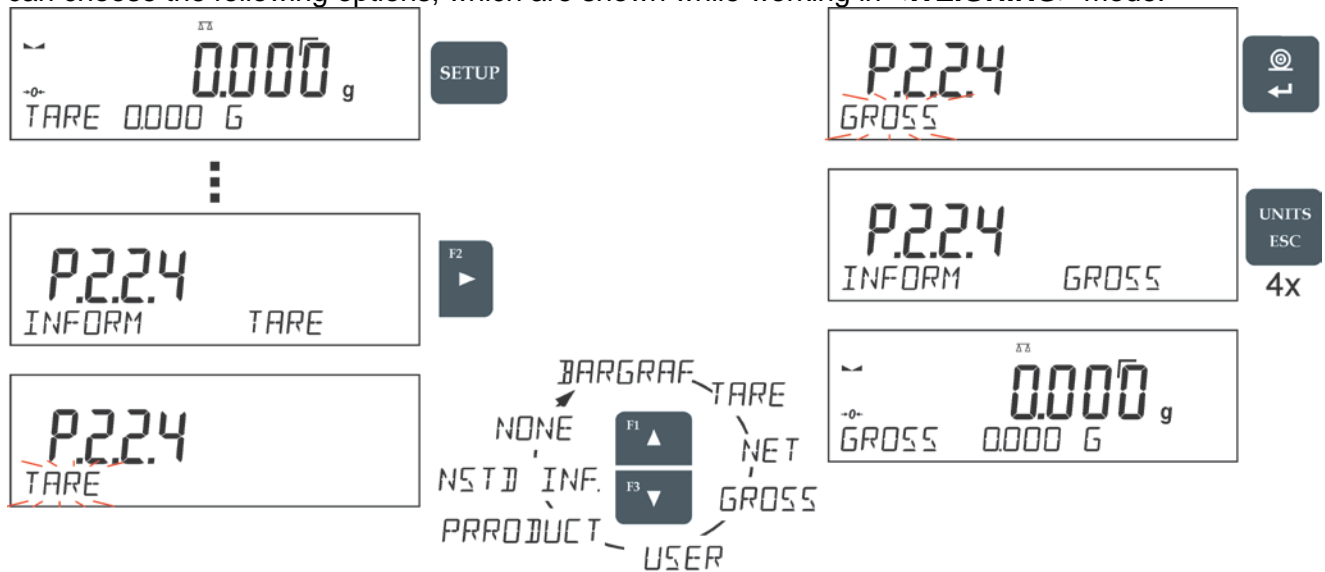


For automatic operation adjust the threshold value.



6.7. WORKING MODE SETTINGS- INFORMATION

Function enables displaying additional information in the bottom line. Depending on the needs, you can choose the following options, which are shown while working in <WEIGHING> mode:



<BARGRAF> option presents amount of used weighing capacity in a graphic form, it covers 0 – MAX range.

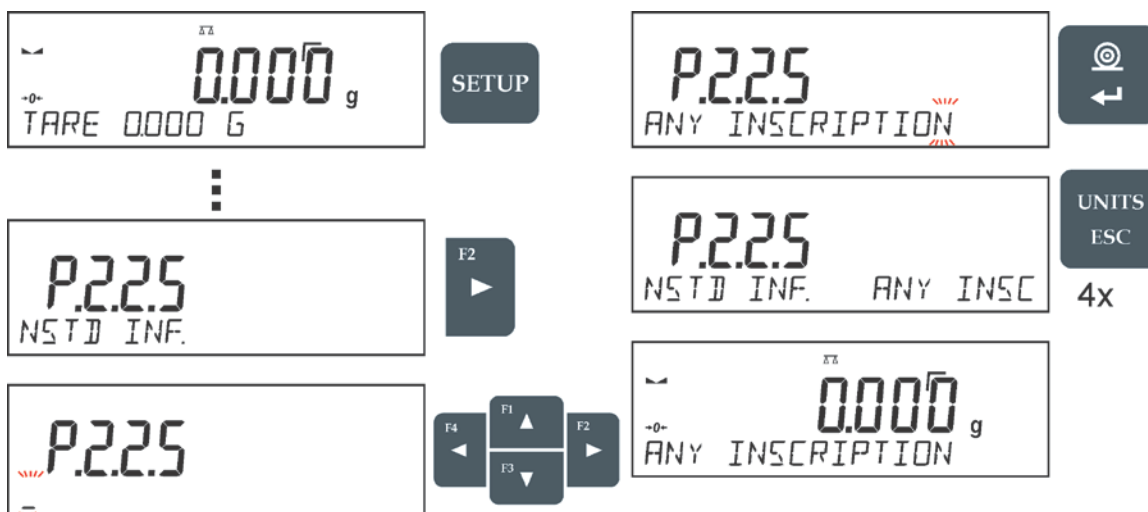


Example of a VWR-1003AC balance display with bar graph option on: 500 g heavy load placed on a weighing pan means that 50% of max capacity has been used (half-filled bar graph bottom line).

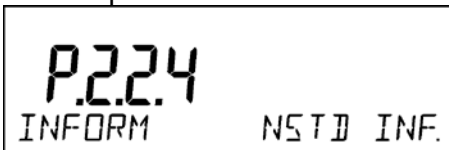
It is possible to enable <BARGRAF> option for the following modes: PARTS COUNTING, DOSING, PERCENT WEIGHING, WEIGHING, ANIMAL WEIGHING, STATISTICS, TOTALIZING, PEAK HOLD.

6.8. WORKING MODE SETTINGS- NON-STANDARD INFORMATION

Function enables declaring non-standard information, which is to be displayed in the bottom line of the display. You can insert any text consisting of 19 characters' maximum.

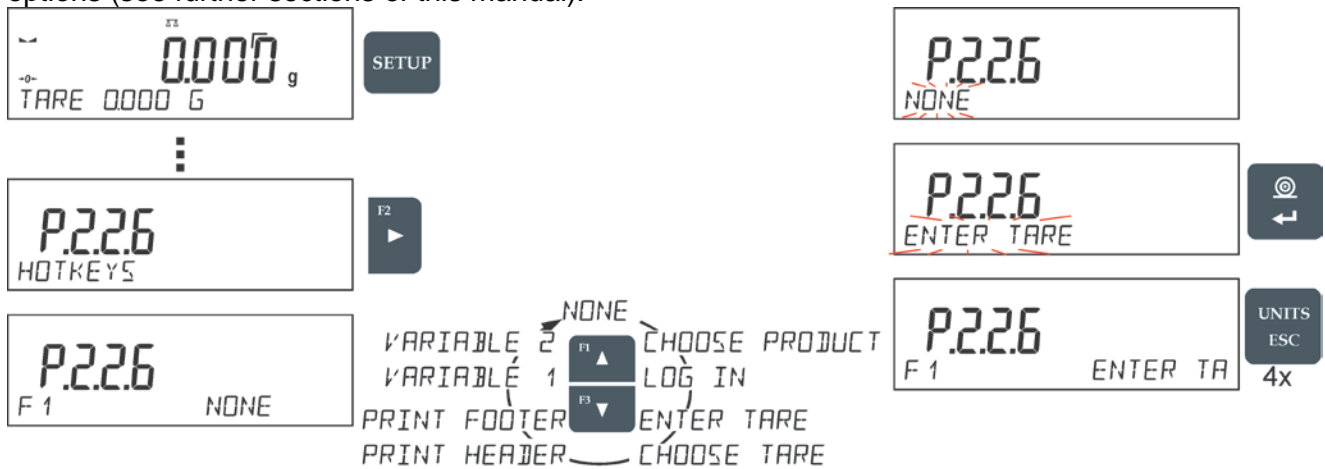


If you want the declared non-standard information is to be visible, set parameter P2.1.2 to < NSTD. INF. > option.



6.9. WORKING MODE SETTINGS- F SHORTCUT KEYS

Function enables assigning quick access for weighing functions which are to be accessible by pressing F1, F2, F3 or F4 keys. You can choose between the following options for <WEIGHING> mode: <NONE / ENTER TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>. These options can be freely assigned to any of the F keys. For other modes there are more available options (see further sections of this manual).



Functions for particular working modes:

Function	Modes featuring the function
SELECT PRODUCT	All modes
LOG IN	All modes
ENTER TARE	All modes
SELECT TARE	All modes
PRINT HEADER	All modes
PRINT FOOTER	All modes
VARIABLE 1	All modes
VARIABLE 2	All modes
ON/OFF LAST DIGIT	All modes
ENTER SAMPLE	Parts Counting, Deviations
DETERMINE SAMPLE	Parts Counting, Deviations
SET HI_LO	Deviations exclusively
START	Animal Weighing, Solids Density, Liquids Density

7. CALIBRATION

In order to ensure the highest weighing accuracy, it is recommended to periodically introduce a corrective factor of indications to balance memory, the said factor must be referred to a mass standard. In other words, balance calibration shall be performed from time to time.

Calibration should be carried out:

Before the beginning of weighing procedure,

If long breaks between following measuring series occur,

If temperature inside the balance changes more than: 1°C or 2°C for balances with d=0.1mg or 2°C for balances with d=0.001g and d=0.01g.

Types of calibration:

External Calibration with predefined weight value

User Calibration with an external weight of declared mass which cannot be modified or of any mass, but not lower than 30% of maximum range.



CAUTION!

Remember to carry out the calibration process when there is no load on the pan! When the weighing pan is loaded, command **<RANGE EXCEEDED>** is displayed. In such a case remove the load and restart the the calibration process. Calibration process can be aborted if necessary by pressing **Esc** button at any time during the process.

7.1. CALIBRATION MENU SETTINGS


- EXT. CALIB. – External calibration (with an external weight)
Calibration with an external weight, value of which is saved in factory settings.
- USER CALIB. – User calibration (with an external weight)
Calibration with an external weight of any mass within balance range, however not lower than 30% of Max range.


7.2. EXTERNAL CALIBRATION

7.2.1. EXTERNAL CALIBRATION

The external calibration for VWR B2-series balances should be carried out with an external mass standard of class F₁.

Run an external calibration process, the balance displays a command ordering to unload the weighing pan, **<REMOVE MASS>** (the weighing pan must be empty). When the weighing pan is

unloaded, press  button. The balance determines mass of an empty pan, message **<CALIBRATION>** is displayed in the bottom line. Next, message **<PLACE MASS>** and mass value to be placed on the weighing pan are displayed, e.g. **200.000g** (depending on the type of


balance). Place an external calibration weight of displayed mass value and press  button. The balance determines the mass, message **<CALIBRATION>** is displayed in the bottom line. On completing calibration process the balance returns to submenu **P1.2 EXT.CALIB.**


7.2.2. USER CALIBRATION

The external calibration for VWR B2-series balances should be carried out with an external mass standard of class F₁.

Run an external calibration process, the first step of the process is to declare the mass of a weight that is to be used for calibration. The mass must be $\geq 30\%$ Max capacity.

Once the mass of the weight is entered and confirmed, the message prompting the user to remove the weight from the pan is displayed: **<REMOVE MASS>** (the weighing pan must be

empty). Unload the pan and press  button, the balance determines the weight of an unloaded pan, message **<CALIBRATION>** is shown in the bottom line. Next, message **<PLACE MASS>** and mass value to be placed on the weighing pan are displayed, e.g. **200.000g** (depending on the type of balance). Place an external calibration weight of displayed mass value

and press  button. The balance determines the mass, message **<CALIBRATION>** is displayed in the bottom line.

7.3. CALIBRATION REPORT PRINTOUT

At the end of each calibration process or calibration test, a calibration report is generated automatically and sent to the communication port. The content of the report is declared in menu P5.1 CAL REPORT.

The instruction on how to declare settings for this option is described in section about printouts.

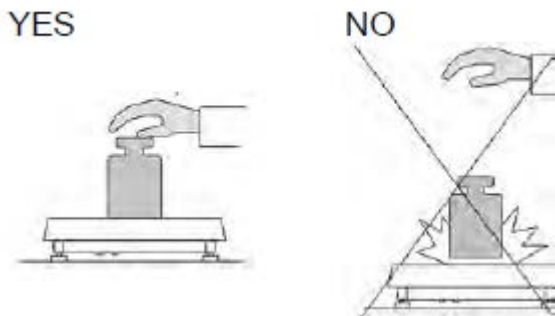
The report can be printed out via a printer connected to the balance or it can be sent to the computer and saved as a file for archiving purposes.

8. WEIGHING

Weighing is a working mode which enables the mass determination of an object.

In order to ensure long lasting use of a balance plus correct and reliable measurement of weighed loads, follow below procedures:

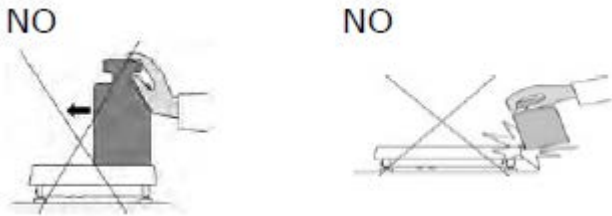
- Start the balance with no load on the weighing pan (permissible value of load on the weighing pan on balance start is $\pm 10\%$ of its maximum capacity).
- Load the weighing pan steadily avoiding shocks:



- Place weighed loads centrally on the weighing pan :







- Avoid side loading, in particular side shocks:






The balance requires calibration before weighing process start or in case of drastic change of ambient conditions at a workstation.

- Before the start of weighing procedure, it is recommended to load the weighing pan a few times with mass close to balance max capacity
- Check if unloaded balance indicates “precise zero” $\rightarrow 0 \leftarrow$ and whether measurement is stable

, if not, press  button

- Press  button to set a measuring unit
- Place object on the weighing pan and read result only on stabilization 
- Mass indication of a load placed on the weighing pan can be tared multiple times by pressing

 (CAUTION: do not exceed maximum capacity during taring procedure)

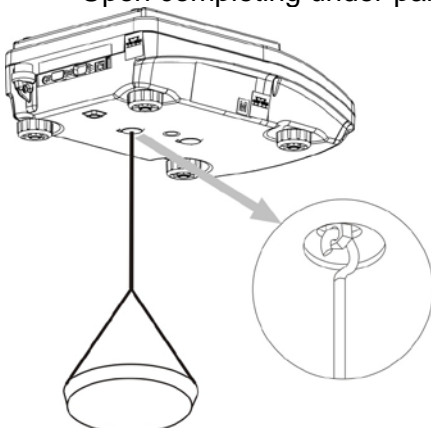
The balance shall stay plugged into the mains in between measurement series. It is recommended to switch off the balance display by pressing  button. By pressing the  button, the balance is ready for operation and carrying out measurements.

8.1. UNDER-PAN WEIGHING

In standard analytical and precision balances, loads can be weighed under a weighing pan. Such means of operation requires placing a balance in an uplifted position.

For under-pan weighing follow below procedure:

- Remove plastic hole plug located in the balance base,
- Under the plug you can find a special holder with an opening dedicated for suspending the load (fixed permanently)
- The opening is used for fixing a hook intended for either load or a dedicated weighing pan, once depositing a load one can start weighing
- Upon completing under-pan weighing, put the plastic plug back onto its place.



CAUTION!

The suspension for hook must not be turned, twisted or manipulated in any direction. Such actions may cause damage to balance mechanism.

Mass of all additional elements of under pan weighing kit, like the hook, weighing pan, string, etc.

should be zeroed by pressing  or .

9. PARTS COUNTING

Parts counting is a working mode which enables determination of quantity of small parts with equal weight. Determined mass of a single part is used for the counting procedure.

9.1. SETTING REFERENCE MASS: MASS DETERMINATION FOR THE SAMPLE OF KNOWN QUANTITY

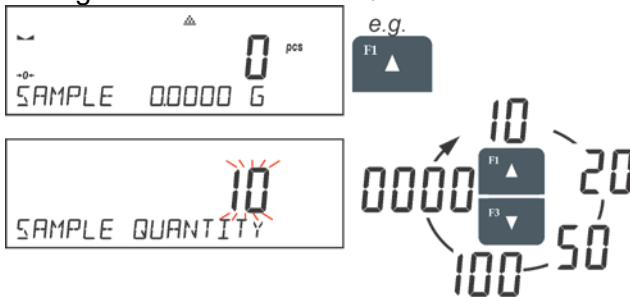
While determining the mass of a single piece, **ACAI** function (Automatic Accuracy Correction) is in use.



Means of operation of ACAI function:

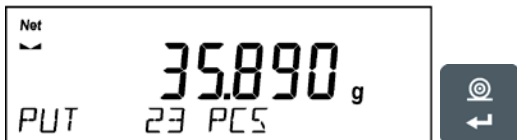
- Number of pieces (on adding) on balance's weighing pan must be greater than before
- Number of pieces (on adding) on balance's weighing pan must be less than twice the amount displayed before adding parts
- Current quantity of parts must be within the ± 0.3 tolerance of the total value,
- Measurement result has to be stabilised.



Procedure:

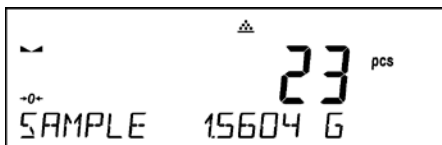
- Place the container on the pan and tare its mass,
- Press F button to which the function **<DETERMINE SAMPLE>** is assigned, wait to see the editing window **<SAMPLE QUANTITY>**




- Use arrow buttons  or  to select the correct sample quantity.
- For optional quantity variable (displayed value <0000>) enter any number using arrow buttons
- Confirm selected sample quantity, confirmation message - **<PLACExx PCS>** - shall be seen.



- Place the declared number of pieces in the container and when the result is stable (the symbol  is displayed) confirm the mass by pressing  button,
- The balance software automatically counts a single piece mass and enters the mode **<PARTS COUNTING>** displaying the number of pieces which are on the pan (**pcs**). In the bottom line, a single piece mass value is shown (if the option has been selected for **<INFORMATION>** function).



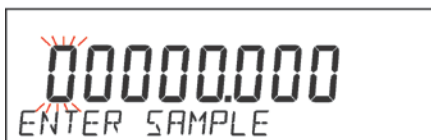
CAUTION!
Remember that:

- The total mass of all the pieces put on the weighing pan must not be greater than the balance maximum weighing range.
- The mass of a single piece cannot be lower than **0.1 reading unit** of the balance. If this condition is not met, the balance displays message: **<Single part mass too low>**.
- While determining the number of pieces, wait for the stability pictogram ▲, next confirm the quantity.
- You can confirm the declared quantity by pressing  button only after the stability pictogram is displayed. Otherwise, the balance will not accept the measurement.

9.2. SETTING REFERENCE MASS: ENTERING MASS VALUE

Procedure:

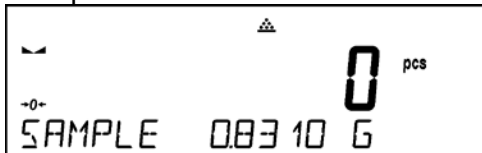
- Press F button to which the function **<ENTER SAMPLE>** is assigned, wait to see the editing window **<ENTER SAMPLE>**



- Use arrow buttons to enter the known weight value of a single piece.



- The balance software automatically enters **<PARTS COUNTING>** mode displaying the number of pieces which are on the pan (**pcs**). In the bottom line, a single piece mass value is shown (if the option has been selected for **<INFORMATION>** function)



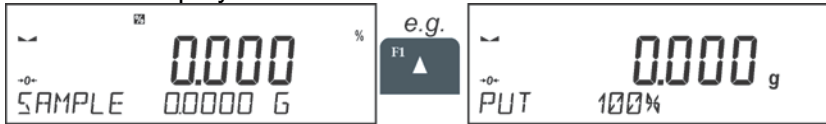
10. DEVIATIONS

Deviations is a working mode for comparison of a measured sample with the reference mass. The result is expressed in [%].

10.1. SETTING THE REFERENCE MASS: WEIGHING REFERENCE SAMPLE

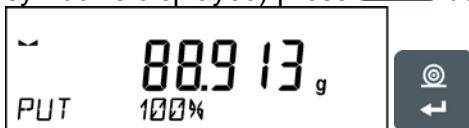
Procedure:

- Press F button to which function <DETERMINE SAMPLE> is assigned, <PUT 100%> editing window is displayed.



- Place the reference sample (to represent 100%) on the pan, and when the result is stable (◀▶

symbol is displayed) press  button to confirm.



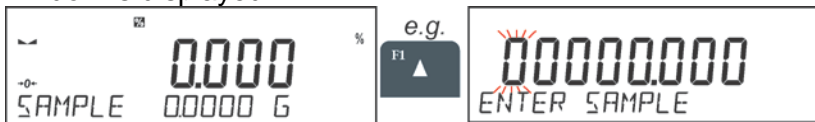
- The software automatically enters the measured load value as a reference sample and enters <DEVIATIONS> mode displaying the value of 100.000%, the bottom line displays reference mass value (if such an option has been selected for <INFORMATION> function).




10.2. SETTING THE REFERENCE MASS: ENTERING THE MASS VALUE

Procedure:

- Press F button to which function <ENTER SAMPLE> is assigned, <ENTER SAMPLE> editing window is displayed.



- Use arrow buttons to enter the known reference mass value, press  button to confirm.
- The software automatically enters <DEVIATIONS> mode displaying the value of 0.000%, the bottom line displays entered reference mass value (if such an option has been selected for <INFORMATION> function).



11. DENSITY OF SOLIDS

Solids density is a working mode enabling determination of density of a representative sample material.

In order to operate this mode, an optional Density Determination Kit is available for purchase. For the measurement, an appropriate model of the kit is used for the balance depending on pan configuration. Prior to installing the kit, it is necessary to remove the weighing pan and a draft shield. Density determination of solids can be carried out by means of two pre-defined types of liquids or user-defined liquid of specified density:

- **WATER** (distilled water),
- **ETHANOL** (spirit 100% +/- 0.1% in temp. 20°C),
- **OTHER** (another liquid of specified density).

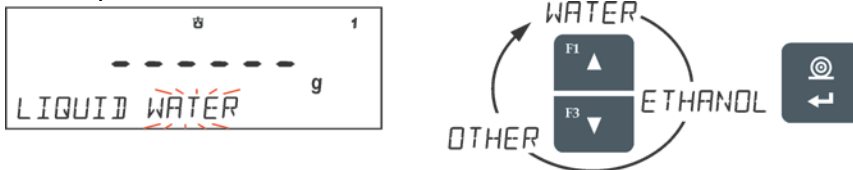
When determining density in water or alcohol it is necessary to specify their temperature. For liquid of specified density, its value (density) is inserted from balance keyboard. Density determination is carried out by weighing a sample first in the air (top weighing pan of the density kit), and then weighing the same sample in liquid (on the bottom weighing pan of the density kit). As the same sample is weighed in liquid, the result of density determination is automatically indicated on a balance display.

Procedure:

1. Install the density determination kit.
2. Enter <SOLIDS DENSITY> function.
3. Prepare a sample.
4. Initiate the process.



5. Set the process following the displayed messages.
6. Select liquid in which the determination is to be carried out.



7. After selecting and entering a liquid type by pressing <ENTER> button, the software proceeds to setting the liquid temperature.

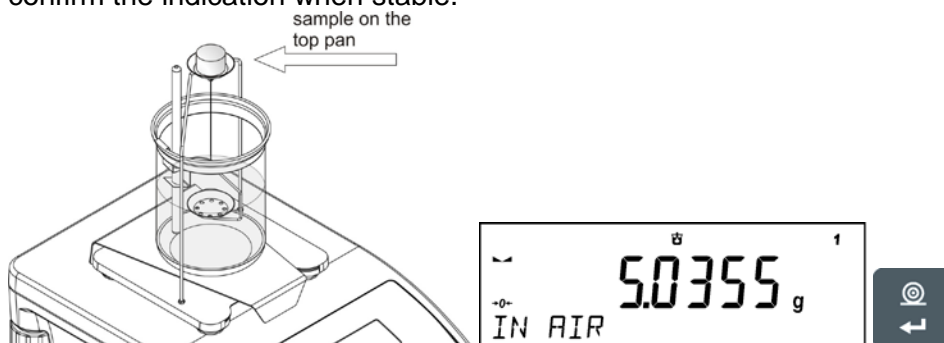


8. If <OTHER> liquid of determined density has been chosen, enter its density.

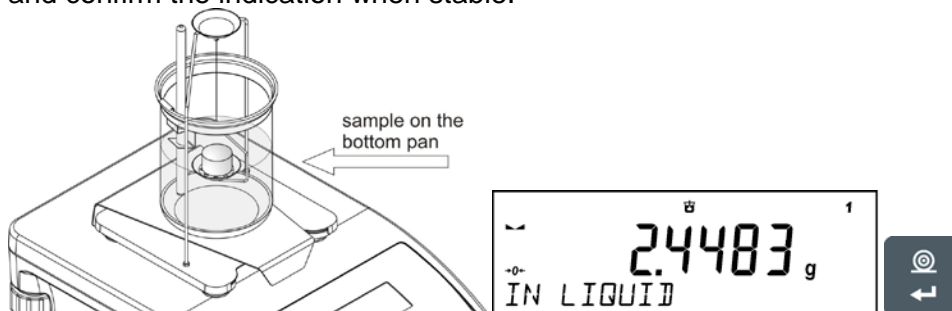


9. With this data entered, the program proceeds to weighing.

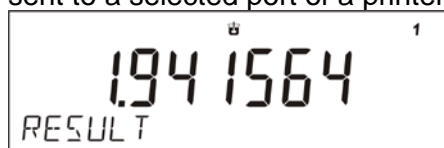
10. First, place a mass sample on the top weighing pan of the kit (weighing in the air), and confirm the indication when stable.



11. Next, place a mass sample on the bottom pan of the kit (mass determination in the liquid), and confirm the indication when stable.



12. On the second confirmation of the indication, the program automatically calculates and displays the tested solid object density. At the same time, a report on the measurement is sent to a selected port of a printer.





An example 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	
.....	



The report may be reprinted upon pressing  button. In order to finish, press  button. The software returns to the main window of the mode and a next measurement can be performed. The balance operates with previously set parameter values (liquid, temperature) thus shortening time needed for the exact measurement.

12. DENSITY OF LIQUIDS

Liquids density is a working mode enabling determination of density of liquid with use of representative sample of a given liquid.

To operate this mode, an optional Density Determination Kit is available for purchase. For the measurement, an appropriate model of the kit is used for the balance depending on pan configuration. Prior to installing the kit, it is necessary to remove the weighing pan and a draft shield. Density determination kit is the same for solids and for liquids.

The density of liquids is calculated using the following formula:

$$\rho = \frac{A - B}{V} + d$$

ρ - density of liquid

A - sinker weight measured in the air

B - sinker weight measured in water

V - volume of the sinker

d - air density (max 0.001 g/cm³)

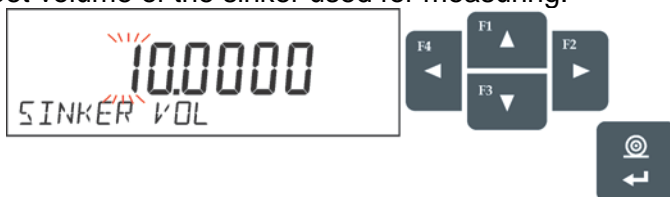
The basic element for measuring liquids density is the sinker. Its volume is precisely determined and given on a sinker's hanger. Before starting liquid density determination, enter sinker's volume value to the balance memory. In order to measure the density of liquid, first determine mass of the sinker in the air. Then, measure mass of the same sinker in the tested liquid. The result of liquid density determination is automatically indicated on balance display.

Procedure:

The basic element for measuring liquids density is the sinker. Its volume is precisely determined and given on a sinker's hanger. Before starting liquid density determination, enter sinker's volume value to the balance memory. In order to measure the density of liquid, first determine mass of the sinker in the air. Then, measure mass of the same sinker in the tested liquid. The result of liquid density determination is automatically indicated on balance display.

In order to determine the liquid density you need to:

1. Install the density determination kit.
2. Enter <LIQUIDS DENSITY> function.
3. Prepare a sample.
4. Initiate the process.
5. Set the process following the displayed messages.
6. Set volume of the sinker used for measuring.

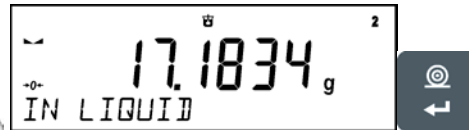
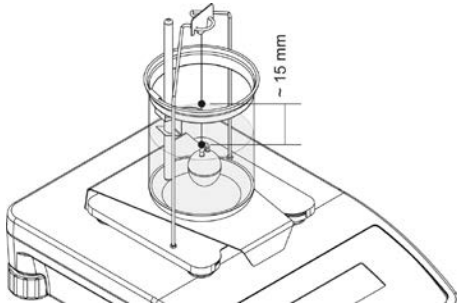


7. On entering the data, the software proceeds to weighing.

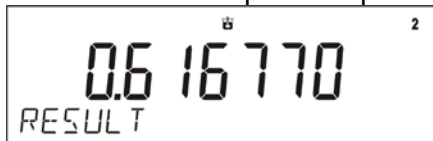
8. First, place the sinker on the hook (a sample mass determination in the air), and confirm the indication when stable.



9. Next, take the sinker out of the hook, put the beaker with liquid on the beaker's basis (the beaker cannot touch the hook), gently hang the sinker on the hook providing that it is totally immersed in the tested liquid (sample mass determination in liquid) – and confirm the indication when stable.



10. On the second confirmation of the indication, the program automatically calculates and displays the tested solid object density. At the same time, a report on the measurement is sent to a selected port of a printer.





An example report:

-----Liquid Dens-----	
Date	28.08.2013
Time	9:38:39
Balance ID	32100000
User	ADMIN
Sinker vol.	10.0000 cm ³
In Air	23.3511 g
In Liquid	17.1834 g
Density	0.616770 g/cm ³

Signature	
.....	



The report may be reprinted upon pressing  button. In order to finish, press  button. The software returns to the main window of the mode and a next measurement can be performed. The balance operates with previously set parameter values (liquid, temperature) thus shortening time needed for the exact measurement.

13. ANIMAL WEIGHING

Animal weighing is a working mode allowing reliable determination of mass of weighed objects in motion. In principle, this type of object generates unstable measurement, thus it requires using a different filtering method of measurement signal.

Apart from standard settings for this mode (i.e. weighing mode settings) some additional parameters have been designed to describe operation of the mode.

Additional settings list:

- **AVERAGING TIME** – Amount of time during which recorded measurement results are analyzed. Obtained data is used to determine average measurement result.
- **THRESHOLD** - It is a value expressed in mass measuring units. To start measurement, the indication value has to exceed the set threshold value.

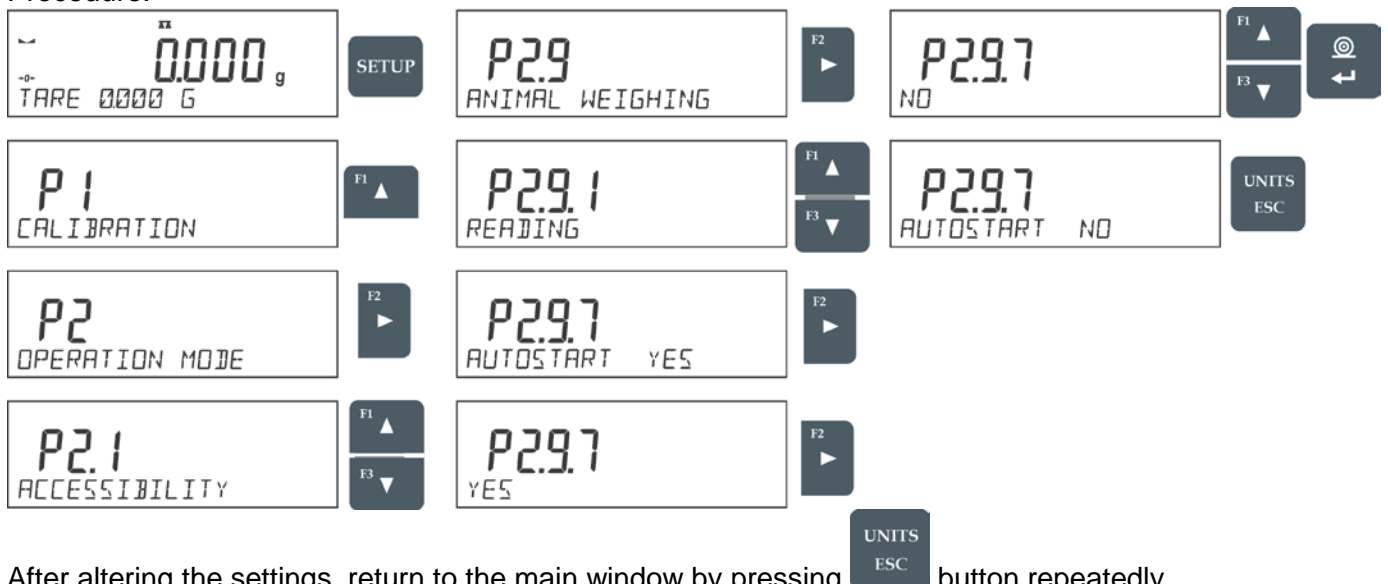
- **AUTOSTART** - Determines start criterion for measurements: whether they are to be initiated manually, on pressing a button or selecting **<START>**, or automatically. When the parameter is set to **<YES>** option, the measurement starts automatically if an indication on a balance display exceeds the set threshold value. The following measurement can start on removing the weighed object from a balance pan (the indication has to return below the value set in the threshold), and on loading the pan with a new object at a moment when the set threshold value indication is exceeded.

Prior to tests it is necessary to adjust settings of the above options so that correct values were provided. The selected options shall be respective to needs and expectations resulting from working environment.

13.1. RUNNING THE PROCESS MANUALLY

To start the process of weighing manually, enter the mode settings, select an **<AUTOSTART>** parameter and set **<NO>** value.

Procedure:



After altering the settings, return to the main window by pressing **UNITS ESC** button repeatedly.

Next, set the averaging time in seconds. It is the time, during which the balance software acquires measurements and based on these measurements the average result is determined.

The **<THRESHOLD>** parameter is not required for this measurement mode.

Select **<ANIMAL WEIGHING>** mode.

Place the container in which the measurement is to be carried out on the weighing pan and when the indication is stable carry out taring.

Next, enter the mode options and start the measurement procedure following the instruction below.



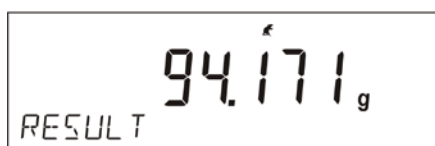
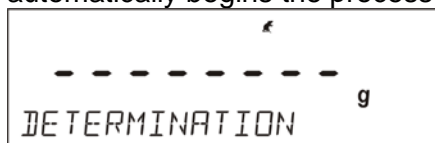
After weighing process completion, the measurement result is locked and automatically printed.

13.2. RUNNING THE PROCESS AUTOMATICALLY

To start the process of weighing automatically, enter the mode settings, select an <AUTOSTART> parameter and set <YES> value, follow description from the previous paragraph. Additionally, set parameters <AVERAGING TIME> and <THRESHOLD>.

In order to carry out the measurement in a container (TARE) for this mode, select the option <ENTER TARE>, for the option overview to be found in weighing mode options description.

To start the process (after setting the options), enter the weight of the container, then put the container on the pan and place the object that is being weighed in the container. The balance automatically begins the process of measurement after exceeding the set mass threshold.



After weighing process completion, the measurement result is locked and automatically printed.

In order to finish the measurement, press  button.

The program automatically returns to the main window of Animal Weighing mode.

14. MISCELLANEOUS PARAMETERS

You can set up parameters which influence balance operation. These parameters are to be found in parameters group **P6 OTHER**.

Settings modification for particular parameters of this parameter group proceeds likewise as described in the previous section.

Menu language

Language parameter enables selecting the language of the balance menu descriptions.

Available languages: POLISH, ENGLISH, GERMAN, SPANISH, FRENCH, TURKISH, CZECH, ITALIAN, HUNGARIAN.

“Beep” sound – reaction to operation of pressing a key

Sound parameter enables switching on/off a ‘beep’ sound responsible for informing a user about pressing any key of balance overlay.

NO - ‘beep’ sound off

YES - ‘beep’ sound on.

Backlight, and display brightness adjustment

The parameter enables setting the brightness of the backlight or switching off the display brightness completely.

100 - maximum brightness of the backlight

10 - minimum brightness of the backlight

NONE - display brightness switched off

Backlight turn-off time


Parameter <P6.4 STAND-BY MODE> enables use of function responsible for activation of the display stand-by mode when weighing process is not being performed (stable indication is a necessary condition for activation of the stand-by mode).

- NONE** – backlit turn-off time not activated
- 0.5; 1; 2; 3; 5** – time given in minutes

If the software registers stable indication for a specified time interval, set in parameter <P6.4 STAND-BY MODE>, then the display goes out immediately.

The backlight activates upon change of indication (no stability pictogram on the display) or pressing any key on the balance keypad. Blanking works also when balance menu is entered.

Auto switch-off

Parameter <P6.5 AUTO OFF> enables use of function responsible for automatic display deactivation (functions as  button). Upon display deactivation the other subassemblies are powered and the balance turns to stand-by mode.

- NONE** – auto switch-off not activated
- 0.5; 1; 2; 3; 5** – time given in minutes

If the software registers stable indication for a specified time interval, set in parameter <P6.5 AUTO OFF> settings, then the display is turned-off immediately (inactive backlight function, no indication on the display, clock displayed).

To start-up the balance it is necessary to press  button located on the balance keypad. The balance will automatically return to weighing.

The balance cannot be turned off if any process is started or if balance menu is entered.

Date

Date parameter enables setting the current date.

Procedure:



Time

Date parameter enables setting the current time.

Procedure:



Date format

Date form. parameter enables altering the date format on the printout [YYYY.MM.DD / YYYY.DD.MM / DD.MM.YYYY / MM.DD.YYYY], where: YYYY – year; MM – month; DD – day.

Time format

Time form. parameter enables specifying time format for a printout [12h / 24h].

For [12h] option selected, <A> or <P> letter is displayed next to presented time value, where: **A** stands for hours before noon; **P** stands for hours after noon.

15. DETERMINING PRINTOUT CONTENT

15.1. CALIBRATION REPORT

P5.1 CAL. REPORT, is a group of parameters enabling user to declare data that is to be printed on an adjustment printout.

Variable	Overview
PROJECT	Option enables naming the project (name associated with a particular type of weighing). The name may consist of 16 characters' maximum.
CALIB TYPE	Option enables printing out the type of the adjustment being carried out.
USER	Option enables printing out the name of a logged-in user.
PROJECT	Option enables printing out the name of the project (see parameter Project).
DATE	Option enables printing out the date of the carried out adjustment.
TIME	Option enables printing out the time of the carried out adjustment.
BALANCE ID	Option enables printing out the balance ID number.
CAL. DIFFER	Option enables printing out the difference between mass of an adjustment weight measured during the last adjustment and the current measured mass of this weight.
DASHES	Option enables printing out dashes that separate the date of a printout from a signature.
SIGNATURE	Option enables providing an area for the signature of a user performing the adjustment.

For the parameters described above, one of these values must be selected:

NO - do not print

YES – print

An example report:

```
-----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:
.....
```

15.2. HEADER, FOOTER, GLP PRINTOUTS

HEADER	group of parameters enabling to declare data that is to be printed on a header printout.
GLP PRINTOUT	group of parameters enabling to declare data that is to be printed on a measurement result printout
FOOTER	group of parameters enabling to declare data that is to be printed on a footer printout

Printout variables list:

Variable	Overview	Active for
WORKING MODE	Option enables printing out the name of a working mode.	Header Footer
BALANCE TYPE	Option enables printing out the balance type.	Header Footer
BALANCE ID	Option enables printing out the balance ID number.	Header Footer
DATE	Option enables printing out the date of the carried out adjustment.	Header GLP printout Footer
TIME	Option enables printing out the time of the carried out adjustment.	Header GLP printout Footer
VARIABLE 1	Option enables printing out the value of VARIABLE 1.	Header GLP printout Footer
VARIABLE 2	Option enables printing out the value of VARIABLE 2.	Header GLP printout Footer
NET	Option enables printing out net weight value in a basic unit (calibration unit).	GLP printout
TARE	Option enables printing out the tare value in the current unit.	GLP printout
GROSS	Option enables printing out the gross mass value in the current unit.	GLP printout
CURR.RES	Option enables printing out the current measurement result (NET weight) in a current unit.	GLP printout
PROFIL	Option enables printing out the current profile set for working mode	GLP printout
CAL.REPORT	Option enables printing out a report from the last adjustment, according to the settings declared for the adjustment report printout (see sec. 14.1 of this user manual).	Header GLP printout Footer
DASHES	Option enables printing out separating dashes.	Header Footer
EMPTY LINE	Option enables printing out an empty separating line.	Header Footer
SIGNATURE	Option enables providing an area for the signature of a user performing the adjustment.	Footer

STANDARD PRNT.	Option enables printing out one of standard printouts on the footer printout.	Header GLP printout Footer
----------------	---	----------------------------------

For the parameters described above, one of these values must be selected:

- NO** - do not print;
- YES** – print

15.3. NON-STANDARD PRINTOUTS

The balance software enables entering 4 non-standard printouts. Each of them can consist of approximately 160 characters.

Non-standard printout may include:

- Variables dependent on the working mode and other needs (mass, date etc.)
- Permanent text from the user menu, remember to use capital letters exclusively
- Non-standard printout can consist of 160-character long string.

Inserting Text

List of variables mutual for all working modes, having the same values:

%%	Printout of a “%” character
%V	Current net mass in the current unit
%N	Current net mass in the basic unit
%G	Current gross mass in the current unit
%T	Current tare mass in the current unit
%D	Current date
%M	Current time
%I	Balance number
%R	Program number
%F	Name of a current function – working mode
%C	Date and time of the last adjustment
%K	Type of the last adjustment
%S	Currently weighed product
%Y	Deviation for the last adjustment
%1	Variable 1
%2	Variable 2

Variables depending on the currently used working mode

Variable	Description	Mode for which the variable is active
%W	Standard mass 1 pcs	PARTS COUNTING
%B	Reference mass	DEVIATIONS

Non-standard characters used in designing non-standard printouts

\\	a single „\” character
\C	CRLF
\R	CR
\N	LF
\T	Tabulator
\F	Form feed (for PCL printers)
%E	Crop the paper for EPSON printers

Every single printout can contain max 160 characters (letters, numerals, non-standard characters, spaces). You can apply non-standard characters depending on type of data that is to be printed out.

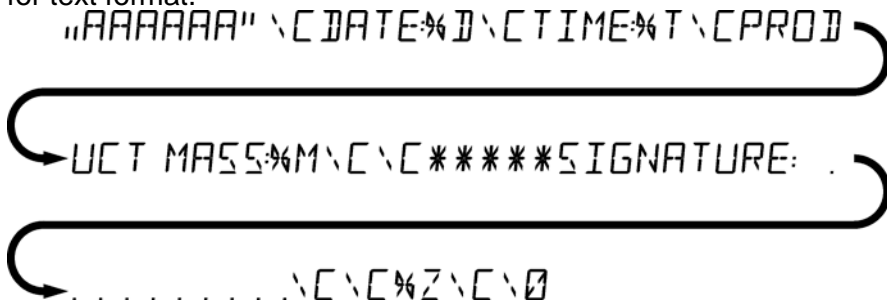
Example 1:

“AAAAAA”
DATE: <current measurement date>
TIME: <current measurement time>
PRODUCT MASS: <current mass indication>

*****SIGNATURE:.....

<current working mode>

Enter printout content settings and design the printout using respective data variables and characters for text format.



The way of inserting texts:

- By means of balance keyboard

	Selecting a character to be replaced. Moving a cursor or an active (blinking) character to the right.
	Selecting a character to be replaced. Moving a cursor or an active (blinking) character to the left.
	Change of the character by one value down
	Change of the character by one value up
	Deleting a character
	Inserting a character

15.4. VARIABLES

Variable is defined as alphanumeric data which can be linked to printouts, products or other information related to weighing. Every variable is characterized by its content, the content must be given. Variables are used for entering various data during the weighing process, e.g. serial number or batch number. The program allows to enter two variables. Each can consist of max 32 characters.

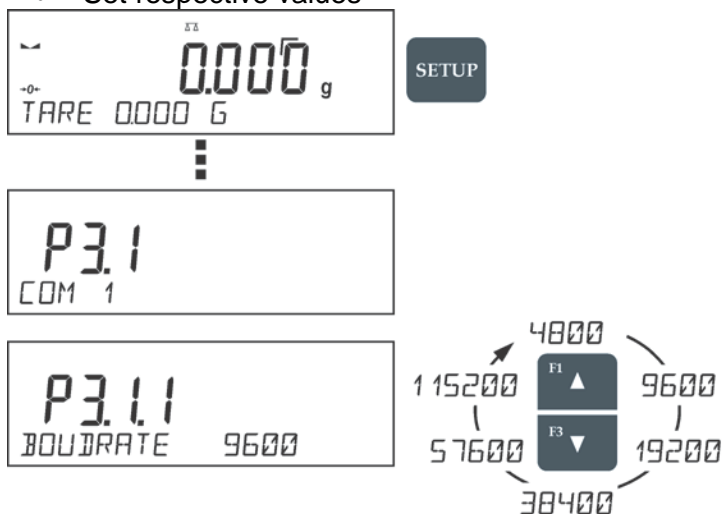
In order to input a variable content, the user needs to enter variable settings (parameter P5.9 – VARIABLE 1 or P5.10 – VARIABLE 2) and enter the respective values using direction keys (arrows) on the balance keypad or a computer keyboard. Procedure for entering texts is the same as for non-standard printouts.

16. COMMUNICATION

16.1. RS 232 PORT SETTING (COM)

Procedure:


- Select communication port <COM 1>,
- Set respective values



The RS 232 ports enable the following setting of transmission parameters:

- Baud rate – 2400, 4800, 9600, 19200, 38400, 57600, 115200 bit/s
- Parity – NONE, ODD, EVEN

17. DEVICES

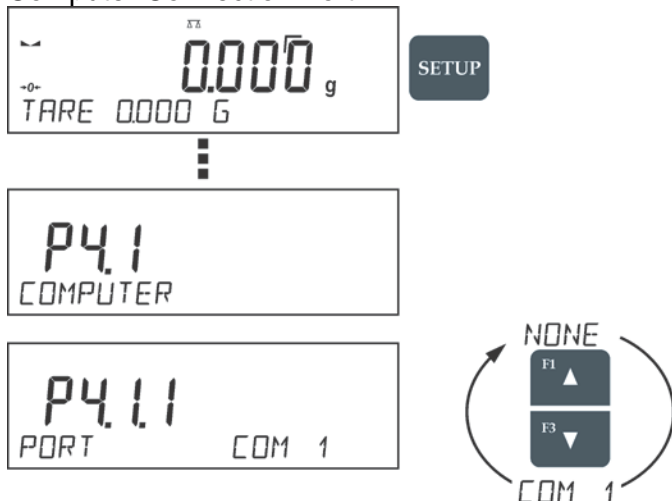
DEVICES menu is comprised within Parameters menu. It is accessed by pressing  key. The menu features list of devices that can cooperate with the balance.

17.1. COMPUTER


<COMPUTER> submenu allows the user to select a port for connection of a computer running software which enables:

- communication with a balance,
- switching the continuous transmission on and off, and
- cooperation of a balance with RLAB software (to request software, contact support@schulersci.com)

Computer Connection Port



Procedure:

- press  button
- enter <P4 DEVICES> menu
- enter menu group: <P4.1 COMPUTER>
- select port to which a computer is to be connected,
COM 1– RS 232 port, to which the computer is connected

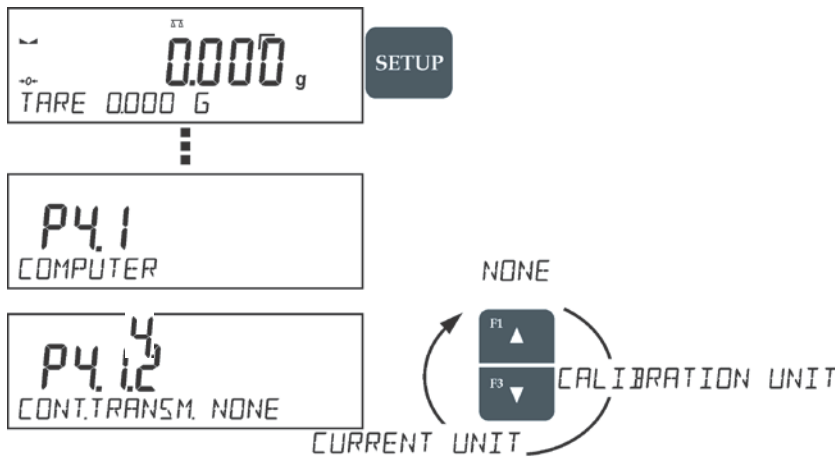
Continuous Transmission

Continuous transmission parameter enables turning on/off continuous transmission of a measurement result.

Available options:

- Continuous transmission in a calibration unit <CAL. UNIT>, independently from currently chosen weight unit, measurements are transmitted in unit set on a main measuring device (calibration unit)
- Continuous transmission in a current unit <CURRENT UNIT> measurements are transmitted in a current unit; the unit changes dynamically whenever the user presses Units button in order to modify the unit on a display.
- Continuous transmission off <NONE>

Procedure:



CAUTION!

Continuous transmission may be turned on/off by means of a command sent from a computer (go to COMMUNICATION PROTOCOL section)

Printouts Interval for Continuous Transmission


Parameter <P4.1.5. INTERVAL> enables setting frequency of printouts for continuous transmission.

Frequency of printouts is set in seconds, wherein the accuracy is 0.1s.


The user may set any time value ranging from 1000 to 0.1 s.

17.2. PRINTER

Submenu <PRINTER> allows the user to choose a port and a device, to which the data is to be sent

upon pressing  button on a balance. Content of data being transferred is set in parameter <PRINTOUTS/PRINTOUT GLP>.

Procedure:

- press  button
- enter <P4 DEVICES> menu
- enter menu group: <P4.2 PRINTER>
- select port to which the printer is to be connected:
COM 1– RS 232 port, to which the printer is connected

Example of the measurement printout is described in the PRINTOUTS section.

Additionally, you can enter a controlling code (of a hexadecimal form) to a printer either at the beginning of the printout - <P4.2.3 PREFIX> or at the end of it - <P4.2.4 SUFFIX>. Sending these codes allows to control globally both, information and actions carried out at the beginning and/or at the end of each printout sent from a balance to a printer.

This function is most frequently used to send an information about the code page of a printout sent by a balance, at the beginning, and to send a command enabling the crop of a paper in EPSON printers (if the printer is equipped with an auto cutter blade), at the end.

<PREFIX> and <SUFFIX> parameters settings are available for all the printouts sent from balance, e.g. calibration reports, density, statistics etc., and for the header, footer and GLP printouts.

CAUTION:

It must be remembered that inserting paper crop command to <SUFFIX> parameter (control code) results in sending the code after each printout. If the user wishes for one whole printout to consist of: HEADER, GLP PRINTOUT and FOOTER and to be cropped underneath the FOOTER, then the paper crop command should be inserted only for FOOTER settings as a non-standard printout with <%E> value (paper crop for EPSON printer). In such a case <SUFFIX> command must remain empty.

To ensure correct cooperation of the balance with the printer (correct printout of diacritical signs of a given language), respective baud rate obligatory for a given printer must be chosen (see the printer settings). Additionally, code page of a sent printout must be accordant with a code page of a printer.

Accordance of a code page may be obtained in two ways:

- setting the right code page in the settings of a printer (see a user manual of the printer) – it must be accordant with the printout code page of a balance (**1250** code page for POLISH, CZECH, HUNGARIAN; **1252** for ENGLISH, GERMAN, SPANISH, FRENCH, ITALIAN; **1254** for TURKISH),
- sending the control code from the balance, which automatically sets the right code page of the printer (code page accordant with the one of a balance) prior to printout of data taken from the balance (this possibility is available only for printers with such option – see a user manual of the printer).

CAUTION! CODES MUST BE ENTERED IN A HEXADECIMAL FORM!

Example balance settings for correct cooperation with **VWR Dot Matrix Printer (10799-132)** connected to RS232 port

Communication parameters for port to which the printer is connected:

- BAUD RATE - 9600 bit-s
- PARITY – none

Printer parameters for a PERIPHERALS group:

- PORT – COM1 or COM2 (the one to which the printer is connected)

18. COOPERATION WITH DEVICES



CAUTION!

A peripheral device that is connected to RS 232 port of a balance, has to be powered from the common low voltage grid equipped with common anti-shock protection in order to provide that possible occurrence of different potentials in zero cables of the peripheral device and the balance is precluded.



Balance transmission parameters must correspond to the parameters of a device that is connected to the balance.

- Baud rate - 4800 ÷ 115200 bit / s
- Parity control - NONE, ODD, EVEN


Value indicated on a display can be sent via RS232 port to a peripheral device in one of four accessible ways:

- manually - on pressing  button
- automatically - on stabilisation of a weighing result
- continuously - on activation of a function or sending a command
- on command sent from a peripheral device (see additional functions).

Value indicated on a display can be sent via COM port in the following form:

- stable – data is sent immediately on stabilisation of weighing result (button )
- unstable – on pressing  button, display status is sent immediately to a peripheral device (on a printout such status is marked with <?> symbol located in front of the weighing result). This option is only available for non-verified balances.

18.1. TRANSFERRED DATA FORMAT

The measurement result can be transferred from a balance to an external device by pressing  button, located on the balance, or by sending a control command from a computer.

18.2. FORMAT OF DATA SENT ON PRESSING PRINT BUTTON



CAUTION!

Unstable measurement printout is disabled for a verified balance.

Printout format:

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

Stability marker [space] if stable
[?] if unstable
[^] if high limit is out of range
[v] if low limit is out of range

Character [space] for positive values
[-] for negative values

Mass 9 characters with decimal point and right justification

Unit 3 characters with left justification

Response Format

On receipt of a command, the balance responds as follows.

- first:
 - XX_A CR LF command understood and in progress
 - XX_I CR LF command understood but not accessible at this moment
 - XX_^ CR LF command understood but max threshold is exceeded
 - XX_v CR LF command understood but min threshold is exceeded
 - XX_E CR LF time limit exceeded while waiting for stable measurement result (time limit is balance characteristic parameter)

Where XX stands for command name.

next:

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] if stable [?] if unstable [^] if high limit is out of range [v] if low limit is out of range
Character	[space] for positive values [-] for negative values
Mass	9 characters with decimal point and right justification
Unit	3 characters with left justification

19. COMMUNICATION PROTOCOL

General information

- A character based communication protocol balance-terminal is designed for establishing communication between a balance and a peripheral device via RS-232C serial interface.
- It consists of commands sent from a peripheral device to the balance and responses from the balance.
- Responses are sent from the balance on each receipt of a command as a reaction to a specific command.
- Commands, forming the communication protocol, enable both, obtaining data on balance status and influencing balance operation, e.g.: acquiring measurement results from the balance, zeroing, etc.

19.1. LIST OF COMMANDS

Command	Command overview
Z	Zero balance
T	Tare balance
OT	Give tare value
UT	Set tare
S	Send stable measurement result in basic measuring unit
SI	Immediately send measurement result in basic measuring unit
SU	Send stable measurement result in current measuring unit
SUI	Immediately send measurement result in current measuring unit
C1	Switch on continuous transmission in basic measuring unit
C0	Switch off continuous transmission in basic measuring unit
CU1	Switch on continuous transmission in current measuring unit
CU0	Switch off continuous transmission in current measuring unit
SM	Set mass value of a single item
RM	Set reference mass value
NB	Give balance serial number
SS	Value release
K1	Lock balance keypad
K0	Unlock balance keypad
OMI	Give available working modes
OMS	Set working mode

OMG	Give current working mode
UI	Give accessible units
US	Set unit
UG	Give current unit
BP	Activate sound signal
PC	Send all implemented commands
BN	Give balance type
FS	Give Max capacity
RV	Give program version
A	Set autozero function
EV	Set ambient conditions state
FIS	Set filter
ARS	Set value release
LDS	Set last digit

CAUTION!

Each command must end with CR LF characters;

On receipt of a command, the terminal responds as follows:

XX_A CR LF	command understood and in progress
XX_D CR LF	command carried out (appears only after the command XX_A)
XX_I CR LF	command understood but not accessible at this moment
XX_^ CR LF	command understood but max threshold is exceeded
XX_v CR LF	command understood but min threshold is exceeded
XX_OK CR LF	command carried out
ES_CR LF	command not recognised
XX_E CR LF	time limit exceeded while waiting for stable measurement result (time limit is balance characteristic parameter)

Where:

XX - name of a sent command

_ - spaces

Commands Overview

Zero balance

Format: **Z CR LF**

Response options:

Z_A CR LF	- command understood and in progress
Z_D CR LF	- command carried out
Z_A CR LF	- command understood and in progress
Z_^ CR LF	- command understood but zeroing range is exceeded
Z_A CR LF	- command understood and in progress
Z_E CR LF	- time limit exceeded while waiting for a stable measurement result
Z_I CR LF	- command understood but not accessible at this moment

Tare balance

Format: **T CR LF**

Response options:

T_A CR LF	- command understood and in progress
T_D CR LF	- command carried out
T_A CR LF	- command understood and in progress
T_v CR LF	- command understood but taring range exceeded
T_A CR LF	- command understood and in progress
T_E CR LF	- time limit exceeded while waiting for stable measurement result
T_I CR LF	- command understood but not accessible at this moment

Give tare valueFormat: **OT CR LF**Response: **OT_TARE CR LF** - command carried out

Response format:

1	2	3	4-12	13	14	15	16	17	18	19
O	T	space	tare	space	unit			space	CR	LF

Tare - 9 characters with right justification

Unit - 3 characters with left justification

CAUTION!*Tare value is always given in calibration unit.***Set tare**Format: **UT_TARE CR LF**, where **TARE** – tare value

Response options:

UT_OK CR LF - command carried out

UT_I CR LF - command understood but not accessible at this moment

ES CR LF - command not recognised (tare format incorrect)

CAUTION! Use dot in tare format as decimal point.**Send stable measurement result in a basic measuring unit**Format: **S CR LF**

Response options:

S_A CR LF - command understood and in progress

S_E CR LF - time limit exceeded while waiting for stable measurement result

S_I CR LF - command understood but not accessible at this moment

MASS FRAME - response: mass value in a basic measuring unit

Response format:

1	2-3	4	5	6	7-15	16	17	18	19	20	21
S	space	stability marker	space	character	mass	space	unit			CR	LF

An example:

S CR LF - command send form a computer

S_A CR LF - command understood and in progress

S _ _ _ _ _ - _ _ _ _ _ 8 . 5 _ g _ _ CR LF - command carried out, response: mass value in a basic measuring unit.

where: _ - space

Immediately send measurement result in a basic measuring unitFormat: **SI CR LF**

Response options:

SI_I CR LF - command understood but not accessible at this moment

MASS FRAME - immediate response: mass value in a basic measuring unit

Response format:

1	2	3	4	5	6	7-15	16	17	18	19	20	21
S	I	space	stability marker	space	character	mass	space	unit			CR	LF

An example:

S I CR LF – command sent from a computer

S I _ ? _ _ _ _ _ 1 8 . 5 _ k g _ CR LF - command carried out, immediate response: mass value in a basic measuring unit

where: _ - space

Send stable measurement result in a current measuring unit

Format: **SU CR LF**

Response options:

SU_A CR LF - command understood and in progress

SU_E CR LF - time limit exceeded while waiting for a stable measurement result

SU_I CR LF - command understood but not accessible at this moment

MASS FRAME - response: mass value in a current measuring unit

Response format:

1	2	3	4	5	6	7-15	16	17	18	19	20	21
S	U	space	stability marker	space	character	mass	space	unit			CR	LF

An example:

S U CR LF - command send form a computer

S U _ A CR LF - command understood and in progress

S U _ _ _ - _ _ 1 7 2 . 1 3 5 _ N _ _ CR LF - command carried out, response: mass value in a current measuring unit

where: _ - space

Immediately send measurement result in a current measuring unit

Format: **SUI CR LF**

Response options:

SUI_I CR LF - command understood but not accessible at this moment

MASS FRAME - immediate response: mass value in a current measuring unit

Response format:

1	2	3	4	5	6	7-15	16	17	18	19	20	21
S	U	I	stability marker	space	character	mass	space	unit			CR	LF

An example:

S U I CR LF - command sent from a computer

S U I ? _ - _ _ _ 5 8 . 2 3 7 _ k g _ CR LF - command carried out, immediate response: mass value in a current measuring unit

where: _ - space

Switch on continuous transmission in a basic measuring unit

Format: **C1 CR LF**

Response options:

C1_I CR LF - command understood but not accessible at this moment

C1_A CR LF - command understood and in progress

MASS FRAME - response: mass value in a basic measuring unit

Response format:

1	2	3	4	5	6	7-15	16	17	18	19	20	21
S	I	space	stability marker	space	character	mass	space	unit			CR	LF

Switch off continuous transmission in a basic measuring unit

Format: **C0 CR LF**

Response options:

C0_I CR LF - command understood but not accessible at this moment

C0_A CR LF - command understood and carried out

Switch on continuous transmission in a current measuring unit

Format: **CU1 CR LF**

Response options:

CU1_I CR LF - command understood but not accessible at this moment

CU1_A CR LF - command understood and in progress

MASS FRAME - response: mass value in a current measuring unit

Response format:

1	2	3	4	5	6	7-15	16	17	18	19	20	21
S	U	I	stability marker	space	character	mass	space	unit			CR	LF

Switch off continuous transmission in a current measuring unit

Format: **CU0 CR LF**

Response options:

CU0_I CR LF - command understood but not accessible at this moment

CU0_A CR LF - command understood and carried out

Set mass value of a single item (only for PARTS COUNTING)

Format: **SM_XXXXX CR LF**, where: _ - space, XXXXX – mass format

Response options:

SM_OK CR LF - command carried out

SM_I CR LF - command understood but not accessible at this moment (e.g. mode other than PARTS COUNTING)

ES CR LF - command not recognised (mass format incorrect)

Set reference mass value (e.g. for DEVIATIONS)

Format: **RM_XXXXX CR LF**, where: _ - space, XXXXX – mass format

Response options:

RM_OK CR LF - command carried out

RM_I CR LF - command understood but not accessible at this moment (e.g. mode other than DEVIATIONS)

ES CR LF - command not recognised (mass format incorrect)

Value release

Format: **SS CR LF**

Response options:

SS_OK CR LF - command understood and in progress

Command's function is similar to function of PRINT button located on an overlay,

Give balance serial number

Format: **NB CR LF**

Response options:

NB_A_"x" CR LF - command understood, response: serial number

NB_I CR LF - command understood but not accessible at this moment

x – serial number of the device (inserted in between inverted commas)

An example:

Command: NB CR LF – return serial number

Response: NB_A_"1234567" – serial number of the device – "1234567"

Lock balance keypad

Format: **K1 CR LF**

Response options:

K1_I CR LF - command understood but not accessible at this moment

K1_OK CR LF - command carried out

Command locks the balance keypad (proximity sensors, touch panel) until the moment of turning the balance off or until sending K0 command

Unlock balance keypad

Format: **K0 CR LF**

Response options:

K0_I CR LF - command understood but not accessible at this moment

K0_OK CR LF - command carried out

Give available working modes

Command overview: Command returns accessible working modes.

Format: OMI <CR><LF>

Response options:

O MI <CR><LF>

n_ "Nazwa modu" <CR><LF>:

– command carried out, response: accessible working modes

n_ "Nazwa modu" <CR><LF>

OK <CR><LF>

O MI_I <CR><LF>

– command understood but not accessible at this moment

Mode name – parameter, working mode name, inserted in between inverted commas. The name takes form given on a particular balance display, it is provided in a currently selected language.

n – parameter, decimal value determining working mode number.

n →

1 – Weighing

2 – Parts Counting

3 – Deviations

4 – Animal Weighing

5 – Solids Density

6 – Liquids Density

CAUTION! Working modes numbering is identical for each kind of balance. The numbers are assigned to working modes names. Some balances give only the number as a response.

An example 1:

Command: O MI <CR><LF>

– return accessible working modes

Response:

O MI <CR><LF>

– accessible working modes are given in return:

2_ " Parts counting" <CR><LF>

mode number + name

OK <CR><LF>

– command carried out

An example 2:

Command: O MI <CR><LF>

– return accessible working modes

Response:

O MI <CR><LF>

– accessible working modes are given in return:

2 <CR><LF>

mode number

4 <CR><LF>

OK <CR><LF>

– command carried out

Set working mode

Command overview: Command sets particular working mode.

Format: O MS_n <CR><LF>

Response options:

O MS_OK <CR><LF>

– command carried out

O MS_E <CR><LF>

– error in-course of command execution, no parameter or incorrect format

O MS_I <CR><LF>

– command understood but not accessible at this moment

n – parameter, decimal value determining working mode number. To see detailed description go to O MI command

An example:

Command: O MS_3<CR><LF>

– set Deviations mode

Response: O MS_OK<CR><LF>

– Deviations mode set

Give current working mode

Command overview: Command returns currently set working mode.

Format: O MG <CR><LF>

Response options:

O MG_n_OK <CR><LF>

– command carried out, response: current working mode

O MG_I <CR><LF>

– command understood but not accessible at this moment

n – parameter, decimal value determining working mode number. To see detailed description go to O MI command.

An example:

Command: O MG<CR><LF>

– return current working mode

Response:

O MG_3_OK<CR><LF>

– balance operates in DEVIATIONS working mode

Give accessible units

Command overview: Command returns units available for a particular device and for a current working mode.

Format: UI <CR><LF>

Response options:

UI_”x₁,x₂, ... x_n”_OK<CR><LF>

– command carried out, returns accessible units

UI_I <CR><LF>

– command understood but not accessible at this moment

x – unit symbols, separated by means of comas

x → g, mg, ct, lb, oz, ozt, dwt, tlh, tls, tlt, tlc, mom, gr, ti, N, baht, tola, u1, u2

An example:

Command: UI <CR><LF>

– return available units

Response: UI_”g, mg, ct”_OK<CR><LF>

– response: available units

Set current unit

Command overview: Command sets current unit for a particular device.

Format: US_x <CR><LF>

Response options:

US_x_OK <CR><LF>

– command carried out, response: current unit


US_E <CR><LF>

– error in-course of command execution, no parameter or incorrect format

US_I <CR><LF>

– command understood but not accessible at this moment

x – parameter, units symbols: g, mg, ct, lb, oz, ozt, dwt, tlh, tls, tlt, tlc, mom, gr, ti, N, baht, tola, msg, u1, u2, next

CAUTION! if x=next, the command swaps to another available unit on the list (it simulates „” button pressing).

An example:

Command: US_mg<CR><LF>

– set „mg” unit

Response: US_mg_OK<CR><LF>

– „mg” set as a current unit

Give current unit

Command overview: command returns current unit.

Format: UG <CR><LF>

Response options:

UG_x_OK<CR><LF>

– command carried out, response: current unit

UG_I <CR><LF>

– command understood but not accessible at this moment

x – parameter, unit symbol

An example:

Command: UG<CR><LF>

– return current unit

Response: UG_ct_OK<CR><LF>

– currently set unit is „ct”

Activate sound signal

Command overview: command activates BEEP sound signal for a specified amount of time

Format: BP_CZAS <CR><LF>

Response options:

BP_OK <CR><LF>

– command carried out, BEEP sound signal activated

BP_E” <CR><LF>

– no parameter or incorrect format

BP_I <CR><LF>

– command understood but not accessible at this moment

TIME – parameter, decimal value specifying how long shall the sound last, parameter given in [ms].

Recommended range <50 - 5000>.

If value greater than the permissible high limit is given, than BEEP sound is operated for the maximum permissible amount of time.

An example:

Command: BP_350<CR><LF>

– activate BEEP for 350 ms

Response: BP_OK<CR><LF>

– BEEP activated

CAUTION!

BEEP sound activated via BP command is inhibited if in-course of its activation the sound is activated by means of other device: keypad, touch panel, proximity sensors.

Send all implemented commands

Format: PC CR LF

Command: PC CR LF

- send all implemented commands

Response: PC_A_ "Z,T,S,Sl..."

- command carried out, the terminal displays all implemented commands.

Give balance type

Format: BN <CR><LF>

Response options:

BN_A_ "x" <CR><LF> - command understood, response: balance type

BN_I <CR><LF> - command understood but not accessible at this moment

x – series of types for a particular balance (in between inverted commas), with general balance type in front

An example:

Command: BN <CR><LF> - return balance type

Response: BN_A_ "VWR" - balance type: "VWR"

Give max capacity

Format: FS <CR><LF>

Response options:

FS_A_ "x" <CR><LF> - command understood, response: Max capacity

FS_I <CR><LF> - command understood but not accessible at this moment

x – Max value of reading units (in between inverted commas)

An example:

Command: FS <CR><LF> - return Max capacity

Response: FS_A_ "220.0000" - Max capacity: "220 g"

Give program version

Format: RV <CR><LF>

Response options:

RV_A_ "x" <CR><LF> - command understood, response: program version

RV_I <CR><LF> - command understood but not accessible at this moment

x – program version (in between inverted commas)

An example:

Command: RV <CR><LF> - return program version

Response: RV_A_ " 1.1.1" - program version: "1.1.1"

Set AUTOZERO function

Format: A_n <CR><LF>

Response options:

A_OK <CR><LF> - command carried out

A_E <CR><LF> - error in-course of command execution, no parameter or incorrect format

A_I <CR><LF> - command understood but not accessible at this moment

n – parameter, decimal value determining autozero settings

n → 0 – autozero off

1 – autozero on

CAUTION!

Command changes settings for a current working mode.

An example:

Command: A_1 <CR><LF> - turn autozero function on

Response: A_OK <CR><LF> - autozero function is on

AUTOZERO function operates until it is turned off by A 0 command.

Set ambient conditions state

Format: EV_n <CR><LF>

Response options:

EV_OK <CR><LF> - command carried out

EV_E <CR><LF> - error in-course of command execution, no parameter or incorrect format

EV_I <CR><LF> - command understood but not accessible at this moment

n – parameter, decimal value determining ambient conditions state

n → 0 – unstable ambient conditions

1 – stable ambient conditions

CAUTION!

Command changes settings for a current working mode.

An example:

Command: EV_1<CR><LF> – set value 'stable' for ambient conditions option
Response: EV_OK<CR><LF> – ambient conditions option set to value 'stable'
<AMBIENT CONDITIONS> parameter is set to value <STABLE> until command EV 0 swaps it to value <UNSTABLE>.

Set filter

Format: FIS_n <CR><LF>

Response options:

FIS_OK <CR><LF> – command carried out
FIS_E <CR><LF> – error in-course of command execution, no parameter or incorrect format
FIS_I <CR><LF> – command understood but not accessible at this moment
n – parameter, decimal value determining filter number

n → 1 – very fast
2 – fast
3 – average
4 – slow
5 – very slow

CAUTION!

The numbering is assigned to a particular filter name and it is identical for all balance types.

The command changes settings for a current working mode if, for a particular balance type, filter settings are assigned to the working mode.

An example:

Command: FIS_3<CR><LF> – set average filter
Response: FIS_OK<CR><LF> – average filter set

Set Value release

Format: ARS_n <CR><LF>

Response options:

ARS_OK <CR><LF> – command carried out
ARS_E <CR><LF> – error in-course of command execution, no parameter or incorrect format
ARS_I <CR><LF> – command understood but not accessible at this moment
n – parameter, decimal value determining value release options

n → 1 – fast
2 – fast+reliable
3 – reliable

CAUTION!

The numbering is assigned to a particular value release option and it is identical for all balance types.

The command changes settings for a current working mode if, for a particular balance type, value release settings are assigned to the working mode

An example:

Command: ARS_2<CR><LF> – set value release parameter to fast+reliable option
Response: ARS_OK<CR><LF> – fast+reliable option set

Set last digit

Format: LDS_n <CR><LF>

Response options:

LDS_OK <CR><LF> – command carried out
LDS_E <CR><LF> – error in-course of command execution, no parameter or incorrect format
LDS_I <CR><LF> – command understood but not accessible at this moment
n – parameter, decimal value determining last digit settings

n → 1 – always
2 – never
3 – when stable

CAUTION!

The numbering is assigned to a particular last digit option and it is identical for all balance types.

The command changes settings for a current working mode if, for a particular balance type, last digit settings are assigned to the working mode.

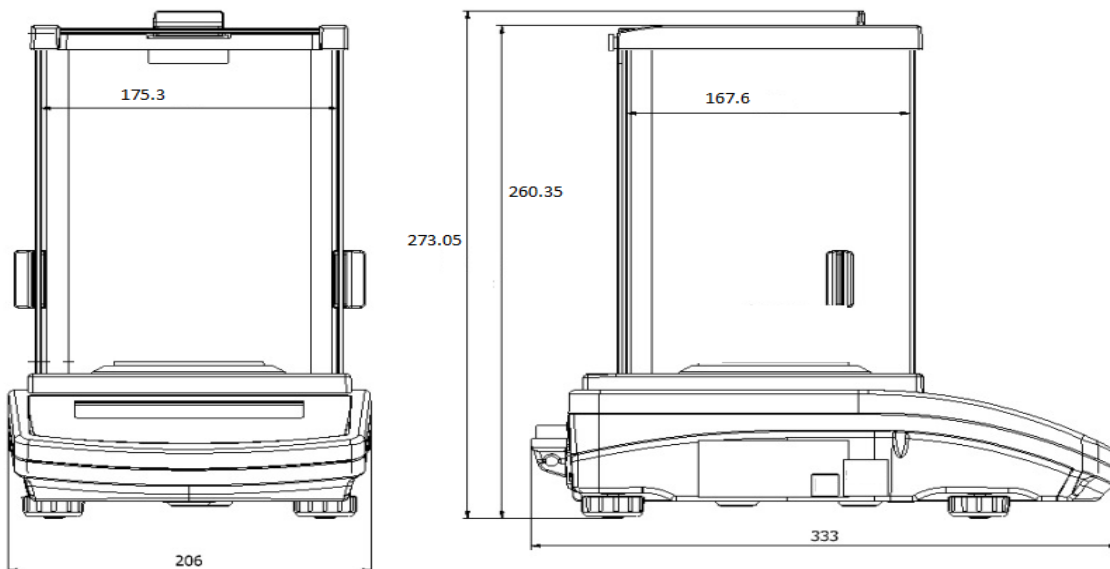
An example:

Command: LDS_1<CR><LF> – set last digit option to value ‘always’
 Response: LDS_OK<CR><LF> – ‘always’ value set

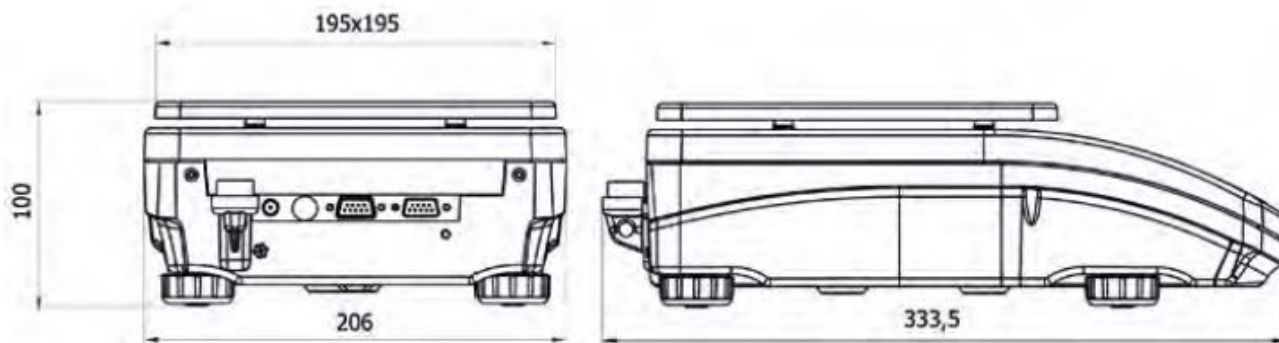
20. APPENDIX

20.1. DIMENSIONS

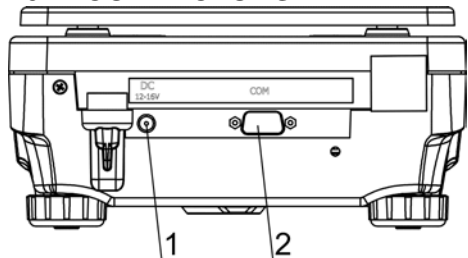
B2 series with d=0.1mg and d=.001g:



B2 series with pan 195 x 195 mm:

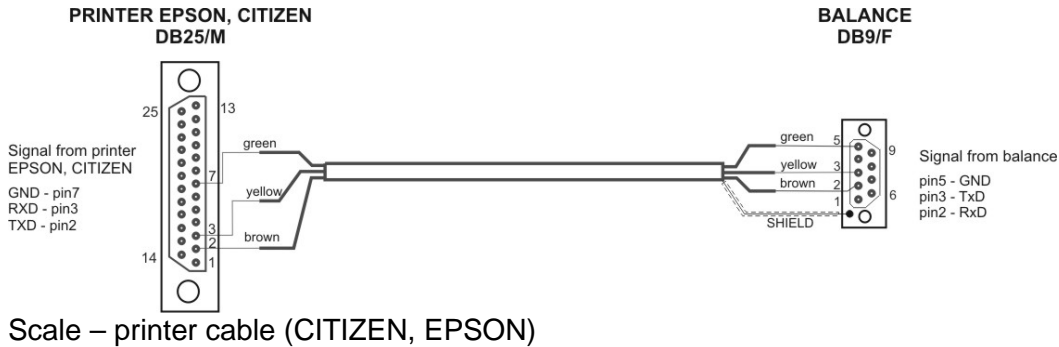
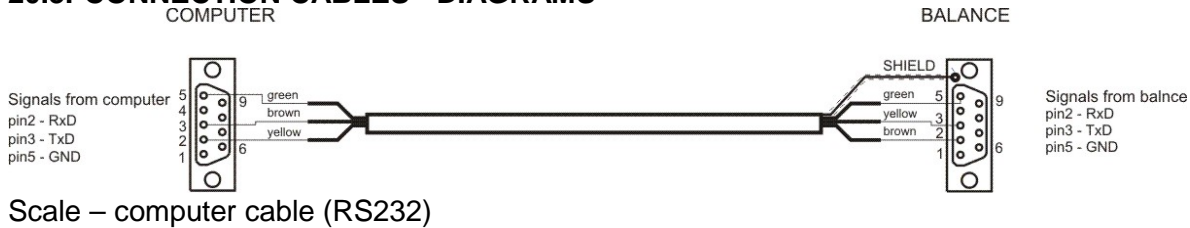


20.2. CONNECTORS



- 1 Power supply socket
- 2 COM connector (printer)

20.3. CONNECTION CABLES - DIAGRAMS



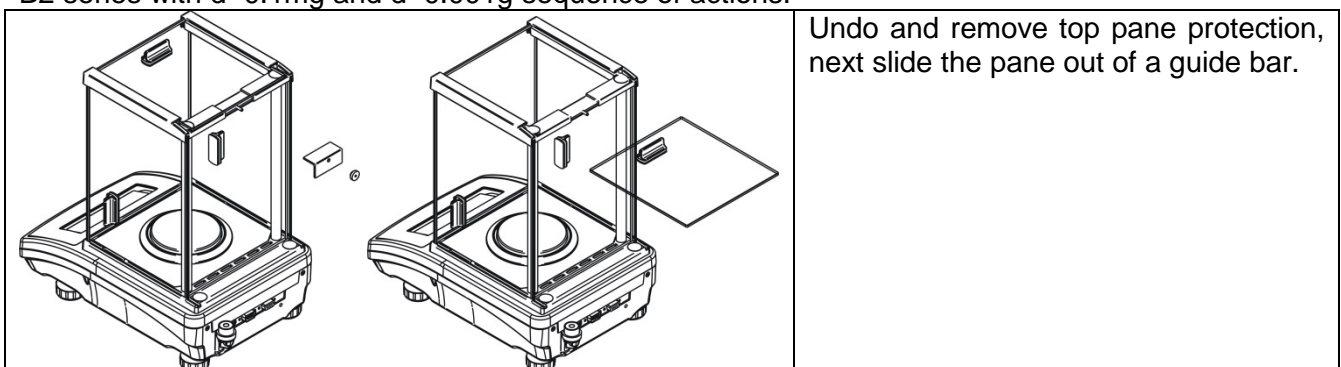
20.4. MAINTENANCE ACTIVITIES

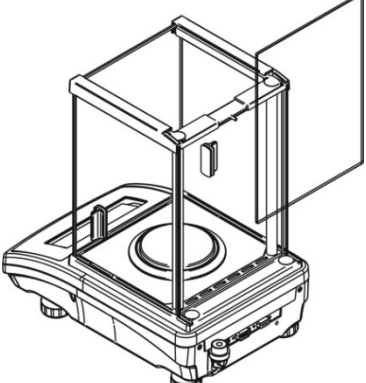
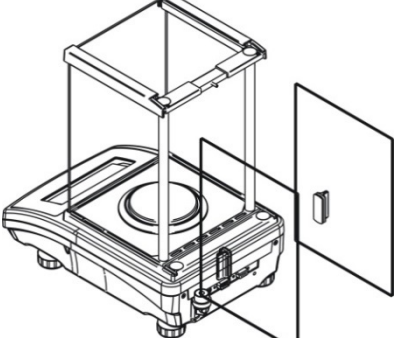
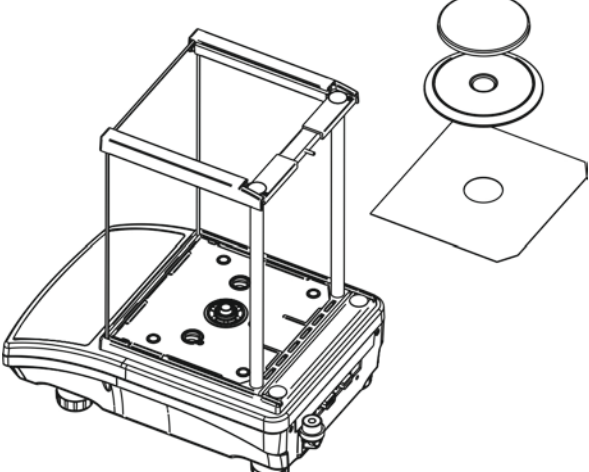
1. Disassemble a weighing pan and other detachable components (the components differ depending on a balance type – see *Unpacking* section). Be careful while detaching the components so as not to cause any damages to the balance mechanism.
2. Using a dry flannel cloth clean glass parts (mild cleanser may be applied if it does not contain any abrasive substances) – draft shield disassembly instruction is to be found further down this section.
3. Using a dry flannel cloth, clean disassembled components (mild cleanser may be applied if it does not contain any abrasive substances).

CAUTION! *Cleaning draft shield while still installed may cause damage of the measuring system.*

In order to ease cleaning of glass draft shield panes, it is permissible to remove them following the below instruction.

B2 series with d=0.1mg and d=0.001g sequence of actions:



	<p>Remove the back pane.</p>
	<p>Remove side panes.</p> <p>Side panes shall not be swapped therefore it is necessary to remember which one is right, and which one is left in order to install them back properly.</p> <p><i>CAUTION! Do not remove the front pane!</i></p>
	<p>Remove a weighing pan, a draft shield, a bottom insert. Clean the components when detached. With this your balance mechanism is protected against accidental damage.</p>

Draft shield and panes now can be properly cleaned. All the operations should be done carefully. Pay special CAUTION to the spot where the weighing pan was installed: dirt and other small elements might enter the balance construction through this opening, which might negatively influence the balance parameters.

21. ERROR MESSAGES

Error Message	Cause	Solution
-Err2-	Value beyond zero range	*Only Zero balance with weighing pan empty *Wait until stability marker appears to press the Zero button
-Err3-	Value beyond tare range	*Only Tare balance with load on the weighing pan *Wait until stability marker appears to press the Tare button
-Err8-	Taring / Zeroing operation time exceeded	*Move balance to stable location free of vibrations or air drafts
-NULL-	Zero value from converter	*Check the weighing pan is installed properly *If unit was started without the pan in place, turn off unit, install pan and turn back on the unit.
-FULL-	Measurement range exceeded	*Unload the weighing pan, ensure only loads are placed on the pan reaching the max capacity of unit
-LH-	Start mass error	*Turn off unit, disassemble and reassemble all components. Once reassembled, turn on unit. *For milligram (0.001g readability) and toploaders (0.01g readability) ensure all 4 rubber mandrels are located under the weighing pan *Make sure no load is on the pan while unit is starting up

If additional support is required, please contact support@schulersci.com or 800-539-1886.