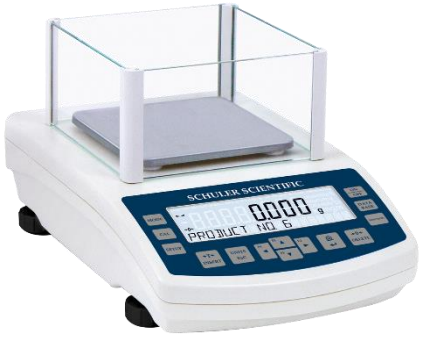
USER MANUAL

SCHULER SCIENTIFIC

A-SERIES BALANCES



1. GENERAL INFORMATION

1.1 INTENDED USE

The balances are designed to provide accurate measurement of weighed loads, performed under laboratory conditions.

1.2 PRECAUTIONS

- Prior to first use, it is highly recommended to carefully read this User Manual, and operate the balance as intended.
- 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.
- While loading the balance make sure that load is placed in the very center of the weighing pan.
- Make sure the load does not exceed instrument's measuring range (maximum capacity).
- Do not leave heavy loads on the weighing pan for a long period of time.
- In case of failure, immediately unplug the instrument.
- Balances to be decommissioned, should be decommissioned in accordance with valid legal regulations.
- Do not use the balance is areas endangered with explosion. The balance is not designed to operate in EX zones.

1.3 SUPERVISION OVER METROLOGICAL PARAMETERS

Metrological parameters of a balance need to be checked by an authorized user. Inspection frequency is qualified by the ambient conditions in which a balance is used, processes carried out and adopted quality management system.

1.4 WARRANTY CONDITIONS

A. Schuler Scientific will exchange, replace or repair the existing balance for any damage that appears to be faulty by production or by construction within the 5-year warranty period.

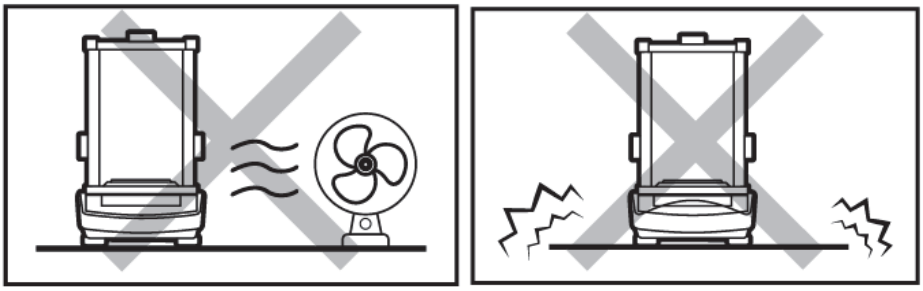
B. Warranty is voided if:
   - mechanical defects caused by inappropriate use:
     - defects of thermal and chemical origin,
     - defects caused by lightning, overvoltage in the power network
     - defects caused by water damage
     - or other random event
   - overloading the mechanical measuring system
   - installing another version of the operating system
   - utilizing the balance contrary to its intended use
   - repairs carried out by non-authorized service centers
   - removing or destroying protective stickers which secure the balance's housing against unauthorized access

C. Warranty card must be filled out for warranty to be valid.

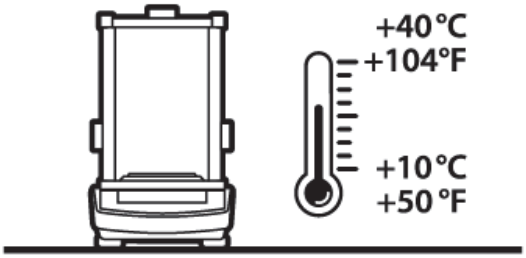
2. UNPACKING AND INSTALLATION

2.1 PLACE OF USE AND ASSEMBLING

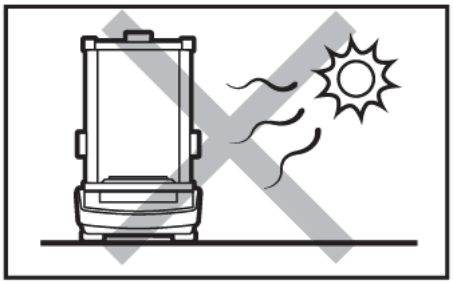
- The balance should be stored and used in locations free of vibrations and shakes, free of air movement and dust.



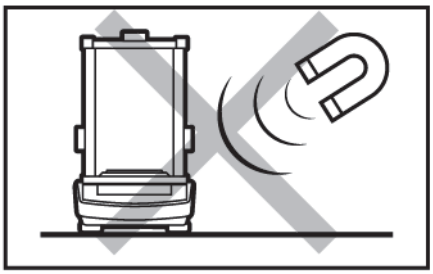
- Ambient air temperature should not exceed the range of: +10 °C ÷ +40 °C. Ambient relative humidity should not exceed 80%. During balance operation, ambient temperature in the weighing room should not change rapidly.



- Place the balance away from heat sources. Avoid exposing the balance to the sunilight.



- 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.

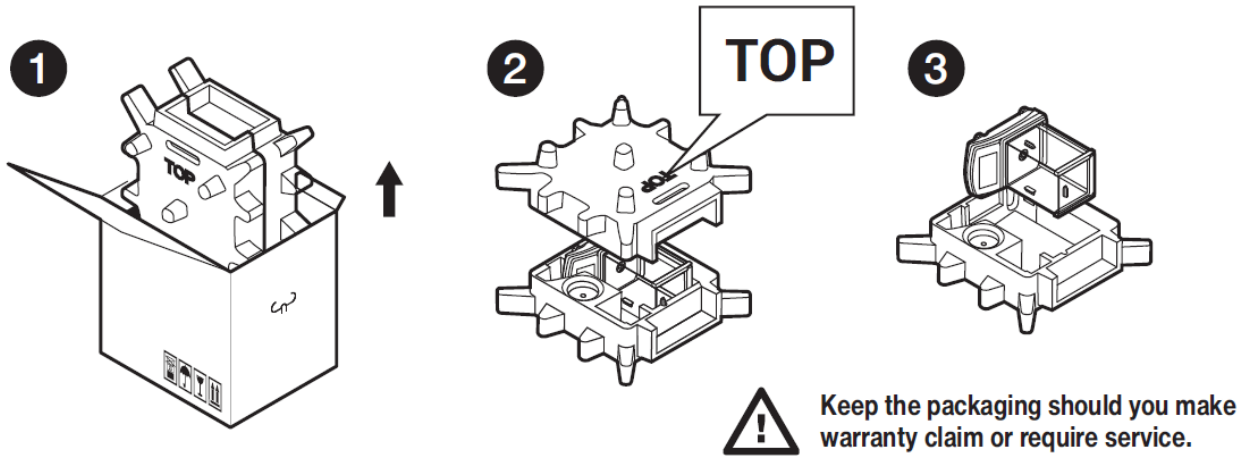


2.2 STANDARD DELIVERY COMPONENTS LIST

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

2.3 UNPACKING

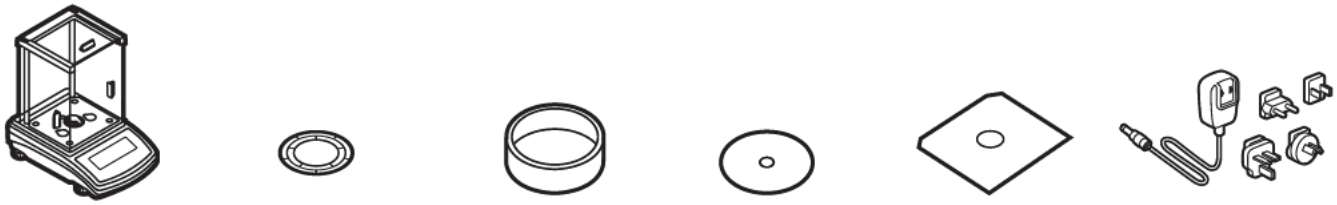
To unpack the system, follow the diagram below-



2.4 BALANCE ASSEMBLY

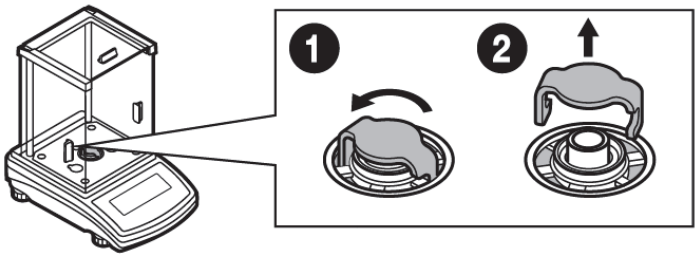
Model: SAS-225

Components:

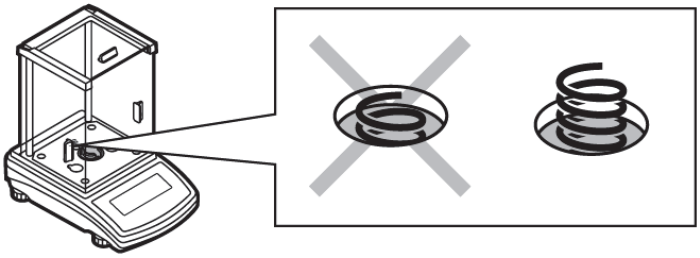


Installation:

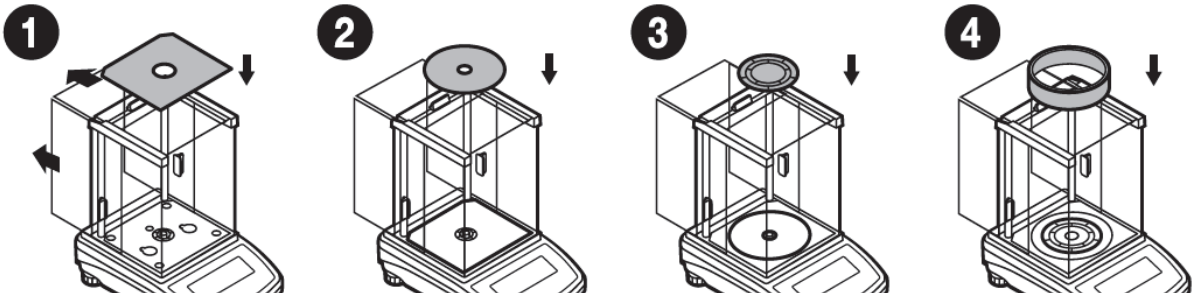
1) Remove the transport lock– gently press the transport lock and turn it accordingly to <OPEN>, keep the transport lock should your balance be transported in the future.



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

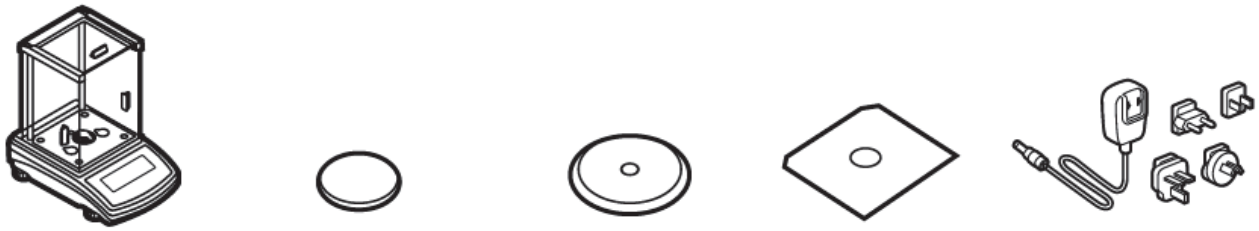


3) Install components following diagram below:
   i. Bottom insert
   ii. Centering ring [embossment side up]
   iii. Weighing pan
   iv. Draft shield



Model: SAS-164, SAS-224, SAS-314

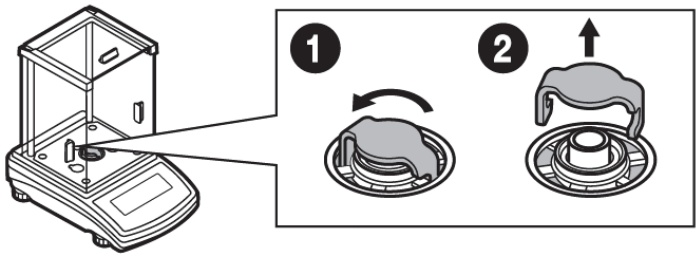
Componets:



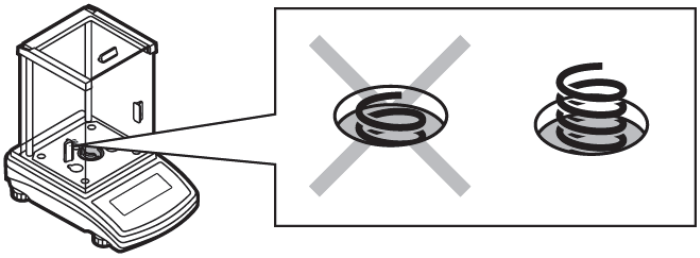
Balance	Weighing pan	Draft shield	Bottom insert	Power adapter
x1	x1	x1	x1	x1

Installation:

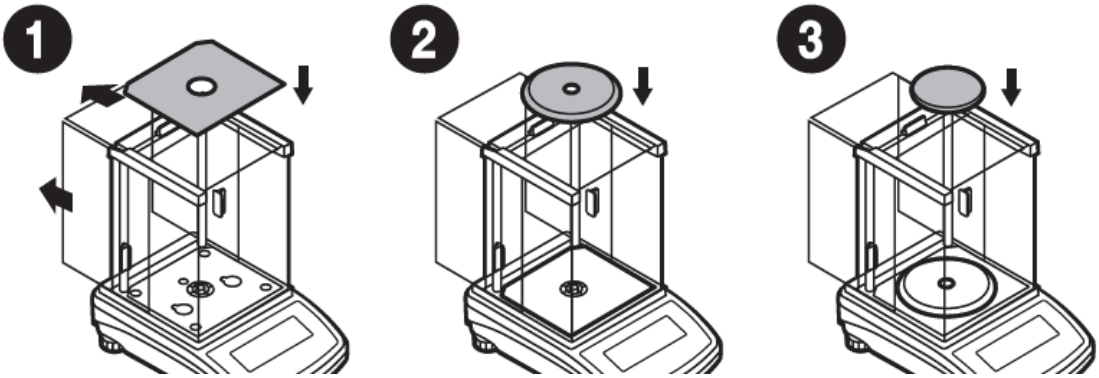
1) Remove the transport lock– gently press the transport lock and turn it accordingly to <OPEN>, keep the transport lock should your balance be transported in the future.



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 the diagram below:
   i. Bottom insert
   ii. Centering ring [embossment side up]
   iii. Weighing pan



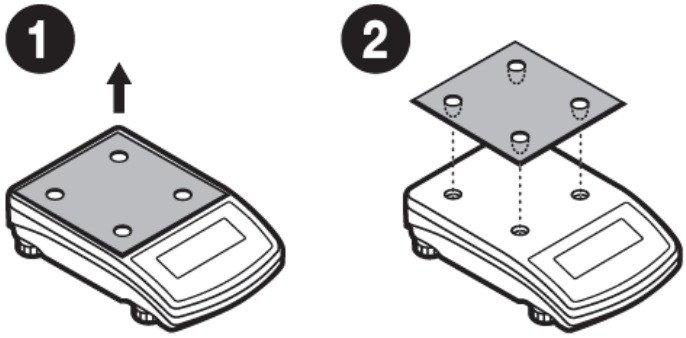
<u>Model: SPS-363, SPS-603, SPS-1003</u>

Components:

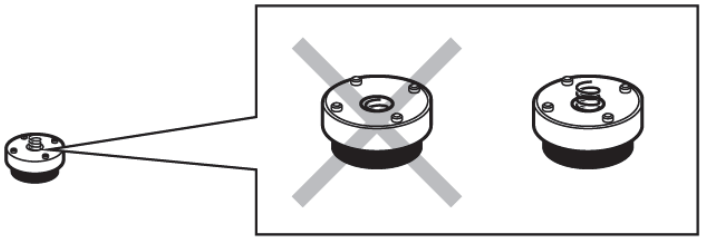
Balance	Weighing pan	Draft shield	Grounding foot	Foot	Power adapter
x1	x1	x1	x1	x3	x1

Installation:

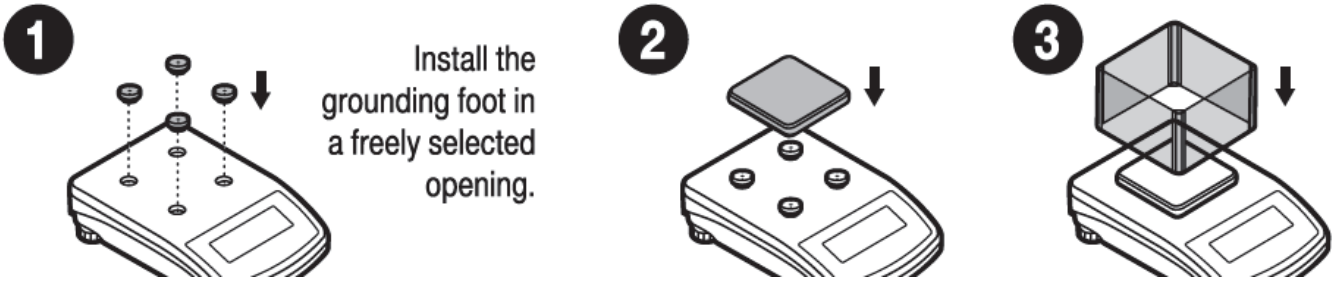
1) Remove transport lock, keep the transport lock should your balance be transported in the future.



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



3) Install components following the diagram below:
   i. Rubber feet (grounding foot can be in any location on the balance)
   ii. Weighing pan
   iii. Glass draft shield

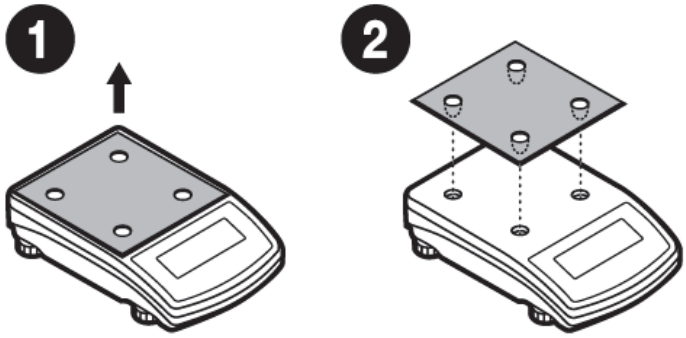


<u>Model: SPS-1202, SPS-2102, SPS-4502</u>

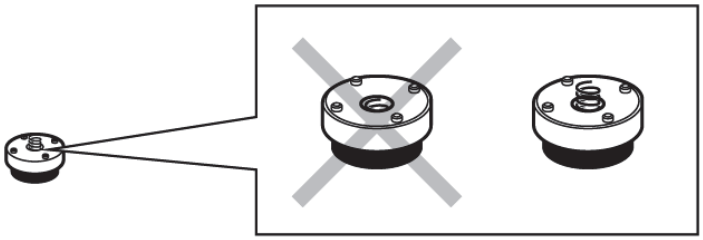
Components:

Installation:

1) Remove transport lock, keep the transport lock should your balance be transported in the future.



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



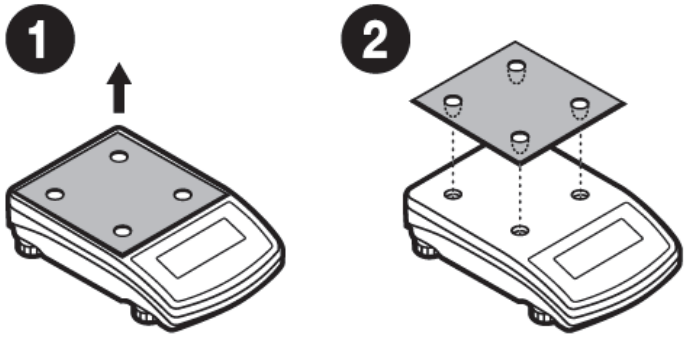
3) Install components following the diagram below:
   i. Rubber feet (grounding foot can be in any location on the balance)
   ii. Weighing pan

<u>Model: SPS-6002</u>

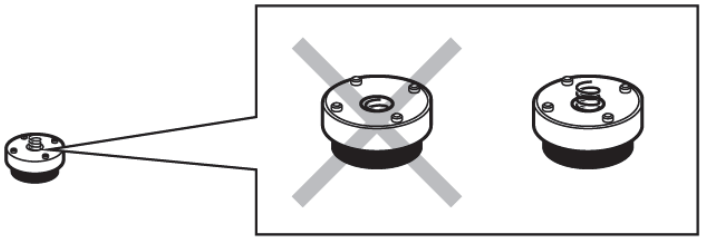
Components:

Installation:

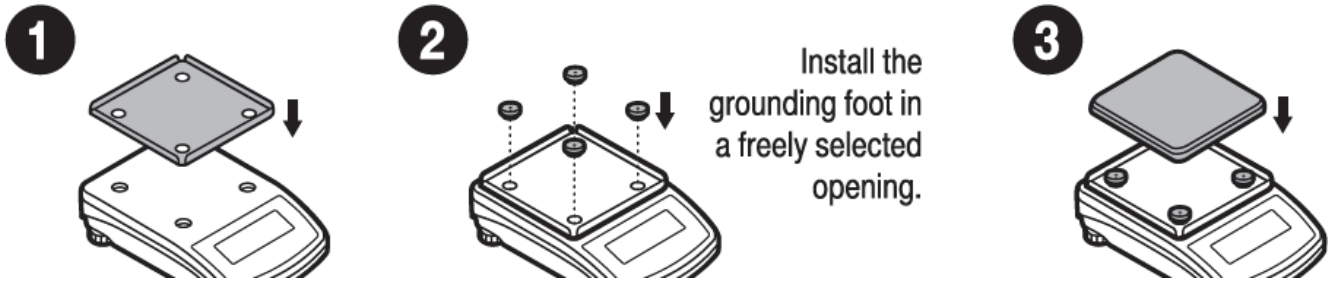
1) Remove transport lock, keep the transport lock should your balance be transported in the future.



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

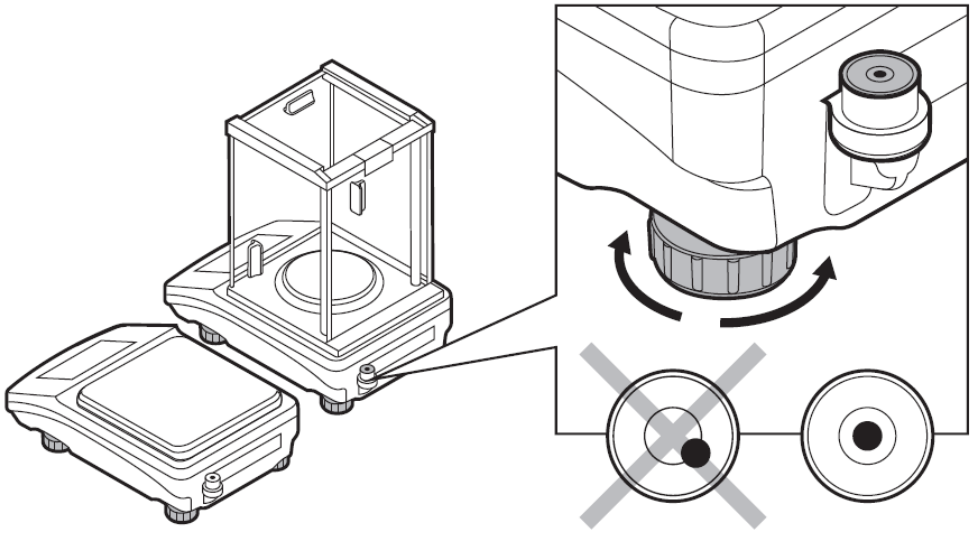


3) Install components following the diagram below:
   i. Draft shield
   ii. Rubber feet (grounding foot can be in any location on the balance)
   iii. Weighing pan



2.5 BALANCE LEVELING

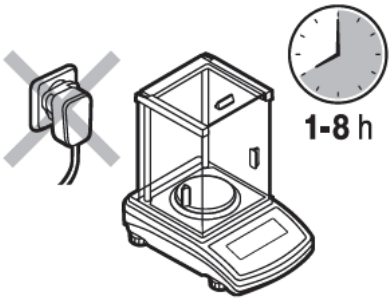
It is necessary to level the balance prior to plugging it in. To level the balance, turn its feet until the air bubble is in the center position.



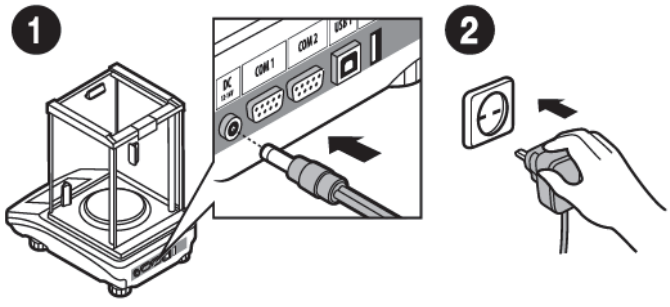
The balance should firmly rest on a surface, each of the feet must be supported.

2.6 POWERING THE DEVICE

Before plugging in your balance, it is imperative to wait until the balance reaches thermal stabilization. For balances that were stored in much lower temperatures (e.g. during winter period), thermal stabilization period will take at least 4 hours for Precision balances, and 8 hours for Analytical balances.



- Balance should be plugged in only with the power adapter that comes standard with the model. Nominal power supply of the power adapter (specified on the power adapter data plate) should be compatible to the power supply.
- Plug the balance in – connect the power adapter to DC connector then connect the power supply to the mains.

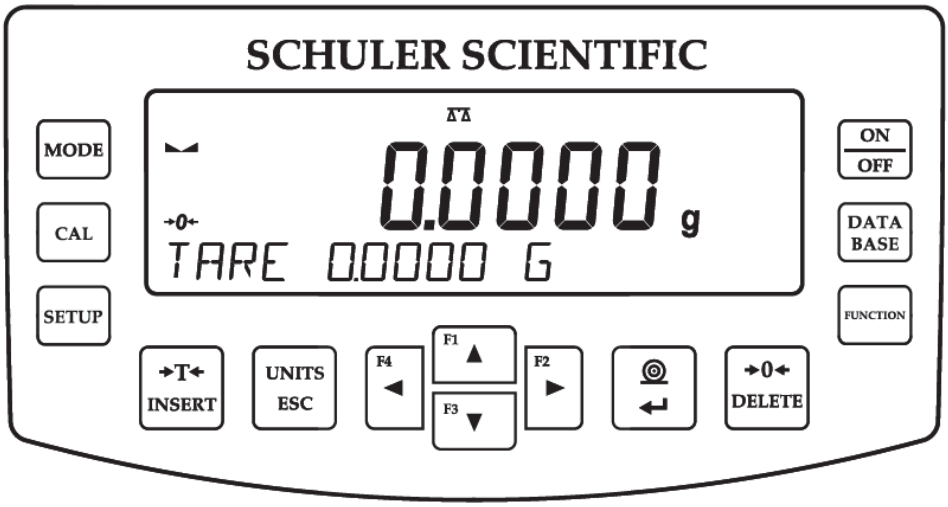


- Press ON/OFF button located in the top right hand corner of the key pad.
  ! Remember to start the balance with no load on the weighing pan
- Test of the display unit takes place right after connecting the balance to the power, all the elements and pictograms are backlit for a short time.
- Next, the name and the software version appears (please note, software number may be different than what appears below)

- The indication gets to ZERO (displayed reading unit depends on the balance). During the balance start, the test of an internal mass adjustment mechanism occurs (single location and elevation of the internal mass adjustment).

- If the indication is different than zero, please press →0← DELETE button

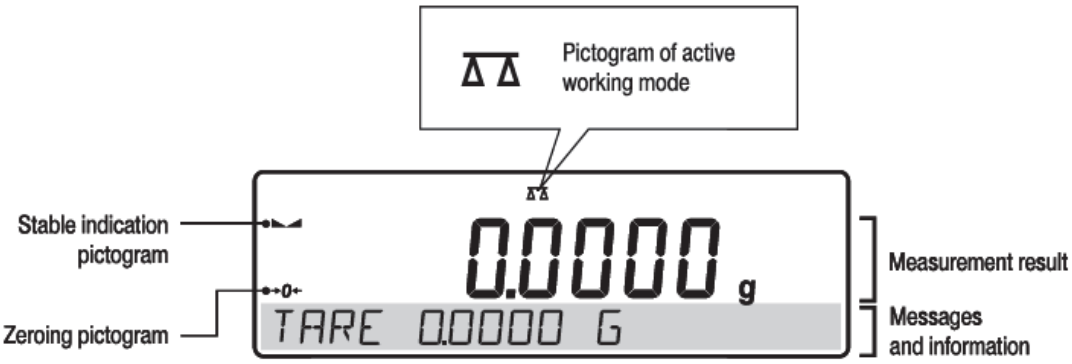
2.7 BALANCE KEYBOARD



ON/OFF	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. **F9** button of the computer keyboard.
DATA BASE	Press to access data stored in a database: user, product, tare. **F10** button of the computer keyboard.
FUNCTION	Press to enter directly the active working mode settings. **F11** button of the computer keyboard.
MODE	Press to select working mode. **F5** button of the computer keyboard.

UNITS ESC	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).
→0← DELETE	Press to Zero the balance
→T← INSERT	Press to Tare the balance
CAL	Press to start adjustment / calibration process immediately. **F6** button of the computer keyboard.
SETUP	Press to enter the main menu of a balance. **F7** button of the computer keyboard.
F4 ◄ F1 ▲ F3 ▼ F2 ►	Press to operate balance menu or change parameter value.

2.7 BALANCE HOME SCREEN



2.7 AMBIENT CONDITIONS STATE INDICATION (ANALYTICAL BALANCES)

The function is intended to inform on unstable ambient conditions for a balance, it is enabled only for Analytical balances.

The function controls dynamic temperature changes occurring in the balance during its operation. If the variation is greater than set limit values (temperature changes speed), then a blinking thermometer pictogram is displayed on the screen.

The blinking thermometer pictogram means that temperature inside the balance is not stable, this may result in inaccurate mass measurement. For such a case it is recommended to wait until the temperature stabilizes or to perform balance adjustment (blanking of the blinking thermometer pictogram).

3. GENERAL BALANCE OPERATION

3.1 BALANCE MENU

Operation of the balance menu is intuitive and easy to use. To enter balance menu, press SETUP button.

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

P1 CALIBRATION

P1.1	INT. CALIB.	|	[internal adjustment]
P1.2	EXT. CALIB.	|	[external adjustment]
P1.3	USER CALIBRATION	|	[user adjustment]
P1.4	CALIBRATION TEST	|	[adjustment test]
P1.5	AUTO. CALIB.	|	[automatic adjustment]
P1.6	AUTO. CALIB. C.	|	[time of automatic 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	CHECKWEIGHING	|	[settings for the function checkweighing]
P2.5	DOSING	|	[settings for the function dosing]
P2.6	DEVIATIONS	|	[settings for the function deviations % against the mass of the standard]
P2.7	DENS. OF SOLIDS	|	[settings for determining density of solids]
P2.8	DENS OF LIQUIDS	|	[settings for determining density of liquids]
P2.9	ANIMAL WEIGHING	|	[settings for the function animal weighing]
P2.10	STATISTICS	|	[settings for the function statistics]
P2.11	TOTALISING	|	[settings for the function totalising]
P2.12	PEAK HOLD	|	[settings for the function peak hold]
P2.13	PIPETTES CALIB.	|	[settings for the function pipettes calibration]
P2.15	ADDING	|	[settings for the function adding]

P3 COMMUNICATION

P3.1	COM1	|	[transmission parameters port COM 1]
P3.2	COM2	|	[transmission parameters port COM 2]
P3.3	WIFI	|	[transmission parameters port WIFI]

P4 DEVICES

P4.1	COMPUTER	|	[PC connection port]
P4.2	PRINTER	|	[printer connection port]
P4.3	BARCODE READER	|	[barcode connection port]
P4.4	ADD.DISPLAY	|	[additional display port]
P4.5	EXT.BUTTONS	|	

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]

P6 OTHER

P6.1	LANGUAGE	|	[menu language]
P6.2	ACCESS LEV.	|	[access levels for editing menu]
P6.3	KEY SOUND	|	[key sound]
P6.4	BACKLIGHT	|	[display backlight level]
P6.5	STAND-BY MODE	|	[backlight turn-off time interval]
P6.6	AUTO SWITCH-OFF	|	[display turn-off time interval]
P6.7	DATE	|	[date settings]
P6.8	TIME	|	[time settings]
P6.9	DATE FORM.	|	[date format]
P6.10	TIME FORM.	|	[time format]
P6.11	GLP AUTOTEST	|	[carrying out autotest for the balance]

P7 INFO

P7.1	BALANCE ID	|
P7.2	SCALE TYPE	|
P7.3	SOFT.VER.	|
P7.4	ID PROD	|
P7.5	TEMP.	|
P7.6	SETUP PRNT.	|

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]

P9 IMPORT/EXPORT (parameter displayed upon inserting the USB flash drive to the balance)

IE1	EXPORT	|	[data export]
IE2	IMPORT	|	[data import]

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

3.2 GOOD WEIGHING PRACTICE

To ensure long lasting use of a balance with correct and reliable measurements of weighed loads, follow the suggestions below:

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

  YES NO

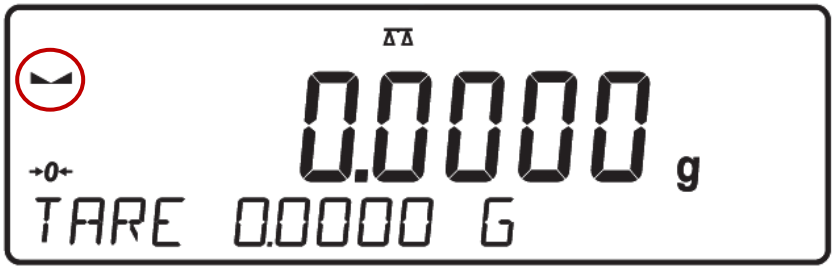
- Place weighed loads centrally on the weighing pan:

  YES NO

- Avoid side loading, in particular side shocks:

  NO NO

When weighing any load, wait for the stability marker located in the top left of the screen to signify a stable reading of the load.



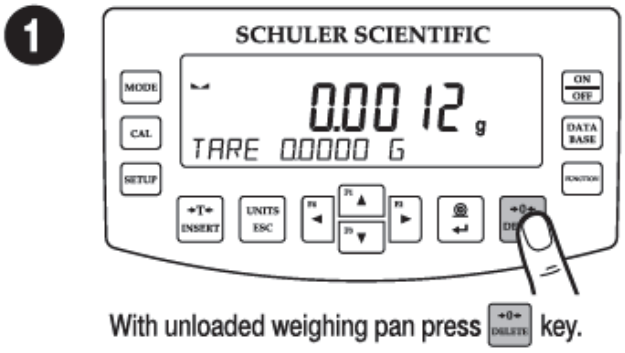
3.3 BALANCE ZEROING

Zeroing is a function allowing to zero the mass on the indication. To perform this function, press →0← DELETE button. Mass indication of zero value shall be displayed together with precise zero →0← and stability markers .

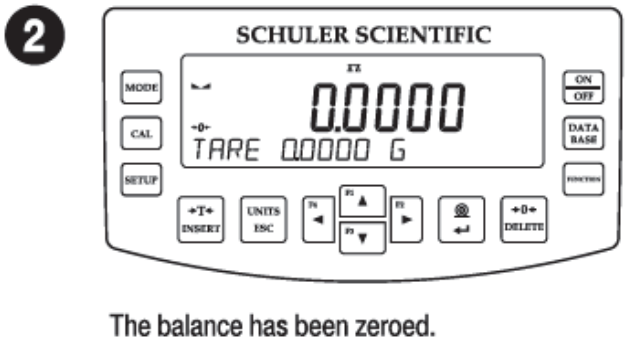
The zeroing process is an equivalent for determining new zero point, recognized by the balance as precise zero. Zeroing is possible only for stable status of display indication.

! CAUTION
Zeroing the display indication is possible only within ±2% range of instrument's maximum capacity. If the zeroed value is above ±2% of the maximum capacity, then the balance indicates a respective error message. There should be no load on the weighing pan or the -Err 2- error message will appear.

! CAUTION
The stability marker must be present to zero the display or an -Err 8- message can appear.



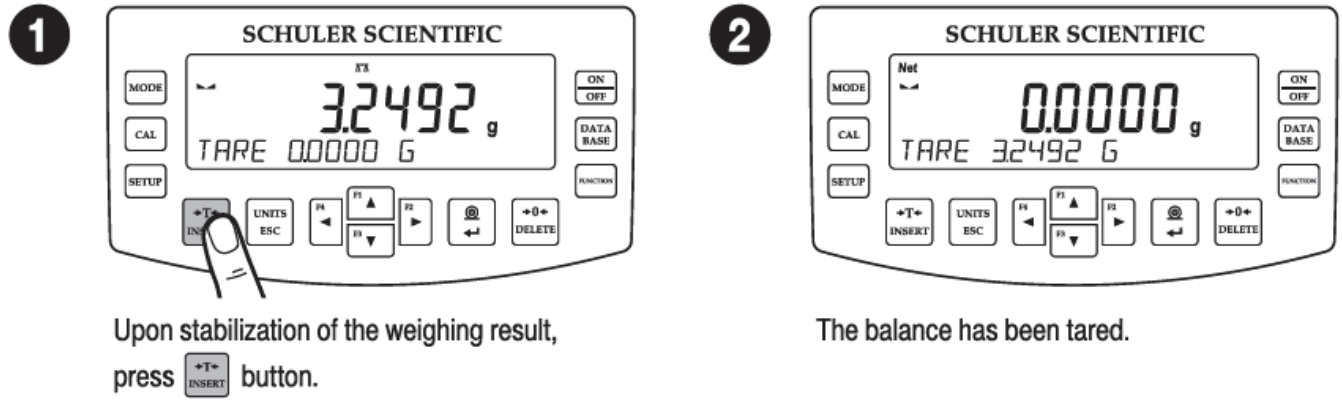
With unloaded weighing pan press →0← DELETE key.



The balance has been zeroed.

3.4 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 →T← INSERT key.



Upon stabilization of the weighing result, press →T← INSERT button.

The balance has been tared.

The display indicates mass equaling zero and symbols: **Net** and ◣◢ . 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 product upon its selection from the database.

! CAUTION
Taring negative values is impossible. On taring negative values the balance responds with an error message, -Err 3-. In such case, zero balance indication and repeat taring procedure.

3.4.1 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.

3.4.2 DELETING TARE

Entered tare value can be deleted by pressing →0← DELETE button or by entering tare value of 0.000g (see description above).

3.5 BALANCE CALIBARTION

To ensure the highest weighing accuracy, it is recommended to periodically introduce a corrective factor of indications to balance memory, the said factor is referred to as a mass standard.

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 Analytical balances or 2°C for Precision series balances.

Types of calibration:

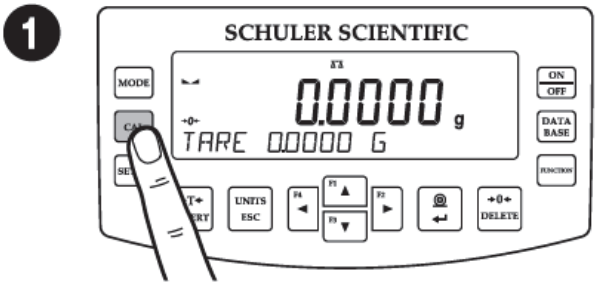
- Internal calibration (automatic or manual)
- External calibration
- User-defined calibration

! 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 adjustment process. Adjustment process can be aborted if necessary by pressing Esc button at any time during the process.

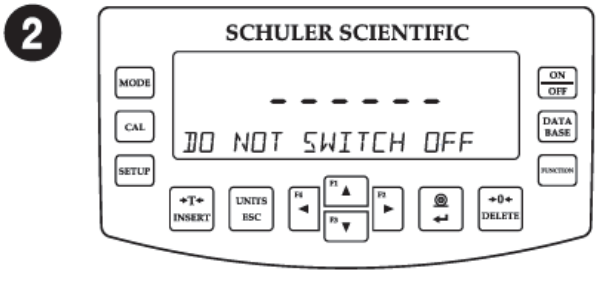
3.5.1 INTERNAL CALIBRATION

The internal calibration process can be initiated automatically and manually.

Manual calibration is when the internal calibration procedure is triggered by pressing CAL button. Second, is through the balance menu **P1.1 INT. CALIB**.



Using CAL key to start the adjustment.



Wait for the adjustment completion.

3.5.2 AUTOMATIC INTERNAL CALIBRATION

The automatic calibration process can take place in the following instances:

- **<NONE>** automatic calibration disabled
- **<TIME>** calibration takes place in time intervals. The time interval is declared in hours and ranges between 0.5 and 12 hours.
- **<TEMP>** calibration is triggered by temperature change only. At each calibration process, the temperature is recorded. The next calibration is automatically initiated if temperature changes more than 1°C or 2°C from the last saved temperature.
- **<BOTH>** calibration is triggered by both, temperature changes and time.

Procedure:

- The balance detects the necessity of carrying out a calibration and signals it by displaying a thermometer or clock pictogram and **<Cal>** sign at the top of the display
- Once the balance signals the need for a calibration, a 2-minute long time interval takes place allowing the weighing procedure to be completed
- Once the 2-minute long time elapses, the balance display shows the message CAL_30 and starts counting down from 30..29..28 to 0 (indicated value is the counter)

- The balance user has 30 seconds to make a decision
    - To allow the internal calibration, do not take any actions
    - If more time is needed to complete weighing procedure, press UNITS ESC.
        - When pressed, the balance returns to weighing procedure and displays last weighing result.
        - In about 5 minutes balance indicates CAL_30 message again.

! CAUTION
The calibration process can be postponed multiple times, however, postponing the calibration for a long time can lead to larger errors in the weighing process. The errors can be the result of temperature changes and as a consequence changes of balance sensitivity.

3.5.3 EXTERNAL CALIBRATION

External calibration is carried out by means of an external mass standard of specified accuracy class and weight. Both, accuracy class and mass standard weight depend on balance type and max capacity and the correct value is saved within the balances factory settings. The process takes semi-automatic form; successive stages are signaled with prompts.

Procedure:

- Go to balance menu **<P1.2 EXT. CALIB.>** , press ↵ button
- The balance displays a prompt to unload the weighing pan, **<UNLOAD PAN>** (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, the message **<LOAD WEIGHT>** appears and the mass value to be placed on the weighing pan is displayed, e.g. 200.000g (depending on the type of balance).
- Place the external calibration weight of displayed mass value and press ↵ button. The balance determines the mass, message **<CALIBRATION>** is displayed in the bottom line.

3.5.4 USER CALIBRATION

An external calibration process can be carried out with an external mass standard of defined value by the user. The calibration mass must be at a value greater than 30% of the balances Max range

Procedure:

- Go to balance menu **<P1.3 USER CALIBRATION>** , press  button
- 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 > 30% Max capacity. Utilize the arrows to enter the weight mass. Press  button.
- Once the mass of the weight is entered and confirmed, the message prompting the user to remove the weight from the pan is displayed: **<UNLOAD PAN>** (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 **<LOAD WEIGHT>** 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 adjustment weight of displayed mass value and press  button**.** The balance determines the mass, message **<CALIBRATION>** is displayed in the bottom line.

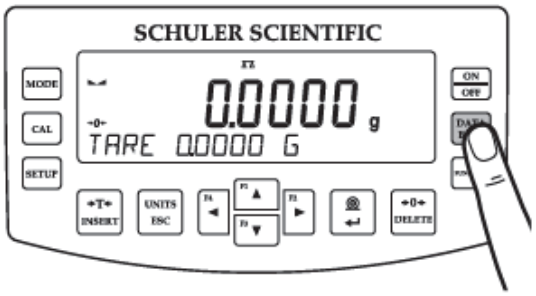
5.4 ADJUSTMENT TEST

The Adjustment Test function enables comparing the result of an internal automatic adjustment with the value recorded in balance factory parameters. The comparison is used for determining balance sensitivity drift over time.

5.5 ADMINISTRATOR LOG-IN

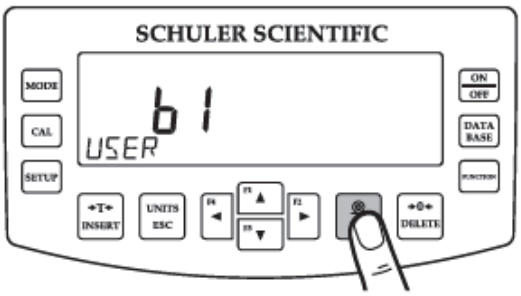
Some balances settings are accessible for Administrator exclusively. Prior to balance parameters setup, log in as Administrator.

1



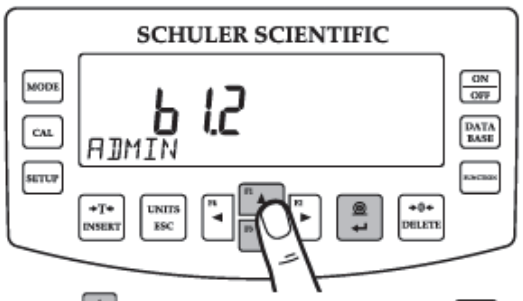
Press DATA BASE key to enter "Database" menu.

2



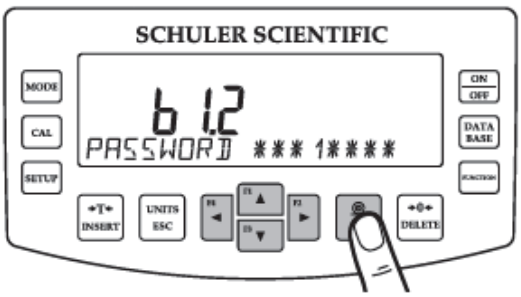
To enter user parameters, press ↵ key.

3



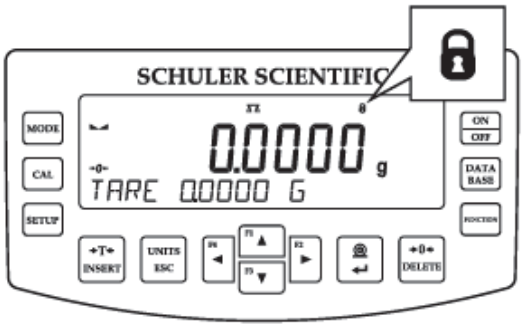
Using ▲ ▼ keys select "Admin" and press ↵ key to confirm.

4



Using ◄ ▲ ▼ ► keys select "1111" and press ↵ key to confirm.

5



You have logged as the administrator.

Upon logging in pictogram is displayed 🔒

4. WORKING MODES- GENERAL INFORMATION

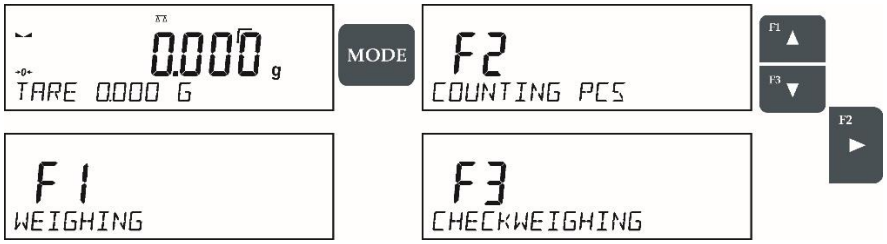
The balance features the following working modes:

	**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. More information found in **Section 5**.
	**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. More information found in **Section 6**.
	**Check Weighing** Means of operation: control of sample mass with applied thresholds. A user should specify the value of min threshold <LO> and max threshold <HI>. More information found in **Section 7**.
	**Dosing** Means of operation: a user should specify sample's target mass to be obtained by pouring. More information found in **Section 8**.
	**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). More information found in **Section 9**.
	**Density of solids** Means of operation: based on Archimedes principle, a balance determines density of solids. The mode requires an optional density determination kit. More information found in **Section 10**.
	**Density of liquids** Means of operation: based on Archimedes principle, a balance determines density of liquids. The mode requires an optional density determination kit. More information found in **Section 11**.
	**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. More information found in **Section 12**.
	**Statistics** Means of operation: carried out measurements are used to calculate statistical data, such as Min, Max, deviation, etc. More information found in **Section 13**.
	**Totalising** Means of operation: by mixing specified ingredients you can obtain particular mixture, in order to program given formulation you have to specify weight of particular ingredients. More information found in **Section 14**.
	**Peak Hold** Means of operation: max temporary indication occurring in course of the weighing process is hold on a display. More information found in **Section 15**.
	**Pipettes Calibration** Means of operation: applied to fixed volume pipettes and adjustable volume pipettes. Software determines accuracy and repeatability errors. More information found in **Section 16.**
	**Adding** Means of operation: allows you to add net masses of weighed samples. More information found in **Section 17**.

4.1 RUNNING WORKING MODE

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

Procedure:



F1 or F3 - press to select working mode

F2 - press to enter the selected working mode

! 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.

4.2 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:

5. WEIGHING MODE

Load an object on the balance weighing pan. The stabilization of weighing result is indicated by a stability marker visible on the left side of balance display, read the measurement result.

5.1 WEIGHING UNITS

To change the weighing unit, press the UNITS ESC button. By pressing this button it changes the unit of measure and will be in use from the moment of its activation until its changed or the balance is switched off and on.

Units List:

- gram [g]
- milligram [mg]
- kilogram [kg]
- carat [ct]
- pound [lb]
- ounce [oz]
- ounce Troy [ozt]
- pennyweight [dwt]
- Taele China [tlc]
- Momme [mom]
- Grain [gr]
- Newton [N]
- Tical [ti]
- baht [baht]
- tola [tola]
- mesghal [msg]
- Taele Hongkong [tlh]
- Taele Singapore [tls]
- Taele Taiwan [tlt]
- User unit 1 [u1]
- User unit 2 [u2]

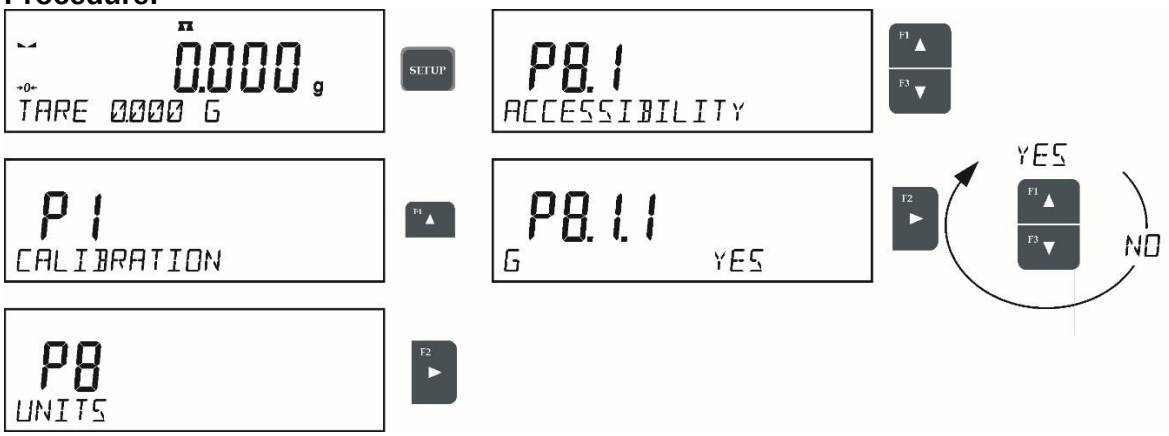
For NTEP verified balances, you can select from the following: [g], [mg] or [kg], [ct]

For non-verified balances, you can select from the following: [g], [mg], [kg], [ct], [lb], [oz], [ozt], [dwt], [tlh], [tls], [tlt], [tlc], [mom], [gr], [ti], [N], [u1], [u2]

5.1.1 UNITS ACCESSIBILITY

The user may declare units to be available for use. Units with parameter value set to **<YES>** are available for selection in specified operating modes.

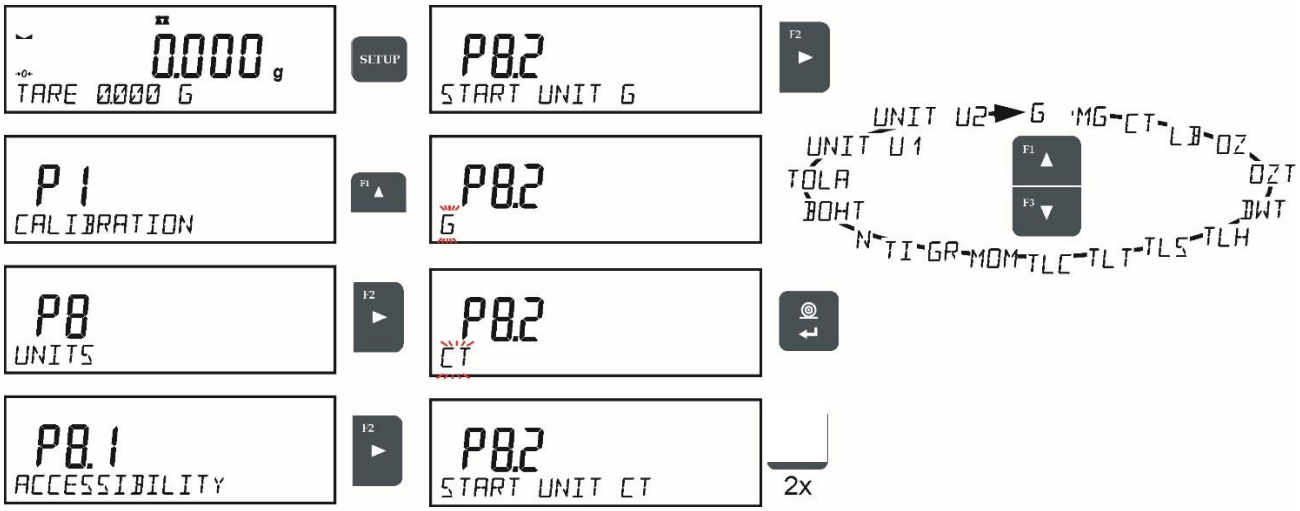
Procedure:



5.1.2 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.

Procedure:

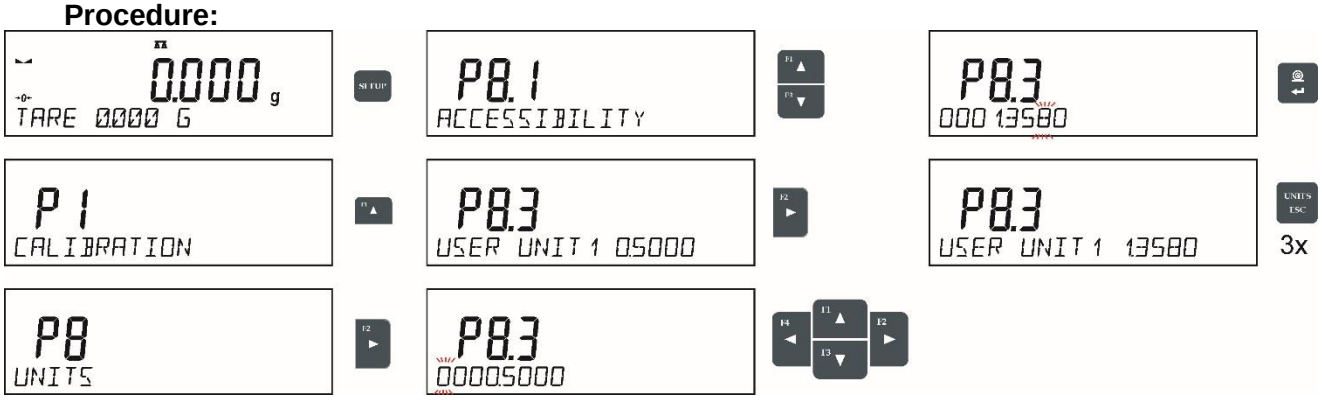


5.1.3 USER-DEFINED UNIT

You may create two custom user-defined units. Displayed value of a user-defined unit is a multiplication of measured mass value and a coefficient specified for the user-defined unit. The units can be freely named with use of 3 characters' maximum.

By default, the names are displayed as **[u1]** – user unit 1 and **[u2]** – user unit 2.

Procedure:



5.2 WEIGH MODE SETTINGS

The balance allows setup of operating parameters (filters, value release and autozero function, deleting the last digit and other settings) separately for each working mode.

It enables customizing the instrument and utilizing its properties depending on the user's needs and expectations, or on specific requirements for selected working mode; as a result the device operation is quick and easy.

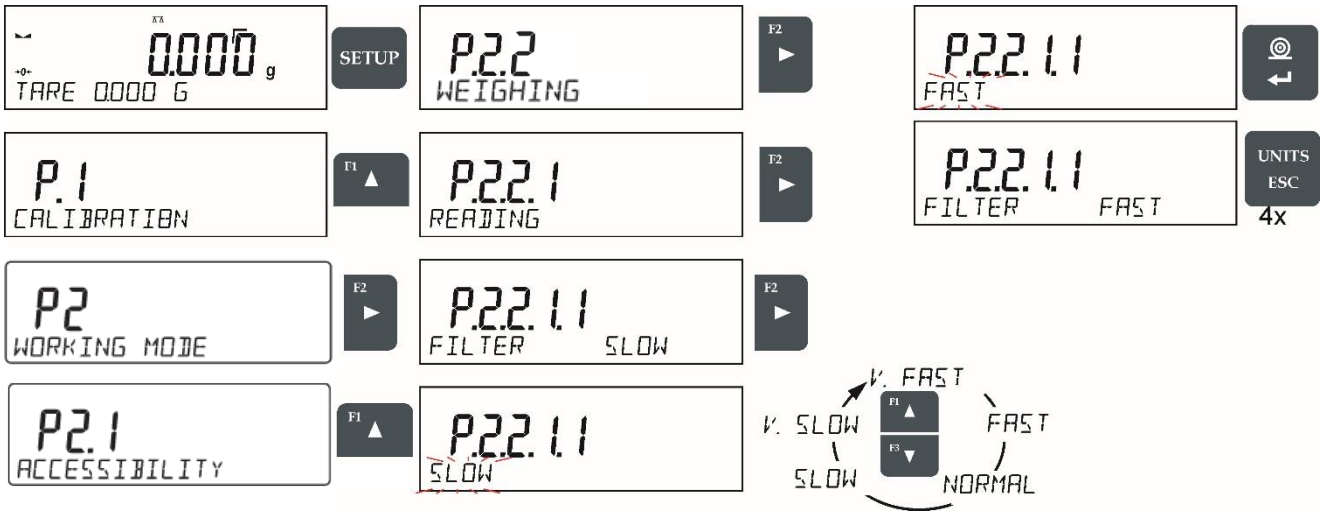
5.2.1 FILTER LEVEL SETTING

Filter settings adjustment 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 quickly for weighed mass within the set range of the filter (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).

Procedure:

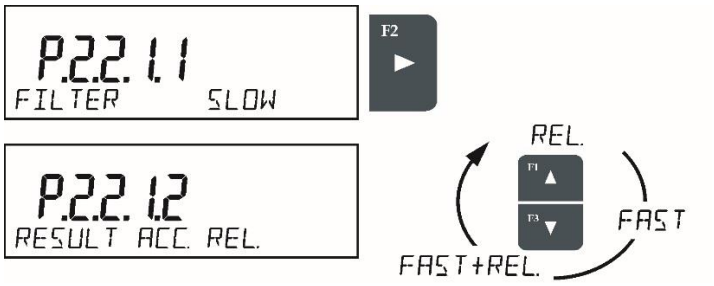


CAUTION!
The higher filter level, the longer the weighing time.

5.2.2 VALUE RELEASE

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:

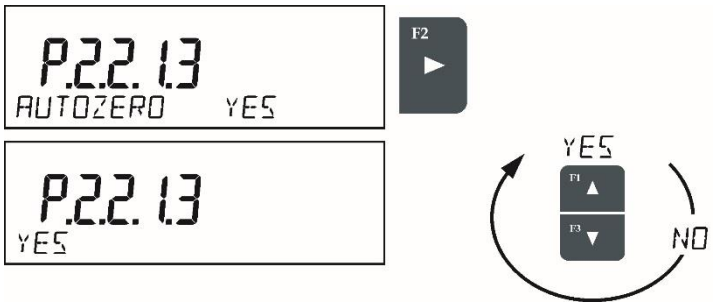


5.2.3 AUTOZERO FUNCTION

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 ▂▃, and precise zero marker →0← 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:

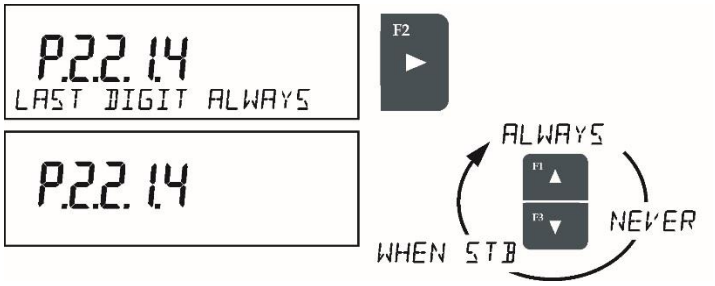


5.2.4 LAST DIGIT DISPLAY

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:



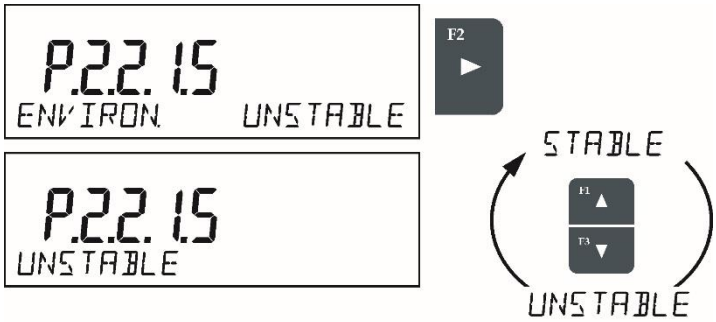
5.2.5 BALANCE AMBIENT CONDTIONS

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.

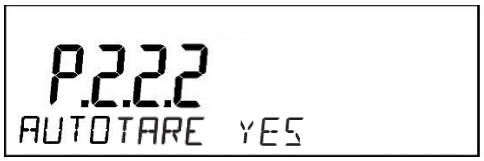
Procedure:



5.2.6 AUTOTARE

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

the function is active when **<AUTOTARE>** is set to **<YES>** option.



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 proceeds (**Net** marker appears in the upper part of the display).
- Put product that is to be packed into the packaging.
- The display shows net weight of the product.
- Take off the product together with the packaging.
- The balance cancels tare value (packaging weight recorded in balance storage during the first step of the operating process) after the gross weight value (set in **<AUTO THRES>** parameter) has been exceeded.
- Put packaging of the next product on a weighing pan, automatic taring of the packaging weight proceeds after measurement stabilization (**Net** marker appears in the top section of the display);
- Put a 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>**.

<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.

5.2.7 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.

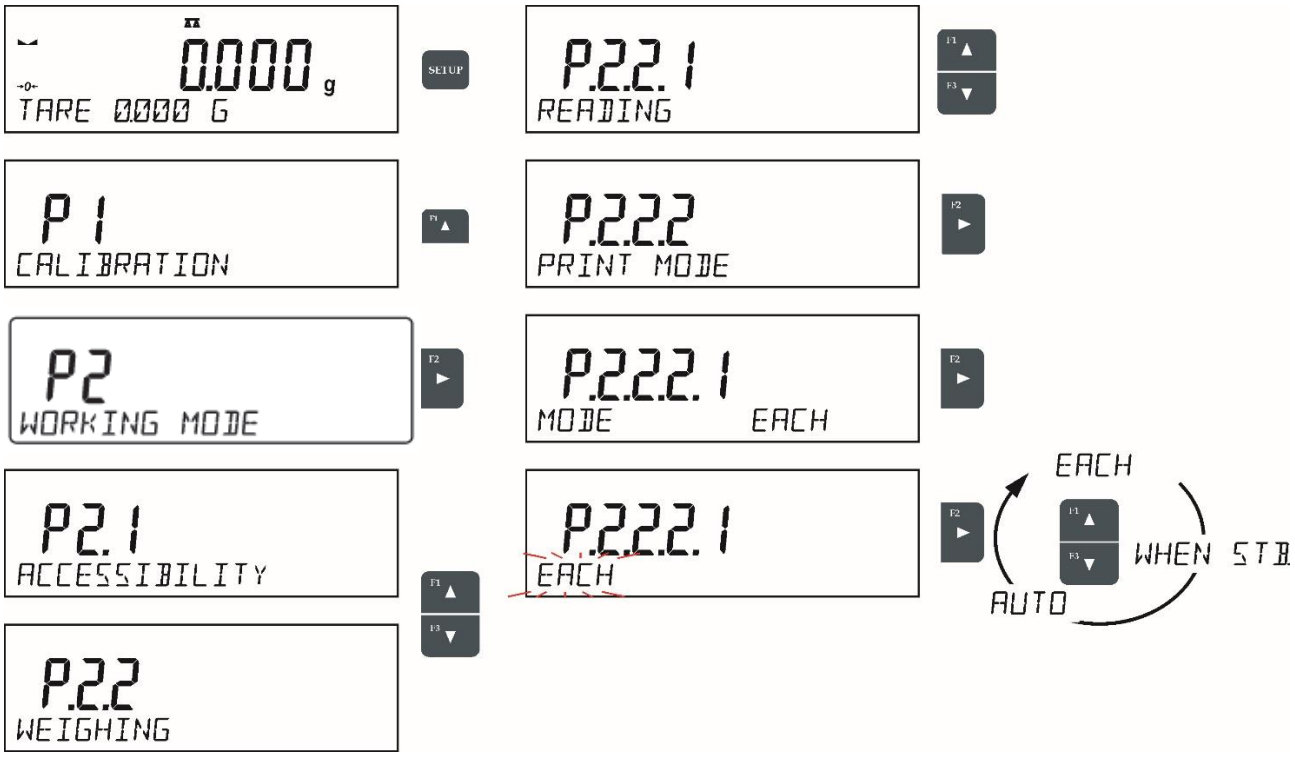
! CAUTION

Each result is printed and recorded (stable and unstable for a non-verified balance, stable for a verified balance).

Automatic operation with interval starts at the moment of switching the function on and it lasts until it is switched off.

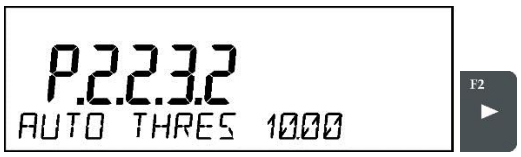
On switching the function of auto print with interval, PRINT button becomes inoperative (no indication is printed when pressed).

Procedure:



5.2.8 AUTOMATIC OPERATION

For automatic operation adjust the threshold value.



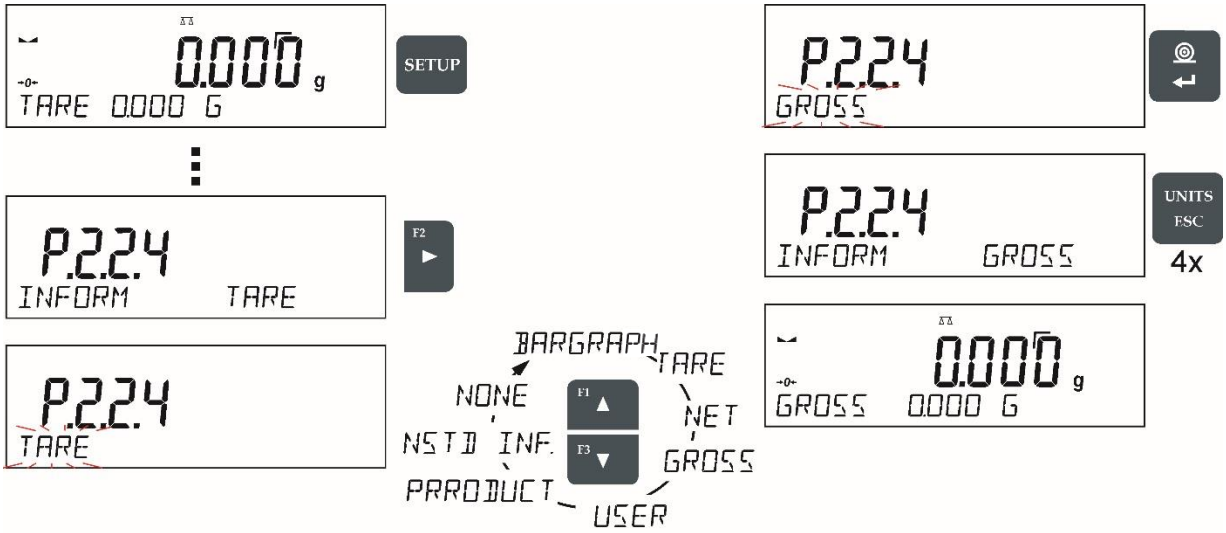
It is also necessary to specify interval value in [min]. The picture presents interval setting, value set to 2 min.

Procedure:

- Press →0← DELETE button to zero the balance (marker of stable measurement and zero marker →0← 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).

5.2.9 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:



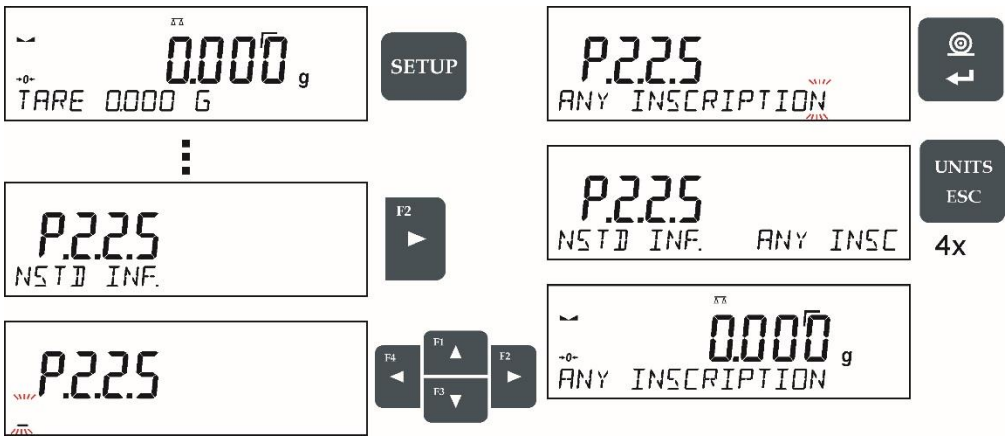
<BARGRAPH> option presents amount of used weighing capacity in a graphic form, it covers 0 – MAX range.

Example of a SCA 4502C balance display with bargraph option on: 500 g heavy load placed on a weighing pan means that 50% of max capacity has been used (half-filled bargraph bottom line).

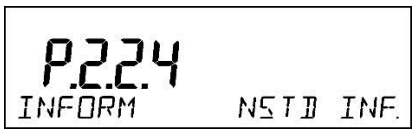
It is possible to enable <BARGRAPH> option for the following modes: PARTS COUNTING, DOSING, PERCENT WEIGHING, WEIGHING, ANIMAL WEIGHING, STATISTICS, TOTALIZING, PEAK HOLD.

5.2.10 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 **P2.2.4 to < NSTD. INF. >** option.

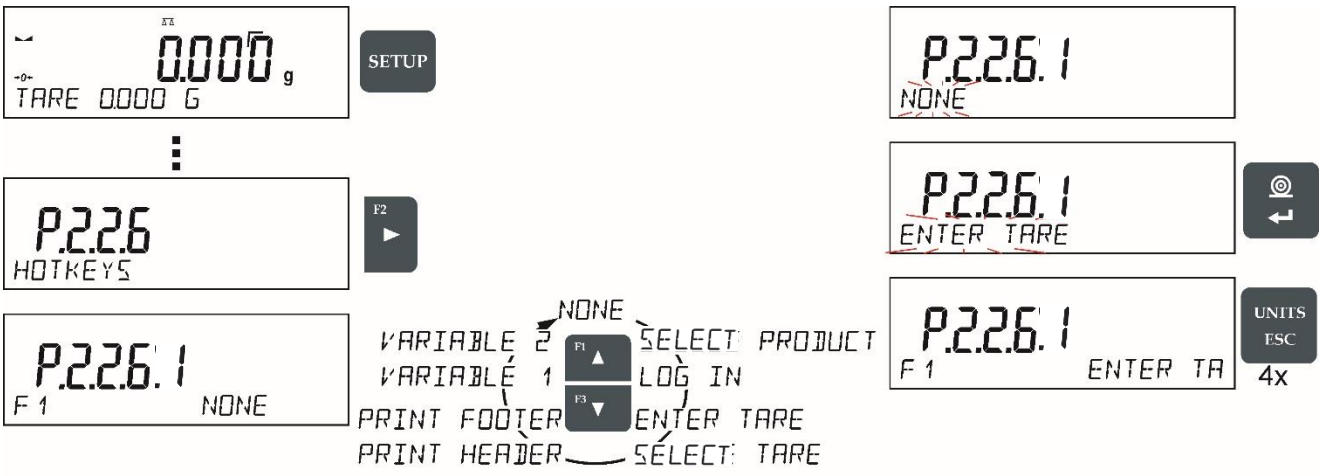


5.2.11 F SHORTCUT KEYS

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 / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT 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).



6. PARTS COUNTING (COUNTING PIECES)

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.

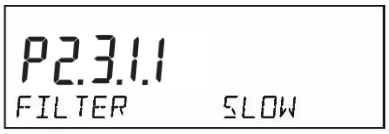
6.1 PARTS COUNTING SETTINGS

The balance allows setup of operating parameters (filters, value release and autozero function, deleting the last digit and other settings) separately for each working mode.

It enables customizing the instrument and utilizing its properties depending on the user's needs and expectations, or on specific requirements for selected working mode; as a result the device operation is quick and easy.

6.1.1 FILTER LEVEL SETTING

To set the filter level for Parts Counting, set parameter **P2.3.1.1 <FILTER>**



Filter settings adjustment 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 quickly for weighed mass within the set range of the filter (parameter for setting filter range is accessible only from the service menu – the user does not have any access to it).

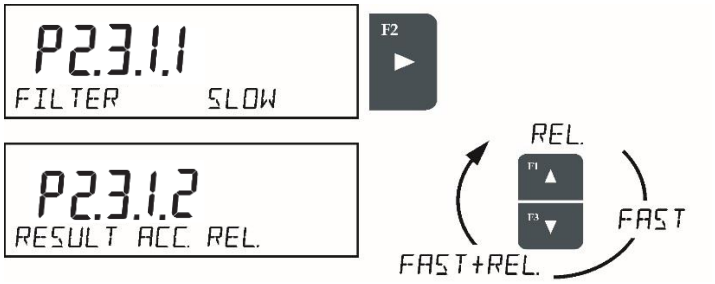
Depending on the filter, the weighing time is shorter (V.FAST and FAST) or longer (SLOW and V. SLOW).

Refer to **Section 5.2.1** for procedure.

6.1.2 VALUE RELEASE

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:

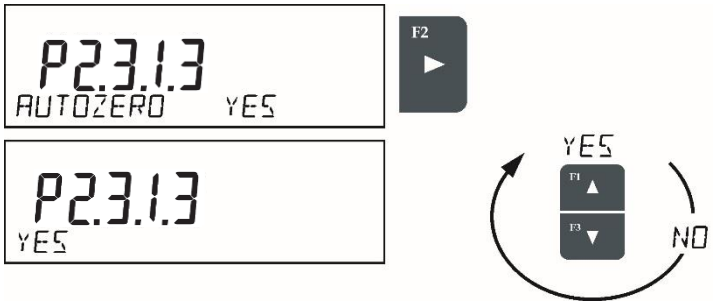


6.1.3 AUTOZERO FUNCTION

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 ▁▁, and precise zero marker →0← 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:

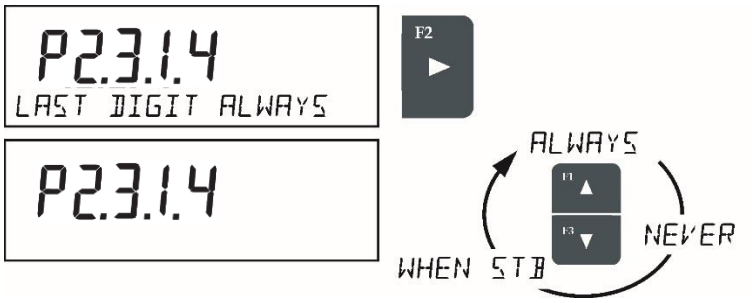


6.1.4 LAST DIGIT DISPLAY

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:



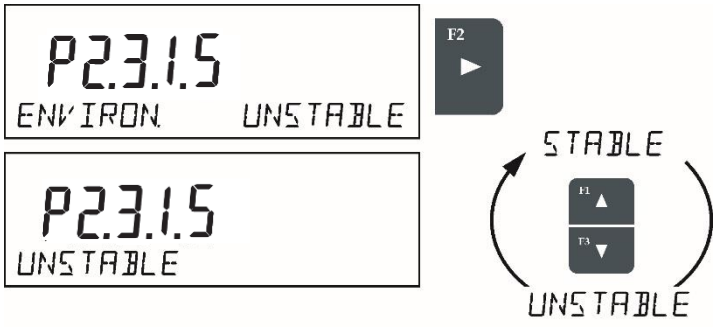
6.1.5 BALANCE AMBIENT CONDTIONS

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.

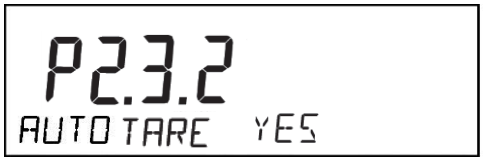
Procedure:



6.1.6 AUTOTARE

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

The function is active when **<AUTOTARE>** is set to **<YES>** option.

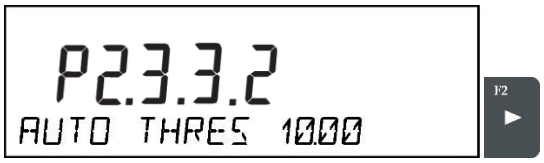


Procedure:

- 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 proceeds (**Net** marker appears in the upper part of the display).
- Put product that is to be packed into the packaging.
- The display shows net weight of the product.
- Take off the product together with the packaging.

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



<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.

6.1.7 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 **P2.3.3.3 <AUTO INT.>**. Interval range is 1-9999 min.

! CAUTION
Each result is printed and recorded (stable and unstable for a non-verified balance, stable for a verified balance).

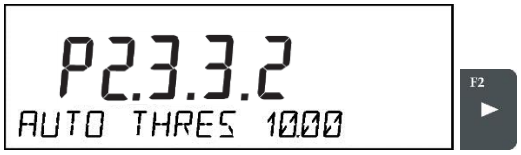
Automatic operation with interval starts at the moment of switching the function on and it lasts until it is switched off.

On switching the function of auto print with interval, PRINT button becomes inoperative (no indication is printed when pressed).

For procedure refer to **Section 5.2.7**

6.1.8 AUTOMATIC OPERATION

For automatic operation adjust the threshold value.



It is also necessary to specify interval value in [min]. The picture presents interval setting, value set to 2 min.

Procedure:

- Press →0← DELETE button to zero the balance (marker of stable measurement and zero marker →0← 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).

6.1.9 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 <**COUNTING PCS**> mode:

- None
- Sample
- Bargraph
- Tare
- Net

- Gross
- User
- Product
- None Standard Information

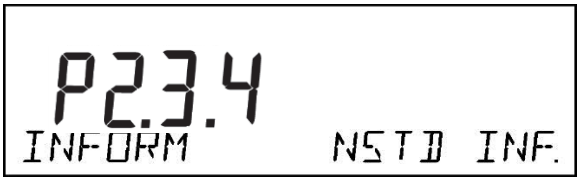
For procedure refer to **Section 5.5**

6.1.10 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.3.4 to < NSTD. INF. >** option.



6.1.11 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 **<COUNTING PCS>** mode: **<NONE / ENTER SAMPLE / DETERMINE SAMPLE / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

These options can be freely assigned to any of the F keys.

For procedure refer to **Section 5.2.11**

6.2 SETTING REFERENCE MASS: MASS DETERMINATION FOR THE SAMPLE OF KNOWN QUANTITY

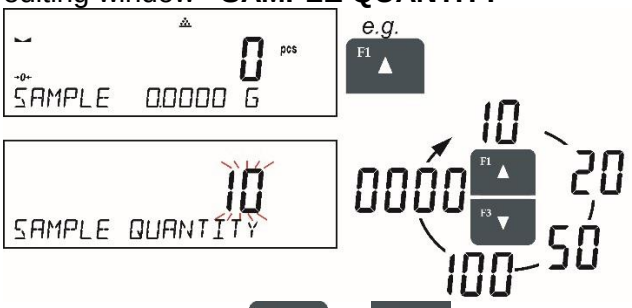
While determining the mass of a single piece, **ACAI function (Automatic Accuracy Correction)** is in use.

Means of operation of ACAI function:

- Number of pieces (on adding) on balance's weighing pan has to 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 stabilized.

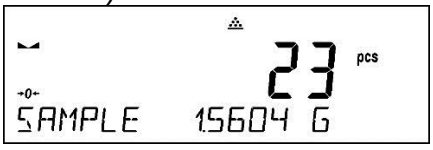
Procedure:

- 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 F1 ▲ or F3 ▼ 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:

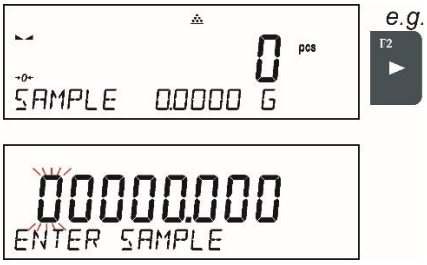
- The total mass of all the pieces put on the weighing pan must not be greater than the balance maximum weighing range.
- The mass of a single piece cannot be lower than **0.1 reading unit** of the balance. If this condition is not met, the balance displays message: **<Single part mass too low>**.
- 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.

6.3 SETTING REFERENCE MASS: ENTERING MASS VALUE

With this option, you set the mass of a sample to be utilized for counting the various parts.

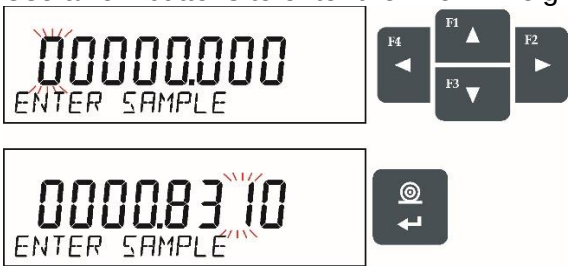
Procedure-

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

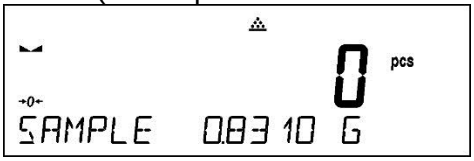


e.g.

- 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)



7. CHECKWEIGHING

Checkweighing is a working mode using two thresholds (LOW and HIGH) in order to check mass of the samples. It is generally assumed that the mass is correct if it is contained within the threshold values.

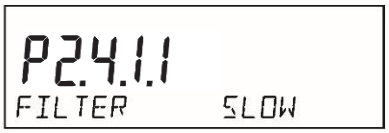
7.1 CHECKWEIGHING SETTINGS

The balance allows setup of operating parameters (filters, value release and autozero function, deleting the last digit and other settings) separately for each working mode.

It enables customizing the instrument and utilizing its properties depending on the user's needs and expectations, or on specific requirements for selected working mode; as a result the device operation is quick and easy.

7.1.1 FILTER LEVEL SETTING

To set the filter level for Parts Counting, set parameter **P2.4.1.1 <FILTER>**



Filter settings adjustment 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 quickly for weighed mass within the set range of the filter (parameter for setting filter range is accessible only from the service menu – the user does not have any access to it).

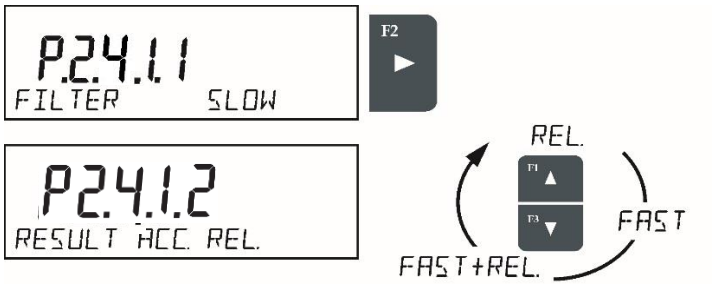
Depending on the filter, the weighing time is shorter (V.FAST and FAST) or longer (SLOW and V. SLOW).

Refer to **Section 5.2.1** for procedure.

7.1.2 VALUE RELEASE

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:

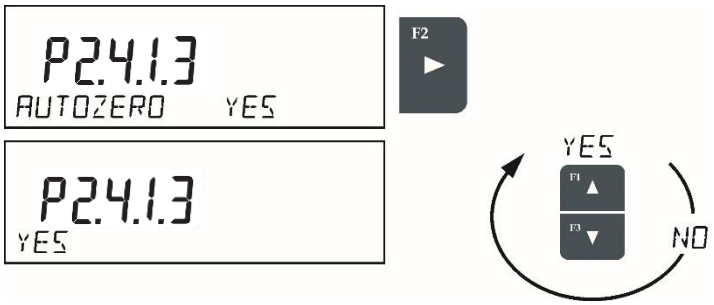


7.1.3 AUTOZERO FUNCTION

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 ▂▃, and precise zero marker →0← 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:

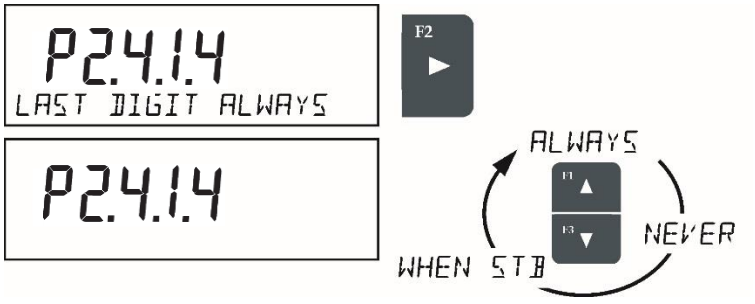


7.1.4 LAST DIGIT DISPLAY

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:



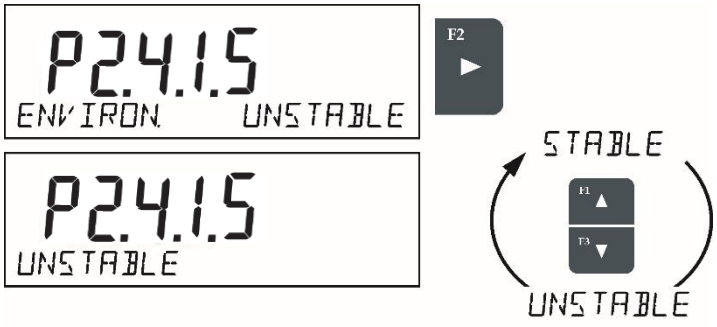
7.1.5 BALANCE AMBIENT CONDTIONS

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.

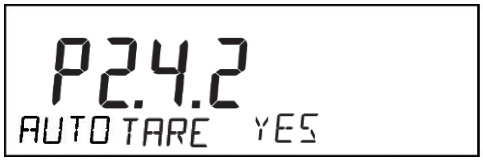
Procedure:



7.1.6 AUTOTARE

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

The function is active when **<AUTOTARE>** is set to **<YES>** option.

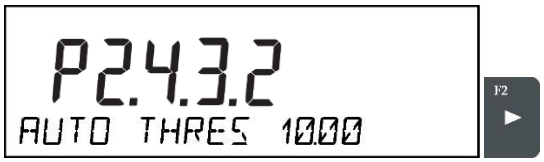


Procedure:

- 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 proceeds (**Net** marker appears in the upper part of the display).
- Put product that is to be packed into the packaging.
- The display shows net weight of the product.
- Take off the product together with the packaging.

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



<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.

7.1.7 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 **P2.3.4.3 <AUTO INT.>**. Interval range is 1-9999 min.

! CAUTION
Each result is printed and recorded (stable and unstable for a non-verified balance, stable for a verified balance).

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).

For procedure refer to **Section 5.2.7**

7.1.8 AUTOMATIC OPERATION

For automatic operation adjust the threshold value.

It is also necessary to specify interval value in [min]. The picture presents interval setting, value set to 2 min.

Procedure:

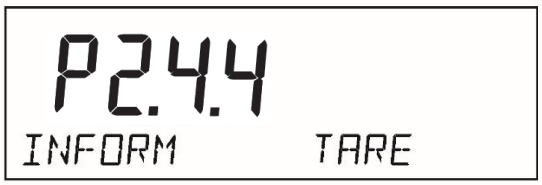
- Press →0← DELETE button to zero the balance (marker of stable measurement and zero marker →0← are shown on a display).
- Deposit load, the balance sends the first stable measurement to the printer port.
- Remove the load from the pan.
- The next measurement is possible when the indication is lower than the set value of **<AUTO THRES.>** parameter (next measurement does not require zero value).

7.1.9 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 <**CHECKWEIGHING**> mode:

- None
- Difference
- Hi_LO
- Bargraph
- Tare

- Net
- Gross
- User
- Product
- None Standard Information (NSTD INF)



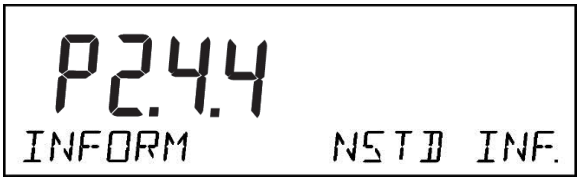
For procedure refer to **Section 5.2.9**

7.1.10 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.4.4 to < NSTD. INF. >** option.



7.1.11 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 **<CHECKWEIGHING>** mode: **<NONE / SET HI_LO/ SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

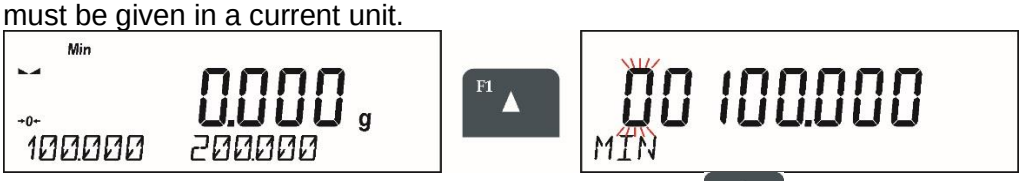
These options can be freely assigned to any of the F keys.

For procedure refer to **Section 5.2.11**

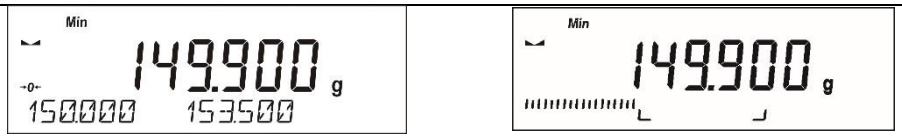
7.2 DECLARING THRESHOLD VALUES

Procedure:

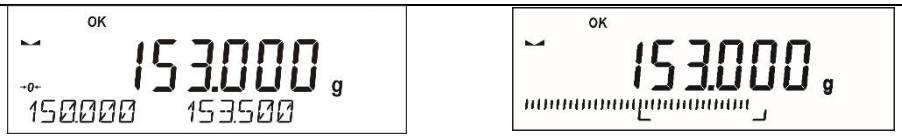
- Press F button to which the function <**ASSIGN THRESHOLDS**> is assigned, the editing window is displayed and the value of MIN low threshold can be ascribed. The ascribed value must be given in a current unit.



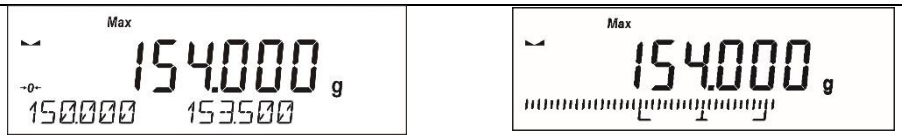
- Use arrow buttons to enter low threshold value, press  button to confirm.
- The software automatically proceeds to the editing window of MAX high threshold value, which is to be given in the current unit. Use arrow buttons to enter high threshold value, press  button to confirm.
- The balance software proceeds to <**CHECKWEIGHING**> mode, values of declared thresholds are displayed in the bottom line (if such an option has been selected for <**INFORMATION**> function).
- At the top of the display the message <Min> is shown, it indicates weight value placed on the weighing pan in relation to low limit weight value. Bottom line of the display, if <BARGRAPH> option is enabled, shall demonstrate weight indication, in a graphic form, in relation to set thresholds.



<Min>: mass lower than the value of the low threshold



<Ok>: mass contained within thresholds



<Max>: mass higher than the value of the high threshold

Since LCD display capacity is limited, the threshold markers do not reflect threshold setups and target weight value precisely. They provide rough information and serve as user aid in course of the balance operation.

8. DOSING

Dosing is a working mode comprised of the process of sample weighing, where the samples weighing is performed until target mass is reached. The target mass is defined along with dosing tolerance value. The tolerance value is set as a percentage of the target mass.

An example:

Target weight = 100.000g
Tolerance = 2.5% (2.5% of 100g, which amounts to 2. 5g)

i.e.: the balance accepts correctly dosed value within the following thresholds: from 97.500g to 102.500g.

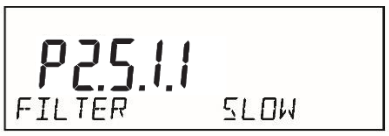
8.1 DOSING SETTINGS

The balance allows setup of operating parameters (filters, value release and autozero function, deleting the last digit and other settings) separately for each working mode.

It enables customizing the instrument and utilizing its properties depending on the user's needs and expectations, or on specific requirements for selected working mode; as a result the device operation is quick and easy.

8.1.1 FILTER LEVEL SETTING

To set the filter level for Parts Counting, set parameter **P2.5.1.1 <FILTER>**



Filter settings adjustment 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 quickly for weighed mass within the set range of the filter (parameter for setting filter range is accessible only from the service menu – the user does not have any access to it).

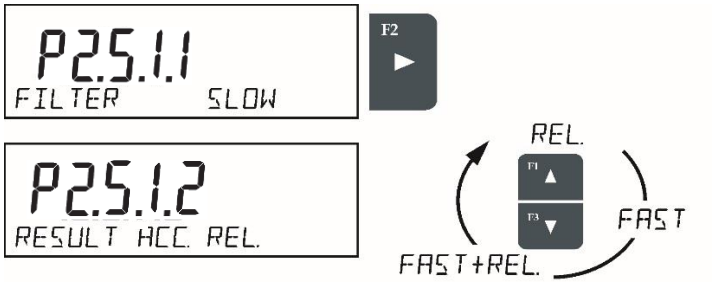
Depending on the filter, the weighing time is shorter (V.FAST and FAST) or longer (SLOW and V. SLOW).

Refer to **Section 5.2.1** for procedure.

8.1.2 VALUE RELEASE

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:

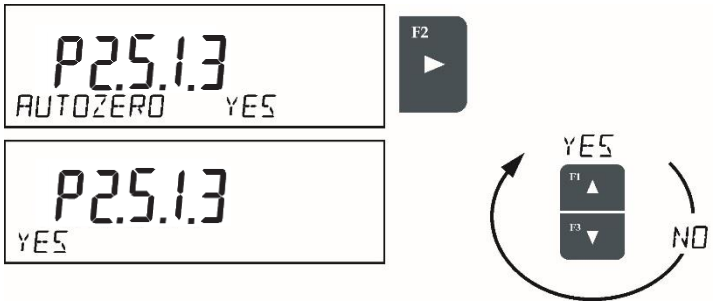


8.1.3 AUTOZERO FUNCTION

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 ▂▃, and precise zero marker →0← 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:

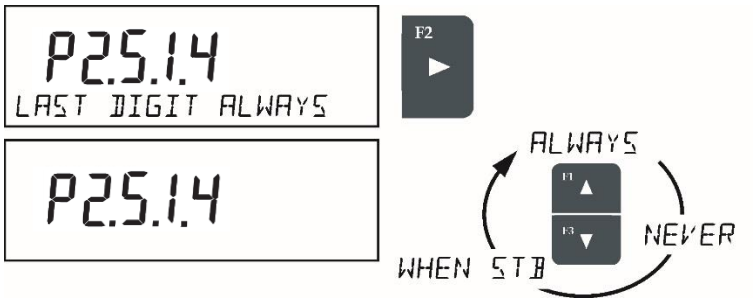


8.1.4 LAST DIGIT DISPLAY

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:



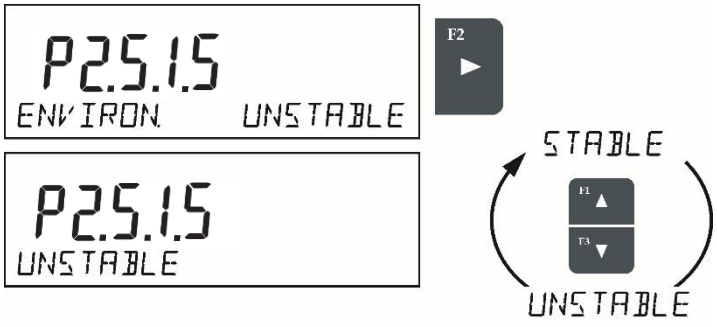
8.1.5 BALANCE AMBIENT CONDTIONS

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:



8.1.6 AUTOTARE

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

The function is active when **<AUTOTARE>** is set to **<YES>** option.

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 proceeds (**Net** marker appears in the upper part of the display).
- Put product that is to be packed into the packaging.
- The display shows net weight of the product.
- Take off the product together with the packaging.

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

<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.

8.1.7 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 **P2.3.4.3 <AUTO INT.>**. Interval range is 1-9999 min.

! CAUTION
Each result is printed and recorded (stable and unstable for a non-verified balance, stable for a verified balance).

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).

For procedure refer to **Section 5.2.7**

8.1.8 AUTOMATIC OPERATION

For automatic operation adjust the threshold value.

It is also necessary to specify interval value in [min]. The picture presents interval setting, value set to 2 min.

Procedure:

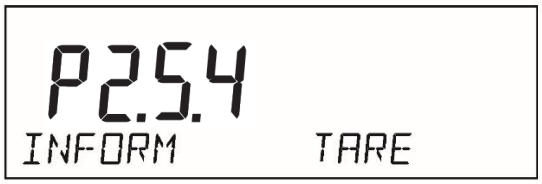
- Press →0← DELETE button to zero the balance (marker of stable measurement and zero marker →0← are shown on a display).
- Deposit load, the balance sends the first stable measurement to the printer port.
- Remove the load from the pan.
- The next measurement is possible when the indication is lower than the set value of **<AUTO THRES.>** parameter (next measurement does not require zero value).

8.1.9 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 <**CHECKWEIGHING**> mode:

- None
- Sample
- Tolerance

- Bargraph
- Tare
- Net
- Gross
- User
- Product
- None Standard Information (NSTD INF)



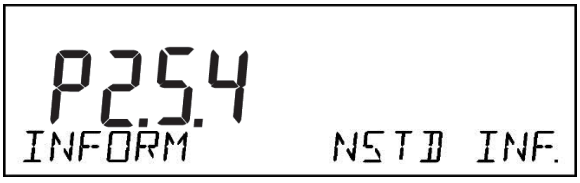
For procedure refer to **Section 5.2.9**

8.1.10 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.4.4 to < NSTD. INF. >** option.



8.1.11 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 **<DOSING>** mode: **<NONE / ENTER SAMPLE/ SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

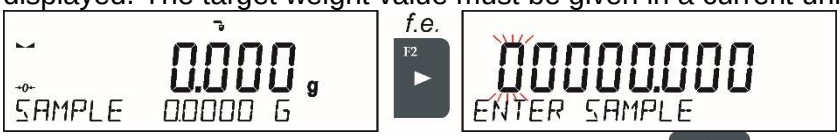
These options can be freely assigned to any of the F keys.

For procedure refer to **Section 5.2.11**

8.2 SETTING TARGET MASS: ENTERING MASS VALUE

Procedure:

- Press F button to which function <**ENTER SAMPLE**> is assigned, the editing window is displayed. The target weight value must be given in a current unit.



- Use arrow buttons to enter the target weight, press  button to confirm.
- The software automatically sets tolerance of target mass dosing. Use arrow buttons to set the tolerance value, press  button to confirm.
- The balance software automatically enters <**DOSING**> mode and displays the target mass value with a minus sign, and in the bottom line, reference mass value – target mass (if such option has been selected for <**INFORMATION**> function).

- The sign <Min> is shown at the top of the display. It indicates the status of the mass on the pan with relations to the target mass. Bottom line of the display, if <BARGRAPH> option is enabled, shall demonstrate weight indication, in a graphic form, in relation to target weight and set tolerance value

<Min>: mass lower than the Target Value - Tolerance

<Ok>: mass contained within tolerance Target Value +/- Tolerance

<Max>: mass greater than the Target Value + Tolerance

Since LCD display capacity is limited, the threshold markers do not reflect threshold setups and target weight value precisely. They provide rough information and serve as user aid in course of the balance operation.

9. PERCENT WEIGHING (DEVIATIONS)

The balance software has an option of control of deviation (in percentage) between weighed loads mass and specified reference mass. The reference mass can be determined by means of a weighing process or it can be entered into memory by the user.

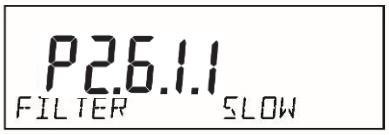
9.1 PERCENT WEIGHING (DEVIATIONS) SETTINGS

The balance allows setup of operating parameters (filters, value release and autozero function, deleting the last digit and other settings) separately for each working mode.

It enables customizing the instrument and utilizing its properties depending on the user's needs and expectations, or on specific requirements for selected working mode; as a result the device operation is quick and easy.

9.1.1 FILTER LEVEL SETTING

To set the filter level for Parts Counting, set parameter **P2.6.1.1 <FILTER>**



Filter settings adjustment 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 quickly for weighed mass within the set range of the filter (parameter for setting filter range is accessible only from the service menu – the user does not have any access to it).

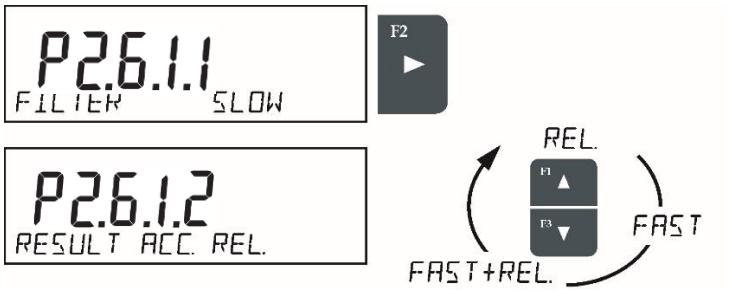
Depending on the filter, the weighing time is shorter (V.FAST and FAST) or longer (SLOW and V. SLOW).

Refer to **Section 5.2.1** for procedure.

9.1.2 VALUE RELEASE

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:

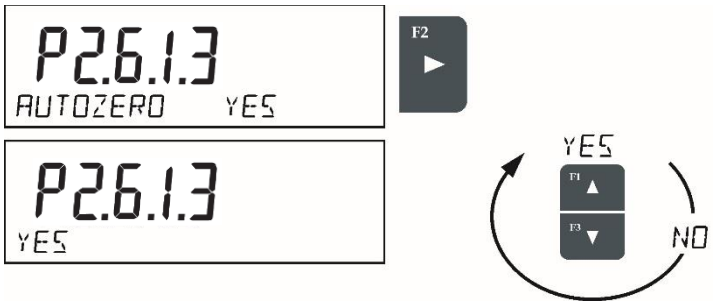


9.1.3 AUTOZERO FUNCTION

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 ▁▂, and precise zero marker →0← 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:

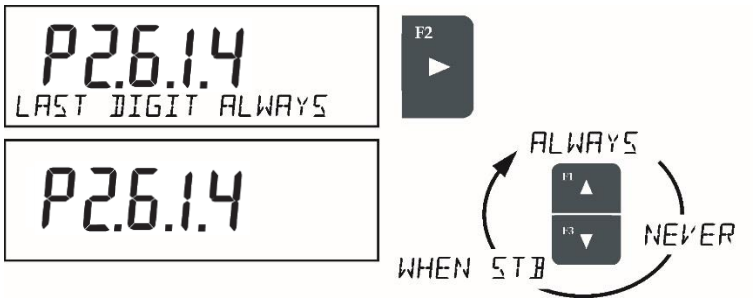


9.1.4 LAST DIGIT DISPLAY

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:



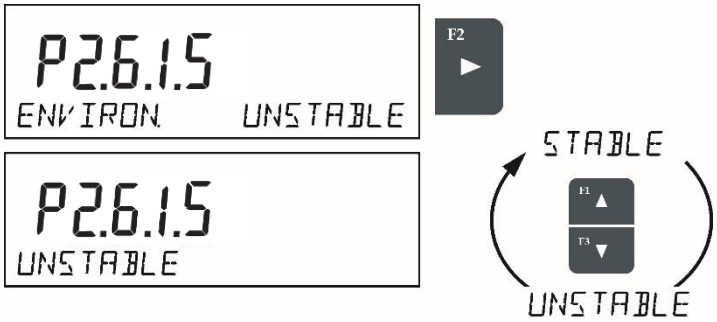
9.1.5 BALANCE AMBIENT CONDTIONS

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.

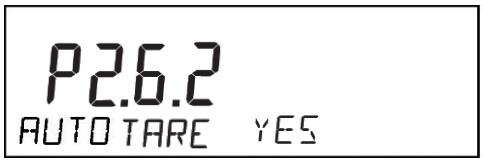
Procedure:



9.1.6 AUTOTARE

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

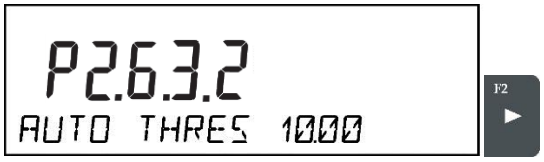
The function is active when **<AUTOTARE>** is set to **<YES>** option.



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 proceeds (**Net** marker appears in the upper part of the display).
- Put product that is to be packed into the packaging.
- The display shows net weight of the product.
- Take off the product together with the packaging.
- The balance cancels tare value (packaging weight recorded in balance storage during the first step of the operating process) after the gross weight value (set in **<AUTO THRES>** parameter) has been exceeded.
- Put packaging of the next product on a weighing pan, automatic taring of the packaging weight proceeds after measurement stabilization (**Net** marker appears in the top section of the display);
- Put a 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>**.



<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.

9.1.7 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 **P2.3.4.3 <AUTO INT.>**. Interval range is 1-9999 min.

! CAUTION
Each result is printed and recorded (stable and unstable for a non-verified balance, stable for a verified balance).

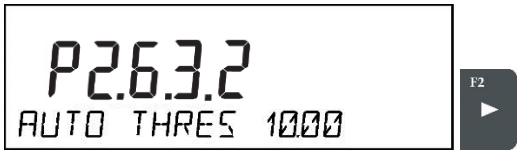
Automatic operation with interval starts at the moment of switching the function on and it lasts until it is switched off.

On switching the function of auto print with interval, PRINT button becomes inoperative (no indication is printed when pressed).

For procedure refer to **Section 5.2.7**

9.1.8 AUTOMATIC OPERATION

For automatic operation adjust the threshold value.



It is also necessary to specify interval value in [min]. The picture presents interval setting, value set to 2 min.

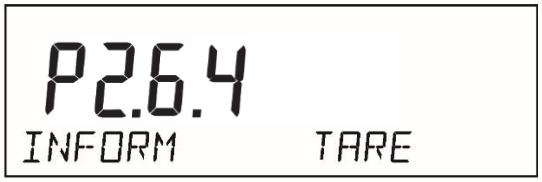
Procedure:

- Press →0← DELETE button to zero the balance (marker of stable measurement and zero marker →0← 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).

9.1.9 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 <**CHECKWEIGHING**> mode:

- None
- Sample
- Bargraph
- Tare
- Net
- Gross
- User
- Product
- None Standard Information (NSTD INF)



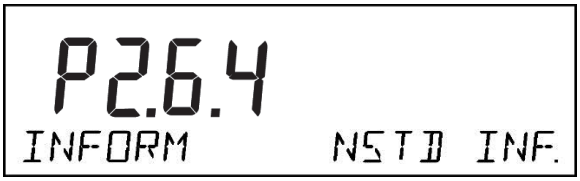
For procedure refer to **Section 5.2.9**

9.1.10 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.4.4 to < NSTD. INF. >** option.



9.1.11 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 **<DEVIATIONS>** mode: **<NONE / ENTER SAMPLE/ DETERMINE SAMPLE / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

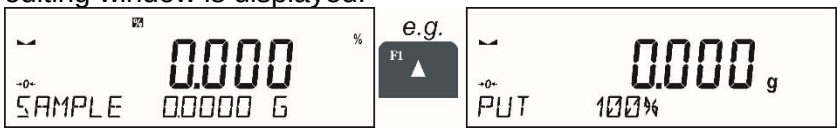
These options can be freely assigned to any of the F keys.

For procedure refer to **Section 5.2.11**

9.2 SETTING THE REFERENCE MASS: WEIGHING REFERENCE SAMPLE

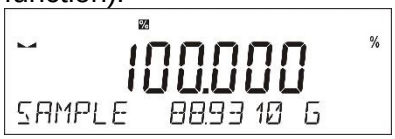
Procedure:

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



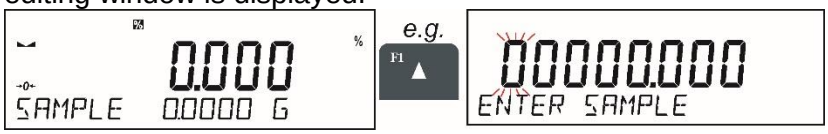
- Place the reference sample (to represent 100%) on the pan, and when the result is stable (▂▄ symbol is displayed) press ↵ button to confirm.

- 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).



9.3 SETTING THE REFERENCE MASS: ENTERING THE MASS VALUE

- 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).

10. 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 (additional information located in Section 24.1) 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^{o}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 (4) of the density kit), and then weighing the same sample in liquid (on the bottom weighing pan (2) of the density kit). As the same sample is weighed in liquid, the result of density determination is automatically indicated on a balance display.

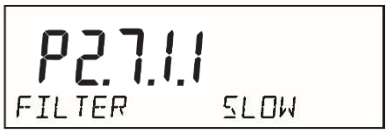
10.1 DENSITY OF SOLIDS SETTINGS

The balance allows setup of operating parameters (filters, value release and autozero function, deleting the last digit and other settings) separately for each working mode.

It enables customizing the instrument and utilizing its properties depending on the user's needs and expectations, or on specific requirements for selected working mode; as a result the device operation is quick and easy.

10.1.1 FILTER LEVEL SETTING

To set the filter level for Density of Solids, set parameter **P2.7.1.1 <FILTER>**



Filter settings adjustment 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 quickly for weighed mass within the set range of the filter (parameter for setting filter range is accessible only from the service menu – the user does not have any access to it).

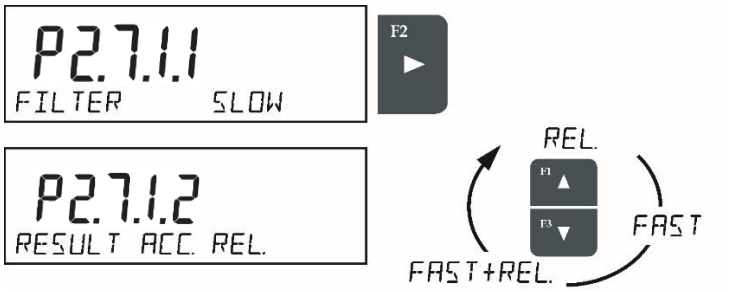
Depending on the filter, the weighing time is shorter (V.FAST and FAST) or longer (SLOW and V. SLOW).

Refer to **Section 5.2.1** for procedure.

10.1.2 VALUE RELEASE

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:

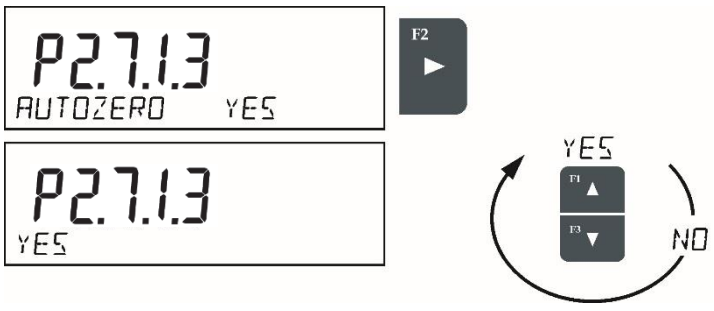


10.1.3 AUTOZERO FUNCTION

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 ▁▂, and precise zero marker →0← 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:

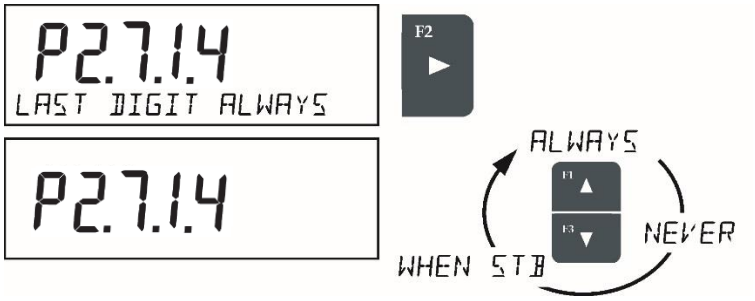


10.1.4 LAST DIGIT DISPLAY

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:



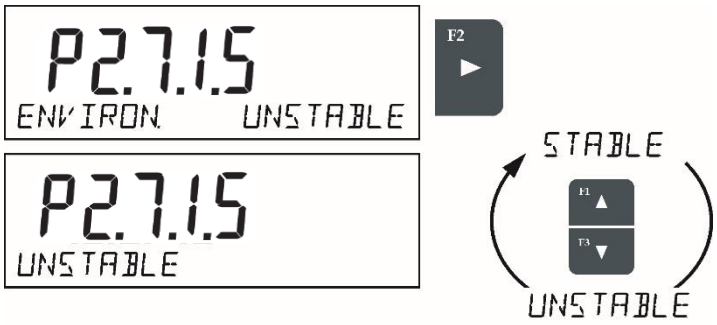
10.1.5 BALANCE AMBIENT CONDTIONS

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:



10.1.6 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 <**SOLIDS DENSITY**> mode:

- None
- Tare
- Net
- Gross
- User
- Product
- None Standard Information (NSTD INF)

For procedure refer to **Section 5.2.9**

10.1.7 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.7.2 to < NSTD. INF. >** option.

10.1.8 F SHORTCUT KEYS

Function enables assigning quick access for weighing functions which are to be accessible by pressing F1, F2, F3 or F4 keys.

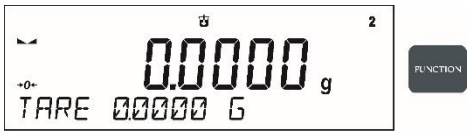
You can choose between the following options for **<SOLIDS DENSITY>** mode: **<NONE / START / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

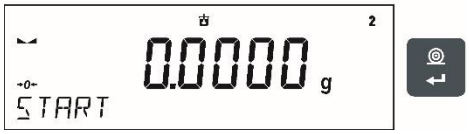
These options can be freely assigned to any of the F keys.

For procedure refer to **Section 5.2.11**

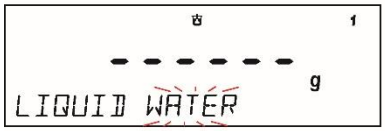
10.2 DENSITY OF SOLIDS PROCEDURE

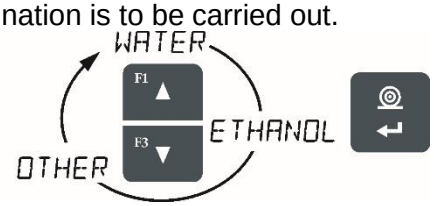
1. Install the density determination kit.
2. Enter <SOLIDS DENSITY> function.
3. Prepare a sample.
4. Initiate the process.





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

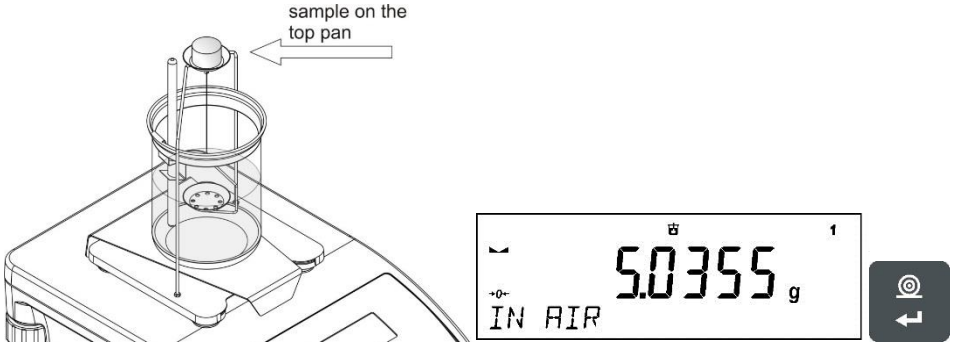




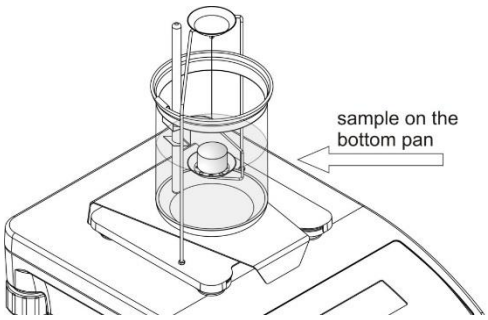
7. After selecting and entering a liquid type by pressing <ENTER> button, the software proceeds to setting the liquid temperature.

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 UNITS ESC 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.

11. 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 (additional information located in Section 24.1) 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/cm^3)

The basic element for measuring liquids density is the sinker (9). 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.

11.1 DENSITY OF LIQUIDS SETTINGS

The balance allows setup of operating parameters (filters, value release and autozero function, deleting the last digit and other settings) separately for each working mode.

It enables customizing the instrument and utilizing its properties depending on the user's needs and expectations, or on specific requirements for selected working mode; as a result the device operation is quick and easy.

11.1.1 FILTER LEVEL SETTING

To set the filter level for Density of Liquids, set parameter **P2.8.1.1 <FILTER>**

Filter settings adjustment 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 quickly for weighed mass within the set range of the filter (parameter for setting filter range is accessible only from the service menu – the user does not have any access to it).

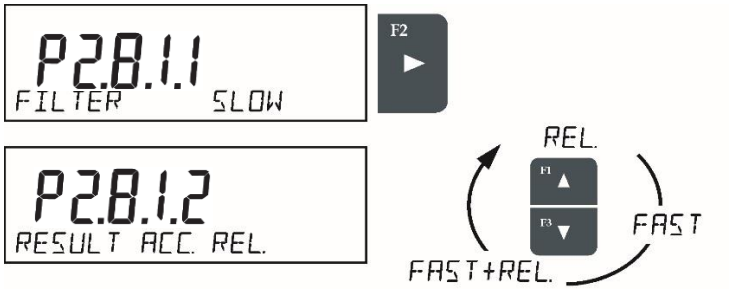
Depending on the filter, the weighing time is shorter (V.FAST and FAST) or longer (SLOW and V. SLOW).

Refer to **Section 5.2.1** for procedure.

11.1.2 VALUE RELEASE

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:

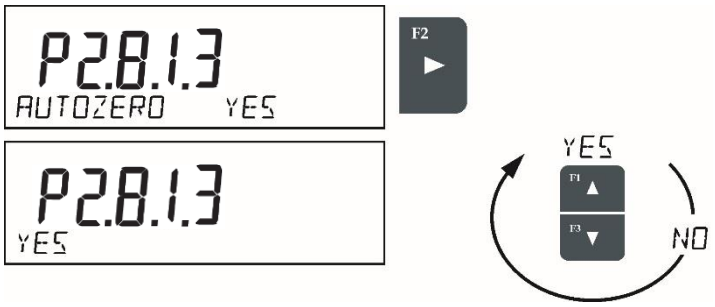


11.1.3 AUTOZERO FUNCTION

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 ▁◢, and precise zero marker →0← 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:

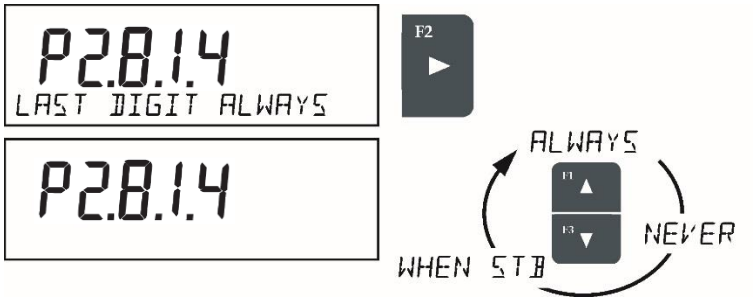


11.1.4 LAST DIGIT DISPLAY

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:



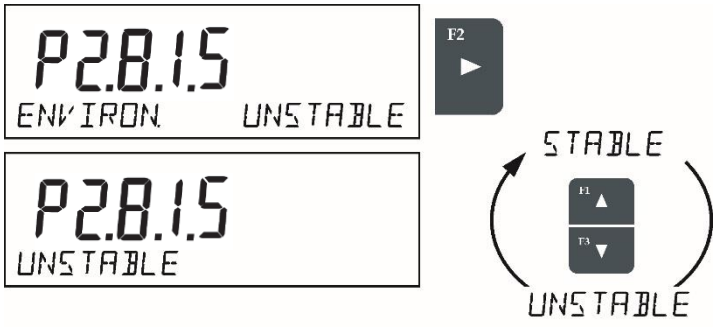
11.1.5 BALANCE AMBIENT CONDTIONS

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:



11.1.6 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 <**LIQUIDS DENSITY**> mode:

- None
- Tare
- Net
- Gross
- User
- Product
- None Standard Information (NSTD INF)

For procedure refer to **Section 5.2.9**

11.1.7 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.8.2 to < NSTD. INF. >** option.

11.1.8 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 **<LIQUIDS DENSITY>** mode: **<NONE / START / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

These options can be freely assigned to any of the F keys.

For procedure refer to **Section 5.2.11**

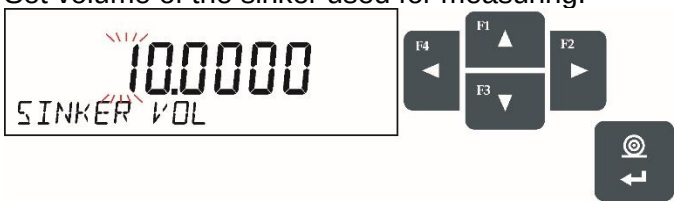
11.2 DENSITY OF LIQUIDS PROCEDURE

The basic element for measuring liquids density is the sinker (9). 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.

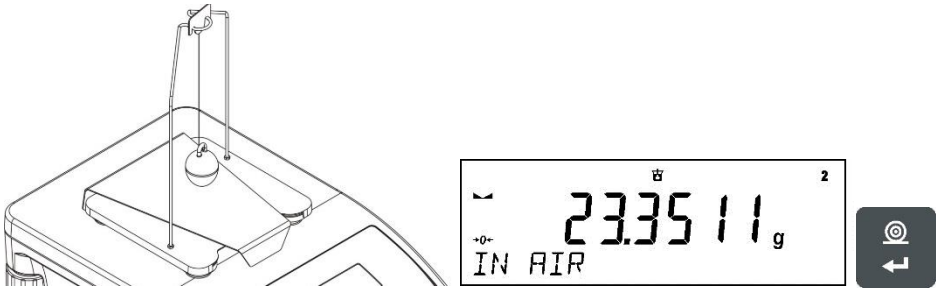
In order to determine the liquid density you need to:

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.

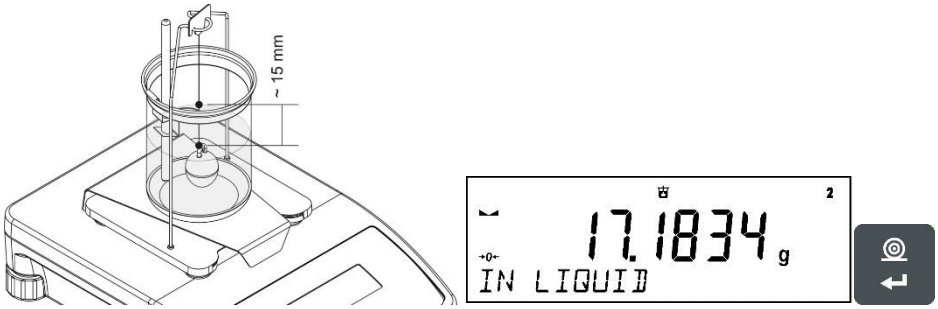
6. Set volume of the sinker used for measuring.



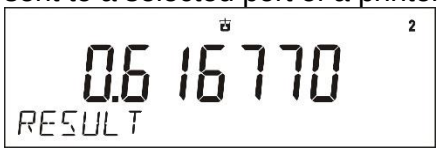
7. On entering the data, the software proceeds to weighing.
8. First, place the sinker on the hook (a sample mass determination in the air), and confirm the indication when stable.



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 cm3
In Air	23.3511 g
In Liquid	17.1834 g
Density	0.616770 g/cm3

Signature

.....

The report may be reprinted upon pressing button. In order to finish, press UNITS ESC 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. ANIMAL WEIGHING

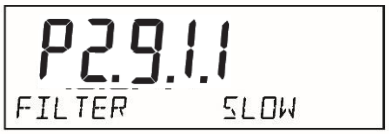
Animal weighing is a working mode allowing reliable determination of mass of weighed objects in motion. In principle, this type of object generates unstable measurement, thus it requires using a different filtering method of measurement signal.

12.1 ANIMAL WEIGHING SETTINGS

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

12.1.1 FILTER LEVEL SETTING

To set the filter level for Animal Weighing, set parameter **P2.9.1.1 <FILTER>**



Filter settings adjustment 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 quickly for weighed mass within the set range of the filter (parameter for setting filter range is accessible only from the service menu – the user does not have any access to it).

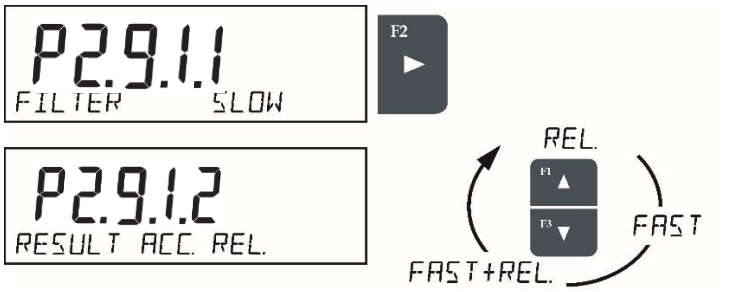
Depending on the filter, the weighing time is shorter (V.FAST and FAST) or longer (SLOW and V. SLOW).

Refer to **Section 5.2.1** for procedure.

12.1.2 VALUE RELEASE

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:

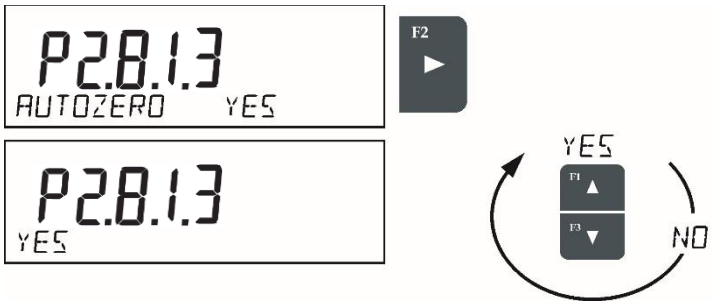


12.1.3 AUTOZERO FUNCTION

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 ▁▂, and precise zero marker →0← 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:

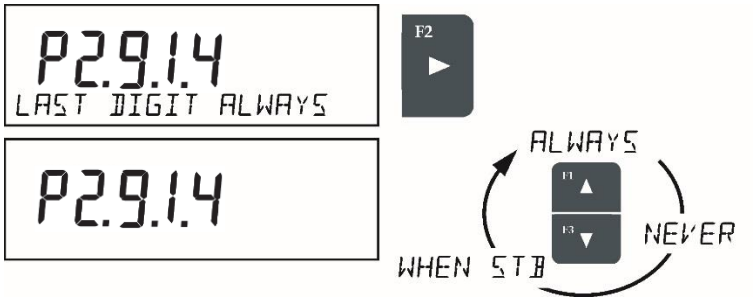


12.1.4 LAST DIGIT DISPLAY

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:



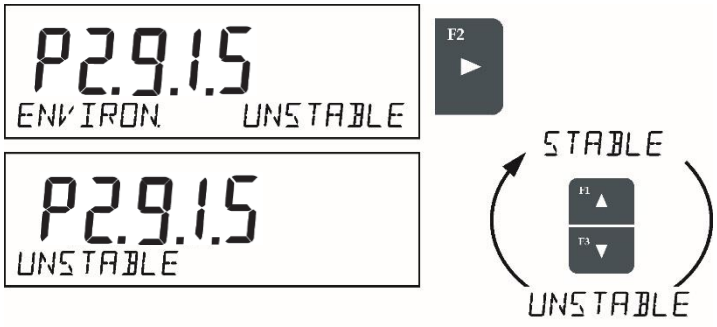
12.1.5 BALANCE AMBIENT CONDTIONS

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:



12.1.6 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 < **ANIMAL WEIGHING**> mode:

- None
- Bargarph
- Tare
- Net
- Gross
- User
- Product
- None Standard Information (NSTD INF)

For procedure refer to **Section 5.2.9**

12.1.7 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.9.2 to < NSTD. INF. >** option.

12.1.8 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 **<ANIMAL WEIGHING>** mode: **<NONE / START / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

These options can be freely assigned to any of the F keys.

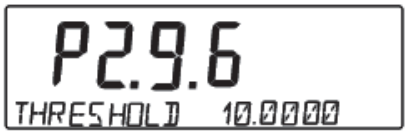
For procedure refer to **Section 5.2.11**

12.1.9 AVERAGING TIME

Amount of time during which recorded measurement results are analyzed. Obtained data is used to determine average measurement result.

12.1.10 THRESHOLD

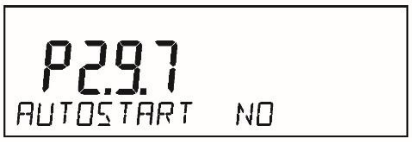
It is a value expressed in mass measuring units. To start measurement, the indication value has to exceed the set threshold value.



12.1.11 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.

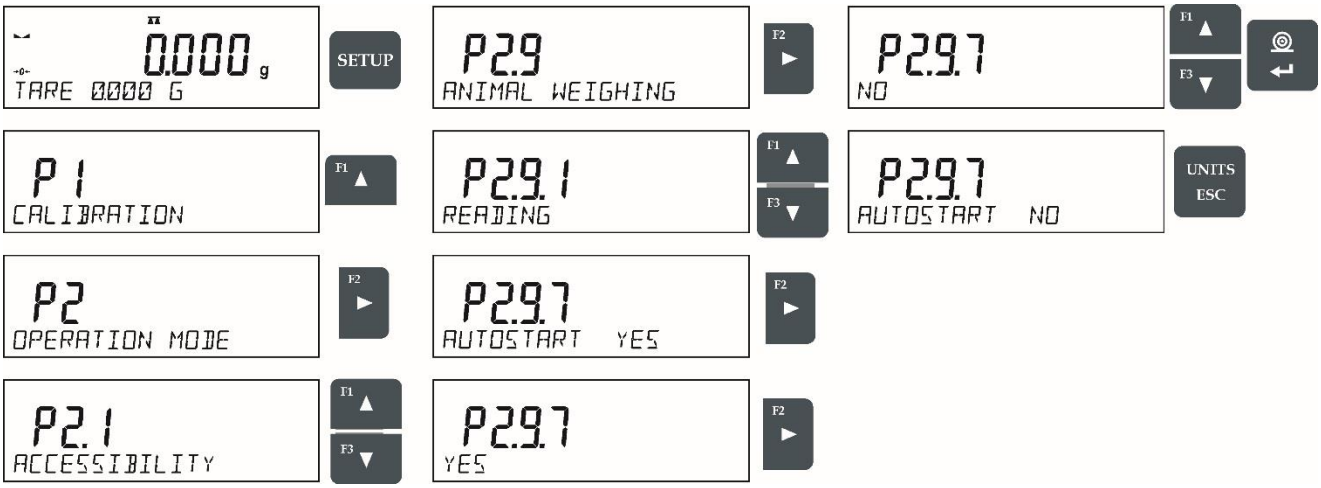
Prior to tests it is necessary to adjust settings of the above options so that correct values were provided. The selected options shall be respective to needs and expectations resulting from working environment.



12.2 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.

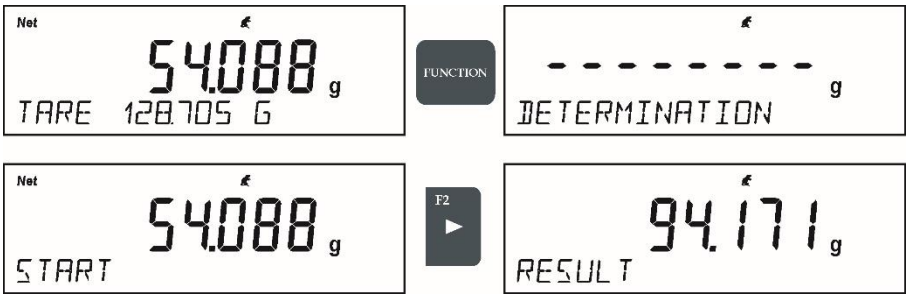
Next, set the averaging time in seconds. It is the time, during which the balance software acquires measurements and based on these measurements the average result is determined.

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.



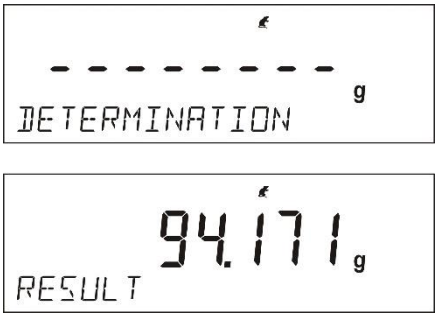
After weighing process completion, the measurement result is locked and automatically printed.

12.3 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 form 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 UNITS ESC button.

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

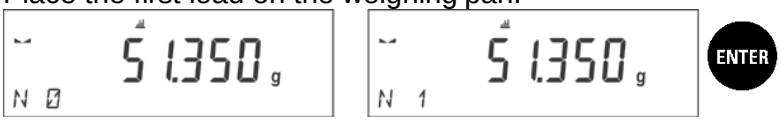
Statistics is a working mode allowing to acquire data from series of measurements and to produce statistics using the acquired data. Settings of this function determine which data is displayed.

Info field provides the following information:

- N (number of samples),
- Sum (total weight of samples within a series)
- AVG (average value of the series)
- Min(minimum value in a series)
- Max (maximum values in a series)
- DIF (difference between MAX and MIN within the series)
- SDV (standard deviation)
- RDV (variance coefficient)

Procedure:

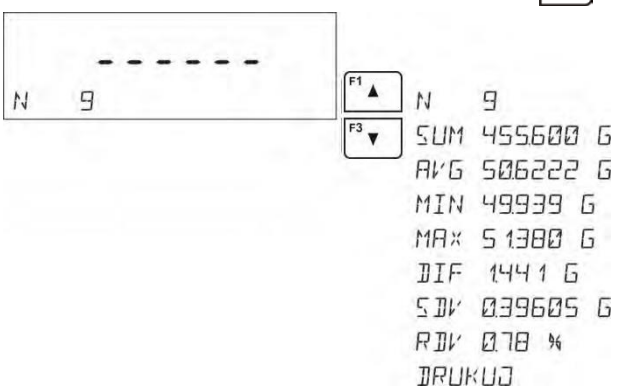
- Enter **<STATISTICS>** mode.
- Place the first load on the weighing pan.



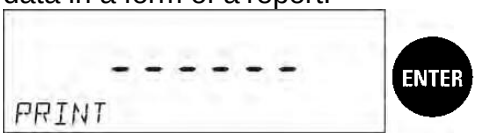
- When the indication is stable, confirm the measurement by pressing ENTER button, the measurement is saved in the balance memory, next it is automatically printed out with the measurement number.
- Remove the load from the weighing pan
- Carry out measurements for other loads within this series

- When all the measurements are saved, it is possible to check the results of statistics by pressing FUNC button

- Select an option **<RESULT>** by pressing F2 ► button.



- The information on number of saved measurements is displayed in a bottom line. On pressing F1 ▲ or F3 ▼, the type of displayed information changes.
- Selecting an option **<PRINT>** and pressing ENTER button initiates printing out the statistics data in a form of a report.



An example report:

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

13. STATISTICS

Statistics is a working mode allowing to acquire data from series of measurements and to produce statistics using the acquired data. Settings of this function determine which data is displayed.

13.1 STATISTICS SETTINGS

13.1.1 FILTER LEVEL SETTING

To set the filter level for Statistics, set parameter **P2.10.1.1 <FILTER>**

Filter settings adjustment 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 quickly for weighed mass within the set range of the filter (parameter for setting filter range is accessible only from the service menu – the user does not have any access to it).

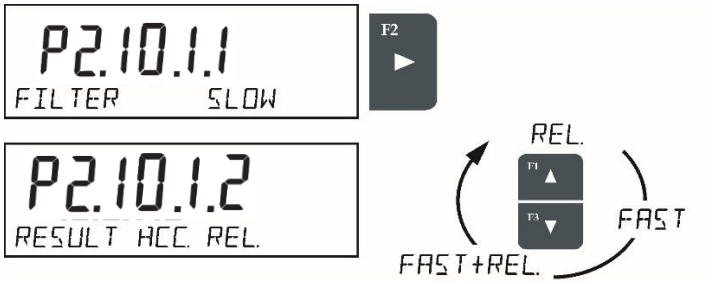
Depending on the filter, the weighing time is shorter (V.FAST and FAST) or longer (SLOW and V. SLOW).

Refer to **Section 5.2.1** for procedure.

13.1.2 VALUE RELEASE

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:

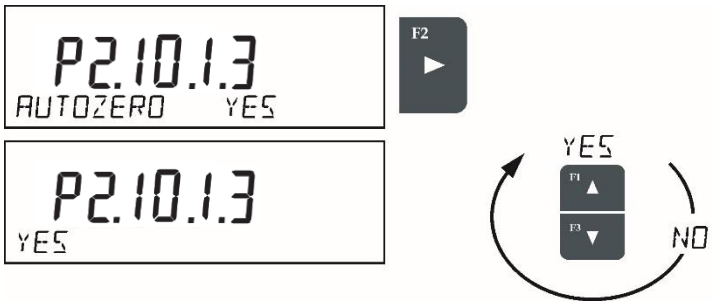


13.1.3 AUTOZERO FUNCTION

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 , and precise zero marker →0← 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:



13.1.4 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:

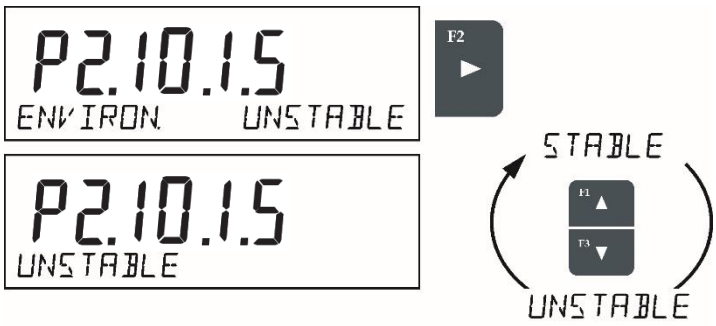
13.1.5 BALANCE AMBIENT CONDTIONS

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:



13.1.6 AUTOTARE

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

The function is active when **<AUTOTARE>** is set to **<YES>** option.

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 proceeds (**Net** marker appears in the upper part of the display).
- Put product that is to be packed into the packaging.
- The display shows net weight of the product.
- Take off the product together with the packaging.
- The balance cancels tare value (packaging weight recorded in balance storage during the first step of the operating process) after the gross weight value (set in **<AUTO THRES>** parameter) has been exceeded.
- Put packaging of the next product on a weighing pan, automatic taring of the packaging weight proceeds after measurement stabilization (**Net** marker appears in the top section of the display);
- Put a 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>**.

<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.

13.1.7 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 **P2.10.3.3 <AUTO INT.>**. Interval range is 1-9999 min.

! CAUTION
Each result is printed and recorded (stable and unstable for a non-verified balance, stable for a verified balance).

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).

For procedure refer to **Section 5.2.7**

13.1.8 AUTOMATIC OPERATION

For automatic operation adjust the threshold value.

It is also necessary to specify interval value in [min]. The picture presents interval setting, value set to 2 min.

Procedure:

- Press →0← DELETE button to zero the balance (marker of stable measurement and zero marker →0← 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).

13.1.9 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 <**STATISTICS**> mode:

- N (number of samples),
- Sum (total weight of samples within a series)
- AVG (average value of the series)
- Min (minimum value in a series)
- Max (maximum values in a series)
- DIF (difference between MAX and MIN within the series)
- SDV (standard deviation)
- RDV (variance coefficient)

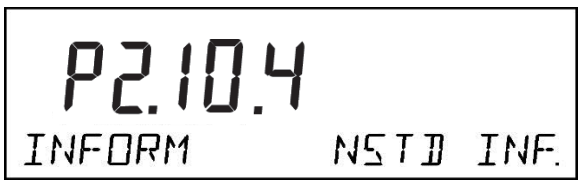
For procedure refer to **Section 5.2.9**

13.1.10 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.4.4 to < NSTD. INF. >** option.



13.1.11 F SHORTCUT KEYS

Function enables assigning quick access for weighing functions which are to be accessible by pressing F1, F2, F3 or F4 keys.

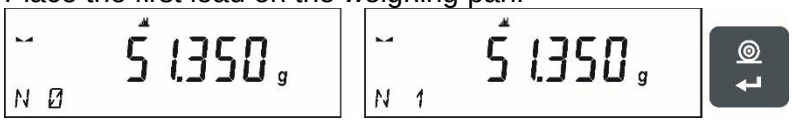
You can choose between the following options for **<STATISTICS>** mode: **<NONE / RESULT/ END / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

These options can be freely assigned to any of the F keys.

For procedure refer to **Section 5.2.11**

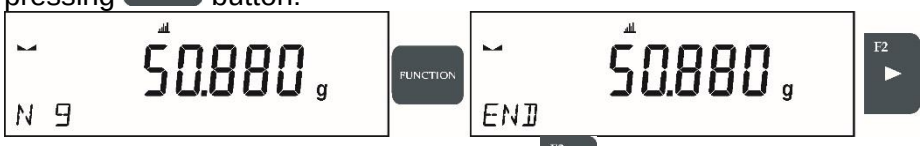
13.2 RUNNING STATISTICS MODE

- Enter **<STATISTICS>** mode.
- Place the first load on the weighing pan.

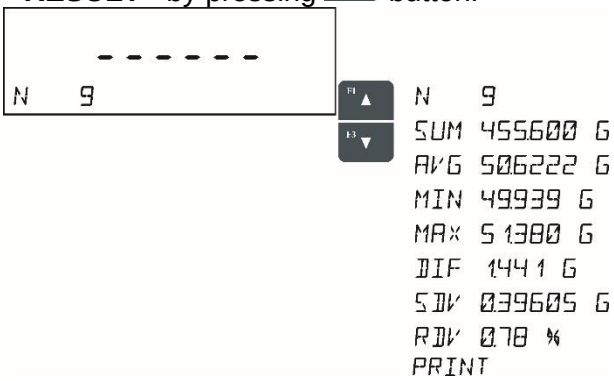


- When the indication is stable, confirm the measurement by pressing  button, the measurement is saved in the balance memory, next it is automatically printed out with the measurement number.
- Remove the load from the weighing pan
- Carry out measurements for other loads within this series

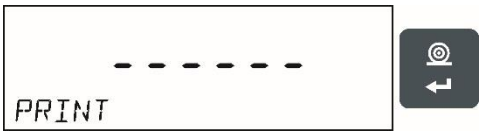
- When all the measurements are saved, it is possible to check the results of statistics by pressing  button:



- Select an option **<RESULT>** by pressing  button.



- The information on number of saved measurements is displayed in a bottom line. On pressing F1 ▲ or F3 ▼, the type of displayed information changes.
- Selecting an option **<PRINT>** and pressing ◎↵ button initiates printing out the statistics data in a form of a report.



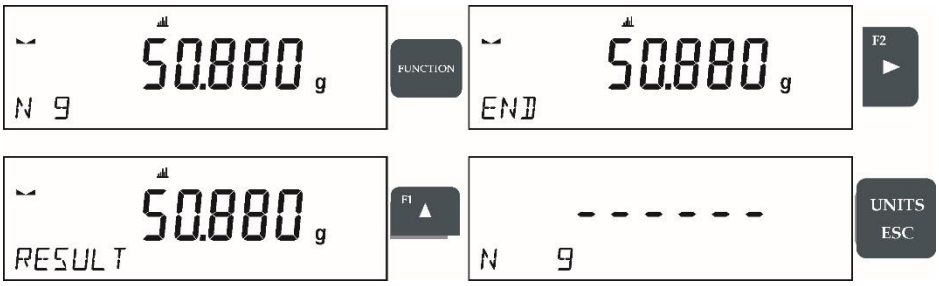
An example report:

```
---------- Statistics ----------

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

13.3 DELETING STATISTICS

To delete statistics data carried out for a series of measurements, follow this procedure:



Activating **<FINISH>** option results in printing out the statistics data and moving to a **<RESULT>** window, using this window it is possible to check the data and print it out again, if necessary.

To exit, press UNITS ESC button. This leads to returning to the main window of **<STATISTICS>** mode and zeroing the data related to carried out measurements.

You can begin another series of measurements or return to the weighing mode.

14. TOTALISING

The Totalising function allows you to weigh individual ingredients of a mixture and totalize its total mass. The software enables adding up approximately 30 ingredients for one mixture.

14.1 TOTALISING SETTINGS

14.1.1 FILTER LEVEL SETTING

To set the filter level for Animal Weighing, set parameter **P2.11.1.1 <FILTER>**

Filter settings adjustment 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 quickly for weighed mass within the set range of the filter (parameter for setting filter range is accessible only from the service menu – the user does not have any access to it).

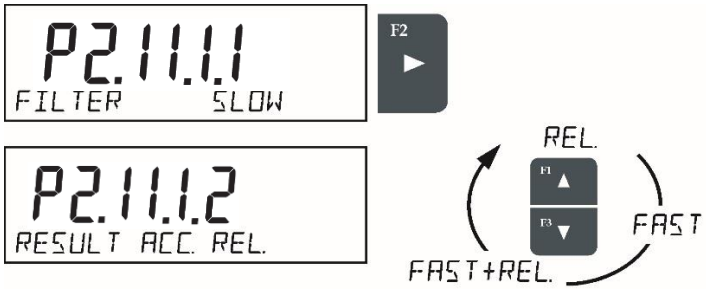
Depending on the filter, the weighing time is shorter (V.FAST and FAST) or longer (SLOW and V. SLOW).

Refer to **Section 5.2.1** for procedure.

14.1.2 VALUE RELEASE

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:

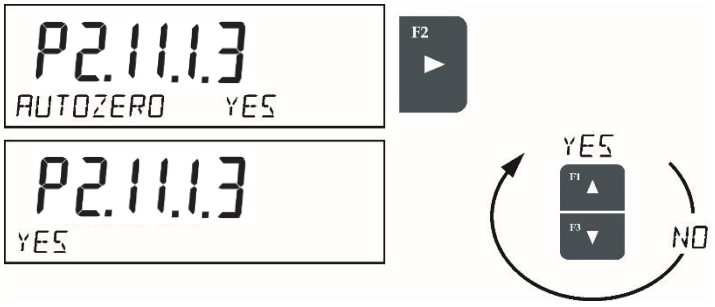


14.1.3 AUTOZERO FUNCTION

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 ▁▂▃, and precise zero marker →0← 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:

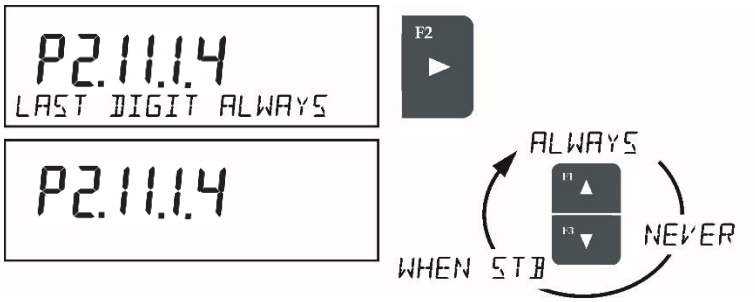


14.1.4 LAST DIGIT DISPLAY

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:



14.1.5 BALANCE AMBIENT CONDTIONS

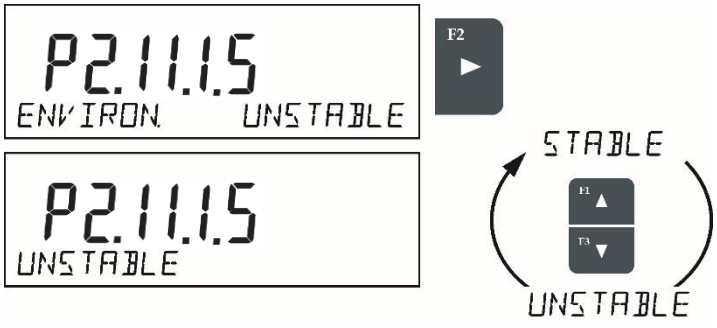
Parameter relating to ambient and environmental conditions in which the balance operates.

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:



14.1.6 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 <**TOTALISING**> mode:

- None
- Result
- Bargarph
- Tare
- Net
- Gross
- User
- Product
- None Standard Information (NSTD INF)

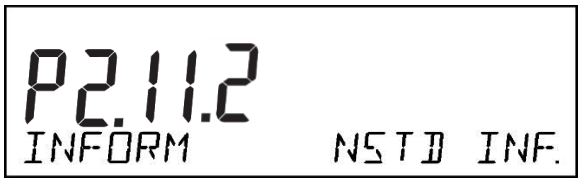
For procedure refer to **Section 5.2.9**

14.1.7 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.9.2 to < NSTD. INF. >** option.



14.1.8 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 **<TOTALISING>** mode: **<NONE / END / DELETE LAST / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

These options can be freely assigned to any of the F keys.

For procedure refer to **Section 5.2.11**

14.1.9 REPORT PRINTING TARE VALUE

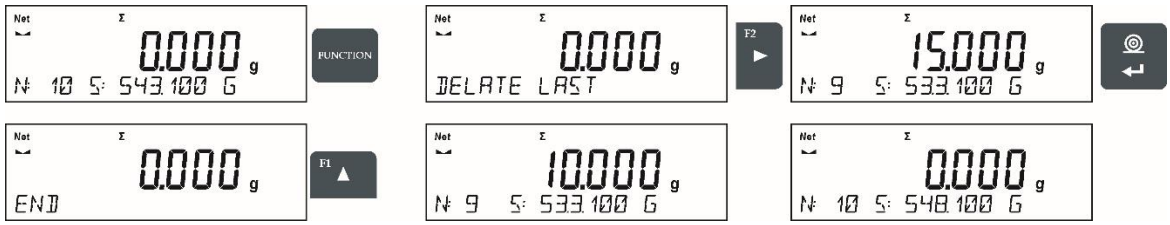
P2.11.5 <REP. PRNT. T.> – allows to turn off printing the tare value on a report.

- YES – print tare value on report
- NO – don't print tare value on report

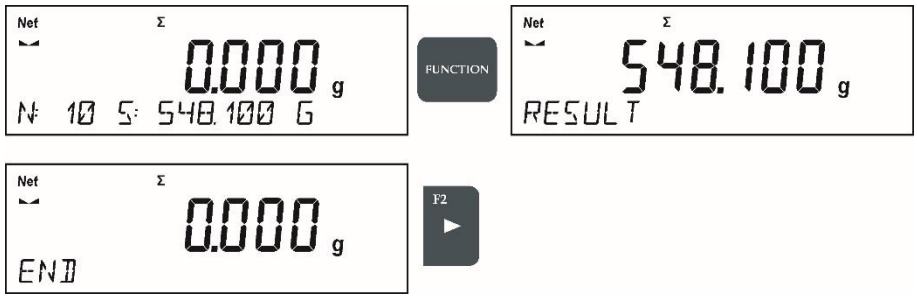
14.2 TOTALISING PROCEDURE

- Enter **<TOTALISING>** mode
  The bottom line shows total sum and data relating to the number of ingredients which are added to the total sum (if such information is selected in the settings for totalising mode).
- On the weighing pan place a container in which the ingredients are to be weighed, tare its mass. Next, place the first ingredient in the container and confirm its mass when stable by pressing  button
  

  The software adds mass of the ingredient to the total mass, next automatic taring of the indication proceeds (zero indication is shown on the main display). In the bottom, line modified data relating to the number of ingredients and total sum is presented.
- Next, place other ingredients in the container and when the indication is stable confirm their mass by pressing  button.
- If a mistake has occurred concerning the mass of the last added ingredient, you can return to the previous step of the procedure. After changing the mass value, it is possible for the user to add this mass to the total sum. In such a case, follow this procedure:



- When all the ingredients have been weighed finish the procedure of totalising. Procedure:



- The message **<RESULT>** is displayed in a bottom line, this means that the total result of all the ingredients that have been weighed is shown on the main display. Additionally, the final report, containing information on mass of individual ingredients, total sum and mass of the applied tare, is printed out.

An example report:

RAP. PRNT. T - **YES**			RAP. PRNT.T. - **NO**		
---------- Totalising --------			---------- Totalising--------		
1.	38.000	g	1.	38.000	g
2.	100.000	g	2.	100.000	g
3.	50.000	g	3.	50.000	g
4.	10.000	g	4.	10.000	g
5.	125.000	g	5.	125.000	g
----------			----------		
Total	323.000	g	Total	323.000	g
Tare	100.000	g	----------		

It is possible to print out the report again by pressing  button.

To exit this window, press 

button. The main window for **<TOTALISING>** mode is displayed, data related to carried out measurements is automatically zeroed.

15. PEAK HOLD

Peak Hold is a function that enables snapping peak hold applied to the weighing pan during a single checkweighing process. Apart from standard settings for this mode (described in the weighing mode), additional setting for threshold values activating function has been introduced.

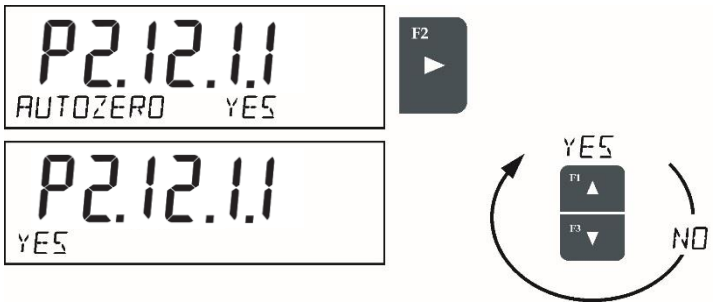
15.1 PEAK HOLD SETTINGS

15.1.1 AUTOZERO FUNCTION

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 , and precise zero marker →0← 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:

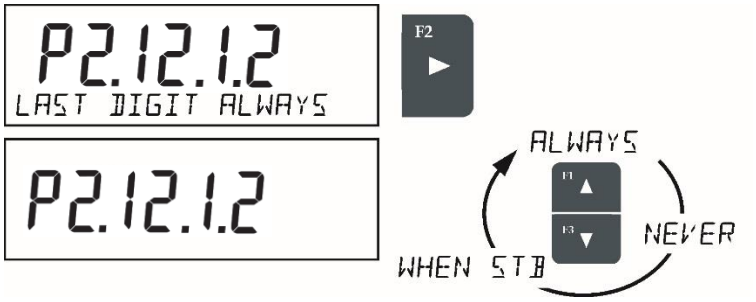


15.1.2 LAST DIGIT DISPLAY

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:



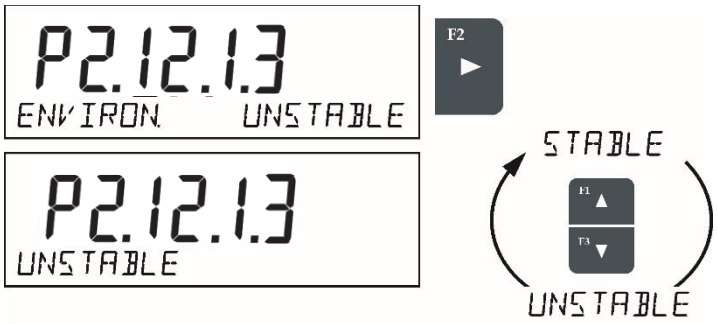
15.1.3 BALANCE AMBIENT CONDTIONS

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:



15.1.4 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 <**PEAK HOLD**> mode:

- None
- Profile
- None Standard Information (NSTD INF)
- Tare
- Net
- Gross
- User
- Product
- Bargraph

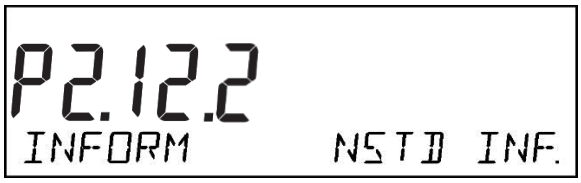
For procedure refer to **Section 5.2.9**

15.1.5 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.12.2 to < NSTD. INF. >** option.



15.1.6 F SHORTCUT KEYS

Function enables assigning quick access for weighing functions which are to be accessible by pressing F1, F2, F3 or F4 keys.

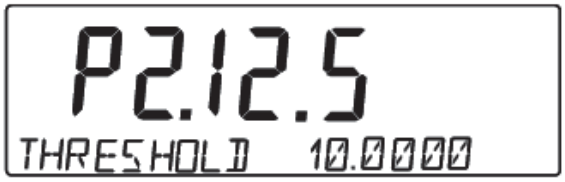
You can choose between the following options for **<PEAK HOLD>** mode: **<NONE / ON/OFF LAST DIGIT / PROFILE / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

These options can be freely assigned to any of the F keys.

For procedure refer to **Section 5.2.11**

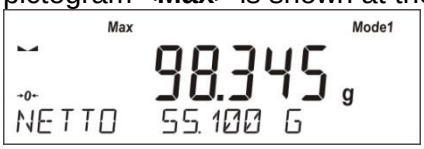
15.1.7 THRESHOLD

This function specifies starting point for control of maximum pressure applied onto the weighing pan, wherein the said control is performed by the balance software. The threshold must be set in accordance with the needs prior to the measuring process.



15.2 PEAK HOLD PROCEDURE

- Enter **<PEAK HOLD>** mode
  Once you select the mode, the function is active and information about the net mass is displayed in a bottom line (only if a different information has not been selected by a user).
  In order to provide proper operation, set the threshold in grams determining point beyond which the function starts to register maximum force apllied.
- From now on the balance registers and holds every single weighing which is above the threshold, and which is higher than the result of the previous peak hold. If the software detects mass above the threshold, the highest detected indication is held on the main display and the pictogram **<Max>** is shown at the top of the display.



You can print the result out by pressing  button.

The start of the next process of peak hold measurement is possible only after removing the load from the weighing pan and pressing UNITS ESC button. This causes returning to the main window of **<PEAK HOLD>** mode, pictogram **<Max>** is automatically deleted.

CAUTION!
Current unit may be selected only if the weighing result is not snapped. In order to select the unit, Units/Esc button is used. If any result has already been snapped than Esc button deletes the last snapped Max result.

16. PIPETTES CALIBRATION

Caution! Function valid for SAS with d=0.01/0.1 mg and d=0.1mg series balances exclusively.

Pipettes calibration function applies to fixed volume pipettes and adjustable volume pipettes. During volume testing procedure, the software determines accuracy and repeatability errors. In case of pipettes with adjustable volume, errors for Max, Min and ½ Max volume are estimated.

All pipettes are tested for adherence to requirements of PN-EN ISO 8655:2003. During the tests dosing repeatability and accuracy are monitored.

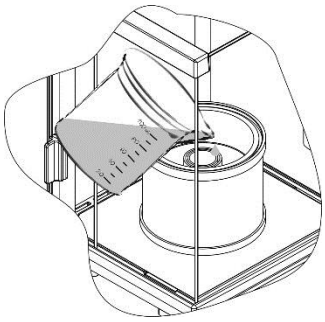
In order to ensure the highest accuracy of pipettes calibration process, maintain the following ambient conditions at a workstation:

- Ambient temperature of a pipette, tips and liquid should be kept between 20°C - 25°C with change rate during testing within ± 0.5°C,
- Relative humidity 50 - 75%;

and

- Use distilled water for pipettes calibration processes,
- Make sure that a pipette, tips and distilled water are thermally stabilized in the room intended for weighing operation performance. The reference standard advises that minimum acclimatization time for above mentioned is 2 hours.

Prior pipettes calibration start, it is necessary to install a dedicated set inside the draft shield. The set is not a standard balance equipment. The picture below presents set installation. Evaporation ring minimizes measurement errors being a result of evaporation of liquid occurring in course of the weighing process.



Prior to pipettes calibration pour 2/3 of the evaporation ring with distilled water. The set is ready to be used after about 1 hour – it takes this long for humidity to stabilize. Excess water can be removed using automatic pump or an external pipette.

To minimize any humidity changes inside the chamber and to avoid air draft influence while opening the door, dose the liquid from a pipette to an evaporation ring via an opening of a weighing chamber lid.

With thus prepared balance you can start pipettes calibration procedure.

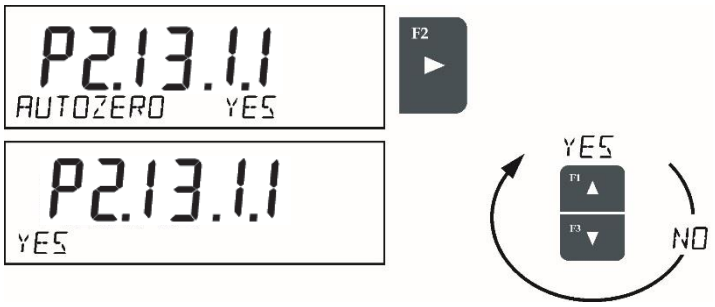
16.1 PIPETTE CALIBRATION SETTINGS

16.1.1 AUTOZERO FUNCTION

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 , and precise zero marker →0← 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:



16.1.2 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:

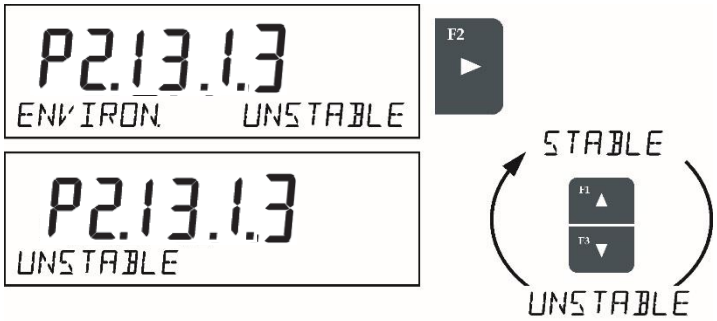
16.1.3 BALANCE AMBIENT CONDTIONS

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:



16.1.4 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 <**PIPETTES CALIBRATION**> mode:

- None
- Profile
- None Standard Information (NSTD INF)
- Tare
- Net
- Gross
- User

- Product

For procedure refer to **Section 5.2.9**

16.1.5 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.13.2 to < NSTD. INF. >** option.

16.1.6 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 **<PIPETTES CALIBRATION>** mode: **<NONE / ON/OFF LAST DIGIT / PROFILE / START / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

These options can be freely assigned to any of the F keys.

For procedure refer to **Section 5.2.11**

16.1.7 VOLUME DETERMINATION

<P2.13.5 VOLUME DETERMINATION> For pipettes with fixed volume please set parameter **<1>**, for pipettes with adjustable volume set parameter **<2>** and **<3>**.

16.1.8 MEASUREMENT NUMBER

<P2.13.6 MEASU. NO. > Allows to predefine number of measurements for each tested volume. Number of measurements ranges from 6 to 20.

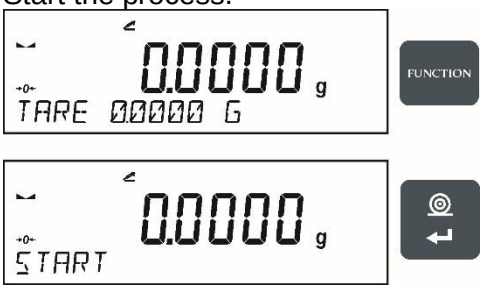
16.1.9 AUTOMATIC TARING

<P2.13.7 AUTOMATIC TARRING> allows to turn on function of automatic taring of dosed portion of water after confirmation of measurement (value set to **<YES>**)

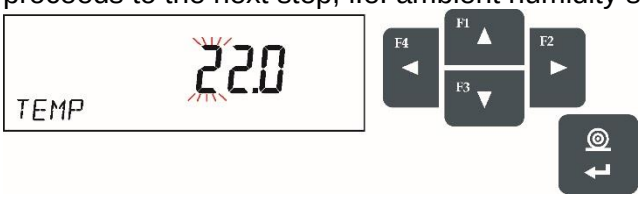
Remember to select correct values of the above options before pipettes calibration procedure is performed. The settings should reflect expectations and needs being a result of working environment.

16.2 PIPETTES CALIBRATION PROCEDURE

- Enter **<PIPETTES CALIBRATION.>** mode.
- Start the process.



- Follow the prompts to set the correct options.
- Enter the ambient temperature, next press ENTER for confirmation. The computer software proceeds to the next step, i.e. ambient humidity settings.



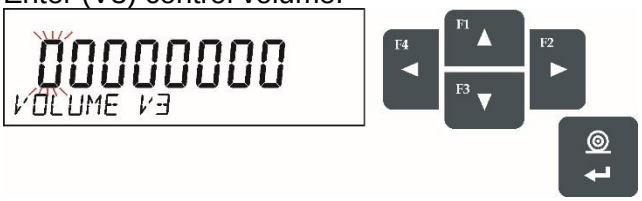
- Set the ambient humidity, next press ENTER for confirmation. The computer software proceeds to the next step, i.e. air pressure settings.

- Set the air pressure, next press ENTER for confirmation. The computer software proceeds to the next step, i.e. entering the first control volume (V1) for a tested pipette.

- Enter (V1) control volume. For fixed volume pipettes (**P2.13.5 VOLUME DETERMINATIO**N parameter set to value <1>) this is the one and only value to be entered. The computer software proceeds to the next step, i.e. entering the second control volume (V2) for a tested pipette.

- Enter (V2) control volume. The computer software proceeds to the next step, i.e. entering the third control volume (V3) for a tested pipette.

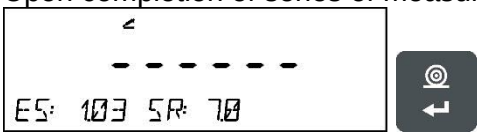
- Enter (V3) control volume.



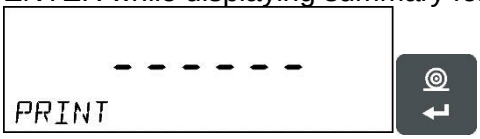
- Upon entering the data the computer software proceeds to pipettes calibration.

- Follow the displayed description and complete the procedure.
- By means of a pipette, dose the first portion of water, wait until the measurement is stable and press ENTER to confirm.

- The computer software records the measurement. If P2.3.7 **AUTOMATING TARING** parameter is set to value **<YES>** than the indication is automatically tared. If P2.3.7 **AUTOMATIC TARING** parameter is set to value **<NO>** than the user must press TARE button in order to tare the indication before (s)he doses another portion of water.
- Upon completion of series of measurements, summary is displayed.

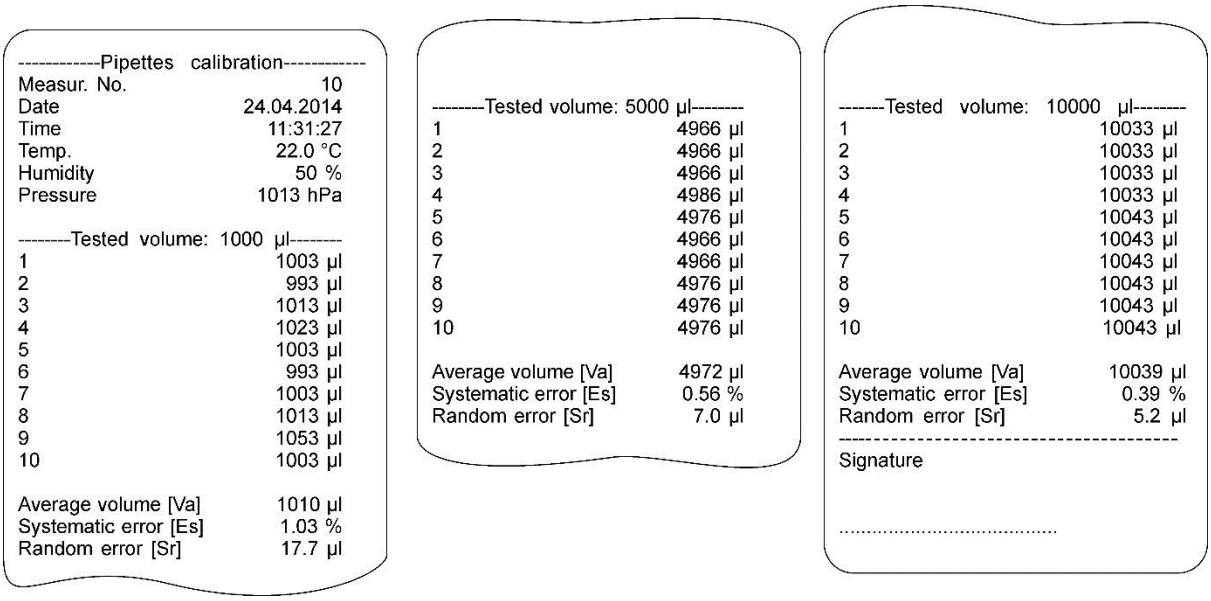


- Press ENTER to continue measuring process, press Esc. to stop it. Upon pressing Esc. button the computer software returns to the main window.
- Upon pressing ENTER, while displaying the summary result for the last adjustable pipette volume, a report is generated. The report is printed on a printer connected to the balance (ambient conditions visible on a report are those that user entered at the beginning of the calibration procedure). For fixed volume pipette the situation is similar if the user presses ENTER while displaying summary for volume V1.



- The computer software returns to the main window.
- Now the user may either start new procedure for the same pipette or enter new data for a different pipette.

An example report: adjustable volume pipette, 3 volumes tested:



----------Pipettes calibration----------

Measur. No.	10
Date	24.04.2014
Time	11:31:27
Temp.	22.0 °C
Humidity	50 %
Pressure	1013 hPa

--------Tested volume: 1000 µl--------

1	1003 µl
2	993 µl
3	1013 µl
4	1023 µl
5	1003 µl
6	993 µl
7	1003 µl
8	1013 µl
9	1053 µl
10	1003 µl
Average volume [Va]	1010 µl
Systematic error [Es]	1.03 %
Random error [Sr]	17.7 µl

--------Tested volume: 5000 µl--------

1	4966 µl
2	4966 µl
3	4966 µl
4	4986 µl
5	4976 µl
6	4966 µl
7	4966 µl
8	4976 µl
9	4976 µl
10	4976 µl
Average volume [Va]	4972 µl
Systematic error [Es]	0.56 %
Random error [Sr]	7.0 µl

-------Tested volume: 10000 µl--------

1	10033 µl
2	10033 µl
3	10033 µl
4	10033 µl
5	10043 µl
6	10043 µl
7	10043 µl
8	10043 µl
9	10043 µl
10	10043 µl
Average volume [Va]	10039 µl
Systematic error [Es]	0.39 %
Random error [Sr]	5.2 µl

Signature

.....

17. ADDING

Caution! Function valid for SAS with d=0.01/0.1 mg and d=0.1mg series balances exclusively.

Adding function allows you to add net masses of weighed samples.

This function enables adding maximum 9999 ingredients in one cycle or such quantity of samples which value of totalized masses is possible to be displayed on 8-section display.

17.1 PIPETTE CALIBRATION SETTINGS

17.1.1 AUTOZERO FUNCTION

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 , and precise zero marker -0- 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.

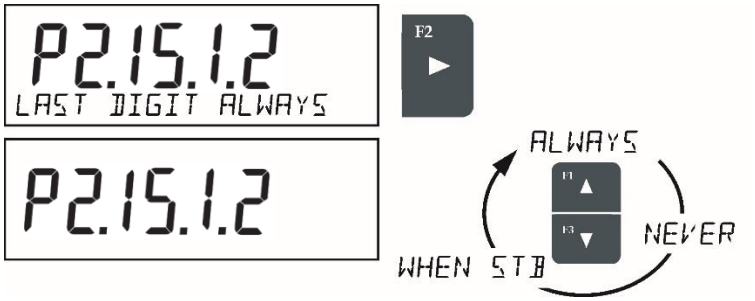
Procedure:

17.1.2 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:



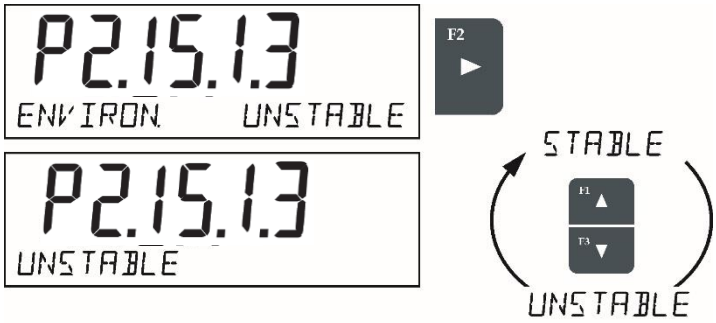
17.1.3 BALANCE AMBIENT CONDTIONS

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:



17.1.4 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 <**ADDING**> mode:

- None
- Profile
- None Standard Information (NSTD INF)
- Tare
- Net
- Gross
- User
- Product
- Bargraph
- Result

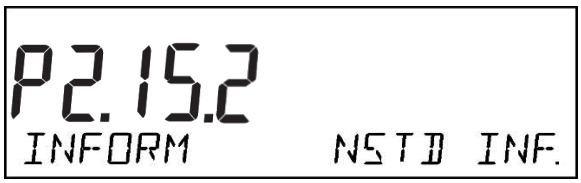
For procedure refer to **Section 5.2.9**

17.1.5 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.

For procedure refer to **Section 5.2.10**

If you want the declared non-standard information is to be visible, set parameter **P2.15.2 to < NSTD. INF. >** option.



17.1.6 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 **<ADDING>** mode: **<NONE / ON/OFF LAST DIGIT / PROFILE / RESULT / END / DELETE LAST / SELECT PRODUCT / LOG IN / ENTER TARE / SELECT TARE / PRINT HEADER / PRINT FOOTER / VARIABLE 1 / VARIABLE 2>**.

These options can be freely assigned to any of the F keys.

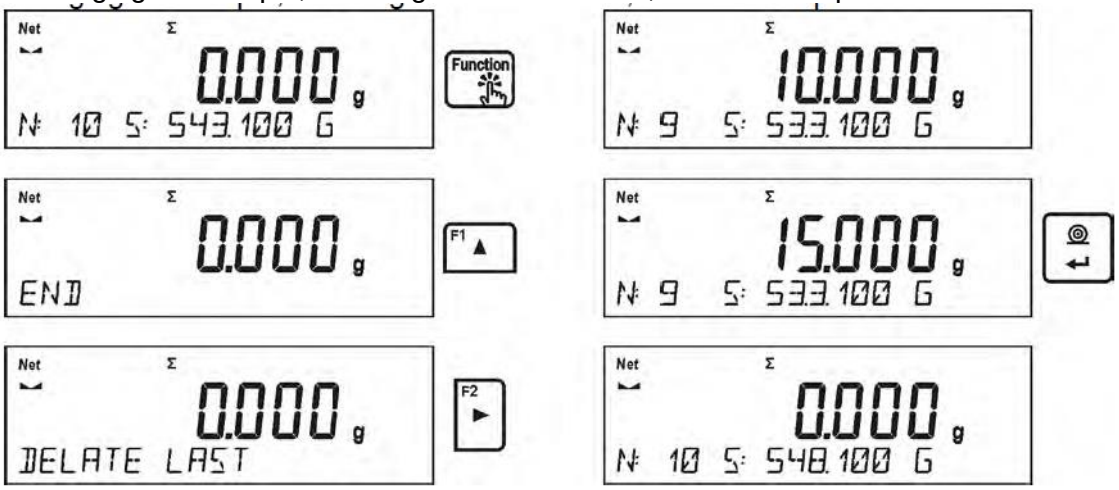
For procedure refer to **Section 5.2.11**

17.2 ADDING PROCEDURE

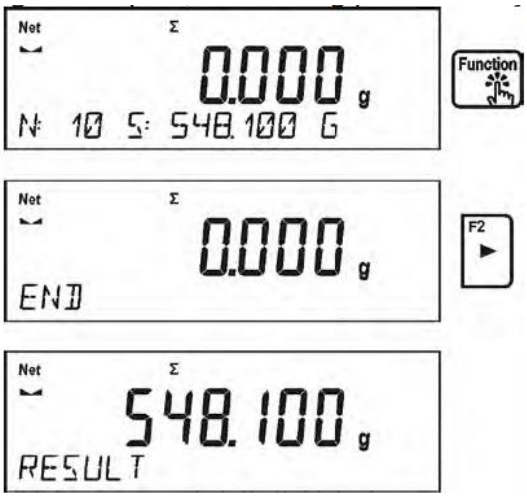
- Enter <**ADDING**> mode.
- The bottom line shows total sum and data relating to the number of ingredients which are added to the total sum and the total mass (if such information is selected in the settings for totalising mode).
- Load the weighing pan with the first sample. Confirm its mass when stable by pressing  button.

- Sample mass is saved to the sum. In the bottom line, data on ingredients quantity and total sum is changed and data on saved measurement is printed.

- Next, take off the first sample and load the weighing pan with the second. Confirm itsmass when stable by pressing  button.
- Carry out adding rest of the samples left in a measurement series.
- If mass of the last added sample is incorrect, you can return to the previous step and onchanging the sample, add it again. In such case, follow the steps:

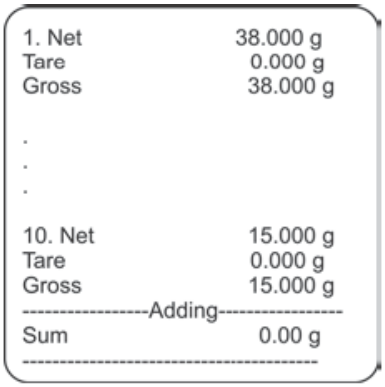


- On adding all samples, end adding procedure by following the steps:



- In the bottom line message <RESULT> is displayed. It means that the total result of all measured samples masses is displayed and the sum is automatically printed.

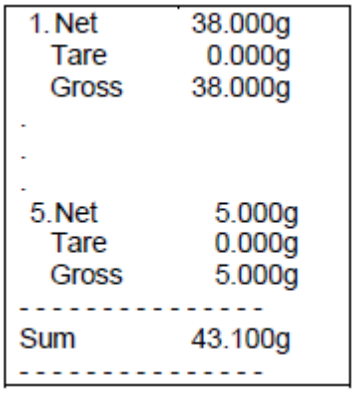
An example printout:



CAUTION: On adding process completion, only a summary is printed. Masses of particular samples are printed on confirmation

You can print the sum once again. To do that, press  button. Press  button to exit the window. You return to <ADDING> mode home screen and the data on carried out measurements is automatically zeroed.

You can print an intermediate sum of saved samples. In such case, follow the steps presented below.



In order to continue adding process, press UNITS ESC button on printing out the sum. Home screen of the main mode is displayed.

If samples are measured with packagings, load the weighing pan with the packaging, wait for stabilization and press →T← INSERT button .

18. DATABASES

The balance software has 3 databases that can be edited (USERS, PRODUCTS, TARES) as well as 2 databases (WEIGHINGS AND ALIBI), to which all the measurements, carried out by means of the balance, are saved.

Data saved within particular databases:

- USERS – 100 different users.
- PRODUCTS – 1000 different products.
- TARES – 100 different masses of the packaging.
- WEIGHINGS – 5,000 consecutive measurements
- ALIBI – 100,000 consecutive measurements

18.1 USERS

Each user is characterized by the following data:

- **NAME** (30 characters)
- **CODE** (6 characters)
- **PASSWORD** (8 characters, digits only)
- **ACCESS** (USER, ADVANCED, ADMIN)
- **LANGUAGE** (any of the available)

Access levels
The balance software has three access levels: USER, ADVANCED, ADMINISTRATOR.

Access levels	Permissions
USER	Access to parameters of the submenu **<Reading>**, permission to change settings for parameter group **<Other>** except for **<Date and Time>**. Permission to start and carry out all the weighing processes. You can preview information in **<Databases>** and define universal variables.
ADV	Access to editing parameters of the submenu: **<Reading>**; **<Working modes>**; **<Communication>**; **<Devices>**; **<Other>** except for **<Date and Time>**. Permission to start and carry out all the weighing processes.
ADMIN	Access to all user parameters and functions, permission to edit databases.

Once the balance is switched on, the display stays active all the time, this enables carrying out mass measurements even when no user is logged-in.

In order to add a user, follow the scheme shown below, add a user and assign a name to him/her.

Procedure:

Once the user name is added, enter the following:
User code – Max 6 charac
User password – Max 8 nu...s.

Next select:

- Access level (USER, ADV, ADMIN)
- Language

In order to remove a user you should follow this procedure:

- Enter the user database
- Select the user that is to be removed from the list

- Press 

button
- The software shows <DELETE?> message in the bottom line
- Confirm by pressing  button
- When confirmed, the software removes the selected user from the list

18.2 PRODUCTS

The balance can store 1000 different products that can be weighed, counted, and controlled.

The following data can be inserted for each product:

- NAME (30 characters)
- CODE (6 characters)
- EAN (16 characters)
- MASS (with the accuracy of a reading unit)
- TARE (mass of the packaging relating to a particular product with the accuracy of a reading unit)
- MIN (low limit for the Checkweighing mode, to be inserted with the accuracy of a reading unit)
- MAX (high limit for the Checkweighing mode, to be inserted with the accuracy of a reading unit)
- TOLERANCE (tolerance limits to [±] for Dosing mode, entered as a % of the target mass).

In order to add a product, enter products database and add name of the product along with respective data (follow the procedure as in the section above).

18.3 TARES

The balance can store 100 different weights of various packaging's.

The following data can be inserted for each packaging:

- NAME (30 characters)
- TARE (packaging weight, enter a value with the accuracy of a reading unit)

In order to add a tare value – packaging weight, enter tare database and add name of the tare along with respective data (follow the procedure as in Users section).

18.4 WEIGHINGS

Weighings database is non-editable i.e. the data relating to the weighings is saved automatically. A user has a possibility of viewing this data and printing it out or exporting it to a PENDRIVE (if such a need occurs go to later sections for more information on export).

The balance software allows you to save and store up to 5 000 measurements carried out on the balance. This occurs automatically, after pressing the <PRINT> button, no additional actions or settings change is needed.

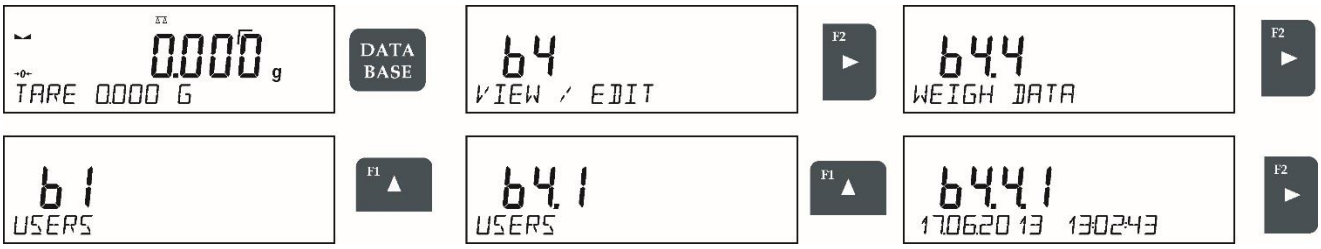
Additional data is saved along with the measurement.

- Date of the measurement
- Time of the measurement
- Measurement result (mass)
- Tare value
- Name of the product that has been weighed
- Person carrying out the measurement (logged-in user)
- Working mode for which the measurement has been carried out
- Value of variable 1 and 2

The software saves the measurements in a so called loop, i.e. when the measurement 5 001 is saved, the measurement 1 is automatically deleted from the balance's memory.

The measurements saved in the balance's memory cannot be deleted.
It is possible for a user to view and print out the data saved in the memory.

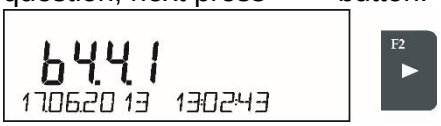
Procedure:



Each measurement is saved with its individual number. The format is: b4.4.n, where <n> is the consecutive number of the saved measurement. In the bottom line the date and time are displayed for every single measurement.

To swap between measurements recorded in database, use the arrow buttons, F1 ▲ or F3 ▼. Pressing one of these buttons lets the user move to the next measurement either up or down the list.

To view the remaining data relating to a respective measurement, first select the measurement in question, next press F2 ► button:



The software automatically shows the data relating to the measurement, data is presented in the bottom line of the balance display.

To swap between data relating to the measurement, press  or  . The data relating to the measurement can be printed out by selecting the option <PRINT> and pressing  button.

An example printout:

Date 21.06.2013
Time 13:05:02
User Product

Tare 0.000 g
Gross 0.000 g
0.000 g
----------Cal. report.----------
Cal. Type Internal
User
Project 1234567890123459
Date 16.07.2013
Time 13:27:09
Balance ID 10353870
Cal. diff. -0.004 g

Signature
…….....

The data that is to be printed out, depends on the settings of parameter P5.3 GLP PRINTOUT. Parameters selected for the printout (**<YES>** option), are printed out also on measurement result printout for WEIGHINGS database.

18.5 ALIBI MEMORY

The balance is equipped with “ALIBI”, a type of memory that allows you to save and store up to 100 000 measurements carried out on the balance.

If the “ALIBI” memory is installed in the balance, the saving of the measurements occurs automatically, by pressing <PRINT> button, without a need of additional actions or settings change.

The additional data is saved along with the measurement.

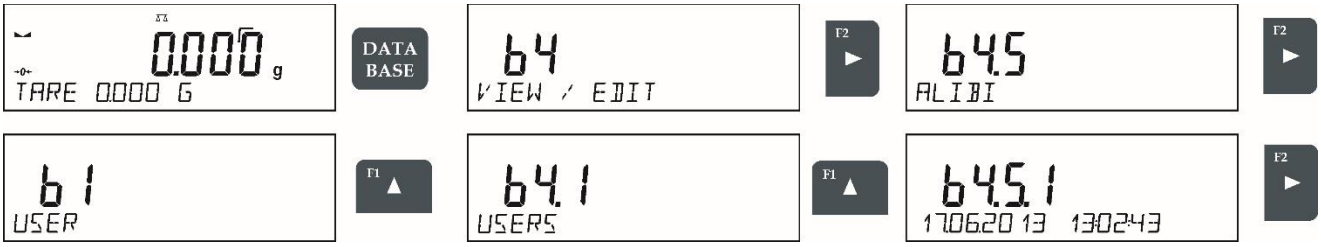
- Date of the measurement
- Time of the measurement
- Measurement result (mass)
- Tare value
- Person carrying out the measurement (logged-in user)
- The name of the product that has been weighed

The software saves the measurements in a so called loop, i.e. when the measurement 100 001 is saved, the measurement 1 is automatically deleted from the balance’s memory.

The measurements saved in the balance's memory cannot be deleted.

It is possible for a user to view and print out the data saved in the "ALIBI" memory.

Procedure:



Each measurement is saved with its individual number. The format is: b4.5.n, where <n> is the consecutive number of the saved measurement. In the bottom line the date and time are displayed for every single measurement.

Operations for ALIBI database and WEIGHINGS database are likewise, for detailed information read the previous section.

An example printout:

Date	19.06.2013
Time	6:48:41
Result	199.90 g
Tare	0.000 g
User	SMITH
Product	PILL

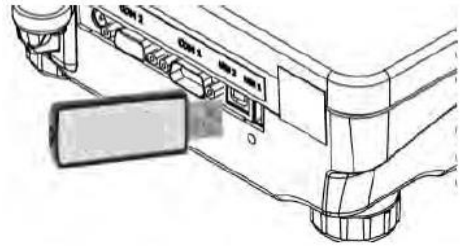
To return to the weighing mode press UNITS ESC button repeatedly.

18.6 IMPORT/EXPORT OF DATABASES

This option allows the user to:

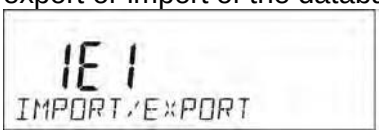
- Archive data relating to the carried out weighings – WEIGHINGS database and ALIBI database.
- Copy the products, tares and users databases between balances of this series.

This can be performed by using external USB flash drive, which shall feature <**FAT files system**> Plug the flash drive into USB 1 Type A port.



The balance automatically detects the flash drive, the message enabling operations relating to the

export or import of the database is displayed.

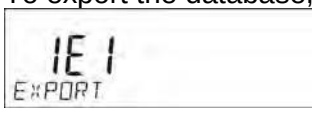


The following options are available when entering this parameter:

- Database EXPORT
- Database IMPORT

18.6.1 DATABASE EXPORT

To export the database, select an option EXPORT.



The following functions are available:

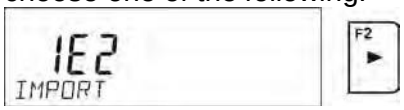
- Export of all the databases
- Export of users databases
- Export of product databases
- Export of tares databases
- Export of weighings
- Export of weighings saved in ALIBI memory
- Export of user parameters

After selecting **<ALL DATABASES>** option, the balance software creates files on the flash drive. The files are of relevant names, data from individual databases is recorded in them. The files are characterized by special extensions, saved data is encoded in a way that the files cannot be read or viewed by standard computer programs.

18.6.2 DATABASE IMPORT

IMPORT function allows transfer of data, recorded in balance databases, from one balance to another. This is a quick and reliable way for entering the data without any mistakes.

To import the database, plug a flash drive to USB port, next select IMPORT option and choose one of the following:



The following options are available:

- Import of all databases
- Import of users databases
- Import of products databases
- Import of tares databases
- Import of user parameters

The data from ALIBI and WEIGHINGS databases cannot be imported.

19. COMMUNICATION

Communication menu enables configuration of port settings. The settings are accessed upon pressing SETUP button.

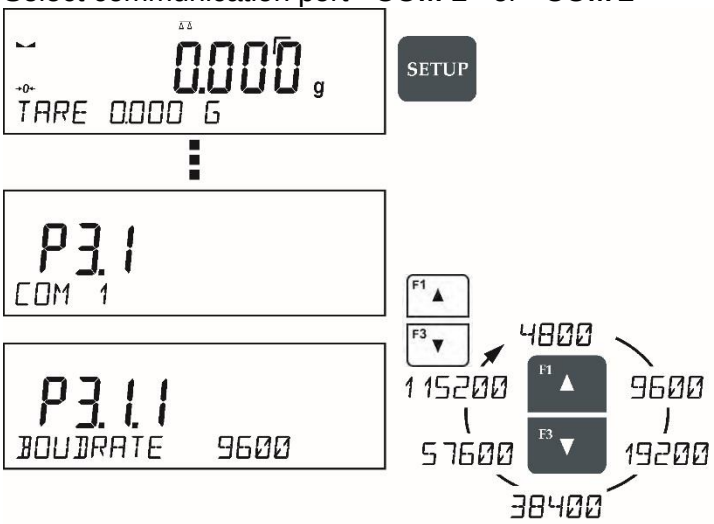
Communication with peripheral devices is established via the following ports:

- COM 1 (RS232)
- COM 2 (RS232)
- USB type A
- USB type B

19.1 RS 232 PORTS SETTING

Procedure:

- Select communication port **<COM 1>** or **<COM 2>**



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

19.2 USB PORT

Parameters of USB ports are not configurable. The port type B is designed to connect a printer or a computer, and the port type A is designed to connect a computer keyboard, a bar code reader or the flash drive.

USB port of type A is intended for:

- Connecting a flash drive storing FAT files system
- Connecting balance to PCL printer
- Connecting EPSON TM-T20 printer to USB port

Flash drive may be used for export/import of data stored in balances, or for carrying out measurement data printout (set parameter P4.2.1 DEVICES/PRINTER/PORT to **<PENDRIVE>** value).

Please remember that for PCL printer, the drivers print completely filled page, i.e. the page will be printed only upon pressing  button, located on a balance, for several times (it depends on a printout size how many times the PRINT button shall be pressed prior printout).

USB port of type B is intended for:

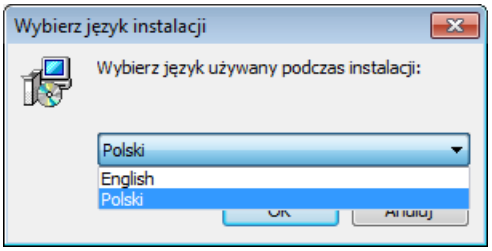
- Connecting balance to a PC computer

In order to make connection of balance and computer possible, it is necessary to install virtual COM port in a computer.

Procedure:

1. Run driver installer

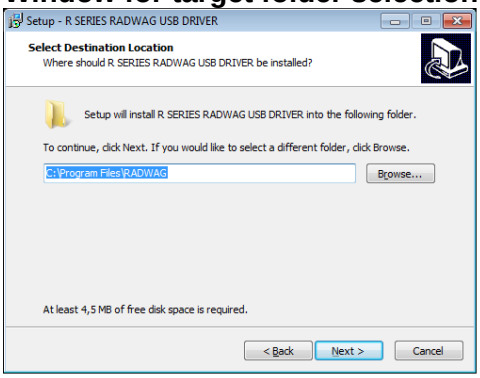
Startup dialog window:



Select language version.

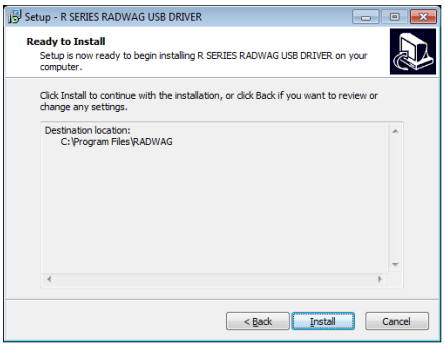
In order to continue, press "**Next**" button.

Window for target folder selection:



Select a respective folder and click **"Next"** key to proceed.

“Ready to Install” window:

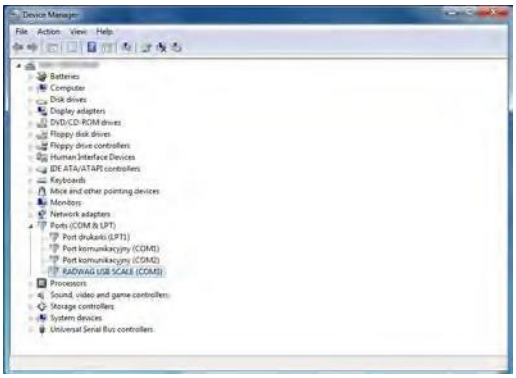


In order to run installation process, press “**Install**” key and clicking respective keys, follow the install wizard.

2.

Having completed driver installation, connect balance to a computer, use 1,8-meter long USB A/B cable maximally (in case of already connected balance, it is necessary to disconnect it and using USB cable connect the balance again).

3. The system detects the new USB device and automatically starts searching a respective driver

4. 

Go to Device Manager and check number assigned to virtual COM port.

For this very case it is STMicroelectronics Virtual COM Port (COM3).

5. Set balance parameters: select USB value for parameter COMPUTER/PORT.

6. Run software for measurement readout.

7. Use the program to set parameters for communication – select respective COM port (for this very case it is COM8), i.e. the one which has been formed while installing drivers.

8. Start cooperation.

19.3 WI-FI PORT SETTINGS

Balance Menu: P3.3 WIFI

CAUTION!

- The transmission parameters must be matched to the customer's local network.
- To ensure proper communication with a computer via Wi-Fi port, set the computer port parameter on your balance to **<WIFI>**: P4.1.1 DEVICES/COMPUTER/PORT/WIFI.

Parameters for Wi-Fi connection:

- P3.3.1 – STATUS
- P3.3.2 – WIFI
- P3.3.3 – CHOOSE NETWORK
- P3.3.4 – NETWORK SETTING
- P3.3.3.1 – DHCP

- P3.3.3.2 – NAME (the name of the network that has been selected)
- P3.3.3.3 – PASSWORD (password – ‘stars’ are displayed)
- P3.3.3.4 – IP (balance ID number, make sure that the number is not engaged by a different device using this network)
- P3.3.3.5 – MASK (default 255.255.000.000)
- P3.3.3.6 – GATE (default 10.10.8.244) P3.3.3.7 – MAC ADRES (0008DC…)

After entering the parameter, message **<STATUS>** and value describing the connection status for Wi-Fi network appear in the bottom line.

- CONNECT – the balance is connected to one of the available Wi-Fi networks, additionally, at the top  pictogram turns up and stays visible as long as network connection is active.
- CONNECTIVITY – the balance is trying to re-establish connection with the previously connected network, suitable for previously entered settings (network, IP, etc.)
- NONE – Wi-Fi module is not installed in the balance.

Procedure:

- Switch **<WIFI>** module on – parameter P3.3.2 COMMUNICATION/WIFI – YES.
- Set respective value for DHCP parameter P3.3.4.1 COMMUNICATION/WIFI/NETWORK SETTINGS/DHCP:
  - **<NO>** - manual entering of data such as: **<IP; MASK, DEFAULT GATE>**,
  - **<YES>** - the balance software automatically reads and displays data assigned by Wi-Fi Router, the one to which the balance is to be connected.
- Now enter parameter P3.3.3 – SELECT NETWORK and start the procedure of searching for available networks by pressing  button. Search procedure starts and after its completion the first network detected by the balance appears in the bottom line. 
- Use  or  buttons to select the demanded network and press button.
- Message **<PASSWORD********>** appears in the bottom line. Use a computer keyboard connected to USB port to easily enter the case-sensitive password (using balance keyboard you can enter only upper-case letters and digits). Enter the network password and confirm it
- by pressing  button.
- Upon entering a respective password the balance automatically connects to the selected network.
- Go to the parameter P3.3.1 – STATUS, message **<CONNECTIVITY>** is displayed meaning that the balance is trying to connect to the network using the settings.
- When the balance connects to Wi-Fi network, the status changes to **<CONNECT>**,  pictogram is displayed.
- If the balance cannot connect to the network for a long time (**<CONNECTIVITY>** status displayed), it is likely that network parameters have been incorrectly entered.
- Ensure that the settings are correctly entered, and repeat the connecting process.

Selected network and parameters settings are stored by the balance memory, each time when the balance is launched the software connects to the network referring to the set parameters.

To disconnect the network, switch the communication off: COMMUNICATION/WIFI/WIFI – NO

20. PERIPHERAL DEVICES

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

20.1 COMPUTER

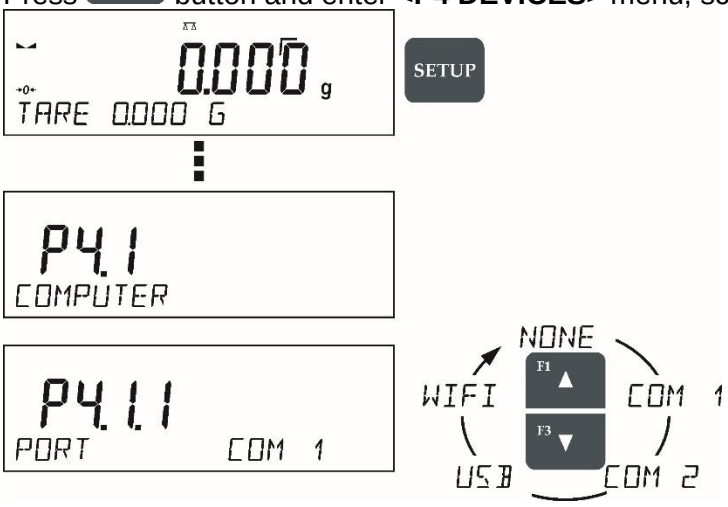
Balance Menu: P4.1 COMPUTER

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
- Computer connection port

Procedure:

Press SETUP button and enter **<P4 DEVICES>** menu, scroll to **<P4.1 COMPUTER>**



P4.1.1 PORT- select port to which a computer is to be connected

- **<COM 1>** or <**COM 2>** – RS 232 port, for connecting a computer
- **<USB 2>** type B – USB port, for connecting a computer
- **<USB FREE LINK>** - USB port, type B, for connecting a computer.
  - Tool for entering data, it functions as a keyboard. Upon proper modification of non-standard printout and sending proper command from the computer, or upon pressing ENTER key located on the operation panel, the data from non-standard printout is entered directly to computer programs, e.g. Excel, Word, Notepad etc.
  - Select **<USB FREE LINK>** port and configure its settings in order to enable correct cooperation of the balance with computer programs:
    P4.1.2 PORT SET- for USB
    - **<SPREADSHEET>**
      - value ‘YES --.—‘ – cooperation with Excel type program, transferred decimal values are separated by dot (.)
      - value ‘YES --,--‘ – cooperation with Excel type program,

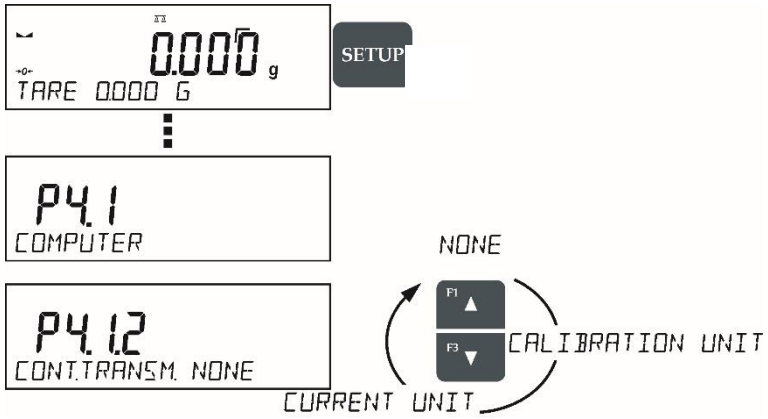
transferred decimal values are separated by coma (,)
    - value ‘NO’ – cooperation with other programs (mass value transferred in a form of text),
- **<DELAY>** – if the transferred information is incomplete, i.e. part of it gets lost (due to auto- entering or auto-formatting of data by computer program) during cooperation with Excel type program, set the parameter value to 2. If the transferred information is still incomplete, the parameter value must be higher. The value ranges between 0 (quick data transfer) and 9 (slow data transfer – around 10 characters per second).

- **<WIFI>** – WIFI port

<P4.1.4 CONTTRANSM>- 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>**



CAUTION!

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

<P4.1.5 INTERVAL>- Printouts Interval for Continuous Transmission

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.

The setting is valid for continuous transmission in calibration unit and in current unit activated by means of the balance, it is also valid for continuous transmission activated by command sent from a computer.

P4.1.7 Printout- Type of the printout sent to the port chosen for the computer.

Procedure:

- Press SETUP button
- Enter P4 DEVICES menu
- Enter menu group P4.1 COMPUTER
- Enter P4.1.7 PRINTOUT parameter
- Select printout:
    - **<NONE>** – no printout selected
    - **<NSD. PRN. 1÷4>** – one of non-standard printouts (see: non-standard printouts description)
    - **<MOB. APP>** – special printout (frame with data sent from the balance) recognized by application used for previewing measurement result on mobile devices.

20.2 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 SETUP button and scroll to P4 DEVICES menu, enter menu group: **<P4.2 PRINTER>**

P4.1.1 PORT select port to which a computer is to be connected

- **<COM 1>** or **<COM 2>** – RS 232 port, for connecting a printer
- **<USB>** type A – USB port, for connecting a PCL printer or EPSON printer
- **<WIFI>** – WIFI port for transferring data from balance to a dedicated software.
- **<PENDRIVE>** – USB 1 port, type A, for connecting USB flash drive. PENDRIVE option requires setting format of saved file. You can save the data in the following formats:
    - .txt format (text file that can be opened on the computer using Notepad),
    - .csv (.) format (file that can be opened using Excel, the transferred decimal value is separated using dot character), or
    - .csv (,) format (file that can be opened using Excel, the transferred decimal value is separated using coma character)
- **<USB PC>** – USB port type B, for connecting a computer with a dedicated software
- **<USB FREE LINK>** – USB port, type B, for connecting a computer. Tool for entering data, it functions as a keyboard. Upon proper modification of the printout and pressing declared balance button (e.g. F1 header, F3 footer, ENTER printout), the data is directly

entered to computer programs, e.g. Excel, Word, Notepad etc.

P4.2.2 PORT SET

- **<SPREADSHEET>**
  - value 'YES --.—' – cooperation with Excel type program, transferred decimal values are separated by dot (.)
  - value 'YES --,--' – cooperation with Excel type program, transferred decimal values are separated by coma (,)
  - value 'NO' – cooperation with other programs (mass value transferred in a form of text),
- **<DELAY>** – if the transferred information is incomplete, i.e. part of it gets lost (due to auto- entering or auto-formatting of data by computer program) during cooperation with Excel type program, set the parameter value to 2. If the transferred information is still incomplete, the parameter value must be higher. The value ranges between 0 (quick data transfer) and 9 (slow data transfer – around 10 characters per second).

Additionally, you can enter a controlling code (of a hexadecimal form) to a printer either at the beginning of the printout - P4.2.2 PREFIX or at the end of it - P4.2.3 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 autocutter blade), at the end.

<PREFIX> and **<SUFFIX>** parameters settings are valid 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!

20.3 BARCODE READER

Balance Menu: P4.3 BARCODE READER

Comprises settings for cooperation with a barcode reader.

Procedure:

- Press SETUP button
- Enter P4 DEVICES menu
- Enter menu group P4.3 BAR CODE READER
- Select port to which the barcode reader is to be connected: **<NONE>, <COM 1>, <COM 2>**

20.4 ADDITIONAL DISPLAY

Balance Menu: P4.4 ADD DISPLAY

Comprises settings for cooperation with WD-6 external additional display.

Procedure:

- Press SETUP button
- Enter P4 DEVICES menu
- Enter menu group P4.4 ADDITIONAL DISP
- select port to which the additional display is to be connected: **<NONE>, <COM 1>, <COM 2>**

CAUTION:

Ensuring correct cooperation between the balance and the additional display requires baud rate parameter value to be set to 115200 bit/s for the port to which the additional display is plugged.

20.5 EXTERNAL BUTTONS

Balance Menu: P4.5 EXT BUTTONS

Comprises settings that enable the balance to cooperate with external buttons: TARE and PRINT.

Procedure:

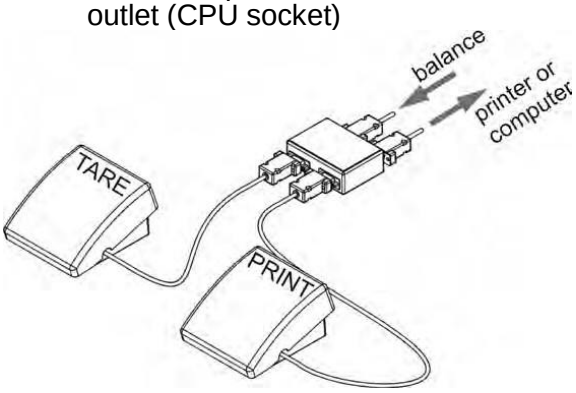
- Press SETUP button
- Enter P4 DEVICES menu
- Enter menu group P4.5 EXTERNAL BUTTONS
- Run the buttons
  - P4.5.1. TARE set to **<YES>** value
  - P4.5.2. PRINT set to **<YES>** value
- Exit the balance menu

CAUTION:
The balance program enables cooperation with one or both buttons. If you need to connect both external buttons, first connect a several electrical outlet to COM 2 port, next connect buttons TARE and PRINT to the electrical outlet. Connect the printer or terminal to COM 1 or to the electrical outlet (determine the PRINTER- BALANCE transfer parameters). Every time the user presses TARE and PRINT external button, the balance reacts as if TARE and PRINT buttons of the balance keyboard were pressed.

If you need to use only one button, connect it directly to COM 2 port or use the electrical outlet.

In order to ensure the proper cooperation, you need to remember:

- To connect additional buttons to COM 2 port
- To connect the buttons to appropriate sockets of the electrical outlet if in use (see descriptions above)
- To activate the buttons in the balance parameters (see description above)
- To disconnect other external devices (additional display or barcode reader) on COM2 port (for these devices it should be **<NONE>**)
- To set the port for PRINTER to **<COM 2>** value if the printer is connected to the electrical outlet (CPU socket)



Set of external buttons TARE and PRINT.

20.6 MEASUREMENT DATA PRINTOUT (USB DRIVE)

Balance software allows the user to save data, relating to a measurement, on an external USB flash drive.

Procedure-

- Plug a flash drive into USB port.
- Press UNITS ESC button to abandon automatically started IMPORT/EXPORT option.
- Set parameter P4.2.1 DEVICES/PRINTER/PORT to **<PENDRIVE>** option.
- Return to the weighing mode.
- From this moment on, ever single pressing of the button results with record of measurement data (compatible with the settings for GLP PRINTOUT) in a text file, the text file is automatically created by the balance software. The file name is: printout.txt.

- Press 

button to switch the balance off, next remove the pendrive from the port and read the data on a computer. Keeping to this sequence of actions you are guaranteed that the data is saved.

More data can be recorded in the same file. The balance software will add the data to the file that has already been created on a flash drive. Consequently, you can continue saving measurements in the same file once created.

CAUTION:
USB flash drive shall feature <**FAT file system**>.

21. 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].

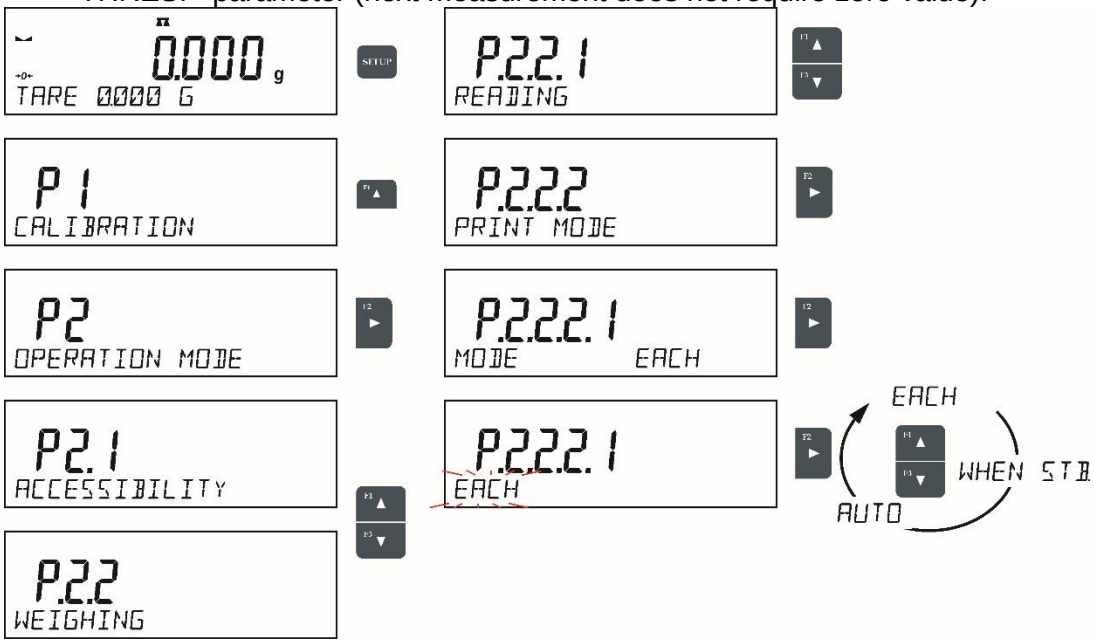
CAUTION!
Each result is printed and recorded (stable and unstable).

Automatic operation with interval starts at the moment of switching the function on and it lasts until it is switched off.

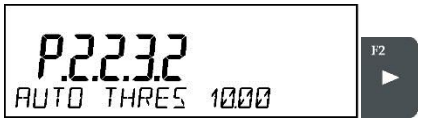
On switching the function of auto print with interval, PRINT button becomes inoperative (no indication is printed when pressed).

Procedure:

- Press →0← DELETE button to zero the balance (marker of stable measurement and zero marker -0- 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.



21.1 ADJUSTMENT REPORT

Balance Menu: P5.1 CAL. REPORT

A group of parameters enabling user to declare data that is to be printed on an adjustment printout.

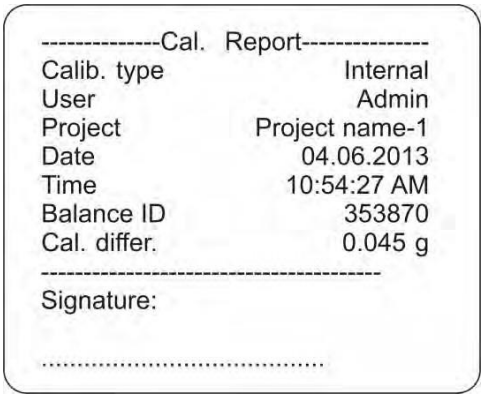
Variable	Overview
PROJECT	Option enables naming the project (name associated with a particular type of weighing). The name may consist of 16 characters maximum.
CALIB TYPE	Option enables printing out the type of the adjustment being carried out.
USER	Option enables printing out the name of a logged-in 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:



21.2 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

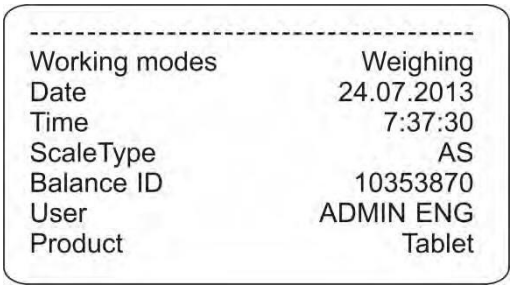
USER	Option enables printing out the name of a logged-in user.	Header GLP printout Footer
PRODUCT	Option enables printing out the name of a currently selected product.	Header GLP printout Footer
DATE	Option enables printing out the date of the carried out adjustment.	Header GLP printout Footer
TIME	Option 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
CAL.REPORT	Option enables printing out a report from the last adjustment, according to the settings declared for the adjustment report printout	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

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

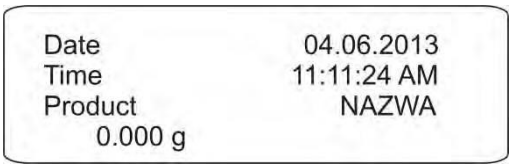
- **<NO>** - do not print
- **<YES>** - print

Example reports:

Header



GLP printout



Footer

21.3 NON-STANDARD PRINTOUTS

The balance software enables entering 4 non-standard printouts.

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 basic unit
%T	Current tare mass in the basic unit
%D	Current date
%M	Current time
%I	Balance number
%R	Program number
%P	Project number
%U	User 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
%H	High threshold	CHECKWEIGHING
%L	Low threshold	
%A	Target mass	DOSING
%B	Reference mass	PERCENT WEIGHING

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

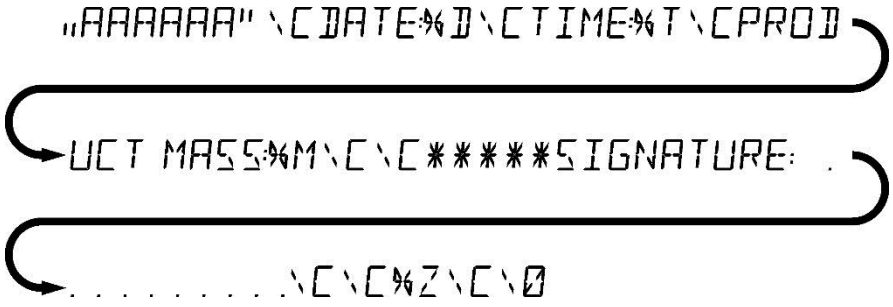
Every single printout can contain max 160 characters (letters, numerals, non-standard characters, spaces). You can apply non-standard characters depending on type of data that is to be printed out.

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.



Example 2:

To crop the paper after the printout had been carried out by EPSON printer (if the printer is equipped with an autocutter blade) the user must select (for a given printout: HEADER, GLP PRINTOUT or FOOTER) an option of non-standard printout 1,2,3 or 4 with <%E> value available and select this printout for a given printout settings.

In such case <SUFFIX> command should stay empty.

Paper must be cropped underneath the FOOTER.

Example settings:

P5.4.14 STANDARD PRINTOUT | NSD. PRN. 1

P5.5 NSD. PRN. 1 | %E

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

- **By the means of computer keyboard of the USB type**
  A computer keyboard of USB type can be connected to a balance, this enables easier and quicker editing of the printouts.

  Willing to insert any text, it is necessary to select a respective menu option and, using the keyboard, type the text. Next the text must be confirmed by means of Enter button.

CAUTION: It is important to type variables, used for non-standard printouts, in capital letters.

21.4. VARIABLES

A 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.

22. ADVANCED FEATURES

22.1 BAR GRAPHS

The bar graph function is accessible for all weighing modes. The bar graph presents in a graphic form how much of balance capacity is in use. Additionally, it shows Min and Max thresholds positions for the Check weighing mode, and for Dosing mode it shows target weight value along with permissible tolerance.

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:

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

Example of a balance display with bargraph option on a 1000g capacity balance: 500 g heavy load placed on a weighing pan means that 50% of max capacity has been used (half-filled bargraph bottom line).

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

22.2 BALANCE SETTI ;

22.2.1 TARE DATABASE

Tare values commonly utilized by user can be saved within the Tare Database.

Procedure:

- Press quick access key F4, to which **<SELECT TARE>** option has been assigned or click **<SELECT TARE>** option available upon pressing SETUP button.
- Wait for the first packaging weight, recorded in tare database, to be displayed.
- Use the arrow buttons to select the tare which is to be recalled and press button,
- The balance returns to the weighing mode, and the display indicates entered tare value with a minus “–" sign.

OR

- While in any working mode, press DATA BASE button.
- Enter b3 **<TARE>** option.
- Wait for the first packaging weight, recorded in tare database, to be displayed.
- Use the arrow buttons to select the tare which is to be recalled and press button.

- The balance returns to the weighing mode, and the display indicates entered tare value with a minus “–" sign.

22.2.2 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.

Balance Menu: P6 OTHER

You can set up parameters which influence balance operation.

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

22.2.3 MENU LANGUAGE

Balance Menu: P6.1 LANGUAGE

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

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

22.2.4 PERMISSIONS

Balance Menu: P6.2 ACCESS LEV

Permissions parameter enables choosing access level for a particular user, one that is not logged in. Available access levels: ADMIN. / USER. / ADV.

Depending on selected permissions level, you can enter balance parameters and modify the settings, as far as possible for a particular level (for permissions overview read point 9.1).

22.2.4 "BEEP" SOUND

Balance Menu: P6.3 KEY SOUND

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

22.2.5 BACKLIGHT

Balance Menu: P6.4 BACKLIGHT

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

22.2.6 BACKLIGHT TURN-OFF TIME

Balance Menu: P6.5 STAND-BY MODE

Parameter P6.5 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 P6.5

STAND- BY MODE, than 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.

22.2.7 AUTO SWITCH-OFF

Balance Menu: P6.6 AUTO SWITCH-OFF

Parameter <P6.6 AUTO OFF> enables use of function responsible for automatic display deactivation (functions as ON/OFF 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 P6.6 AUTO OFF settings, then the display is turned-off immediately (inactive backlight function, no indication on the display, clock displayed).

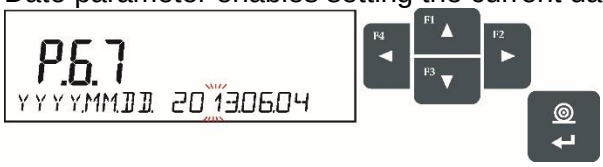
To start-up the balance it is necessary to press ⏻ button located on the balance keypad. The balance will automatically return to weighing.

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

22.2.8 DATE

Balance Menu: P6.7 DATE FORM

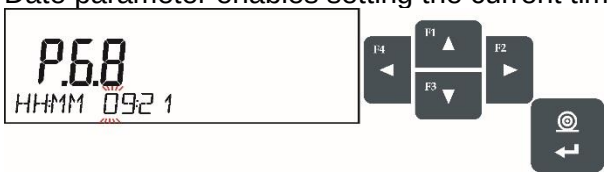
Date parameter enables setting the current date.



22.2.9 TIME

Balance Menu: P6.8 TIME

Date parameter enables setting the current time.



22.2.10 DATE FORMAT

Balance Menu: P6.9 DATE FORM

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.

22.2.11 TIME FORMAT

Balance Menu: P6.10 TIME FORM

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. On the printout AM and PM symbols are placed right next to the time.

22.2.12 AUTOTEST GLP

Balance Menu: P6.11 GLP AUTOTEST

AUTOTEST function is designed to aid a user in assessing balance's operation and diagnosing the reasons for occurrence of errors in weighing which exceed the maximum permissible values for a given balance model.

By means of a simple, repeatable and fully documented way, the function enables optimizing balance's settings to maintain the best possible repeatability and weighing time at workstation. The main purpose of the function is the possibility of monitoring the above-mentioned parameters at optional moment and saving records from the carried out tests in the form of printed reports of the tests that are automatically generated at the end of examination.

The test controls repeatability of placing the interval weight and determining error of indication with reference to balance's maximum capacity.

Testing procedure:

- Deposits internal weight twice
- Deposits internal weight ten times
- Calculate the value of standard deviation
- Performs balance adjustment
- Print a report.

Test results provide balance data, calculated error for Max capacity and value of repeatability of indication expressed as standard deviation.

An example report:

.....

--------- Autotest GLP: Report ---------

Balance type	PS 3000.R2
Balance ID	400010
User	Admin
Software ver.	v.0.4.9
Date	2013.07.16
Time	09:17:16

Number of measurements	10
Reading unit	0.001/0.01g
Internal weight mass	1402.094 g
Filter	Average
Value release	Fast & Reliable

Deviation for Max.	-0.118 g
Repeatability	0.0088 g
Signature	

.....

Procedure:

- To initiate parameter <P6.11 GLP AUTOTEST > press  button. The balance software launches the GLP autotest procedure and it is carried out automatically from now on to the end.
- You can stop the procedure at any time by pressing  button of the GLP process window.
- Once the procedure is finished, the value of standard deviation of all measurements is shown in the main display, and message <RESULT> in the bottom line, the final report is printed out automatically (as shown above). It is possible to print out the report again by pressing  button.
- Report is not saved, therefore when abandoning this level, it is deleted from the balance volatile memory.
- To abandon the window press  button and the program returns to the main menu. To return to weighing, press  button repeatedly.

23. MAITENANCE

Disassemble the balance weighing pan and other detachable components (the components differ depending on a balance type – see Unpacking and Installation, Section 2). Be careful while detaching the components so as not to cause any damages to the balance mechanism.

- Using handheld vacuum cleaner remove dust from the weighing chamber.

- Using a dry flannel cloth to clean glass parts (mild cleanser may be applied if it does not contain any abrasive substances) – for draft shield disassembly instruction go to the next end of this section.

- Using a dry flannel cloth to 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.

Cleaning ABS components:
To clean dry surfaces and avoid smudges, use clean non-colored cloths made of cellulose or cotton. You can use a solution of water and detergent (soap, dishwashing detergent, glass cleaner) if needed. Gently clean the intended surface and let it dry. Repeat cleaning process if needed.

In the case when contamination is hard to remove, e.g. adhesive, rubber, resin, polyurethane foam residues etc., you can use a special cleaning agent based on a mixture of aliphatic hydrocarbons that do not dissolve plastics. Before using the cleanser for all surfaces, we recommend spot test and small area first. Do not use products containing abrasive substances.

Cleaning stainless steel components:
Avoid using cleansers containing any corrosive chemicals, e.g. bleach (containing chlorine). Do not use abrasive substances. Always remove the dirt using microfiber cloth to avoid damage of the protective coating.

Daily maintenance:

1. Remove the dirt using cloth dipped in warm water.
2. For best results, add a little dishwashing detergent.

Cleaning powder-coated components:
For the first cleaning stage, you need running water or wet sponge to help remove loose, heavy dirt. Do not use cleansers containing abrasive substances.
Next using cloth and cleanser-water solution (soap, dishwashing liquid) gently rub the cleaned surface.

Avoid using cleanser without water since it may result in damage of the cleaned surface, please keep in mind that large amount of water mixed with cleanser is desired.

Cleaning aluminum components:

While cleaning aluminum components use products that are acidic by nature, e.g. spirit vinegar, lemon. Do not use abrasive substances. Avoid using hard brush as this may cause scratches. It is recommended to use microfiber cloth.

Polishing the surface using circular movements. Use a clean, dry cloth.

Cleaning draft shield panes:
Select dissolvent depending on a dirt. Never soak the glass panes in alkaline solutions since they interact with glass and may cause damage. Do not use abrasive substances.

For organic dirt use acetone first, next use water or detergent. For other than organic dirt use diluted acid solutions (soluble salts of hydrochloric or nitric acid) or base solutions (ammonium or sodium base).

To remove ACIDS use protophilic solvent (sodium carbonate), to remove BASE use protogenic solvent (mineral acid of various concentration).

In case of heavy contamination use brush or detergent and avoid detergents containing large and hard molecules which could potentially scratch glass panes.

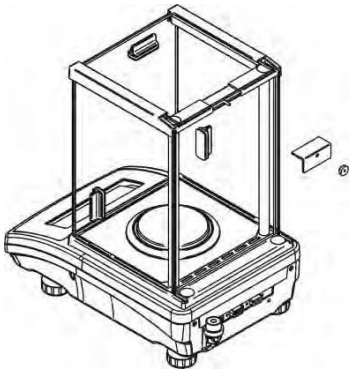
Only use a soft brush with wooden or plastic handle to avoid risk of scratches. Do not use a wire brush.

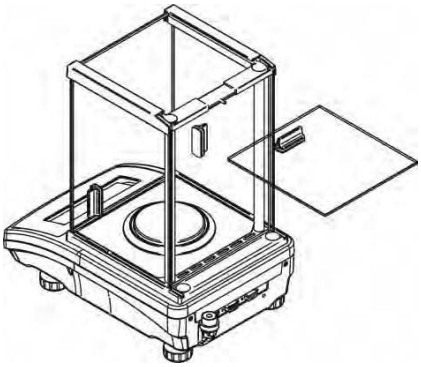
At the end of the cleaning process rinse the pane using running water first, and then distilled.

Rinsing is a necessary cleaning process, allowing to remove remaining soap, detergents and other cleansers from the panes prior their reinstallation.

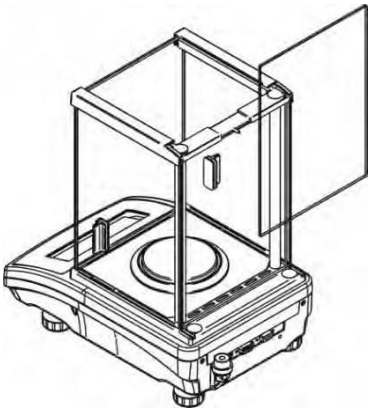
Avoid drying the panes either using paper towel or forced air circulation since some fibers, grains or contamination of other type could permeate into the panes thus causing weighing errors.
Do not use dryers when drying glassware, leave glass components on a rack to dry.

Removal of Glasspanes:

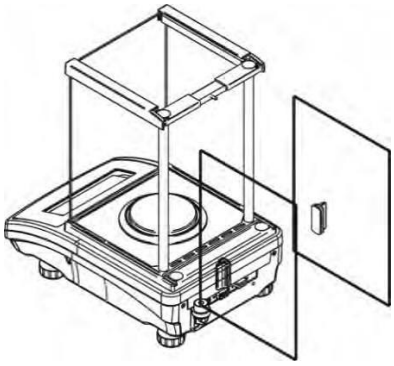




Undo and remove top pane protection, next slide the pane out of guide bar.



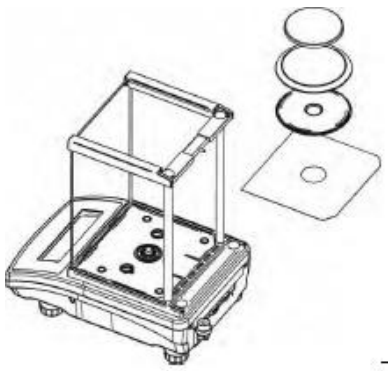
Remove back pane.



Remove side panes.

Side panes shall not be swapped therefore it is necessary to remember which one is right, and which one is left to install them back properly.

CAUTION! Do not remove the front pane!



Remove the weighing pan and the draft shield bottom insert prior to cleaning. Clean the components after removed to ensure your balance mechanism is protected against accidental damage.

All the operations should be done carefully. Pay special ATTENTION 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.

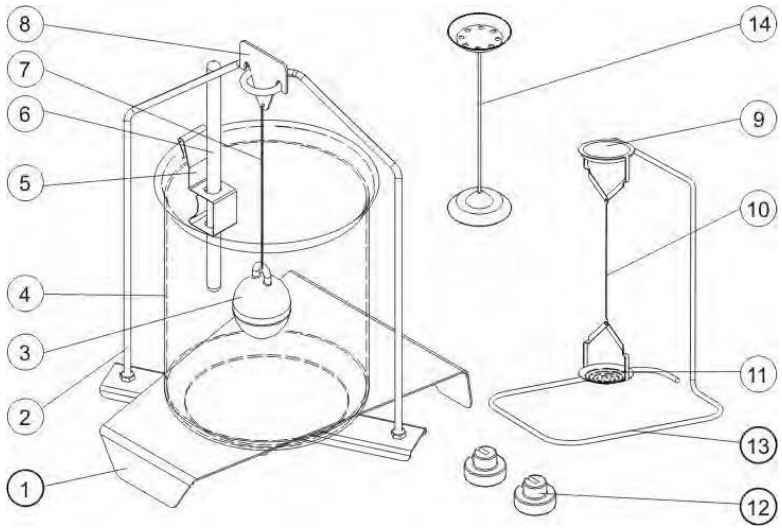
24. ACCESSORIES

Available Accessories for Schuler Scientific balances

24.1 DENSITY DETERMINATION KIT

Kit intended for Analytical balances.

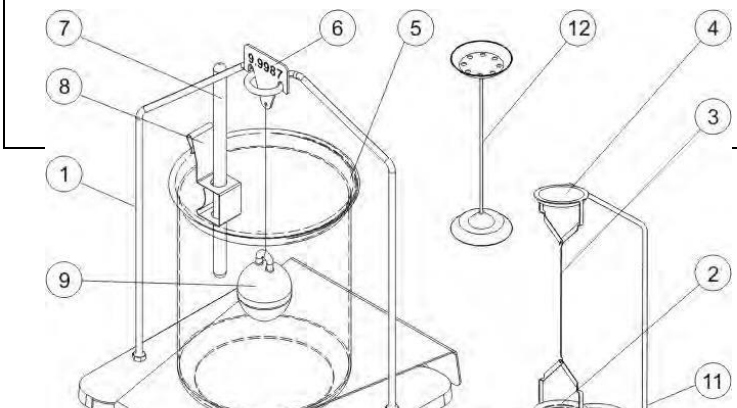
Balance Models: d=0.01/0.1mg



1	Beaker base
2	Stand
3	Sinker
4	Beaker
5	Thermometer holder
6	Thermometer
7	Flexible connector for sinker
8	Hanger
9	Top weighing pan for solids density determination
10	Flexible connector for weighing pans
11	Bottom weighing pan for solids density determination
12	Additional sinker
13	Additional stand for a set of pans or a sinker
14	Additional set of weighing pans for density determination of solids with density lower that density of water

Kit intended for Precision balances featuring 128x128 mm weighing pan

Balance Models: d = 1mg

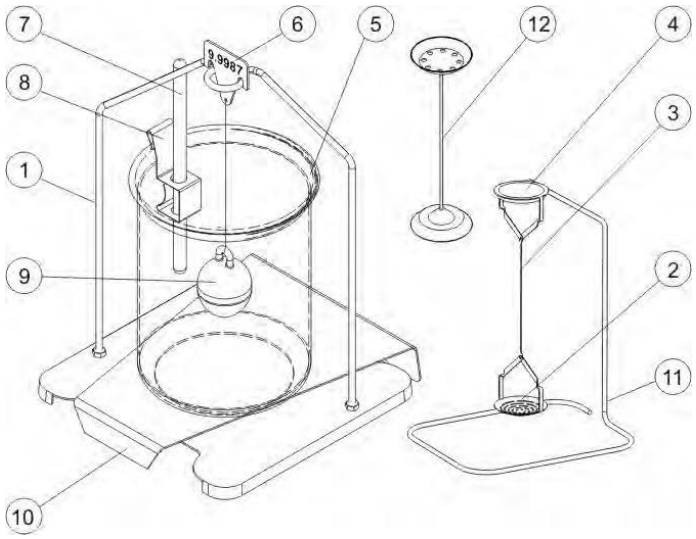


1	Weighing pan with stand
2	Bottom weighing pan for solids density determination
3	Flexible connector

	4	Top weighing pan for solids density determination
	5	Beaker
	6	Hanger
	7	Thermometer
	8	Thermometer holder
	9	Sinker
	10	Beaker basis
	11	Additional stand for a set of pans or a sinker
	12	Additional set of weighing pans for density determination of solids with density lower that density of water

Kit intended for Precision balances featuring 195x195 mm weighing pan

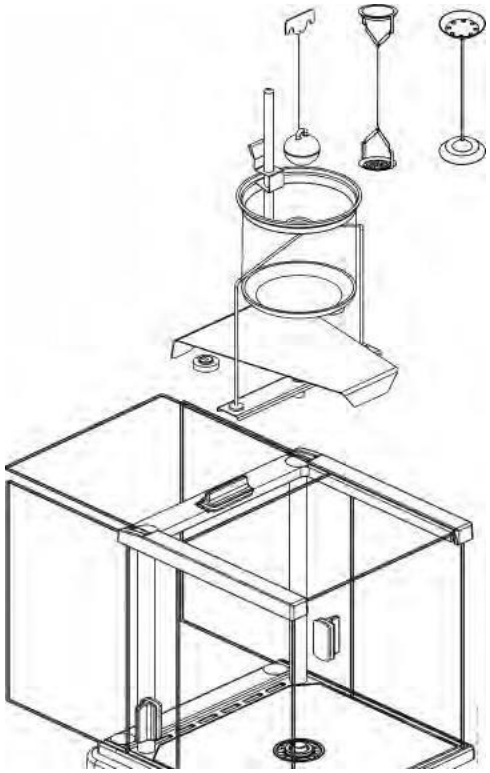
Balance Models: d= 0.01/0.1g



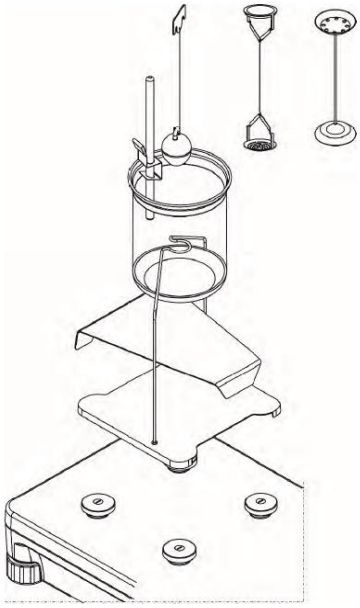
	1	Weighing pan with stand
	2	Bottom weighing pan for solids density determination
	3	Flexible connector
	4	Top weighing pan for solids density determination
	5	Beaker
	6	Hanger
	7	Thermometer
	8	Thermometer holder
	9	Sinker
	10	Beaker basis
	11	Additional stand for a set of pans or a sinker
	12	Additional set of weighing pans for density determination of solids with density lower that density of water

Installation Procedure:

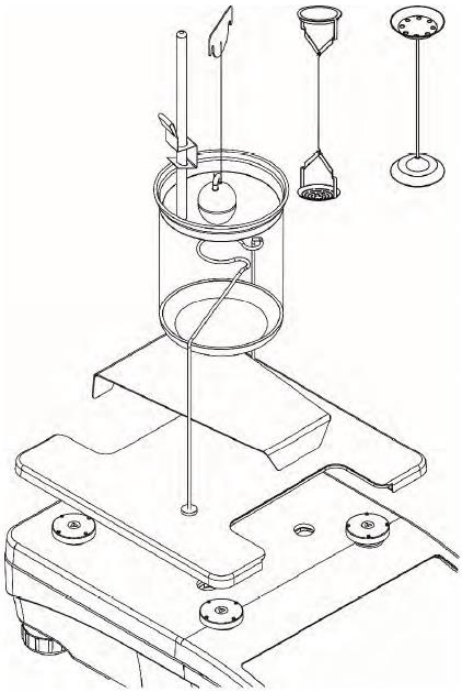
Analytical Balance Models



Precision Balance Models (128x128 mm weighing pan):



Precision Balances Models (featuring 195x195 mm weighing pan):



CAUTION!

- Components of density determination kit shall be stored in a respective box.
- Weighing pans and sinker shall not be put directly on a table, this might cause their damage.
- Weighing pans and sinker, if not operated, shall be put on an additional stand.
- If the kit has been installed and -nuLL- message is displayed than the balance shall be loaded with weights set (12). Thus prepared balance can be used for density determination.

For additional instructions, please refer to the density determination User Manual included with the kit.

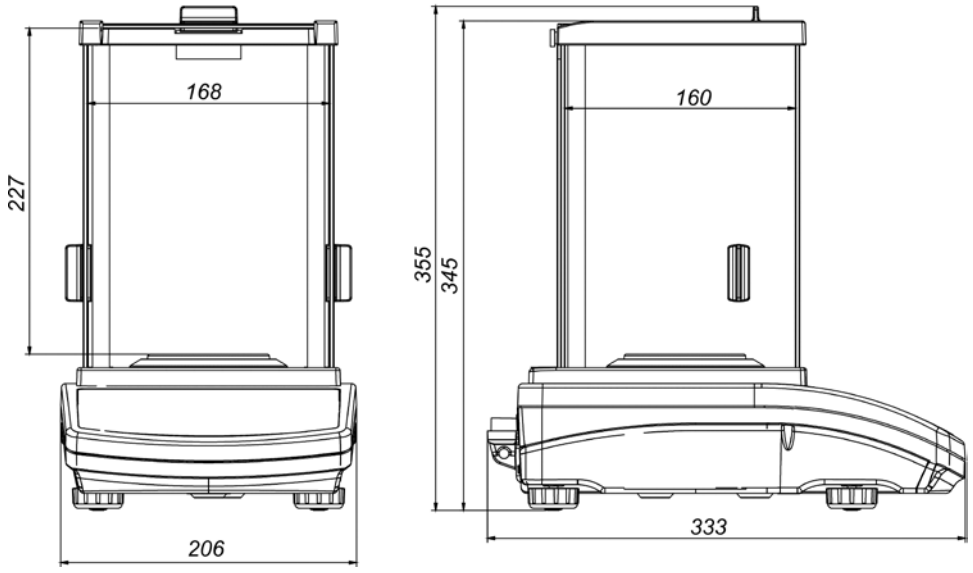
25. APPENDIX

25.1 SAS/SPS Series Balances

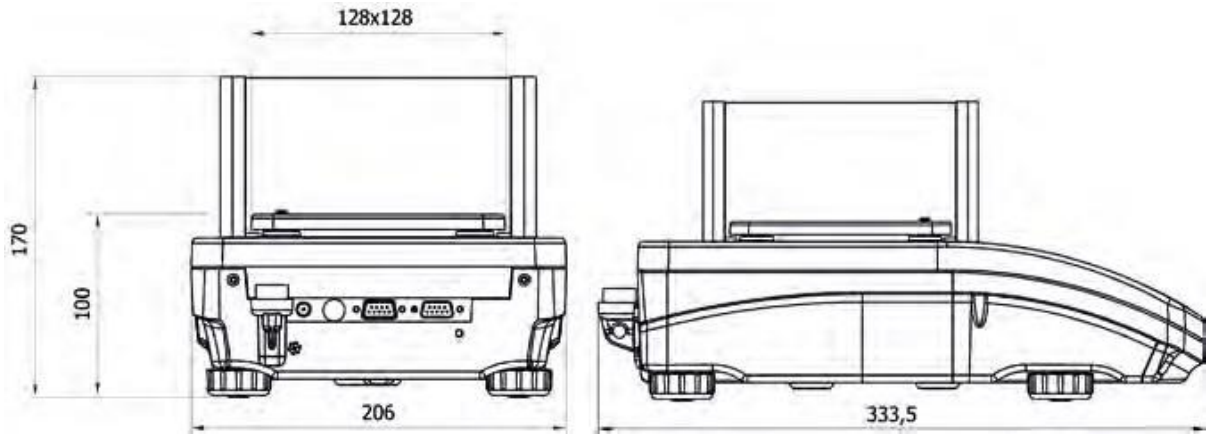
MODEL	CAPACITY	READABILITY	LINEARITY	REPEATABILITY	PAN SIZE
SAS-225	82g/220g	0.01mg/0.1mg	±0.2mg	0.1mg	90 mm
SAS-164	160g	0.1mg	± 0.2mg	0.1mg	100 mm
SAS-224	220g	0.1mg	± 0.2mg	0.1mg	100 mm
SAS-314	310g	0.1mg	± 0.3mg	0.2mg	100 mm
SPS-363	360g	0.001g	± 2mg	1mg	128 x 128 mm
SPS-603	600g	0.001g	± 3mg	1.5mg	128 x 128 mm
SPS-1202	1200g	0.01g	±20mg	10mg	195 x 195 mm
SPS-2102	2100g	0.01g	±20mg	10mg	195 x 195 mm
SPS-4502	4500g	0.01g	±20mg	10mg	195 x 195 mm
SPS-6002	6000g	0.01g	±30mg	15mg	195 x 195 mm

25.2 DIMENSIONS

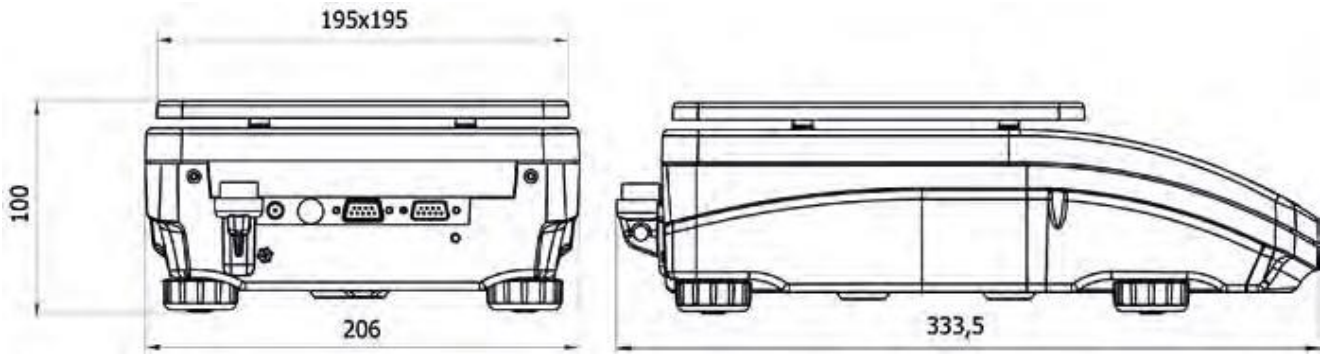
SAS series (SAS-164, SAS-225, SAS-224, SAS-314)



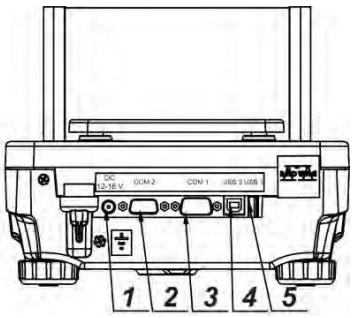
SPS series (SPS-363, SPS-603)



SPS series (SPS-1202, SPS-2102, SPS-4502, SPS-6002)



25.3 CONNECTORS



1 Power supply socket
2 COM 2 connector (additional display or external buttons)
3 COM 1 connector (printer)
4 USB 2, type B (computer)
5 USB 1, type A (keyboard)

25.4 ERROR MESSAGES

-Err2- Value beyond zero range
-Err3- Value beyond tare range
-Err8- Taring / Zeroing operation time exceeded
-NULL- Zero value from converter
-FULL- Measurement range exceeded
-LH- Start mass error