User Manual

COLE-PARMER TB-800 SERIES BALANCES

Cole-Parmer®
an antylia scientific company

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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 operate the touch panel using sharp-edged tools (knife, screwdriver, etc.).
- 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. Cole-Parmer 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:
   - 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.
- The balance should be located on a stable wall console desk or a stable working table which is not affected by vibrations and distant from heat sources.
- Take special precaution when weighing magnetic objects, as part of the balance is a strong magnet. Should such loads be weighed, use under-pan weighing option, which removes the weighed load from area influenced by the balance's magnet. The hook for under-pan weighing is installed in balance's base.

- Keep all package element should your device be transported in the future. Remember that only original packaging can be used for shipping purposes. Prior to packing, uncouple any cables, remove any separable components (weighing pan, shields, inserts). Pack the device components into an original packaging. The original packaging protects the equipment against potential damage during transportation.

2.2 STANDARD DELIVERY COMPONENTS LIST
- Balance and components shown in Section 2.4 depending on balance model
- Warranty Card
- Balance Quick Start Guide
- USB
  - User Manual

2.3 UNPACKING
To unpack the system, follow the diagram below-

Keep the packaging should you make warranty claim or require service.
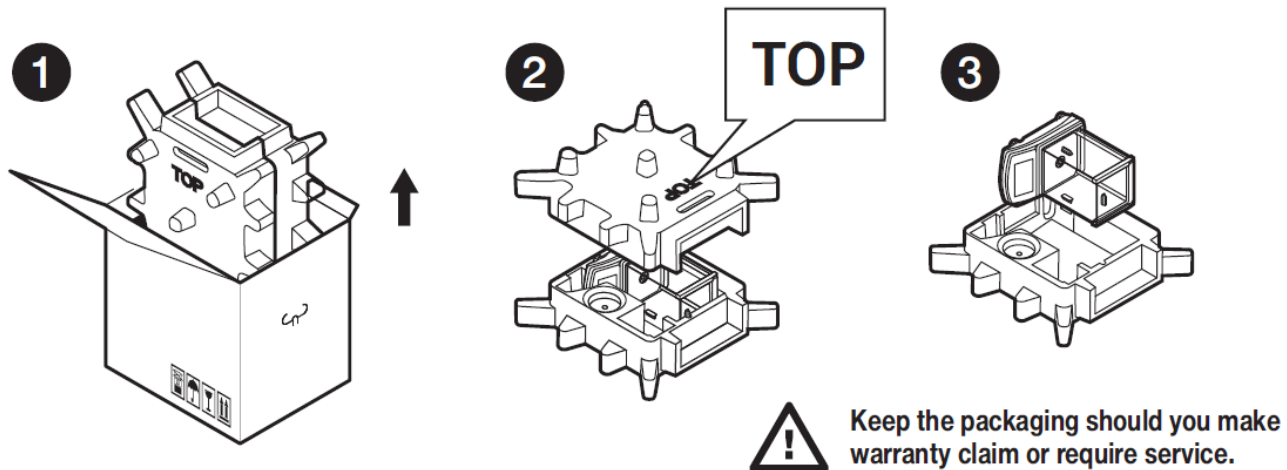
2.4 BALANCE ASSEMBLY

Model: TB-800-82/220i,
Components:
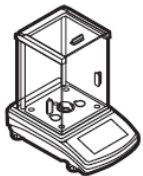
| Balance x 1 | Weighing pan x 1 | Draft shield x 1 | Centering ring x 1 | Bottom insert x 1 | Power adapter x 1 |
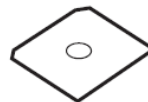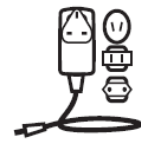
Installation:

1) Remove the transport lock– gently press the transport lock and turn it accordingly to <OPEN>, keep the transport lock should your balance be transported in the future.
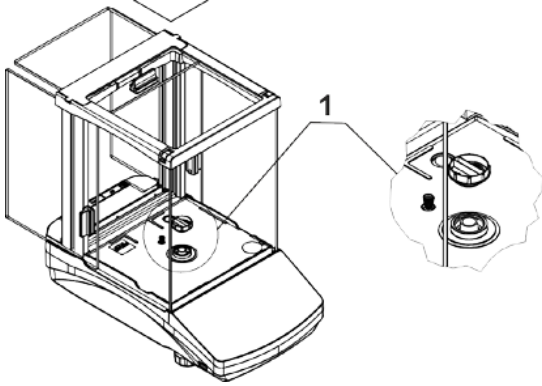
2) Check grounding spring to insure it is in the appropriate location. Make sure that the grounding spring juts slightly out of the hole.
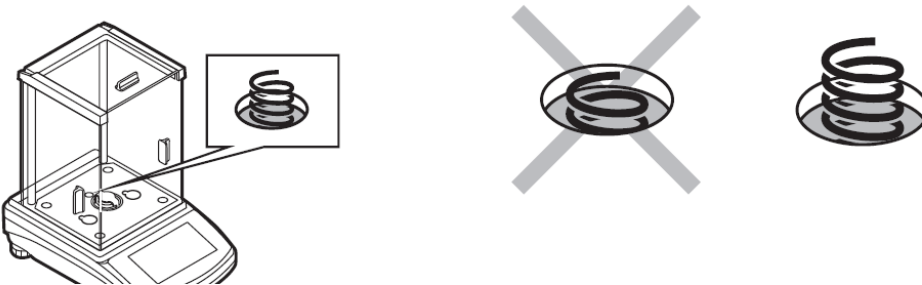
3) Install components following diagram below:
    i.   Bottom insert
    ii. Centering ring [embossment side up]
    iii. Weighing pan
    iv. Draft shield
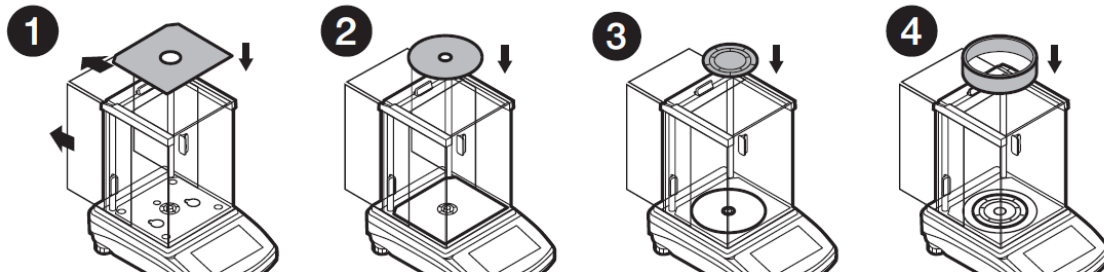
Model: TB-800-160(i), TB-800-220(i), TB-800-310(i),
Componets:
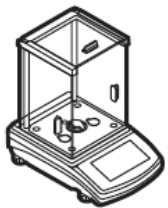
| Balance x 1 | Weighing pan x 1 | Draft shield x 1 | Bottom insert x 1 | Power adapter x 1 |
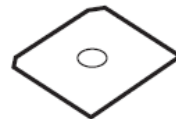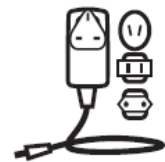
Installation:

1) Remove the transport lock– gently press the transport lock and turn it accordingly to <OPEN>, keep the transport lock should your balance be transported in the future.
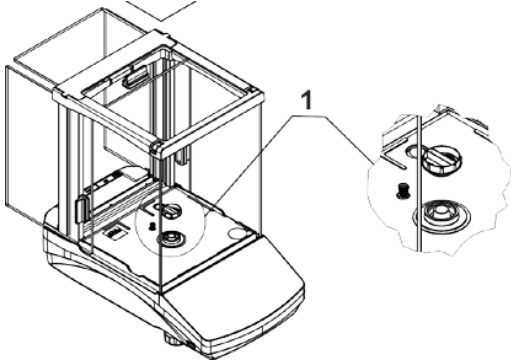
2) Check grounding spring to insure it is in the appropriate location. Make sure that the grounding spring juts slightly out of the hole.
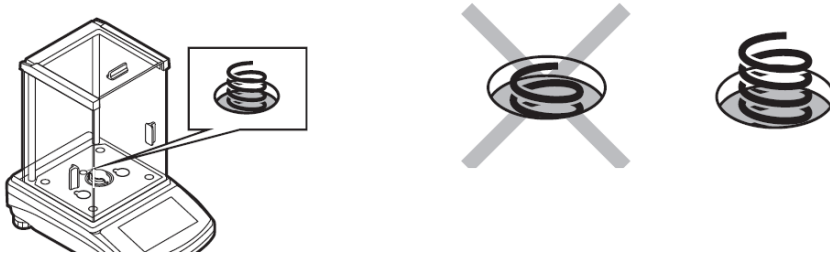
3) Install components following the diagram below:
    i.   Bottom insert
    ii. Centering ring [embossment side up]
    iii. Weighing pan
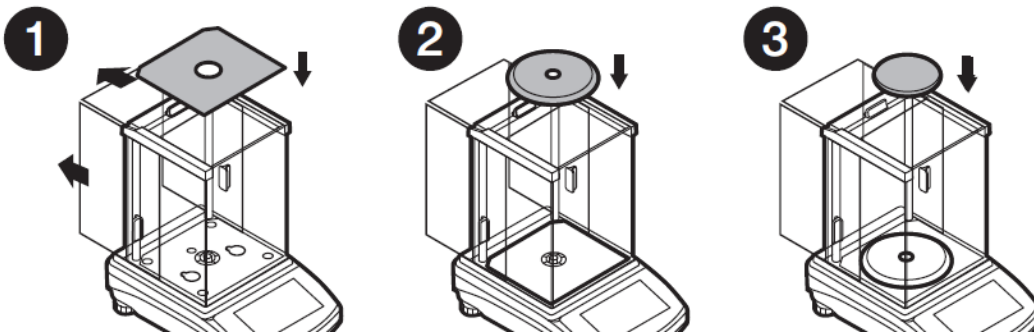
Model: TB-800-360(i), TB-800-600(i), TB-800-1000(i)
Components:
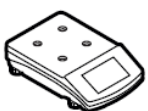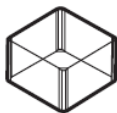
| Balance x 1 | Weighing pan x 1 | Draft shield x 1 | Grounding foot x 1 | Foot x 3 | Power adapter x 1 |

Installation:

1) Remove transport lock, keep the transport lock should your balance be transported in the future.
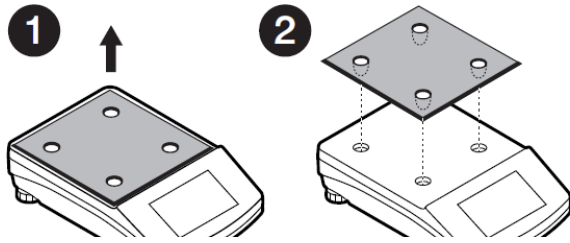
2) Check that the grounding spring is in the correct location, the spring juts slightly out of the hole.

Grounding foot
x 1

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
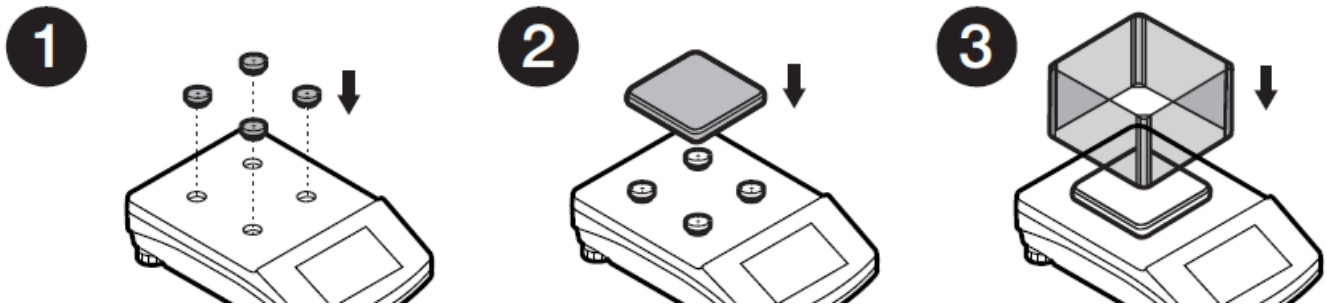
Model: **TB-800-2100(i), TB-800-6001, TB-800-10000**
Components:

| Balance x 1 | Weighing pan x 1 | Grounding foot x 1 | Foot x 3 | Power adapter x 1 |

Installation:

1) Remove transport lock, keep the transport lock should your balance be transported in the future.
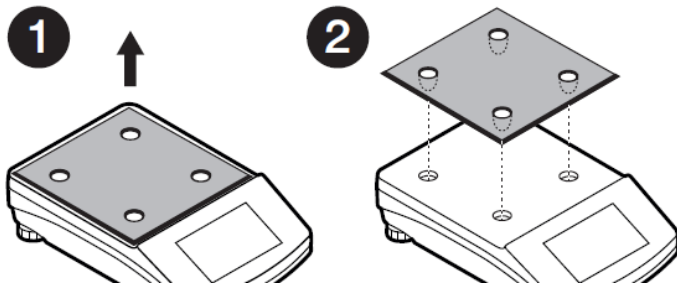
2) Check that the grounding spring is in the correct location, the spring juts slightly out of the hole.

Grounding foot
x 1

3) Install components following the diagram below:
    i. Rubber feet (grounding foot can be in any location on the balance)
    ii. Weighing pan
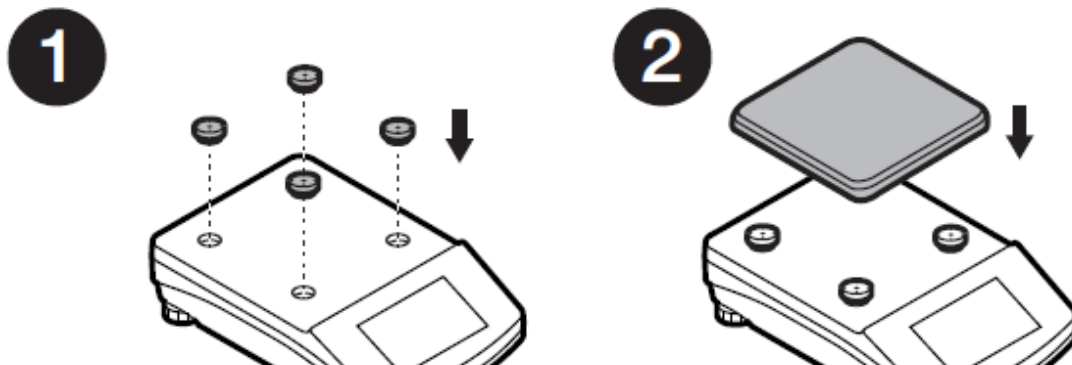
Model: TB-800-4500(i), TB-800-6000(i), TB-800-10100i
Components:

Balance
x1

Weighing pan x1
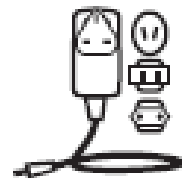
Draft shield
x1

Power adapter
x 1

Installation:

Install components following the diagram below:
- i. Draft shield
- ii. Weighing pan
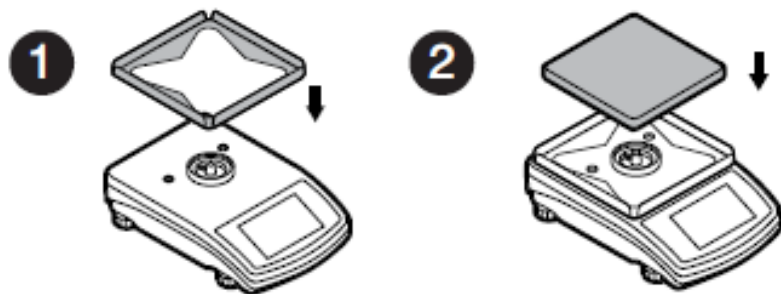
2.5 BALANCE LEVELING

It is necessary to level the balance prior to plugging it in. To level the balance (0.001g and 0.01g readability models), turn its feet until the air bubble is in the center position.
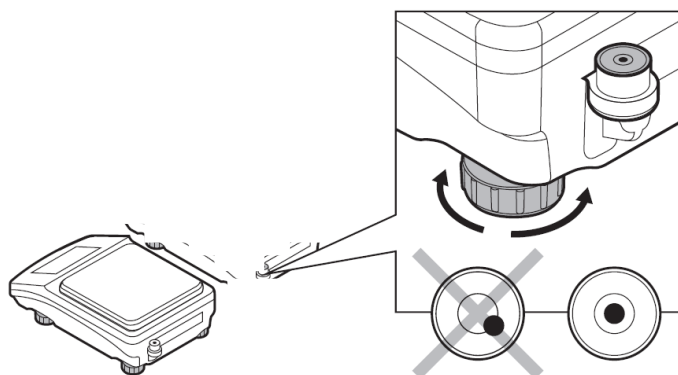
The balance should firmly rest on a surface, each of the feet must be supported.

The TB-800 Analytical and Semi-Microbalances (0.01mg and 0.1mg readability) equipped with an AutoLEVEL System which allows monitoring of the balance level. Level monitoring is performed uninterruptedly in the course of balance operation. Level status is signaled with a respective pictogram, displayed in the lower right corner of the operation panel screen, on the quick access keys toolbar.
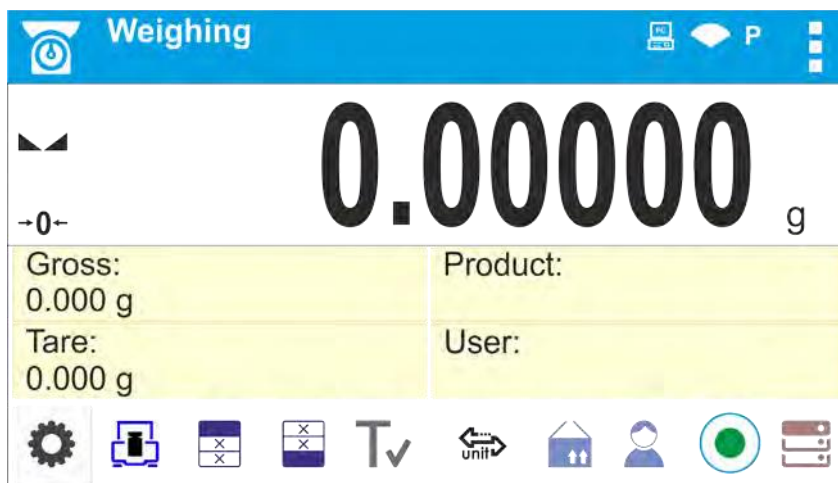
The system monitors balance level state. In case of level deviation, position of level marker is displayed on the screen ⬤ correct ⬤ incorrect levelling) and/or respective alarm is activated. Balance level setting proceeds.

Leveling procedure:

- Press < ⬤ > level status button located on the top of the display.
- Control panel of level function is displayed. Next to the level indicator, pictograms of balance's feet are displayed with the suggested direction of their rotation.

- Level the balance by turning its feet left/right, follow the pictograms, level marker moves towards the center of the circle.
- When the marker takes central position, its color turns from red to green – the balance is correctly leveled.

Go to the home screen.

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 the socket, next connect its connector to port located at the back of the balance housing.
- Press ⏻ button located in the top right hand corner of the key pad.
  - ! *Remember to start the balance with no load on the weighing pan*
- Wait until the start-up procedure is completed. The home screen of balance software is displayed automatically.

- If the indication is different than zero, please press $\rightarrow 0 \leftarrow$ button

3. BALANCE CONTROL
3.1 BALANCE KEYBOARD
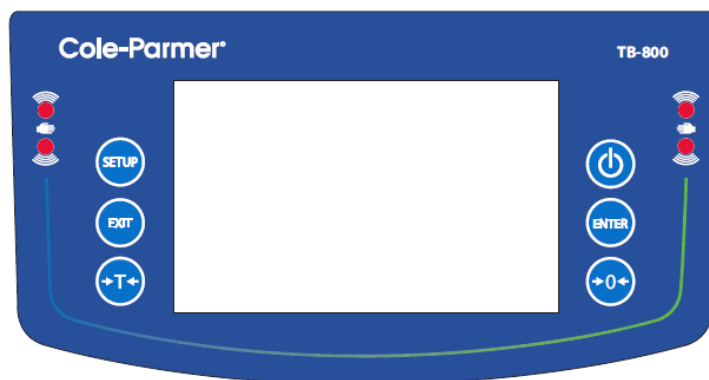
	⏻	Press to switch the balance ON/OFF
	→0←	Press to zero the balance
	→T←	Press to tare the balance
	ENTER	Press to send measurement to a printer or a computer
	EXIT	Function key <Esc>; press to abandon parameter changes or exit to previous menu level
	SETUP	Function key <Home>; press to exit to home screen
	📶	Programmable proximity sensors; press to enable operation of user-programmed functions

3.2 BALANCE HOME SCREEN
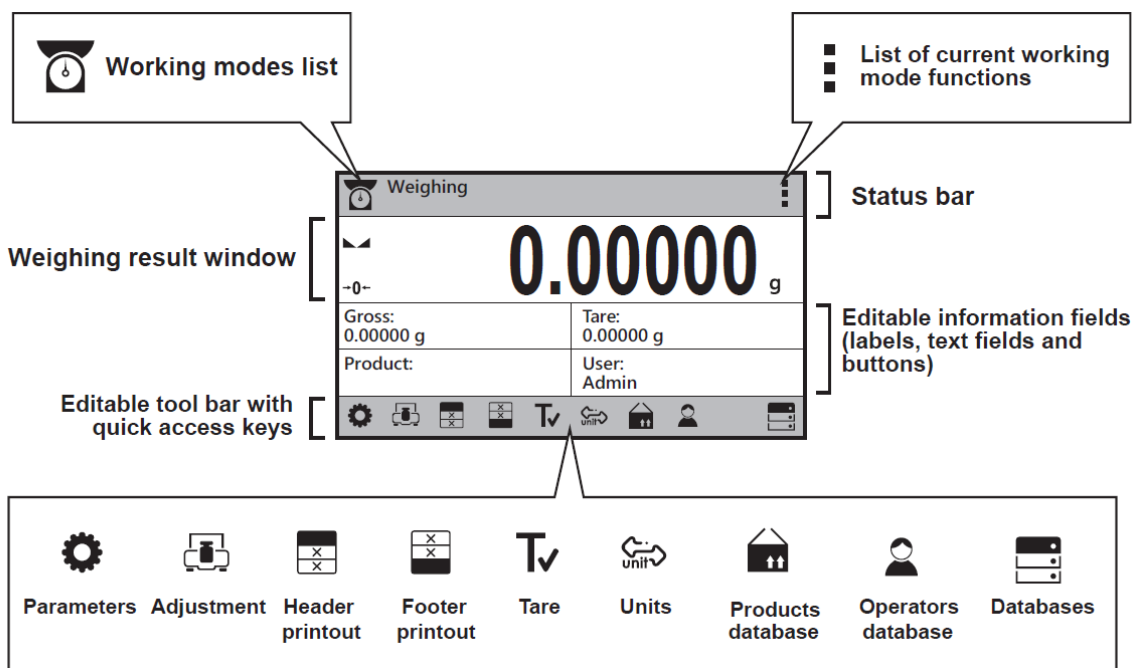
The home screen of balance software can be divided into 4 sections:

- Top section displaying data on active working mode (pictogram and name), metrologically important data and button enabling selection of functions available for a particular working mode.

Weighing
Max 220 g; Min 1 mg; d=0.1 mg g; e=1 mg; T=-220 g

The top bar displays the following information:

Ważenie	Working mode name and symbol.
	Symbol informing that wireless communication is on.
	Symbol informing that communication with a USB flash drive is on.
	Symbol informing that PC keyboard is connected.
	Symbol informing that printer is connected via USB.
	Symbol informing that communication with a PC computer is on.
	Symbol informing that data is saved to moisture analyzer memory.
A	Symbol informing that ACAI function in Parts Counting mode is active.
E2R	Symbol informing that the moisture analyzer connects with E2R system.
F	Symbol informing that the weighing profile is active.

- Section presenting the weighing result.
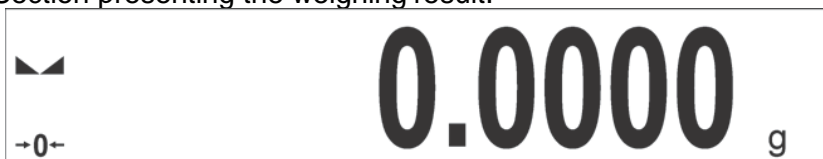
- Section comprising supplementary information on currently performed operations, and function buttons.

Gross: 0.000 g	Product: Test product 01
Tare: 0.000 g	User: Kowalski Jan

CAUTION!

Data and buttons contained in the workspace are freely configurable. For detailed information on data and buttons configuration refer to section 7 of this user manual.

3.3 USER LOG IN
Full access to user parameters and to editing databases requires logging in as an operator with **<Administrator>** permission. The logging in procedure should be carried out each time the balance in turned on.

First Log In Operation Procedure:

1

Weighing

0.00000 g

Gross:
0.00000 g

Tare:
0.00000 g

Product:
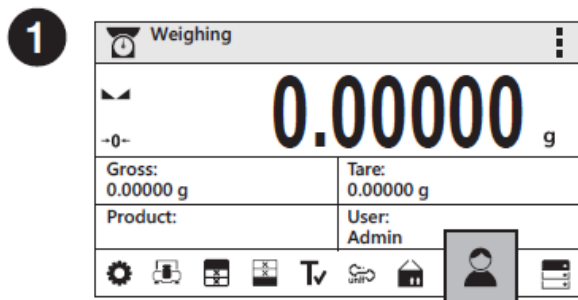
User:
Admin

Press Operators button.

2

User

Log out
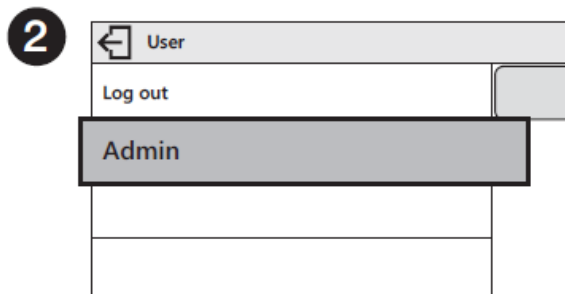
Admin

Users list is displayed, select Admin option.

3
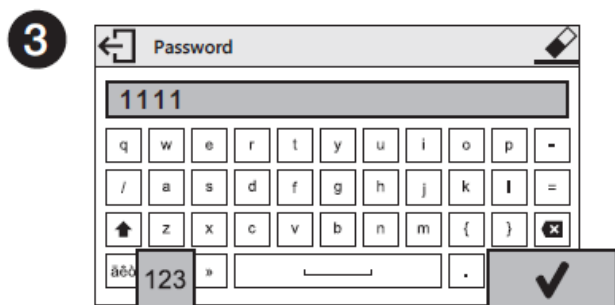
Password

1111

Press 123 button to activate numeric keyboard. Enter "1111" password and press ✔ button to confirm.

4

Weighing

0.00000 g

Gross:
0.00000 g

Tare:
0.00000 g

Product:
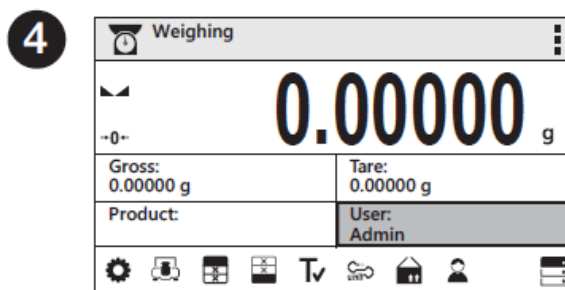
User:
Admin

You have logged in as the administrator.

On future Logging In, select a user from the list and enter the password, the software initiates operation with permissions set for the selected user.

Log out operation – procedure:

- Run the home screen and press ![person icon] **>** button, operator's database window opens,
- Press **<Log out>** soft key (located as position no. 1 in the list of operators),
- Home screen of the software is displayed again automatically.

Permissions levels

Balance software comprises of three permission levels: administrator, advanced operator, user.
Permission level dependent access to edition of user parameters, databases and software functions.

Permissions levels	*Enabled operations*
User	Free editing of parameters of <Readout> submenu. Modification of settings for **<Misc.>** parameter group, except for settings for **<Date and Time>**. The operator can start and carry out all weighing processes. The operator can preview information recorded in **<Databases>**, (s)he can define universal variables.
Advanced User	Free editing of parameters for the following submenus: <Readout>; **<Working modes>**; **<Communication>**; **<Peripherals>**; **<Misc.>**. Access to <Date and Time> submenu denied.
Administrator	Access to all user parameters and functions, editing databases enabled.

3.3 ENTERING BALANCE MENU

Operation of the balance menu is intuitive and easy to use. The touch panel makes the software operation easy. Pressing a function key, a soft key or an area on the display initiates an assigned function or process. To enter balance main menu, press **< ⚙ PARAMETERS>** button. Clicking any button within this section, or clicking any button with a parameter name, results in a change of color. This is for signaling purposes. If a given area has any function or action assigned, then it is performed automatically upon clicking (e.g. calibration procedure), respectively a window with parameters or a list of appropriate settings is displayed (available options vary depending on series features).
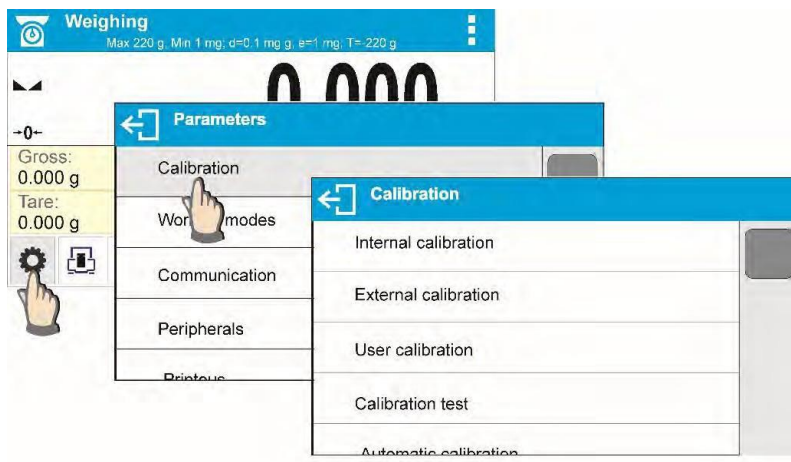
3.4 SCREEN SCROLLING
There are two methods for scrolling the screen of parameters window. The first one requires pressing, holding down and scrolling up or down the scrollbar located on the left. The second one requires pressing, holding down and scrolling up or down on any point of the displayed window.
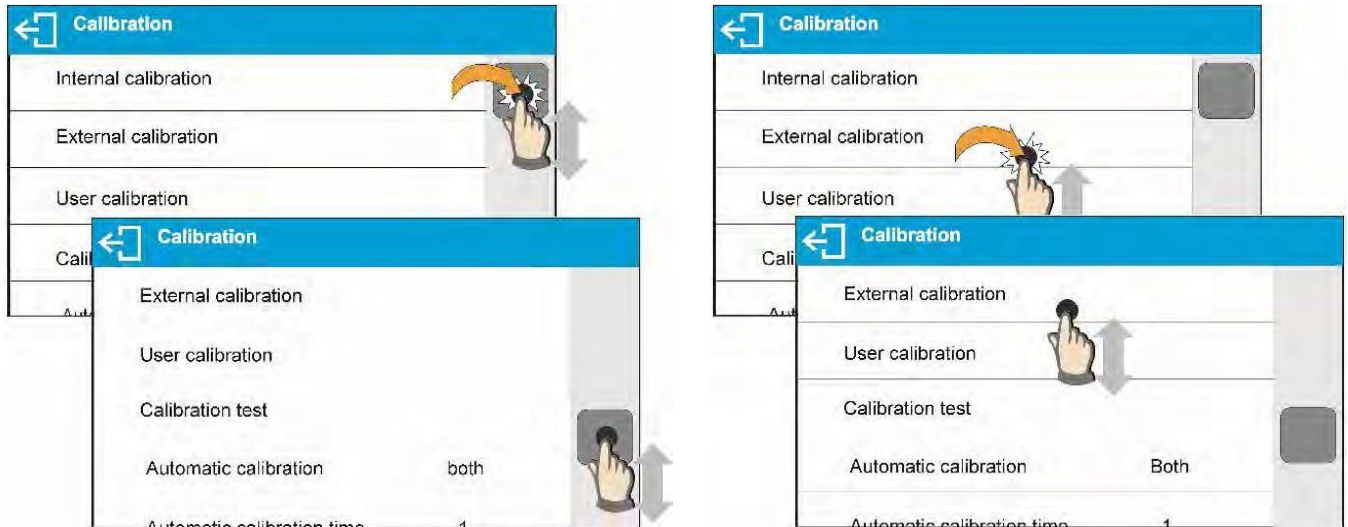
3.5 SOFT KEYS LIST

⚙	Press to enter the main menu.	✐	Press to clear the editing field.
▪	Press to scroll the menu "up", or "down".	⌨	Press to enable / disable an on-screen keyboard.
✓	Press to confirm changes.	▤→	Press to export databases (key active upon plugging a pen drive).
✗	Press to resign form introducing function modifications.	▤←	Press to import databases (key active upon plugging a pen drive).
+	Press to add a new record to a database.	🔍N	Press to search particular database entry by name.
🖶	Press to print out a particular record from a database.	🔍C	Press to search particular database entry by code.
←	Press to select variables, out of the list, for a printout.	🗑	Press to delete database's content

4. 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.

4.1 GOOD WEIGHING PRACTICE

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

- Start the balance with no load on the weighing pan.
- Load the weighing pan carefully and avoid dropping it:
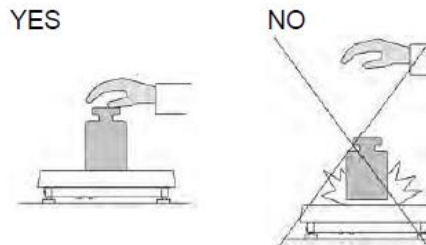
- Place weighed load in the center of the weighing pan:

- Avoid side loading, in particular side shocks:
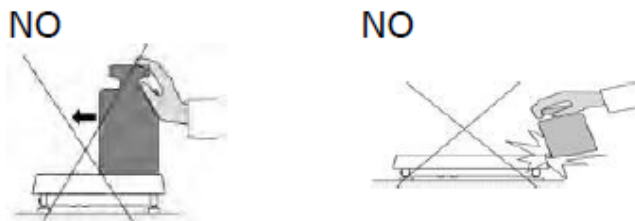
4.2 UNITS

To change the weighing unit, press the weighing unit icon. This brings up the available unit's list, choose new unit from the list displayed.
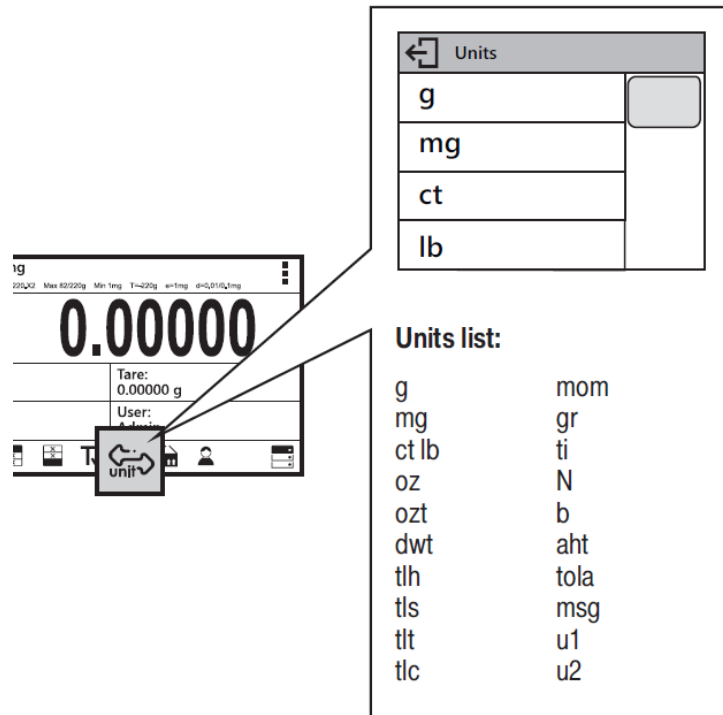
Units List:

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

4.3 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.
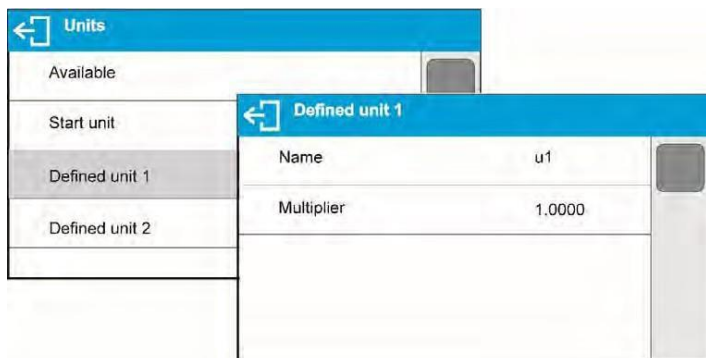
4.4 BALANCE ZEROING

Zeroing is a function allowing to zero mass indication.

Unload the weighing pan and press "Zeroing" button.

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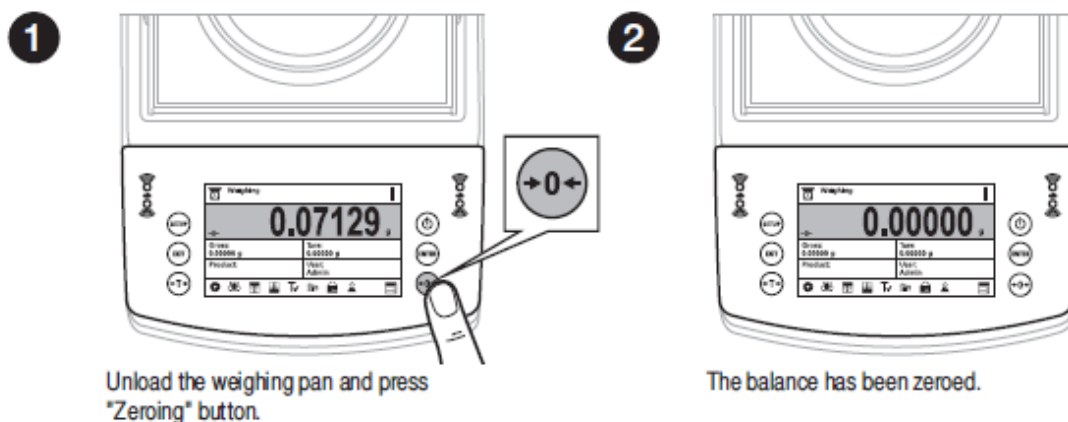
The Zeroing process is an equivalent for determining new zero point, recognized by the balance as precise zero. Zeroing is possible only for stable status of display indication.

> ! *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.*

4.5 BALANCE TARING

Taring is a function allowing to determine net weight of a measured object. To determine net weight of the object, place object's container (packaging) on the weighing pan, and on stabilization of measurement result press $\rightarrow T \leftarrow$ key.
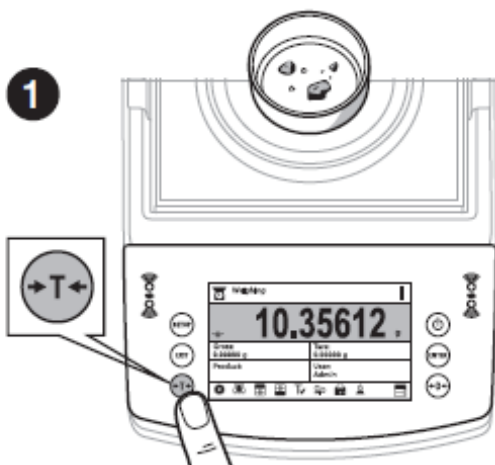
When the weighing result has been displayed press "Tare" button.
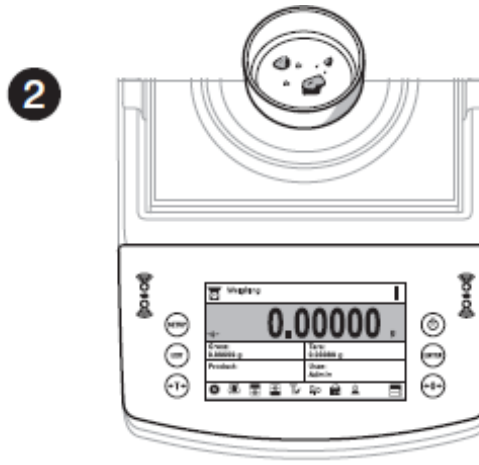
The balance has been tared.

The balance enables assigning 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. In such case, zero balance indication and repeat taring procedure.

4.5.1 MANUAL TARE DETERMINATION

- Press quick access key $T_✓$
- An on-screen numeric keyboard is displayed
- Enter tare value and press ✔ key
- The balance returns to the weighing mode, and the display indicates entered tare value with minus '–' sign

4.5.2 DELETING TARE

The tare value indicated on balance display can be deleted by pressing →0← key on balance overlay.

Procedure 1 - on taking the tared load off the weighing pan
- Press →0← key.
- The NET marker is deleted, and new zero point of the balance is determined.

Procedure 2 – with tared load on the weighing pan
- Press →0← key.
- The NET marker is deleted, and new zero point of the balance is determined.
- When tare value exceeds 2% of the maximum capacity, respective message is displayed to inform a user about the fact.

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4.5.3 TARE DATABASE

Procedure-

- While in optional mode, press button located in a top right hand corner of the mass display.

- Wait for a respective window to open, next select <PACKAGING>.
- Window with a list of tare values recorded into tare database opens.
- Select the packaging that is to be used.
- The balance returns to the weighing mode, and the display indicates selected tare value with a minus '–' sign.

<div align="center">OR</div>

- While in optional mode, press button (if displayed on the screen),
- Window with a list of tare values recorded into tare database opens.
- Select the packaging that is to be used.
- The balance returns to the weighing mode, and the display indicates selected tare value with a minus '–' sign.

4.6 WEIGH MODE SETTINGS

To simplify weighing instrument operation, there are 4 profiles in the software. Their settings are selected and saved so that the weighings for respective requirements and conditions are optimized.

Profile settings apply to settings for specific working mode and are grouped in the following parameter: *Setup/Working modes/Weighing/Readout*.

For detailed description of these settings go to the next section of this user manual.

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

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

On the top bar of the display, pictogram (a letter) informing you on currently selected profile is displayed. The profile can be selected individually for working mode. The balance saves the last used profile in each working mode (with your modifications) and starts operation with that profile selected.

Profile pictogram:

No.	Pictogram	Description
1	**U**	**User** profile
2	**F**	**Fast** profile
3	**D**	**Fast dosing** profile
4	**P**	**Precision** profile

Profile selection.

4.7 <WEIGHING> - READOUT MODE SETTINGS

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

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

4.7.1 FILTER LEVEL SETTING

Function unavailable for the following profiles: Fast, Fast dosing, Precision

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 intensively 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).

CAUTION!

The higher filter level, the longer weighing time.

4.7.2 VALUE RELEASE

Function unavailable for the following profiles: Fast, Fast dosing, Precision

Since ambient conditions at a workplace vary, it is necessary to determine the value release parameter in the most preferable way enabling balance adaptation, parameter options are: FAST.+REL., FAST or RELIABLE. Depending on the selected option, weighing time is either shorter or longer.

4.7.3 AUTOZERO FUNCTION

The software features an autozero function (Auto) ensuring precise mass indication. This function automatically controls and corrects zero indication. When Autozero is enabled, it compares balance indications at declared time interval e.g. 1s, provided that 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 – $\rightarrow 0 \leftarrow$ are displayed.

If AUTOZERO function is enabled, then each weighing process starts from precise zero point. There are, however, some cases 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 indication correction can also correct actual indication of loaded mass.

4.7.4 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 stable: last digit is displayed only for a stable weighing result.

4.7.5 BALANCE AMBIENT CONDITIONS

Parameter relating to ambient and environmental conditions in which the balance operates. There are two options: STABLE and UNSTABLE. Selecting STABLE mode makes the balance work much faster, i.e. weighing takes much less time than for UNSBABLE mode. If the ambient conditions are unstable it is recommended to use UNSTABLE mode. By default, the parameter is set to STABLE option.

5. ADJUSTMENT (CALIBRATION)

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

Calibration should be carried out:
- Before the beginning of weighing procedure
- If long breaks between following measuring series occur
- If temperature inside the balance changes more than: 1°C or 2°C for Analytical balances or 2°C for Precision series balances.

Types of calibration:
- Automatic calibration (automatic or manual)
- External calibration
- User defined calibration- external weight of declared mass which cannot be modified or of any mass, but not lower than 30% of maximum range.

5.1 INTERNAL ADJUSTMENT (TB-800-i models only)
Internal calibration can be triggered in two fashions, automatically or manually by the user.

5.1.1 AUTOMATIC ADJUSTMENT
This menu is for declaring a value initiating an automatic internal adjustment. Accessible options:
- None – automatic calibration disabled
- Time – calibration takes place in time intervals declared in menu <Automatic adjustment time>. The time interval is declared in hours and ranges between 0.5 and 12 hours.
- Temperature – calibration is triggered by temperature change only
- Both – calibration is triggered by both, temperature changes and time.

CAUTION!
Parameter settings can be modified only for balances that are not a subject to conformity assessment (NTEP certified balances).

5.1.2 MANUAL INTERNAL ADJUSTMENT (TB-800-i models only)

Calibration adjustment is carried out with of an internal calibration weight. [icon] button, when pressed, automatically triggers calibration process. Upon calibration process completion, respective message informing about process end and about its status is displayed.

CAUTION!
Calibration procedure requires stable environmental conditions (no air drafts or ground vibrations). The process must be carried out with an empty weighing pan.

5.2 EXTERNAL ADJUSTMENT

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. The process takes semi-automatic form; successive stages are signaled with prompts.

Procedure-
- Enter **<Adjustment >** submenu, next select "External adjustment" option,
- "Remove weight" prompt is displayed.
- Take the weight off the weighing pan and press ✔ button. Whereas balance determines start mass, "Adjustment; Please wait…" prompt is displayed,
- Upon completed start mass determination procedure "Put weight …" prompt is displayed along with particular mass standard value.
- Put the required weigh on a pan and press ✔ button,
- Upon completed procedure "Remove weight" prompt is displayed.
- Take the weight off the weighing pan, wait for **<Adjustment>** window to be displayed again.

5.3 USER ADJUSTEMENT

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-
- Enter <Adjustment> submenu, next select "User adjustment" option,
- Type in calibration weight to be utilized (must be at a value greater than 30% of balances max range)
- Press ✔ button.
- The balance prompts you to "Remove weight", with weighing pan clear press ✔ button
- Put the required weigh on a pan and press ✔ button,
- Upon completed procedure "Remove weight" prompt is displayed.
- Take the weight off the weighing pan, wait for **<Adjustment>** window to be displayed again.

5.4 ADJUSTMENT TEST (TB-800-i models only)

<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.

6. 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.
	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.
	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>.
	Dosing Means of operation: a user should specify sample's target mass to be obtained by pouring.
	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).
	Density of solids Means of operation: based on Archimedes principle, a balance determines density of solids. The mode requires an optional density determination kit.
	Density of liquids Means of operation: based on Archimedes principle, a balance determines density of liquids. The mode requires an optional density determination kit.
	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.
	Statistics Means of operation: carried out measurements are used to calculate statistical data, such as Min, Max, deviation, etc.
	Peak Hold Means of operation: max temporary indication occurring in course of the weighing process is hold on a display.
	Formulations 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.
	Adding Means of operations: allows you to add net masses of weighed samples.

6.1 WORKING MODES ACCESSIBILITY

Group of parameters enabling you to declare which functions are to be accessible. You can deactivate functions that are not used in course of balance operation, to do it, value **<NO>** has to be selected for a particular parameter.

Procedure:
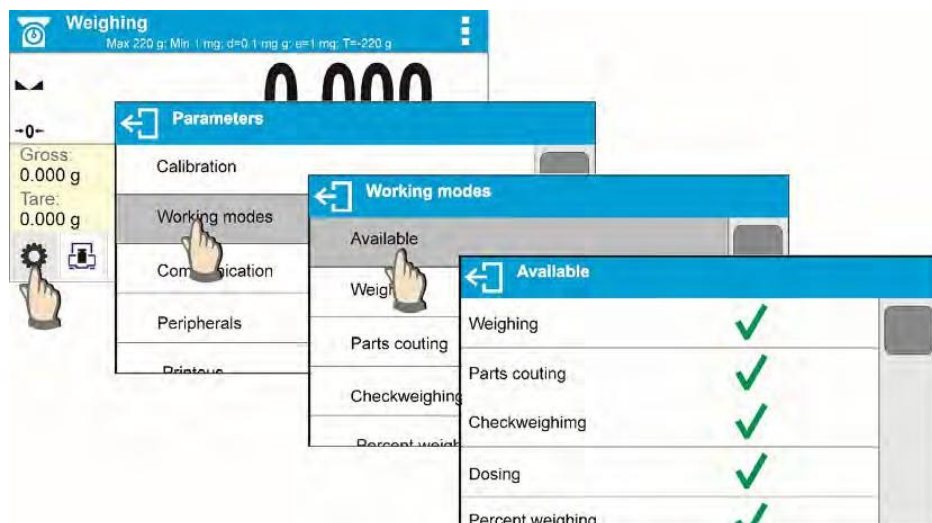
6.2 RUNNING WORKING MODE

To run working mode other than the one currently operating:

- Press pictogram of currently used working mode, the pictogram is in the top left hand corner
  Wait for the available working modes list to be displayed
- Select the working mode you need to operate.
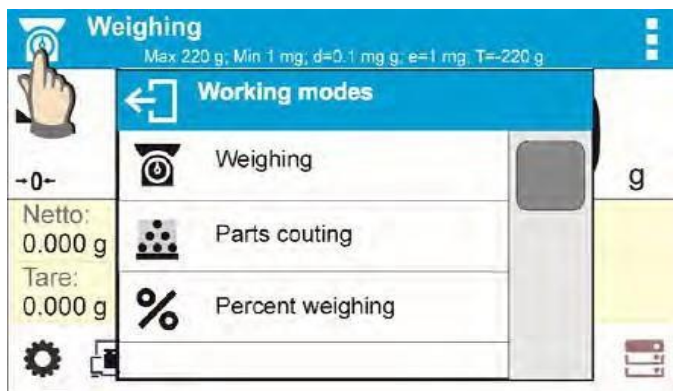
6.3 QUICK ACCESS KEYS FOR EACH WORKING MODE

Key	Function	Modes featuring the key
	Accept/Print	All modes
	Print header	All modes
	Print footer	All modes
	Zero	All modes

![Tare icon]	Tare	All modes
![Change unit icon]	Change unit	All modes (Parts Counting and Percent Weighing modes excluded)
![Select unit icon]	Select unit	All modes (Parts Counting and Percent Weighing modes excluded)
![Parameters icon]	Parameters	All modes
![Databases icon]	Databases	All modes
![User icon]	User	All modes
![Product icon]	Product	All modes
![Customer icon]	Customer	All modes
![Packaging icon]	Packaging	All modes
![Adjustment icon]	Adjustment	All modes
V1	Variable 1	All modes
V2	Variable 2	All modes
V3	Variable 3	All modes
0.000 / 0.00	Hide/show last digit	All modes (Parts Counting and Percent Weighing modes excluded)
![Working mode parameters icon]	Working mode parameters	All modes
![Set part mass icon]	Set part mass	Parts Counting mode exclusively
![Determine part mass icon]	Determine part mass	Parts Counting mode exclusively
![Determine mass using 5 parts icon]	Determine mass using 5 parts	Parts Counting mode exclusively
![Determine mass using 10 parts icon]	Determine mass using 10 parts	Parts Counting mode exclusively
![Determine mass using 20 parts icon]	Determine mass using 20 parts	Parts Counting mode exclusively

	Determine mass using 50 parts	Parts Counting mode exclusively
	Determine mass using 100 parts	Parts Counting mode exclusively
	Thresholds	Check weighing mode exclusively
	Min threshold	Check weighing mode exclusively
	Max threshold	Check weighing mode exclusively
	Target value	Dosing mode exclusively
	Set reference mass	Percent Weighing mode exclusively
	Determine reference mass (set as 100%)	Percent Weighing mode exclusively
	Start	Solids and Liquids Density modes and Formulations mode
	Results	Statistics mode exclusively
	Finish	Statistics mode exclusively
	Finish	Peak Hold mode exclusively
	Formulation	Formulations mode exclusively
	Profile	All modes
	Level *(only for analytical and semi-micro balances)*	All modes

7. PARTS COUNTING

<⋮⋮⋮ Parts counting> is a working mode which enables determination of quantity of small parts with equal weight. Determined mass of a single part is used for the counting procedure. The single part mass may be:

- Determined from a reference quantity of parts subjected to weighing,
- Acquired from database of products,
- Entered manually as a numeric value.

Procedure for activation of Parts Counting mode

Select **< ⛄ Parts counting>** mode, home screen featuring parts counting pictogram ⛄ in a top bar is automatically displayed.
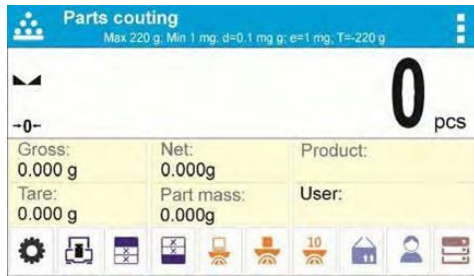
Info field provides the following information:

- Gross weight
- Tare weight
- Net weight
- Part mass
- Product
- User

7.1 SUPPLEMENTARY SETTINGS FOR PARTS COUNTING MODE
The supplementary settings enable adjusting the working mode to your needs and requirements.

ACAI, Automatic Accuracy Correction, provides the following options:
- YES, single part mass is updated
- NO, single part mass is not updated

Means of operation of ACAI function:
1. Number of pieces (on adding) on balance weighing pan has to be greater than before.
2. Number of pieces (on adding) on balance weighing pan must be less than twice the amount displayed before adding the pieces.
3. Current quantity of parts must be within □ 0,3 tolerance of the total value.
4. Measurement result has to be stabilized.

Procedure:
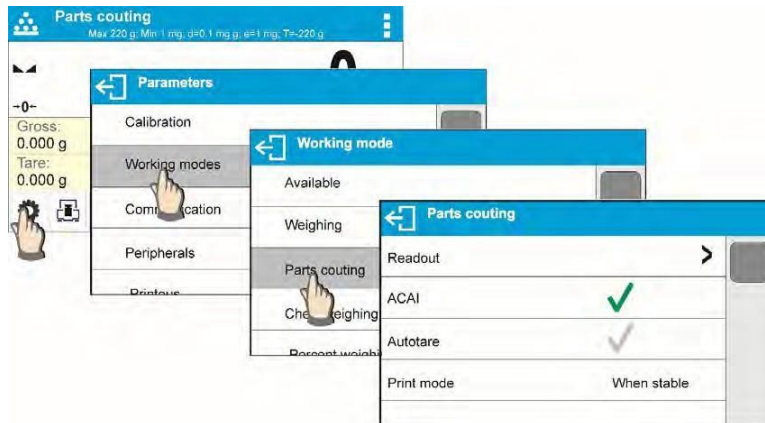
7.2 PARTS COUNTING – QUICK ACCESS KEYS
Each working mode features automatically displayed set of default quick access keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys. Such operation requires particular permissions level.

Default Quick Access Keys: parameters, adjustment, print header, print footer, set part mass, determine part mass (from a reference quantity of parts), determine mass using 10 parts, product, user, databases.

7.3 PARTS COUNTING PROCEDURE
The first step for Parts Counting mode is obtaining data on mass of a single part. Select one of available options:

- Give weight value of a single part and put parts to be counted on the weighing pan, balance displays totalized parts.

- Determine mass of a single part from a given quantity of parts. Put parts to be counted on the weighing pan, the balance displays totalized parts. In course of calculation, ACAI function pictogram $\underset{\blacktriangledown}{A}$ > is displayed (providing the function is active).
- Acquire mass of a single part from database of products by selecting a desired product record. Put parts to be counted on the weighing pan, the balance displays totalized parts.

    CAUTION!
    Any additional elements (packaging) shall be tared prior to counting process start.

With single part mass set, put parts to be counted into tare container weight of which has been stored by balance memory.

Number of weighed pieces is displayed on a screen.

Stable measurement (stability pictogram displayed) can be printed. To do it press [ENTER] button, please note a printer must be connected to perform this action.

7.4 SETTING REFERENCE BY ENTERING DETERMINED PART MASS

Procedure-

- Press Set part mass> key or the label
Part mass:
0.000g , **<Part mass>** editing window featuring an on-screen keyboard is displayed,

- Enter the requested value and confirm by pressing key, **<Parts counting>** mode is run with automatically specified part mass.
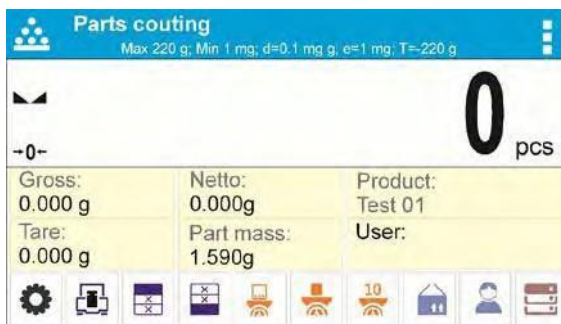
> *CAUTION!*
> *If you enter weight of value that is lower than 0.1 reading unit, then <Value too low> message is displayed.*

7.5 SETTING REFERENCE MASS BY DETERMINING PART MASS

Procedure-
- Put a container on a weighing pan, tare its mass,

- Press **<** **Determine part mass>** button, **<Reference quantity>** editing window featuring an on-screen keyboard is displayed,
- Enter the requested value and confirm by pressing key,

- Message on number of parts to be loaded is displayed: **<Number of parts to be loaded:18>**,

- Put specified number of pieces on the weighing pan, when the result is stable (� stability pictogram displayed) press [✔] key to confirm
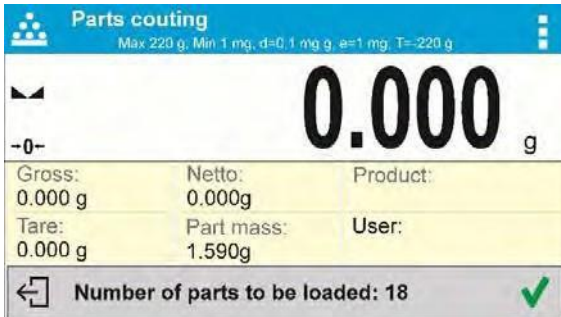
- The balance automatically recalculates single part mass, next it moves to **<Parts counting>** mode displaying number of parts loaded on the weighing pan (**pcs** marking).

> *CAUTION!*
> *It is important to remember the following:*
> - *Total mass of all parts loaded on the weighing pan must not exceed the maximum capacity (weighing range) of the balance;*
> - *Total mass of all parts loaded on the weighing pan must not be lower than value declared in parameter "**Minimal reference mass**". Unless this condition is met, the balance displays a message: **<Sample mass too low>**;*
> - *Mass of a single part must not be lower than **0,1** of balance reading unit. Unless this condition is met, the balance displays a message: **<Single part mass too low>**.*

7.6 ACQUIRING PART MASS FROM A DATABASE

Each product recorded in a database of products features a set of information which allows it to be identified by. Among the information there is mass value used during part counting process.

Procedure:

Operating **<Parts counting>** mode, press **<**🏠 **Product>** button and using the list select a particular product. The program returns to **<Parts counting>** mode with single part weigh value set automatically on the basis of data recorded for a selected product.
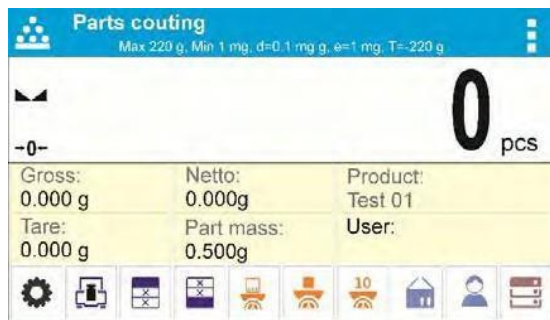
Entering reference mass to balance memory
Procedure for entering single part mass to products database:

- Press **<**▤ **Databases>** button,
- While in database press **<Products>** button,
- Press ➕ button (add product), located in the top bar,
- Fill in fields referring to product (Name, Code, EAN, Mass – for Parts Counting mode it is single part weight),
- Return to **<Parts counting>** mode.

8. CHECKWEIGHING

<▬ **Checkweighing>** is a working mode using two thresholds (Min and Max) for control of samples weight. Usually the weight is considered to be correct if it is comprised within threshold values.

Procedure for activation of checkweighing mode

Select **<**▬ **Checkweighing>** mode, home screen featuring checkweighing pictogram ▬ in a top bar is automatically displayed.

Info field provides the following information:
- Bar graph with checkweighing thresholds
- Gross weight
- Tare weight
- User

8.1 SUPPLEMENTARY SETTINGS FOR CHECKWEIGHING MODE

The supplementary settings enable adjusting the working mode to your needs and requirements. For means of operation of these functions read section 4.6 "WEIGH MODE SETTINGS".

You can place the bar graph within information field area. Below the bar graph, Min and Max threshold values are displayed.

8.2 CHECKWEIGHING – QUICK ACCESS KEYS

Each working mode features automatically displayed set of default keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys. Such operation requires particular permissions level.

Default Quick Keys: parameters, adjustment, print header, print footer, specify checkweighing thresholds, product, user, databases.

8.3 MAKING USE OF CHECKWEIGHING THRESHOLDS

In order to use checkweighing thresholds:

- Select **<Product Database** **>** with Min and Max threshold declared

- Enter numerical value for the thresholds using **>** or **>** or **>** button, in this case thresholds do not refer to any product.

Procedure 1 – selecting product from Products Database

- Press **<** **Products Database>** key.
- Using product list, select the product that is to be weighed.
- The balance displays threshold values under the bar graph within INFO area. Bar graph color corresponds to the current status of weight:
    - Yellow color: weight value below Min threshold value
    - Green color: weight value within set threshold values
    - : Max threshold value
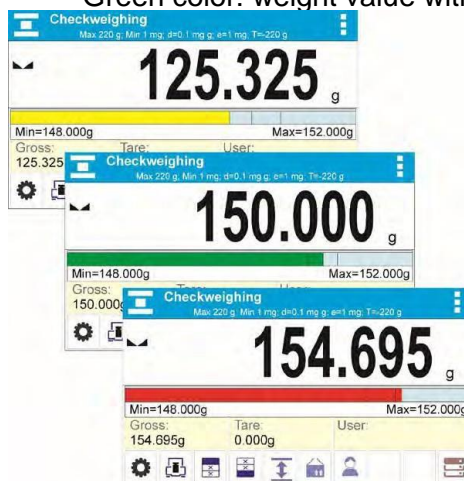
Procedure 2 – entering checkweighing thresholds manually

- Press **<** **Checkweighing Thresholds>** button,
- Window with an on-screen numeric keyboard is displayed, use it to enter Min threshold value,
- Press **< ✔ >** button for confirmation,

- Window with an on-screen numeric keyboard is displayed, use it to enter Max threshold value,
- Press **< ✔ >** button for confirmation,
- Home screen of the mode is displayed with entered threshold values.
    CAUTION!
    Max threshold value has to be greater than Min threshold value.

For thresholds value modification the following buttons are used:

- ↓ - Min threshold value modification, enter the new value using an on-screen numeric keyboard, next press **< ✔ >** button for confirmation. Upon confirmation, home screen of checkweighing mode is automatically displayed.

- ↑ - Max threshold value modification, enter the new value using an on-screen numeric keyboard, next press **< ✔ >** button for confirmation. Upon confirmation, home screen of checkweighing mode is automatically displayed.

9. DOSING

< **Dosing**> is a working mode for performance of sampling process, wherein the sampling takes as long as it is necessary to obtain pre-defined target weight.

Procedure for activation of dosing mode

Select **< Dosing>** mode, home screen featuring dosing pictogram in a top bar is automatically displayed.

Info field provides the following information:
- Bar graph with target value
- Net weight
- Tare weight
- User

9.1. SUPPLEMENTARY SETTINGS FOR DOSING MODE

The supplementary settings enable adjusting the working mode to your needs and requirements. For means of operation of these functions read section 4.6 "WEIGH MODE SETTINGS".

You can place the bar graph within information field area. Below the bar graph, Min and Max threshold values are displayed.

9.2 DOSING – QUICK ACCESS KEYS

Each working mode features automatically displayed set of default keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys. Such operation requires particular permissions level.

Default Quick Access Keys: parameters, adjustment, print header, print footer, specify target value, product, user, databases

9.3 MAKING USE OF PRODUCTS DATABASE FOR DOSING OPERATION

The operator can use target value assigned to a product or values recorded in Product Database. Additionally, option of user-defined temporary target values is at user disposal. Mass field is the target value for Product Database.

Procedure 1 – selecting product from Products Database

- Press < **Products Database>** button.
- Using product list, select the product that is to be weighed.
- Target and tolerance values are displayed automatically within bar graph area.
- Target value with minus sign is displayed
- The balance displays threshold values under the bar graph within INFO area.

- Bar graph color corresponds to the current status of weight:
    - Yellow color: weight value below Target Value - Tolerance
    - Green color: weight value within tolerance, Target Value +/- Tolerance
    - Red color: weight value above Target Value + Tolerance

Procedure 2 – target value entered manually

- Press **< ⇥ Target Value>** button,
- Window with an on-screen numeric keyboard is displayed, use it to enter the target value,
- Confirm the entered value,
- Window with an on-screen numeric keyboard is displayed again, use it to enter the sampling tolerance value,
- Confirm the entered value, home screen of the mode is displayed.

10. PERCENT WEIGHING

< 🔲 Percent weighing> is a working mode for comparison of a measured sample with the reference mass. The result is expressed in [%].

Procedure for activation of Percent Weighing mode

Select **< 🔲 Percent Weighing>** mode, home screen featuring percent weighing pictogram 🔲 in a top bar is automatically displayed.

Info field provides the following information:
- Gross weight
- Tare weight
- Net weight
- Reference mass
- Product
- User

10.1. SUPPLEMENTARY SETTINGS FOR PERCENT WEIGHING
The supplementary settings enable adjusting the working mode to your needs and requirements. For means of operation of these functions read section 4.6 "WEIGH MODE SETTINGS".

You can place the bar graph within information field area. Below the bar graph, Min and Max threshold values are displayed.

10.2 PERCENT WEIGHING – QUICK ACCESS KEYS
Each working mode features automatically displayed set of default keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys. Such operation requires particular permissions level.

Default Quick Access Keys: parameters, adjustment, print header, print footer, set reference mass, determine reference mass (set as 100%), product, user, databases.

10.3 COMPARISON OF SAMPLE OF REFERENCE MASS
Comparison of samples and reference mass can be carried out by means of:

- **<** **Set reference mass>** button used for entering reference mass value

- **<** **Determine reference mass (set as 100%)>** button used for accepting current mass loaded on a weighing pan as a reference mass,
- **<Product>** button used for selecting a product, out of products database, for which mass parameter has been defined.

Procedure 1 – determining reference mass manually

- Press **<** **Set reference mass >** button.
- Using an on-screen keyboard of a displayed window, enter reference mass value and press < > button for confirmation.
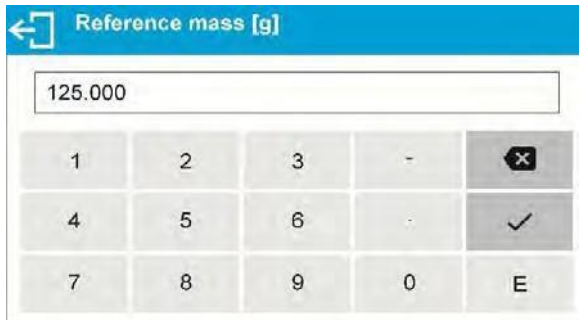
- Mass of all weighed products is compared to reference mass, the weight difference is displayed in [%].

Procedure 2 – accepting currently loaded mass as reference mass
- Put the sample on a weighing pan.

- On measurement result stabilization, press< **Determine reference mass (set as 100%)>** button, dialog bar with prompts is displayed at the bottom, follow the prompts.
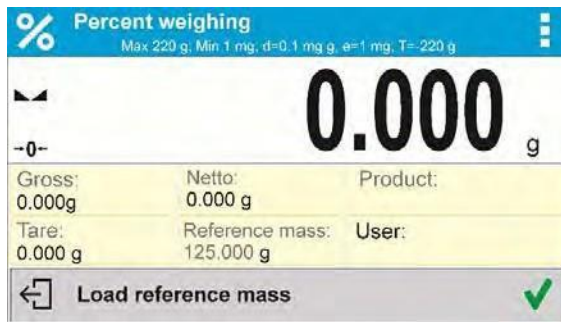
- Load the part to be weighed and upon measurement stabilization press button for confirmation,

- 100.000% indication is displayed, loaded part weight is accepted as a reference mass, it is automatically recorded and displayed in reference mass field.
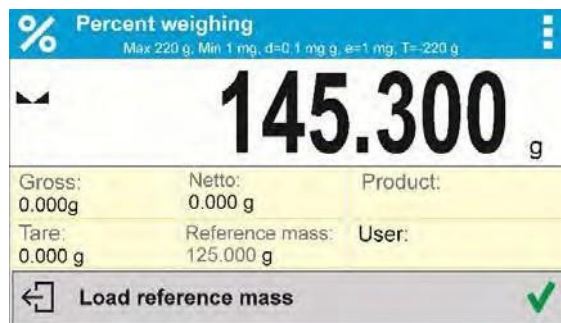
- Remove the sample form the weighing pan.
- All samples weighed afterwards are compared with the reference mass, and the display indicates the difference, expressed in [%], for each weighed sample in relation to the reference mass

Procedure 3 – selecting product from Products Database

- Press **< Product>** button, using displayed product list select the product that is to be weighed.

- Info" field automatically displays new information on reference mass and product.

- Reference mass relating to the product is recorded automatically and displayed in reference mass field.
- 0.000 % indication is displayed (for unloaded pan).
- All samples weighed afterwards are compared with the reference mass, and the display indicates the difference, expressed in [%], for each weighed sample in relation to the reference mass

11. DENSITY OF SOLIDS

< 🖱 **Solids density>** is a working mode enabling determination of density of a representative sample material.

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

Procedure for activation of Solids Density mode

Select 🖱 Solids Density> mode, home screen featuring solids density pictogram 🖱 in a top bar is automatically displayed.
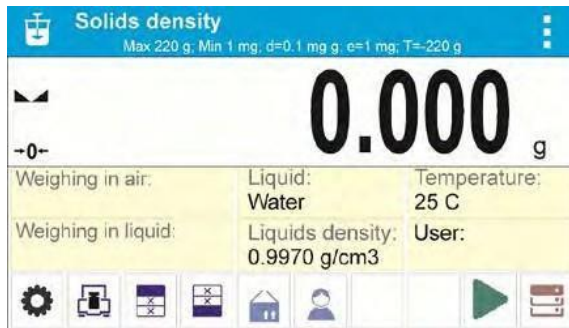
Info field provides the following information:

- Weighing in air
- Weighing in liquid
- Liquid
- Liquid density
- Temperature
- User

11.1 SUPPLEMENTARY SETTINGS FOR SOLIDS DENSITY MODE
The supplementary settings enable adjusting the working mode to your needs and requirements.
- **Liquid**
  Parameter allowing to specify liquid used for measurement performance: Water/Ethanol/Other.

- **Liquid density**
  Parameter allowing to enter density of liquid used for measurement performance. This parameter is operable only when OTHER option for LIQUID parameter has been selected.

- **Temperature**
  Parameter allowing to enter temperature of liquid used for measurement performance. Temperature value is necessary in order to take the right liquid density value needed for density calculation.

Balance stores tables with density of water and ethanol in relation to temperature.

11.2. SOLIDS DENSITY – QUICK ACCESS KEYS
Each working mode features automatically displayed set of default keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys. Such operation requires particular permissions level.

Default Quick Access Keys: parameters, adjustment, print header, print footer, product, user, start, databases.

11.3 SOLIDS DENSITY DETERMINATION
Prior to procedure start, it is necessary to set process-related parameters:
- Liquid type
  - Distilled water
  - Ethanol
  - Other liquid with determined density

- Liquid temperature
  (required if either distilled water or ethanol is used as liquid for measurement performance)

- Liquid density
  The parameter is set automatically, after the temperature has been entered, if either distilled water or ethanol is used as liquid. In case of using liquid other than distilled water or ethanol, it is necessary to enter its density manually.

The density of solids is calculated using the following formula:
$$\rho = \frac{A}{A - B} \rho^O$$

ρ - density of a sample
A - sample's mass measured in the air
B - sample mass measured in liquid
ρ^O - liquid density
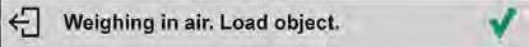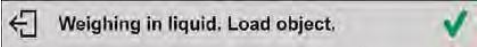
Determination of density for a particular solid consists in weighing the solid in the air first (using a top weighing pan of the density determination kit), and in the liquid next (using a bottom weighing pan of the density determination kit). Upon completed procedure the result is displayed automatically.

Procedure-

1. Install density determination kit
2. Enter **<SOLIDS DENSITY>** function.
3. Prepare sample that is to be measured.
4. Start the process by pressing **< ▶ Start>** button.
5. Select liquid type intended for the test performance.
6. Enter the liquid temperature (the program displays the most recently operated temperature value).
7. If liquid assigned to OTHER parameter is used, enter its density for measurement temperature.
8. The following message is displayed in a bottom bar: `↩ Weighing in air. Load object.   ✔`
9. Put your sample on a top weighing pan (sample weight measurement carried out in the air), confirm the indication upon stabilization.

sample on the top pan
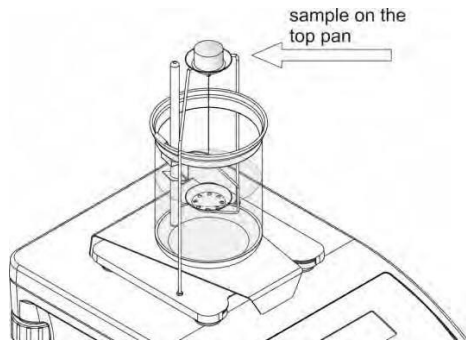
10. The following message is displayed in a bottom bar: `↩ Weighing in liquid. Load object.   ✔`
11. Now put your sample on a bottom weighing pan (sample weight measurement carried out in the liquid), confirm the indication upon stabilization.

sample on the bottom pan
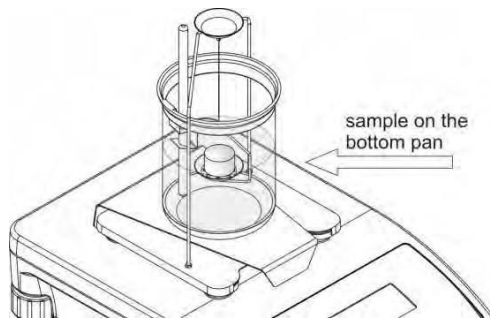
12. Upon confirmation of the second indication, the balance automatically calculates measured solid density, which is next displayed together with a respective message.

Solids density		
Max 220 g, Min 1 mg, d=0.1 mg g, e=1 mg, T=-220 g		
1.981312 g/cm3		
Weighing in air: 26.9823 g	Liquid: Water	Temperature: 25 C
Weighing in liquid: 13.4038 g	Liquids density: 0.9970 g/cm3	User:
↩ Indication		
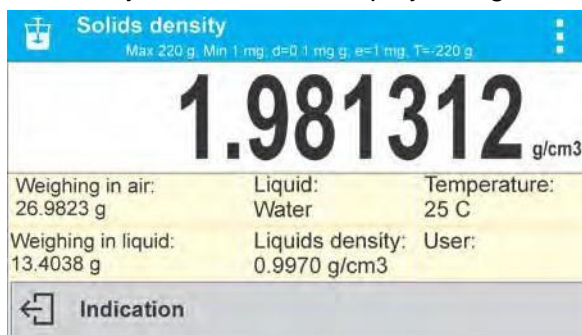
A report of the measurement can be printed through the attachment of a printer to the balance.

To print the report, press the **ENTER** button.

An example report:

```
----------Solids density----------
Date                     2015.04.29
Time                        6:44:00
Balance Id                     1236
User                          Admin
Liquid                        Water
Temperature                 25.0 °C
Liquids density      0.99707 g/cm3
Waighing in air           26.9823 g
Waighing in liquid        13.4038 g
Density              1.981312 g/cm3
----------------------------------
Signature                         1

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

To finish density determination process, press **EXIT** key. The home screen for solid density mode is displayed. The next measurement can be started now. The balance operates with previously entered settings (liquid, temperature) thus providing quicker start of the very measurement.

12. DENSITY OF LIQUIDS

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

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

Procedure for activation of Solids Density mode-

Select **<⚖ Liquids Density>** mode, home screen featuring liquids density pictogram ⚖ in a top bar is automatically displayed.

Info field provides the following information:
- Weighing in air
- Weighing in liquid
- Sinker volume
- User

12.1 SUPPLEMENTARY SETTINGS FOR LIQUIDS DENSITY MODE
The supplementary settings enable adjusting the working mode to your needs and requirements.

Sinker volume
Parameter allowing to enter volume of the sinker.

12.2 LIQUIDS DENSITY – QUICK ACCESS KEYS
Each working mode features automatically displayed set of default keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys. Such operation requires particular permissions level.
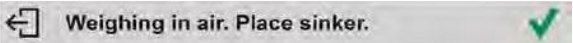
Default Quick Access Keys: parameters, adjustment, print header, print footer, product, user, start, databases.

12.3 LIQUIDS DENSITY DETERMINATION
Glass-made sinker is a basic component for liquid density determination. Its volume, given on a sinker hanger, is precisely calculated. Prior to determination, enter the sinker volume value into balance memory.

Determination of density for a particular solid consists in weighing the sinker in the air first, and in the liquid next. Upon completed procedure the result is displayed automatically.

Procedure-

1. Install density determination kit
2. Enter **<LIQUIDS DENSITY>** function.
3. Prepare sample that is to be measured (pour tested liquid to the beaker).
4. Start the process by pressing **< ▶ Start>** key.
5. Enter the sinker volume (the program displays volume of the most recently used sinker).
6. The following message is displayed in a bottom bar: Weighing in air. Place sinker. ✓

7. Hang the sinker on a stand (sinker weight measurement carried out in the air), confirm the indication upon stabilization.
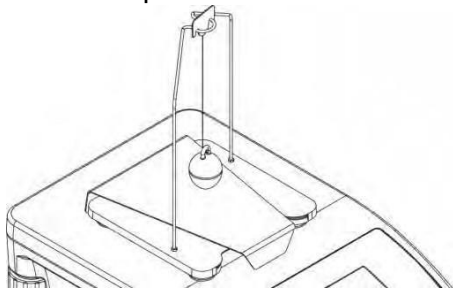
8. The following message is displayed in a bottom bar: Weighing in liquid. Place sinker.
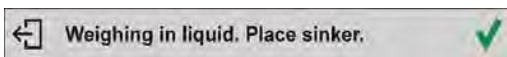
9. Now take the sinker out of the stand and put a beaker on the beaker basis (the beaker cannot be in contact with the stand), gently hang the sinker on the stand making sure that it is completely immersed in the liquid (measurement carried out in the liquid), confirm the indication upon stabilization.
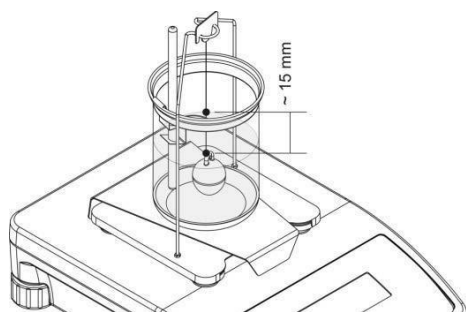
10. Upon confirmation of the second indication, the software automatically calculates measured liquid density, which is next displayed together with a respective message.

A report of the measurement can be printed through the attachment of printer to the

balance. To print the report, press the **ENTER** button.

An example report:

```
------------Liquids density------------
Date                      2015.04.29
Time                       6:57:04
Balance Idi                 1236
User                       Admin
Sinker volume           2.0000 cm3
Weighing in air           26.9808 g
Weighing in liquid        13.4032 g
Density            6.788800 g/cm3
----------------------------------------
Signature

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

To finish density determination process, press EXIT key. The home screen for liquid density mode is displayed. The next measurement can be started now. The balance operates with previously entered settings (sinker volume) thus providing quicker start of the very measurement.

13.   ANIMAL WEIGHING

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

Procedure for activation of Animal Weighing mode-

Select < **Animal Weighing>** mode, home screen featuring animal weighing pictogram in a top bar is automatically displayed.

Info field provides the following information:
- Gross weight
- Tare weight
- Product
- User

13.1 SUPPLEMENTARY SETTINGS FOR ANIMAL WEIGHING MODE
The supplementary settings enable adjusting the working mode to your needs and requirements.

- **Averaging time**
  Time interval within which measurements are analyzed. Obtained data is used for calculation of measurement result. The result is given in [s].

- **Autostart**

Parameter determining whether the measurement is to be carried out manually (on pressing ▶ key) or automatically:

- • YES: automatically performed operation,
- • NO: manually performed operation.

Automatic operation basis: the object is measured automatically when put on a weighing pan and when the indication exceeds pre-set threshold value (respective message is displayed).

← Determining. Remaining time 10 s.

On completed measurement procedure the following message is displayed.

← Indication

Measurement of the next object can be carried out when: previous load has been removed and

< EXIT > key pressed. Now the new object can be loaded. The next measurement starts when the pre-set threshold value is exceeded.

Auto threshold
Value expressed in mass units. In order to start the measurement, the indicated value has to be greater than the threshold value.

13.2. ANIMAL WEIGHING – QUICK ACCESS KEYS
Each working mode features automatically displayed set of default keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys. Such operation requires particular permissions level.

Default Quick Access Keys: parameters, adjustment, print header, print footer, product, user, databases.

13.3 ANIMAL WEIGHING PROCEDURE
- • Set the function parameters (averaging time, autostart, autothres).

- • Load the object that is to be weighed on a weighing pan, press < ▶ > key; for automatic operation, mass determination process starts when the pre-set auto threshold mass is exceeded.

- On completed mass determination process, "freezed" weighing result is displayed, the mass is automatically printed using the printer.

- The next measurement can be carried out when< **EXIT** > key is pressed:
    - for manual operation press < ▶ > key,
    - for automatic operation, remove weighed object form the weighing pan and load the new object.

14. STATISTICS

< ili **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.

Procedure for activation of Statistics mode

Select < ili **Statistics>** mode, home screen featuring statistics pictogram ili in a top bar is automatically displayed.

Info field provides the following information:
- N (number of samples)
- Sum (total weight of samples within a series)
- Min (minimum value in a series)
- Max (maximum values in a series)
- SDV (standard deviation)
- User

14.1. SUPPLEMENTARY SETTINGS FOR STATISTICS MODE
The supplementary settings enable adjusting the working mode to your needs and requirements.

14.2. STATISTICS – QUICK ACCESS KEYS

Each working mode features automatically displayed set of default keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys. Such operation requires particular permissions level.

Default Quick Access Keys: parameters, adjustment, print header, print footer, statistics, delete statistics, product, user, databases.

14.3 PARAMETERS FOR SERIES OF MEASUREMENT

For each series of measurements, it is possible to overview the results, print a report, delete results of all statistics.

Procedure 1-

- Press **< Results>** button

- Results of performed measurements are displayed, top bar features delete and print options.
- Select:

  - , if you want to print a report
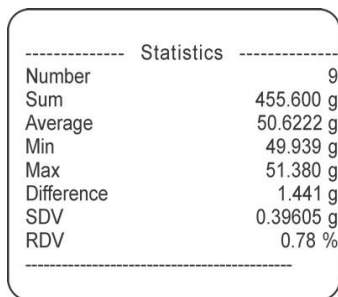
- , if you want to delete all information on statistics

Procedure 2-

- Press **< Finish>** button, statistical data is printed and deleted automatically.

15. PEAK HOLD

< Peak Hold> is a working mode allowing you to snap value of maximum force applied to the weighing pan during one loading. Apart from standard settings for this mode (described in the

weighing mode), additional parameter has been introduced, it sets threshold value determining function activation.

Procedure for activation of Peak Hold mode

Select **<Peak Hold>** mode, home screen featuring peak hold pictogram ⬆ in a top bar is automatically displayed.

Info field provides the following information:
- Net
- Gross
- Tare
- Threshold
- Product
- User

15.1 SUPLEMENTARY SETTINGS FOR PEAK HOLD MODE
The supplementary settings enable adjusting the working mode to your needs and requirements.

THRESHOLD – function determining start point for peak hold control performed by the balance software. Remember to set this threshold prior to the measuring process.

15.2. PEAK HOLD – QUICK ACCESS KEYS
Each working mode features automatically displayed set of default keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys. Such operation requires particular permissions level.

Default Quick Access Keys: parameters, adjustment, print header, print footer, product, user, delete, databases.

15.3 MEANS OF OPERATION
- Enter **<PEAK HOLD>** mode
- Once you select the mode, the function is active. In order to provide proper operation, set the threshold in grams determining point beyond which the function starts to register maximum force applied.
- From now on the balance registers and holds every single weighment 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 on the right over the measuring unit.

- Press ⬤ENTER button in order to print the result. Please note, a printer must be connected to perform this operation.
- The start of the next process of peak hold measurement is possible only after removing the load from the weighing pan and pressing ✖ button. This causes returning to the home screen of **<PEAK HOLD>** mode, pictogram **<Max>** is automatically deleted.

16. FORMULATIONS

< ■■ Formulations> is a working mode allowing you to prepare multi-ingredient mixture. The whole process is performed automatically.

While making mixtures you can:
- Use formulations database, the program helps you dose particular ingredients, you are prompted with messages providing you with respective instruction,
- Make mixture on your own, without using formulations database, with this option you control ingredients dosing, sequence and quantity by yourself.

If you want to use formulations database, first you have to make a formulation, next apply it.

Making formulations is possible using Formulation Database option.

Procedure for activation of Formulations mode

Select **< ■■ Formulations>** mode, home screen featuring animal weighing pictogram ■■ in a top bar is automatically displayed.

Info field provides the following information:
- Bar graph
- Formulation
- Target value
- Sum

> *CAUTION!*
> *Information area may contain bar graph – a graphic interpretation of ingredient weight which informs if the weight stays within correct thresholds and specified +/- tolerance.*

16.1 SUPPLEMENTARY SETTINGS FOR FORMULATIONS MODE

The supplementary settings enable adjusting the working mode to your needs and requirements.

Multiplier

Option designed to allow preparation of respectively larger amount of particular mixture, made in accordance with selected formulation, within one weighing process:
- **YES**, on selecting a formulation for processing, the software asks you to specify multiplier value, each ingredient is next multiplied by this value in course of weighing, i.e. entered multiplier value is valid for all the ingredients.
- **NO**, entering multiplier value is disabled, by default the value is set to <1>.

16.2. FORMULATIONS – QUICK ACCESS KEYS

Each working mode features automatically displayed set of default keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys. Such operation requires particular permissions level.

Default Quick Access Keys: parameters, adjustment, print header, print footer, product, user, formulation, start, databases.

16.3 ADDING FORMULATION TO FORMULATIONS DATABASE

Formulation database menu has been designed to enable adding formulations. You can add up to 100 formulations consisting of 25 ingredients maximally.

Formulation database contains formulations names, ingredients names and their weight. For formulation you can use a database-recorded product or product with unspecified name. For each used product enter weight value determining how much of the ingredient is to be added to mixture, next specify tolerance thresholds for dosing. Weight value and tolerance enable display of bar graph providing information on amount of dosed ingredient (read Dosing section for detailed description of bar graph).

While adding formulation, first it is necessary to name products required for the formulation. In course of adding, specify ingredients and their weight.

Particular procedure steps are displayed in a form of prompts.

Make sure you know complete recipe as it is necessary to specify name and weight of each mixture ingredient.

Procedure-
- Enter **<Databases>** submenu, press **<Formulations>** key.
- Press **< Add>** key for adding a new formulation.

New record is added and edited automatically. Enter necessary data.

List of information defined for formulation:
- Name: click Name button, new window opens, go to the window and enter formulation name.

- Code: click code button, new window opens, go to the window and enter code number.
- Ingredients: click ingredients button, list of formulation ingredients is displayed (for new formulation the list is empty), add the ingredients:
  - press **<** ✛ **Add>** button,
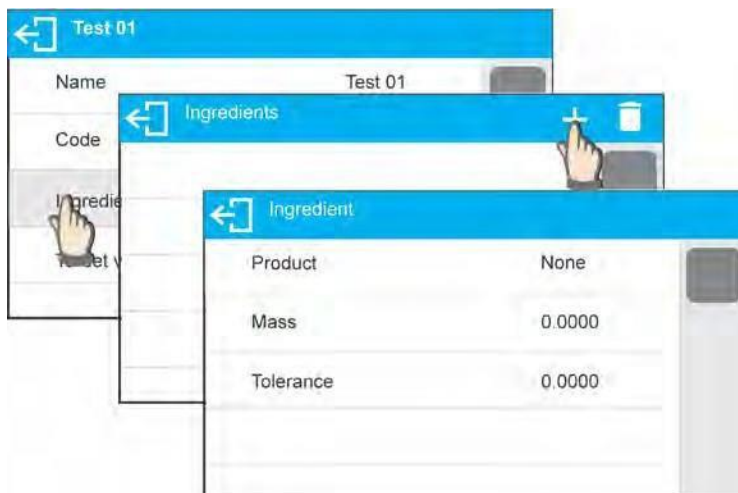
- New record is added and edited automatically, enter respective ingredient data,
- Press ⬤EXIT button to go one level up,
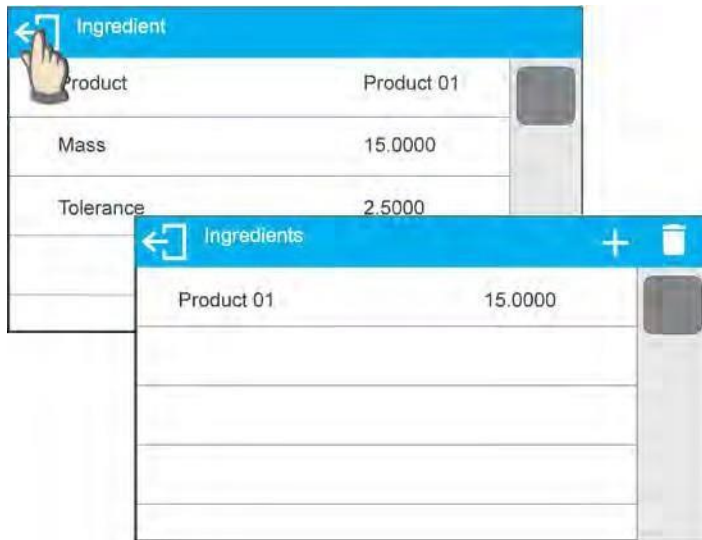
- Enter remaining formulation ingredients.

- Target value – target weight, total mass of all the ingredients, non-editable option, it is updated automatically by the program upon each ingredient adding.
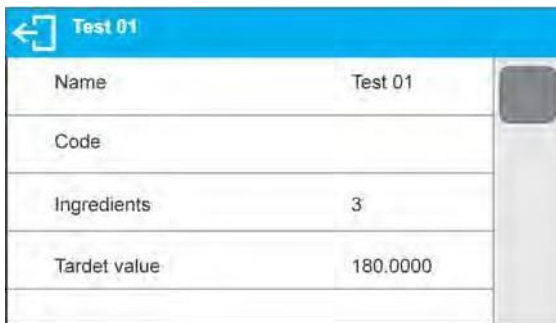
- Go back to the home screen.

16.4 USING FORMULATIONS FOR WEIGHING

With FORMULATIONS function launched, you can prepare mixture either manually or by selecting formulation out of database.

Mixture preparation options:
- formulation that is not saved in the Formulation Database – i.e. "manually",
- formulation that is saved in the Formulation Database,
- formulation that is saved in the Formulation Database – using multiplier function.

Select a particular formulation, weigh each of its ingredients. Wait for the indication to stabilize next press ✔ > button, with this weight of each ingredient is tared, i.e. it is accepted for the total mass of the formulation.

Press ⬑ > button to cancel the formulation making process. Now you can prepare a different formulation.

Procedure 1 – Preparing formulation that is not saved in the Formulation Database – i.e. "manually".

Following the prompts:

- Load container intended for the ingredients

- Go to quick access bar and press **<Start ▶ >** button
- List of formulations is displayed
- Press **<None>** button

- Home screen is displayed, container weight is tared automatically, navigation bar with messages for ease of operation is shown

- Pour specified amount of ingredient no. 1

- Press ✔ > button to confirm, ingredient weight 1 is recorded into balance memory (Sum field provides weight of dosed ingredient no.1), indication is tared

- Repeat the steps for remaining mixture ingredients
- Having completed dosing press ⬅ button, wait to see the following message: "Weigh to reach specified weight?", press ✔ button in order to boost mixture weight to a specified value

- Main window displays net weight of already weighed ingredients, respective message is provided at the bottom bar,
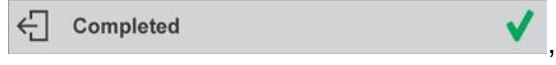
- Boost mixture weight, weigh as much as required to provide specified weight value

- Press ✔ button to confirm, mixture dosing ends, formulation report is printed and recorded in a database (read next section of this manual to view an example of the report), the following message is displayed: "Completed"

- Press ✔ button in order to proceed to other operations.

OR

- With the last ingredient dosed and weighed, press ⬅ button,

- Wait to see the following message: "Weigh to reach specified weight?"

  press ⬅ button again in order to resign from boosting mixture weight to a specified value, if there is such a need,

- Wait to see the following message: ,

- Press ✔ button to confirm, mixture dosing ends, formulation report is printed and recorded in a database (read next section of this manual for an example of the report), the following message is displayed: ,

- Press ✔ button in order to proceed to other operations.

Procedure 2 – Preparing formulation that is saved in the Formulation Database. Basic option for creating recipes.

Following the prompts:
- Load container intended for the ingredients,

- Go to quick access bar and press Start ▶ > button,
- List of formulations is displayed, select the formulation that is to be carried out,
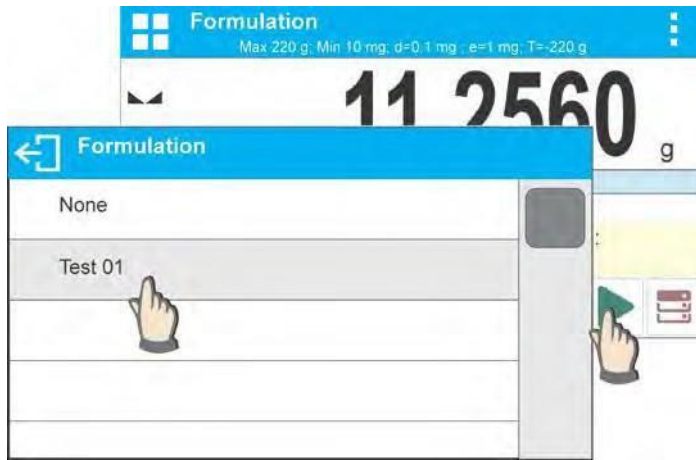
- Home screen is displayed, container weight is tared automatically, <Formulation> field provides formulation name, <Target value> field provides total weight value for a selected formulation, navigation bar with messages for ease of operation and with names of particular mixture ingredients is shown,

At the top of information area there is a bar graph, underneath the bar graph weight value that is to be dosed is displayed. Bar graph color changes gradually depending on the ingredient weight (read Dosing section for detailed description of bar graph).

- Pour specified amount of ingredient no. 1

- Press ✔ > button to confirm
- Weight of ingredient 1 is recorded into balance memory (Sum field provides weight of dosed ingredient no.1), indication is tared,

- Repeat the steps for remaining mixture ingredients,

- When dosing is completed formulation report is printed and recorded in a database (read next section of this manual to view an example of the report), the following message is displayed: "Completed"

- Press ✔ button in order to proceed to other operations

- Press ⬅ button to abort formulation any time you need.

PROCEDURE 3 – Preparing formulation that is saved in the Formulation Database – using multiplier function.

Go to Formulation mode settings and set **<Multiplier>** parameter to **<YES>** value, next follow the below procedure.
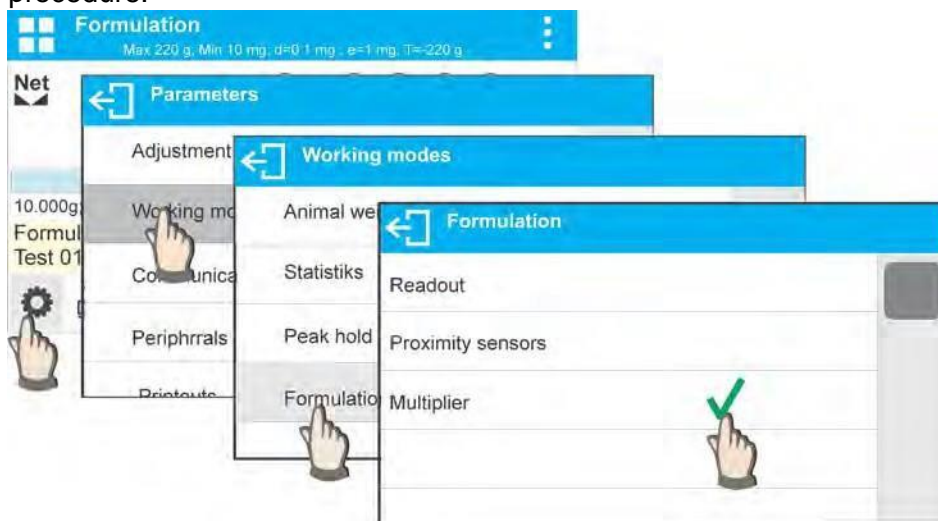
- With **<YES>** value selected, the program asks you to specify multiplier value prior to each process start.

Following the prompts:
- Load container intended for the ingredients

- Go to quick access bar and press Start ▶ > button
- List of formulations is displayed, select the formulation that is to be carried out
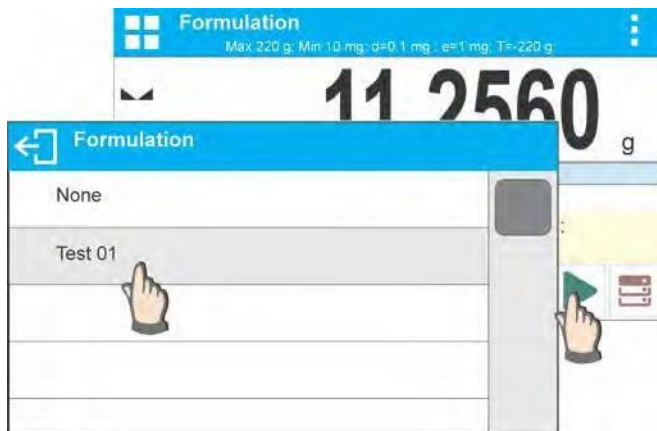
- Window with numeric keyboard is displayed, enter the multiplier value

- Home screen is displayed, container weight is tared automatically, <Formulation> field provides formulation name, **<Target value>** field provides total weight value for a selected formulation, navigation bar with messages for ease of operation and with names of particular mixture ingredients is shown

16.5 PERFORMED FORMULATIONS REPORT

Upon each completed formulation process the program generates a report. The report is recorded in **<Formulations reports>** database. Report file name contains date and time of particular process performance.

Report example:

----------- Formulation Report --------------

User	Nowak Jan
Formulation name	Test 1
Start date	2015.07.10 13:21:40
End date	2015.07.10 13:22:28
Ingredients quantity	5
Measurements quantity	5

----------------- Ingredient 1 -----------------

Name	Product 01
Weight	19.994 g

----------------- Ingredient 2 -----------------

Name	Product 02
Weight	49.993 g

----------------- Ingredient 3 -----------------

Name	Product 03
Weight	9.999 g

----------------- Ingredient 4 -----------------

Name	Product 04
Masa	1.001 g

----------------- Ingredient 5 -----------------

Name	Product 05
Weight	19.995 g
Sum	100.982 g
Target value	101.000 g
Difference	-0.018 g
Status	Completed

Signature

....

17. ADDING

Σ **<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.

Procedure for activation of Adding mode:

- Enter <Adding> mode. Program automatically returns to the home screen and displays Σ pictogram in the upper part of the display:

Info field provides the following information:

- Quantity (quantity of samples measured in a series)
- Sum (total mass of samples in a series)
- User
- Buttons: parameters, adjustment, print header, print footer, results, product, user, databases

17.1 SUPPLEMENTARY SETTINGS FOR ADDING MODE
The supplementary settings enable adjusting the working mode to your needs and requirements.

17.2 ADDING – QUICK ACCESS KEYS
Each working mode features automatically displayed set of default keys. The set can be modified by assigning out-of-list quick access keys to on-screen keys.

17.3 MEANS OF OPERATION

- Enter <ADDING> mode. Data on quantity of ingredients, that are added to the total sum, and the total mass are displayed in the home screen.

- 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.

1. Net	38.00 g
Tare	0.000 g
Gross	38.00 g

- Next, take off the first sample and load the weighing pan with the second one. Confirm its mass when stable by pressing [ENTER] button.
- Add rest of the samples left in a measurement series.
- On adding all samples, end adding procedure by following the steps:
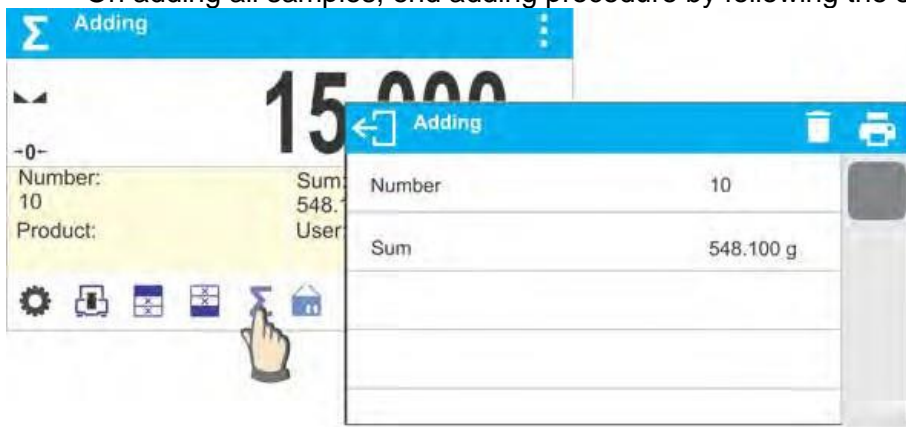
- Results of carried out measurements and the following options are displayed: Delete, Print. Select option:
  - 🖨 - to print the summary without deleting results, you can continue adding masses on returning to the home screen
  - 🗑 - to delete measurement series and, at the same time, to print the summary.

An example printout:

```
1. Net          38.000 g
Tare             0.000 g
Gross           38.000 g

.
.
.

10. Net         15.000 g
Tare             0.000 g
Gross           15.000 g
-----------------Adding------------------
Sum              0.00 g
------------------------------------------
```

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

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

CAUTION: for ADDING mode, on pressing [ENTER] *button (confirming mass of measured sample) data connected with the measurement is printed. The following data can be printed: **Measurement number**, **NET mass** (in calibration unit), **TARE mass** (in current unit), **GROSS mass** (in current unit), and **current result** (in current unit). Data for printing is to be set in GLP PRINTOUT parameter*

- Other information (except the above-listed), such as: USER, PRODUCT, DATE, TIME, VARIABLE 1, VARIABLE 2, CALIBRATION REPORT, NON-STANDARD

PRINTOUT are not printed in this mode, regardless their settings.

18. DATABASES

Balance software features the following databases :
- Products (5,000 products)
- Users (100 users)
- Packaging (100 packaging types)
- Customers (1,000 customers)
- Formulations (100 formulations consisting of 25 ingredients maximally)
- Formulations reports (500 reports)
- Ambient Conditions (10,000 records)
- Weighings (50,000 records)
- Alibi (512,000 records)

18.1 DATABASE CONNECTED OPERATIONS
The program enables the user with appropriate access level to carry out the following operations: adding new record, exporting data from databases, importing data to databases, deleting one record from the database, deleting all records from database, printing data saved in a record.

ADD NEW RECORD
Procedure:
- Enter a database and press ✚ (Add) button located in the top bar.
- Define fields for the new record (data content depends on the database).
- On returning to the databases window a new record is displayed on the list.

EXPORT
Procedure:
- Insert USB flash drive.
- Open the database that is to be exported.
- Press ⊟➔ icon located in the top bar.
- The program automatically saves exported data to a USB flash drive file, respective prompts are displayed for confirmation of successfully completed operation.
- The name of a file depends on the database.

Database	File name and extension
Operators database	users.x2
Products database	products.x2
Packaging database	packaging.x2
Customers database	customers.x2
Formulations database	formulas.x2
Non-standard printouts	non_standard_printouts.x2

IMPORT
Procedure:
- Save the file with database content that is to be imported to a flash drive. Only files exported from other balance that have proper names and extensions can be imported – see table above.
- Insert USB flash drive.
- Enter database that is to be imported.
- Press ⊟⬅ icon located in the top bar.
- The program automatically reads the file and the data is imported to the balance. Respective prompts are displayed for confirmation of successfully completed operation.

DELETE A RECORD
Procedure:
- Press the record and hold it.
- A message: <Confirm to delete> is displayed.
- Press [✔] > to confirm, the record is deleted from the list.

DELETE A DATABASE
Procedure:

- Enter selected database and press ▮ (Delete everything) pictogram located in the top bar.
- A message: <Confirm to delete all records> is displayed.
- Press [✔] > to confirm, the database is deleted.

FORMULATIONS REPORTS, WEIGHING REPORTS and ALIBI cannot be imported. ALIBI database cannot be deleted. The databases content can only be exported and saved to a flash drive. Names of files with exported data consist of serial number and proper extension (see table below).

Database	File name and extension
Formulations Reports	123456.for
Weighing Reports	123456.wei
Alibi	123456.ali

Files can be read using ALIBI Reader that can be downloaded from the USB drive included with balance.

AMBIENT CONDITIONS database serves informative purposes only. Using records preview option, you can check ambient conditions and observe how they changed over time. The data saved to

records can be printed by pressing 🖶 pictogram located in the top bar when connected to a printer. Records' names contain date and time of saving the record's data to balance memory.

18.2 PRODUCTS
Product database stores names of all products that can be weighed, counted, controlled.

Procedure:

- Enter **<** ▤ **Databases>** submenu, press <Products> key.
- Press **<** ✚ **Add>** key for adding a new product.
- For operating an already introduced product press the product field.

List of parameters defined for a product:
1. Name
2. Code [product code]
3. EAN [EAN code for a product]
4. Mass [nominal mass/single product mass]
5. Tare [tare value, set automatically when the product is selected out of the database]
6. Min [low limit for product weighing in CHECKWEIGHING mode]
7. Max [high limit for product weighing in CHECKWEIGHING mode]

8. Tolerance [% value calculated in relation to mass, the parameter determines measuring area for which the measurement is recognized as correct for DOSING mode.]

CAUTION!
Remember to assign product to particular mode, as some of data values are adopted to the particular mode functions, e.g. mass in <Percent Weighing> mode is accepted as reference mass, whereas mass in <Parts Counting> mode is accepted as single part mass. When a particular product is used for different modes then its weight, taken from product data, is associated with different data for these modes.

18.3 OPERATORS

Users database features list of operators permissioned to operate the balance. List of parameters defined for a user:
1. Name
2. Code
3. Password
4. Permissions level
5. Language

Adding a new operator – operation to be carried out by an Administrator exclusively. In order to add a new user:
- Enter Operators menu and press **< ✚ Add>** key,
- Fill in the new record fields,
- Return to window displaying operators list, the new record has been added.

Editing information - relating to an operator:
- Press selected operator name
- The selected operator parameters are displayed
- Select data that is to be modified, introduce changes.

Deleting an operator - operation to be carried out by an Administrator exclusively. In order to delete a user:
- Press and hold selected user,
- Message **<Confirm to delete>** is displayed,
- Press < ✔ > key,
- Selected user is deleted.

18.4 PACKAGING

List of used packaging with parameters such as name, code and weight value specified. When carrying out weighing process, upon selection of packaging, a respective tare value is operated automatically. The tare value is displayed with minus sign.

Procedure-

- Enter < 🗄 Databases> menu, press <Packaging> key,
- Press < ✚ Add> key for adding new packaging,
- For operating already introduced packaging press the packaging field, fill in respective data.

List of parameters defined for packaging:

1. Name
2. Code [internal code providing packaging identification]
3. Tare [packaging weight]

18.5 CUSTOMERS
Customers database features a list of names of customers for whom the measurements are carried out.

Procedure-

- Enter **< Databases>** menu, press **<Customers>** key
- Press **< + Add>** button for adding a new customer,
- For operating an already introduced customer, press the customer field, fill in respective data.

List of parameters defined for a customer:
1. Name
2. Code   [internal code providing customer identification]
3. VAT no.   [tax identification no.]
4. Address
5. Postal code
6. City

18.6 FORMULATIONS
Formulations database contains all added formulations. They can be carried out automatically.

Procedure-
- Enter **< Databases>** submenu, press **<Formulations>** key
- Press **< + Add>** button to design a new formulation, or
- Select already existing formulation button and press it

List of parameters defined for a formulation:
1. Name
2. Code
3. Ingredients
4. Target value

18.7 FORMULATIONS REPORTS
Reports on formulations database stores information on carried out formulations. Each report can be previewed and printed.

Procedure-
- Enter **< Databases>** submenu, press **<Formulation Reports>** key,
- Select particular report button out of the list, use scroll buttons to find the report you need,
- Report's name consists of date and time of its creation, e.g.: 2011.10.12 15:12:15.

Information provided by the Formulation Report:

- User
- Formulation
- Start date
- End date
- Ingredients quantity
- Measurements
- Sum
- Target value
- Difference
- Status

18.8 AMBIENT CONDITIONS
Ambient Conditions database comprises ambient conditions related information. Depending on the setup, the ambient conditions record may comprise data such as temperature, humidity, atmospheric pressure.

Procedure-

- Enter **< Databases>** submenu, press **<Ambient conditions>** key.
- Press the required record, if not visible scroll the records list down.
- Record name comprises date and time.
- To print the record press printer pictogram

  CAUTION!
  *The software saves ambient conditions record in a so-called loop, i.e. when the measurement 10,001 is saved, the measurement 1 is automatically deleted from the balance's memory. **Records saved to balance memory cannot be deleted.***

18.9 WEIGHING RECORDS
Each measurement result sent from a balance to a printer or a computer is saved in the database of weighing records. Balance user can preview data from each weighing record.

Procedure-

- Enter **< Databases>** submenu.
- Enter **<Weighing records>** database and press selected record.

Information defined for a weighing record:
- Measurement date
- Measurement time
- Measurement result
- Weight
- Tare value
- User
- Product name
- Customer, Customer name
- Packaging, tare name applied during product measurement
- Working mode name
- Warehouse, source warehouse name
- Result control, information specifying within which threshold limit the obtained result is:
  - MIN – below min threshold (possible only if **<Result control>** is set to **<NO>** value)

- OK – within min and max threshold,
- MAX – above max threshold (possible only if **<Result control>** is set to **<NO>** value)
- Variable 1
- Variable 2
- Variable 3

18.10 ALIBI

Each measurement result sent from a balance to a printer or a computer is saved in ALIBI database. Balance user can preview data from each weighing record.

Procedure:

- Enter **< Databases>** submenu.
- Enter **<Alibi>** database and press selected record.

Information defined for a particular measurement recorded into a database:
- Measurement date
- Measurement time
- Measurement result
- Weight
- Tare value
- User
- Product name

19. COMMUNICATION

Communication menu is comprised within Parameters menu. It is accessed by pressing ⚙ key. The balance can communicate with a peripheral device, wherein the communication is established via the following ports:
- COM 1 (RS232)
- COM 2 (RS232) (Not available on the analytical or semi-micro balance)
- USB 1, type A
- USB 2, type B
- Ethernet
- Wi-Fi
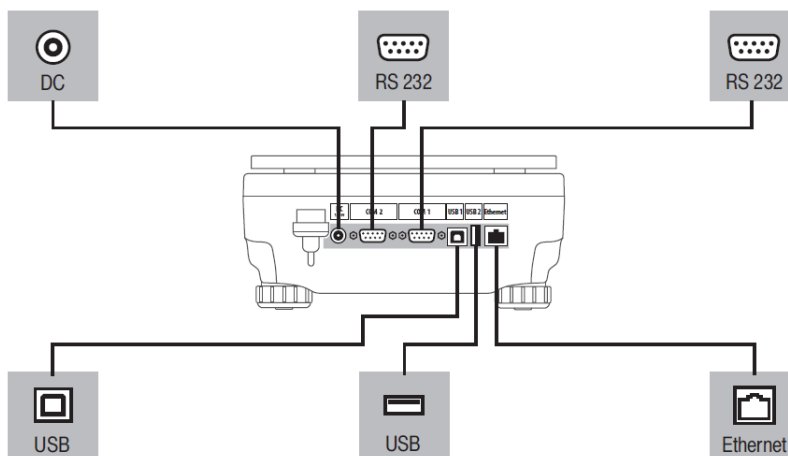
The ports can be configured using **<Communication>** parameter group. To enter this submenu, press ⚙ key, next press "Communication" key.

19.1 RS 232 PORTS SETTING

Procedure:
- Select communication port <COM1> or <COM2>
- Set appropriate values

The RS 232 ports enable the following setting of transmission parameters:
- Baud rate   - 2400, 4800, 9600, 19200, 38400, 57600, 115200 bit/s
- Parity   - None, Even, Odd

19.2 ETHERNET PORT SETTINGS

Procedure:

Select < 🖱️ **Ethernet>** communication port, next set appropriate values:

- DHCP   - Yes – No
- IP   - 192.168.0.2
- Subnet   - 255.255.255.0
- Default   - 192.168.0.1

CAUTION!
Above settings serve information purposes only. Transmission parameters should be selected in accordance with the settings of customer's local network.

Return to weighing mode and restart the device.

19.3 WI-FI PORT SETTINGS
CAUTION!
1. *Make sure that transmission parameters are accordant for your local network settings,*
2. *For correct communication via Wi-Fi, set port parameter for computer to **<WIFI>** value: **<PERIPHERALS/COMPUTER/PORT/WIFI>**, next set the parameters as follows:*

Balances equipped with Wi-Fi module features a respective pictogram at the home screen in the top right-hand corner:

Pictogram for Wi-Fi network connection status:

No.	Pictogram	Overview
1	◆	Balance connected, very strong signal
2	◆	Balance connected, strong signal
3	◆	Balance connected, poor signal
4	·	Balance connected, very poor signal
5	▽	No connection (too poor signal or inaccessible selected network or invalid connection parameters – password, IP, etc.)

Example settings for Wi-Fi port:
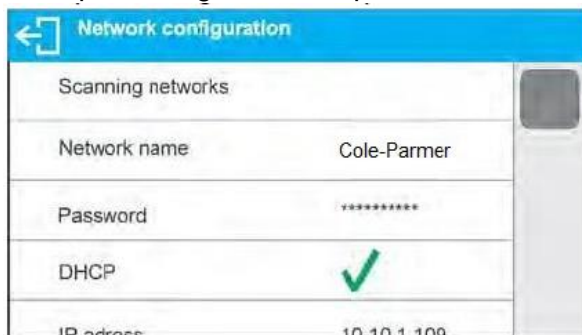
CAUTION!
The above presented settings serve informative purposes exclusively

Procedure:
- Select **<WIFI>** communication port,
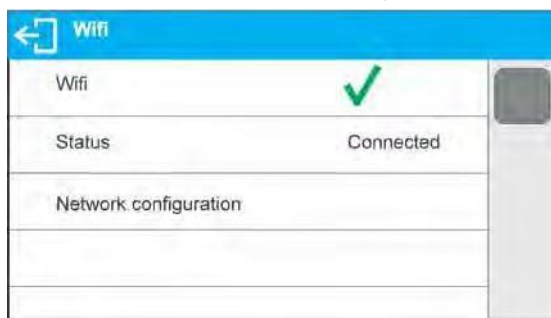
- Enter **<NETWORK CONFIGURATION>** parameter and set DHCP parameter value:
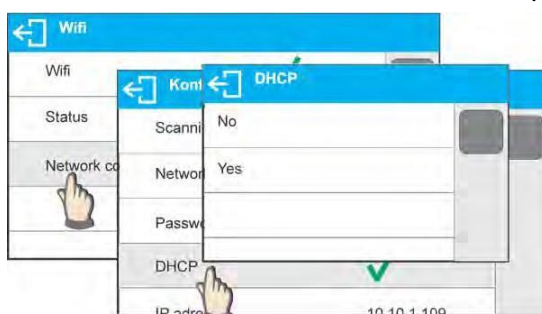
- With DHCP set to NO value, enter manually IP; MASK; DEFAULT GATE parameters, with DHCP set to YES value, the balance software automatically reads and displays data assigned by Wi-Fi router by means of which the balance is to be connected

- Enter **<SCANNING NETWORKS>** parameter and start network searching procedure, upon completion, list of detected networks is displayed along with information on signal strength and channel number
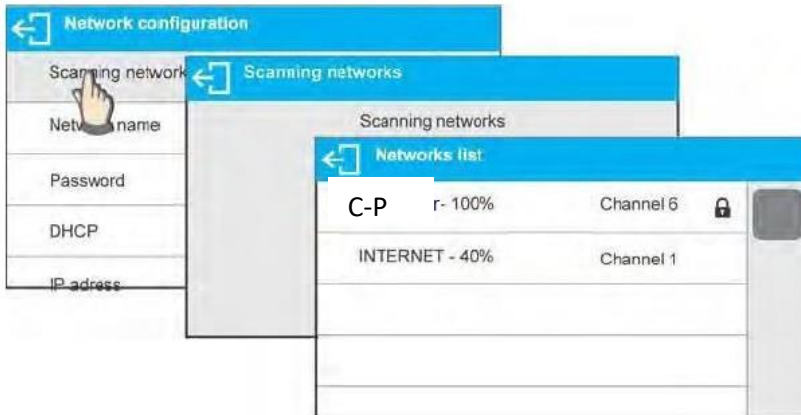
- Select network of your choice
- Password window is displayed, using an on-screen keyboard enter the password

- **<NETWORK CONFIGURATION>** window is displayed, connection procedure starts automatically
- Press ⬅ button to go one level up, **<STATUS>** parameter features **<CONNECTING>** sign informing on the fact that the balance tries to connect the network
- For successfully established connection **<CONNECTING>** status turns to **<CONNENTED>** status, respective pictogram is displayed (see pictogram overview above)
- If it takes too long to establish connection it may be concluded that connection parameters are invalid (password etc.), check the parameters and try to reestablish connection

The selected network and parameters for connection are stored in the balance program. The program connects to the network using the stored parameters each time the balance is activated.

To disconnect the network, turn the communication off: **<COMMUNICATION/WIFI/WIFI – NO>**

19.4 USB PORT
USB port of type A is intended for:
- Connecting a USB flash drive storing <**FAT files system**>
- Connecting balance to printer

USB flash drive may be used for printout of data on measurements (setting PRINTER/PORT parameter to PENDRIVE value). Additionally, databases and user's parameters settings can be copied balance to balance. On inserting USB flash drive an Export/Import group of parameters opens automatically.

If you are authorized, you can:
- Export: databases, user's parameters
- Import: databases, user's parameters

During export the program saves files with databases and parameters content on a flash drive.

USB port of type B is intended for:
- Connecting balance to a PC computer

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

To carry out this procedure, you need to utilize the respective USB driver. For this driver please contact support@schulersci.com

20. PERIPHERAL DEVICES

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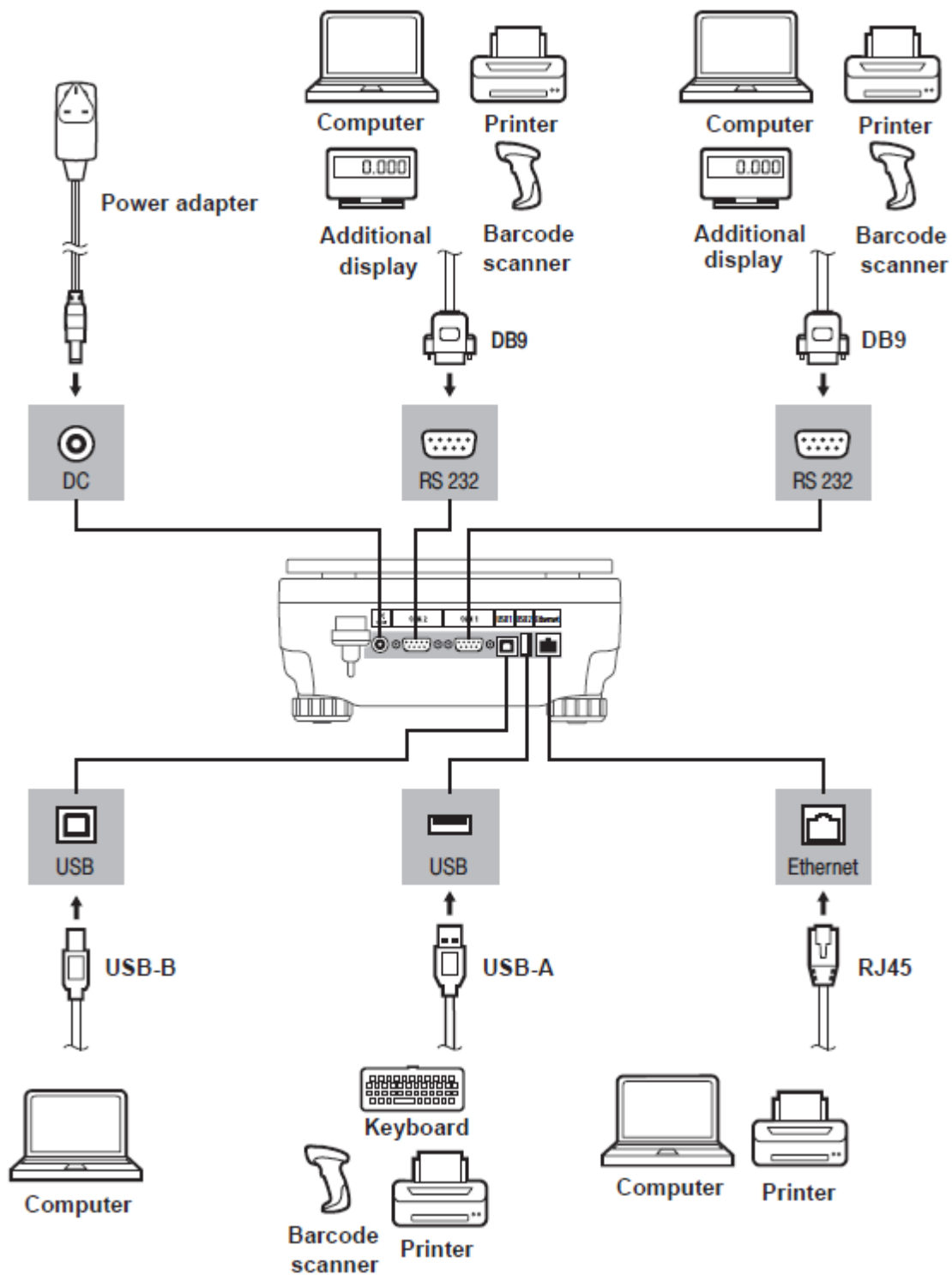
20.1 COMPUTER

Carry out configuration using **<Computer>** submenu.

- press ⚙ key, next press: <Peripherals / Computer>
- set parameters related to cooperation with a computer
- select <u>computer port</u>
  - available options: none, COM 1, COM 2, USB, Ethernet, USB Free Link

CAUTION: *In order to set USB Free Link instead of USB B, select any other port (e.g. none, COM1, etc.), and next select USB Free Link port. Analogously when changing USB Free Link to USB B.*

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:

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).

In case of Free Link printout (keyboard emulator) all languages without special characters are operated ('QWERTY' keyboard layout), and two languages that feature special characters:
- Polish for 'Polish (Programmers) keyboard'. To enable support of this language go to printer settings on your balance and select Windows-1250 code page (Central European, Latin-2). The following Polish diacritical signs are added: ą, ć, ę, ł, ń, ó, ś, ż, ź.
- German for 'German (Germany) keyboard'. To enable support of this language go to printer settings on your balance and select Windows -1252 code page (Western European, Latin-1). The following German diacritical signs are added: ä, ö, ü, ß. The keyboard layout changes from 'QWERTY' to 'QWERTZ'. The characteristic feature of such keyboard is 'ß' sign located on the right side of the 'zero'.
Caution!

Free Link printout option allows printing only signs that are available on a keyboard. Entering capital letters and special signs, by means of key combination where "Shift" key is pressed, is also possible.

In case of Polish and German, basic special characters (written using key combination of a given letter and right 'Alt' button) have been added.

Free Link printout option does not support printing of remaining special signs.

- port settings
  - settings related to a port selected for computer connection
  CAUTION: for Ethernet port Timeout parameter is on. The parameter specifies time delay – time interval for disconnection, counted from the moment of the most recent command sent from the device to which the balance is connected. Timeout parameter value has to be entered in milliseconds [ms].

- address

▪ parameter for setting address of balance connected with a computer
- weighing operation printout template
    ▪ parameter enabling you to design customized printout, for this use window with printout template. For more information on designing printouts read section 14.3.
- continuous transmission, parameter enabling to turn on/off continuous transmission of a weighing result, available options:
    ▪ continuous transmission in calibration unit, indications are transmitted in a main unit (calibration) independently from currently selected weight unit,
    ▪ continuous transmission in current unit, indications are transmitted in a currently selected weight unit, the transmitted unit changes along with the current unit change (Units key),
    ▪ continuous transmission turned off <NONE>,
    CAUTION!

    Continuous transmission can be turned on/off by a respective message sent form a computer (read COMMUNICATION PROTOCOL).

- interval
  Parameter enables setting frequency of printouts for continuous transmission.
  Frequency of printouts is set in seconds, wherein the accuracy is 0.1s.
  you 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.

20.2 PRINTER

Submenu **<Printer>** enables you to select a port to which data is sent upon pressing 🔵 key of a balance keyboard. Content of sent data is set in **<PRINTOUTS/GLP PRINTOUTS>** parameter.

Procedure-

- Press ⚙ key
- Enter **<PERIPHERALS>** menu
- Next enter **<PRINTER>** menu
    ▪ Set balance parameters related to cooperation with the printer; i.e. **<PORT>** to which a

    printer is to be connected upon pressing 🔵 button (printer connected), options:
        ▪ **COM 1 or COM 2** – RS 232 port, the one to which a printer is connected
        ▪ **USB type A** – USB port, the one to which a printer is connected
        ▪ **Ethernet** – port sending data to a dedicated software, operated on a computer connected to a balance via network.
        ▪ **PENDRIVE** – USB port type A for connecting USB flash drive.
        ▪ **USB PC** – port USB type B, intended for connection of computer with PC 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 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 directly entered 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:

        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).

Example balance settings for correct cooperation with **Dot Matrix Printer (10100-85)** connected to RS232 port:

1. With printer **Dot Matrix Printer (10100-85)**
   Communication parameters for port to which the printer is connected:
   - baud rate   - 9600 bit/s
   - parity   - none
   Printer parameters for PERIPHERALS group:
   - port   - COM 1 or COM 2 (the one to which the printer is connected)

20.3 SAVE MEASURMENT DATA ONTO USB FLASHDRIVE
The balance software enables record of measurement data on an external flash drive.

Procedure-
- Plug a USB flash drive into USB 1 port, type A.
- Set **<PENDRIVE>** option for **<PERIPHERALS/PRINTER/PORT>**.
- Return to weighing procedure.

- ![ENTER] key, when pressed, provides record of measurement data (specified for GLP PRINTOUT), wherein the data is saved in a form of a text file, created automatically by balance software; the file name is: *printout.txt*.
- Remove the USB flash drive from a balance USB port after about 10s counting from the last measurement record, only after this time the data is saved. Next plug the USB flash drive to a computer and read the saved text file.

CAUTION!
USB flash drive shall comprise <FAT file system>. For software to read this file type please contact support@schulersci.com

20.4 ADDITIONAL DISPLAY

Submenu <ADDITIONAL DISP.> comprises settings for cooperation with an   external additional display.

Procedure:

- press ![gear] button,

- enter <PERIPHERALS> submenu,
- enter <ADDITIONAL DISPLAY> submenu,
- set balance parameters for cooperation with an additional display,
  <u>PORT></u> - selection of the port, to which the additional display is to be connected
- accessible options: NONE, COM 1, COM 2

CAUTION!

For this display type please contact support@schulersci.com

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.

Additional display features text area for extra information such as date, tare value etc. (balance variables), it is located at the bottom. Displayed data content is set using balance.

Procedure:

- press ⚙ button,
- enter <PERIPHERALS> submenu,
- enter <ADDITIONAL DISPLAY> submenu,
- enter <BOTTOM TEXT AREA TEMPLATE> parameter, an on-screen keyboard is displayed.

  Enter data that is to be displayed. With the keyboard write appropriate text, press ✔ to confirm. The text can consist of 19 characters maximum. If you want to display any variable, enter it following the rules, e.g.: {3} – time.

20.5 BARCODE READER
The balance can cooperate with a barcode reader.

The barcode is used for searching products database in order to find a respective product.
To set parameters for coupling the barcode reader go to <Parameters/Peripherals/Barcode reader> submenu.

You can set:
- Communication port, to which the barcode reader is to be coupled,
- Selected port parameters.

CAUTION!

Go to <Communication> submenu to set baud rate accordant with barcode reader (by default it is 9600 b/s), this parameter can be set using barcode reader settings as well.

Procedure:

- press ⚙ button,
- enter <PERIPHERALS> submenu,
- enter <BARCODE READER> submenu,
- set balance parameters for cooperation with barcode reader:
  < PORT> - selection of the port, to which the barcode reader is to be connected
- accessible options: NONE, COM 1, COM 2

20.6 EXTERNAL BUTTONS

Submenu <EXTERNAL BUTTONS> comprises settings that enable the balance to cooperate with external buttons: TARE and PRINT.

Procedure:

- enter <P4 DEVICES> menu
- enter menu group <EXTERNAL BUTTONS>
- run the buttons
  - <TARE> set to <YES> value
  - < 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 or DB9/M (analytical and semi-micro balances), 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 perameters). 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 DB9/M (analytical or semi-micro balances) or use the electrical outlet.

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

- *to connect additional buttons to COM 2 port or DB9/M (analytical or semi-micro balances),*
- *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) – setting not available on the analytical or semi-micro balances.*
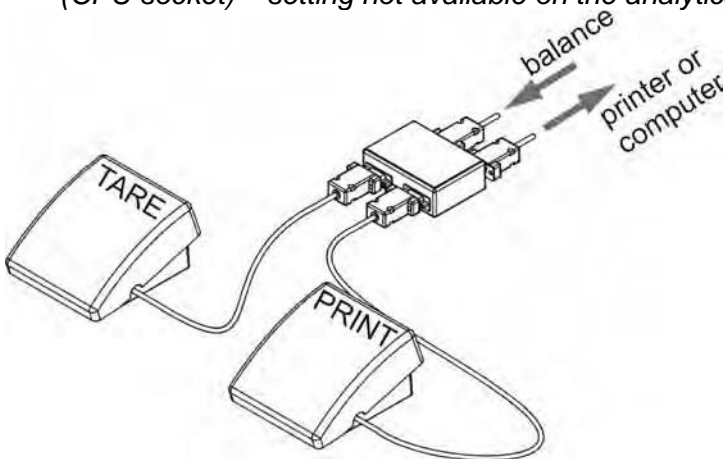
Set of external buttons TARE and PRINT.
Standard balance equipment does not include the set of external buttons.

21. PRINT MODE

Function designed to enable print mode setting, it activates ENTER 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 ENTER 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 time that the ENTER button is pressed, it results in sending the reading to the printer port along with the settings for **<GLP PRINTOUT>** parameter. Every single reading is sent (stable and unstable). For unstable readings **<?>** character appears at the beginning of the printing frame.
- **<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.

Automatic operation procedure:
- Press →0← 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,
- 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. For automatic operation, the measurement will not be sent from the computer to the printer if the mass measurement stays within the set value range **<AUTO THRES>.**

<AUTO THRES> parameter relates to the following functions:
- automatic tare
- automatic operation
- auto with interval

<AUTO+INT.> select this option to start automatic printout and record of indications in the Weighings database and Alibi database, carried out in a cyclic manner in a specified time interval. The interval is set in minutes. Interval range is 1-9999 min.

> *CAUTION!*
> *Each result is printed and recorded. Automatic operation with interval starts when the switching function is turned on and it lasts until it is switched off. The first stable weighing result of value greater than AUTO THRES value is printed as a first measurement. The following measurements are printed with frequency set in INTERVAL parameter. Automatic operation with interval stops when the option is off.*

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

22.1 ADJUSTMENT PRINTOUT REPORT

ADJUSTMENT REPORT is a group of parameters enabling data to be printed on a printout.

Variable	Overview
PROJECT	Option enables naming the project (name associated with a weighing). The name may consist of maximum 31 characters.
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.

Procedure for naming the project-

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

NO - do not print
YES - print

An example report:

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

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

22.2 ADJUSTMENT PRINTOUT REPORT

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
CUSTOMER	Option enables printing out the name of a currently selected Customer.	Header GLP printout Footer
PACKAGING	Option enables printing out the name of a currently selected packaging.	GLP printout
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
VARIABLE 3	Option enables printing out the value of VARIABLE 3.	Header GLP printout
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
NSTD. PRNT.	Option enables printing out one of 100 non- standard printouts on the footer printout. You can choose one of the following options: NONE / non- standard printout name. The way of entering non- standard printouts is described further down this user manual.	Header GLP printout Footer

For the parameters described above, one of these values must be selected:
NO- do not print
YES- print

Example reports:

Header

```
----------------------------------------
Working modes              Weighing
Date                      24.07.2013
Time                         7:37:30
ScaleType                         AS
Balance ID                 10353870
User                      ADMIN ENG
Product                       Tablet
```

GLP printout

```
Date                      04.06.2013
Time                    11:11:24 AM
Product                       NAZWA
      0.000 g
```

Footer

```
-----------------------------------------
Date                    24.07.2013
Time                      7:41:10
User                    ADMIN ENG

Signature


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

22.   PROXIMITY SENSORS

The balance features two proximity sensors enabling touch-free balance control. The software detects two motions performed around the sensors:

1. hand in close vicinity to the left sensor **<Left sensor>**
2. hand in close vicinity to the right sensor **<Right sensor>**

Each motion can trigger optional balance functions. You can assign the proximity sensors with different functions for each working mode. Upon completed configuration procedure, the software runs the function that is assigned to the proximity sensor after having detected motion around it.

Procedure for setting up proximity sensors-

1
Weighing	
0.00000 g	
Gross: 0.00000 g	Tare: 0.00000 g
Product:	User: Admin

Press "Parameters" button.

2
Parameters	
Adjustment	>
Working modes	
Communication	>
Peripherals	>
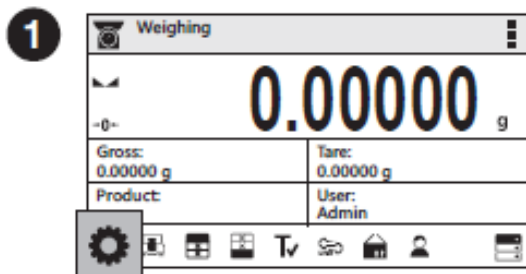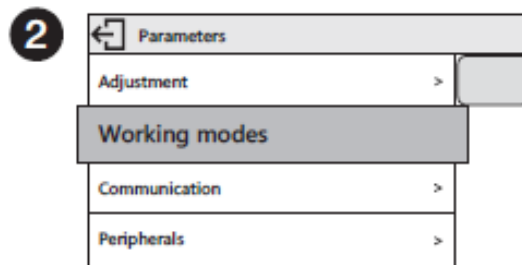
Parameters list is displayed, select Working Modes parameter.

3
Working modes	
Availability	>
Weighing	
Parts counting	>
Checkweighing	>
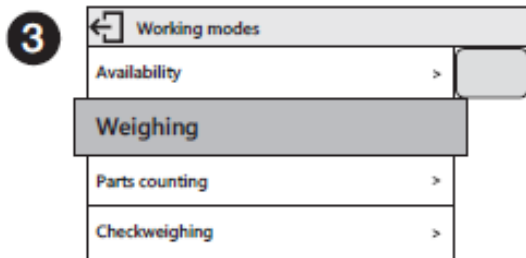
Select Weighing parameter.

4
Weighing	
Readout	>
Proximity sensors	
Autotare	✔
Print mode	When stable
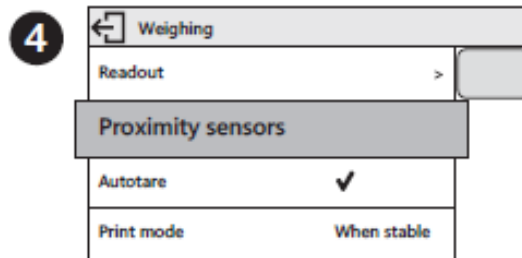
Select Proximity Sensors parameter.

⑤ Proximity sensors
| Left sensor | None |
| **Right sensor** | |
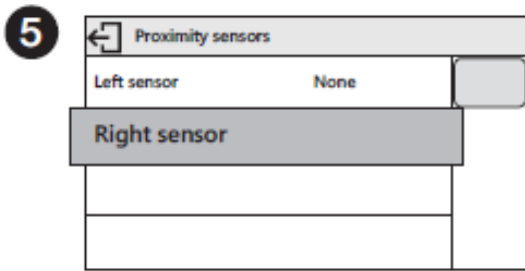
Select Right Sensor parameter.

⑥ Right sensor
- Accept / Print
- Print header
- Print footer
- →0← Zeroing
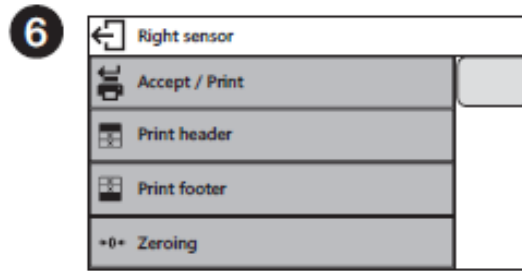
Select function that is to be assigned to the right proximity sensor.

In order to set left sensor function repeat steps 5 and 6, this time select Left Sensor parameter.

Following the above procedure you can also set sensors for remaining working modes.

23. ADVANCED FEATURES

23.1 BUTTON, LABELS AND TEXT FIELDS CONFIGURATION

Area beneath weight indication section can be freely programmed. It is divided into active fields taking the form of a table with 3 rows and 10 columns.
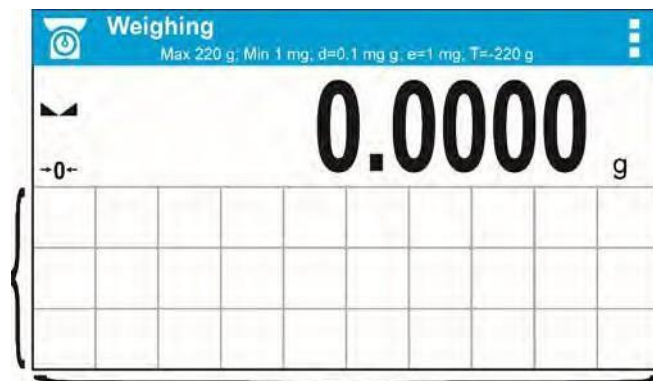
The division lines presented above are not visible on the balance screen, they serve only for informative purposes.

This section is designed to explain user-selected widgets: buttons, labels, text fields, bar graphs.

- **button** – pictogram to which a function is assigned, the function is triggered upon pressing the pictogram;

- **label** – field for information, its content is stable. The content depends on displayed option, wherein the options change in course of balance operation. The label may be active or passive. Active label, when pressed, triggers function that is assigned to it, e.g. selecting product out of products database. Passive label provides you with information on current state, no function is assigned to it;

- **text field** - field for information, both content (text and variables of line 1 and 2) and function assigned to text field are programmable. The field may be active or passive. Its operation is likewise as for label; the only difference is that for the text field it is the user who specifies which function is to be assigned to it. The function does not have to refer to displayed information,

    e.g. the text field displaying date and time may trigger balance calibration upon being pressed;

- **bar graph** – option available for *Check weighing* and *Dosing* modes, field providing information on Min and Max threshold – *Check weighing* mode, and target weight - *Dosing* mode, the given information is presented in a graphic form, bar graph color informs whether weight stays within the specified tolerance or is out of it.

The section may be set up freely to match your needs. Each of the modes may be configured independently.

Set up rules:
1. Widgets dimensions (width x height)
   - button – 1x1
   - label – 2x1; 3x1; 4x1; 5x1
   - text field – 2x1; 3x1; 4x1; 5x1; 6x1; 7x1; 8x1; 9x1; 10x1
   - bar graph – 5x1; 10x1

   To quickly restore the default widgets layout press any widget and hold it until a window with available options is displayed. Select **<Default screen settings>** and confirm.

   Example arrangement and dimensions of labels and text fields.

2. Always click the far left side of a field to hold a selected widget.
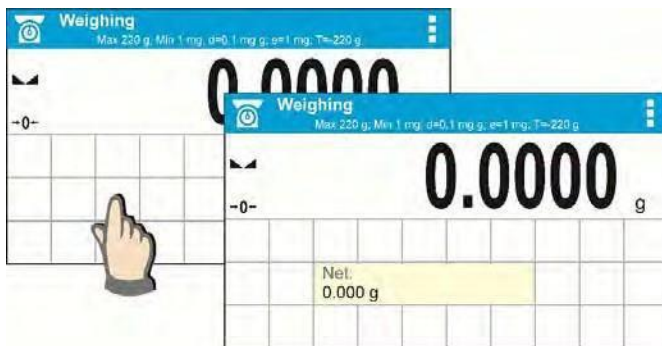
3. A new widget can only be applied to an area that holds no other widgets. The balance automatically detects which widgets can be applied to an area, this is conditioned by the widget dimensions.
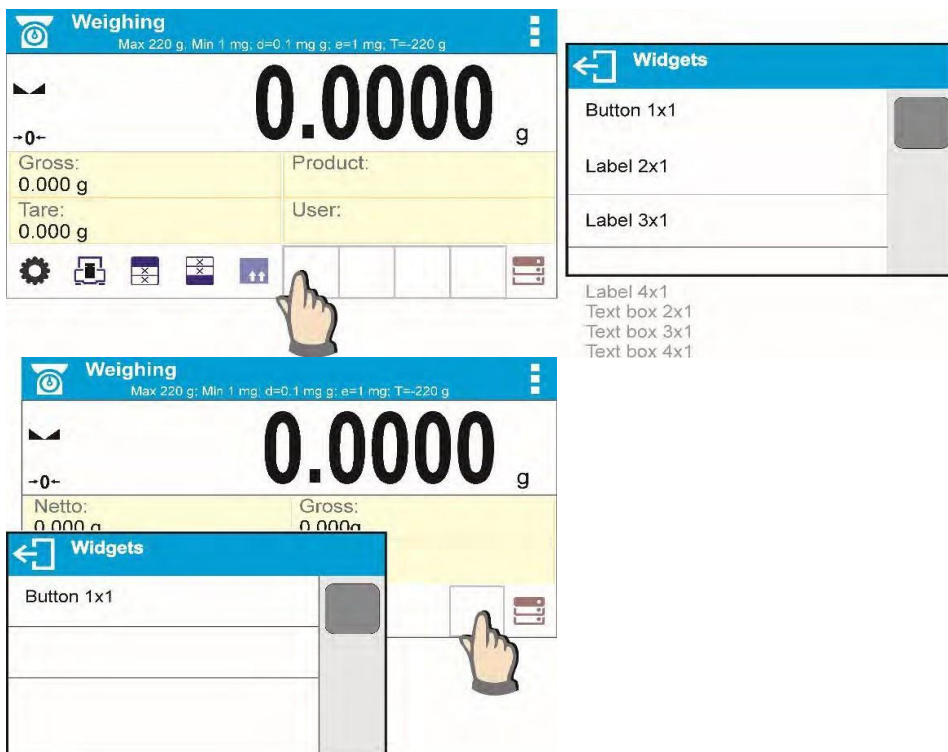
4. It is possible to change functions assigned to an already applied widget. The applied widget, if not needed, can be removed.
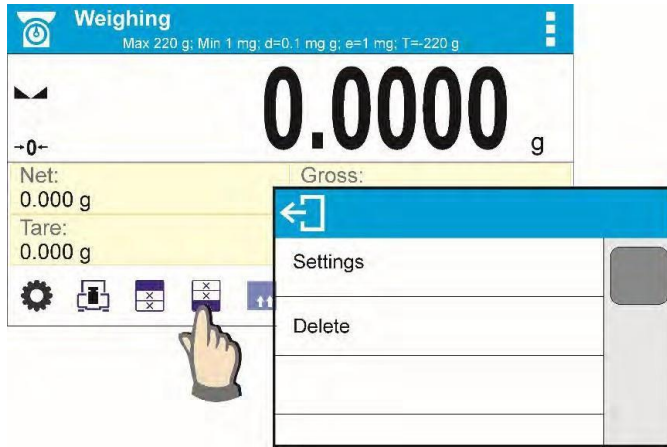
5. To rearrange widgets layout, it is required to delete an already applied widgets first, and define new arrangement of buttons, labels and text fields next.

23.2 LABELS

You can select label size and type of information to be displayed for a label.

To select a label, use the list of available labels. Upon label selection, specify the type of information to be displayed on the label. The selected label is displayed automatically on a specified home screen spot.

Procedure-

Press and hold the spot where the label is to be placed.

Select a label and its size.

Label settings window opens, click INFORMATION field to see a list of information type available for the selected label.
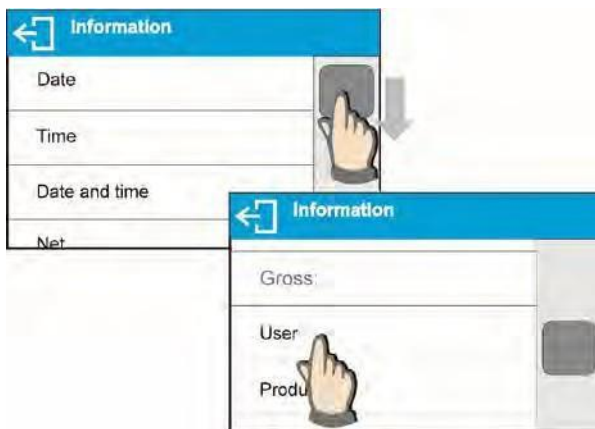
Select data to be displayed.

The selected label is displayed automatically on the home screen.

Information type:

Label information type	Modes featuring the information
Date	All modes
Time	All modes
Date and time	All modes
Net weight	All modes
Tare	All modes
Gross weight	All modes
User	All modes
Product	All modes
Packaging	All modes
Customer	All modes
Variable 1	All modes
Variable 2	All modes
Variable 3	All modes
MSW value	Weighing mode only
MSW tare	Weighing mode only
MSW status	Weighing mode only
Part mass	Parts Counting mode only
Thresholds	Check weighing mode only
Min threshold	Check weighing mode only
Max threshold	Check weighing mode only
Target value	Dosing mode only
Reference mass	Percent Weighing mode only
Weighing in air	Solids and Liquids Density Determination modes only
Weighing in liquid	Solids and Liquids Density Determination modes only
Liquid	Solids Density Determination mode only
Temperature	Solids Density Determination mode only
Liquid density	Solids Density Determination mode only
Sinker volume	Liquids Density Determination mode only
Number	Statistics mode only
Sum	Statistics mode only
Mean	Statistics mode only
Min	Statistics mode only
Max	Statistics mode only
Difference	Statistics mode only

SDV	Statistics mode only
RDV	Statistics mode only
Threshold	Peak Hold mode only
Formulation	Formulation mode only
Sum	Formulation mode only
Target value	Formulation mode only

23.3 TEXT FIELDS

You can select text field size and type of information to be displayed in the first and the second line of the field, plus you can decide on a function and assign it to a text field.
Upon completed setup operation, the selected text field is displayed automatically on a specified home screen spot.

Procedure-

Press and hold the spot where the key is to be placed.
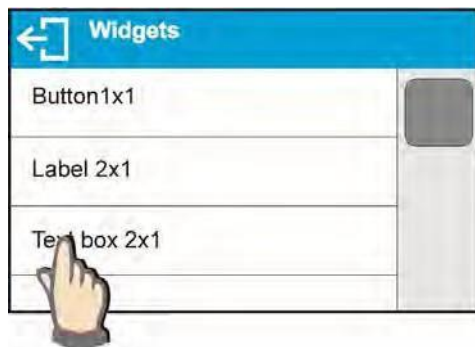
Select text field and its size.
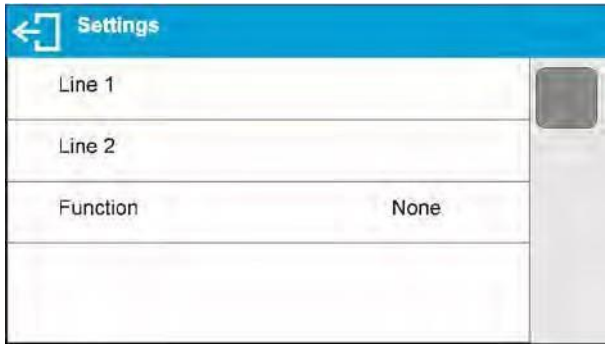
Text field settings window opens. Define text field parameters:

Line 1: e.g. text <Time:>,

Line 2: e.g. variable {3}, variable for current time displaying (other variables refer to point for non- standard printouts).
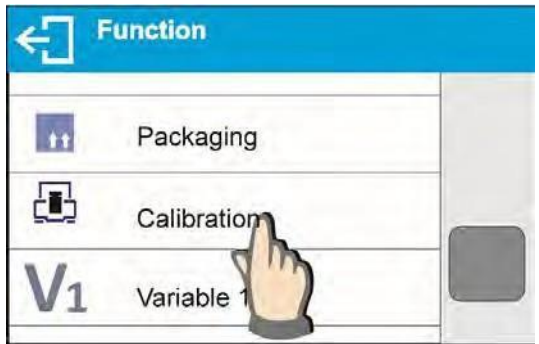
function: e.g. adjustment.
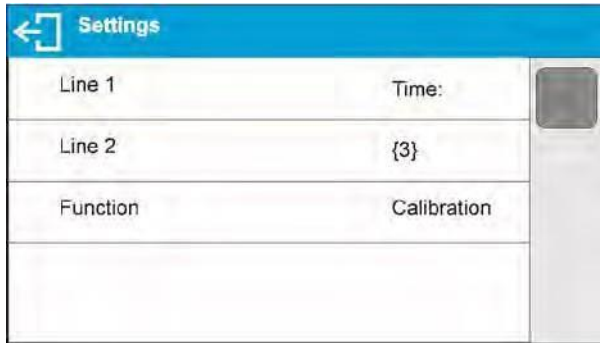
When all text field parameters have been defined, the window displays respective values.

The defined text field is displayed automatically on the home screen.

23.4 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.

You can select bar graph size and turn on/off **<Zoom>** function. This function rescales bar graph to improve visualization of indication.

Procedure:

Press and hold the spot where bar graph is to be placed.
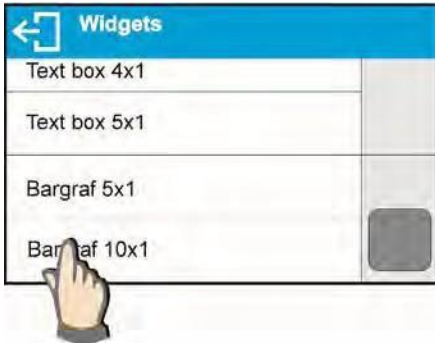
Select bar graph and its size.

Bar graph settings window opens.

The selected bar graph is displayed automatically on the home screen.

Example for bar graph with <Zoom> function on:

Example for bar graph with <Zoom> function off:
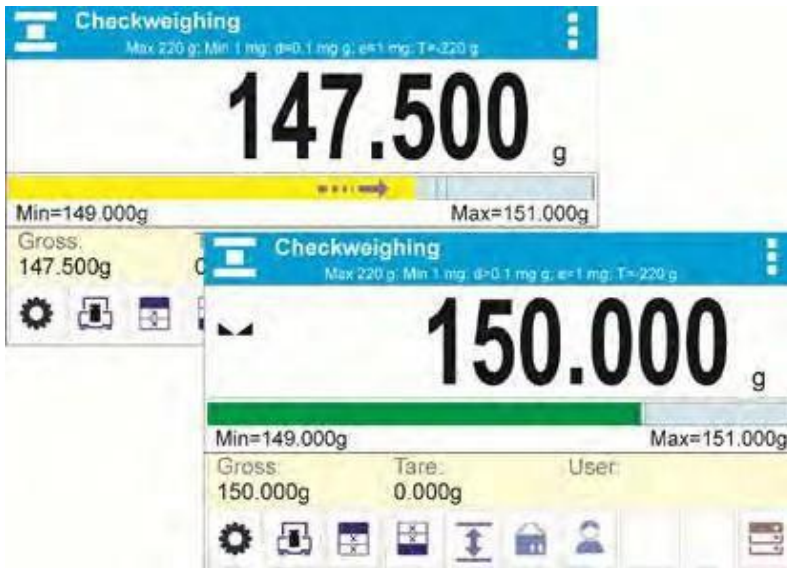
23.5 QUICK ACCESS KEYS CUSTOMIZATION

You can define quick access keys; the keys are displayed underneath weight indication section. Quick access keys provide direct access to the most frequently operated functions, it is selected from a list of available keys.

Procedure:
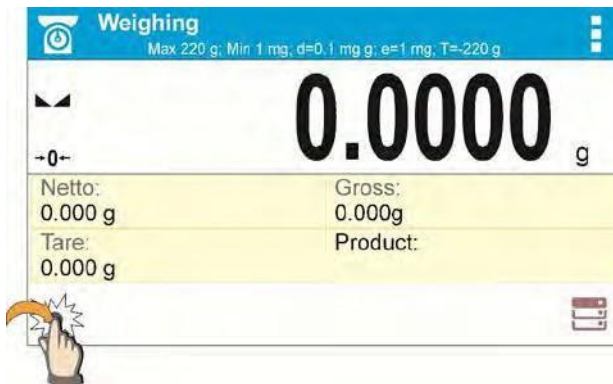
Press and hold the spot where the key is to be placed.

Select option: key 1x1
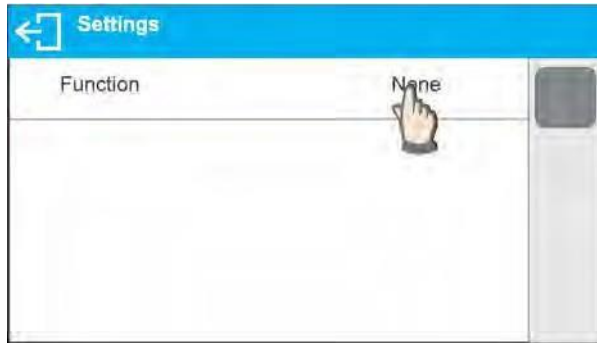
Enter key setup.

Select the key.

The selected key is displayed automatically on a home screen.

23.6 WEIGHING UNIT ACCESSIBILITY

You may declare which units shall be accessible while selecting a temporary unit by means of

key. Units with parameter value set to **<Yes ✓ >** option are available for selection in working modes, i.e. modes facilitating units change.

Units with parameter value set to **<No ✓ >** option will not be accessible while operating the balance.

23.7 START UNIT SELECTION
Upon selection of start unit, the balance activates with the specified start unit for these modes where change of the unit is possible.
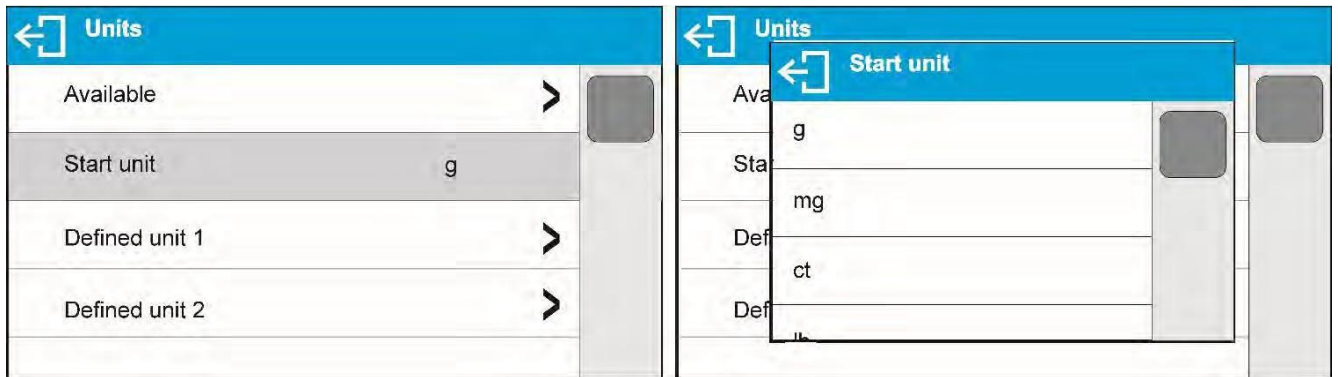
23.8 BALANCE SETTINGS
A user can set up parameters which influence balance operation. These parameters are to be found in parameters group **MISC**.

Menu language
Language parameter enables selecting the language of the balance menu descriptions. Available languages: POLISH, ENGLISH, RUSSIAN, SPANISH, FRENCH, GERMAN, ITALIAN, CZECH, CHINESE, ARABIC, TURKISH, KOREAN.

Permissions
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.

"Beep" sound – reaction to operation of pressing a key
Sound parameter enables switching on/off a 'beep' sound responsible for informing a user about pressing any key of balance overlay or display, or about proximity sensors response.
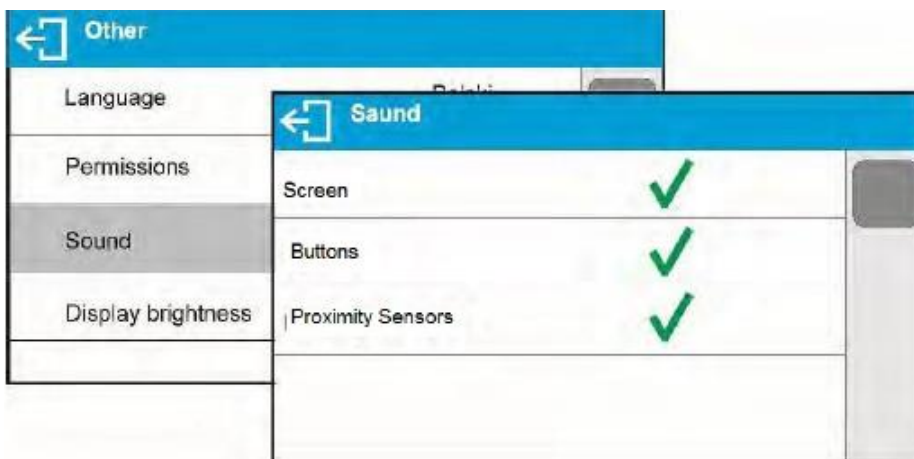
Backlight and adjusting display brightness

Display brightness parameter enables setting the brightness of the backlight or switching off the display brightness completely.
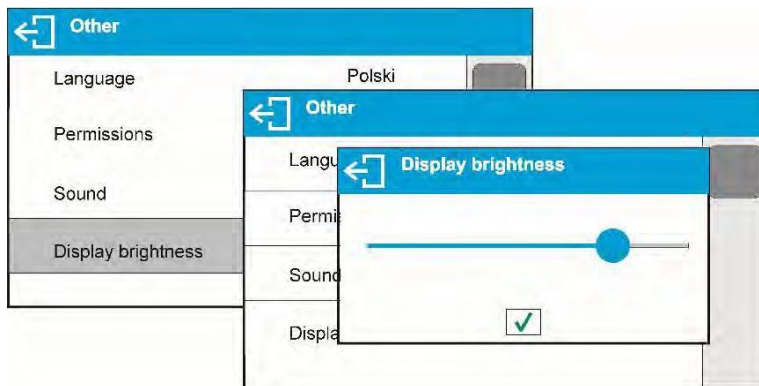
Proximity sensors sensitivity adjustment

Proximity sensors sensitivity parameter specifies distance within which the sensors can be operated, its scale is expressed in percent and it ranges from 0% to 100%. For lower percent value the proximity sensors operate at a shorter distance.

Usually the sensitivity value is comprised within 50%-70% limits.

Date

Date parameter enables setting the current date.
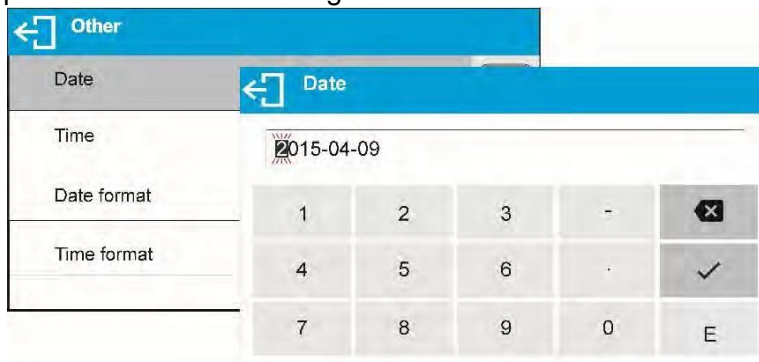
Time

Time parameter enables setting the current time. Procedures for change of time settings and date settings are likewise.

Date format

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

Time format
<TIME FORM> parameter enables specifying time format for a printout [12h / 24h].
For **[12h]** option selected, **<A>** or **<P>** letter is displayed next to presented time value, where: **A** stands for hours before noon; **P** stands for hours after noon.

Backlight turn-off time
<BACKLIGHT OFF> parameter enables activation of display stand-by mode, the stand-by mode is activated when no weighing process is carried out (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 balance registers stable indication for a specified time interval, set in parameter **<BACKLIGHT OFF>**, then the display goes out immediately. The backlight activates upon change of indication (no stability pictogram on the display) or pressing any key on the balance keypad. The display remains blank also when balance menu is entered.

Auto switch-off
<AUTO OFF> parameter enables automatic display deactivation (the parameter functioning is likewise to button functioning). 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 balance registers stable indication for a specified time interval, set in parameter **<AUTO OFF>**, then the display is turned-off immediately.

To start-up the balance, it is necessary to press button located on the balance keypad. The balance automatically returns to weighing operation.

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

24. COMMUNICATION PROTOCOL
General information

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

24.1 LIST OF COMMANDS

Command	Command overview
Z	Zero balance
T	Tare balance
OT	Give tare value
UT	Set tare
S	Send stable measurement result in basic measuring unit
SI	Immediately send measurement result in basic measuring unit
SU	Send stable measurement result in current measuring unit
SUI	Immediately send measurement result in current measuring unit
C1	Switch on continuous transmission in basic measuring unit
C0	Switch off continuous transmission in basic measuring unit
CU1	Switch on continuous transmission in current measuring unit
CU0	Switch off continuous transmission in current measuring unit
DH	Set min checkweighing threshold
UH	Set max checkweighing threshold
ODH	Give value of min checkweighing threshold
OUH	Give value of max checkweighing threshold
SM	Set mass value of a single item
TV	Set target mass value
RM	Set reference mass value
NB	Give balance serial number
SS	Value release
IC	Internal adjustment performance
IC1	Disable automatic internal adjustment of the balance
IC0	Enable automatic internal adjustment of the balance
K1	Lock balance keypad
K0	Unlock balance keypad
OMI	Give available working modes
OMS	Set working mode
OMG	Give current working mode
UI	Give accessible units
US	Set unit
UG	Give current unit
BP	Activate sound signal
PC	Send all implemented commands
BN	Give balance type
FS	Give Max capacity
RV	Give program version
A	Set autozero function
EV	Set ambient conditions state
EVG	Give currently set ambient conditions
FIS	Set filter
FIG	Give current filter
ARS	Set value release
ARG	Give current value release
LDS	Set last digit

LOGIN	Operator Logging
LOGOUT	Operator Logout

CAUTION!

Each command must end with CR LF characters;

24.2 RESPONSE FORMAT
On receipt of a command, the terminal sends a response in one of the following formats:

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

XX - stands for a name of a sent command
 _ - stands for spaces

Commands Overview

Zero balance

Format: **Z CR LF**
Response options:

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

Tare balance

Format: **T CR LF**
Response options:

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

Give tare value

Format: **OT CR LF**
Response: **OT_TARE CR LF** - command carried out
Response format:

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

Tare   -   9 characters with right justification
Unit   -   3 characters with left justification
CAUTION!
Tare value is always given in calibration unit.

Set tare

Format: **UT_TARE CR LF**, where **TARE** – tare value
Response options:
UT_OK CR LF   - command carried out
UT_I CR LF   - command understood but not accessible at this moment
ES CR LF   - command not recognised (tare format incorrect)
CAUTION! Use dot in tare format as decimal point.

Send stable measurement result in a basic measuring unit

Format: **S CR LF**
Response options:
S_A CR LF   - command understood and in progress
S_E CR LF   - time limit exceeded while waiting for stable measurement result
S_I CR LF   - command understood but not accessible at this moment
MASS FRAME   - response: mass value in a basic measuring unit
Response format:

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

An example:

S CR LF   - command send form a computer
S _ A CR LF   - command understood and in progress
S _ _ _ _ - _ _ _ _ _ _ _ 8 . 5 _ g _ _ CR   - command carried out, response: mass value in a basic
      LF   measuring unit.

where: _ - space

Immediately send measurement result in a basic measuring unit

Format: **SI CR LF**
Response options:
SI_I CR LF   - command understood but not accessible at this moment
MASS FRAME   - immediate response: mass value in a basic measuring unit

Response format:

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

An example:

S I CR LF   – command sent from a computer

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

where: _ - space

Send stable measurement result in a current measuring unit

Format: **SU CR LF**
Response options:
SU_A CR LF   - command understood and in progress
SU_E CR LF   - time limit exceeded while waiting for a stable measurement result
SU_I CR LF   - command understood but not accessible at this moment
MASS FRAME   - response: mass value in a current measuring unit
Response format:

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

An example:
S U CR LF   - command send form a computer
S U _ A CR LF   - command understood and in progress
S U _ _ _ - _ _ 1 7 2 . 1 3 5 _ N _ _ CR LF   - command carried out, response: mass value in a current measuring unit

where: _ - space

Immediately send measurement result in a current measuring unit

Format: **SUI CR LF**
Response options:
SUI_I CR LF   - command understood but not accessible at this moment
MASS FRAME   - immediate response: mass value in a current measuring unit
Response format:

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

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

where: _ - space

Switch on continuous transmission in a basic measuring unit

Format: **C1 CR LF**
Response options:
C1_I CR LF   - command understood but not accessible at this moment
C1_A CR LF   - command understood and in progress
MASS FRAME   - response: mass value in a basic measuring unit
Response format:

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

Switch off continuous transmission in a basic measuring unit

Format: **C0 CR LF**
Response options:
C0_I CR LF   - command understood but not accessible at this moment
C0_A CR LF   - command understood and carried out

Switch on continuous transmission in a current measuring unit

Format: **CU1 CR LF**

Response options:

CU1_I CR LF   - command understood but not accessible at this moment
CU1_A CR LF   - command understood and in progress
MASS FRAME   - response: mass value in a current measuring unit

Response format:

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

Switch off continuous transmission in a current measuring unit

Format: **CU0 CR LF**

Response options:

CU0_I CR LF   - command understood but not accessible at this moment
CU0_A CR LF   - command understood and carried out

Set min checkweighing threshold

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

Response options:

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

Set max checkweighing threshold

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

Response options:

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

Give value of min checkweighing threshold

Format: **ODH CR LF**
Response: **DH_MASA CR LF** - command carried out

Response format:

1	2	3	4-12	13	14	15	16	17	18	19
D	H	space	mass	space	unit			space	CR	LF

Mass   -   9 characters with right justification
Unit   -   3 characters with left justification

Give value of max checkweighing threshold

Format: **OUH CR LF**
Response: **UH_MASA CR LF** - command carried out

Response format:

1	2	3	4-12	13	14	15	16	17	18	19
U	H	space	mass	space	unit			space	CR	LF

Mass   -   9 characters with right justification
Unit   -   3 characters with left justification

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

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

SM_OK CR LF	- command carried out
SM_I CR LF	- command understood but not accessible at this moment (e.g. mode other than PARTS COUNTING)
ES CR LF	- command not recognised (mass format incorrect)

Set target mass value (e.g. for DOSING)

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

Response options:

TV_OK CR LF	- command carried out
TV_I CR LF	- command understood but not accessible at this moment (e.g. mode other than DOSING)
ES CR LF	- command not recognised (mass format incorrect)

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

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

Response options:

RM_OK CR LF	- command carried out
RM_I CR LF	- command understood but not accessible at this moment (e.g. mode other than DEVIATIONS)
ES CR LF	- command not recognised (mass format incorrect)

Value release

Format: **SS CR LF**
Response options:
SS_OK CR LF   - command understood and in progress
Command's function is similar to function of PRINT button located on an overlay,

Internal Calibration

Format: IC CR LF
Response options:

IC_A CR LF	IC_A CR LF
IC_D CR LF	IC_D CR LF
IC_A CR LF	IC_A CR LF
IC_E CR LF	IC_E CR LF
IC_I CR LF	IC_I CR LF

Disable automatic internal calibration of the balance

Format: IC1 CR LF
Response options:

IC1_I CR LF	IC1_I CR LF
IC1_E CR LF	IC1_E CR LF
IC1_OK CR LF	IC1_OK CR LF

Operation is disabled for verified balances.
For non-verified balances the command inhibits internal calibration until it is enabled via IC0 command or until the balance is turned off. The command does not modify settings specifying calibration start.

Enable automatic internal calibration of the balance

Format: IC0 CR LF
Response options:

IC0_I CR LF	IC0_I CR LF
IC0_OK CR LF	IC0_OK CR LF
Operation is disabled for verified balances.	Operation is disabled for verified balances.

Give balance serial number

Format: NB CR LF
Response options:
NB_A_"x" CR LF   - command understood, response: serial number
NB_I CR LF   - command understood but not accessible at this moment
x – serial number of the device (inserted in between inverted commas)
An example:
Command: NB CR LF – return serial number
Response: NB_A_"1234567" – serial number of the device – "1234567"

Lock balance keypad

Format: K1 CR LF
Response options:
K1_I CR LF   - command understood but not accessible at this moment
K1_OK CR LF   - command carried out
Command locks the balance keypad (proximity sensors, touch panel) until the moment of turning the balance off or until sending K0 command

Unlock balance keypad

Format: K0 CR LF
Response options:
K0_I CR LF   - command understood but not accessible at this moment
K0_OK CR LF   - command carried out

Give available working modes

Command overview: Command returns accessible working modes.
Format: OMI <CR><LF>
Response options:
OMI <CR><LF>
n_"Nazwa modu" <CR><LF>:
n_"Nazwa modu" <CR><LF> – command carried out, response: accessible working modes
OK <CR><LF>
OMI_I <CR><LF>   – command understood but not accessible at this moment
Mode name – parameter, working mode name, inserted in between inverted comas. The name takes form given on a particular balance display, it is provided in a currently selected language.
n – parameter, decimal value determining working mode number.

n →   1 – Weighing
            2 – Parts Counting
            3 – Deviations
            4 – Dosing
            5 – Formulas
            6 – Animal Weighing
            8 – Solids Density
            9 – Liquids Density
            10 – Peak Hold
            11 – Totalizing
            12 – Checkweighing
            13 – Statistics

CAUTION! Working modes numbering is identical for each kind of balance. The numbers are assigned to working modes names. Some balances give only the number as a response.
An example 1:
Command: OMI <CR><LF>   – return accessible working modes

Response:	OMI <CR><LF>	
	2_" Parts counting" <CR><LF>	– accessible working modes are given in return: mode number + name
	4_" Dosing" <CR><LF>	
	12_"Checkweighing" <CR><LF>	
	OK <CR><LF>	– command carried out

An example 2:

Command:	OMI <CR><LF>	– return accessible working modes
Response:	OMI <CR><LF>	
	2 <CR><LF>	– accessible working modes are given in return: mode number
	4 <CR><LF>	
	12 <CR><LF>	
	OK <CR><LF>	– command carried out

Set working mode

Command overview: Command sets particular working mode.
Format: OMS_n <CR><LF>
Response options:
OMS_OK <CR><LF>   – command carried out
OMS_E <CR><LF>   – error in-course of command execution, no parameter or incorrect format
OMS_I <CR><LF>   – command understood but not accessible at this moment
n – parameter, decimal value determining working mode number. To see detailed description go to OMI command

An example:

Command:	OMS_13<CR><LF>	– set Statistics mode
Response:	OMS_OK<CR><LF>	– Statistics mode set

Give current working mode

Command overview: Command returns currently set working mode.
Format: OMG <CR><LF>
Response options:
OMG_n_OK <CR><LF>   – command carried out, response: current working mode
OMG_I <CR><LF>   – command understood but not accessible at this moment
n – parameter, decimal value determining working mode number. To see detailed description go to OMI command.

An example:

Command:	OMG<CR><LF>	– return current working mode
Response:	OMG_13_OK<CR><LF>	– balance operates in Statistics working mode

Give accessible units

Command overview: Command returns units available for a particular device and for a current working mode.
Format: UI <CR><LF>
Response options:
UI_"$x_1, x_2, \ldots x_n$"_OK<CR><LF>   – command carried out, returns accessible units
UI_I <CR><LF>   – command understood but not accessible at this moment

x – unit symbols, separated by means of comas
x → g, mg, ct, lb, oz, ozt, dwt, tlh, tls, tlt, tlc, mom, gr, ti, N, baht, tola, u1, u2

An example:

Command:	UI <CR><LF>	– return available units

Response: UI_"g, mg, ct"_OK<CR><LF> – response: available units

Set current unit

Command overview: Command sets current unit for a particular device.
Format: US_x <CR><LF>
Response options:
US_ x_OK <CR><LF> – command carried out, response: current unit
US_E <CR><LF> – error in-course of command execution, no parameter or incorrect format
US_I <CR><LF> – command understood but not accessible at this moment
x – parameter, units symbols: g, mg, ct, lb, oz, ozt, dwt, tlh, tls, tlt, tlc, mom, gr, ti, N, baht, tola, msg, u1, u2, next

CAUTION! if x=next, the command swaps to another available unit on the list

An example:
Command: US_mg<CR><LF> – set „mg" unit
Response: US_mg_OK<CR><LF> – „mg" set as a current unit

Give current unit

Command overview: command returns current unit.
Format: UG <CR><LF>
Response options:
UG_x_OK<CR><LF> – command carried out, response: current unit
UG_I <CR><LF> – command understood but not accessible at this moment
x – parameter, unit symbol
An example:
Command: UG<CR><LF> – return current unit
Response: UG_ct_OK<CR><LF> – currently set unit is „ct"

Activate sound signal

Command overview: command activates BEEP sound signal for a specified amount of time
Format: BP_CZAS <CR><LF>
Response options:
BP_OK <CR><LF> – command carried out, BEEP sound signal activated
BP_E" <CR><LF> – no parameter or incorrect format
BP_I <CR><LF> – command understood but not accessible at this moment
TIME – parameter, decimal value specifying how long shall the sound last, parameter given in [ms]. Recommended range <50 - 5000>.
If value greater than the permissible high limit is given, than BEEP sound is operated for the maximum permissible amount of time.
An example:
Command: BP_350<CR><LF> – activate BEEP for 350 ms
Response: BP_OK<CR><LF> – BEEP activated
CAUTION!
BEEP sound activated via BP command is inhibited if in-course of its activation the sound is activated by means of other device: keypad, touch panel, proximity sensors.

Send all implemented commands

Format: **PC CR LF**
Command: PC CR LF - send all implemented commands

| Response: | PC_A_"Z,T,S,SI…" | - command carried out, the terminal displays all implemented commands. |

Give balance type

Format: BN <CR><LF>
Response options:
BN_A_"x" <CR><LF>   - command understood, response: balance type
BN_I <CR><LF>   - command understood but not accessible at this moment
x – series of types for a particular balance (in between inverted commas), with general balance type in front
An example:
Command: BN <CR><LF>   – return balance type
Response: BN_A_"AS"   – balance type: "AS"

Give max capacity

Format: FS <CR><LF>
Response options:
FS_A_"x" <CR><LF>   - command understood, response: Max capacity
FS_I <CR><LF>   - command understood but not accessible at this moment
x – Max value of reading units (in between inverted commas)
An example:
Command: FS <CR><LF>   – return Max capacity
Response: FS_A_"220.0000"   – Max capacity: "220 g"

Give program version

Format: RV <CR><LF>
Response options:
RV_A_"x" <CR><LF>   - command understood, response: program version
RV_I <CR><LF>   - command understood but not accessible at this moment
x – program version (in between inverted commas)
An example:
Command: RV <CR><LF>   – return program version
Response: RV_A_" 1.1.1"   – program version: "1.1.1"

Set AUTOZERO function

Format: A_n <CR><LF>
Response options:
A_OK <CR><LF>   – command carried out
A_E <CR><LF>   – error in-course of command execution, no parameter or incorrect format
A_I <CR><LF>   – command understood but not accessible at this moment
n – parameter, decimal value determining autozero settings
n →   0 – autozero off
              1 – autozero on
CAUTION!
Command changes settings for a current working mode.
An example:
Command: A_1<CR><LF>   – turn autozero function on
Response: A_OK<CR><LF>   – autozero function is on
AUTOZERO function operates until it is turned off by A 0 command.

Set ambient conditions state

Format: EV_n <CR><LF>
Response options:
EV_OK <CR><LF>   – command carried out

EV_E <CR><LF>   – error in-course of command execution, no parameter or incorrect format
EV_I <CR><LF>   – command understood but not accessible at this moment
n – parameter, decimal value determining ambient conditions state
n →   0 – unstable ambient conditions
           1 – stable ambient conditions
CAUTION!
Command changes settings for a current working mode.
An example:
Command: EV_1<CR><LF>   – set value 'stable' for ambient conditions option
Response: EV_OK<CR><LF>   – ambient conditions option set to value 'stable'
<AMBIENT CONDITIONS> parameter is set to value <STABLE> until command EV 0 swaps it to value <UNSTABLE>.

Set filter

Format: FIS_n <CR><LF>
Response options:
FIS_OK <CR><LF>   – command carried out
FIS_E <CR><LF>   – error in-course of command execution, no parameter or incorrect format
FIS_I <CR><LF>   – command understood but not accessible at this moment
n – parameter, decimal value determining filter number
n →   1 – very fast
           2 – fast
           3 – average
           4 – slow
           5 – very slow
CAUTION!
The numbering is assigned to a particular filter name and it is identical for all balance types.
The command changes settings for a current working mode if, for a particular balance type, filter settings are assigned to the working mode.

An example:

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

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

Set Value release

Format: ARS_n <CR><LF>
Response options:
ARS_OK <CR><LF>   – command carried out
ARS_E <CR><LF>   – error in-course of command execution, no parameter or incorrect format
ARS_I <CR><LF>   – command understood but not accessible at this moment
n – parameter, decimal value determining value release options
n →   1 – fast
           2 – fast+reliable
           3 – reliable
CAUTION!
The numbering is assigned to a particular value release option and it is identical for all balance types.
The command changes settings for a current working mode if, for a particular balance type, value release settings are assigned to the working mode
An example:
Command: ARS_2<CR><LF>   – set value release parameter to fast+reliable option
Response: ARS_OK<CR><LF>   – fast+reliable option set

Set last digit

Format: LDS_n <CR><LF>

Response options:

LDS_OK <CR><LF>   – command carried out
LDS_E <CR><LF>   – error in-course of command execution, no parameter or incorrect format
LDS_I <CR><LF>   – command understood but not accessible at this moment
n – parameter, decimal value determining last digit settings
n →   1 – always
               2 – never
               3 – when stable

CAUTION!
The numbering is assigned to a particular last digit option and it is identical for all balance types.
The command changes settings for a current working mode if, for a particular balance type, last digit settings are assigned to the working mode.
An example:
Command: LDS_1<CR><LF>   – set last digit option to value 'always'
Response: LDS_OK<CR><LF>   – 'always' value set

25. 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.
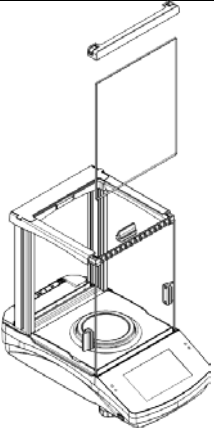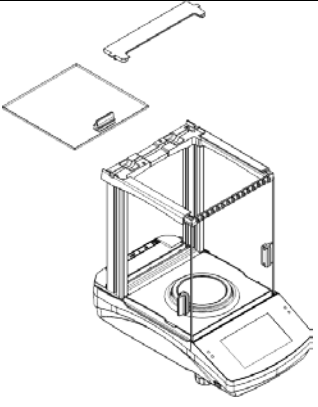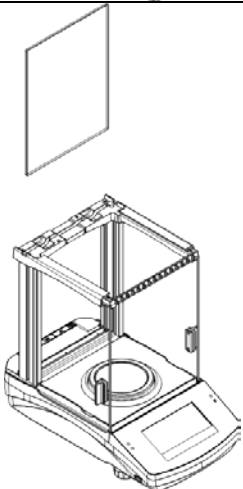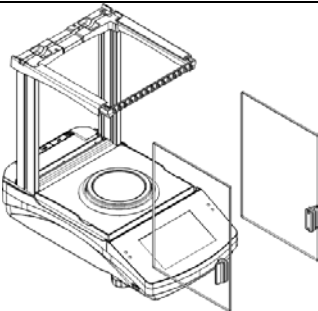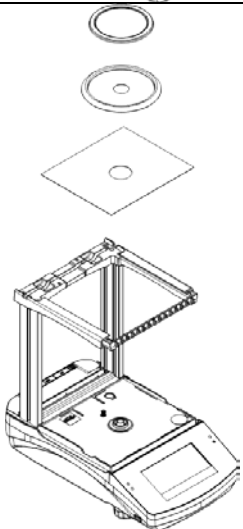
At the end of the cleaning process rinse the pane using running water first, and then distilled.

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.

Glass Pane Removal Process:

	Detach the front part of the frame and take out the front pane.		Detach the back part of the frame and take out the top pane.
	Remove the back pane of the chamber.		Remove the left and the right side pane.
	Carefully disassemble the weighing pan, the draft shield and the bottom insert.		

Clean the weighing chamber and the panes. All the operations have to be done carefully. Pay special attention to the spot where the weighing pan is installed; dirt and other small elements might enter the balance construction through this opening. This may cause incorrect operation of the instrument. Upon maintenance is completed carry out the same set of actions in a reverse order. Pay a special attention to the left and the right side panes, assembly them on the correct side of the balance.
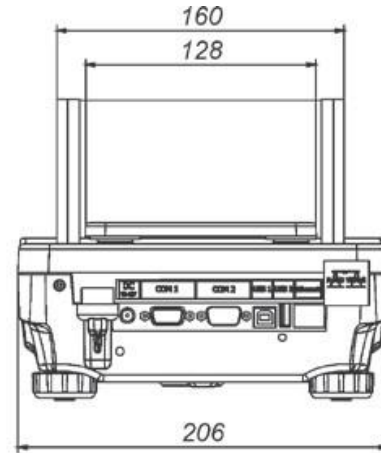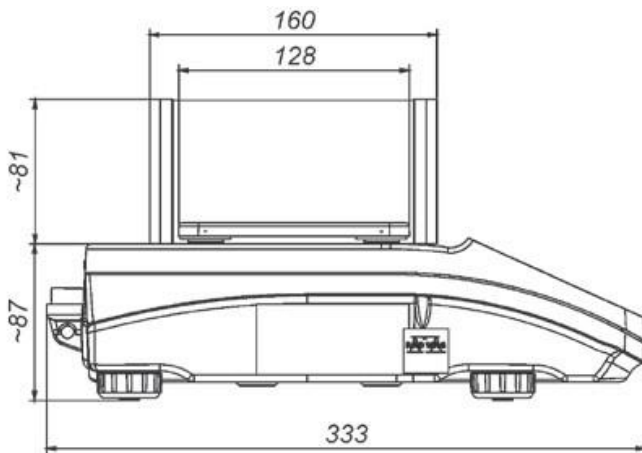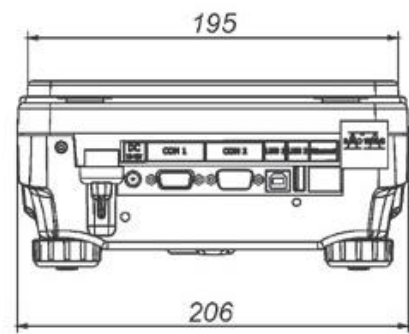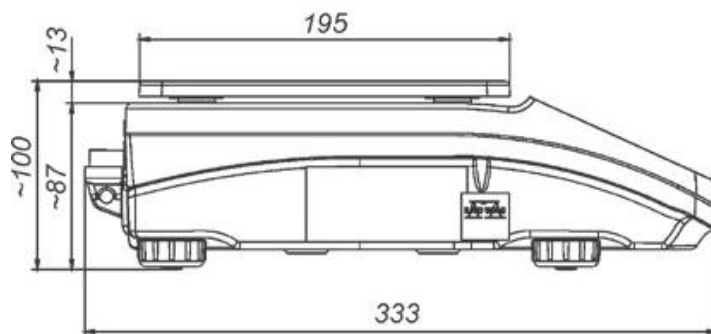
26. APPENDIX

26.1 DIMENSIONS

TB-800-82/220i, TB-800-160(i), TB-800-220(i), TB-800-310(i)
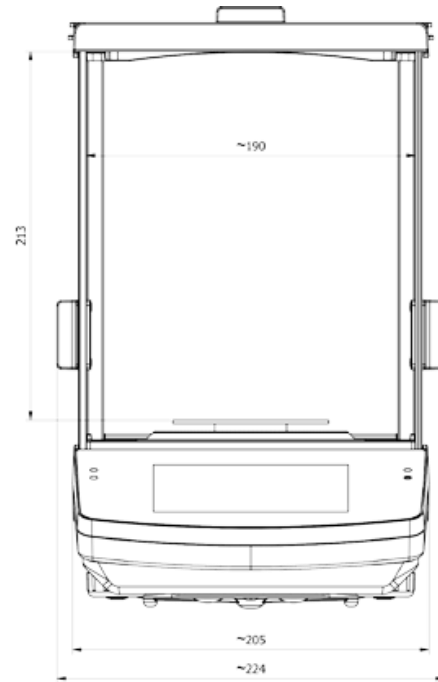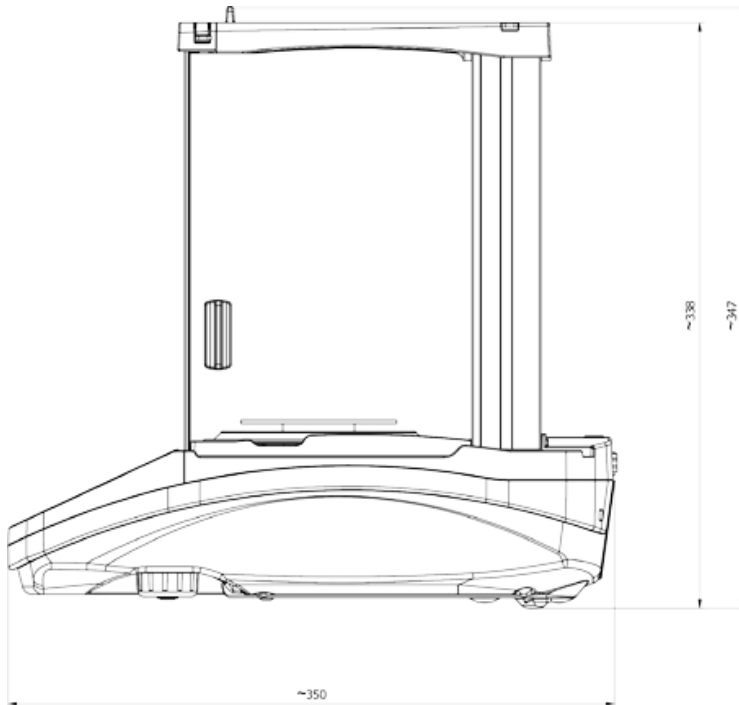
TB-800-360(i), TB-800-600(i), TB-800-1000(i)

TB-800-2100(i), TB-800-4500(i), TB-800-6000(i), TB-800-6001,TB-800-10000, TB-800-10100i

26.2 CONNECTORS

Analytical (0.1mg) and Semi-Micro (0.01mg) Models

	1. power supply seat 2. DB9/M connector (external buttons) 3. COM 1 connector (e.g. printer) 4. USB 2 type B connector (e.g. computer) 5. USB 1 type A connector (e.g. computer keyboard) 6. RJ45 Ethernet connector
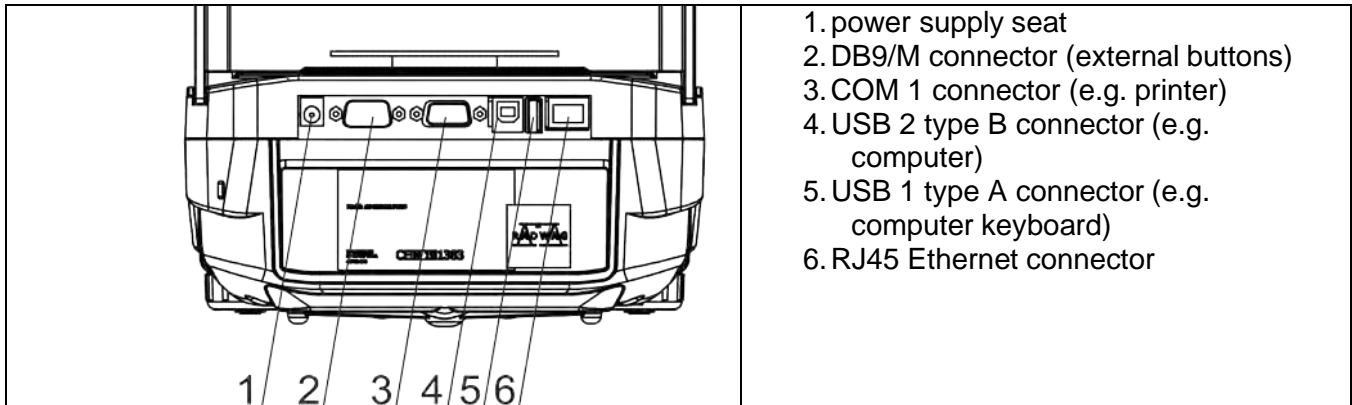
Precision Models (0.001g and 0.01g)

	1. Ethernet RJ45 connector 2. USB 1, Type A connector 3. USB 2, Type B connector 4. COM 1 connector 5. COM 2 connector 6. Power supply socket
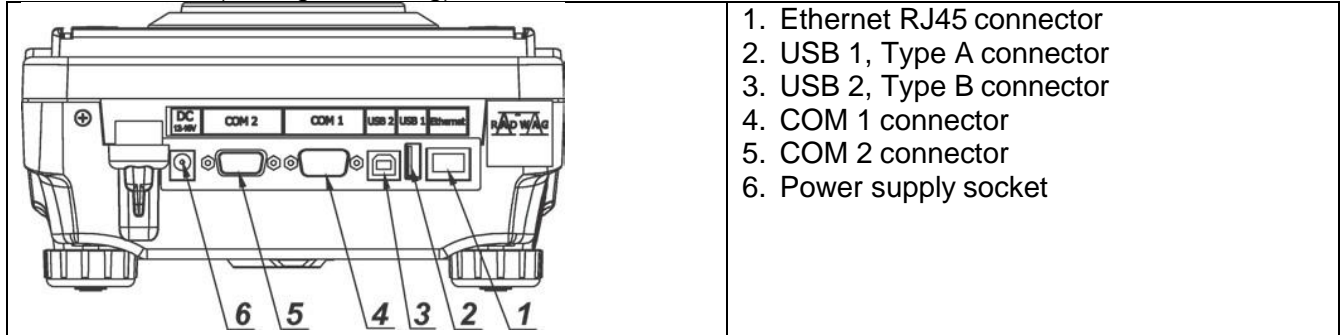
26.3 ERROR MESSAGES

⚠	Max weighing threshold exceeded Unload the weighing pan
⚠	Min weighing threshold exceeded Install weighing pan
⚠	Display capacity out of range Unload the weighing pan

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⚠️	Tarring out of range Press zeroing button or restart the balance
⚠️	Zeroing/tarring time out of range Weighing indication unstable
⚠️	Start mass out of range Install weighing pan

Five-Year Limited Warranty

Cole-Parmer 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.

Warranty is voided if:

A. Cole Parmer 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.

Cut Here_ _

Warranty Registration Card
(Please Return Within 30 Days)

Company or Institution_____**Department**_____

Contact Name_____**Title**_____

Street Address_____

City_____**State**_____**Zip**_____

Telephone_____**Date Purchased**_____

Purchased From_____

Model Number_____**Serial Number**_____

Industry_____**Application**_____

What influenced you to purchase this product?_____

For your reference and records:

Model Number

_____

Serial Number

_____

Purchase Date

_____

_____

_____

_____

It is recommended that Cole-Parmer products are calibrated annually to ensure proper function and accurate measurements; however, your quality system or regulatory body may require more frequent calibrations. To schedule your recalibration, please contact InnoCal, an ISO 17025 calibration laboratory accredited by A2LA.

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INNOVATIVE CALIBRATION SOLUTIONS
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For Product and Ordering Information, Contact:

Cole-Parmer®
Toll-Free: 1-800-323-4340
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