User Manual

Schuler Scientific Moisture Analyzer

01-16-17 REV03

Contents

1. GENERAL INFORMATION

1.1 INTENDED USE

The moisture analyzer is designed to verify relative moisture content in small samples of various substances, dry mass content in small samples, and determine the mass of weighed objects. Any other use of the moisture analyzer may be dangerous both to the device and the user. The device ensures a fast and precise determination of water content in a tested sample, and the touch screen display considerably simplifies the operation and improves the functionality of the moisture analyzer. The device can be used to determine humidity content of different materials.

At the initial stage of the measurement, the moisture analyzer precisely determines the mass of an object placed on the weighing pan. As the mass reading is stabilized, the sample is quickly heated by the halogen lamp, an IR emitter, or a metal heater, causing water to evaporate from the sample. While sampling, the moisture analyzer is continuously checking loss of mass, and on completing this calculation, it displays the current moisture content of the sample being tested.

Compared to conventional methods of humidity content determination of various substances, the moisture analyzer considerably shortens the measurement time and simplifies the testing procedure. The moisture analyzer allows users to set multiple parameters that influence moisture content determination in a sample (temperature, time, drying modes, etc.).

> ! The moisture analyzer should be utilized and supervised only by users who are trained and experienced in these types of instruments. Do not make any design modifications. Additional equipment compatible with the moisture analyzer and spare parts should be supplied by Cole-Parmer.

1.2 WARNING SYMBOLS AND SIGNALS

Safety precautions are marked with special descriptions and warning signs. They warn a user of possible dangers. Ignoring the safety warnings may cause injuries, damage to the moisture analyzer, incorrect operation, and errors of measurements.

<u>Warning Descriptions</u>

WARNING	Medium-risk danger that can lead to a serious injury or death.
CAUTION	Low-risk danger that can lead to moisture analyzer damage or dysfunction, loss of data, or minor or moderate injury.
NOTE	Critical information on the moisture analyzer.

Warning Symbols

Electric shock

Acid / Corrosion

Potential danger

Flammable or explosive substances

Toxic substances

Hot surface

1.3 SAFETY PRECAUTIONS

WARNING: Adherence to safety information and user manual guidelines is required to prevent risk of accident or death.

WARNING: Nominal voltage for a moisture analyzer is 110V AC. Safety precautions for low-voltage devices must be abided by while operating the device. The moisture analyzer is equipped with a three-core power supply cable with grounding pin. If necessary, an extension cord can be used, provided that it meets the applicable standards and has a protective ground conductor. Intended disconnection of the grounding cable is forbidden.

CAUTION: The drying chamber cannot be opened during the drying process. The halogen lamp and its glass shield may reach temperatures up to 400° C.

When setting up the moisture analyzer, leave enough space to prevent heat from building up and to keep your analyzer from overheating. Leave about 20 cm around the instrument and about 1 m above. Air vents located in the housing cannot be covered, sealed, or blocked in any other way.

Do not put any flammable substances on, under or near the moisture analyzer. Be particularly careful when removing the sample from the drying chamber. The sample itself, the drying chamber, the shields, and the pan can still be extremely hot.

For any maintenance work such as cleaning the inside of the drying chamber, the moisture analyzer must be switched off. Wait until all the components have cooled down. Do not perform any modification to the heating module.

CAUTION: Corrosion can come from substances that release aggressive vapors (e.g., acids) during the heating process. While drying such substances, it is recommended that users work with small samples. Otherwise, vapors can condense on cold housing parts and cause corrosion.

Some types of samples require taking particular safety precautions.
Some samples can pose a danger for people and objects. It is always the user who is liable for possible damages caused by the use of an inappropriate sample.

WARNING:

Fire or explosion can result from flammable or explosive substances, substances containing solvents, or substances releasing flammable or explosive gases or vapors. When in doubt, characteristics perform a risk analysis with the sample before carrying out the procedure. For these samples, apply as a low drying temperature as possible to prevent flames or explosion. During the analysis, it is necessary to wear protective glasses and gloves. The samples should be relatively small. **Under no circumstances can the instrument be left unsupervised!**

WARNING:

Caustic or corrosive components in substances that release toxic gases or vapors can cause irritations of the eyes, skin, or respiratory system, illnesses, or even death. Dry such substances only in fume cupboards.

Under no circumstances should the instrument be used within an area near potential explosions. The moisture analyzer is designed to be operated outside hazardous areas exclusively.

Do not open the drying chamber during the drying process. The moisture analyzer features a halogen lamp, which is a very powerful heat source. Pay special attention not to touch those elements of the moisture analyzer that get hot while the drying procedure (i.e., the disposable pan, the pan handle, and the inner shields of the drying chamber).

1.4 SYSTEM PRECAUTIONS

!   Do not open the instrument's housing. There are no parts inside that would require maintenance, repair, or replacement by a user. In case of any problems, contact Schuler Scientific.

!   The moisture analyzer is not intended for dynamic weighing. Even if small amounts of a sample are added to or taken off the weighing pan, the mass readout should be taken only on stabilization of the measurement result (appearance of stability symbol ◣◢ on the display).

!   Do not place any magnetic materials on the weighing pan, as this can damage the measuring system of the instrument.

! Avoid impact shock and overloading of the moisture analyzer in excess of the prescribed maximum measuring range (max capacity), minus any possible tare weight that has been applied.

!   Remember that it is forbidden to make any modification to the moisture analyzer. The Schuler Scientific moisture analyzer adheres to all binding safety regulations. Nevertheless, there are exceptional circumstances that may cause danger.

!   Before commissioning the moisture analyzer, make sure that the nominal power of the device specified on its data plate is compatible with the supply in the power supply to which the moisture analyzer is to be plugged in.

! Halogen lamps can only be changed by an authorized service employee.

! Protect the moisture analyzer from liquid. This might lead to electrocution, fire, emission of substances containing toxic or caustic vapor, or emission of explosive substances.

1.5 SUPERVISION OVER METROLOGICAL PARAMETERS

Metrological parameters of the moisture analyzer need to be checked by a user at regular intervals.

Inspection frequency depends on the ambient conditions in which the moisture analyzer is used, the types of processes performed, and the adopted quality management system.

1.6 PROTECTIVE CLOTHING

While working with the instrument, use protective clothing to protect yourself from potential hazards, which might be samples and ingredients being tested.

Use the following while carrying out tests:
- protective apron
- protective glasses
- protective gloves (while working with hazardous chemical substances)

Make sure that any protective clothing has been designed to be used with specific samples and that it is not damaged.

1.7 WARRANTY CONDITIONS

A. Schuler Scientific will exchange, replace or repair the existing balance for any damage that appears to be faulty by production or by construction within the 3-year warranty period.

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

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

# 2. UNPACKING AND INSTALLATION

2.1 PLACE OF USE AND ASSEMBLING

☐ Store and use your moisture analyzer in locations free of vibrations as well as air movement and dust.

☐ Make sure that it is located at the max altitude of 2000 feet above sea level.

• Make sure that the moisture analyzer's setting ensures good air circulation around the instrument (approximately 20 cm free space around the moisture analyzer and 1 m free space over it).

☐ The ambient air temperature in the weighing room should not be out of the specified range: +10°C to +40°C.

• The ambient relative humidity for temperatures up to 31°C it should be 80% maximum, and it should decrease linearly to 50% for a temperature of 40°C.

☐ Make sure that the moisture analyzer is placed away from heat sources on a stable table that is not affected by vibrations.

☐ Since part of the balance is a strong magnet, take special safety measures when weighing magnetic objects.

2.2 STANDARD DELIVERY COMPONENTS LIST

☐ Balance and components shown in Section 2.4 depending on balance model
☐ Warranty Card
☐ USB
    o User Manual
    o RLAB Software
   o RLAB Software Manual
    o 5 x Disposable Aluminum Pans

2.3 UNPACKING

Carefully take the device out of the packaging, remove the transport lock, and gently place the moisture analyzer where it will be used. Install the weighing pan and accessories following the diagram below.

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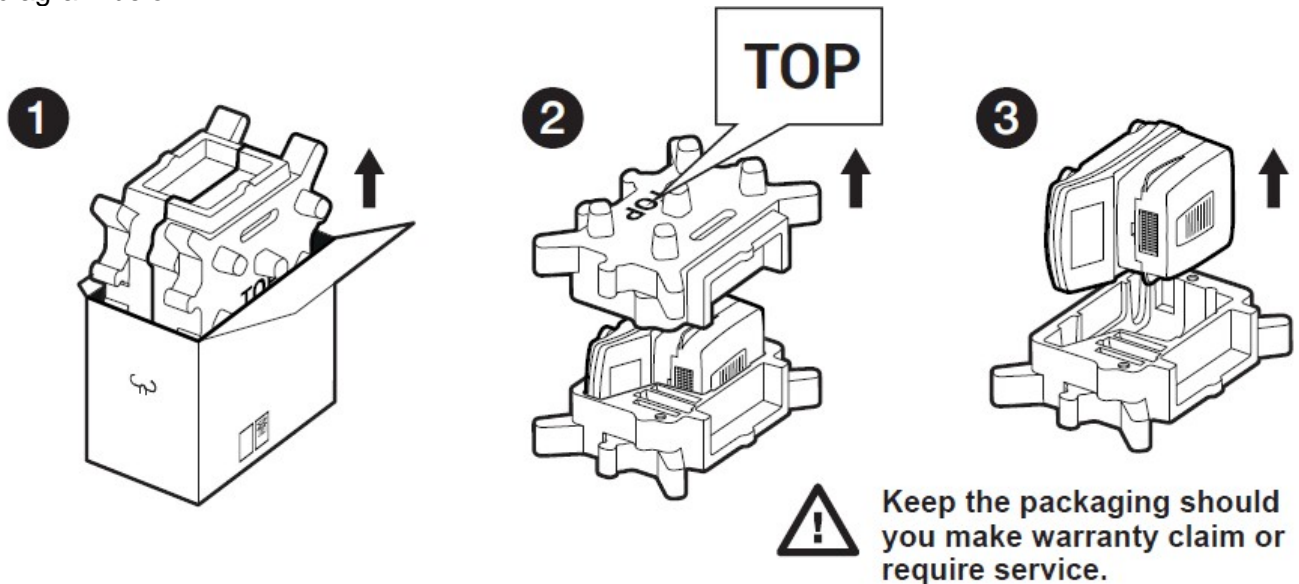
2.4 BALANCE ASSEMBLY

Components-
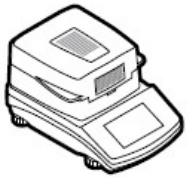
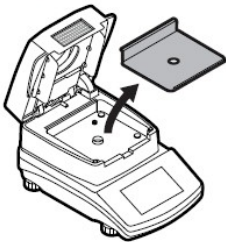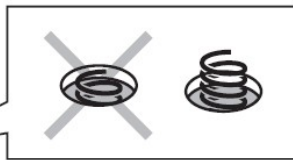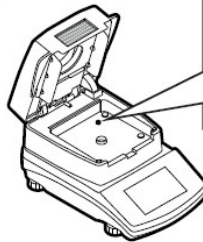| Moisture Balance x 1 | Aluminum Pan x 1 | Pan holder x 1 | Pan Handle x 1 | Anti-Draft Chamber x 1 | Power Supply x 1 |

Installation-

1)   Install components following diagram below:

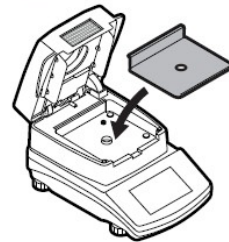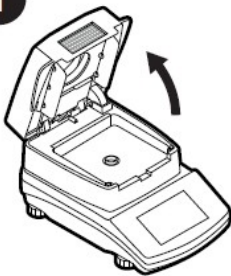❶ Remove the drying chamber base insert

❷ Check the grounding spring position. It should be jutting out of hole slightly.

❸ Once spring is checked, reinstall the chamber base insert.
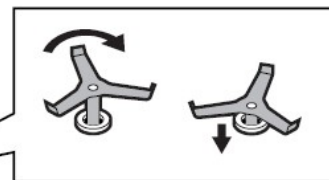

❶

❷

❸ When installing the pan holder, pay special attention to the correct positioning of its mandrel.
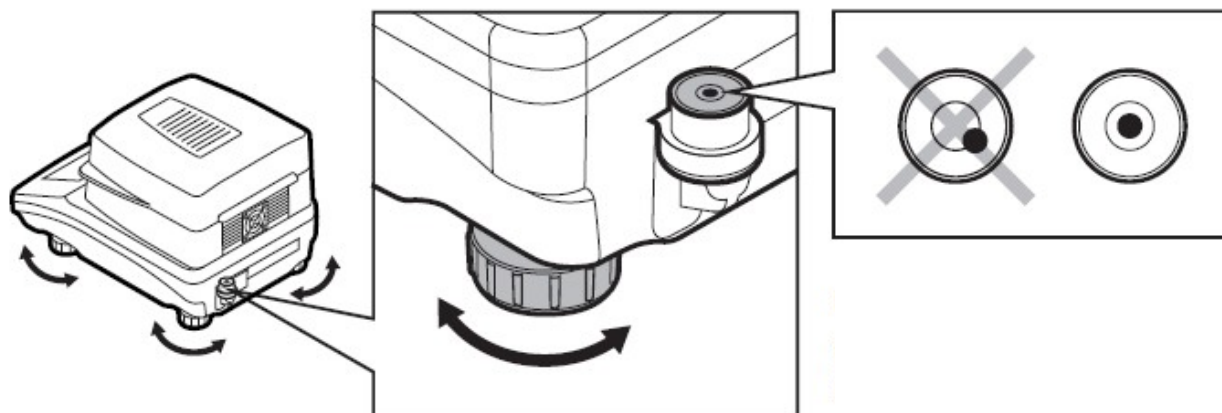
The mandrel features a cut, providing unique positioning of the holder against the pan handle to prevent contact.

❹

❺

2.5 BALANCE LEVELING

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

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

2.6 POWERING THE DEVICE

Before beginning a measuring processes, wait until the moisture analyzer reaches thermal stabilization.

For moisture analyzers that were stored in much lower temperatures before being plugged in, (e.g., during winter), thermal stabilization will take at least 4 hours. During the thermal stabilization, the indications on the display panel can change. It is recommended that ambient temperature changes where the device will be used are insignificant and slow to change.
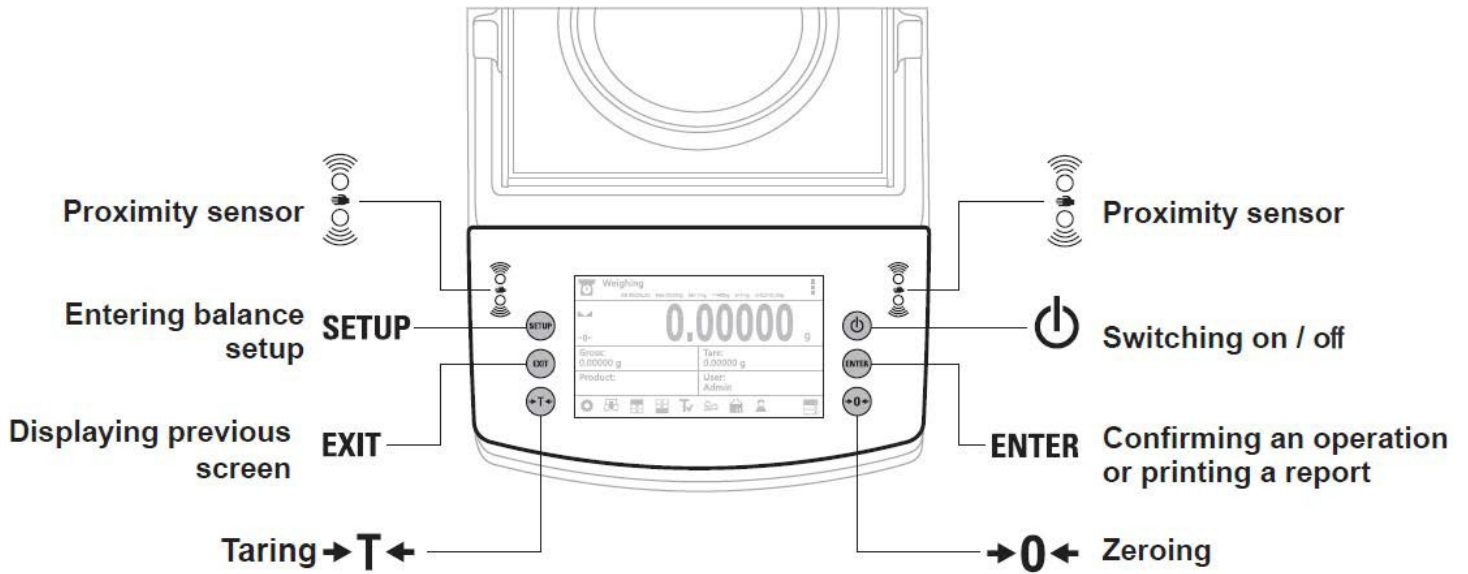
The moisture analyzer can be plugged to the outlet only by using its original power cord, which comes standard with the moisture analyzer. The rated voltage specified on the device's data plate must be compatible with the power source's rated voltage.

The power cord can be connected only to a socket with a ground contact. Plug the power cord into the moisture analyzer. The moisture analyzer's power plug is located at the back of its housing.
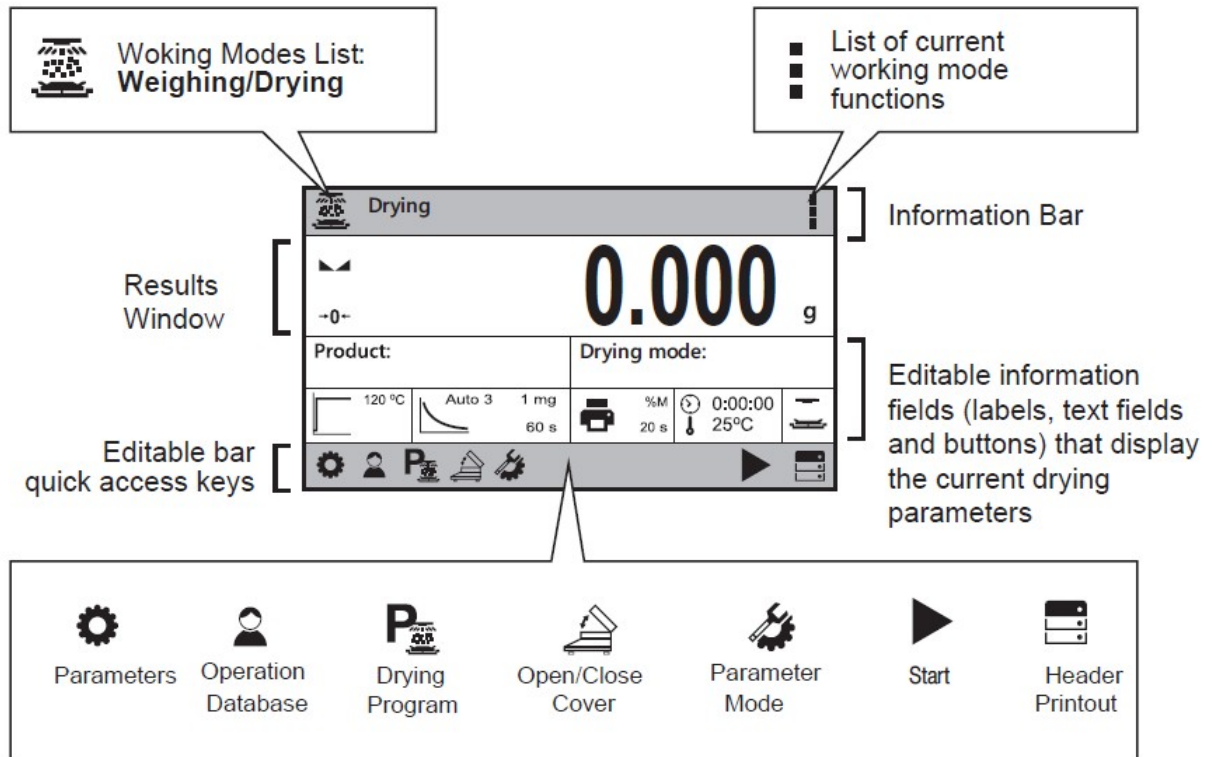
The moisture analyzer display shows its name and program number first, followed by an indication of 0.000 g (balances with readability of 1 mg) or 0.0000 g (balances with readability of 0.1 mg). If the indication does not equal zero, press the $\rightarrow 0 \leftarrow$ > button.

3. BALANCE CONTROL

3.1 BALANCE KEYBOARD

Proximity sensor		Proximity sensor
Entering balance setup	SETUP	Switching on / off
Displaying previous screen	EXIT	ENTER — Confirming an operation or printing a report
Taring →T←		→0← Zeroing

3.2 BALANCE HOME SCREEN

Woking Modes List: **Weighing/Drying**

List of current working mode functions

Information Bar

Results Window

Editable information fields (labels, text fields and buttons) that display the current drying parameters

Editable bar quick access keys

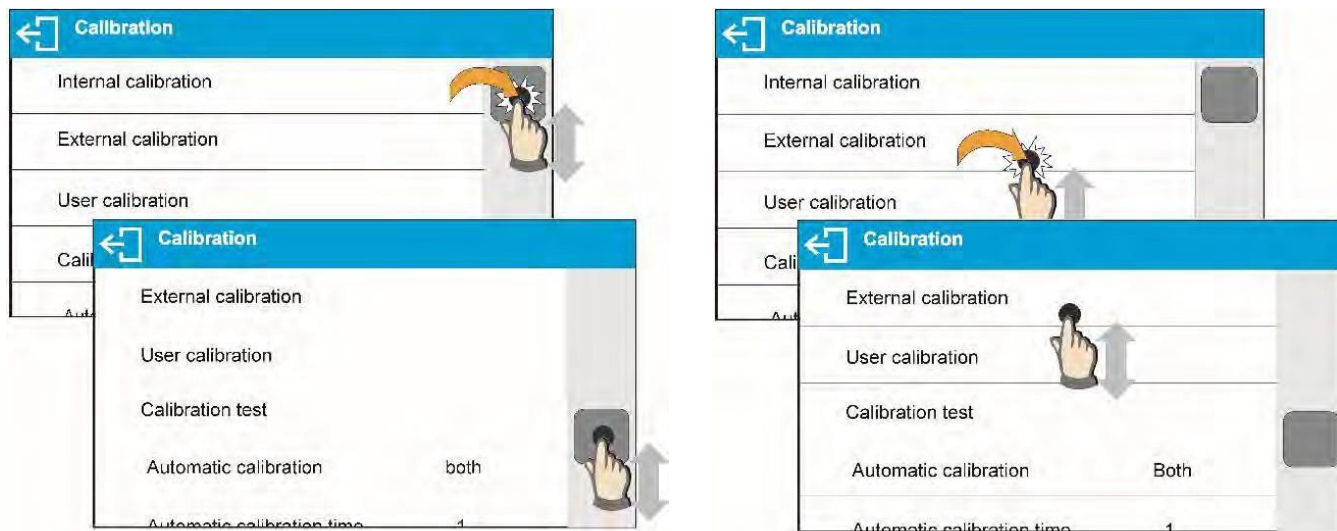| Parameters | Operation Database | Drying Program | Open/Close Cover | Parameter Mode | Start | Header Printout |

3.3 ENTERING BALANCE MENU

Operation of the balance menu is intuitive and easy to use. The touch panel makes the balance 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. adjustment procedure), respectively a window with parameters or a list of appropriate settings is displayed.
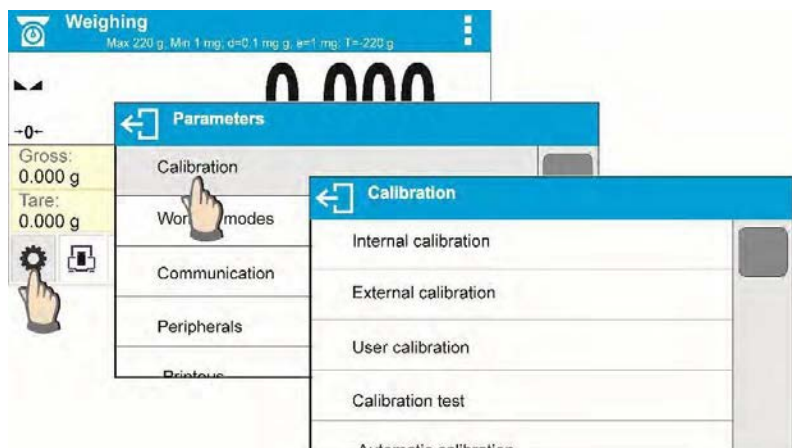
3.4 SCREEN SCROLLING

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 USB flash drive).
✖	Press to resign form introducing function modifications.	▤←	Press to import databases (key active upon plugging a USB flash drive).
＋	Press to add a new record to a database.	⟵	Press to move (exit) one level up.
🖶	Press to print out a record from a database.	🗑	Press to delete a database's content.

4. DRYING MODE
The main window of balance software can be divided into 3 sections:

- The top section displays data on the active working mode (symbol and name), metrologically important data and a button for choosing from the functions available for a particular working mode.

- The middle section presents the weighing result.

☐ The bottom section contains supplementary information on the current operation, as well as function buttons.

Enter drying process menu and set the following parameters:
- Drying process mode and drying process parameters
- Drying process finish mode and finish mode parameter
- Unit for a displayed and printed result
- Interval for measurement printout where the measurements are printed during the drying process

4.1 MOISTURE CONTENT MEASUREMENT ON A MOISTURE ANALYZER

Measurement of moisture content in a tested sample is performed by determining the loss of mass in a sample by its heating (humidity evaporation).

The Cole-Parmer moisture analyzer has two components: a precision balance and a drying chamber. Compared to standard moisture content determining methods, measurements with a Cole-Parmer moisture analyzer are much quicker and do not require additional mathematical calculations (the result of moisture content is previewed on an ongoing basis during product testing process).

Independent of the moisture content determination method, measurement accuracy is highly influenced by means of sample preparation and selection of testing parameters, such as:
☐ Sample size
☐ Sample type
☐ Drying temperature
☐ Drying time

In practice, the measurement accuracy is not as important as the speed of obtaining a measurement result (control over technological process). Thus, heating a sample with the halogen filament by the moisture analyzer makes the measurement process very time efficient. Measurement speed can be additionally increased by adjusting the moisture analyzer's parameters depending on the tested substances.

Optimum temperature and drying time depend on sample type and size, as well as anticipated measuring accuracy. The selection of drying parameters can only be performed on the basis of test measurements.

4.2 SAMPLING AND PREPARATION

The sample's features, its preparation and its size are very important factors influencing the speed and accuracy of the measurement process.

The means of sampling and preparation are extremely important for repeatability of measurement results, as a sample should be a representative part of the tested substance.
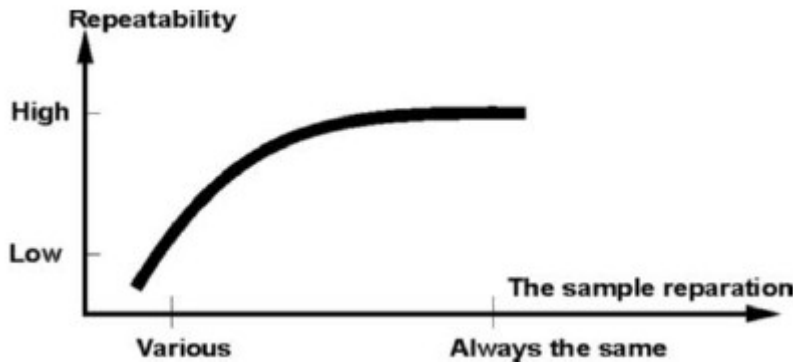
The final measurement result is vastly conditioned by precise and considered sample preparation. A sample used for analysis has to represent the total structure of the tested material. The sampling process should determine the sampling means, sample disintegration, particle size after disintegration, sample uniformity and other. The sampling process should be completed as quickly as possible so that a sample does not lose or absorb humidity from the surrounding area.

Applied sampling standards should match individual user needs as well as the requirements of the tested material, its consistency and its sample size.

Number of samples
  Increasing the number of tested samples also increases the statistical measurement certainty. The number of samples depends on the uniformity of tested material, its purity, the accuracy of applied measuring method and the anticipated accuracy of obtained results.

Material mechanical reducing for measurements
  The applied reducing method should be selected appropriately for the tested material. Substances that are hard and brittle can be cut. Grinding such substances may cause them to heat up and result in humidity vaporization, resulting in unreliable measurement results. Unless a substance can be prepared for measurement in a way besides grinding, any possible moisture content loss should be calculated.

Use of high-silica sand
  Ensuring optimum substance drying requires that a sample has the largest possible surface for moisture content evaporation. Test results of moisture content for substance with a glossy surface (e.g., glucose syrup) or with a sheen (e.g., butter) can be much more reliable if the sample is mixed with a dried high-silica sand to improve the measurement's accuracy and

repeatability. While using the mixture, a disposable weighing pan with extended brim must be applied to hold a greater volume of the sample.

Grease in a form of paste or melting substances
Such substances require testing with use of a filter made of glass fiber, which considerably increases the active evaporation surface by separating the substance between the fibers. Initial filter drying is necessary only for measurements that require very high accuracy.

Liquid substances
Liquid substances, by creation of drops on their surface caused by surface tension, may render difficulties in drying process. Use a glass fiber filter to shorten the measurement time. The filter causes the tested liquid to separate around the fibers and increase the active evaporating surface. Initial filter drying is necessary only for measurements that require very high accuracy.
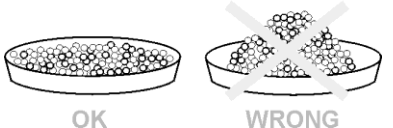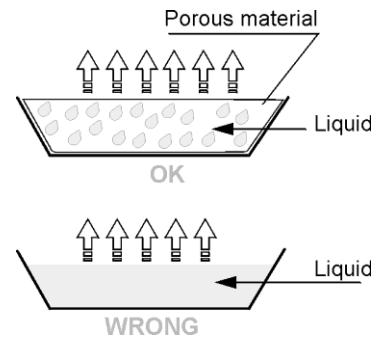
Substances with a leather-like structure or that are temperature sensitive
Use a glass fiber filter. While testing, a substance is placed on a drying pan, and the sample surface is covered with a filter, which protects the sample from direct heat radiation. In such case, the sample is heated by convection, which is milder than radiation.

**Substances containing sugar**
The surface of such substances may caramelize during the testing procedure. Therefore, use a thin layer of the sample and a moderate drying temperature.

Sample distribution on a pan

|	
Loose materials Dried in their natural state, i.e., in their natural form or disintegrated. Sample disintegration causes smaller dispersion between the following measurements. The sample mass should not be too high, and the sample should be evenly spread on the whole surface of the drying pan.	
Liquid substances Semi-fluid substances are dried in their natural form. Large amounts of oils occurring in some substances makes moisture content determination difficult. In such cases, use additional components that increase the sample's active surface and aid in the moisture content releasing process from a sample. Such components are high-silica sand, blotting paper or a filter. Before drying a tested substance, dry the additional component so that its humidity is close to zero.	

Solid objects
Depending on a solid object's structure (dense or loose), the time it takes to determine moisture content will vary. The size of the solid's surface determines the speed of drying process and measurement reliability. Thus, the surface of a solid object should be as large as possible. Since solid objects release moisture through their outer surfaces, sample thickness is another important factor.
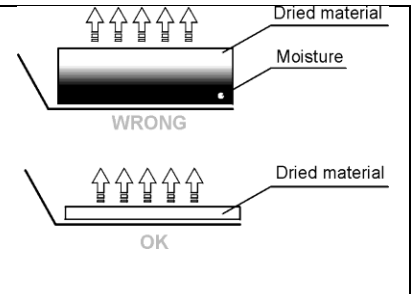
4.3 SELECTING OPTIMUM MASS FOR A SAMPLE

The sample mass influences the accuracy of the measurement result and measurement time. A higher mass of a sample means a higher amount of moisture content that needs to evaporate, and therefore measurement time is longer.

Obtaining a short measurement time is feasible for a small sample mass, but sample mass cannot be too small, as it may negatively influence required measurement accuracy.
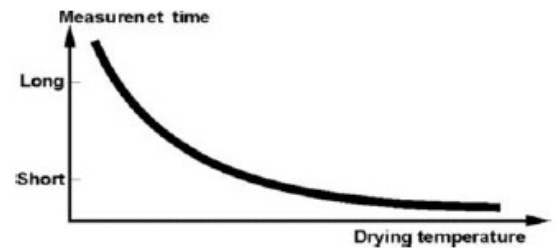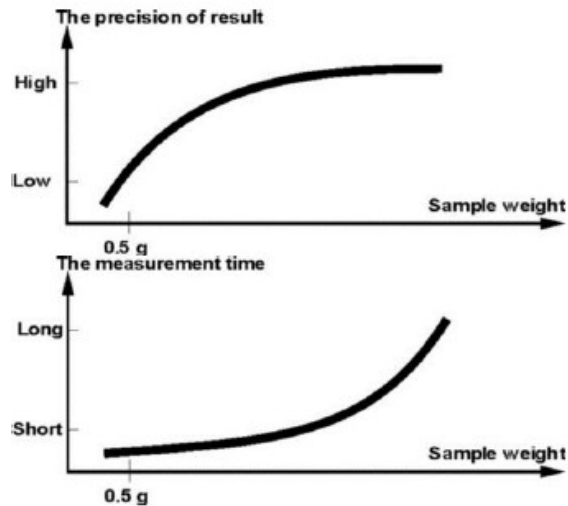
Influence of Sample Weight on Measurement Result Repeatability
The sample mass considerably influences the repeatability of measurement results obtained with a moisture analyzer. The relation between sample mass and repeatability is presented in a table below.

Sample weight	Repeatability
~ 2g	±0.05%
~ 10g	±0.01%

The above data refers to a model, uniform sample containing no moisture due to the evaporation process and showing no signs of decomposition (e.g., wet high-silica sand).

19

The result's uncertainty cannot be avoided, due to the sample's nature and moisture analyzer repeatability. In practice, it means that an obtained measurement result may exceed the repeatability values provided above.

4.4 DRYING TEMPERATURE
The drying temperature has the largest impact on drying time. The temperature value depends on the type of dried substance. Too low a drying temperature causes too low moisture content evaporation and an under-dried sample and consequently an unnecessary extension of measurement time. Too high a drying temperature causes a dried sample to burn and overheat, as well as chemical decomposition. The drying temperature of traditional methods using a furnace is specified in applicable industry or company standards. Unless standards apply, then the temperature should be adjusted by tests.

On selecting the drying temperature value, proceed as follows:
  ☐ Determine the moisture content in a sample.
  ☐ Determine the temperature of the substance chemical decomposition by tests.
  ☐ Compare the result obtained with a moisture analyzer with the one using the traditional method.

When drying a sample with high moisture content, it is possible to shorten the measurement time by selecting quick or step drying mode. Then the majority of moisture content is released when the drying temperature is higher than set. After some time, the temperature is lowered to the set value and maintained until completing drying process.
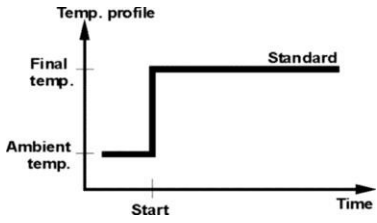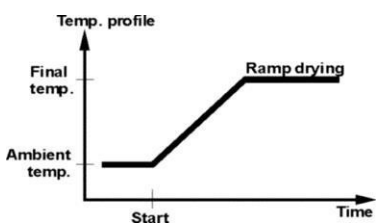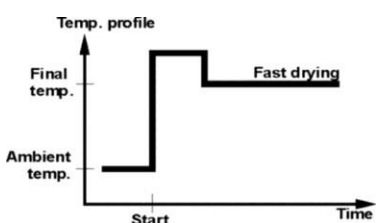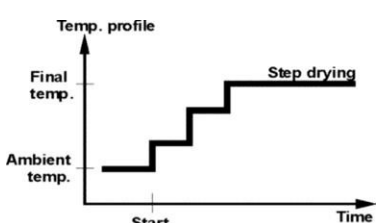
4.5 DRYING PROCESS PROFILE AND DRYING PARAMETERS
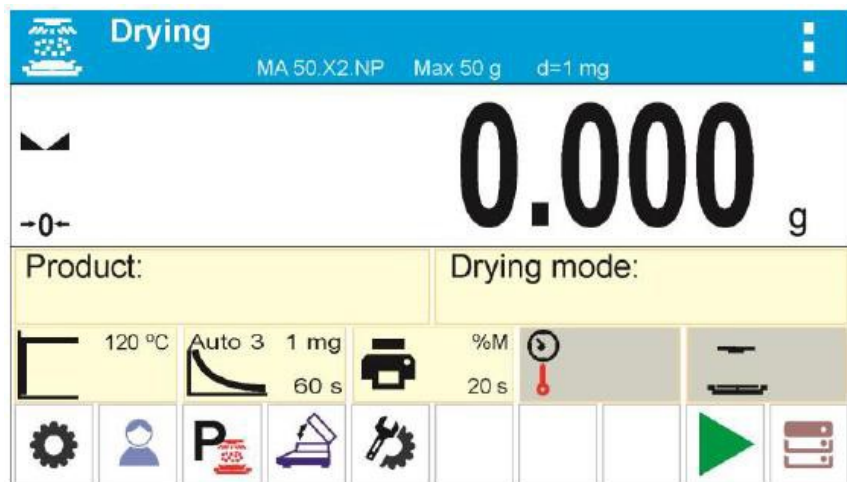
The default display configuration in drying mode.

The software of the moisture analyzer enables user to select one of four drying profiles:
  ☐ Standard
  ☐ Quick
  ☐ Mild
  ☐ Step

Standard profile The most frequently used of all drying profiles. It enables accurate determination of moisture content in a dried sample.	
Mild profile Used for drying substances that are sensitive to rapid heat emitted by filaments operating at full power in the initial stage of drying process. This profile prevents substances sensitive to heat from decomposing by mild temperature increase in a set amount of time (the time interval has to be selected by tests). The Mild profile is recommended for drying leathery samples.	
Fast profile Recommended for drying samples whose moisture content varies from 5% to 15%. In the initial stage of the Fast profile, heating takes place at full power of the filaments, causing heating the drying chamber to increase the temperature (maximum temperature value is higher by 30% from set drying temperature). Overheating compensates for heat loss during the evaporation of large moisture content in the test's initial stage.	
Step profile Enables determining up to three steps with random drying temperatures. The Step profile is recommended for drying substances with moisture content over 15%. Temperature and heating time in each step have to be adjusted by tests.	

Current drying parameters are displayed as symbols in the middle of the information field. To perform the procedure in accordance with other parameters, enter the settings and modify the respective parameters' values.

Enter drying process menu and set the following parameters:
- ☐ Drying process mode and drying process parameters
- ☐ Drying process finish mode and finish mode parameter
- ☐ Unit for a displayed and printed result
- ☐ Interval for measurement printout where the measurements are printed during the drying process
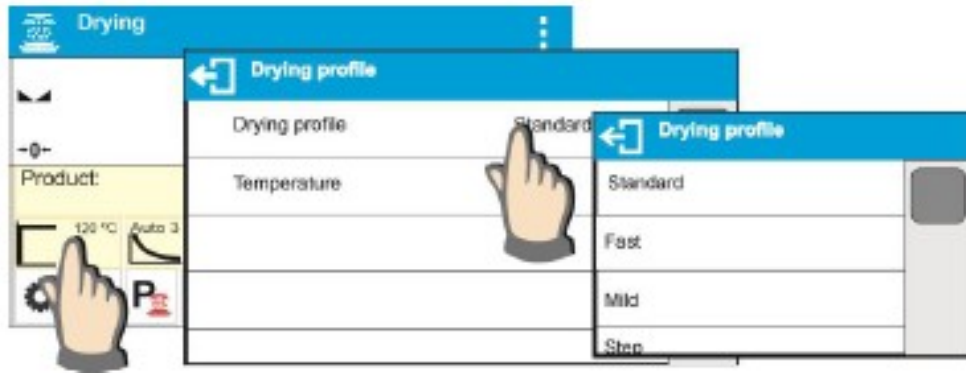
Enter the drying parameters settings and select mode type. Upon selection, the fields enabling users to set profile parameters are displayed. Parameters depend on the selected mode.

Drying Process mode parameter takes the following values:

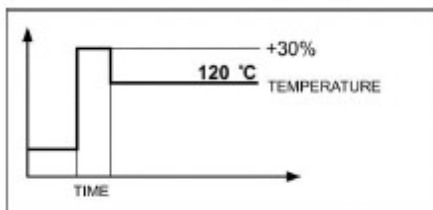- **Standard drying profile** – Set the drying temperature at which a sample is to be tested.
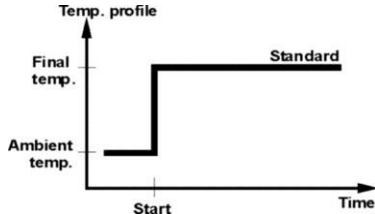
☐ **Fast drying profile -** Set both heating time in a temperature higher than the preset one and the temperature for which a sample is to be tested.
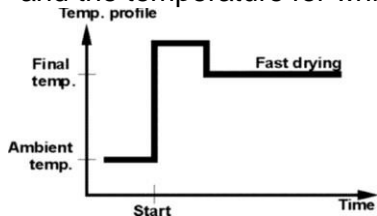
A specific feature of this drying profile is the fast increase of drying temperature in short period of time. When compared to the preset temperature, the drying temperature rises 30% within 180 seconds, and it is maintained at this level for a specified amount of time before dropping to the temperature value preset in drying profile parameters.

> ! CAUTION: For the Fast profile, set the drying temperature and heating time 30% higher than the set temperature. Heating time is measured after reaching the set temperature.

☐ **Mild drying profile** - Set the length of time within which the moisture analyzer is to reach the specified temperature and temperature for which a sample is to be tested.

☐ **Step drying profile -** Set the heating time in temperature number one, first step temperature, heating time in temperature number two, second step temperature and the temperature in which a sample is to be tested.
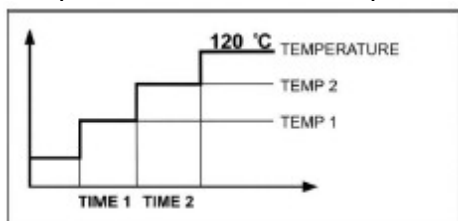
! CAUTION: For the Step profile, set the step temperature 1 and 2 and the temperature of drying. Also set the heating time, in particular indirect temperatures (1 and 2). Time for heating in particular steps is counted from the moment of reaching a preset temperature for a particular step.

4.6 DRYING TIME

Drying time is set by selecting one of the available finish mode criteria. This means that a moisture analyzer must meet preset criteria (one of the requirements: mass over time, time) to automatically finish the drying process.

The end of the drying process can be triggered by the amount of time independent of loss in mass. This criterion is used for substances that may decompose during drying process and their mass does not reach constant value.

The second criterion is loss in mass (less than 1 mg) in a defined amount of time.

Automatic finish mode (Auto switch off mode) - the operator can choose between various types of finish modes:
☐Automatic 1 (change 1mg/10s)
☐Automatic 2 (change 1mg/25s)
☐Automatic 3 (change 1mg/60s)
☐Automatic 4 (change 1mg/90s)
☐Automatic 5 (change 1mg/120s)

Time-defined finish mode - drying process finish takes place when a set amount of time elapses independent of the measurement result (maximum drying time 99 hours 59 minutes).

Manual finish mode - the operator ends the drying process manually by pressing the <START/STOP> key on the moisture analyzer's display.

Defined finish mode – user-defined criterion. The operator determines the limit value for loss of mass and time in which the loss of mass must not exceed a preset value. As the moisture analyzer reaches the set criterion, it automatically finishes the drying process.
- User defined 1 (Δm – change of mass and Δt – change of time must be given, the former in mg, the latter amounts to 120 s. maximally)
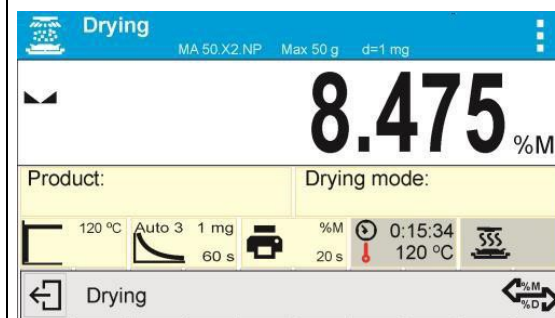- User defined 2 (set moisture content change ratio ☐%M over time 60s)

4.7 DRYING PROCESS

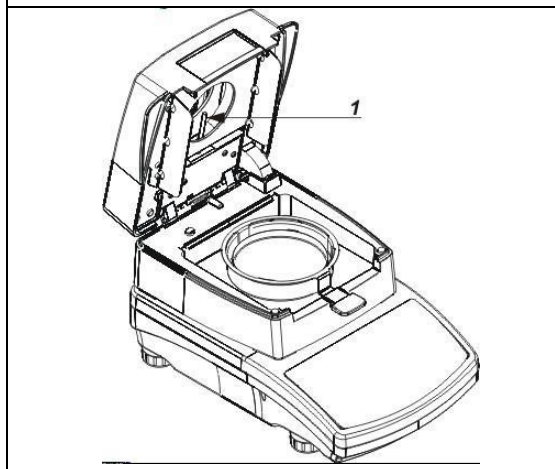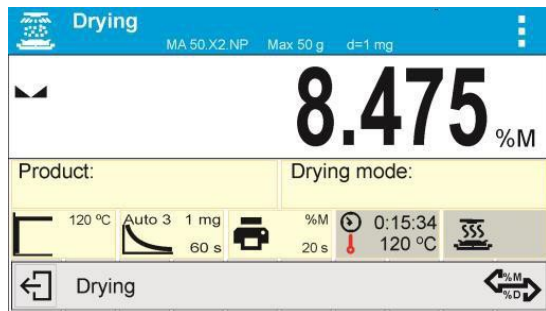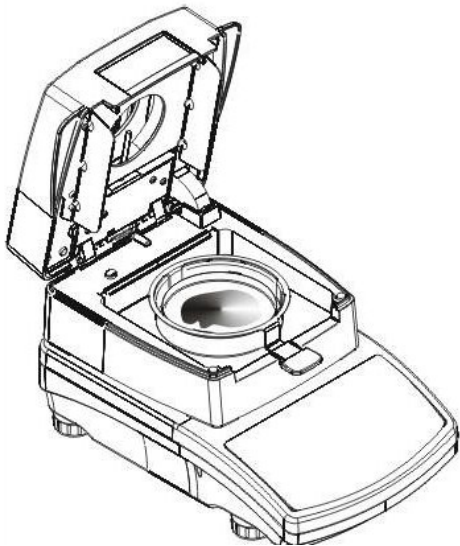|	
	Drying process settings are displayed in the information field above the buttons.
	Press the <Start> button to run the drying process. Prompts and messages are displayed. Follow the prompts to correctly prepare the sample and to perform the process of humidity content determination for a tested sample.
	The program prompts you to prepare the weighing pan. A symbol on the drying chamber status is displayed.
	Place the disposable weighing pan in the pan handle and deposit it on the bracket. The display shows the disposable pan weight. Close the drying chamber to provide stable ambient conditions while taring.

|	
Drying MA 50.X2.NP Max 50 g d=1 mg **2.245** g Product: Drying mode: 120 °C Auto 3 1 mg %M 60 s 20 s Prepare pan	Press ✔ > to zero the weighing pan weight.
Drying MA 50.X2.NP Max 50 g d=1 mg **8.475** %M Product: Drying mode: 120 °C Auto 3 1 mg %M 0:15:34 60 s 20 s 120 °C Drying	When the indication equals zero, the next prompt is displayed and the symbol for the drying chamber status changes.
	Deposit the sample on the weighing pan. Sample weight should be selected on the basis of prior experience and tested material characteristics.
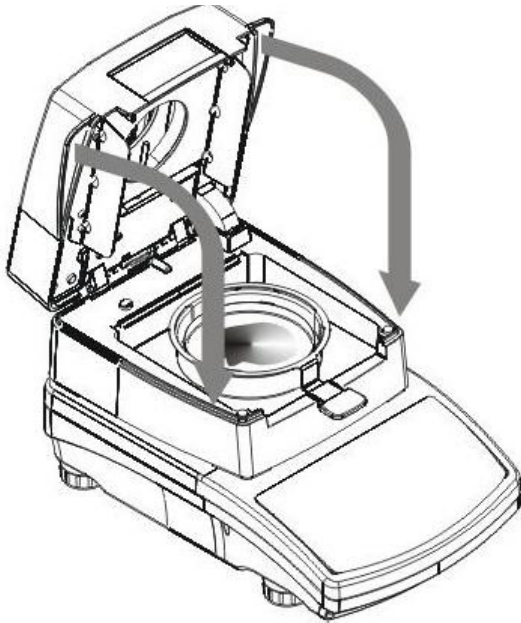
On sample preparation and result stabilization, close the drying chamber and confirm the operation by pressing ✔ >. The drying process starts automatically.
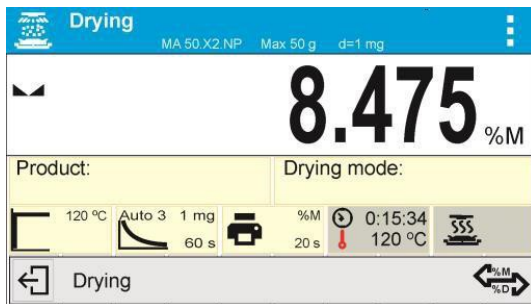
Information on the drying process is displayed and the moisture analyzer proceeds according to set parameters. The required mass measurements and calculations of the tested sample moisture content are performed where the calculations are a result of mass change. At process start, a printout header is sent to the selected interface according to the set printout options in parameter group Drying Process Report/Header).
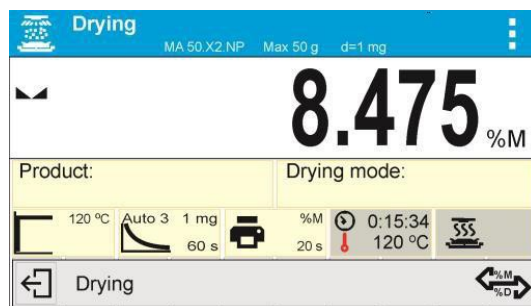
During the drying process, the current weight results and information on the process are displayed (test duration, drying chamber temperature, etc.).
According to set printout options in parameter group Drying Process Report/Measurement, measurements are sent to a selected communication port in preset time intervals (Interval).

26

The ⟨%M/%D⟩> key allows you to swap between the displayed result types during the process.
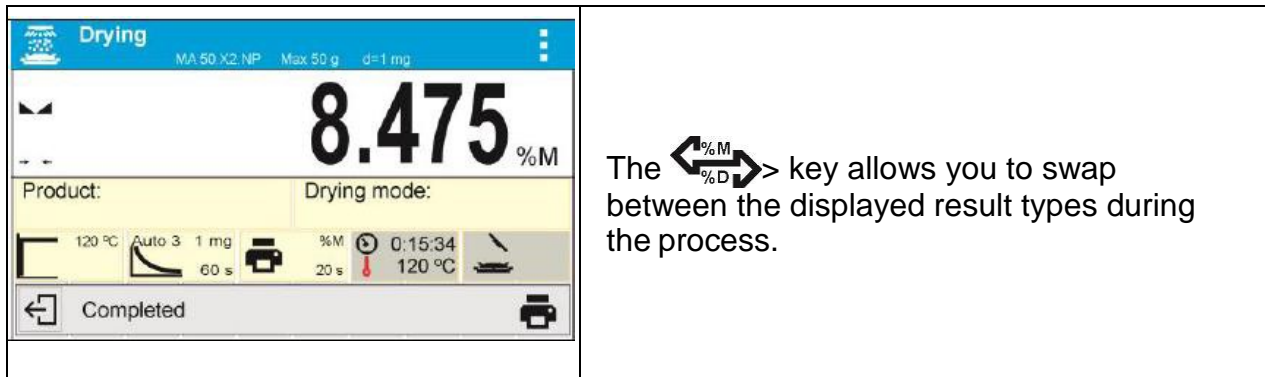
The drying process may be aborted at any time by pressing the ⟨←⟩ > key and confirming completion by pressing ✓ >.

Manual auto switch-off mode is an exception to the rule. For moisture analyzers working in this mode, the drying process ends upon pressing ⟨←⟩>. There is no need to confirm completion by pressing ✓ >.

The report on drying is printed again by pressing 🖶> in the bottom bar of the display. The report is also automatically saved in the moisture analyzer's memory in the Drying Reports database.

To return to the main screen of the drying process settings, press ⟨←⟩> in the bottom bar of the display. The moisture analyzer returns to its initial state and the completed process summary is blank. The moisture analyzer is ready to perform another test.

4.8 DRYING PROFILE ANALYSIS

For the first case, the drying profile is an asymptote. The moisture content value remains constant even after a long drying time. Using this drying profile makes the determination of humidity easy. The measurement result is always referred to constant value of the asymptote. The result corresponds easily, and it is not difficult to select the proper criterion for the finish mode.

For the second case, the drying process is quick at the beginning before stabilizing. The moisture content value is never constant. The drying process profile may proceed as follows: The sample undergoes thermal decomposition, where evaporation takes place and as a result the product weight decreases. Evaporation of grease, oil, plastic, or other volatile materials may take much more time than water. Difficult to evaporate materials drop weight.

The result obtained using this mode may be optimistic:
- ☐ Lower temperature may slow material reaction.
- ☐ The selection of the appropriate criterion may let the user recognize the end of analysis within described drying step.
- ☐ Constant drying often assures good drying results.
- ☐ Maintaining the start sample weight permanently *(+10%....+20%).*
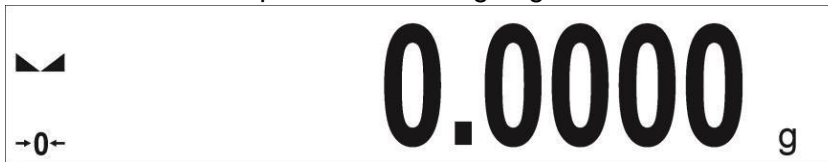
5. WEIGHING MODE

The main window can be divided into 3 sections:

- The top section displays data on the active working mode (symbol and name), metrologically important data and a button for choosing from the functions available for a particular working mode.

- The middle section presents the weighing result.

- The bottom section contains supplementary information on the current operations, as well as function buttons.


5.1 GOOD WEIGHING PRACTICE

Load an object on the weighing pan. On stabilization of the weight indicated by stability marker on the left side of balance display, read the measurement result.
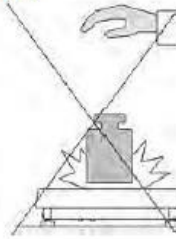
To ensure long lasting use of a balance with correct and reliable measurements of weighed loads, follow the procedures below:

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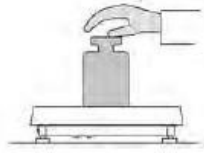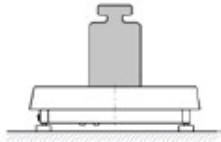
YES   NO
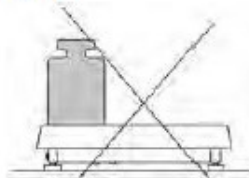
□ Place weighed load in the center of the weighing pan:
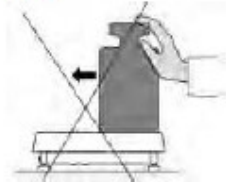

YES   NO

□ Avoid side loading, in particular side shocks:
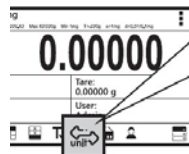

NO   NO

5.2 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]		

5.3 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.
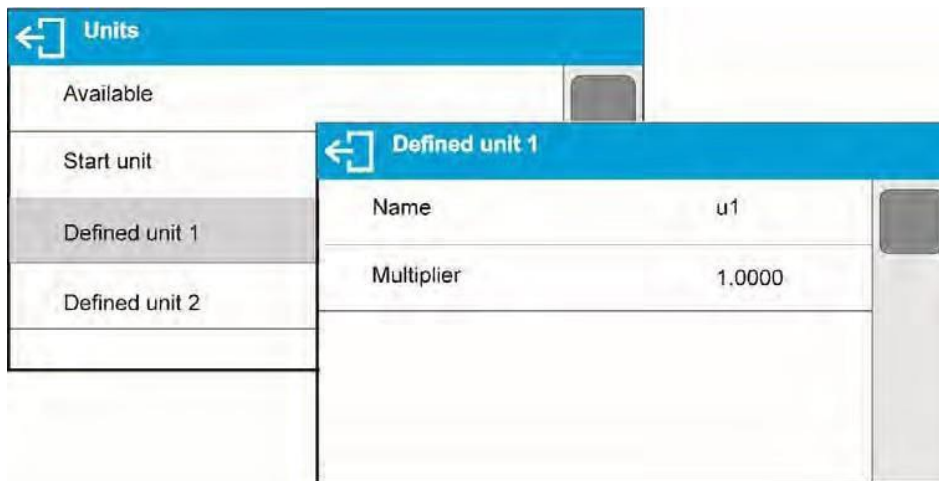
5.4 BALANCE ZEROING

Zeroing is a function allowing to zero mass indication.

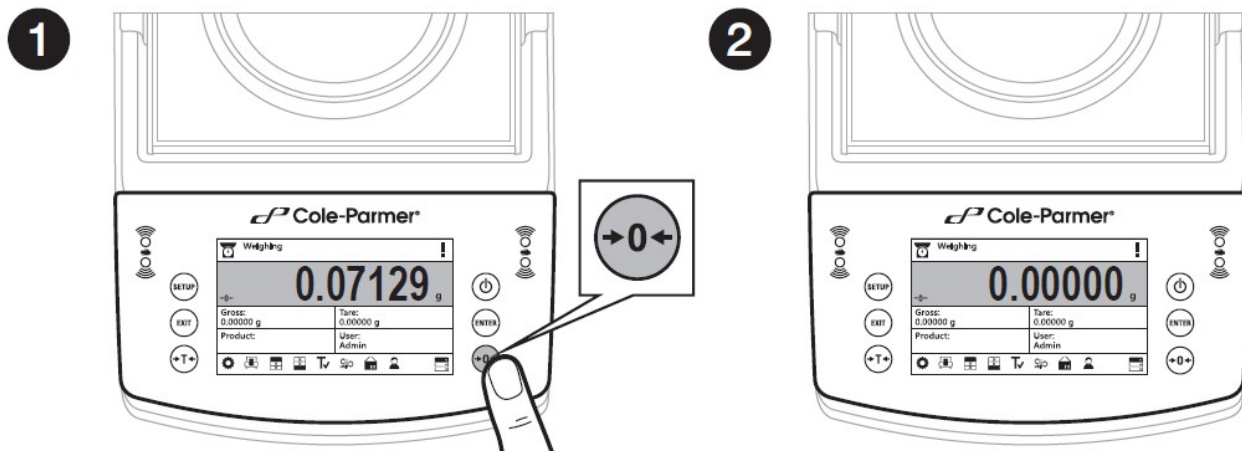Unload the weighing pan and press "Zeroing" button.

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.*

5.5 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 →T← key.
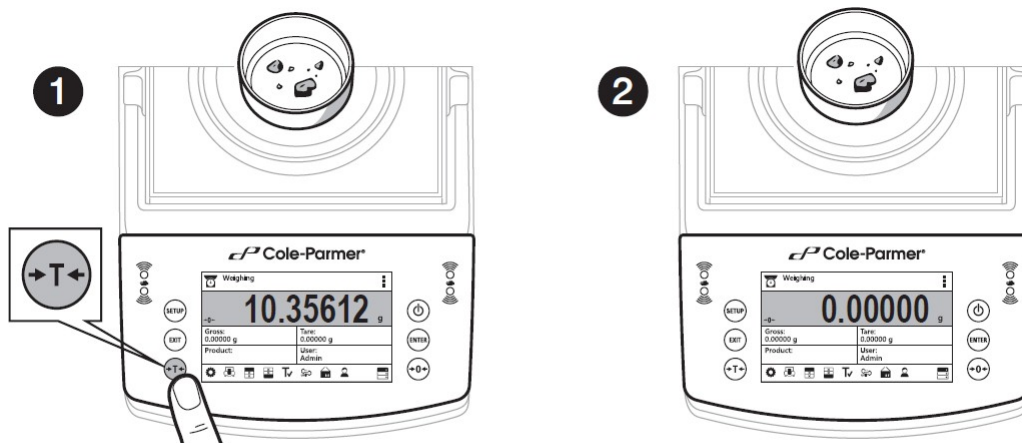
When the weighing result has been displayed press "Tare" button.

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.*

Manual tare determination
- Press quick access key **I✔**
- 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

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.

Selecting tare value out of 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.

OR

- ☐ 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.

5.6 WEIGH MODE SETTINGS

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

Procedure:
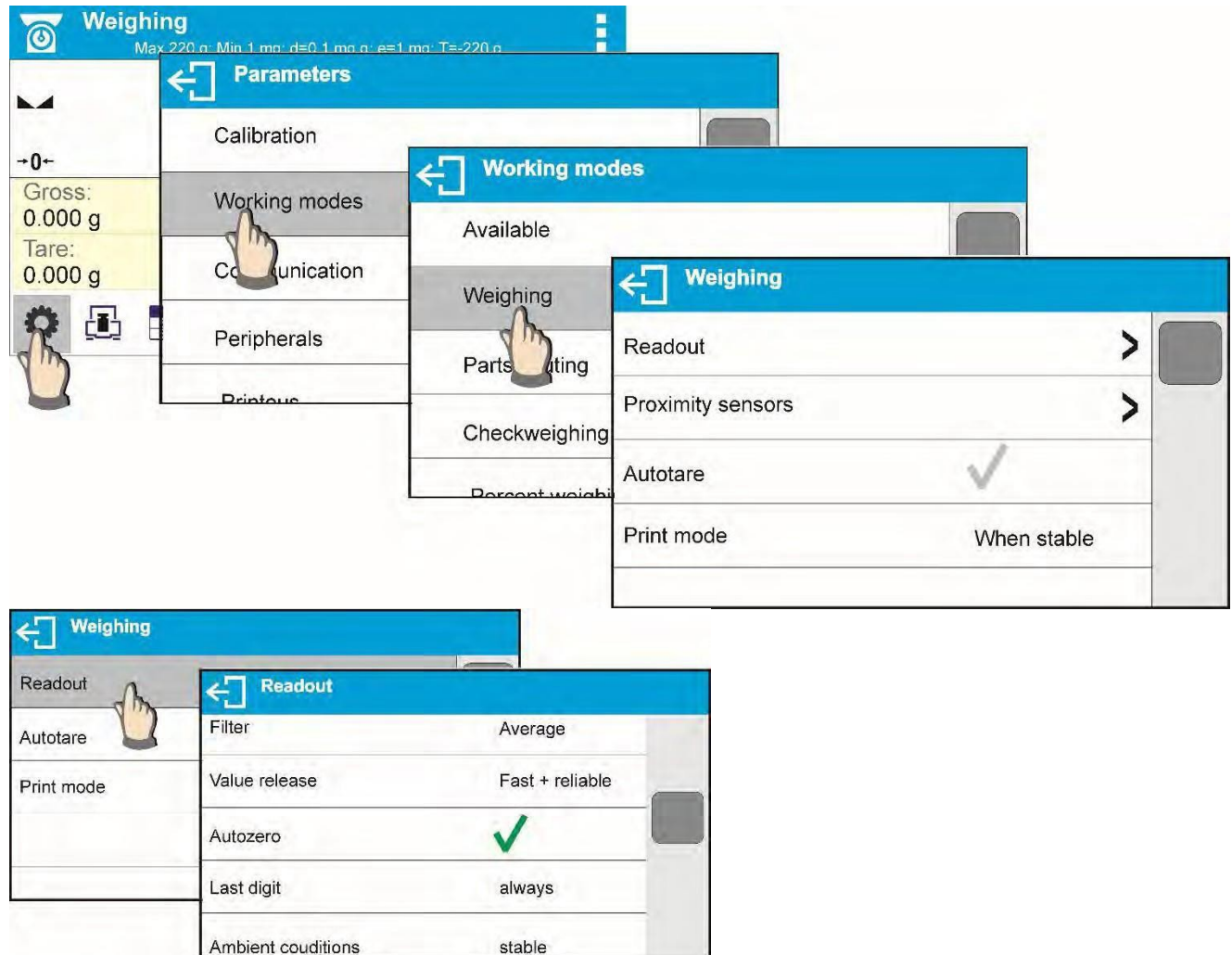
Filter level setting

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

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

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

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

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

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

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

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.

6. ADJUSTMENT

For the best weighing accuracy, it is recommended to periodically introduce a corrective factor of indications to the balance's memory. This factor must refer to a mass standard. In other words, a balance adjustment should be performed from time to time.

The adjustment should be done as follows:
- Before the beginning of weighing procedure
- If long breaks between measuring series occur
- If the temperature inside the balance changes more than 2°C

This requires an adjustment with an external weight of a declared mass that cannot be modified, or of any mass not lower than 30% of the maximum range.

⚠️ *CAUTION:* Carry out the adjustment process only when there is no load on the pan. When the weighing pan is loaded, "Range Exceeded" will be displayed. In this case, remove the load and restart the the adjustment process. The adjustment process can

be aborted if necessary by pressing the ⬅️> button at any time during the process.

6.1 EXTERNAL ADJUSTMENT
External adjustment is carried out by means of an external mass standard of a specified accuracy class and weight. The process is semi-automatic; successive stages will be signaled with prompts.

Procedure:

1. Enter <Adjustment> submenu and select <External adjustment>.
2. The "Remove weight" prompt is displayed.
3. Take the weight off the weighing pan and press ✔ >. While the balance determines the start mass, "Adjustment; Please wait…" is displayed.
4. When the start mass determination is complete, <Put weight …> is displayed along with the particular mass standard value.
5. Put the required weight on the pan and press ✔ >.
6. When finished, "Remove weight" is displayed.
7. Take the weight off the weighing pan and wait for the Adjustment window to be displayed again.

6.2 USER ADJUSTMENT
User adjustment is performed using an optional standard of mass ranging between 0.3 Max and Max. User adjustment and external adjustment procedures are the same, with one exception: before beginning the user adjustment, a text box for entering the mass of the standard to be used opens.

To start user adjustment, enter the <Adjustment> submenu and select <User adjustment>. Then follow the commands displayed on the screen.

7. WORKING MODES- GENERAL INFORMATION
The balance features the following working modes:

	Weighing
⚖️	Weight of a load is determined through an indirect measurement. The balance measures the gravitational force that attracts the load. The result is processed in a digital format and displayed as a measurement result.

|	**Drying**
	Moisture content is determined by vaporization of all moisture components from the sample placed inside a drying chamber of the moisture analyzer. The measurement result is automatically calculated by the software and shown on an ongoing basis on the moisture analyzer's display by comparing the mass of a sample at the start, while in progress, and at the end of the drying process.

Particular working mode settings feature specific functions. The functions enable users to adapt the mode operation to your individual needs. The special settings are activated on selecting a profile. A detailed description of specific functions is provided within the descriptions of working modes.

7.1 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
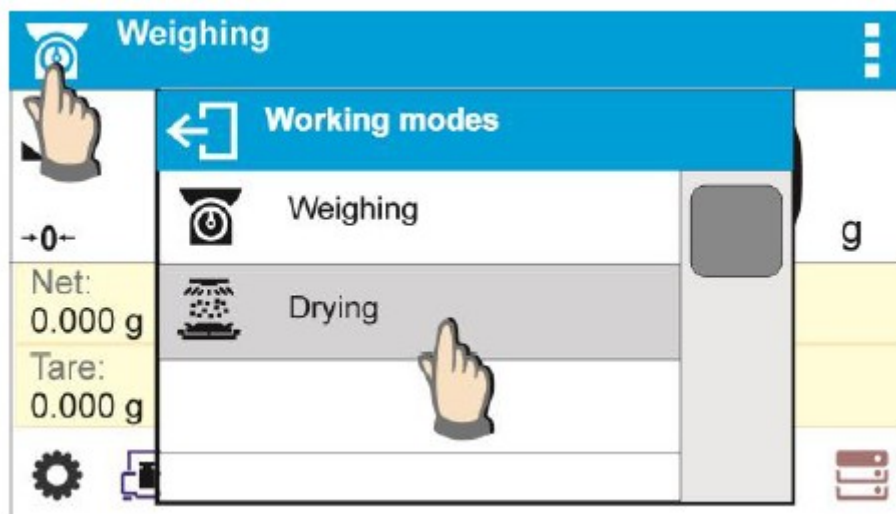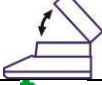
- ☐ Wait for the available working modes list to be displayed
- ☐ Select the working mode you need to operate.

7.2 QUICK ACCESS KEYS

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

	Tare	All modes
	Set tare	All modes
	Change unit	Weighing mode exclusively
	Select unit	Weighing mode exclusively
	Parameters	All modes
	Databases	All modes
	User	All modes
	Product	All modes
	Customer	All modes
	Packaging	All modes
	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	Weighing mode exclusively
	Working mode parameters	All modes
P	Drying mode	Drying mode exclusively
P	Drying profile	Drying mode exclusively
P	Finish mode	Drying mode exclusively

P (icon)	Printout interval and unit	Drying mode exclusively
(open/close cover icon)	Open/close cover	Drying mode exclusively
(start icon)	Start	Drying mode exclusively

8. DATABASES

The balance software features the following databases (icon) >:

- Products (5,000 products)
- Users (100 users)
- Packaging (100 packaging types)
- Customers (1,000 customers)
- Drying modes (200 drying modes)
- Drying reports (5,000 reports)
- Ambient Conditions (10,000 records)
- Weighings (50,000 records)

8.1 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.

Drying Reports and Weighing Reports cannot be imported. The Drying Reports database cannot be deleted. The database's content can only be exported and saved to a flash drive. Names of files with exported data consist of a serial number and the proper extension (see table below).

Database	*File name and extension*
Drying Reports	123456.for
Weighing Reports	123456.wei

The Ambient Conditions database is for information purposes only. Using the 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 🖶 > in the top bar. Records' names contain the date and time of saving the record's data to balance memory.

8.2 PRODUCTS
The Products database stores names of all products that can be weighed, counted and controlled.

List of parameters defined for a product:
1. Name   [product code]
2. Code   [EAN code for a product]
3. EAN   [nominal mass/single product mass]
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 the measuring area for which the measurement is recognized as correct for Dosing mode.]

CAUTION: Remember to assign a product to a particular mode, as some of the 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 it is accepted as a 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.

8.3 USERS
The 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

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

List of parameters defined for packaging:
1. Name
2. Code   [internal code providing packaging identification]
3. Tare   [packaging weight]

8.5 CUSTOMERS
The Customers database features a list of names of customers for whom the measurements are performed.

List of parameters defined for a customer:
1. Name
2. Code   [internal code providing customer identification]
3. NIP
4. Address
5. Postal code
6. City

8.6 DRYING PROGRAM
The database of drying programs contains saved data on drying parameters that are activated to dry a product.

List of parameters defined for drying mode:
1. Name
2. Code
3. Drying profile
4. Finish mode
5. Printouts
6. Sample mass control

8.7 DRYING PROCESS REPORTS
The reports on drying processes database stores information on carried-out drying processes. Each report can be previewed and printed.

Procedure:
1. Enter the Databases submenu and press <Drying Process Reports> key.
2. Select the particular report button from the list using scroll buttons to find the report you need.
3. The report's name consists of the date and time of its creation, e.g.: 2011.10.12 15:12:15.

Information provided by the Drying Process Report:
1. User
2. Drying mode
3. Start date
4. End date
5. Drying time
6. Status
7. End mass
8. Drying status
9. Indication

8.8 AMBIENT CONDITIONS
The Ambient Conditions database includes information related to ambient conditions. Depending on the setup, the ambient conditions record may have data such as temperature, humidity and atmospheric pressure.

Procedure:
1. Enter the Databases submenu and press the <Ambient conditions> key.
2. Press the required record; if not visible, scroll the records list down.
3. The record name is comprised of the date and time.

CAUTION: The software saves ambient conditions records 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.**

8.9 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

9. COMMUNICATION

The Communication menu is found within the Parameters menu. It is accessed by pressing the ⚙> key. The balance can communicate with a peripheral device via the following ports:

- COM 1 (RS232)
- USB 1 type A
- USB 2 type B
- Ethernet
- Wi-Fi

The ports can be configured using the Communication parameter group. To enter this submenu, press ⚙> and then <Communication>.
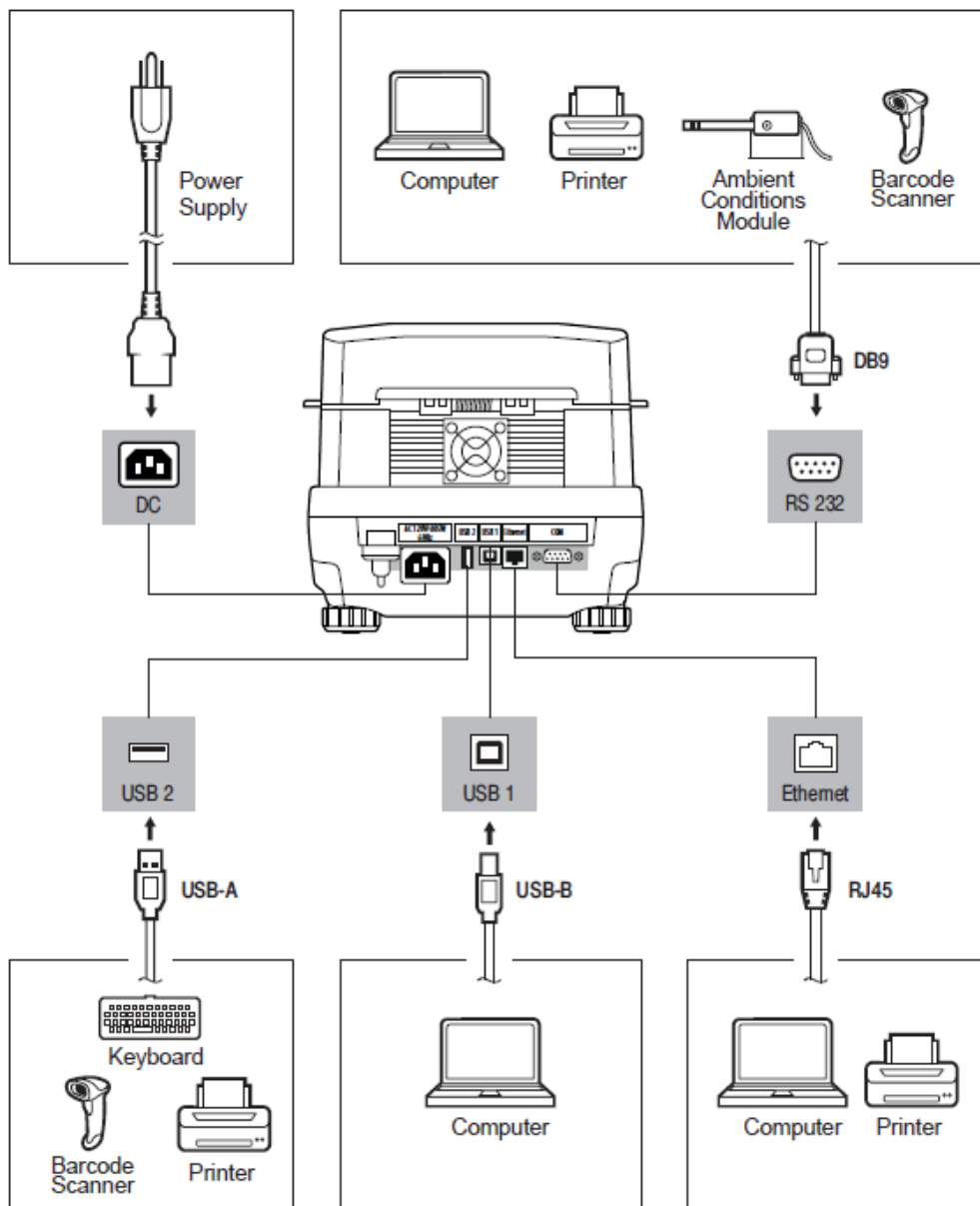
9.1 RS232 PORTS SETTINGS PROCEDURE:
1. Select communication port <COM1>.
2. Set appropriate values.

The RS232 ports enable the following setting of transmission parameters:
- Baud rate - 2400, 4800, 9600, 19200, 38400, 57600, 115200 bit/s
- Parity   - None, Even, Odd

9.2 ETHERNET PORT SETTINGS
Procedure:

1. Select the   Ethernet> communication port and set the appropriate values:

- DHCP   - Yes – No
- IP Address   - 192.168.0.2
- Subnet mask   - 255.255.255.0
- Default gate   - 192.168.0.1

CAUTION: The above settings are for information only. The transmission parameters should be selected in accordance with the settings of the user's local network.

2. Return to weighing mode and restart the device.

9.3 WI-FI PORT SETTINGS
CAUTION: Make sure that the transmission parameters are set according to your local network settings. For correct communication via Wi-Fi, set the port parameter for the computer to <WIFI> value <Peripherals/Computer/Port/Wifi>. Then set the parameters as described below.

Balances equipped with a Wi-Fi module have a symbol on the home screen in the top right corner:
Balance 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:
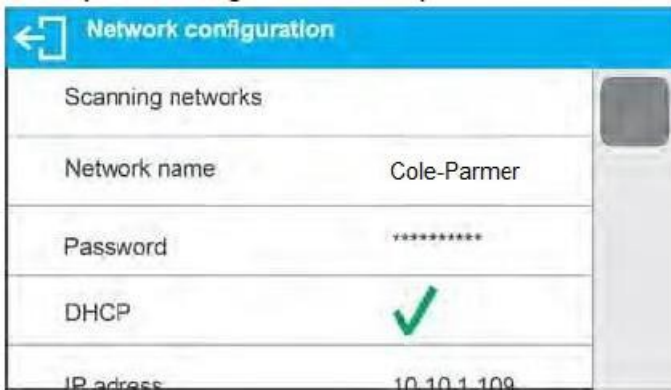
CAUTION!
The above presented settings serve informative purposes exclusively

Procedure:

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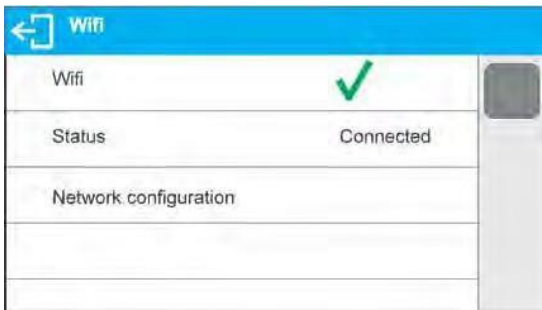
☐ Enter <NETWORK CONFIGURATION> parameter and set DHCP parameter value:
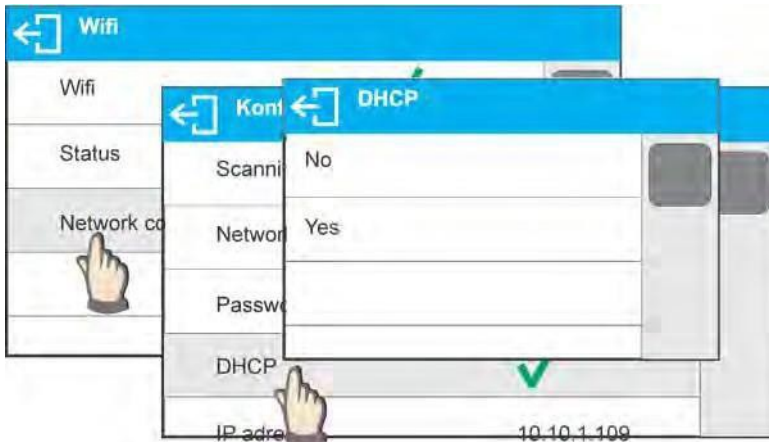
☐ With DHCP set to NO value, enter manually IP; MASK; DEFAULT GATE parameters, with DHCP set to YES value, the balance software automatically reads and displays data assigned by Wi-Fi router by means of which the balance is to be connected

☐ 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
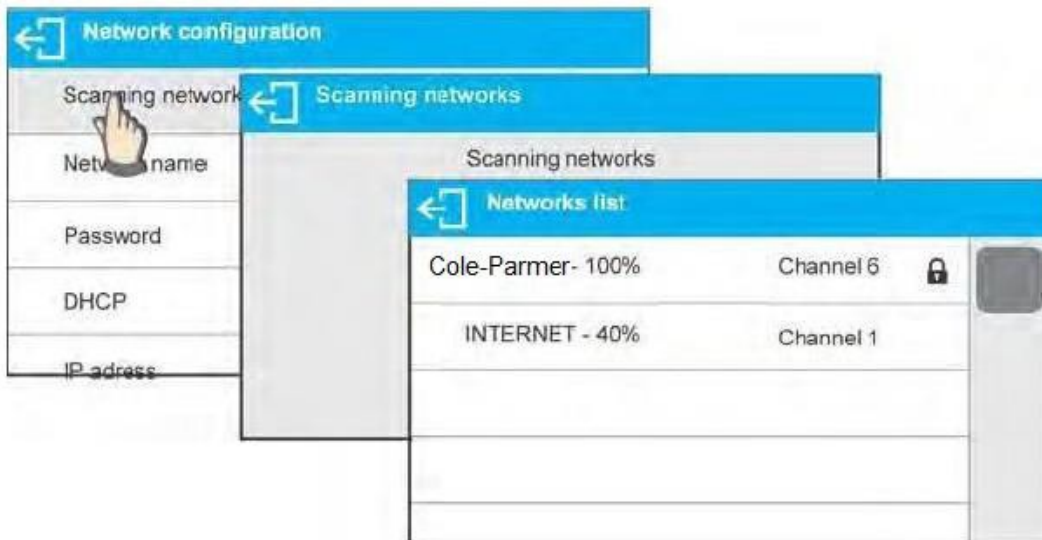
☐ Select network of your choice
☐ Password window is displayed, using an on-screen keyboard enter the password

- <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

9.4 USB PORT

USB 1 port of type A is intended for:

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

A USB flash drive may be used for printing data on measurements (set the Printer/Port parameter to Pendrive). Additionally, databases and the user's parameter settings can be copied from balance to balance. On inserting a 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 database and parameter content on a flash drive. The exported data can be imported to any Schuler Scientific branded balance.

Please remember that for PCL printers, the drivers print a completely filled page. The page will be printed only upon pressing the <Print> button on the balance several times. It depends on printout size how many times the button needs to be pressed prior printout.

It is possible to print a report after pressing <PRINT> only once, if control code <0C> has been set as "Suffix".

USB 2 port of type B is intended for:

- Connecting balance to a PC computer

To connect the balance with a computer, install a virtual COM port in the computer. You need the correct driver installer, which may be either downloaded from the website

Steps:

1. Run driver installer

    Startup dialog window:
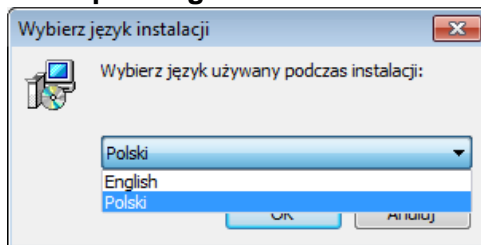
Select language version.

To continue, press "**Next**" button.

Window for target folder selection:
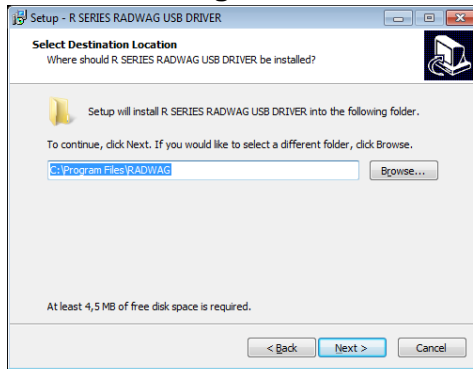
Select a respective folder and click **"Next"** key to proceed.

"Ready to Install" window:
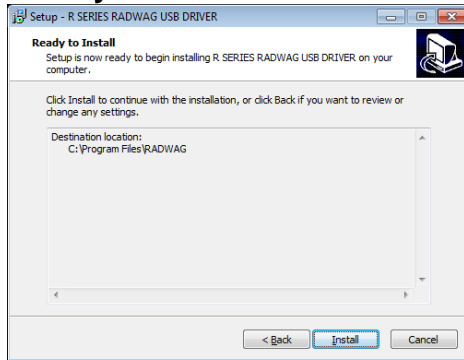
To run installation process, press "**Install**" key and clicking respective keys, follow the install wizard.
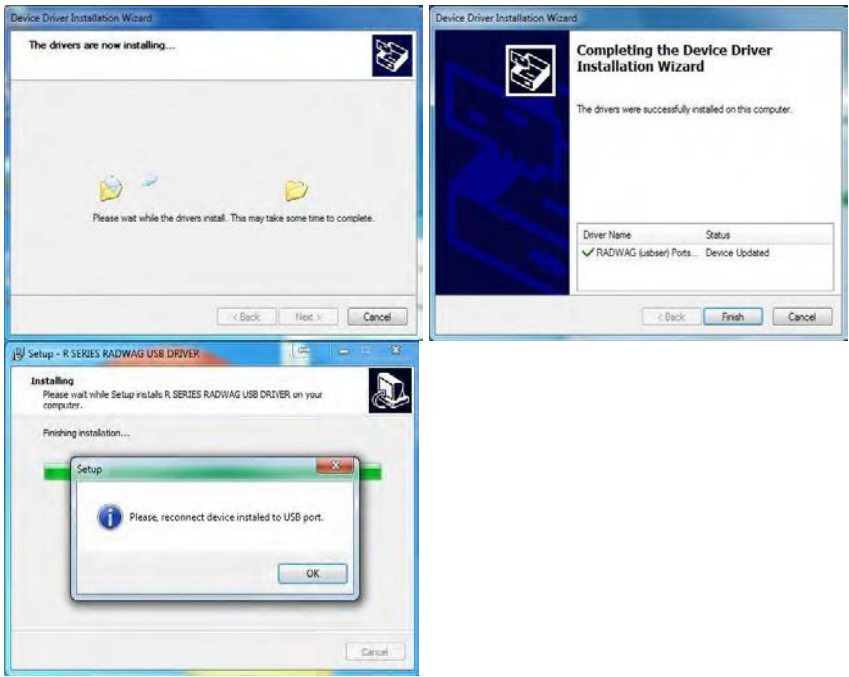
2.

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

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

4.
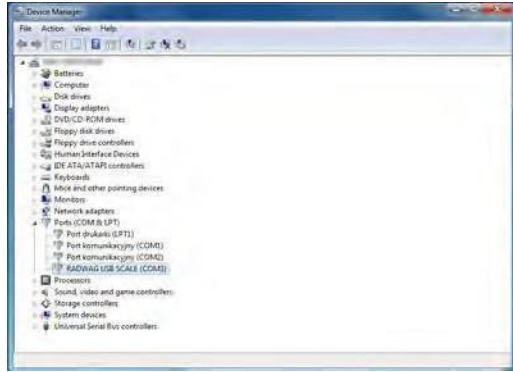
Go to Device Manager and check number assigned to virtual COM port.

For this very case it is STMicroelectronics Virtual COM Port (COM8).

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

6. Run software for measurement readout.

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

8. Start cooperation.

10. 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.

10.1 COMPUTER
Carry out configuration using the Computer submenu.

Procedure:

1. Press ⚙> and then <Peripherals / Computer>.
2. Set the parameters related to cooperation with a computer:
    - Computer Port
        - o available options: none, COM 1, USB, Ethernet, Wi-Fi, USB Free Link

    CAUTION: To set USB Free Link instead of USB, select any other port (e.g. none, COM1, etc.). Then select the USB Free Link port. Analogously when changing USB Free Link to USB.

    USB FREE LINK – USB type B port to which the computer is connected. The tool, acting like a keyboard, is used for entering data for peripherals. On proper modification of a nonstandard printout and sending the proper command from the computer, or on pressing <Enter> on the balance's keyboard, the data from a nonstandard printout is directly entered into programs such as Excel, Word, Notepad, etc.

    Press <USB FREE LINK> and configure the port settings to enable balance correct cooperation with computer programs:

SPREADSHEET –YES - cooperation with an Excel-type program
– NO - cooperation with other programs

DELAY – if any loss of transferred information occurs (caused by data auto- entering or auto-formatting by the computer program) during cooperation with a spreadsheet program, the parameter value should be set to <2>. If the losses still occur, the parameter value should be higher. The user can change the parameter's value ranging from 0 (quick data transfer) to 9 (slow data transfer, around 10 characters per second).

For the Free Link printout option set, all languages without special characters are operated using a QWERTY keyboard.

> *Caution:* The Free Link printout option enables use of signs available exclusively on the keyboard. Key combinations (pressing a letter and <Shift> at the same time) allow capital letters and special characters. Polish and German were completed with basic special characters written using the key combination of a letter and the right <Alt> button. Other special characters are not operated in the Free Link printout option.

☐ Port Settings
- o settings related to a port selected for computer connection
  CAUTION: For Ethernet and Wi-Fi ports, the Timeout parameter is on. The parameter specifies a time delay for disconnection, which starts at the moment of the most recent command sent from the device to which the balance is connected. The Timeout parameter value has to be entered in milliseconds [ms].

☐ Address
- o parameter for setting address of balance connected with a computer

☐ Weighing Operation Printout Template
- o parameter enabling you to design customized printout, for this use window with printout template.

☐ Continuous Transmission,
- o parameter enabling users to turn on/off the continuous transmission of a weighing result. Available options:
  - ▪ continuous transmission in calibration unit. Indications are transmitted in the main unit (calibration) independent of the currently selected weight unit.
  - ▪ continuous transmission in current unit. Indications are transmitted in the 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 via a message sent from a computer.

☐ Interval
Parameter enables setting the frequency of printouts for continuous transmission.

The frequency of printouts is set in seconds with an accuracy of 0.1s. You may set any time

value ranging from 1000 to 0.1 s. The setting is valid for continuous transmission in the calibration unit and in the current unit activated by means of the balance. It is also valid for continuous transmission activated by a command sent from a computer.

10.2 PRINTER

The Printer submenu enables you to select a port to which data is sent when the ⊙ > key is pressed. The content of the sent data is set in the Printouts/GLP Printouts parameter.

Procedure:

1. Press ⚙ >.
2. Enter the Peripherals menu.
3. Enter the Printer menu.
   o Set the balance parameters for the printer; i.e. the port to which a printer is to be

   connected upon pressing ⊙ >.
   CAUTION: To set USB Free Link instead of USB, select any other port (e.g. none, COM1, etc.). Then select USB Free Link port. Analogously when changing USB Free Link to USB.

   Options:
   - **COM 1** – RS 232 port, to which a printer is connected
   - **USB** – USB 1 port type A, to which a PCL printer or Epson printer is connected
   - **Ethernet** – port sending data to dedicated RLAB software operated on a computer connected to a balance via a network
   - **PENDRIVE** – USB port type A for connecting a USB flash drive. Set the format of the saved file. You can save the data in *.txt format (a text file that can be opened on the computer using Notepad) or *.csv format (file that can be opened using Excel).
   - **WIFI** – port for sending data to RLAB software (opened on a computer connected to the balance via Wi-Fi) or to a printer with a Wi-Fi port or to a network printer
   - **USB PC** –USB port type B for connection of computer with RLAB software.
   - **USB FREE LINK** – USB type B port to which the computer is connected. The tool, acting like a keyboard, is used for entering data for peripherals. On proper modification of a nonstandard printout and sending the proper command from the computer, or on pressing <Enter> on the balance's keyboard, the data from a nonstandard printout is directly entered into programs such as Excel, Word, Notepad, etc. Press <USB FREE LINK> and configure the port settings to enable the balance's correct cooperation with computer programs:

     SPREADSHEET –YES - cooperation with Excel-type programs
                 –NO – cooperation with other programs

DELAY – if any loss of transferred information occurs caused by data auto-entering or auto-formatting by the computer program during cooperation with a spreadsheet program, the parameter value should be set to <2>. If the losses still occur, the parameter value should be higher. The user can change parameter's value ranging from 0 (quick data transfer) to 9 (slow data transfer, around 10 characters per second).

On Free Link printout option set, all languages without special characters are operated using a QWERTY keyboard.

Caution: The Free Link printout option enables the use of signs available exclusively using keyboard. Key combinations (pressing a letter and <Shift> at the same time) allows for writing capital letters and special characters. Polish and German were completed with basic special characters written using a key combination of a letter and the right <Alt> key. Other special characters are not operated in the Free Link printout option.

Additionally, you can send a controlling code in hexadecimal form to a printer either at the beginning of the printout using the Prefix parameter or at the end of it using the Suffix parameter. Sending these codes allows you to control globally both the information and the actions performed at the beginning and/or at the end of each printout sent from the balance to the printer.

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

The Prefix and Suffix parameter settings are available for all the printouts sent from balance, e.g., calibration reports, and for the header, footer and GLP printouts.

CAUTION: Inserting the paper crop command to the Suffix results in sending the code after each printout. If you wish for one whole printout to consist of Header, GLP Printout and Footer, and to be cropped underneath the Footer, then the paper crop command should be inserted only for the Footer settings as a nonstandard printout with the <{151}> variable (paper crop for Epson printer). In this case, the Suffix must remain empty.

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

Accordance may be set up in two ways:
- setting the right code page in the printer settings (see the printer's user manual. It must be in accordance with the printout code page of the balance:

Code	Language
1250	Polish, Czech, Hungarian
1251	Russian
1252	English, German, Spanish, French, Italian
1254	Turkish

1256	Arabian

- sending the control code from the balance, which automatically sets the right code page of the printer prior to the printout of data taken from the balance. (This is only available for printers with the option. See the printer's user manual.)

CAUTION: Codes must be entered in hexadecimal form!

Example balance settings for correct cooperation with Schuler Scientific Epson TM-U220D printer (10100-85) connected to RS232 port:

Impact printer Epson TM-U220D (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 (whichever the printer is connected to)
- code page - **852**

10.3 USB FLASH DRIVE
The balance's software enables a record of measurement data on an external flash drive.

Procedure:
1. Plug a USB flash drive into USB 1 port type A.
2. Set the Pendrive option to <Peripherals/Printer/Port>.
3. Set file format: *.txt or *.csv.
4. Return to weighing procedure.

5. Press [ENTER] > for a record of measurement data (specified for GLP PRINTOUT). The data is saved as a text file created automatically by the balance software with the file name *printout.txt*.
6. Remove the USB flash drive from the port after about 10 seconds, counting from the last measurement record. Only after this time the data is saved. Plug the USB flash drive into a computer and read the saved text file using Notepad or Excel.

11. USERS

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:
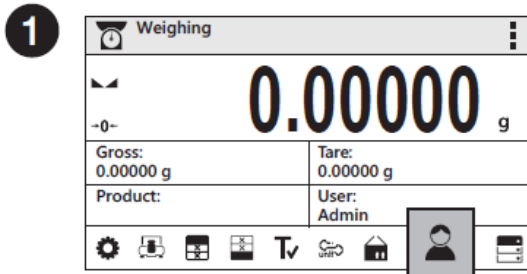
Press Operators button.
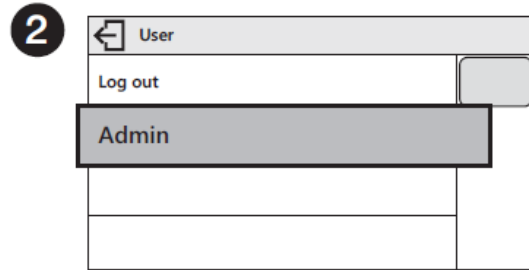
Users list is displayed, select Admin option.
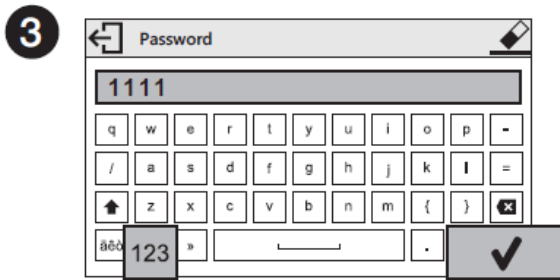
Press 123 button to activate numeric keyboard. Enter "1111" password and press ✓ button to confirm.
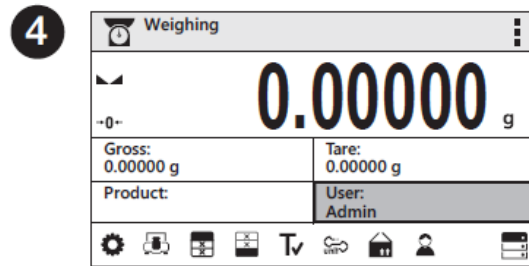
You have logged in as the administrator.

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 👤> 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 the Readout/Filter submenu. Modification of settings for the Misc. parameter group, except settings for Date and Time, Access Level and Software Update. The operator can start and carry out all weighing processes. The operator can preview information recorded in Databases, and they can define universal variables.
Advanced User	Free editing of parameters of the following submenus: Readout, Working Modes, Communication, Peripherals, Misc. No access to Date and Time, Access Level and Software Update submenus.
Administrator	Access to all user parameters and functions, and editing databases enabled.

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.

- <AUTO+INT>.: Start an automatic printout and record of indications in the Weighing database and ALIBI database, performed at specified time intervals. The interval is set in minutes using Auto Int., and the interval range is 1-9999 minutes.

    CAUTION: When using Auto+Int, each result is printed and recorded (stable and unstable for a non-verified balance, stable for a verified balance). The function starts at the moment it's enabled and it lasts until it is switched off. The first stable weighing result of value greater than Auto Thresh value is printed as a first measuremnt. The following measurements are printed at the frequency set in the Interval parameter. Automatic operation with interval stops when the option is turned off. When using Auto+Int, the
    <PRINT> button is inoperative (no indication is printed when pressed).

Automatic operation procedure:

- Press $\rightarrow 0 \leftarrow$ button to zero the balance (marker of stable measurement ◢ and zero marker $\cdot 0 \cdot$ 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

12. PRINTOUTS
12.1 ADJUSTMENT PRINTOUT REPORT

Adjustment Report is a group of parameters allowing users to set the data that is to be printed on an adjustment printout.

←	Calibration report
Project	
Calibration type	✓
User	✓
Project	✓
Date	✓
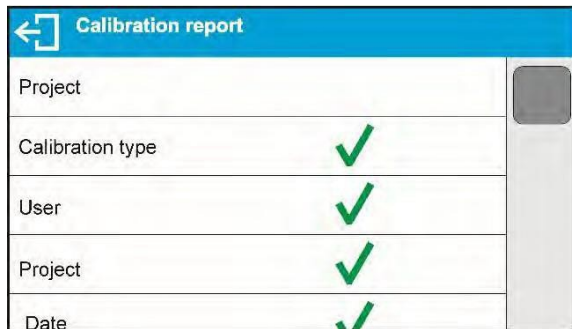
Variable	Overview
PROJECT	Option enables naming the project (name associated with a weighing). The name may consist of maximum 31 characters.
CALIB TYPE	Option enables printing out the type of the adjustment being carried out.
USER	Option enables printing out the name of a logged-in user.
PROJECT	Option 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
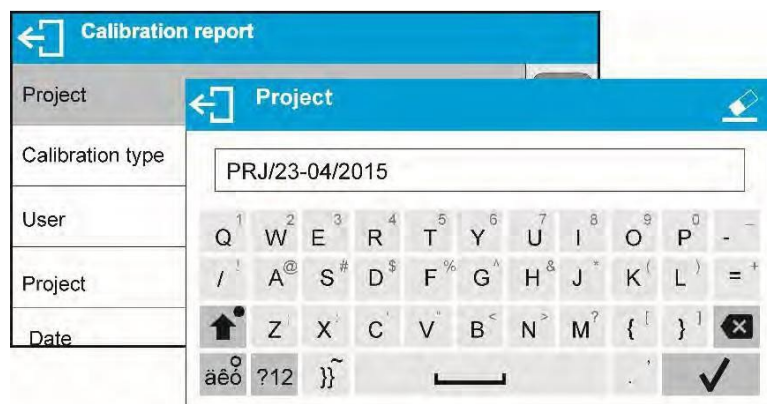
For the parameters described above, one of these values must be selected:

NO - do not print
YES - print

An example report:
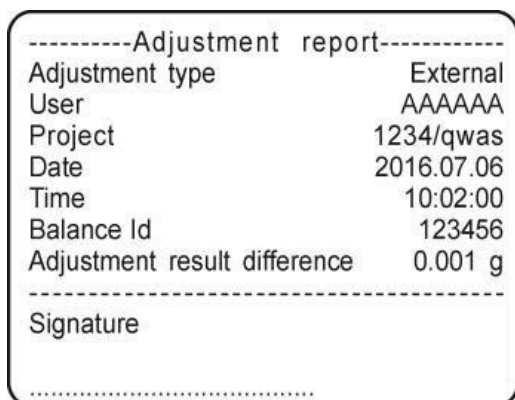
12.2 OTHER PRINTOUTS

This group of parameters allows the user to set the data to be printed on a Drying Process Report printout.

The Drying Process Report is divided into three individually customized sections: the header, the measurement and the footer.

The settings are valid for Drying Process mode exclusively.

HEADER	Set the data to be printed in the header.	
MEASUREMENT	Set the data to be printed on a drying process result printout.	
FOOTER	Set the data to be printed in the footer.	

Printout variables list

Variable	*Overview*	*Active for:*
DATE	Print the date of drying process start	Header
TIME	Print the time of drying process start	Header
BALANCE TYPE	Print the balance type	Header
BALANCE ID	Print the balance ID number	Header
USER	Print the name of the logged-in user	Header
PRODUCT	Print the name of the currently selected product	Header
PROGRAM	Print the name of the currently selected drying mode	Header
DRY. PARAM.	Print the drying parameters according to which sample is to be dried	Header
VARIABLE 1	Print the value of VARIABLE 1	Header
VARIABLE 2	Print the value of VARIABLE 2	Header
VARIABLE 3	Print the value of VARIABLE 3	Header

| START MASS	Print the net weight value in a basic unit (calibration unit)	Header
EMPTY LINE	Include an empty separating line	Header Footer
TIME	Print the drying time at the preset interval during drying process	GLP printout
INDICATION	Print the drying process indication at the preset interval during drying process	GLP printout
DRYING TIME AND INDICATION	Print the time and indication at the preset interval during drying process	GLP printout
NET	Print the net weight value at the preset interval during drying process	GLP printout
TARE	Print the tare value at the preset interval during drying process	GLP printout
GROSS	Print the gross weight value at the preset interval during drying process	GLP printout
SET TEMPERATURE	Print the temperature set in a particular stage of the drying process at the preset interval during the process	GLP printout
CURRENT TEMPERATURE	Print the current temperature read from the sensor at the preset interval during drying process	GLP printout
STATUS	Print the status of the drying process summary (Completed/Aborted)	Footer
END DATE	Print the end date of the drying process	Footer
END TIME	Print the end time of the drying process	Footer
DRYING TIME	Print the total time of the drying process	Footer
END MASS	Print the end mass of the tested sample	Footer
INDICATION	Print the final indication of the drying process	Footer
SIGNATURE	Provide an area for the signature of the user performing the measurement	Footer
NSTD. PRNT.	Print one of 100 nonstandard printouts on the footer printout. Choose NONE or a nonstandard printout name. See section 12.4 for more on nonstandard printouts.	Header Footer

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

Sample Printouts:

```
----------------------------------------
Working mode              Weighing
Date                    2016.07.06
Time                       10:51:05
Balance type              MAX2 NP
Balance Id                  123456
User                       AAAAAA
Product                      TTTTT
```

```
Date                    2016.07.06
Time                       10:51:05
Product                      TTTTT
            10.253  g
```

```
Date                    2016.07.06
Time                       10:02:00
User                       AAAAAA
Balance Id                  123456

Signature

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

**Header**   **GLP Printout**   **Footer**

13. PROXIMITY SENSORS

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

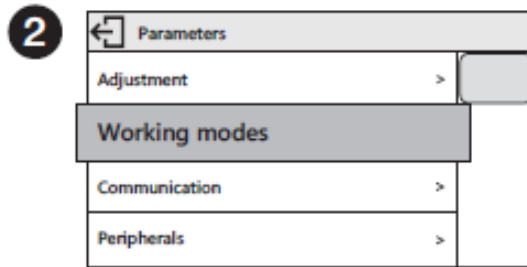1. Hand in close vicinity to the left sensor <Left sensor>,
2. Hand in close vicinity to the right sensor <Right sensor>.

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.
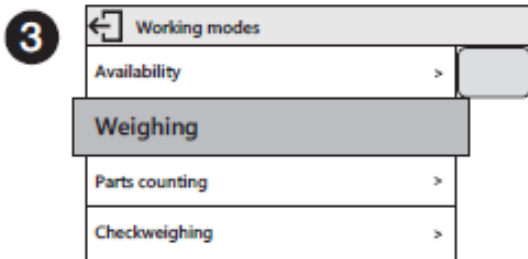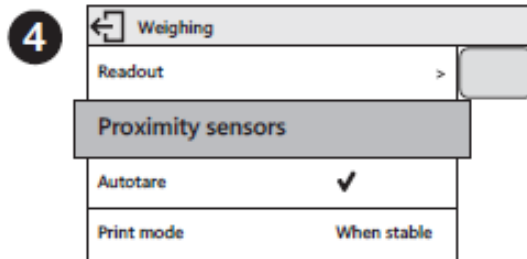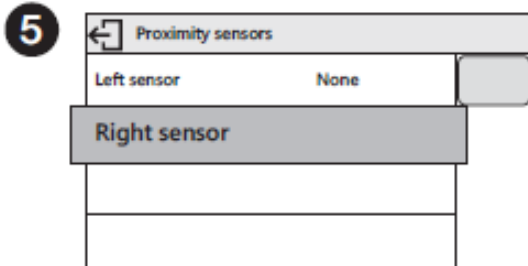
Procedure for setting up proximity sensors-

1 | Weighing

0.00000 g

Gross: 0.00000 g | Tare: 0.00000 g
Product: | User: Admin
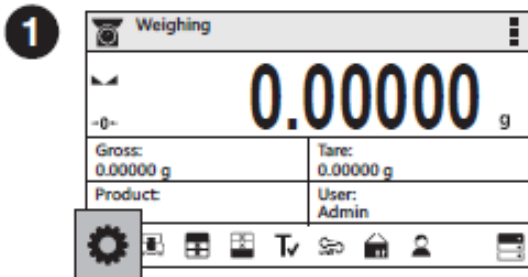
Press "Parameters" button.

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
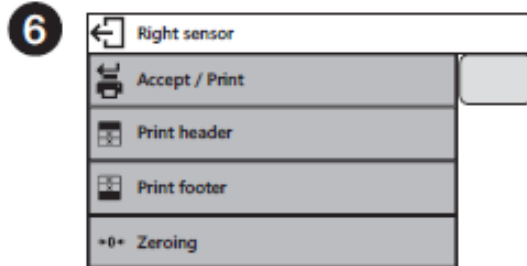
Select function that is to be assigned to the right proximity sensor.

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.

14.   ADVANCED FEATURES

14.1 AUTOMATIC FINISH MODE

Automatic finish mode (Auto switch off mode) takes the following values:

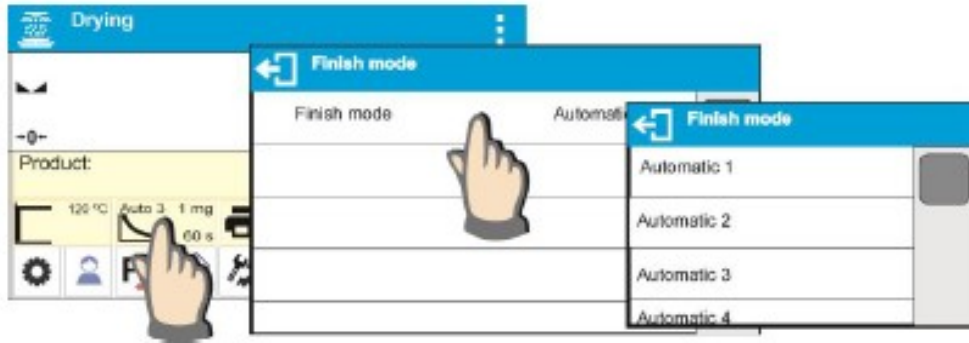- ☐ **Automatic 1** - auto switch-off (mass change of 1mg / within time length of 10s)
- ☐ **Automatic 2** - auto switch-off (mass change of 1mg / within time length of 25s)
- ☐ **Automatic 3** - auto switch-off (mass change of 1mg / within time length of 60s)
- ☐ **Automatic 4** - auto switch-off (mass change of 1mg / within time length of 90s)
- ☐ **Automatic 5** - auto switch-off (mass change of 1mg / within time length of 120s)
- ☐ **Manual** - Manual switch-off (on pressing the <Start/Stop> button. Maximum drying time is 99 hours and 59 minutes. When drying takes this long or longer, the drying process is ended automatically.
- ☐ **Time-defined** - time-defined switch-off (maximum drying time is 99 hours 59 minutes)
- ☐ **Defined 1** - defined switch-off (change of mass comprised within the balance range, set with moisture analyzer readability, time interval ranging from 1 to 120s)
- • **Defined 2** – defined switch-off (change in humidity set with moisture analyzer readability, time interval ranging from 1 to 60s).

14.2 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.
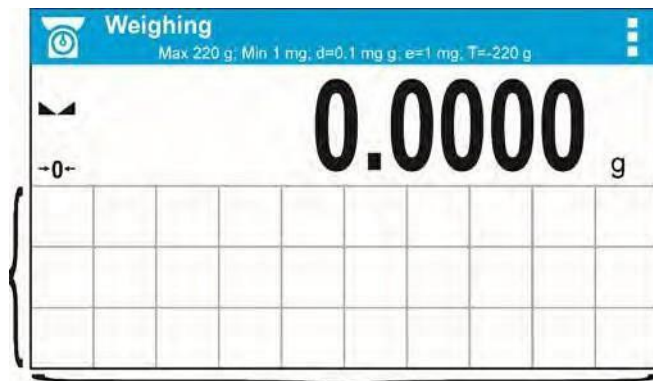
The division lines presented above are not visible on the balance screen, they serve only for informative purposes.

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:
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.
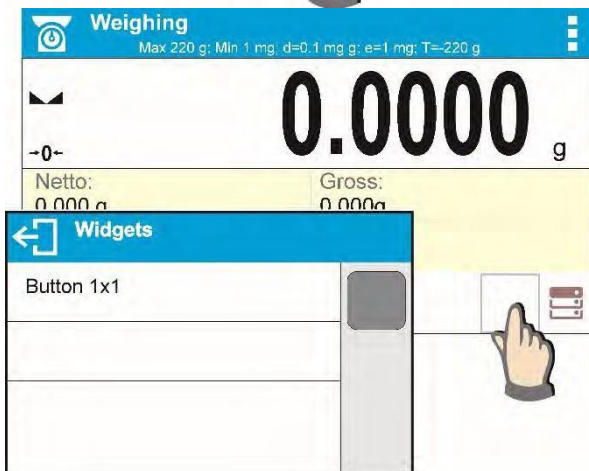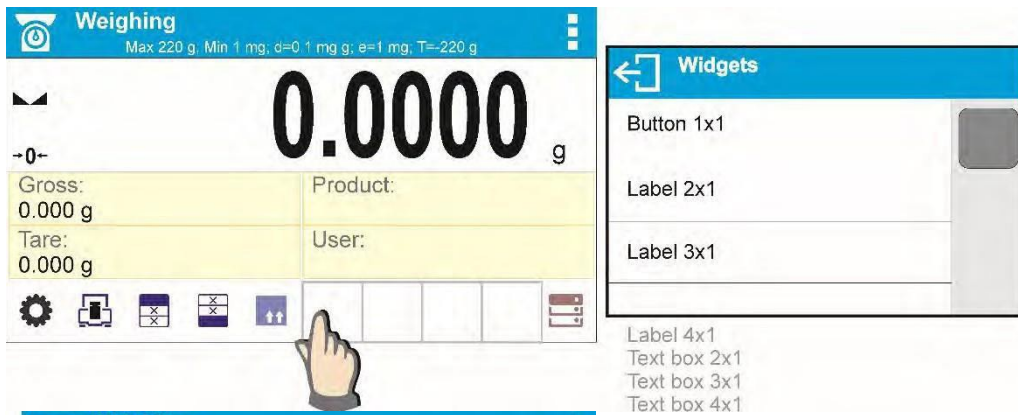
Example arrangement and dimensions of labels and text fields.

1. Always click the far left side of a field to hold a selected widget.
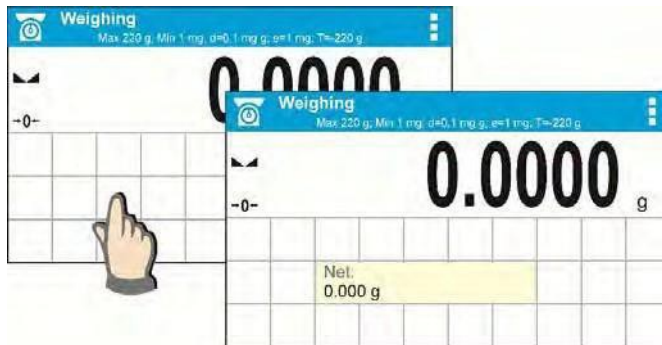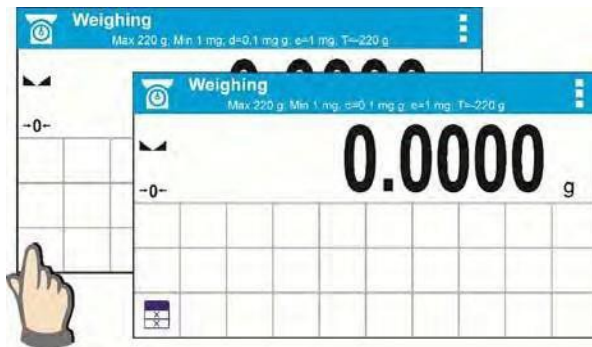
2. A new widget can only be applied to an area that holds no other widgets. The software automatically detects which widgets can be applied to an area, this is conditioned by the widget dimensions.

3. It is possible to change functions assigned to an already applied widget. The applied widget, if not needed, can be removed.


4. 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.

14.3 DRYING PROCESS PERFORMED USING THE DRYING MODES DATABASE

The moisture analyzer can record up to 200 drying modes that may be freely configured, recorded and used.

Procedure for selecting a mode:

1. Enter the mode into the moisture analyzer's memory (read section 14 Databases).
2. Select the new mode prior to the drying process. The drying parameters update to the parameters saved in the selected drying mode.
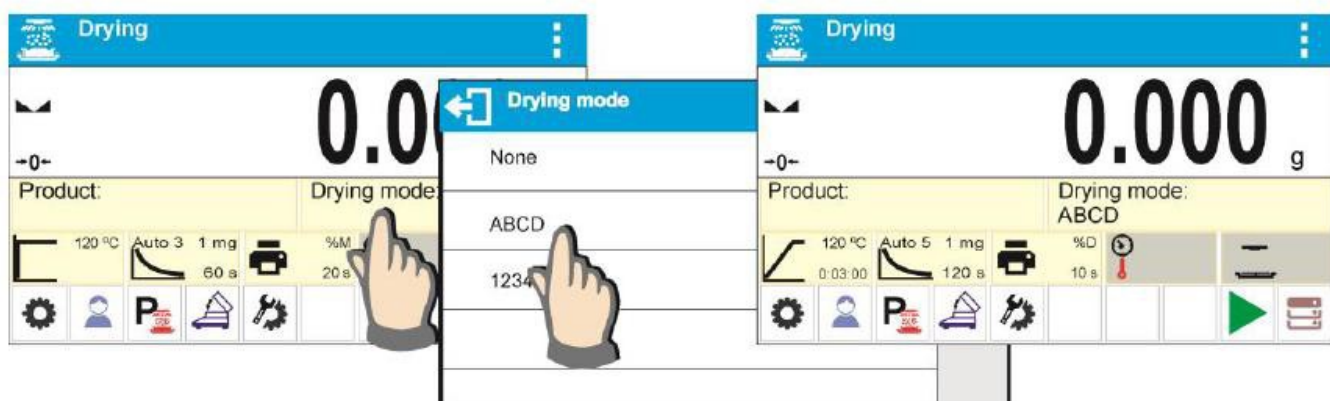
Or:

1. Enter the data related to the product/sample that is to be dried. Set the new mode as the drying mode (read section 14 Databases).
2. Select the new product as the current one prior to the drying process. Drying parameters update to parameters saved in the drying mode that is assigned to a selected product.
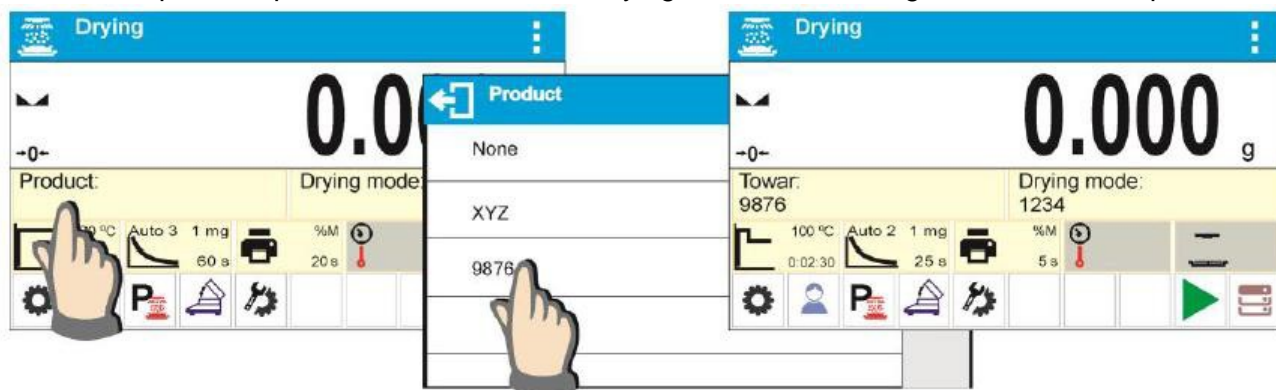
14.4 LABELS

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.
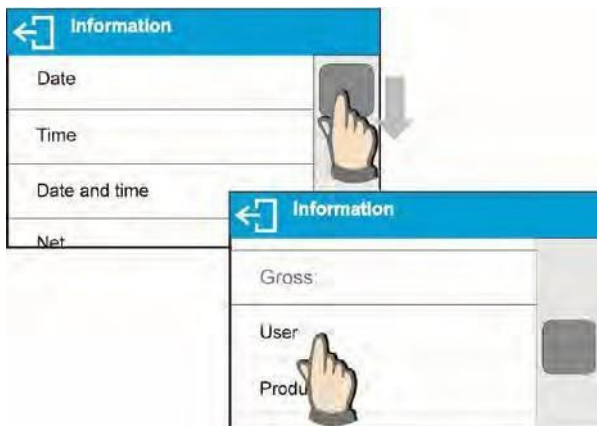
Procedure:

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 exclusively
MSW tare	Weighing mode exclusively
MSW status	Weighing mode exclusively
Drying mode	Drying mode exclusively
Drying profile	Drying mode exclusively
Finish mode	Drying mode exclusively
Printout interval	Drying mode exclusively
Temperature/drying time	Drying mode exclusively
Drying chamber status	Drying mode exclusively

14.5 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.
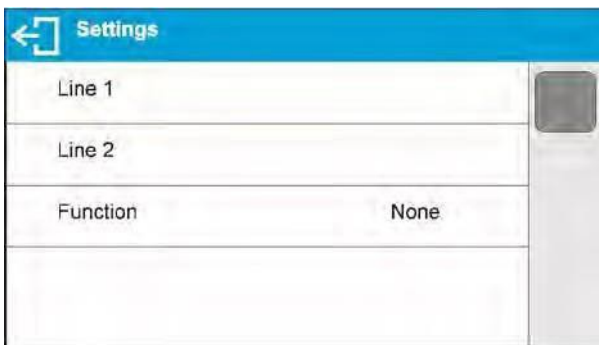
Procedure:

Press and hold the spot where the key is to be placed.
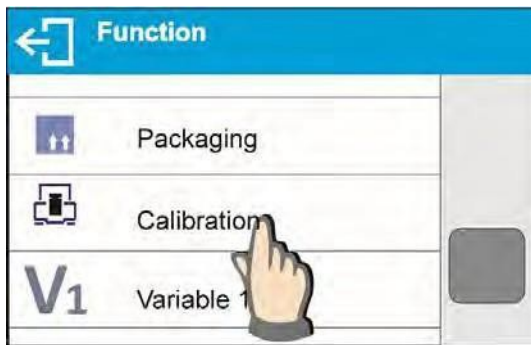
Select text field and its size.

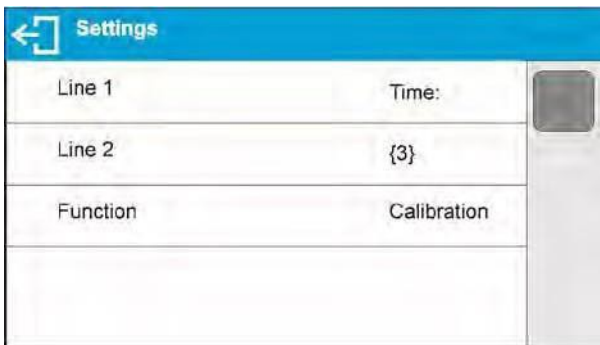Text field settings window opens. Define text field parameters:

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.

14.6 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.
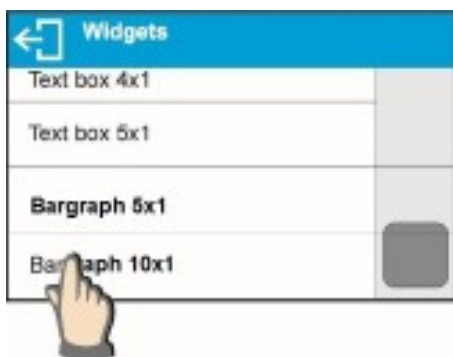
Select bar graph and its size.

Bar graph settings window opens.

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

14.7 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.
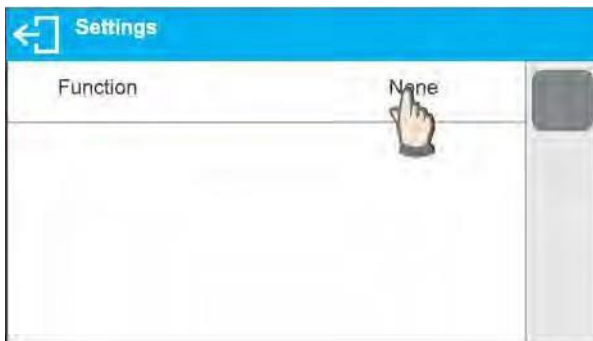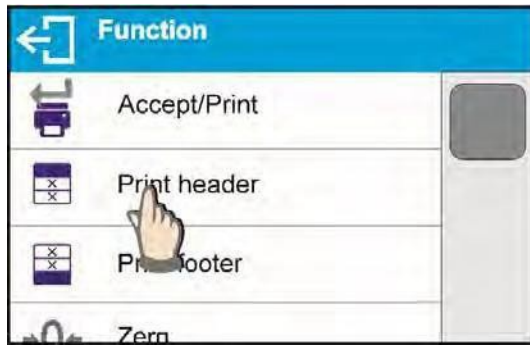
Procedure:

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.

14.8 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. |

14.9 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.
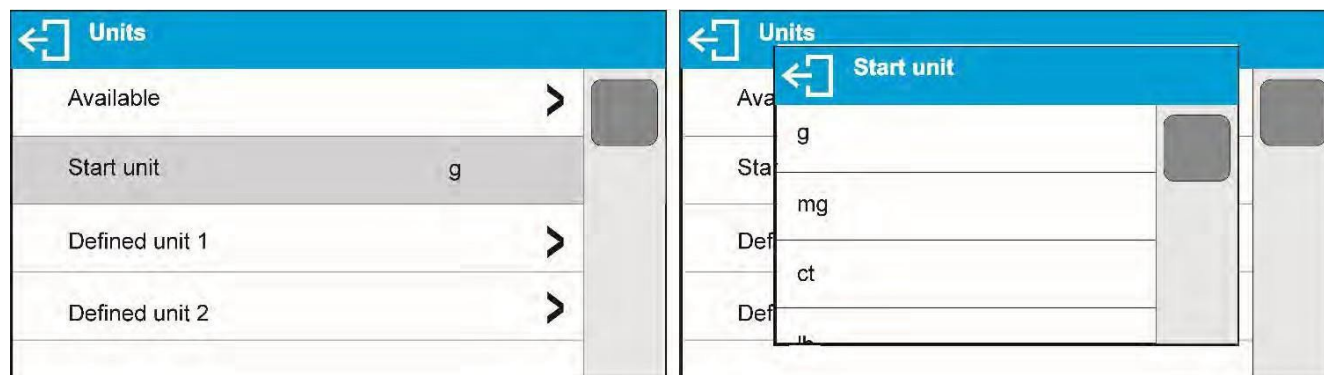
14.10 BALANCE SETTINGS

A user can set up parameters which influence balance operation. These parameters are to be found in parameters group **MISC**.

Menu language

The language parameter enables the user to select the language of the balance menu descriptions for a user not logged in. Available languages are Polish and English. To change the menu default language for a user not logged in, select the new language (Setup/Misc./Language) and restart the balance.

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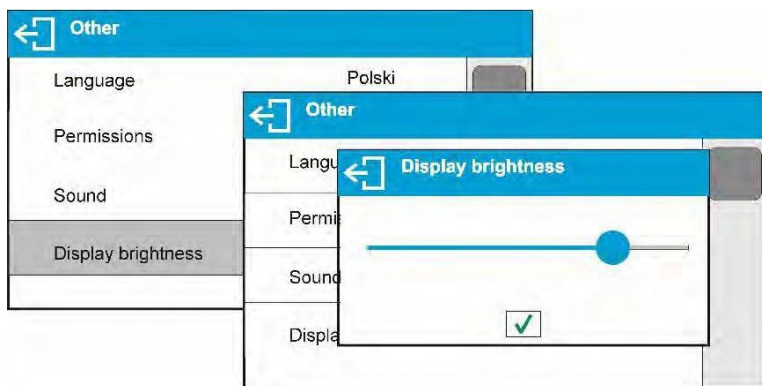
Proximity sensors sensitivity adjustment
Proximity sensors sensitivity parameter specifies distance within which the sensors can be operated, its scale is expressed in percent and it ranges from 0% to 100%. For lower percent value the proximity sensors operate at a shorter distance.

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

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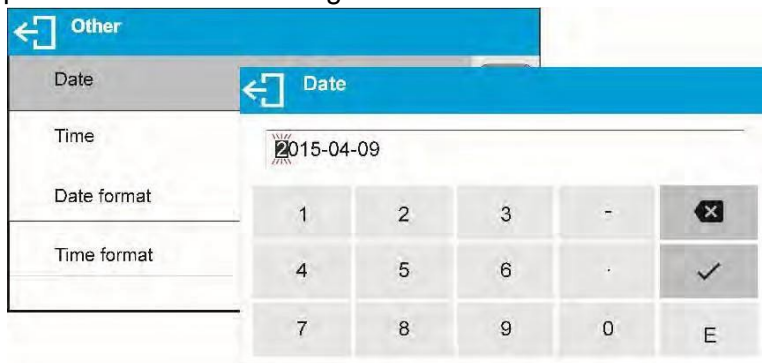
Time
Time parameter enables setting the current time. Procedures for change of time settings and date settings are likewise.

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 software 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 software 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.

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

By means of a simple, repeatable and fully documented way, the function enables optimizing balance's settings to maintain the best possible repeatability and weighing time at workstation. The main purpose of the function is the possibility of monitoring the above-mentioned parameters at optional moment and saving records from the carried-out tests in the form of printed reports of the tests that are automatically generated at the end of examination. Up to 50 reports can be recorded.

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

Testing procedure:
- deposit internal weight twice,
- deposit internal weight ten times, calculate the value of standard deviation,
- perform balance adjustment,
- print a report.

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

An example report:

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


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

Enter <OTHER> parameters' group, start <AUTOTEST GLP> parameter.

Press <Start> field. Autotest GLP procedure starts, it is carried out automatically. Autotest procedure progress bar is displayed.

Press ⬅ or ⌂ button to abort the procedure, you can do it at any time.

On completing procedure the parameter screen is displayed, value informing on recorded autotest number, to be found in <RESULT> field, is increased by <1>. To view results press <RESULTS> field and select the given autotest.

To print a report, go to <Details> window and press printer pictogram. The software can store up to 50 reports.

15. MAITENANCE

Disassemble the weighing pan and other detachable components (components differ depending on a balance type). Be careful while detaching the components so as not to cause any damage to the balance mechanism.

To ease cleaning of the glass anti-draft chamber panes, you may remove them following the below instructions.

CAUTION: Cleaning the anti-draft chamber while it is still installed may damage the measuring system.

Cleaning ABS components

To clean dry surfaces and avoid smudging, use a clean, colorfast cloth made of cellulose or cotton with a solution of water and detergent (soap, dishwashing detergent, glass cleaner). Gently rub the surface and let it dry. Repeat the cleaning process if needed.

If the 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 testing it first. Do not use products containing abrasive substances.

Cleaning anti-draft chamber panes

Select a solvent depending on the 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, followed by 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 protofilic solvent (sodium carbonate); to remove bases, use protogenic solvent (mineral acid of various concentration).

In cases of heavy contamination, use a brush or detergent, but avoid detergents containing large, hard molecules that could potentially scratch glass panes.

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

At the end of the cleaning process, rinse the pane using running water followed by distilled water.

Rinsing is a necessary cleaning process stage that removes any remaining soap, detergents, and other cleansers from the panes prior their reinstallation.

Avoid drying the panes with a paper towel or forced air circulation since some fibers, grains, or other types of contamination could permeate into the panes, resulting in weighing errors.

Do not use driers when drying measuring glass tools. Leave glass components on a rack to dry.

Cleaning stainless steel components

Avoid using cleansers containing any corrosive chemicals, e.g. bleach containing chlorine. Do not use abrasive substances. Always remove any dirt using a microfiber cloth to avoid damaging the protective coating.

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

Cleaning powder-coated components

For preliminary cleaning, you need running water or a wet sponge with large holes. This will help you to remove loose, heavy dirt.

Do not use cleansers containing abrasive substances.

Using the cloth and a solution of soap and dishwashing liquid, gently rub the surface.

Avoid using cleanser without water, which may result in damage to the cleaned surface. Use a large amount of water mixed with cleanser.
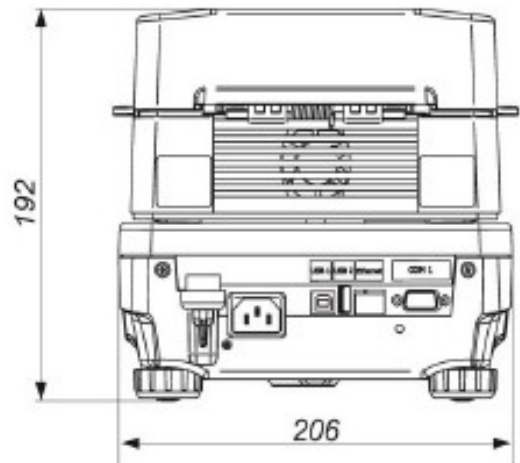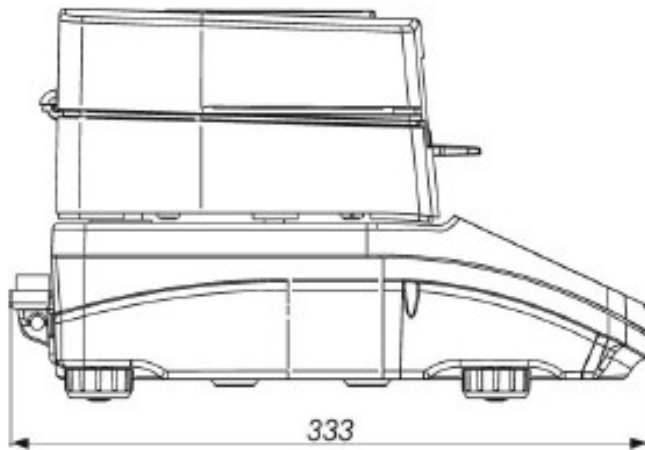
Cleaning aluminum components

While cleaning aluminum components, use acidic products such as spirit vinegar or lemon. Do not use abrasive substances. Avoid using a hard brush, which may cause scratches. Use instead a microfiber cloth.
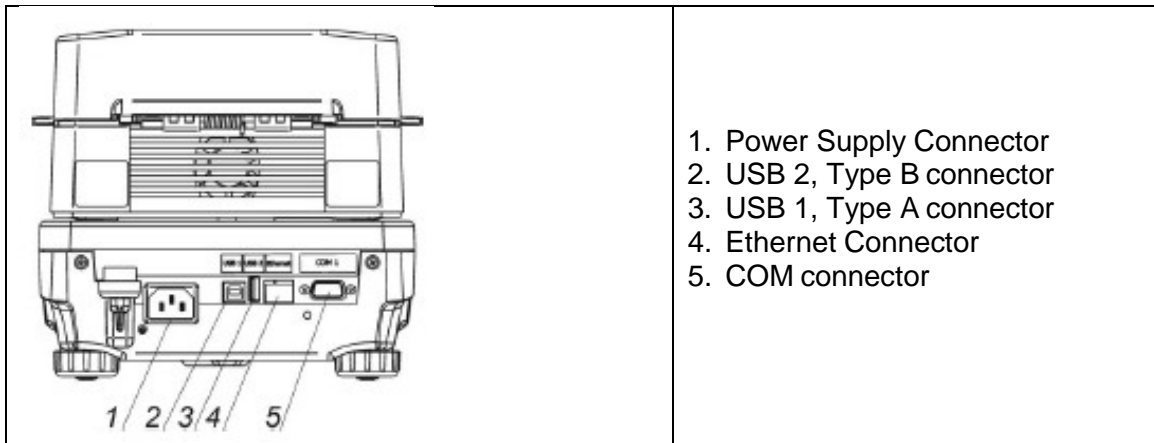
While polishing the surface, use circular movements with a clean, dry cloth.

16. APPENDIX

16.1 DIMENSIONS

16.2 CONNECTORS

	1. Power Supply Connector 2. USB 2, Type B connector 3. USB 1, Type A connector 4. Ethernet Connector 5. COM connector

16.3 ERROR MESSAGES

⚠️	Max weighing threshold exceeded Unload the weighing pan
⚠️	Min weighing threshold exceeded Install weighing pan
⚠️	Zeroing out of range Press tarring button or restart the balance
⚠️	Display capacity out of range Unload the weighing pan
⚠️	Tarring out of range Press zeroing button or restart the balance
⚠️	Start mass out of range Install weighing pan
⚠️	Zeroing/tarring time out of range Weighing indication unstable